STUDY OF WATER IMPAIRMENTS ATTRIBUTABLE TO ONSITE WASTEWATER TREATMENT SYSTEMS IN THE VENTURA RIVER WATERSHED

Funded by a California's Nonpoint Source Pollution
Control Program Federal Clean Water Act
Section 319(h) Grant

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- Grant Funds - $175,000.00
- Labor Match - $ 82,836.91
- State Contract Lab - $13,238.00

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EXECUTIVE SUMMARY

In 2012, the Los Angeles Regional Water Quality Control Board (Regional Board) released the Resolution No. R12-011, Algae, Eutrophic Conditions, and Nutrients Total Maximum Daily Loads for Ventura River and its Tributaries (Algae TMDL). This TMDL identified onsite wastewater treatment systems (OWTS) as a contributing source of nutrients to the Watershed.

The Ventura County Environmental Health Division (Division) entered into a grant agreement with the State Water Resources Control Board (State Board) for a Clean Water Act 319(h) Nonpoint Source Program Grant in the amount of $175,000. The purpose of this grant was to fund a special study to evaluate OWTS contribution to water quality impairments in the Ventura River Watershed (Algae TMDL Study).

A project management team comprised of Division staff was selected and Geosyntec Consultants was contracted to develop the Algae TMDL Study work plans and reports. Groundwater and surface water sampling locations were selected and sampled on three separate occasions.

Geosyntec staff evaluated the analytical data and presented the findings in a Technical Report and GIS map delineating areas of OWTS in the Ventura River Watershed designated at high and potential risk of contributing to nutrient loading. Using current OWTS permitting criteria, historical geologic and water quality data, and the technical report and GIS map developed during this study, the Division created a Prescriptive Plan aimed at reducing nutrient loading to the Ventura River Watershed attributable to OWTS.

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LIST OF ACRONYMS AND ABBREVIATIONS

Algae TMDL – Resolution No. R12-011, Algae, Eutrophic Conditions, and Nutrients Total Maximum Daily Loads for Ventura River and its Tributaries

Algae TMDL Study – Special Study funded by Clean Water Act 319(h) Nonpoint Source Program Grant to evaluate onsite wastewater treatment system contribution to water quality impairments in the Ventura River Watershed

ATU – Advanced Treatment Unit

BOS – Ventura County Board of Supervisors

CEDEN – California Environmental Data Exchange Network

CWA – Clean Water Act

Division – Ventura County Environmental Health Division

GIS Map - Map of Onsite Wastewater Treatment System Risk Areas in the Ventura River Watershed based on the Algae TMDL Study data

LA – Load Allocation

LAMP – Local Agency Management Program

OVSD – Ojai Valley Sanitary District

OWTS – Onsite Wastewater Treatment System

OWTS Policy – State OWTS Policy: Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems

PAEP – Project Assessment and Evaluation Plan

PPCP – Pharmaceuticals and Personal Care Products

Regional Board – Los Angeles Regional Water Quality Control Board

State Board – State Water Resources Control Board

TMDL – Total Maximum Daily Load

TN – Total Nitrogen

VCBC – Ventura County Building Code

VRW – Ventura River Watershed

WDR – Waste Discharge Requirements

1.0 Introduction and Background

1.1 About the Ventura River Watershed

The Ventura River Watershed (VRW) is primarily located in Ventura County, California, with a small portion of the watershed in Santa Barbara County. The main tributaries of the 226 square mile watershed are Matilija Creek, North Fork Matilija Creek, San Antonio Creek, Canada Larga Creek, and Coyote Creek, and the watershed discharges to the Pacific Ocean. Most of the watershed consists of mountains and foothills, with only 15 percent of the watershed considered flat (slope of 10% or less).

The portion of the watershed within Ventura County consists of the County of Ventura (49.1%), the United States Forest Service (47.7%), the City of Ojai (1.9%), and the City of Ventura (1.2%) (Walter, 2015). The majority of the watershed is undeveloped, with the northern half in the Los Padres National Forest while the southern half includes the cities of Ojai and Ventura and several unincorporated communities such as Oak View and Meiners Oaks. After open space, agriculture is the predominant land use in the watershed. The primary agricultural uses in the watershed consist of citrus and avocado irrigated crops and cattle grazing. A map of watershed may be seen in Appendix 1-1.

The four major groundwater basins in the watershed include the Ojai Valley basin (10.1 square miles), Upper Ojai basin (4.4 sq. mi.), Upper Ventura River basin (14.6 sq. mi.), and the Lower Ventura River basin (9.5 sq. mi). The Ojai Valley basin has the largest capacity of the four basins, and several municipal and agricultural water users rely heavily on this basin for supply. The Ojai Valley basin contributes regular annual flow to the San Antonio Creek. The basin has unconfined conditions in the northern and eastern portions and mostly confined to semi-confined in the central, southern, and western portions. Depth to groundwater is usually less than 50 feet in the southern and western portions, while the eastern and northern areas may have depths to groundwater up to 300 feet (Walter, 2015).

Although the Upper Ojai Valley basin has the smallest storage capacity of the four basins, it serves as an important source of water for residents in Upper Ojai and some agricultural users. The basin is a bowl-shaped, unconfined basin filled predominately with alluvial fan deposits from erosions of the surrounding mountains. Depth to groundwater in this basin typically ranges from 45 to 60 feet below ground surface. The Upper Ojai Valley basin is currently managed by the Ojai Basin Groundwater Management Agency, who have authority to manage the supply and demand of the groundwater resources (Walter, 2015).

The Upper Ventura River basin is located under and adjacent to the Ventura River and flows from the Matilija Creek and North Fork Matilija Creek junction downgradient toward Foster Park. Although this basin is not the largest of the four basins, it supplies the greatest volume of groundwater in the watershed. The Upper Ventura River basin is unconfined, shallower than the Ojai Valley basins, and has a direct relationship with surface water in the Ventura River. Much of the surface water in the river overlying this basin can become dry in low to moderate rainfall years. The subsurface diversion structure at Foster Park serves as the border between the Upper and Lower Ventura River basins (Walter, 2015).

The Lower Ventura River basin also lies under the Ventura River, starting from Foster Park and extending to the coast. This basin supplies the smallest water supply of the four basins and is used minimally for industrial and/or agricultural needs. The basin is unconfined and the depth to groundwater in the floodplain areas is typically between three and 13 feet, since depth to groundwater becomes deeper towards the edges of the basin (Walter, 2015).

1.2 Nutrient Loading in the Watershed

Water quality in the Ventura River Watershed is generally good. However, sections of the watershed are identified on the Federal Clean Water Act's (CWA) Section 303(d) list of impaired waterbodies for algae, low dissolved oxygen, high nitrogen, and eutrophic conditions. The most serious algae problems, in terms of the intensity of algae blooms, occur early in the dry season following a wet season with high rainfall and large storm events. Table 1 lists the 2016 Federal CWA 303(d) listed waterbodies within the Ventura River Watershed.

Table 1. 2016 CWA Section 303(d) Waterbodies in the Ventura River Watershed

Waterbody	Impairment
San Antonio Creek (Tributary to Ventura River Reach 4)	Nitrogen, nutrients
Canada Larga (Ventura River Watershed)	Dissolved oxygen, nutrients
Ventura River Estuary	Algae, eutrophic, nutrients
Ventura River Reach 1 and 2 (Estuary to Weldon Canyon)	Algae, nutrients

According to the *State OWTS Policy: Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS),* which became effective June 2012, if there is no TMDL or special provisions, all new or replacement OWTS within 600 feet of 303(d)-listed impaired water bodies are required to meet specific requirements, such as supplemental treatment for nitrogen and/or pathogen removal, and routine inspection and reporting (State Board, 2012).

In 2012, the Los Angeles Regional Water Quality Control Board (Regional Board) released the Resolution No. R12-011, Algae, Eutrophic Conditions, and Nutrients Total Maximum Daily Loads for Ventura River and its Tributaries (Algae TMDL). This technical document provided a review of the data cited as the basis for why certain reaches of the Ventura River were added to the CWA 303(d) list of impaired water bodies, including source assessment estimates for point and nonpoint sources. OWTS may be significant nonpoint sources of nutrient loading to subsurface and surface waters. The concern is that wastewater with high concentrations of nitrogen and phosphorus may seep into shallow groundwater and eventually enter surface waters.

The Algae TMDL became effective in June 2013, superseding the 600-foot setback requirements prescribed in the OWTS Policy. Nitrogen and phosphorus are the primary concern with excessive algae. Attachment A of the Algae TMDL identifies pollution source categories as point and nonpoint and differentiates between wet and dry weather estimated contributions (Regional Board, 2012). These values are summarized below:

- Point Sources
    - Storm water runoff discharged via municipal storm water system (MS4) – 21.3% in dry weather; 28.3% in wet weather.
    - Ojai Valley waste water treatment plant- 37.6% in dry weather; 1.7% in wet weather.

- Nonpoint Sources
    - Horses/livestock and agricultural land uses- 33.5% in dry weather; 36.1% in wet weather.
    - Open space loading- 7.6% in dry weather; 19.1% in wet weather.
    - **Septic Systems (OWTS) – 4.7% of annual nutrient load.**
    - Groundwater discharge – 1.3% of annual nutrient load.
    - Direct atmospheric deposition to the water surface – 0.2% of annual nutrient load.

While multiple sources are identified in the Algae TMDL and there is a high amount of uncertainty in the estimates of sources of nitrogen, the Algae TMDL estimated that 4.7 percent of the total nitrogen contribution was from OWTS (Regional Board, 2012). The Algae TMDL requires a 50 percent load reduction for total nitrogen from OWTS for both dry and wet weather. These load reductions apply to all existing OWTS within the VRW.

Most parcels in the watershed are connected to a sanitary sewer system operated by either the Ojai Valley Sanitary District (City of Ojai and some surrounding areas) or the Ventura Water Reclamation Facility (City of Ventura), which treat sewage at centralized wastewater treatment facilities. However, a portion of the watershed, primarily unincorporated areas, is not serviced by these sanitary sewer systems and thus utilize OWTS for treatment of domestic wastewater. An estimated 2,874 parcels utilize OWTS for domestic wastewater disposal. Appendix 1-2 depicts a map of estimated OWTS parcels in the VRW.

This estimate is based on a review of permit applications and GIS data, and does not include parcels with OWTS which were identified as being within the service area of a sanitary sewer utility. The Division does not have permitting records of OWTS on properties within the City of Ojai and the City of Ventura as these systems are permitted by their respective city building divisions and discharges are regulated by the Regional Board, Groundwater Permitting and Land Disposal Section. Similarly, the Division does not regulate mobile home parks. The California Department of Housing and Community Development is the building authority for mobile home parks. Although this information including a map was created very earlier on in the study and was presented to all TAC members for review as part of the Sampling Strategy in January 2017, the Division and Geosyntec were not aware of the OWTS information gaps until after all the sampling had occurred and the Technical Report was provided for TAC review in September 2018. Information on OWTS permitting for these parcels and how OWTS-related nutrient loading is going to be addressed, may be obtained by contacting the appropriate authority with jurisdiction.

1.3 Ventura River Watershed TMDL Special Study

The Algae TMDL recognizes that not all OWTS may be contributing to the impairment and allows for a special study to be conducted to further investigate the influence of OWTS on surface water quality. The overall goal of conducting a special study is to determine the geographic area(s) where OWTS are contributing to the algae impairment, allowing for total nitrogen load reductions to be targeted to OWTS that are impacting surface water quality. It is through a special study that the contributing area of OWTS may be modified.

On September 15, 2015 the Ventura County Board of Supervisors authorized the Director of the Ventura County Environmental Health Division (Division) to enter into a grant agreement with the State Water Resources Control Board (State Board) for a Clean Water Act 319(h) Nonpoint Source Program Grant in the amount of $175,000. The purpose of this grant is to fund a special study to evaluate OWTS contribution to water quality impairments in the VRW (Algae TMDL Study).

Geosyntec Consultants is a specialized consulting and engineering firm contracted by the Division to assist in developing and implementing the Algae TMDL Study model. The services Geosyntec was contracted to provide include data collection and evaluation, analysis of groundwater and surface water quality in the project area, GIS mapping, preparation of sampling and monitoring plans, and the development of a Technical Report evaluating project results.

A Technical Advisory Committee (TAC) was developed to assist in the design and implementation of the Algae TMDL Study. Table 2 is a list of the TAC members. The TAC members reviewed and provided comments on the Sampling Strategy and preliminary GIS map, Monitoring Plan, Technical Report, and GIS map of high-risk OWTS areas. The TAC members also met to hear presentations on the Algae TMDL Study and provide comments before field sampling was initiated.

Table 2. Technical Advisory Committee Members

TAC Member	Organization
Charles Genkel	Ventura County Environmental Health Division
Ewelina Mutkowska	Ventura County Public Works, Watershed Protection District, Stormwater Program Manager
Kim Loeb	Ventura County Public Works, Watershed Protection District, Groundwater Resources Program Manager
Steve Offerman	Office of Ventura County Supervisor Steve Bennett
Greg Grant	City of Ojai Public Works
Jennifer Tribo	City of Ventura
Jenny Newman	Los Angeles Regional Water Quality Control Board
Kevin DeLano	State Water Resources Control Board Department of Water Rights
Jeff Palmer	Ojai Valley Sanitation District
Zoe Carlson	Ventura River Watershed Council
Ben Pitterle	Santa Barbara ChannelKeeper
Lexi Everhart	Ventura County Resource Conservation District

2.0 Project Description

2.1 Project Type

The Algae TMDL Study is funded by a Federal Nonpoint Source Pollution Control Program CWA Section 319(h) Grant. This is a planning project which involved gathering and assessing water quality data to help determine the causes and sources of pollution. The data collected was analyzed to identify areas of OWTS that are contributing substantive nutrient loads to the Ventura River and its tributaries. These results were presented in a Technical Report and GIS map of high-risk OWTS areas (GIS Map). The Division utilized the results, Technical Report, and GIS Map to develop a Prescriptive Plan to identify potential strategies and implementation methods aimed at reducing nutrient pollution attributable to OWTS in targeted areas.

Activities supported by grant funds are defined as projects which must comply with the California Environmental Quality Act (CEQA). Activities for the Algae TMDL Study were limited to research, basic data evaluation, and water sampling from surface water locations and existing water wells. The Algae TMDL Study fits the criteria for a Class 6 Categorical Exemption as described in California Code of Regulations, Title 14, Section 15306 Information Collection. A Notice of Exemption (NOE) was submitted to the Ventura County Clerk and Recorder’s Office on September 29, 2016 and was publicly posted from September 29, 2016 to December 5, 2016. This NOE was also submitted to the Office of Planning and Research State Clearinghouse on October 4, 2018 (see Appendix 5).

2.2 Project Cost

The State Board awarded the Division a CWA 319(h) Nonpoint Source Program Grant in the amount of $175,000. The Division allocated the entire grant award to pay for services completed by Geosyntec Consultants. Most activities for the Algae TMDL Study, including development of the study design, field sampling, and development of the final Technical Report and GIS Map were made possible by the 319(h) Grant. The Division provided matching funds in the form of labor and some materials, such as ice. Laboratory analytical costs for nitrites, nitrates, ammonia and total nitrogen were covered by the Regional Board through the use of their contracted laboratory. The total cost of the Algae TMDL Study, including the State Board grant funds, Division labor matching costs, and Regional Board contract laboratory costs was $271,074.91. Table 3 includes all funding sources utilized in the study with corresponding dollar amounts.

Table 3. Funding for Algae TMDL Study

Funding Source	Amount
CWA 319(h) NPS Program Grant	$175,000.00
Labor Matching	$82,836.91
State Contract Lab Funds	$13,238.00

2.3 Project Goals and Schedule

The purpose of the Algae TMDL Study was to investigate the influence of OWTS on surface water quality and identify OWTS areas that are contributing to nutrient loading in the Ventura River and its tributaries. The goal of this project was to identify areas of OWTS and determine their relative degree of risk or likelihood of contributing to nutrient loading in the Ventura River and its tributaries, and to develop a plan to reduce nutrient loading attributable to OWTS. The general approach for accomplishing this can be described by study question. Sampling data collected during this study was evaluated and used to answer the following three study questions:

1. Are groundwater nitrogen levels elevated downgradient of OWTS areas (and if yes, which areas)?
2. Are these areas also impacted by sewage indicators that would further support OWTS as a source (if yes, which areas)?
3. Are these impacted groundwaters impacting surface water nitrogen levels at upwelling locations (if yes, downstream of which OWTS areas)?

A detailed timeline and list of deliverable items was part of the grant agreement. Table 4 is a list of the critical and estimated due dates for project milestones and deliverables as described in the Algae TMDL Study grant agreement.

Table 4. Project Milestones and Items for Review

ITEM	DESCRIPTION	CRITICAL DUE DATE	ESTIMATED DUE DATE
EXHIBIT A – SCOPE OF WORK – WORK TO BE PERFORMED BY THE GRANTEE			
A.	PLANS AND GENERAL COMPLIANCE REQUIREMENTS		
1.	All HUC-12s for Project Site	120 Days After Execution	
	Stream Reach for Project Site and Monitoring Locations	April 30, 2017	
2.	Project Assessment and Evaluation Plan (PAEP)	90 Days After Execution	
	Non Point Source Pollution Reduction Project Follow-up Survey Form	Annually by December 15th	
3.	Monitoring Plan (MP)	March 31, 2017	

	Monitoring Reports		Quarterly
4.	Quality Assurance Project Plan (QAPP)	May 31, 2017	
5.	Proof of Water Quality Data Submission to CEDEN	Before Final Invoice	
6.	Copy of Final CEQA/NEPA Documentation	September 30, 2016	
7.	Public Agency Approvals, Entitlements or Permits		As Needed
	Rights of Way Documentation		As Needed
B.	PROJECT-SPECIFIC REQUIREMENTS		
1.	Project Management		
1.2	Notification of Upcoming Meetings, Workshops, and Trainings		Ongoing
2.	Technical Advisory Committee (TAC)		
2.1	List of TAC Members with their Organizational Affiliation, and Roles and Responsibilities		August 2016
2.2	Agendas, Meeting Minutes, and Sign-In Sheets		Ongoing
3.	Preliminary Data Evaluation		
3.3	Preliminary GIS Map and Sampling Strategy	January 30, 2017	
5.	Identify High Risk Areas		
5.3	Technical Report		October 2018
EXHIBIT B – INVOICING, BUDGET DETAIL, AND REPORTING PROVISIONS			
A.	INVOICING		Quarterly
F.	REPORTS		
1.	Progress Reports by the Twentieth (20th) of the Month Following the End of the Calendar Quarter (March, June, September, and December)		Quarterly
ITEM	DESCRIPTION	CRITICAL DUE DATE	ESTIMATED DUE DATE
EXHIBIT B – INVOICING, BUDGET DETAIL, AND REPORTING PROVISIONS			
2.	Annual Progress Summaries		Annually by 9/30
3.	Natural Resource Project Inventory (NRPI) Project Survey (If applicable)	Before Final Invoice	
4.	Draft Project Report	October 31, 2018	
5.	Final Project Report	December 31, 2018	

6.	Final Project Summary	Before Final Invoice	
7.	Final Project Inspection and Certification	N/A	
EXHIBIT D –SPECIAL CONDITIONS			
1.	Lobbying Certification		With Final Report
2.	MBE/WBE Documentation (http://www.epa.gov/osbp/pdfs/5700_52a.pdf)		Quarterly

2.4 Methodology of Special Study

The Algae TMDL Study utilized a combination of historical data from OWTS records, surface and ground water quality analytics, and hydrogeology for the Ventura River, as well as field sampling activities, to identify and prioritize geographic areas within the VRW. The Algae TMDL Study used existing information of the area to identify data gaps in order to create a Sampling Strategy and preliminary GIS map of OWTS areas. A Monitoring Plan was developed which outlined the monitoring being conducted for this study. The Monitoring Plan included monitoring objectives, constituents to be monitored, and field sampling activities such as locations and frequencies. The final version of the MP was approved by the State Board and uploaded to the State Board's Financial Assistance Application Submittal Tool (FAAST) on October 9, 2017. A Quality Assurance Project Plan (QAPP) was also developed in accordance with the State Board's Surface Water Ambient Monitoring Program's QAPP guidelines. The QAPP was approved by the State Board in October 10, 2017. The historic information and the field sampling results from this study helped to identify areas most at risk of excessive nutrient loading.

2.4.1 Selection of Field Sampling Locations

A review of OWTS permitting records, surface and ground water quality analytics, and hydrogeology for the Ventura River area was done to identify areas of high OWTS use. Geosyntec identified over sixty groundwater wells located in these areas as potential groundwater sampling sites. Eight surface water sampling locations were selected in these areas as well, five along the Ventura River and three along the San Antonio Creek.

Since almost all of the groundwater wells are located on private property, requests for permission to sample these wells were sent to all the identified groundwater well property owners. Twenty-three property owners responded to the request to allow Division staff to enter their property to collect a water sample. All surface water locations were located on either publicly accessible land or on County-owned property. Appendix

1-3 shows the ground water wells and surface water locations sampled for the Algae TMDL Study.

Three sampling events, plus one location scouting event, were planned for the Algae TMDL Study. Four sampling events occurred according to the following time schedule: August 23-25, 2017; September 18-21, 2017; April 2-6, 2018; and May 14-17, 2018. More details on the field sampling are provided in Section 3.2 of this report.

2.4.2 Analytical Data

Water samples collected were analyzed for numerous contaminants to measure potential OWTS contribution to nutrient loading in the VRW. Multiple laboratories were contracted to analyze the water samples. Table 5 shows the contaminants analyzed, the laboratory analytical methods used, and the laboratories which performed the analysis.

Table 5. List of Analytes

Analyte	Method	Laboratory
Ammonia	EPA 350.1	Institute for Integrated Research in Materials, Environments & Society (IIRMES) / Physis Environmental Laboratories, Inc.; Enthalpy Analytical, LLC; Weck Laboratories, Inc.
Total Nitrogen	Direct Method (Physis) ALCH 4025 (IIRMES)	Institute for Integrated Research in Materials, Environments & Society (IIRMES) / Physis Environmental Laboratories, Inc.; Enthalpy Analytical, LLC
Total Nitrogen	EPA 351.2	Weck Laboratories, Inc. (for samples taken on April 6, 2018 only)
Nitrate + Nitrite	EPA 300.0	Institute for Integrated Research in Materials, Environments & Society (IIRMES) / Physis Environmental Laboratories, Inc.; Enthalpy Analytical, LLC; Weck Laboratories, Inc.
Nitrate Isotope^{18} [O-NO_3]	Adapted from USGS method 2900	Source Molecular
Nitrate Isotope^{15} [N-NO_3]	Adapted from USGS method 2900	Source Molecular
Pharmaceuticals and Personal Care Products (PPCPs)	EPA 1694M-ESI+	Weck Laboratories, Inc.

Once all the laboratory analytical results were received, Geosyntec staff evaluated the data and generated a GIS map of high-risk OWTS areas and a Technical Report interpreting the results (see Appendix 1-4 and Appendix 3).

3.0 Project Evaluation and Effectiveness

3.1 Project Objectives

The purpose of the Algae TMDL Study was to investigate the influence OWTS on surface water quality in the VRW. The goal of this project was to identify areas of OWTS and determine their relative degree of risk or likelihood of contributing to nutrient loading in the Ventura River and its tributaries.

The Algae TMDL Study utilized existing information of the area to develop a Sampling Strategy and preliminary GIS map. The historic information and the sampling results helped identify areas most at risk of significant and potential nutrient loading by OWTS. The desired outcome of this project was the preparation of a Technical Report and final GIS Map for the VRW that identifies areas of nutrient loading attributable to OWTS. This GIS Map and Technical Report helped Division staff create a Prescriptive Plan to identify options to address the OWTS areas identified as contributing to nutrient loading.

A Project Assessment and Evaluation Plan (PAEP) was developed to identify the tasks and objectives of the Algae TMDL Study. The PAEP included three project task categories which described the development and progression of the Algae TMDL Study. The three tasks, and how they were addressed during the study, are listed below:

- <u>Task 1: Project Development and Administration</u>
  “A project management team will be established. A consultant will be selected to conduct research and help develop a work plan. The appropriate CEQA documentation will be prepared and recorded at the Ventura County Clerk’s office. Available data will be compiled from existing sources and studies, such as watershed plans and water quality sampling plans. Areas where more data or study is needed will be identified by reviewing the existing data. A preliminary GIS map displaying results of the historical data research will be prepared.”

  A team comprised of Division staff was selected and Geosyntec Consulting was contracted to develop the Algae TMDL Study work plans and reports. To comply with CEQA, a NOE was submitted to the Ventura County Clerk and Recorder’s Office on September 29, 2016, and was publicly posted from September 29, 2016, to December 5, 2016. The NOE was also submitted to the Office of Planning and Research State Clearinghouse on October 4, 2018 and is included in this report as Appendix 5. Geosyntec reviewed available OWTS data for the watershed and developed a preliminary GIS map, a Sampling Strategy and a Monitoring Plan to address data gaps.

- Task 2: Data Collection and Analysis
  "Field data will be collected and evaluated as needed to fill in the data gaps which were revealed during Task 1. Data results collected from the field will be evaluated to determine if the remaining areas (data gaps) are potential sources of contamination in the watershed. The existing nitrogen loading from OWTS will be identified. All project analytical and sampling data will be submitted following Surface Water Ambient Monitoring Program (SWAMP) and State Board's required formats including upload to the California Environmental Data Exchange Network (CEDEN) database if needed. Historical data and data acquired from field sampling will be used to create a GIS map of OWTS areas in the Ventura River Watershed. The map will show OWTS areas at high risk of contributing to nutrient loading in the watershed."

  Groundwater and surface water sampling locations were selected and sampled on multiple occasions. An account specific to the Algae TMDL Study was created in CEDEN and all laboratory analytical data was uploaded. Geosyntec evaluated the analytical data and presented the findings in a Technical Report and GIS map delineating areas of OWTS in the Ventura River Watershed designated at high risk of contributing to nutrient loading.

- Task 3: Project Administration
  "Data will be analyzed to identify and prioritize geographic areas within the watershed wherein management measures/practices will be necessary to reduce OWTS pollution. A Prescriptive Plan, including management measures for nutrient reduction from OWTS, will be developed. An advanced protection management plan is intended to prohibit or reduce nitrogen impacts from OWTS on the watershed. Draft and final reports will be prepared with project outcomes. The Algae TMDL Special Study project management team will coordinate and consult with the Regional Board to achieve the targets of the Algae TMDL and goals of the statewide OWTS Policy."

  The Division developed a Prescriptive Plan (see Appendix 2) to identify options and strategies aimed at reducing nutrient loading to the VRW which are attributable to OWTS. The Prescriptive Plan is described briefly in Section 4.0 of this report.

Performance measures were also developed and described in the PAEP. These performance measures identify output indicators and outcomes to track activities and deliverables, measurement tools and methods which describe how the project performance will be documented, and measurable targets to be met during the project period.

Table 6 describes the project performance measures from the PAEP and includes the project goal, desired outcome, output and outcome indicators, measurement tools and methods, targets, and results of the Algae TMDL Study.

Table 6. Ventura River OWTS Special Study Project Performance Measures

Project Goal	Identify areas of OWTS and determine their relative degree of risk or likelihood of contributing to nutrient loading in the Ventura River and its tributaries. Develop a plan to reduce nutrient loading from OWTS.
Desired Outcome	Documentation of the OWTS areas mostly likely to contribute significantly to excessive nutrient loading and a plan to reduce nutrient loading from OWTS in the Ventura River Watershed.
Output Indicators	• Preliminary GIS map of OWTS and relevant watershed features • Sampling strategy, monitoring plan, and quality assurance project plan for field sampling events.
Outcome Indicators	• Final GIS map delineating areas of OWTS in the Ventura River Watershed designated at high risk of contributing to nutrient loading • Technical Report to accompany final GIS Map
Measurement Tools and Methods	• Historical data from OWTS records, surface and ground water quality, and hydrogeology for the Ventura River. • Field sampling and monitoring plan results
Targets	Broad acceptance of Prescriptive Plan and supporting basis in technical report and GIS map.

The Algae TMDL Study was successful at meeting the stated project goals and desired outcomes. The Technical Report (Appendix 3) and GIS Map of high-risk OWTS areas (Appendix 1-4) were developed by Geosyntec Consultants. A Prescriptive Plan (Appendix 2) was prepared by Division staff based on the study results.

3.2 Project Challenges

The Algae TMDL Study project team encountered a variety of challenges, including access and availability of water sources to sample, delays in receiving laboratory analytical results, the 2017 Thomas Fire, unidentified data gaps, and time and budget constraints.

3.2.1 Dry Surface Water

Three sampling events, plus one location scouting event, were planned for the Algae TMDL Study. Initially, the events were planned for August and September, October, and November 2017. During the August and September 2017 field sampling events, it was noted that most surface water sites were dry and were not able to be sampled (see Appendix 4, photographs 6 and 7 for an example). Surface water sampling is an important component of this study to investigate the impact of OWTS on surface water quality, so a request to extend the grant deadline was approved by the State Board. This time extension allowed the remaining two water sampling events to be conducted sometime between November 2017 and March 2018, after winter rainfall had recharged groundwater to the point where more surface water locations were flowing. The December 2017 Thomas Fire made it necessary to delay the remaining sampling events further, as described in Section 3.2.3 of this report. The remaining two week-long sampling events were completed in April 2018 and May 2018.

3.2.2 Access to Groundwater Wells

Since almost all of the groundwater wells are located on private property, requests for permission to sample these wells were sent out to over sixty groundwater well property owners. Twenty-three property owners responded to the request allowing Division staff to enter their property to obtain a water sample. It was discovered during the first sampling event that three of the wells were not sampleable due to the following reasons:

- One well (GW-B-01) did not have a pump or sample port and was filled with rocks.
- Another well (GW-C-01) pumped into a large reservoir. Water from sample port is obtained from this reservoir and not from the ground. It was determined this would not be representative of groundwater in the area.
- The third well (GW-B-05) was open and not protected from surface contamination. Staff observed trash inside the well, so it was determined that water from this well would also not be representative of the groundwater in the area.

Field sampling staff identified a previously unidentified groundwater well in sample area D to include as part of the study (GW-D-07).

3.2.3 Thomas Fire

The Thomas Fire started in Ventura County on December 4, 2017. It spread very quickly through northern Ventura County, including around the VRW. The sample locations were not directly affected by the Thomas Fire in terms of fire damage, however, the area was inaccessible while the fire remained active and for several weeks afterwards. Division staff and resources were redirected to address fire recovery and debris removal needs. Once the debris removal activities were mostly completed Division staff scheduled and conducted the remaining two sampling events in April 2018 and May 2018.

The fires may have affected the April and May 2018 field sampling due to ash and fire retardants used during firefighting activities, as well as runoff issues from post-Thomas Fire rainfall events. For example, sediment from the January 2018 rainfall may have prevented the usual amount of groundwater recharge in certain areas. Instead of infiltrating, runoff entered the Ventura River creating an unusual amount of surface water for the season.

3.2.4 Laboratory Delays

Laboratory reports for the water analytical results from Weck Laboratories and IIRMES were generated and received by Geosyntec within six weeks of the final field sample date. Laboratory results from Source Molecular were delayed and were received sixty days after the samples were sent as opposed to ten days. This delay in receipt of the laboratory reports meant that the Draft Project Report, Technical Report, and GIS Map deliverables were not completed by the critical due dates. Another request to extend the grant deadline was submitted and approved by the State Board to allow for sufficient time to generate the reports and map, as well as ensure the TAC group was provided with sufficient time to review and provide comments for the Technical Report.

3.2.5 Data Gaps

Geosyntec conducted an extensive review of historical information from Ventura County Environmental Health and Ventura County Watershed Protection District related to hydrology, surface water quality conditions, and OWTS permits. All this information was utilized when developing the study design, Sampling Strategy, Monitoring Plan, GIS Map, and Technical Report. TAC members were allowed to comment on these plans/reports. Deficiencies in the project design resulting from unidentified or underutilized data were not identified or commented on by TAC members until after the sampling portion of study was completed and the draft Technical Report was provided for review. As a result, it was not possible to fully address some concerns raised by TAC members (see Appendices 3-2 and 3-3).

OWTS areas were identified by Geosyntec staff based on the permitting information and GIS mapping. A map of OWTS areas was created based on this information (Appendix 1-2). However, all OWTS areas in the City of Ojai and the area of Ojai known as the

Arbolata, as well as mobile homes parks, were not all included in this map. Although this map was created very earlier on in the study and was presented to all TAC members for review as part of the Sampling Strategy in January 2017, this oversight was not identified until after all the sampling has occurred and the Technical Report was provided for TAC review in September 2018.

On their own the final analytical results of the Algae TMDL Study do not provide sufficient evidence to exclude any potentially contributing OWTS areas. However, the data gaps identified in the study design do not negate the usefulness and meaningfulness of the results. Data collected and analyzed in this study will be incorporated into other studies and will be used to create meaningful and appropriate policies and management strategies for nutrient reduction in the VRW. Further investigation and discussions with stakeholders and the Regional Board will be required to further define OWTS contributing areas.

3.2.6 Time and Budget Limitations

State Board, Regional Board, Geosyntec and Division staff carefully developed a schedule and budget for the Algae TMDL Study. However, a variety of factors resulted in the need for time extensions and budget overages. The Monitoring Plan, QAPP, and Technical Report and GIS Map are deliverables which required TAC review as well as acceptance from the State and Regional Boards. Numerous revisions of these plans resulted in more time and grant funds being spent than previously budgeted. Geosyntec’s fees exceeded the grant amount by $7,271.40.

3.3 Discussion of Study Results

Geosyntec evaluated the analytical data and presented the findings in a Technical Report and GIS Map delineating areas of OWTS in the VRW designated at high risk of contributing to nutrient loading. The Algae TMDL Study segregated groundwater and surface water sampling locations in to groups identified by the letters A-G. Sampling data collected during this study were evaluated and used to answer the three study questions described in Section 2.3 of this report. Appendix 1-3 shows the ground water wells and surface water locations sampled for the Algae TMDL Study.

3.3.1 Groundwater

Sampling results from group A revealed nutrient, PPCP, and nitrate isotope results which suggest groundwater in group A is likely influenced by upgradient OWTS, and that surface water was likely impacted by the groundwater analyzed in group A (Geosyntec, 2018).

Group B results showed nutrient, PPCP, and nitrate isotope results which suggest that groundwater in group B is likely influenced by upgradient OWTS, although to a lesser extent compared to group A based a lower density of upgradient OWTS and lower average nitrate concentrations in groundwater (Geosyntec, 2018).

Group C consists of three groundwater wells that are located in an area classified as bedrock, but where shallow alluvium is most likely present. Nutrient, PPCP, and nitrate isotope results all suggest that groundwater in group C is likely influenced by upgradient OWTS at a similar level to group B (Geosyntec, 2018).

Group D wells were located along the San Antonio Creek and were not in close proximity to one another. Group D results indicated that groundwater may be influenced by upgradient OWTS, although not to the same extent as other groups (Geosyntec, 2018).

Group E is located in an area east of the City of Ojai and included two groundwater wells along San Antonio Creek that were considered to have medium density upgradient OWTS. Analytical results suggest it is likely that groundwater in this area is influenced by nearby OWTS (Geosyntec, 2018).

Group F consisted of one groundwater well with medium density upgradient OWTS located near Coyote Creek below Casitas Dam in an area with bedrock geology. Group F results suggest it is highly likely that groundwater in these bedrock areas is influenced by OWTS (Geosyntec, 2018).

Wells in group G consisted of two groundwater wells, both considered to have medium upgradient OWTS density. Group G results suggest it is highly likely that groundwater in these bedrock areas is influenced by OWTS (Geosyntec, 2018).

3.3.2 Surface Water

The group A surface water sampling location on the Ventura River, just downstream of the groundwater wells, had the highest average nitrate concentration of all surface water locations, yet no PPCPs were detected in surface water and the nitrate isotope ratios were lower than that of the nearby groundwater wells. The high nitrate levels suggest that surface water at this location was likely impacted by the groundwater analyzed in group A, but other sources of nitrate could also be potentially impacting surface waters in this stream reach such as land application of animal manure on upgradient croplands and orchards (Geosyntec, 2018).

Both the upstream and downstream surface water locations in group B had average concentrations of nitrate less than 1.15 mg/L, no detected PPCPs, and nitrate isotope ratios lower than that of the nearby groundwater wells. These results were unable to verify that surface water in Group B is impacted by the nearby groundwater analyzed in Group B. Although OWTS contribution cannot be completely ruled out, other sources of nitrate contribution may be impacting surface waters in this stream reach (Geosyntec, 2018).

Group C consisted of two surface water sampling locations (one upstream and one downstream of the group C wells), and is a reach identified as consistently upwelling. No PPCPs were detected in group C surface water locations and had nitrate concentration between 1.0 – 1.4 mg/L. All locations in group C had sources identified as animal waste and/or sewage based on the analysis of nitrate isotopes. Although OWTS contribution cannot be completely ruled out, other sources of nitrate contribution may be impacting surface waters in this stream reach (Geosyntec, 2018).

There were two group D surface water sampling locations along the San Antonio Creek. The upstream location was high in nitrates (2.7 mg/L average) and the downstream location was low in nitrates (0.75 mg/L average). Group D was considered to have animal waste and/or sewage sources based on the nitrate isotope analysis. Although OWTS contribution cannot be completely ruled out, other sources of nitrate contribution may be impacting surface waters in this stream reach. Upstream nitrogen loading may be from OWTS and/or animal manure sources from cropland/irrigated pastureland. The City of Ojai could also be contributing urban runoff and runoff from residential fertilizer use and golf courses (Geosyntec, 2018).

Group E consisted of one surface sampling location in Soule Park Golf Course, downstream from the two groundwater wells. The group E surface water location had an average nitrate concentration of 1.4 mg/L, no detected PPCPs, and nitrate isotope results suggesting nitrate sources from animal waste and/or sewage. Large portions of the surrounding area are utilized for orchards and vineyards, so land application of manure may also be a contributing source of nitrate. Based on these results, it is likely that groundwater and surface waters in this area are influenced by nearby OWTS (Geosyntec, 2018).

The surface water sampling location for group F was located in Foster Park, downstream from the group F well. OWTS density was characterized as low. Although OWTS contribution cannot be completely ruled out, other sources of nitrate contribution may be impacting surface waters in this stream reach (Geosyntec, 2018).

Group G groundwater wells are located in far proximity to surface water locations. No OWTS influence vs distance relationships could be established. Therefore, it is unknown whether surface waters would be impacted by nearby OWTS areas in group G. OWTS contribution cannot be completely ruled out (Geosyntec, 2018).

3.3.3 Areas of OWTS Influence

A relationship between the nitrate concentration in groundwater and the density of upgradient OWTS was found, and this relationship was extrapolated to unsampled areas of the VRW by first defining the density of OWTS throughout the watershed. The strongest relationship between nitrate in surface water and upgradient OWTS for sampled wells was found for an upgradient area of influence within 2,000 feet (Geosyntec, 2018).

Surface water sample results (both from this study and historically) in close proximity and downgradient of OWTS were examined to determine if average surface water nitrate levels were generally high compared to the allowable in-stream concentration of 1.15 mg/L for total nitrogen (TN). If groundwater was identified as being likely influenced by OWTS (based on medium or high density OWTS) but available surface water data just downstream did not suggest surface water impacts (i.e., low nitrate levels), the area was identified as “potential” risk for surface water impairment. However, if an area was identified as likely having influence from OWTS in groundwater (i.e., medium or high density OWTS), and surface water sampling results show elevated levels of nitrate, the area was identified as having “high” risk of surface water contamination due to OWTS (Geosyntec, 2018).

It is important to note that the study used average nitrate concentrations across events. The use of average nitrate concentrations is a less protective basis for evaluating water quality than was utilized in the development of the Algae TMDL and may have resulted in fewer OWTS areas being identified as contributing to surface water impairments.

As previously mentioned, the general approach for accomplishing this can be described by answering three study questions, and the sampling data collected was used to answer these questions (Geosyntec, 2018):

Question 1: Are groundwater nitrogen levels elevated downgradient of OWTS areas (and if yes, which areas)?

Areas with OWTS throughout the VRW were previously identified, and groundwater wells located downgradient of these areas with OWTS were sampled and analyzed for nutrient levels. Areas with high observed nitrate levels were noted. It should be noted that the average nitrate concentration in the background wells was 0.77 mg/L. Therefore, background nitrate levels in groundwater were also considered when evaluating whether nitrate levels were elevated.

Nitrate in groundwater was elevated downgradient of areas with OWTS throughout the VRW. The average nitrate concentrations for all groups, except group D (low density OWTS) and the background wells, were above the TMDL allowable in-stream concentration. Group D had one of three wells above the target. The number of OWTS within a certain distance upgradient of each well was found to be significantly correlated with groundwater nitrate concentrations in alluvial areas. Nitrate was also found to be elevated where OWTS were in areas identified as bedrock geology.

Question 2: Are these areas also impacted by sewage indicators that would further support OWTS as a source (if yes, which areas)?

Within the areas that were identified with high nitrate levels in groundwater, it was then determined if these high nutrient levels were potentially caused by OWTS. Analysis of PPCPs (as chemical sewage indicators) and stable nitrate isotopes were conducted. Detections of PPCPs and nitrate isotope ratios matching sewage sources would suggest the presence of sewage (i.e., influence from OWTS) in groundwater.

At least one PPCP was detected in groundwater downgradient of OTWS in each groundwater sampling group, with multiple PPCPs detected in some wells. Nitrate isotope ratios also suggested that groundwater was impacted by animal waste and/or human sewage throughout the VRW. Therefore, both chemical (PPCP) and isotope data supports OWTS effluent as a source of nitrate to groundwater in the VRW.

Question 3: Are these impacted groundwaters impacting surface water nitrogen levels at upwelling locations (if yes, downstream of which OWTS areas)?

Finally, surface water data was also examined to determine if high nitrogen concentrations, in addition to the presence of PPCPs and/or nitrate isotopes matching sewage sources, were present in the areas where influence to groundwater from OWTS was determined to be likely (based on the analyses described above). This was examined in upwelling areas, where groundwater and surface water interactions are likely.

While OWTS influence to groundwater were evident throughout the watershed, the impacts to surface waters during dry weather were not as ubiquitous. At many locations on the impaired streams, average nitrate, both historically and in this study, were below the TMDL allowable in-stream concentration for TN.

4.0 Study Conclusions and Next Steps

4.1 Analysis of Results

Attachment A of the Algae TMDL estimated nutrient contributions to the watershed from point and nonpoint sources, including OWTS. Each source was assigned load allocations (LA) aimed at reducing nutrient loading to meet water quality objectives and/or maintain existing discharge quality. The LAs for OWTS are equal to 7,478 pounds TN per year based on a required 50 percent reduction in loading. They are to be implemented through discharge prohibitions, waste discharge requirements (WDR) and WDR waivers. According to the Regulatory Provisions in Attachment A of the Algae TMDL, existing OWTS are required to be upgraded or modified to enhance their nitrogen removal or meet other requirements if it is determined they are contributing to the impairment. These systems are either covered by approved special provisions of a LAMP, or if the Regional Board issues subsequent orders requiring upgrades or modifications (Regional Board, 2012).

The purpose of the Algae TMDL Study was to investigate the influence of OWTS on surface water quality and determine relative risks or likelihood of OWTS areas which may be contributing to nutrient loading in the Ventura River and its tributaries. The highest risk of contribution to surface waters was found to be where OWTS are in close proximity to these surface water reaches. Because the correlation between nitrate and OWTS density was found to be the strongest using an upgradient area of influence for the sampled wells within 2,000 feet, an area of impact was established around the impaired waterbodies 2,000 feet in length on either side (Geosyntec, 2018).

To summarize, the determination of risk levels for surface water contamination to the impaired reaches from OWTS for the entire VRW are as follows:

- Low density OWTS (within 2,000 ft buffer of impaired reaches) or not within 2,000 ft buffer of impaired reaches = **Low risk** of surface water contamination.

- Medium and high density OWTS (within 2,000 ft buffer of impaired reaches) = **high risk or potential risk** of surface water contamination based on downgradient surface water nitrate levels observed in the study and historically.

The results of this study suggest OWTS in high risk areas are likely to influence TMDL-listed surface waters. During this study, the surface waters found to be elevated for nitrogen during dry weather were located downgradient of OWTS groups A and E, near the community of Mira Monte and east of Ojai, respectively. A community known as the Siete Robles Tract is located within group E and is an area known for OWTS-related concerns due to elevated groundwater conditions and poor soil percolation and absorption characteristics. Appendix 6 is an Advisory Notice for OWTS in the Siete Robles Tract. Initial future actions aimed at reducing nutrient loading in the VRW shall prioritize these high-risk, high OWTS density areas.

For OWTS in areas identified as potential risk areas, results suggest that groundwater is likely being influenced by OWTS and has the potential to impact surface waters, but there is not sufficient evidence of surface water impacts. Finally, OWTS in the areas identified as low risk were shown to as not likely to significantly contribute nitrates to impaired surface waters (Geosyntec, 2018).

Data gaps in the Algae TMDL Study design mean the study results alone are not sufficient to support ruling out the possibility that significant nutrient loading from OWTS is not occurring or likely to occur in the low or potential risk areas. Further investigation and discussions with the Regional Board would be required to determine if OWTS nutrient contributions in low and potential risk areas are significantly contributing to exceedances of the TMDL allowable in-stream concentrations for nitrogen in surface waters to justify the cost of implementing nutrient-reducing policies and technologies (i.e., sanitary sewer connection or requiring the installation of a nitrate-removal unit / OWTS upgrade) to property owners and the community.

Table 7. Summary of Sampling Data Conclusions by Group

Group	Groundwater - high nitrate	Groundwater - under influence of OWTS (PPCPs and isotopes)	Surface Water – high downgradient average nitrate	Surface water - risk level of contamination from OWTS	
				This study[1]	Historical[2]
A	✓	✓	✓	High	Low
B	✓	✓	✗	Low	Low
C	✓	✓	✗	Low	Low
D	✓	✓	✗	Low	Low
E	✓	✓	✓	High	High
F	✓	✓	✗	Low	Low
G	✓	✓	Undetermined[3]	Undetermined[3]	Undetermined[3]

[1] Conclusion is based on surface water quality data collected during this study

[2] Conclusion is based on available historical surface water quality data

[3] This medium density area was distant from impaired surface waters. Further investigation is recommended to determine if downgradient surface waters could be impacted.

4.2 Current OWTS Regulations in Ventura County

4.2.1 State OWTS Policy and LAMP

The State Board's Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy) was adopted in 2012. The OWTS Policy describes minimum OWTS requirements for OWTS in California. Although the State Board implements the OWTS Policy, Tier 2 of the OWTS Policy allows local jurisdictions to develop a Local Agency Management Program

(LAMP) which meets or exceeds the State Board's minimum criteria. The Ventura County LAMP was approved by the Regional Board Executive Officer on May 4, 2018, and by the Ventura County Board of Supervisors (BOS) on August 6, 2018.

Tier 3 of the OWTS Policy describes specific OWTS criteria for areas which, due to geographic conditions or a TMDL, require additional technology and/or monitoring to ensure they are not contributing to groundwater contamination or creating a public health concern. New or replacement OWTS within these areas are required to meet supplemental treatment requirements for nitrogen as described in Tier 3 of the OWTS Policy (State Board, 2012). The Ventura County LAMP includes an Advanced Protection Management Program (APMP) for individual OWTS and OWTS areas which require advanced technologies in unincorporated Ventura County (Division, 2018).

4.2.2 Ventura County Building Code

The Ventura County Building Code (VCBC) includes regulations and design requirements for new and existing OWTS in unincorporated Ventura County. VCBC Appendix H, section 13.0(E) describes design and monitoring requirements for OWTS which require advanced treatment units (ATU) in order to meet discharge requirements.

Section 713.4 of the VCBC details the requirements to connect to a sewer utility when available. If a property requires the installation, repair, or replacement of a conventional OWTS, but is located within 200 feet of an available public sewer utility line, connection to public sewer is required. Likewise, if a property requires the installation, repair, or replacement of an alternate OWTS (such as a mound system, subsurface sand filtration system, and/or ATU to remove nitrogen or pathogens) but is located within one-half mile (2,640-feet) of an available public sewer utility line, connection to public sewer is required (VCBC 2016).

4.3 Summary of Prescriptive Plan

The Division developed a Prescriptive Plan to address the need to reduce nutrient loading to the VRW attributable to OWTS. Development of the Prescriptive Plan utilized current OWTS permitting criteria, historical geologic and water quality data, and the Technical Report and GIS Map developed during the Algae TMDL Study which were made possible by the 319(h) grant. The Prescriptive Plan describes different options and "paths forward" available to property owners, communities, and regulators, as well as evidence and supporting statements which reinforce how the implementation of the options will be effective in reducing OWTS-related nutrient loading as required in the Algae TMDL (Regional Board, 2012). The complete Prescriptive Plan is provided as Appendix 2 of this report.

The State Board is developing a surface water-groundwater nutrient transport model for the VRW. This model is expected to compute groundwater gradient and velocity for every grid cell in the watershed, as well as travel time and denitrification from each grid cell to surface water. Field sampling data analysis from the Algae TMDL Study will be utilized in the development of this model. The nitrogen transport model will aid in achieving the nutrient load reductions set forth in the Algae TMDL by providing a tool for nitrogen source assessment (Geosyntec 2018). Once this model has been developed and approved, the Division will work with stakeholders to determine how best to utilize this new tool to address nutrient loading attributable to OWTS in the watershed.

Local property owners, City and County staff and elected officials, and Regional Board staff will work together to develop implementation methods to address nutrient loading from OWTS in the Ventura River Watershed. The development of strategic and integrated approach will meet the goal of 50% reduction in loading from OWTS, without causing undue financial hardship to property owners.

4.4 Public outreach

The Division has participated in public outreach activities throughout the Algae TMDL Study process and will continue to do so during continued efforts to address nutrient loading attributable to OWTS in the VRW.

As mentioned earlier in this report, a TAC was developed as a part of this project. There are many individuals and organizations who have a vested interest in the results of the Algae TMDL Study and any actions and/or decisions affecting the VRW. These include property owners, local and State regulators, City and County elected officials, local water and sewer utilities, and non-profit organizations. Several of these stakeholder entities participated as TAC members for this study.

Division staff provided direct outreach to water well property owners during the pre-sampling stage of the Algae TMDL Study. Consultations, both written and verbal (phone calls and in-person), were conducted with property owners to explain the purpose of the field sampling events and possible outcomes/uses for the results. Water quality data was provided to property owners when requested.

Division staff and Geosyntec consultants co-presented an overview of the Algae TMDL Study at the California Stormwater Quality Association conference in Riverside, CA on October 17, 2018.

The Division will continue to meet and network with stakeholders, in both the regulatory arena and in the affected community, to help develop solutions to address OWTS-related nutrient loading in the VRW. The Division will present the finding of the Algae TMDL Study to the Ventura County BOS, a public venue. The results and any guidance information will be provided to the public on the Division’s website. Public meetings and/or workshops will be scheduled to gain input from the community during the development of any implementation plans and strategies. The Division will provide support to the State Board and the Regional Board during the plan development and decision-making processes.

5.0 References

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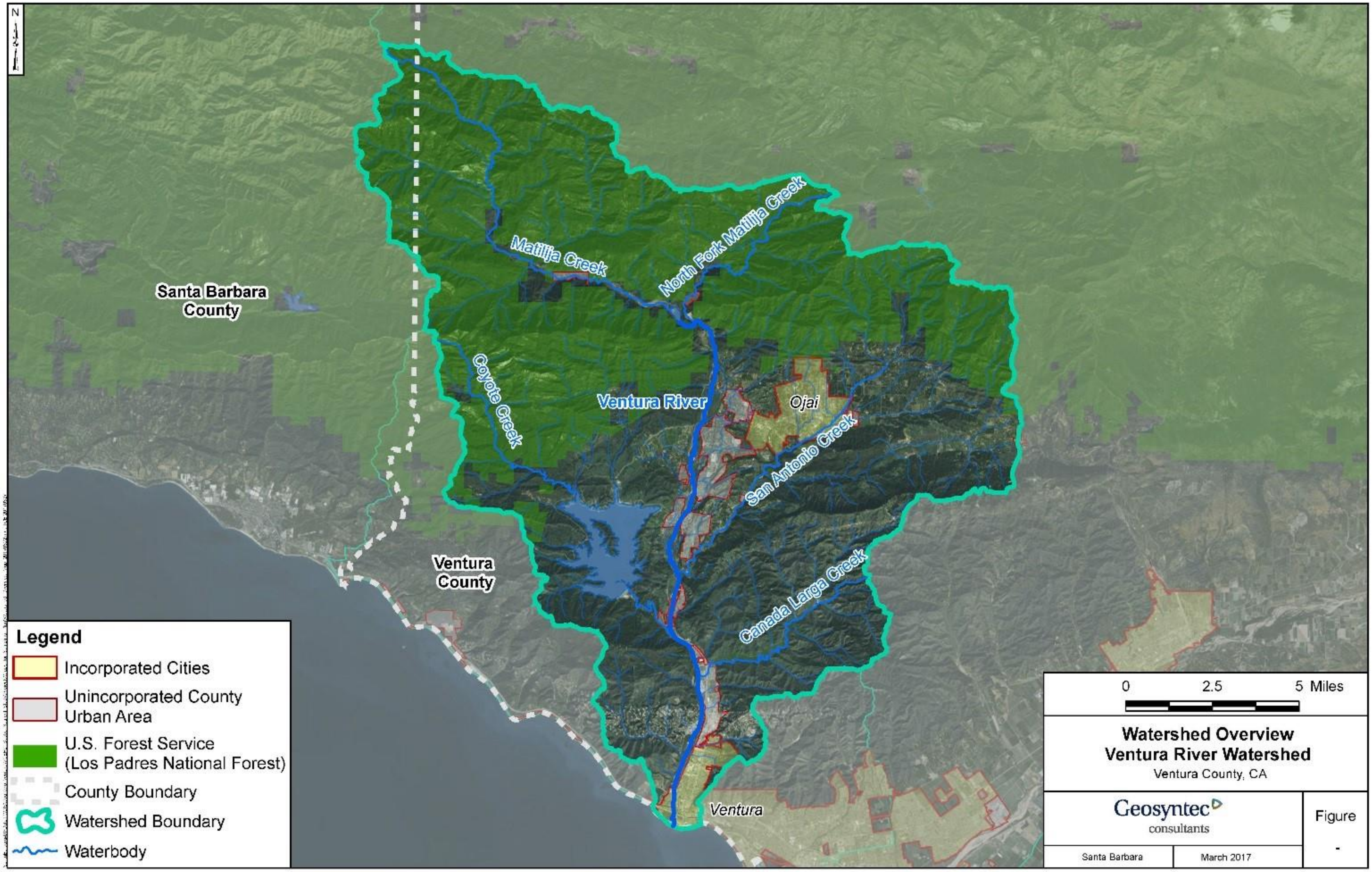
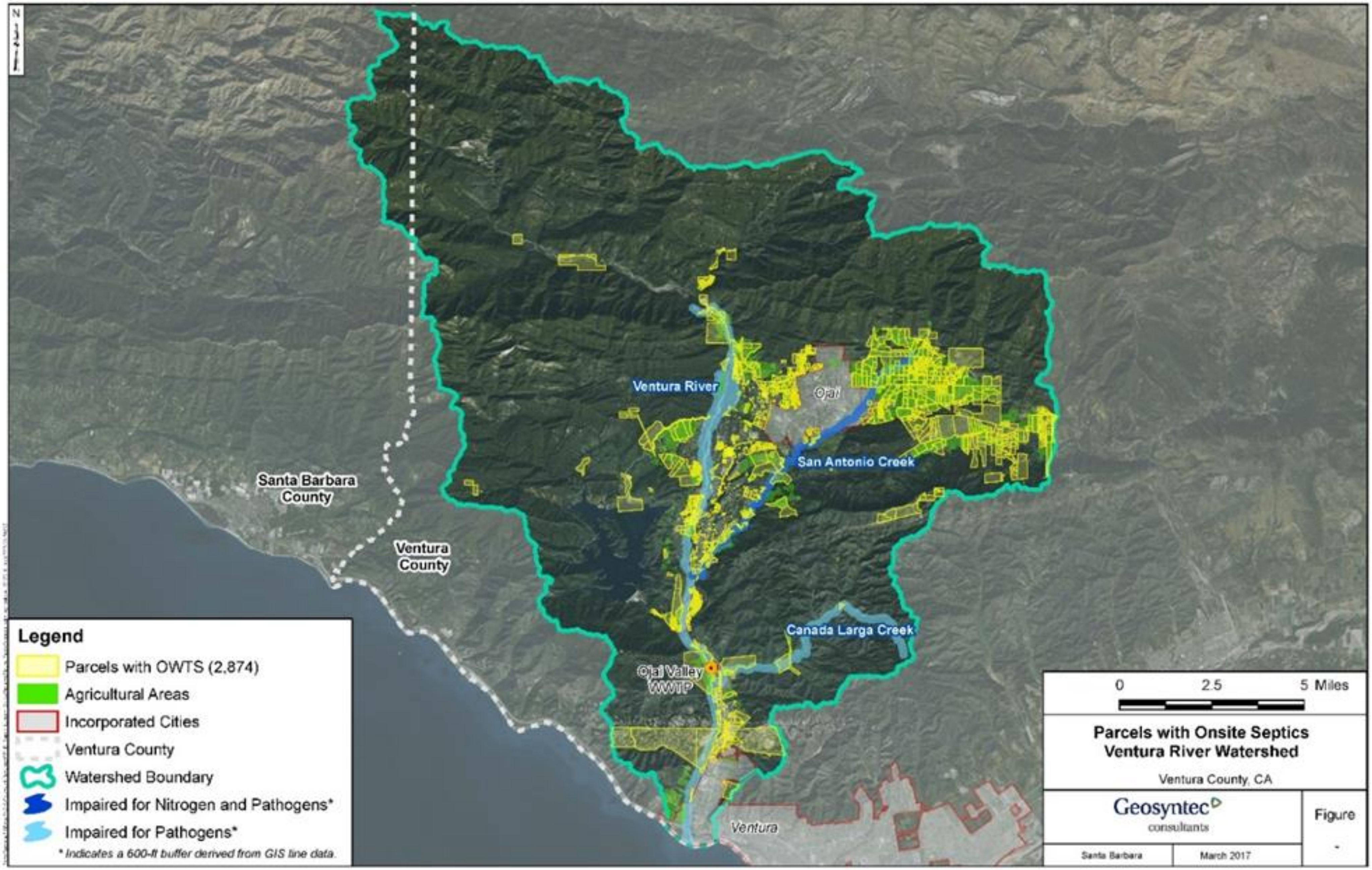
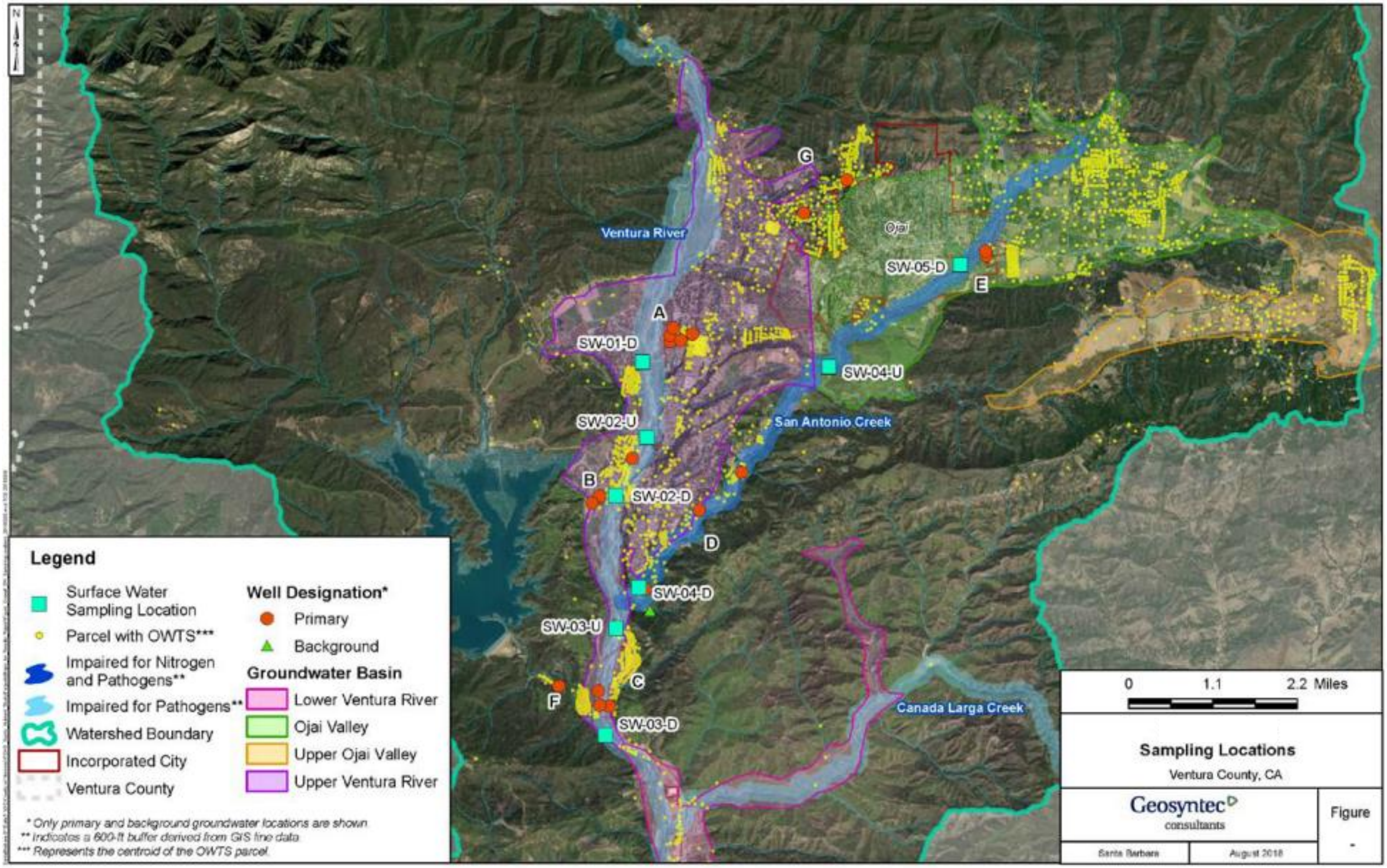
Appendix 1-1: Overview of Ventura River Watershed



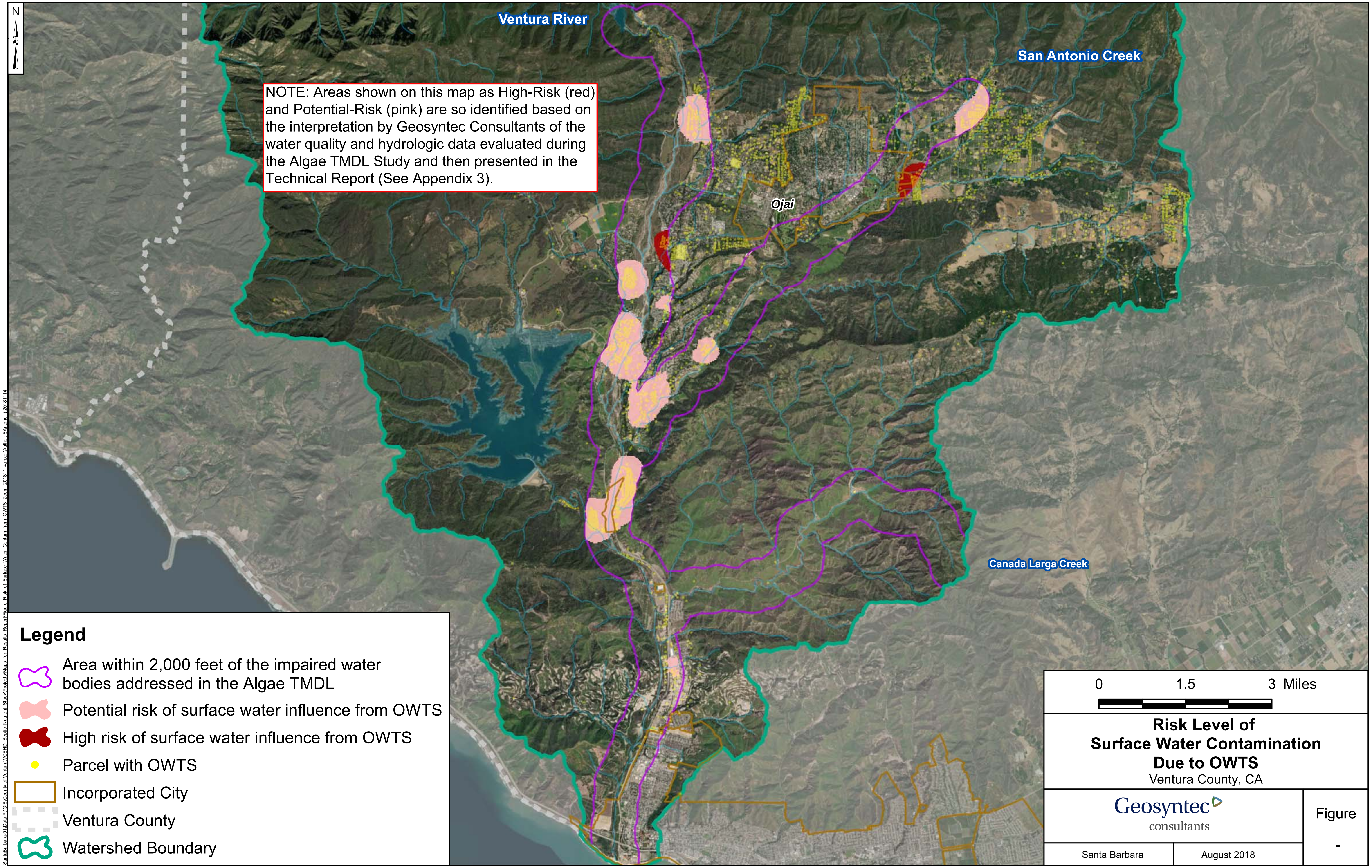
Appendix 1-2: OWTS Parcels in the Ventura River Watershed



Appendix 1-3: Surface Water and Groundwater Sampling Locations



Appendix 1-4: GIS Map of High-Risk OWTS Areas in the Ventura River Watershed



NOTE: Areas shown on this map as High-Risk (red) and Potential-Risk (pink) are so identified based on the interpretation by Geosyntec Consultants of the water quality and hydrologic data evaluated during the Algae TMDL Study and then presented in the Technical Report (See Appendix 3).

Legend

- Area within 2,000 feet of the impaired water bodies addressed in the Algae TMDL
- Potential risk of surface water influence from OWTS
- High risk of surface water influence from OWTS
- ● Parcel with OWTS
- Incorporated City
- Ventura County
- Watershed Boundary

Risk Level of
Surface Water Contamination
Due to OWTS
Ventura County, CA

Geosyntec
consultants

Figure
-

Santa Barbara
August 2018

SantaBarbara-01\Data P:\GIS\County of Ventura\VCEHD Septic Nutrient Study\Projects\Maps for Results Report\Figure Risk of Surface Water Contam from OWTS Zoom 20181114.mxd (Author: SAntonelli) 20181114

Appendix 2: Algae TMDL Special Study Prescriptive Plan

Purpose

In 2012, the Los Angeles Regional Water Quality Control Board (Regional Board) released the Resolution No. R12-011, the Algae, Eutrophic Conditions, and Nutrients Total Maximum Daily Loads for Ventura River and its Tributaries (Algae TMDL). The Ventura County Environmental Health Division (Division) entered into a grant agreement with the State Water Resources Control Board (State Board) for a Clean Water Act 319(h) Nonpoint Source Program Grant in the amount of $175,000. The purpose of this grant was to fund a special study to evaluate onsite wastewater treatment system (OWTS) contribution to water quality impairments in the Ventura River Watershed (Algae TMDL Study). The grant agreement detailed works to be completed and project specific requirements. Item B.6. required the Division to develop a Prescriptive Plan (Plan) which was to be included with the Final Project Report.

The purpose of the Plan is to identify areas which will be required to implement management measures to reduce pollution attributable to OWTS. Development of the Plan utilized current OWTS permitting criteria, historical geologic and water quality data, and the Technical Report and GIS Map of High-Risk OWTS Areas (GIS Map) developed during this study and made possible by this grant. The Plan describes different options and “paths forward” available to property owners, communities, and regulators, as well as evidence and supporting statements which reinforce how the implementation of the options will be effective in reducing OWTS-related nutrient loading as required in the Algae TMDL.

Stakeholders

There are a number of individuals and organizations who have a vested interest in the results of the Algae TMDL Study and any actions and/or decisions affecting the Ventura River Watershed (VRW) in order to reduce nutrient loading. These include property owners, local and State regulators, City and County elected officials, local water and sewer utilities, and non-profit organizations.

Several of these stakeholder entities are listed below, most of which participated as technical advisory committee (TAC) members for this study:

- Property owners in the affected area(s)
- Ventura County Environmental Health Division (Division)- responsible for issuing building permits for OWTS and responding to OWTS related complaints in unincorporated Ventura County.

- Ventura County Watershed Protection District (WPD)- provide for the protection of watercourses and watersheds in the County.
- Ventura County Board of Supervisors (BOS)- Elected five-person legislative body in Ventura County.
- Ventura County Resource Conservation District- Special district of the State which provides assistance to rural and urban communities to conserve, protect, and restore natural resources.
- California State Water Resources Control Board (State Board) and the Los Angeles Regional Water Quality Control Board (Regional Board)- have regulatory responsibility for protecting water quality throughout California.
- Cities of Ojai and Ventura- public works and building departments which have regulatory oversight for OWTS within their respective City limits, and/or obtain drinking water from surface waters or groundwater within the VRW.
- Ojai Valley Sanitation District (OVSD)- collects and processes wastewater from City of Ojai, the unincorporated Ojai Valley, and the north Ventura Avenue area.
- Ventura River Watershed Council- a stakeholder group for watershed planning in the VRW.
- Santa Barbara ChannelKeeper- non-profit organization whose mission is to protect and restore the Santa Barbara Channel and its watersheds.

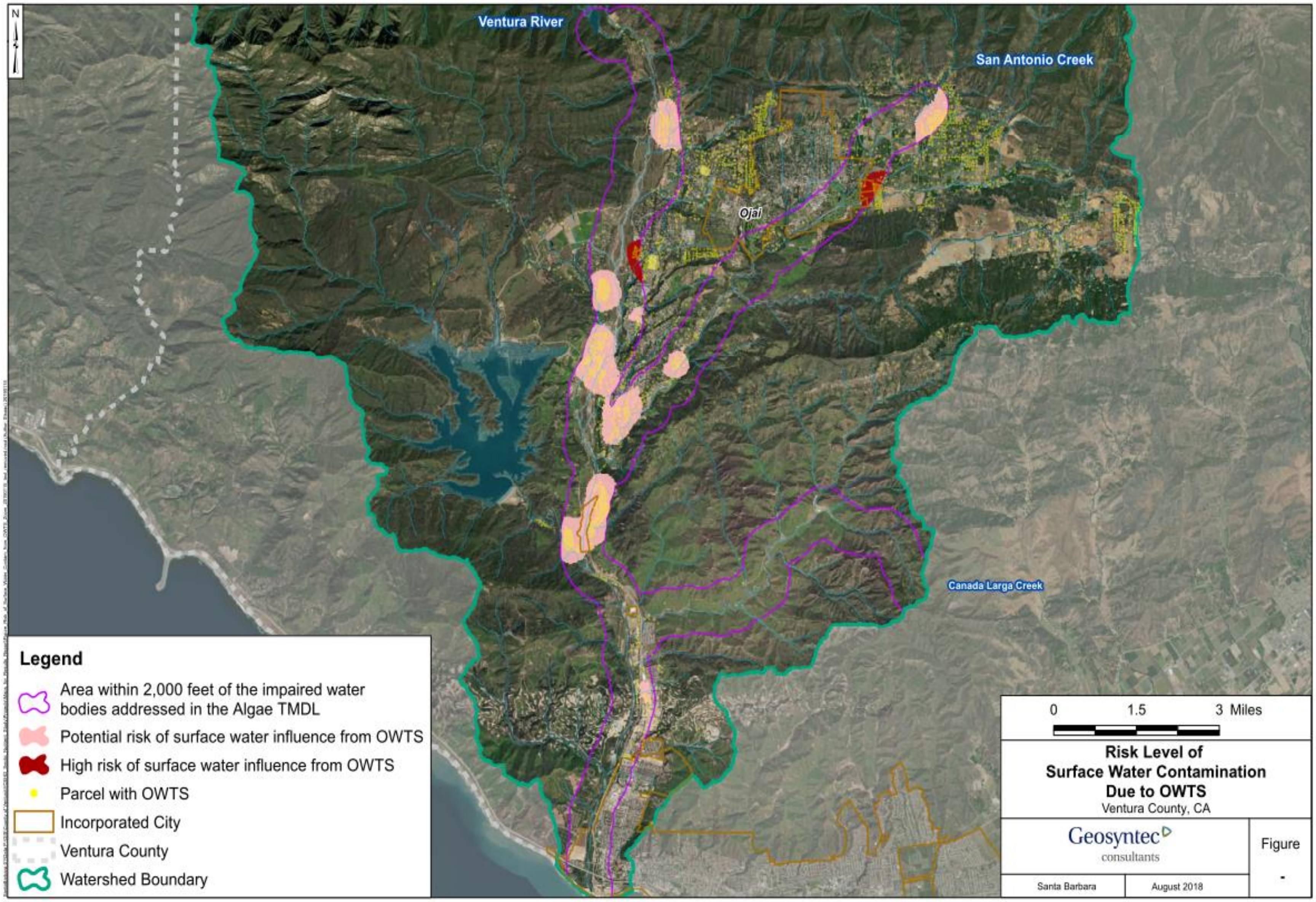
Summary of the Algae TMDL Study

A project management team comprised of Division staff was selected and Geosyntec Consultants was contracted to develop the Algae TMDL Study work plans and reports. Groundwater and surface water sampling locations were selected and sampled on three separate occasions. Geosyntec evaluated the analytical data and presented the findings in a Technical Report and GIS Map delineating areas of OWTS in the VRW designated at high risk of contributing to nutrient loading (See Figure 1). The Algae TMDL Study segregated groundwater and surface water sampling locations in to groups identified by the letters A-G.

Because the correlation between nitrate and OWTS density was found to be the strongest using an upgradient area of influence for the sampled wells within 2,000 feet, an area of impact was established around the impaired waterbodies 2,000 feet in length on either side (Geosyntec, 2018). The determination of risk levels for surface water contamination to the impaired reaches from OWTS for the entire VRW are as follows:

- Low density OWTS (within 2,000 ft buffer of impaired reaches) or not within 2,000 ft buffer of impaired reaches = **Low risk** of surface water contamination.

FIGURE 1: GIS Map of High-Risk OWTS Areas In the Ventura River Watershed



- Medium and high density OWTS (within 2,000 ft buffer of impaired reaches) = **high risk or potential risk** of surface water contamination based on downgradient surface water nitrate levels observed in the study and historically.

The results of this study suggest OWTS in high risk areas are likely to influence TMDL-listed surface waters. During this study, the surface waters found to be elevated for nitrogen during dry weather were located downgradient of OWTS groups A and E, near the community of Mira Monte and east of Ojai, respectively. The table below illustrates the sampling data conclusions by Group:

Group	**Groundwater - high nitrate**	**Groundwater - under influence of OWTS (PPCPs and isotopes)**	**Surface Water – high downgradient average nitrate**	**Surface water - risk level of contamination from OWTS**	
				This study[1]	**Historical**[2]
A	✓	✓	✓	High	Low
B	✓	✓	✗	Low	Low
C	✓	✓	✗	Low	Low
D	✓	✓	✗	Low	Low
E	✓	✓	✓	High	High
F	✓	✓	✗	Low	Low
G	✓	✓	Undetermined[3]	Undetermined[3]	Undetermined[3]

[1] Conclusion is based on surface water quality data collected during this study

[2] Conclusion is based on available historical surface water quality data

[3] This medium density area was distant from impaired surface waters. Further investigation is recommended to determine if downgradient surface waters could be impacted.

On their own the final analytical results of the Algae TMDL Study do not provide sufficient evidence to exclude any potentially contributing OWTS areas. However, the data collected and analyzed in this study will be incorporated into other studies and will be used to create meaningful and appropriate policies and management strategies aimed at reducing nutrient contributions attributable to OWTS in the VRW.

Enforcement of the Ventura County OWTS Program

Ventura County Environmental Health Division Local Agency Management Program

On June 19, 2012, the State Water Resources Control Board's Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems Policy (OWTS Policy) became effective. The OWTS Policy established water quality protection requirements by adopting statewide minimum standards for OWTS. Under Section 3.1 and 3.2 of the OWTS Policy, Local agencies are provided the option to implement a Tier 2 Local Agency Management Program (LAMP) within their jurisdiction. The Ventura

County LAMP was approved by the Regional Board on May 4, 2018 and was made effective by the Ventura County BOS on August 7, 2018.

The Division administers the LAMP which provides guidelines for OWTS site suitability analyses, OWTS design review, OWTS installation, permitting and inspections, and OWTS recordkeeping functions. The LAMP also addresses failing OWTS and illicit discharge complaints. In the event of a sewage release resulting from OWTS failure, the owner of the OWTS is issued a Notice of Violation by the Division to discontinue the unauthorized sewage release, and repair or replace the failed OWTS system. Any OWTS repair or replacement must be conducted in conformance with the applicable VCBC requirements. If public sewer is available as determined pursuant to VCBC requirements, the owner will be required to abandon the OWTS and connect to the public sewer utility.

Requirements in the Ventura County LAMP only cover unincorporated portions of Ventura County and only OWTS with a projected flow of less than 5,000-gallons per day and only receive domestic waste. The Division does not have the jurisdictional authority to review and approve, or authorize discharges from, OWTS within incorporated cities, including areas of the VRW. Properties located within the City of Ventura and the City of Ojai are subject to permitting requirements dictated by their local building authorities. Likewise, mobile home parks are regulated by the California Department of Housing and Community Development. Discharges from OWTS not regulated by the Division are authorized by the Regional Board through the issuance of waste discharge requirements (WDR).

Connection to Sewer Utility

Per Ventura County Building Code (VCBC), section 713.4 if a property is located with 200-feet of an available sewer line, that property is not eligible to obtain a permit to install an OWTS on the property. Likewise, if soil and other geologic conditions require an alternate OWTS be installed, the property owner is required to connect to sewer if it is available within one-half mile of the property. These requirements are currently enforced for new and replacement systems. So, regardless of low, potential, or high-risk areas as identified in the Algae TMDL Study, if a proposed new or replacement OWTS is within 200 feet of existing sewer (or one-half mile if an alternate OWTS is required), connection to sewer will be required.

Based on the GIS Map developed as a results of the Algae TMDL Study, sanitary sewer service provided by Ojai Valley Sanitary District (OVSD) is available very near most of the high-risk and potential risk areas. Upon failure or expansion, they will likely not be allowed to repair or enlarge their existing OWTS, but rather be required to connect to the available sewer per VCBC requirements.

Supplemental Treatment for Nitrate and Pathogen Removal

Certain geologic, hydrologic, and/or soil conditions require the installation of an alternate designed OWTS, such as a mound system, subsurface sand filtration system, or supplemental / advanced treatment unit (ATU) to remove nitrogen or pathogens. Regardless of low, potential and high risk, if the soils/geological report states the property cannot accommodate a conventional OWTS, the installation of an alternate designed OWTS with an ATU will be required to conform to VCBC. Historical geologic data suggests bedrock in areas south of the Ventura River and the San Antonio Creek confluence, near sample groups C and D of the Algae TMDL Study. It is very likely OWTS installed in these areas will be required to have ATUs installed in order to meet nutrient load reductions. The VCBC will need to be amended to require an ATU for properties within unincorporated Ventura County whose soils reports to not specifically dictate the need for an ATU. Nitrate reduction technologies are required to be NSF/ANSI Standard 245 certified to meet a 50-percent reduction in total nitrogen, and must be installed by contractor with a valid C-42 license from the California State License Board.

Siete Robles Tract Limitations

The Siete Robles tract is located in the Ojai Valley, East of the City of Ojai and South of Ojai Avenue (Highway 150). Elevated groundwater conditions have reduced the ability of soil to receive and treat the sewage discharges from OWTS in the Siete Robles tract. An advisory notice has been issued by the Division for this tract prohibiting new conventional OWTS installation due to poor soil conditions, high groundwater and high potential of flooding during heavy rain events. Residents are allowed to continue using their existing, fully operable OWTS and obtain repair permits, but are prohibited from installing new OWTS, increasing the amount of wastewater discharge, and/or increase OWTS capacity (addition of plumbing fixtures and/or bedroom equivalents).

Possible Future Actions

Connection to Public Sewer

Ideally, the areas contributing nutrients from OWTS to surface water within the VRW would be provided sanitary sewer services via connection to the OVSD. This would reduce the OWTS-related nutrient contribution from these properties to zero. The Division does not have the regulatory authority to require property owners to connect to sanitary sewer beyond what is currently written in VCBC. There are currently no requirements to compel or require property owners whose existing OWTS is both fully functioning and who are not seeking to modify their existing property, to connect to OVSD. Additionally, the Division cannot compel OVSD to connect properties which are outside their established service area.

One possibility is for the State Board or the Regional Board to pass a resolution prohibiting OWTS in areas identified as high-risk of contributing to nutrient loading in the VRW. Various Regional Boards have passed similar resolutions for a “phasing out” of OWTS in areas which do not meet water quality objectives specified in their respective Water Quality Control Plans (Basin Plan). Los Angeles Regional Board passed Resolution No. 99-13, the Oxnard Forebay Septic System Prohibition in 1999, which required all OWTS in the Oxnard Forebay of Ventura County to cease discharging by 2008. The area is now served by a sanitary sewer. The Santa Ana Regional Board passed Resolution No. R8-2006-0024 which amended their Basin Plan to include a prohibition on the use of OWTS in the Quail Valley Area of Riverside County. That resolution also included a phased and gradual connection to sanitary sewer service.

At this time, the cost for a single service connection to OVSD is approximately $18,000.00. Due to the cost and labor-intensive activities required to connect to OVSD, including the connection fees and the cost of labor and equipment, the best method would be to plan a sanitary sewer connection project which will result in numerous properties being connected at the same time. This type of project will require targeted and efforts by State, County and City officials, as well as support from residents and local community leaders.

Requirement to Upgrade OWTS

Another option for reducing nutrient loading attributed to OWTS in the VRW is the installation or nitrate-reduction technologies, or ATUs, on new and existing OWTS. The Division does not have the regulatory authority to require property owners to install ATU’s on their new or existing systems beyond what is currently written in VCBC. There are currently no requirements to compel or require property owners whose existing OWTS is both fully functioning and who are not seeking to modify their existing property, to install ATUs on their existing systems.

A Ventura County BOS resolution and/or amendment to the VCBC may be required to impose an ordinance which would require property owners in areas identified as contributing to nutrient loading in the VRW to install an ATU on their existing OWTS by a certain deadline. The cost of upgrading an existing OWTS is estimated to be between

$15,000-$50,000 depending on specific site and OWTS conditions, plus additional annual costs related to ongoing maintenance, service contracts, and effluent monitoring.

Moving Forward

Local property owners, City and County staff and elected officials, and State and Regional Board staff will work together to develop implementation methods to address nutrient loading from OWTS in the Ventura River Watershed. The development of a strategic and integrated approach will help to meet the goal of 50% reduction in loading from OWTS, without causing undue financial hardship to property owners.

The Algae TMDL Study is a first step in identifying nutrient contributions from OWTS in the VRW. Subsequent work is anticipated to build upon the findings from this study. At this time, all areas in the VRW are considered dischargers of nutrients as defined in the Algae TMDL and are subject to the required 50% load reduction. Future studies and additional information may support a TMDL revision, however, the Algae TMDL Study results alone did not supply sufficient information for the Regional Board to revise numeric targets and nitrate load allocations for OWTS. The Division will work with and support the Regional Board during any consideration to modify and/or refine the Algae TMDL in the future as more information becomes available.

The State Board is developing a surface water-groundwater nutrient transport model for the VRW. Once this model has been developed and approved, the Division will work with stakeholders to determine how best to utilize this new tool to address nutrient loading attributable to OWTS in the watershed.

The Division will network with stakeholders, in both the regulatory arena and in the affected community, to help develop a solution to address OWTS-related nutrient loading in the VRW. The results and any guidance information will be provided to the public on the Division’s website. Public meetings and/or workshops will be scheduled to gain input from the community during the development of any implementation plan(s). Implementation of any load reduction strategies will initially be targeted in areas identified in the Algae TMDL Study Technical Report as high and potential risk. The Division will provide support to the State and Regional Board during the plan development and decision-making processes.

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Appendix 3-1: Complete November 2018 Technical Report - FINAL

Prepared for

County of Ventura – Environmental Health Division

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Technical Report

for the Study of Water Quality Impairments Attributable to Onsite Wastewater Treatment Systems (OWTS) in the Ventura River Watershed

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Project Number LA0391

November 2018

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APPENDICES

Appendix A: Sampling Results

Appendix B: Field Forms and Photos

Appendix C: Laboratory Reports and COCs

EXECUTIVE SUMMARY

Many parcels in the Ventura River Watershed (VRW) are connected to a sanitary sewer system, but a portion of the watershed, primarily unincorporated areas, is not serviced by these sanitary sewer systems and instead utilize onsite wastewater treatment systems (OWTS) for treatment of wastewater. The OWTS Policy (SWRCB, 2012) was established by the State Water Resources Control Board (SWRCB) and establishes a statewide, risk-based tiered approach for the regulation and management of OWTS installations and replacements. This policy was adopted as a result of Assembly Bill 885, which required the SWRCB to develop statewide standards for permitting and operation of OWTS. The intent was to allow continued use of OWTS while also protecting water quality and human health.

The purpose of this State 319(h) grant-funded study was to define the geographic extent of OWTS that are contributing significant nitrogen loads to the impaired reaches of the Ventura River and its tributaries. OWTS usually release treated wastewater effluent into unsaturated soil via a leach field, which disperses any remaining organic materials and other contaminants prior to reaching groundwater. The treated effluent from OWTS can be a potential source of pollution to groundwater and surface waters if systems are not sited, maintained, or functioning properly. The OWTS may also contribute nutrients such as nitrate even in properly functioning systems. Nitrates from OWTS can persist in the subsurface environment potentially causing elevated concentrations in shallow groundwater, which can then flow into surface waters and impact surface water quality.

This study investigated the influence of OWTS on nitrogen impairments in the VRW. The objectives of the study included: (1) collecting information regarding nitrogen levels in the watershed through sampling and analysis of both groundwater and instream surface water at selected locations, with a focus on locations near OWTS and TMDL-covered waterbodies to capture spatial variability in water quality; and (2) identifying geographic areas where OWTS are contributing nitrogen to surface waters.

Sampling and analysis for this study were conducted at numerous surface and groundwater locations using both low-cost analytical methods (to determine where nitrogen in groundwater may be impacting surface water) and advanced forensic tools (to identify nutrient sources). Samples were collected from surface waters upstream and downstream of upwelling stream reaches and from groundwater between upwelling reaches and OWTS, as well as other locations. Upwelling reaches (i.e., surface water reaches that are fed by rising groundwater) were conservatively defined in this study as all reaches with dry weather flow, during this study or in prior sampling or observational flow mapping efforts.

Samples were collected from 29 locations in the VRW (21 groundwater locations and eight surface water locations) during three sampling events from August 2017 to May 2018. Wells were sorted based on geologic classification (bedrock or alluvial) and categorized into alphabetical group names (i.e. A, B, C, etc.) based on proximity to each other. All selected groundwater sampling groups have at least one associated downgradient surface water sampling location identified, although some groups are a considerable distance from the nearest upwelling stream reach. Samples were analyzed for nitrogen compounds, in addition to advanced forensic analytes including chemical sewage indicators and stable nitrate isotopes. The evaluation of sampling data by group is summarized in Table ES-1

Table ES-1. Summary of Sampling Data Conclusions by Group

Group	Groundwater - high nitrate	Groundwater - under influence of OWTS (PPCPs and isotopes)	Surface Water – high downgradient average nitrate	Surface water - risk level of contamination from OWTS	
				This study[1]	Historical[2]
A	✓	✓	✓	High	Low
B	✓	✓	✗	Low	Low
C	✓	✓	✗	Low	Low
D	✓	✓	✗	Low	Low
E	✓	✓	✓	High	High
F	✓	✓	✗	Low	Low
G	✓	✓	Undetermined[3]	Undetermined[3]	Undetermined[3]

[1] Conclusion is based on surface water quality data collected during this study

[2] Conclusion is based on available historical surface water quality data

[3] This medium density area was distant from impaired surface waters. Further investigation is recommended to determine if downgradient surface waters could be impacted.

Based on the sampling data evaluation by group, the following study questions were addressed:

1) **Are groundwater nitrogen levels elevated downgradient of OWTS areas? If yes, which OWTS areas?**

Nitrate in groundwater was elevated downgradient of areas with OWTS throughout the VRW. The average nitrate concentrations for all groups, except group D (low density OWTS) and the very low OWTS density "background" wells, were above the TMDL allowable in-stream concentration. Group D had one of three wells above the target. The number of OWTS within a certain distance upgradient of each well was found to be significantly correlated with groundwater nitrate concentrations in alluvial areas. Nitrate was also found to be elevated where OWTS were in areas identified as bedrock geology.

2) Are these areas also impacted by sewage indicators that would further support OWTS as a source? If yes, which OWTS areas?

At least one pharmaceutical and personal care product (PPCP), which are used as chemical sewage indicators, was detected in groundwater downgradient of OWTS in each groundwater sampling group, with multiple PPCPs detected in some wells. Nitrate isotope ratios also suggested that groundwater was influenced by animal waste and/or human sewage throughout the VRW. Therefore, both chemical (PPCP) and isotope data supports OWTS effluent as a source of nitrate to groundwater in the VRW.

3) **Are these impacted groundwaters impacting surface water nitrogen levels at upwelling locations? If yes, downstream of which OWTS areas?**

While OWTS influences to groundwater were evident throughout the watershed, the impacts to surface waters during dry weather were not as ubiquitous. At many locations on the TMDL-covered streams, average nitrate, both historically and in this study, were below the TMDL allowable in-stream concentration for TN. During this study, the surface waters found to be elevated for nitrogen during dry weather were located downgradient of OWTS Groups A and E, near the community of Mira Monte and east of Ojai, respectively.

Evaluation of the sampling data showed that levels of nitrate in groundwater increase with the density of upgradient OWTS. The correlation between nitrate and upgradient OWTS density was used to determine low, medium, and high upgradient OWTS density designations. Using the linear regression equation, the upper limit of the low density designation was set to correspond to a nitrate concentration of 1.15 mg/L, which represents the allowable dry weather concentration for total nitrogen that would meet Algae TMDL allowable in-stream concentrations for the receiving water, such that areas with low density OWTS would have average nitrate levels in groundwater less than the allowable in-stream concentration based on the data collected in this study.

The goal of this study was to define the geographic extent of OWTS that are contributing significant nitrogen loads to the TMDL-covered reaches of the Ventura River and its tributaries, and the highest risk of contribution to surface waters was found to be for OWTS in close proximity to these surface water reaches. The correlation between nitrate and OWTS density was found to be the strongest using a distance of upgradient influence for the sampled wells of 2,000 ft. Therefore, an area of impact around the impaired waterbodies of 2,000 feet on either side was used. This represents the area where OWTS have the potential to significantly contribute nitrate to surface water impairments based on the analysis conducted in this study. Within this distance, areas were further evaluated based on OWTS density and sampling results from this study to determine the risk of surface water contamination.

The relationship between nitrate concentration in groundwater and density of upgradient OWTS was used to extrapolate results to other unsampled areas of the VRW based on the density of OWTS, in both bedrock and alluvium geologic areas. Areas with low density upgradient OWTS were predicted to have a low risk of contribution to surface water impairments, since groundwater levels of nitrate are expected to be below the TMDL numeric limit on average. Areas with medium or high density OWTS (within the 2,000 ft buffer of impaired reaches) were examined further to determine risk level to surface water contamination. Surface water sample results (both from this study and historically) in close proximity and downgradient (such that groundwater quality would likely influence surface waters in upwelling areas) were examined to determine if average surface water nitrate levels were above the TMDL numeric limit. If groundwater was identified as being likely influenced by OWTS (based on medium or high density upgradient OWTS) but available surface water data downstream did not suggest surface water impacts (i.e., low nitrate levels), the area was identified as “potential” risk for surface water impairment. However, if an area was identified as likely having influence from OWTS in groundwater (i.e., medium or high density OWTS), and downstream surface water sampling results showed elevated levels of nitrate, the area was identified as a having high risk of surface water contamination due to OWTS.

Based on the results of this study, there are enough data to support that OWTS in the low risk areas are not likely to significantly contribute nitrate to impaired surface waters. Similarly, the results of this study support that OWTS in high risk areas are likely to influence impaired water bodies addressed in the Algae TMDL. For the areas classified as potential risk, results suggest that groundwater is likely being influenced by OWTS (based on OWTS density) and has the potential to impact surface waters, but there is not evidence of surface water impacts (based on average surface water nitrate concentrations at downstream locations). Further investigation, such as through the ongoing groundwater-surface water interaction modeling project, is necessary to determine whether contributions in these areas are significantly contributing to exceedances of the TMDL allowable in-stream concentration for nitrogen in surface waters.

The surface water risk map for the VRW is illustrated in Figure ES-1. Out of an estimated 2,874 OWTS in the VRW, 43 are in the high risk area and 807 are in the potential risk area (30% of all OWTS in the VRW are classified as high or potential risk). Sources of uncertainty for the risk map are discussed in Section 4.5.

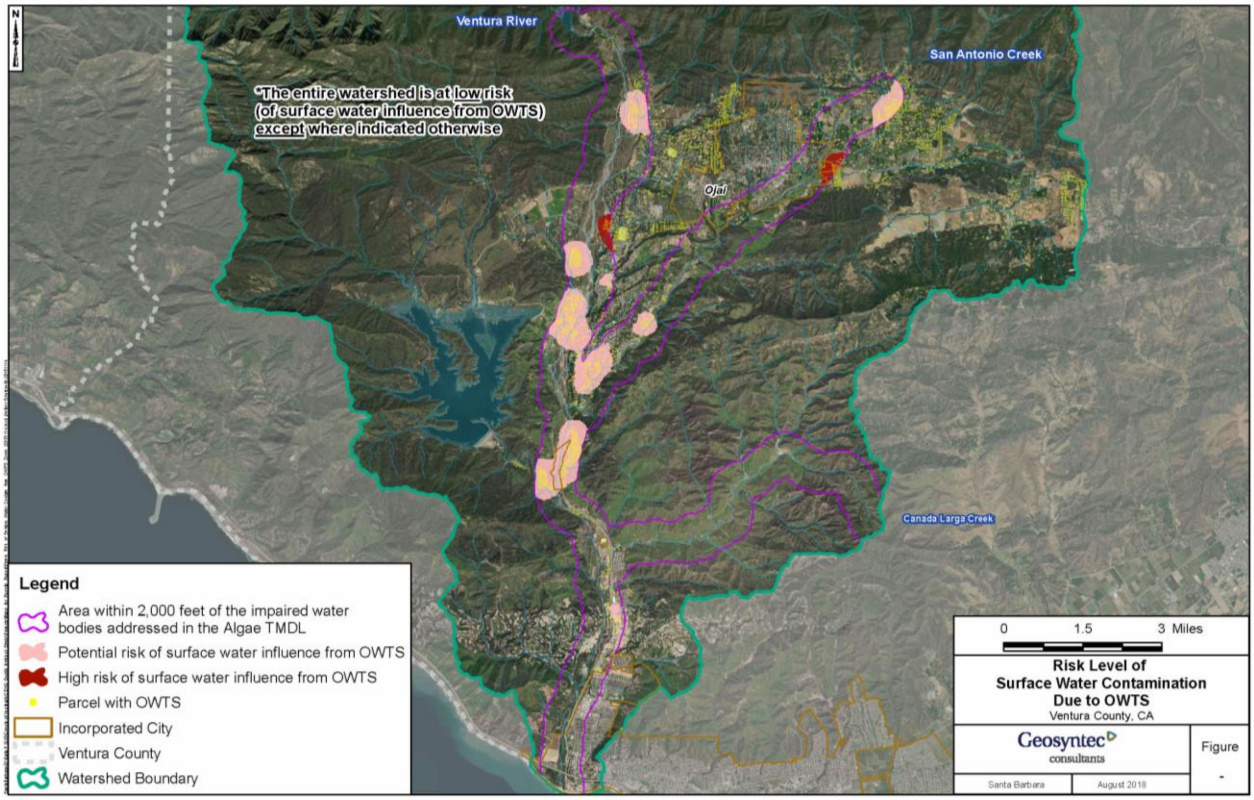


Figure ES-1. Risk Map: Geographic Areas where OWTS Contamination of Groundwater is Likely Contributing to Impairment of Surface Waters

1 INTRODUCTION

The County of Ventura Environmental Health Division (VCEHD), with assistance from Geosyntec Consultants, has prepared this technical report ("report") for the study of water quality impairments attributable to Onsite Wastewater Treatment Systems (OWTS) in the Ventura River Watershed (VRW). This report includes a summary of the monitoring conducted as part of the study and conclusions regarding the potential influence of OWTS on water quality impairments in the VRW.

Monitoring conducted for this study was based on the Monitoring Plan for the Study of Water Quality Impairments Attributable to OWTS in the VRW ("Monitoring Plan") (Geosyntec Consultants, 2017a), which outlined the monitoring objectives, constituents to be monitored, and the sampling locations and frequencies for the water quality monitoring activities, and the SWAMP-compliant Quality Assurance Project Plan (QAPP) (Geosyntec Consultants, 2017b), which detailed the quality assurance and quality control procedures for groundwater and surface water sample collection and analysis.

1.1 Project Setting

The VRW is predominantly located in Ventura County, California, with a small portion (2.8%) of the watershed in Santa Barbara County. The main tributaries of the 226 square mile watershed are Matilija Creek, North Fork Matilija Creek, San Antonio Creek, Cañada Larga Creek, and Coyote Creek, and the watershed discharges to the Pacific Ocean. The portion within Ventura County consists of the County of Ventura (49.1%), the United States Forest Service (47.7%), the City of Ojai (1.9%), and the City of Ventura (1.2%) (Walter, 2015). The majority of the watershed is undeveloped (approximately 87%), with the northern half of the watershed falling within the Los Padres National Forest. The southern half includes the cities of Ojai and Ventura and several unincorporated communities such as Oak View and Meiners Oaks. An overview of the VRW is shown in Figure 1.

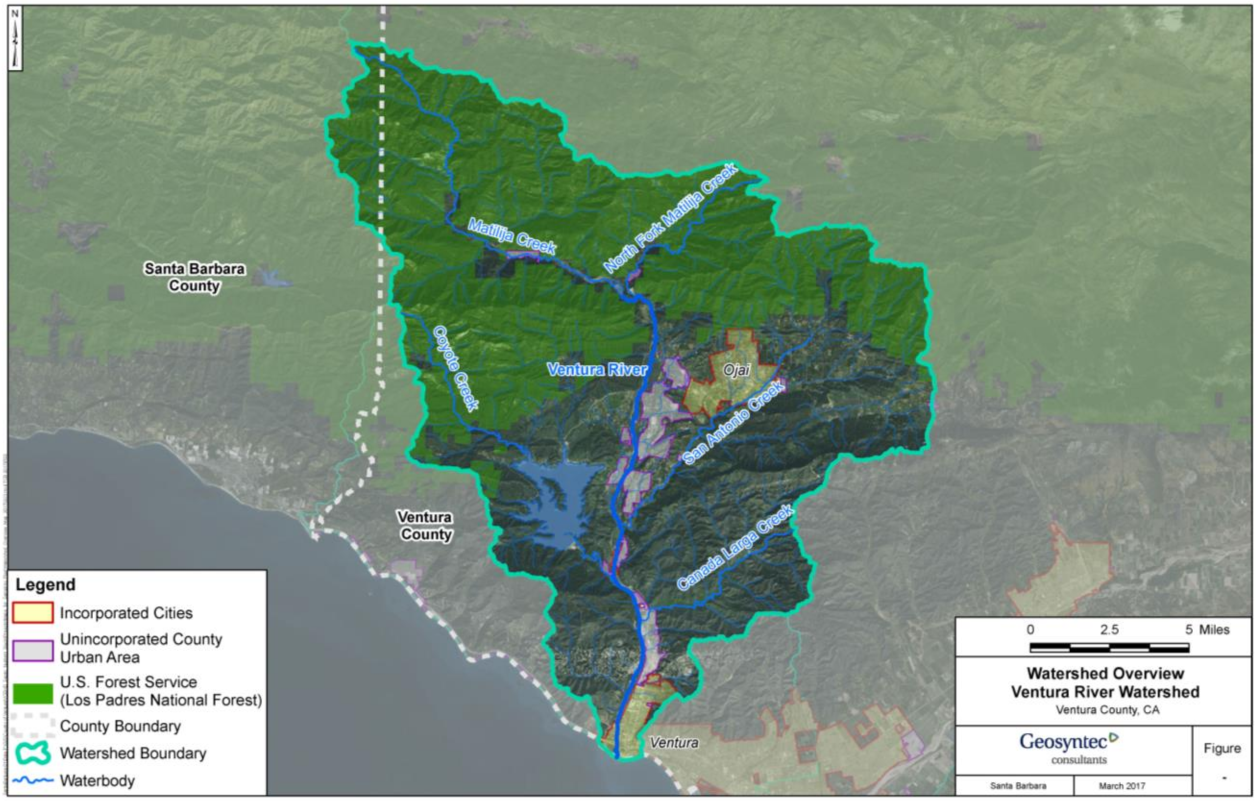


Figure 1. Ventura River Watershed Overview

Most of the watershed consists of mountains and foothills, with only 15 percent of the watershed considered flat (slope of 10% or less). After open space, agriculture is the predominant land use in the watershed. The primary agricultural uses in the watershed consist of citrus and avocado, irrigated crops, and cattle grazing.

The four major groundwater basins in the watershed, shown in Figure 2, include the Ojai Valley basin (10.1 square miles), Upper Ojai Valley basin (4.4 sq. mi.), Upper Ventura River basin (14.6 sq. mi.), and the Lower Ventura River basin (9.5 sq. mi). The Ojai Valley basin has the largest capacity of the four basins, and several municipal and agricultural water users rely heavily on this basin for supply. The Ojai Valley basin contributes regular annual flow to the San Antonio Creek. The basin has unconfined conditions in the northern and eastern portions and mostly confined to semi-confined in the remaining central, southern, and western portions (depending on the volume of water in storage and groundwater level) (Walter, 2015). Depth to groundwater is usually less than 50 feet in the southern and western portions, while the eastern and northern areas may have depths to groundwater up to 300 feet (Walter, 2015).

Although the Upper Ojai Valley basin has the smallest storage capacity of the four basins, it serves as an important source of water for residents in Upper Ojai and some agricultural users. The basin is a bowl-shaped, unconfined basin filled predominately with alluvial fan deposits from erosions of the surrounding mountains. Depth to groundwater in this basin typically ranges from 45 to 60 feet below ground surface. The Upper Ojai Valley basin is currently managed by the Ojai Basin Groundwater Management Agency (OBGMA), who have authority to manage the supply and demand of the groundwater resources.

The Upper Ventura River basin is located under and adjacent to the Ventura River and flows from the Matilija Creek and North Fork Matilija Creek junction downgradient toward Foster Park. Although this basin is not the largest of the four basins, it supplies the greatest volume of groundwater in the watershed. The Upper Ventura River basin is unconfined and shallower than the Ojai Valley basins. The basin is unconfined and has a direct relationship with surface water in the Ventura River. Much of the surface water in the river overlying this basin can become dry in low to moderate rainfall years. The subsurface diversion structure at Foster Park serves as the border between the Upper and Lower Ventura River basins (Walter, 2015).

The Lower Ventura River basin also lies under the Ventura River, starting from Foster Park and extending to the coast. This basin supplies the smallest water supply of the four basins and is used minimally for industrial and/or agricultural needs. The basin is unconfined and the depth to groundwater in the floodplain areas is typically between three and 13 feet (depth to groundwater becomes deeper towards the edges of the basin) (Walter, 2015).

The usable aquifers in the VRW are unconfined, with the exception of the Ojai Valley basin, which has areas of confined, semi-confined, and unconfined groundwater (Walter, 2015).

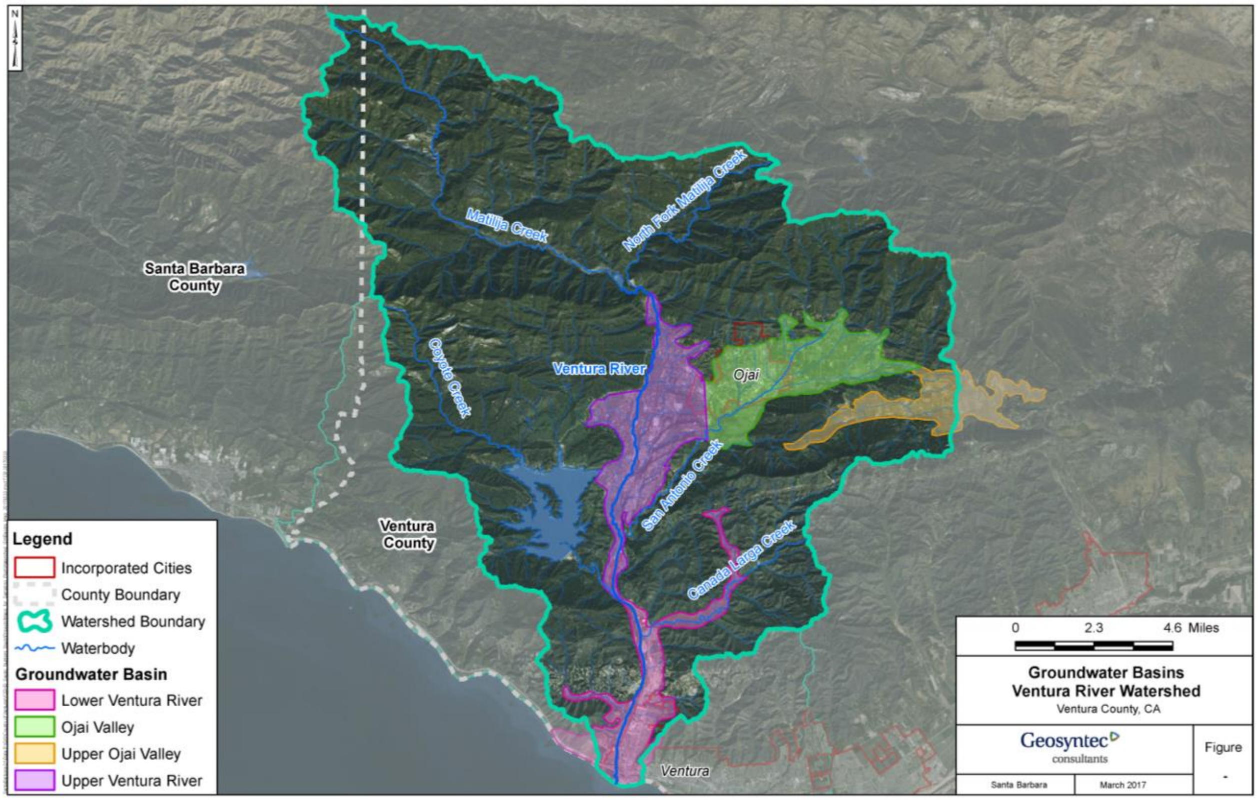


Figure 2. Ventura River Watershed Groundwater Basins

The mountains consist of primarily tertiary (3 to 70 million years old) sedimentary rocks such as sandstones, siltstones, and shales. The valley area consists of unconsolidated quaternary alluvial deposits. These unconsolidated alluvial deposits consist of silt, sand, gravel, cobbles, and boulders, and constitute the major groundwater aquifers. The major geologic features of the VRW are shown in Figure 3. The sandstone and mudstone areas are collectively referred to as "bedrock" areas. Bedrock is shown to exist surrounding the Ventura River just downstream of the confluence with San Antonio Creek. However, information regarding the alluvium thickness from DBS&A (2018) confirms that shallow alluvium is actually present in this area.

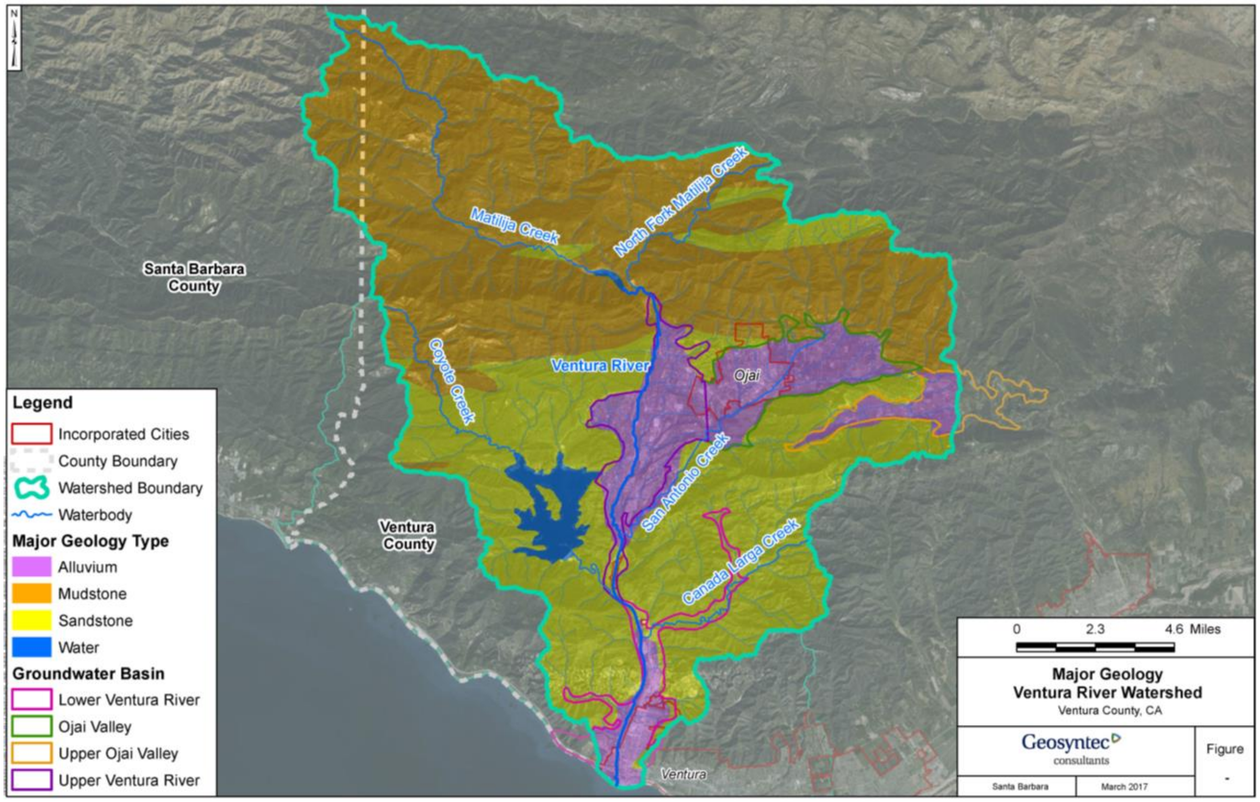
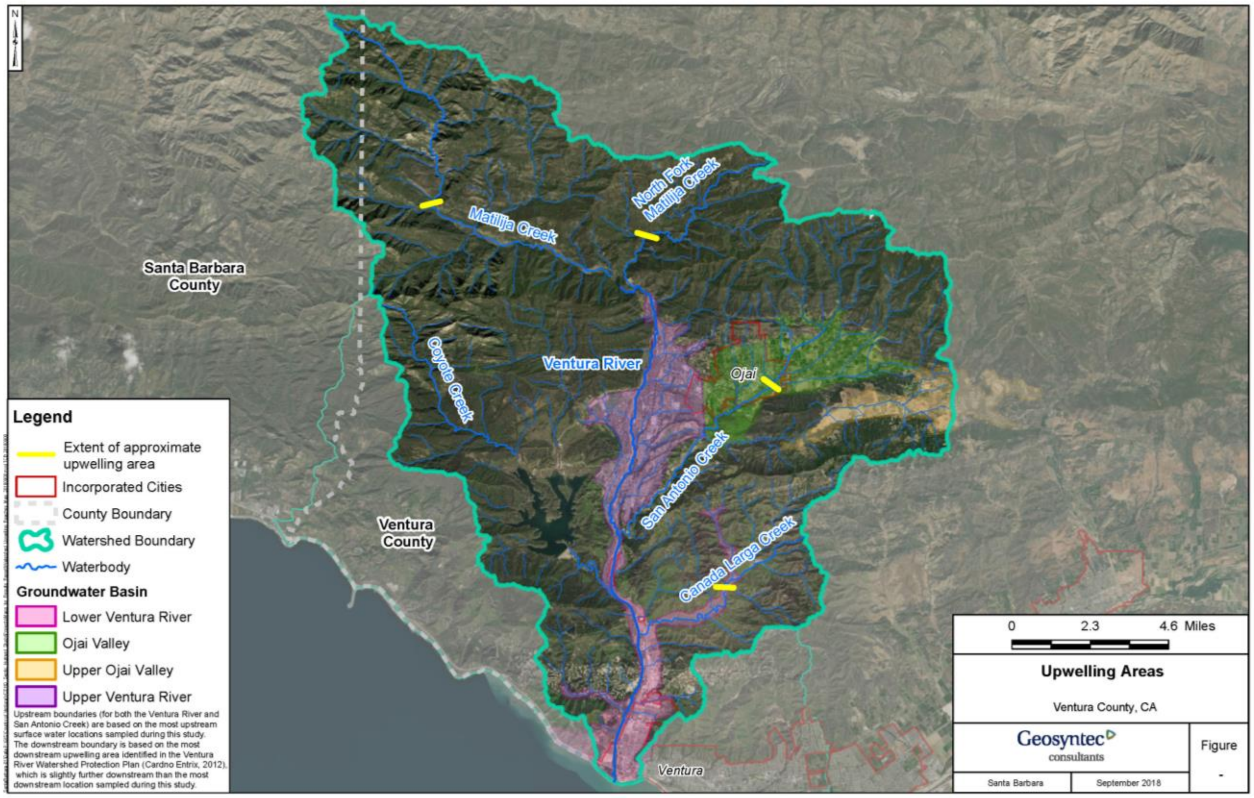


Figure 3. Ventura River Watershed Geology

In portions of the Ventura River, upwelling conditions are observed, meaning groundwater seeps into the river waterbody. These groundwater spill points to surface water are important to consider in the VRW. The upwelling portions of the Ventura River shown in the Monitoring Plan reflect information from the *Ventura River Watershed Protection Plan Report* (Cardno Entrix, 2012). Based on past reports and USGS streamflow data, portions of San Antonio Creek are upwelling, but it is unclear exactly which portions these are. The *Ventura River Watershed Management Plan* (Walter, 2015) reported that upwelling reaches are present in the lower elevations of the basin (below the confluence of Thacher Creek and San Antonio Creek). Model-simulated results vary widely but generally show upwelling areas in the lower basin areas that are maintained even at minor levels during dry periods. Flow mapping (wettedness) data received from California Department of Fish and Wildlife (CDFW) shows that there were flowing (wet) and dry areas along San Antonio Creek during the driest periods in 2015 and 2016, but that these areas can change from year to year.

Groundwater levels were expected to be higher in 2017 after the previous wet winter, potentially resulting in more upwelling areas and flow in streams throughout the VRW. The 2017/2018 rainy season was fairly dry, which could have resulted in lower groundwater levels and less upwelling areas in 2018. Surface water sampling conducted during this study (to be described further in Section 2.1.2) and historically from various sources (sources outlined in the Monitoring Plan and historical data summarized in Section 4.4) was used to define upwelling areas. Sampling for this study, in addition to the historical surface water sampling that was evaluated, was conducted in dry weather, so the maximum upstream extent of upwelling area was defined based on the most upstream locations where surface water sampling has occurred and is shown in Figure 4.



Upstream boundaries (for both the Ventura River and San Antonio Creek) are based on the most upstream surface water locations sampled during this study. The downstream boundary is based on the most downstream upwelling area identified in the Ventura River Watershed Protection Plan (Cardno Entrix, 2012), which is slightly further downstream than the most downstream location sampled during this study.

Figure 4. Ventura River Watershed Approximate Upwelling Reaches

It was not possible to conduct detailed investigation of groundwater and surface water interactions. However, several sources provide reference to useful information regarding groundwater movement to surface water, including: Kear, 2005 (Figure 5-7, Ojai basin); Schnaar, 2011 (Ojai basin); SWRCB, 2016 (Upper Ventura River basin and Ojai Valley basin); and Kear, 2016 (Ojai Valley basin). The hydraulic gradient of groundwater generally follows the land topography (Kear, 2005), which was used to determine the approximate direction of groundwater flow for sampling planning throughout the VRW. As previously mentioned, the groundwater basins in the VRW represent primarily unconfined aquifers, except for the Ojai Valley basin, which has some unconfined portions in the northern and eastern parts of the basin and semi-confined or confined areas in the remainder of the basin. The referenced reports include several cross sections throughout the Ojai Valley basin showing undifferentiated alluvium and bedrock and layers of aquitard material located in between aquifer layers. These cross sections provide information on the areas that are confined, in addition to the transitions to semi-confined and unconfined areas.

Water quality in the VRW is generally good, as only a small portion of the watershed is developed. However, the Ventura River reaches 1 and 2 and the estuary are on the Clean Water Act's Section 303(d) list of impaired waterbodies for algae and eutrophic conditions[1]. San Antonio Creek, Ventura River reaches 1 and 2, Cañada Larga, and the estuary are identified on the 303(d) list for low dissolved oxygen (DO), high nitrogen, and eutrophic conditions. The most serious algae problems, in terms of the intensity of algae blooms, occur early in the dry season, following a wet season with high rainfall and large storm events. Because of the excessive algae growth and problems caused by high nutrient levels, the Algae, Eutrophic Conditions, and Nutrients TMDL for the Ventura River and its Tributaries (Algae TMDL) was established. The Algae TMDL was adopted by the Los Angeles Region Water Quality Control Board (Regional Board) in December 2012 and became effective in June 2013. Nitrogen and phosphorus are the primary concern with excessive algae. Existing groundwater and surface water data (nitrate as N) was analyzed as part of this study. These data are shown spatially in Appendix B of the Monitoring Plan and were also updated to include recent available data, as shown in Section 4.4 herein. Figure 5 shows the waterbodies that are addressed in the Algae TMDL.

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[1] In addition, Matilija Creek Reach 2 (above reservoir), Matilija Creek Reach 1 (junction with North Fork to reservoir), and Matilija Reservoir are listed for fish barriers (fish passage). San Antonio Creek (tributary to Ventura River Reach 4) is listed for indicator bacteria, nitrogen, and total dissolved solids (TDS). Casitas Lake is listed for mercury. Ventura River Reach 1 (Main Street to Estuary) is listed for benthic community effects. Ventura River Reach 3 (Weldon Canyon to confluence with Coyote Creek) is listed for indicator bacteria and toxicity. Cañada Larga is listed for fecal coliform and TDS (in addition to low dissolved oxygen). The Ventura River estuary is listed for trash and total coliform (in addition to algae and eutrophic conditions). Various shoreline beaches are listed for indicator bacteria.

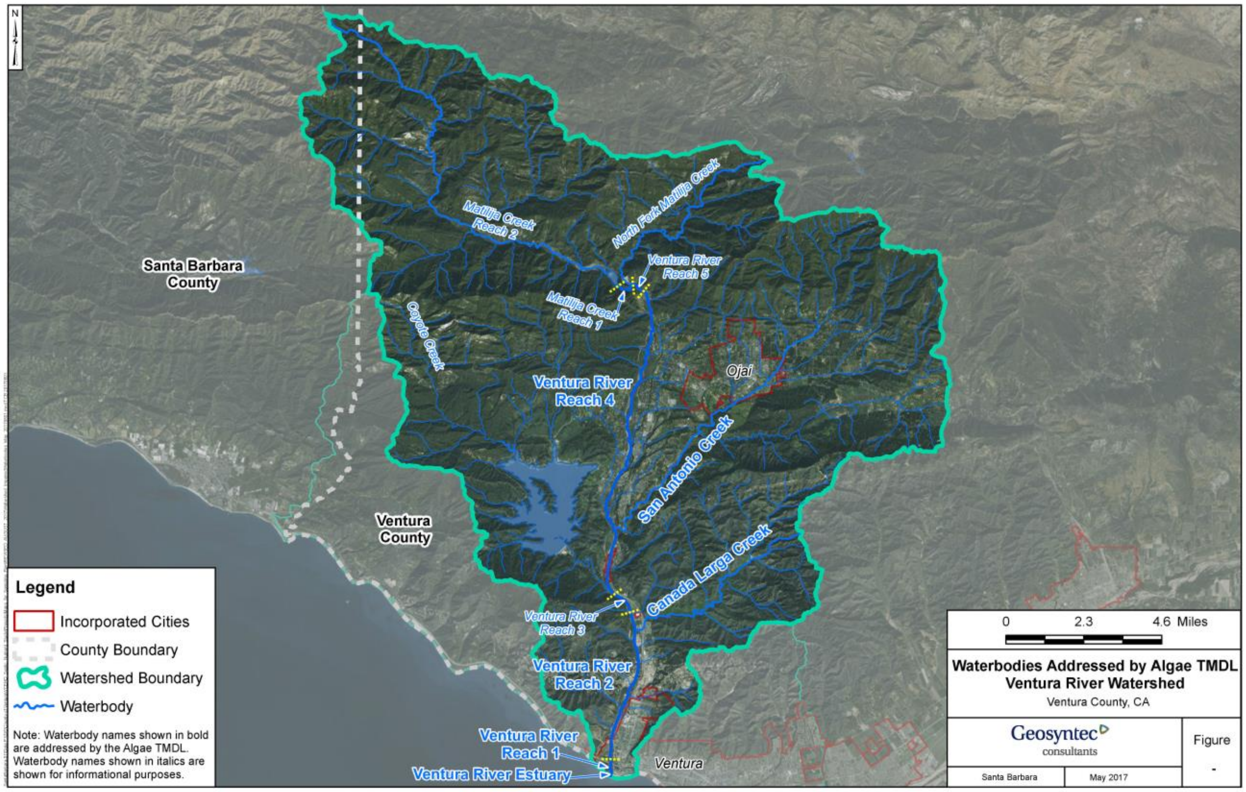

Figure 5. Water Bodies Addressed by the Algae TMDL

Table 1 shows the water bodies and specific impairments identified in the Algae TMDL (LARWQCB, 2012).

Table 1. Impairments Addressed by the Algae TMDL (LARWQCB, 2012)

Waterbody	303(d) Listed Impairments	Additional Impairments
Ventura River Estuary	Algae, Eutrophic Conditions	Low DO
Ventura River Reach 1	Algae, Eutrophic Conditions	Low DO
Ventura River Reach 2	Algae, Eutrophic Conditions	Low DO
Cañada Larga	Low DO	-
Ventura River Reach 3	-	Low DO
Ventura River Reach 4	-	Low DO
San Antonio Creek	Nitrogen	Low DO

While multiple sources are identified in the Algae TMDL and there is a high amount of uncertainty in the estimates of sources of nitrogen, the Algae TMDL estimated that 4.7 percent of the total nitrogen contribution was from septic systems (LARWQCB, 2012). The Algae TMDL includes requirements for a 50 percent load reduction for total nitrogen from OWTS for both dry and wet weather. No load reductions for phosphorous were allocated to OWTS. The Algae TMDL recognizes that not all OWTS may be contributing to the impairment and allows for a special study to be conducted investigating the influence of OWTS on surface water quality. **The overall goal of this study is to determine the geographic area where OWTS are contributing to the algae impairment, allowing for total nitrogen load reductions to be targeted to OWTS that are impacting surface water quality**. A complementary study funded by the State Water Resources Control Board (SWRCB) and Los Angeles Region Water Quality Control Board (LARWQCB), is ongoing and will result in the development of a groundwater-surface water model of the VRW to evaluate dry weather instream flow quantity and quality (nitrogen specifically), and therefore will use results from this OWTS study to improve on previous estimates of septic contributions to the VRW nitrogen mass balance

Most parcels in the watershed are connected to a sanitary sewer system operated by either the Ojai Valley Sanitary District (City of Ojai and some surrounding areas) or the Ventura Water Reclamation Facility (City of Ventura), which treat sewage at centralized wastewater treatment facilities. However, a portion of the watershed, primarily unincorporated areas, is not serviced by these sanitary sewer systems and thus utilize OWTS for treatment of waste. Based on information provided by the Ventura County Watershed Protection District (VCWPD), it is estimated that there are 2,874 parcels with OWTS, primarily septic systems, within the Ventura River watershed, as shown in Figure 6. These parcels were determined based on OWTS applications/permits to the VCEHD (as of July 2015) and this estimate is slightly larger than the 2,131 parcels identified in the Algae TMDL (LWA, 2015)[2].

The OWTS Policy (SWRCB, 2012) was established by the State Water Resources Control Board (SWRCB) and became effective in May 2013. The OWTS Policy establishes a statewide, risk-based tiered approach for the regulation and management of OWTS installations and replacements. This policy was adopted as a result of Assembly Bill 885 (amendment to California Water Code section 13290), which required the SWRCB to develop statewide standards for permitting and operation of OWTS. The intent was to allow continued use of OWTS while also protecting water quality and human health.

The buffer surrounding the TMDL-covered reaches, as shown in Figure 6, represents a 600-foot distance extending from the stream centerline[3]. This buffer area was provided by VCEHD and is shown as a reference to the approximate area that would be required for advanced treatment by the Statewide OWTS Policy if no TMDL was in place for this watershed. However, the load reductions for OWTS in the Algae TMDL apply to the entire watershed, and it is through this study that the

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[2] The estimate cited in the Algae TMDL identified parcels with structures having private or public restrooms where there were no sewer lines. The total number of septic systems was then determined by subtracting the parcels where sewer services are available from all parcels.

[3] This differs from the OWTS policy and may be reevaluated to extend from the natural or levied bank for TMDL-covered reaches, per the OWTS policy.

contributing area of OWTS required for advanced treatment or connection to a sanitary sewer system may be modified.

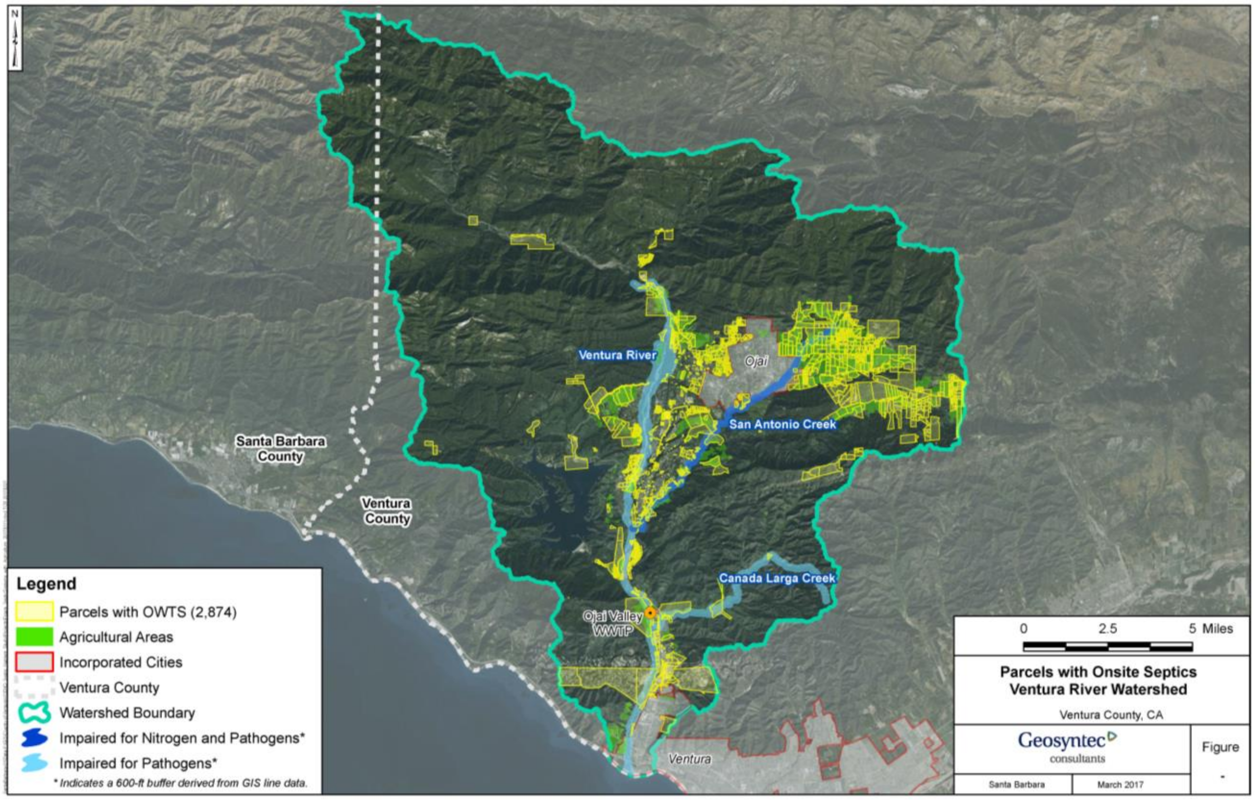

Figure 6. OWTS Parcels in the VRW

1.2 Study Objectives

The purpose of the State 319(h) grant-funded study was to define the geographic extent of OWTS that are contributing significant nitrogen loads to the TMDL-covered reaches of the Ventura River and its tributaries. OWTS usually release treated wastewater effluent into unsaturated soil via a leach field, which disperses any remaining organic materials and other contaminants prior to reaching groundwater. The treated effluent from OWTS can be a potential source of pollution to groundwater and surface waters if systems are not sited, maintained, or functioning properly. The OWTS may also contribute nutrients such as nitrate even in properly functioning systems. Nitrates from OWTS can persist in the subsurface environment potentially causing elevated concentrations in shallow groundwater, which can then flow into surface waters and impact surface water quality.

This study investigated the influence of OWTS on nitrogen impairments in the VRW. The objectives of the study included: (1) collecting information regarding nitrogen levels in the watershed through sampling and analysis of both groundwater and instream surface water at selected locations, with a focus on locations near OWTS and TMDL-covered waterbodies to capture spatial variability in water quality; and (2) identifying geographic areas where OWTS are contributing nitrogen to surface waters. The sampling and analysis performed for this study achieved objective 1 and the collected data was analyzed, as summarized in this report, to complete objective 2. The study questions addressed through this water quality monitoring included:

1. Are groundwater nitrogen levels elevated downgradient of OWTS areas? If yes, which OWTS areas?
2. Are these areas also impacted by sewage indicators that would further support OWTS as a source? If yes, which OWTS areas?
3. Are these impacted groundwaters impacting surface water nitrogen levels at upwelling locations? If yes, downstream of which OWTS areas?

1.3 Stakeholder Involvement

The LARWQCB provided input and approved the Monitoring Plan and QAPP, and the Technical Advisory Committee (TAC) also provided input throughout the planning and implementation phases of the study. Table 2 includes personnel and stakeholders involved in the Study. Several meetings have occurred throughout the study, as shown below.

- Kickoff meeting with VCEHD (September 27, 2016): outlined the project objectives, desired outcomes, sampling and analysis approach, stakeholder outreach, and project schedule.
- TAC Meeting (November 22, 2016): overview of VRW impairments and existing OWTS regulation, objectives and approach for the study, current project status, and schedule.
- TAC Meeting (June 13, 2017): outlined the selection of sampling locations and the schedule.

Table 2. Study Stakeholder Involvement

Name	Organization	Role
William Stratton	VCEHD	County Project Director
Charles Genkel	VCEHD	County Project Manager
Brandon Steets, P.E.	Geosyntec	Project Director
Jared Ervin, Ph.D.	Geosyntec	Project Manager
Shana Rapoport	LARWQCB	State Grant Manager
Renee Spears	SWRCB	State QA Program Manager
Ewelina Mutkowska	Ventura County PWA, Stormwater	TAC Member
Steve Offerman	Office of Ventura County Supervisor	TAC Member
Zoe Carlson	Ventura County Watershed Council	TAC Member
Ben Pitterle	Santa Barbara Channelkeeper	TAC Member
Jennifer Tribo	City of Ventura	TAC Member
Jeff Palmer	Ojai Valley Sanitation District	TAC Member
Jenny Newman	LARWQCB	TAC Member
Kevin Delano	SWRCB	TAC Member
Alma Quezada	Ventura County PWA, Groundwater	TAC Member
Greg Grant	City of Ojai Public Works	TAC Member
Lexi Everhart	Ventura County Resource Conservation District	TAC Member
Charles Genkel	Ventura County EHD	TAC Member

1.4 Organization

Section 2 describes the sampling performed for this study, including the sampling strategy, locations, schedule, and parameters. Section 2 also includes a brief discussion on the potential impacts of the Thomas Fire on the study. Section 3 summarizes the sampling data collected for this study, including nutrients, pharmaceutical and personal care products as sewage indicators, and nitrate isotopes. Section 4 presents the geographic areas where OWTS have a high risk of contributing nitrogen to surface waters, including an overview of the approach to develop the OWTS contribution risk map and a detailed discussion of the sampling results. Section 4 also includes a comparison of sampling data from the study to historical water quality data and a discussion of uncertainties associated with the risk map.

2 SAMPLING ACTIVITIES

Sampling and analysis for this study were conducted at numerous surface and groundwater locations using both low-cost analytical methods (to determine where nitrogen in groundwater may be impacting surface water) and advanced forensic tools (to identify nutrient sources). Samples were collected from surface waters upstream and downstream of upwelling stream reaches and from groundwater between upwelling reaches and OWTS. Samples were collected from 29 locations in the VRW (21 groundwater locations and eight surface water locations) during three sampling events from August 2017 to May 2018. Samples were analyzed for nitrogen compounds, in addition to advanced forensic tools including chemical sewage indicators and stable nitrate isotopes.

2.1 Sampling Locations

2.1.1 Groundwater Sampling Locations

During development of the Monitoring Plan, 24 existing groundwater monitoring wells were selected as monitoring locations (21 primary wells and 3 background wells). Additional wells were selected as backup wells in case of access or other issues. Refer to section 3.2.1 of the Monitoring Plan for a detailed description of the methodology used to select groundwater sampling locations, which utilized Geographic Information Systems (GIS) software and available datasets such as geology. In general, wells were selected close to upwelling reaches because the concentration of nitrate there is as close as possible to what is being discharged into the stream. Nitrate measured in wells further away from streams would undergo transformation and dilution before reaching the stream. Wells were also selected in differing geology (i.e., alluvium and bedrock), even though areas near upwelling reaches (known at the time of Monitoring Plan development based on available information) in bedrock geology could not be identified, because movement of groundwater is expected to vary based on geology. Groundwater is expected to move slowly (unless fractures allow preferential flow paths providing more rapid transport) and have more heterogeneous and unpredictable flow paths in bedrock compared to alluvial areas. Wells were sorted based on geologic classification (bedrock or alluvial) and categorized into alphabetical group names (i.e. A, B, C, etc.) based on proximity to each other.

Background monitoring wells, located near primary wells selected for sampling but upgradient of most nearby OWTS, were also selected for sampling. The background groundwater sampling locations were intended to have little to no upgradient sources nearby, to quantify water quality that is not impacted by potential sources, but it should be noted that low density OWTS, sanitary sewers, and/or agricultural areas may still be present further upgradient.

During the first sampling/reconnaissance event, the selected groundwater sampling wells were examined for feasibility of collecting samples, which included accessibility to wells, access/availability of groundwater in the wells, safety considerations, etc. Some wells selected in the Monitoring Plan were not feasible[4], so previously identified backup wells were instead used[5]. The primary and background wells used for sampling are listed in Table 3 and shown in Figure 7. Additional data for these wells, including all wells identified as backup, are included in Appendix C of the Monitoring Plan.

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[4] This includes GW-B-01, GW-B-02, GW-C-01, GW-C-02, GW-C-03, GW-D-01, GW-D-02, GW-D-03, GW-E-01, GW-F-01, GW-G-03, GW-A-BK-05, and GW-B-BK-04.

[5] Specifically, GW-A-07, GW-B-04, GW-B-05, GW-C-07, GW-C-08, GW-D-04, GW-D-05, GW-D-07, GW-F-02, and GW-C-BK-06.

Table 3. Groundwater Sampling Wells

Location ID	Group	Designation	State Well Number	Latitude	Longitude	Owner	Groundwater Basin	Area Geology
GW-A-01	A	Primary	04N23W16C09S	34.42933	-119.29386	Private	Ventura River-upper	Alluvium
GW-A-02	A	Primary	04N23W16C10S	34.43021	-119.29633	Ventura River Water Dist	Ventura River-upper	Alluvium
GW-A-03	A	Primary	04N23W16F04S	34.42908	-119.29635	Ventura River Water Dist	Ventura River-upper	Alluvium
GW-A-04	A	Primary	04N23W16C08S	34.43169	-119.29564	Ventura River Water Dist	Ventura River-upper	Alluvium
GW-A-07	A	Primary	04N23W16B05S	34.43057	-119.29121	Meiners Oaks Co Water	Ventura River-upper	Alluvium
GW-B-03	B	Primary	04N23W20R01S	34.40681	-119.30458	Private	Ventura River-upper	Alluvium
GW-B-04	B	Primary	04N23W29F02S	34.39956	-119.31203	Private	Ventura River-upper	Alluvium
GW-B-05	B	Primary	04N23W29F04S	34.39824	-119.31371	Private	Ventura River-upper	Alluvium
GW-C-04	C	Primary	03N23W08B01S	34.35972	-119.30915	Ventura Water	Ventura River-upper	Bedrock/shallow alluvium[a]
GW-C-BK-05	C	Background	04N23W32Q01S	34.37539	-119.30825	Ojai Valley Land Cons	Ventura River-upper	Bedrock/shallow alluvium[a]
GW-C-BK-06	C	Background	04N23W33N02S	34.37798	-119.30012	Girl Scouts	Ventura River-upper	Bedrock/shallow alluvium[a]
GW-C-07	C	Primary	03N23W05P02S	34.36258	-119.31170	Ventura Water	Ventura River-upper	Bedrock/shallow alluvium[a]
GW-C-08	C	Primary	03N23W08C02S	34.35992	-119.31133	Ventura Water	Ventura River-upper	Bedrock/shallow alluvium[a]
GW-D-04	D	Primary	04N23W28G01S	34.39718	-119.28914	Private	Ventura River-upper	Alluvium
GW-D-05	D	Primary	04N23W22P04S	34.40444	-119.27958	Private	Ventura River-upper	Alluvium
GW-D-07	D	Primary	04N23W33M03S	34.38198	-119.30143	Girl Scouts	Ventura River-upper	Alluvium
GW-E-02	E	Primary	04N22W07C06S	34.44698	-119.22444	Soule Park Golf Course	Ojai Valley	Alluvium
GW-E-03	E	Primary	04N22W07C05S	34.44612	-119.22428	Soule Park Golf Course	Ojai Valley	Alluvium
GW-F-02	F	Primary	03N23W06R02S	34.36342	-119.32072	Private	Undefined	Bedrock
GW-G-01	G	Primary	04N23W02M01S	34.45382	-119.26611	Private	Ventura River - Upper	Bedrock
GW-G-02	G	Primary	04N23W02B01S	34.46021	-119.25633	Private	Ventura River - Upper	Bedrock

[a] Located in an area classified as bedrock (i.e., sandstone or mudstone) but where shallow alluvium is likely present based on alluvium thickness information from DBS&A (2018).

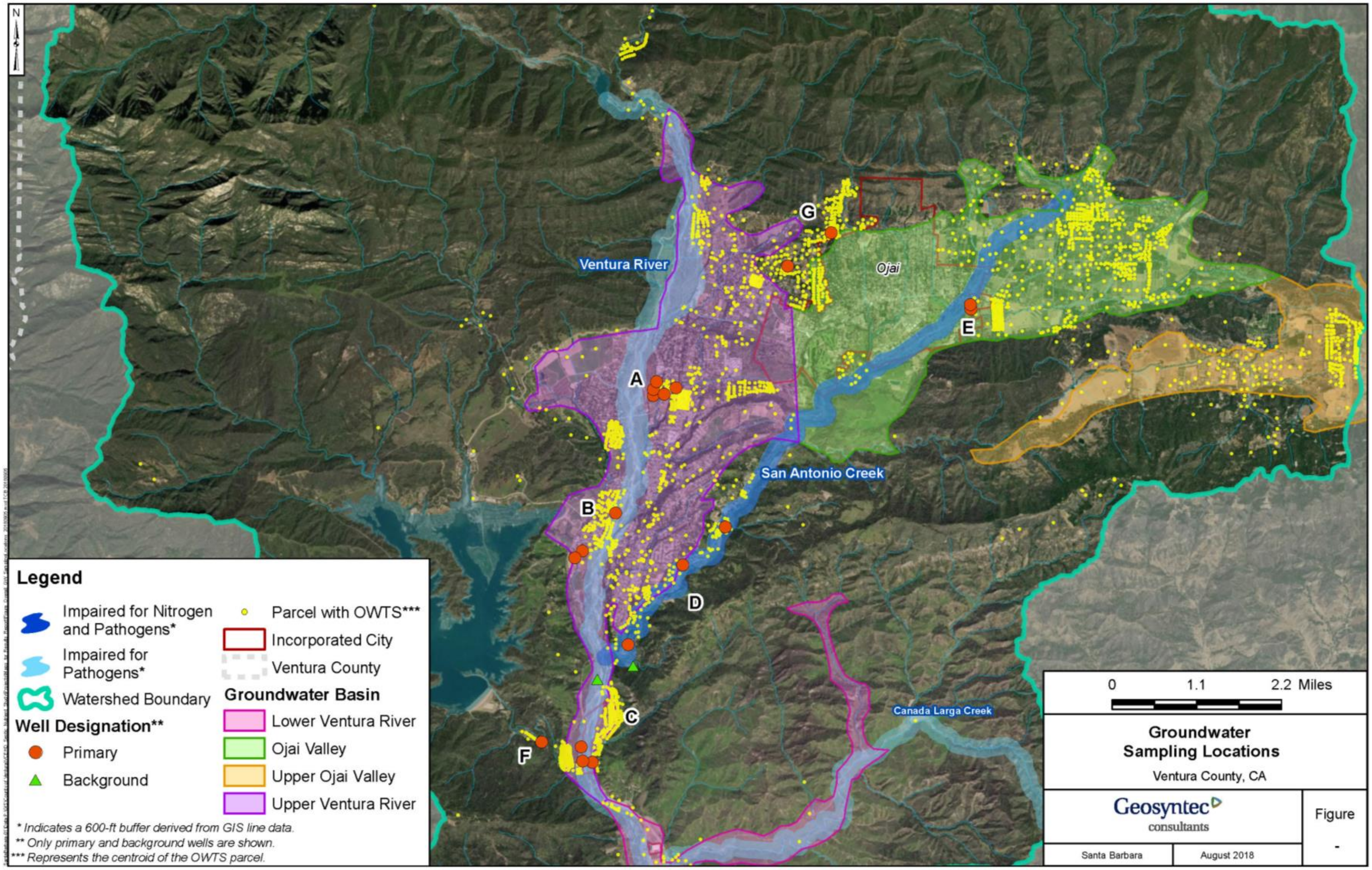

Figure 7. Groundwater Sampling Locations

The groundwater sampling wells were characterized based on the level of potential influence from nearby OWTS, which was defined as the number of OWTS located within a certain distance upgradient of the well ("upgradient OWTS density"). This characterization was intended to describe the relative magnitude of potential influence of OWTS, and sampling data collected for the study was then used to determine to what extent the wells were influenced by OWTS. Recent literature has noted trends potentially associating septic density with surface water contamination, using sewage markers, which justifies this approach.

To characterize the upgradient OWTS density, GIS was used to draw a buffer (2,000 feet in radius[6]) around the well location, then the "upgradient area of influence" was defined as the area within this buffer with a ground surface elevation higher than the ground surface elevation at the well location. Groundwater flow patterns roughly correspond to ground surface elevations (more so in alluvium areas than bedrock), so it was assumed that the ground surface elevations could be used to approximate groundwater flow patterns and define the areas where OWTS could influence groundwater from the given well. If the well was located in close proximity to a major waterbody (Ventura River or San Antonio Creek), such that the area (within the buffer and at a higher surface elevation) included area on both sides of the major waterbody, areas on the opposite side of the major waterbody as the well were removed from the upgradient area of influence for the given well. This representation of the area where groundwater may influence groundwater quality at a given well is an approximation and contains uncertainty. The surface water-groundwater model for the VRW currently in development for the SWRCB and RWQCB may be used to confirm or refine these approximations in the future.

The number of OWTS located[7] within this upgradient area of influence was determined for each sampled well and the OWTS density was calculated using the size of the area of influence for each well. Each sampled well was then classified as having low, medium, or high upgradient OWTS density (to be described further in Section 4.2).

Defining the upgradient OWTS density of wells was used to aid in evaluating the sampling data (to be discussed further in Section 3), and it was also used in confirming the definition of background wells. Background wells were sampled to represent groundwater quality without any potential influence from OWTS. The background wells selected during development of the Monitoring Plan were confirmed as appropriate due to the lack of or very small number of upgradient OWTS present. Table 4 shows the number of OWTS within the upgradient area of influence and corresponding background, low, medium, or high OWTS density designation for

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[6] The criteria for selecting this radius will be further discussed in Section 4.2.

[7] Exact locations of the OWTS are not known. This was represented by the centroid of each parcel identified as having an OWTS.

each sampled well. Figure 8 illustrates the number of upgradient OWTS density and density designations.

Table 4. OWTS Density Upgradient of Sampled Groundwater Wells

Location ID	Number of OWTS	Area of Upgradient Area of Influence[1] (acres)	Upgradient OWTS Density (#/acre)	Upgradient OWTS Density Designation
GW-C-BK-06	1	182	0.0055	Background
GW-C-BK-05	1	117	0.0085	Background
GW-D-07	5	138	0.036	Low
GW-D-05	10	214	0.047	Low
GW-B-05	15	214	0.070	Low
GW-F-02	11	151	0.073	Low
GW-D-04	20	178	0.11	Low
GW-B-04	41	173	0.24	Medium
GW-G-01	52	205	0.25	Medium
GW-C-04	47	138	0.34	Medium
GW-E-02	43	123	0.35	Medium
GW-A-04	75	189	0.40	Medium
GW-E-03	56	137	0.41	Medium
GW-B-03	40	96	0.42	Medium
GW-G-02	69	166	0.42	Medium
GW-A-02	83	171	0.48	Medium
GW-C-07	85	131	0.65	Medium
GW-A-03	108	142	0.76	Medium
GW-A-07	225	215	1.1	High
GW-C-08	96	82	1.2	High
GW-A-01	222	162	1.4	High

[1] Defined as area with higher ground surface elevation than the ground surface elevation of the well within a circle centered on well having a radius of 2,000 ft, refer to section 4.2.7 for rationale

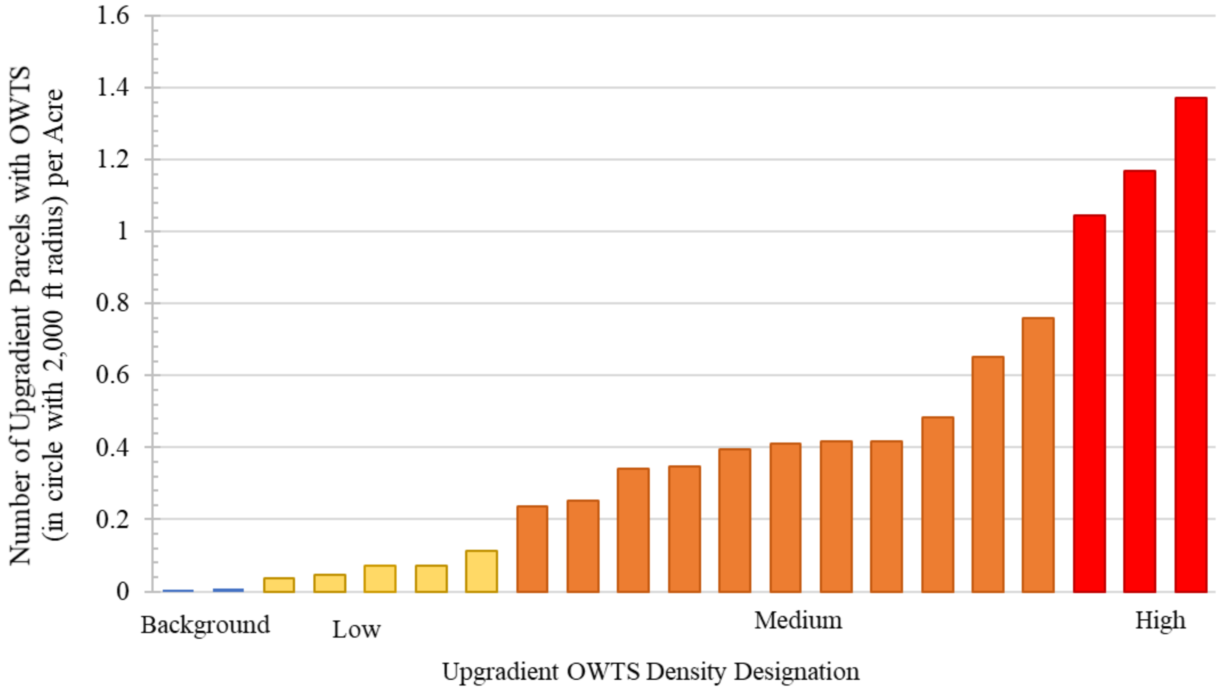

Figure 8. Upgradient OWTS Density of Sampled Wells and Density Designations

Additionally, available boring logs, well configuration, and local geology were analyzed for each of the sampled wells. It was necessary to evaluate available data in order to determine if the groundwater sampled from the wells has the potential to be influenced by nearby OWTS. Influence was considered unlikely in locations where an impermeable zone (i.e., confining layer such as clay or bedrock) was present above the screened portion of the well, because the impermeable zone prevents interactions between the deeper groundwater extracted from the well and the shallow groundwater influenced by OWTS effluent. However, some areas, such as the Ojai Valley groundwater basin, have confined areas that are fed by unconfined areas, such that confined areas can be influenced by OWTS in unconfined areas. Because this interaction was possible but difficult to evaluate for each well, wells with confined layers above the screened portion of the well were considered unlikely, but not impossible, to be potentially influenced by OWTS.

It was determined that groundwater sampling wells GW-G-01, GW-E-02, GW-E-03, and GW-C-BK-06 are unlikely to be influenced by OWTS effluent based on the presence of an impermeable zone. The entire depth of the GW-G-01 well lies within sespe bedrock, with a screen depth from 100 to 515 feet beneath the ground surface (DWR, 1990). GW-E-02 and GW-E-03 are located in an area with boulders and clay from the ground surface to 115 feet below ground surface, sand/gravel from 115 to 162 feet below ground surface, hard shale from 162 to 170 feet below ground surface, and sand/gravel from 170 to 300 feet below ground surface (VCWPD, 2018a; California Regional Water Pollution Control Board, 1961). GW-E-02 is screened from 200 to 580 feet below ground surface, and GW-E-03 is screened from 192 to 228 feet. Because the screened depth of these wells are located below bedrock, clay, or hard shale, influence from OWTS effluent is unlikely. Sampling data for these wells have been included in all maps and summary tables (but shown as partially transparent in maps). However, results were not considered as heavily for overall conclusions regarding the potential influence of OWTS on groundwater quality since it was determined that OWTS effluent may not be influencing the sampled groundwater due to the presence of confining layers.

GW-C-BK-06 is primarily in bedrock (clay rock or gravel/rock) and has a screened depth from 60 to 105 feet below ground surface (DWR, 1977). This well also has a low possibility for interactions with OWTS effluent. Because GW-C-BK-06 is located upgradient of OWTS locations and was classified as a background well to evaluate background concentrations, sampling data for this well was still used in analyses. It is important to note that adequate well/boring log data was not found for all sampling locations. Wells without sufficient information available were assumed to have the potential for interactions with OWTS effluent.

2.1.2 Surface Water Sampling Locations

Eight surface water locations were selected for sampling. Locations were selected based on their location on a TMDL-covered stream reach, on an upwelling stream reach, in an area of known dry weather flow, and in relation to other existing monitoring locations and groundwater sampling locations. Additionally, spatial distribution was considered such that a large portion of the reaches were represented. Refer to section 3.3.1 of the Monitoring Plan for a full description of how surface water sampling locations were selected.

All selected groundwater sampling groups have at least one associated downgradient surface water sampling location identified, although some groups are a considerable distance from the nearest upwelling stream reach. It was not possible to have a nearby surface water location for all groundwater monitoring groups. Wells downgradient of OWTS near upwelling reaches were not available in bedrock areas. While groups F and G do not have a nearby surface water location directly associated with them, more distant surface water locations are included and the influence on groundwater in these areas will be used to extrapolate to other areas where surface waters could be impacted. Surface water locations SW-01-D, SW-02-U, SW-04-U, SW-04-D, and SW-05-D are not located on reaches that were previously identified as upwelling during development of the Monitoring Plan (based on information from Cardno Entrix [2012]). Sites SW-04-U and SW-04-D are located in an area of San Antonio Creek where upwelling has been reported, but flow mapping data suggests that these areas can change from year to year. However, the surface water locations sampled during this study had flow during at least one of the sampling events and are therefore upwelling (even if intermittently). The surface water locations sampled for the study are listed in Table 5 and shown in Figure 9.

Table 5. Surface Water Sampling Locations

Location ID	Waterbody	Latitude	Longitude	Upstream or Downstream of GW Sampling Locations	Corresponding GW Sampling Location Group
SW-01-D	Ventura River	34.42516	-119.30253	Downstream	A, G
SW-02-D	Ventura River	34.39972	-119.30829	Downstream	B
SW-02-U	Ventura River	34.41085	-119.30134	Upstream	B
SW-03-D	Ventura River	34.35421	-119.30994	Downstream	C, F
SW-03-U	Ventura River	34.37451	-119.30783	Upstream	C
SW-04-D	San Antonio Creek	34.38237	-119.30276	Downstream	D
SW-04-U	San Antonio Creek	34.42471	-119.25992	Upstream, Downstream	D, G
SW-05-D	San Antonio Creek	34.44436	-119.23018	Downstream, Upstream	E, G

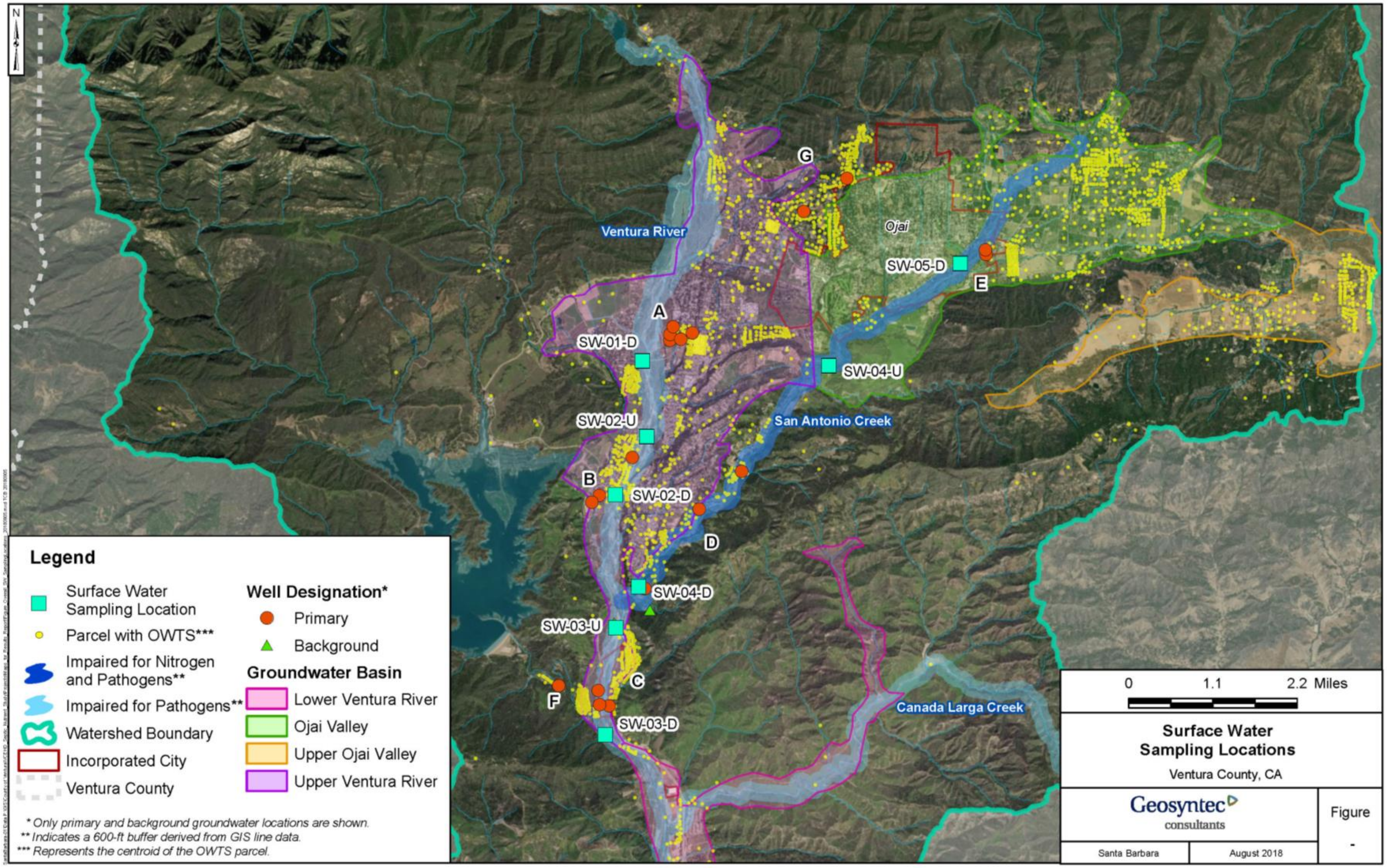

Figure 9. Surface Water Sampling Locations

2.2 Field Procedures

Standard field procedures that were followed during sampling activities are outlined in this section. The Field Forms and Procedures in Appendix A of the Monitoring Plan include detailed instructions for field measurement and sampling procedures (for both groundwater and surface water sampling) used by the field sampling team. Quality assurance and quality control methods outlined in the QAPP were also followed. Appendix A of the Monitoring Plan also contains references to Standard Operating Procedures (SOPs) that were reviewed by the sampling team. These SOPs contain more detailed information on sampling procedures, such as preparation for sampling, equipment needed, procedures for collection of samples, safety concerns, etc.

The general field procedure for groundwater sampling included water level measurement using an electronic water level indicator, purging of three well volumes to remove standing water and to facilitate collection of representative groundwater during sampling, and collection of samples for analysis. Field measurements were recorded at regular time intervals during purging. The general procedure for surface water sampling included collecting field measurements using a water quality meter, making aesthetic observations, measuring flow using a measuring tape and flow meter, and collecting grab samples. For both the groundwater and surface water samples, samples were collected in the laboratory supplied bottles and stored in ice-filled coolers. Additionally, proper chain of custody documentation was maintained until the samples were relinquished to a laboratory courier.

2.3 Sampling Schedule

Sampling occurred at the selected surface water and groundwater locations during three events in August/September 2017, April 2018, and May 2018, as shown in Table 6. During each of these events, 24-25 sites were sampled. Because the sampling design is focused on dry weather periods when groundwater influence on surface water quality is greatest, sampling did not occur during the winter. Additionally, nutrient levels in surface water generally peak in the winter months from winter storm events, which transport nutrients through surface runoff from both urban and agricultural areas.

Table 6. Sampling Event Schedule

Action	Date
Sampling Event #1	8/23/2017 - 8/25/2017; 9/18/2017 - 9/21/2017
Sampling Event #2	4/2/2018 - 4/6/2018
Sampling Event #3	5/14/2018 - 5/17/2018

2.4 Sampling Parameters

Field parameters were collected in the field for groundwater and surface water samples. Additionally, samples were analyzed for nutrients, pharmaceutical and personal care products (PPCPs), and stable nitrate isotopes, as shown in Table 7. Presence of the PPCPs listed in Table 7 may indicate the presence of wastewater impacts. To further identify nitrate sources, stable nitrate isotope analyses were performed.

Sampling parameters were selected with consideration of requirements specified in the Algae TMDL identified as being contributed by OWTS. The Ventura River (and estuary) and its tributaries were identified on the CWA Section 303(d) list of impaired waterbodies for algae, eutrophic conditions, low dissolved oxygen, and nitrogen. The algae and nutrient related impairments are primarily caused by high loadings of nutrients, including nitrogen, and nitrogen load reductions were identified for OWTS in the watershed.

Table 7. Sampling Parameters

Category	Laboratory	Parameter
Field Parameters	N/A	Temperature
		pH
		Oxidation-reduction potential (ORP)
		Turbidity
		Dissolved Oxygen
		Total Dissolved Solids
		Specific Conductivity
Nutrients	Physis Environmental Laboratories, Inc. IIRMES Weck Laboratories, Inc.[a]	Nitrate-N
		Nitrite-N
		Total Nitrogen
		Ammonia-N
PPCPs	Weck Laboratories, Inc.	Acetaminophen
		Atenolol
		Azithromycin
		Caffeine
		Carbamazepine
		Cotinine
		Primidone
		Sucralose
Isotopes	Source Molecular	d^{18}O-NO$_3$
		d^{15}N-NO$_3$

[a] Performed make-up nutrient analyses for select samples

2.5 Potential Impacts from the Thomas Fire

The potential impact of the Thomas Fire on sampling activities for the study was investigated. The Thomas Fire ignited on December 4, 2017 and burned within the VRW, as shown in Figure 10. It was not officially extinguished until June 1, 2018.

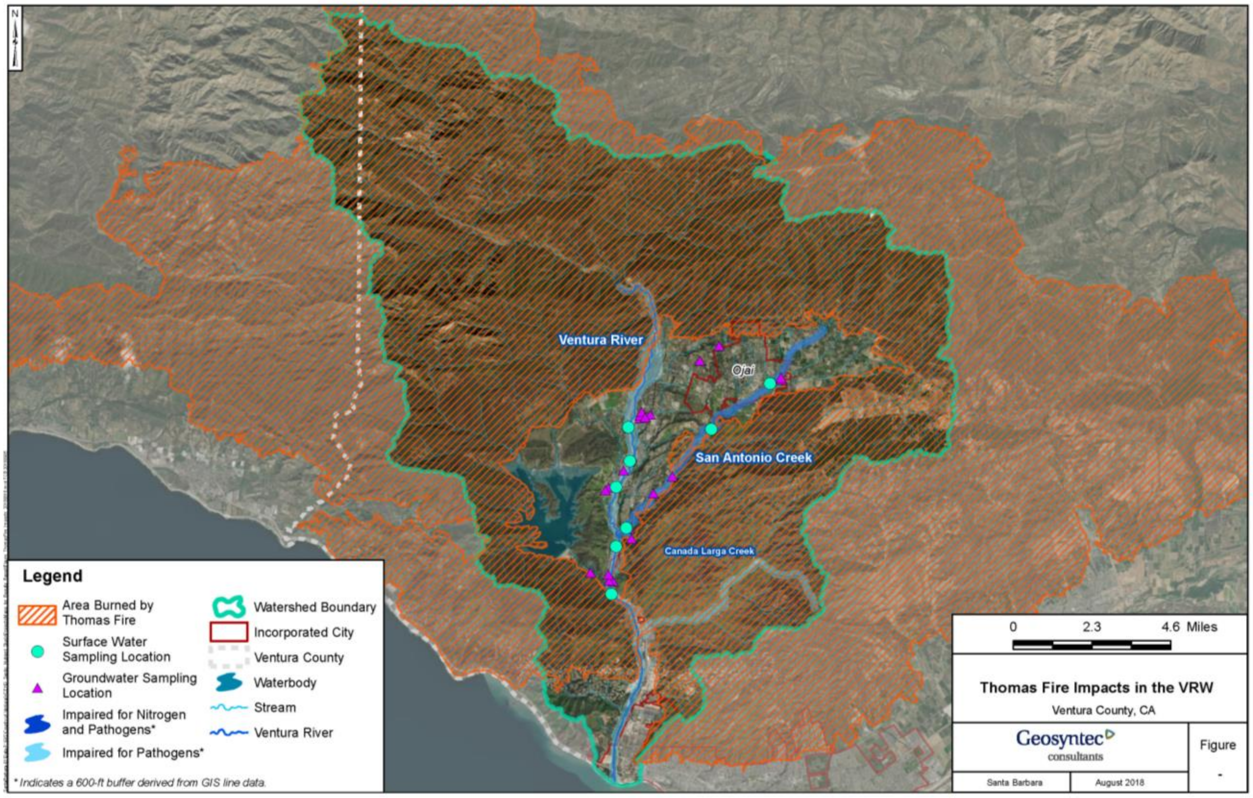

Figure 10. Thomas Fire Perimeter

The Ventura County Watershed Protection District (VCWPD) performed post fire stormwater quality monitoring within Ventura County. Within the VRW, sampling occurred at the major outfalls (Meiners Oaks-1 [MO-MEI] and Ojai-1 [MO-OJA]) and mass emission site (ME-VR2). The drainage areas for these monitoring locations, in addition to portions of the drainage area burned by the Thomas Fire, are shown in Figure 11 through Figure 13.

Regular monitoring at these locations (for nitrate + nitrite as N[8]) began in 2009. The first flush and first post-fire storm monitoring event occurred on January 8th and 9th, 2018, and there are a total of three sample results post-fire available for each monitoring location to date. A summary of sample results for nitrate + nitrite as N is shown in Table 8. There was not a significant increase

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[8] Nitrate as N results not available.

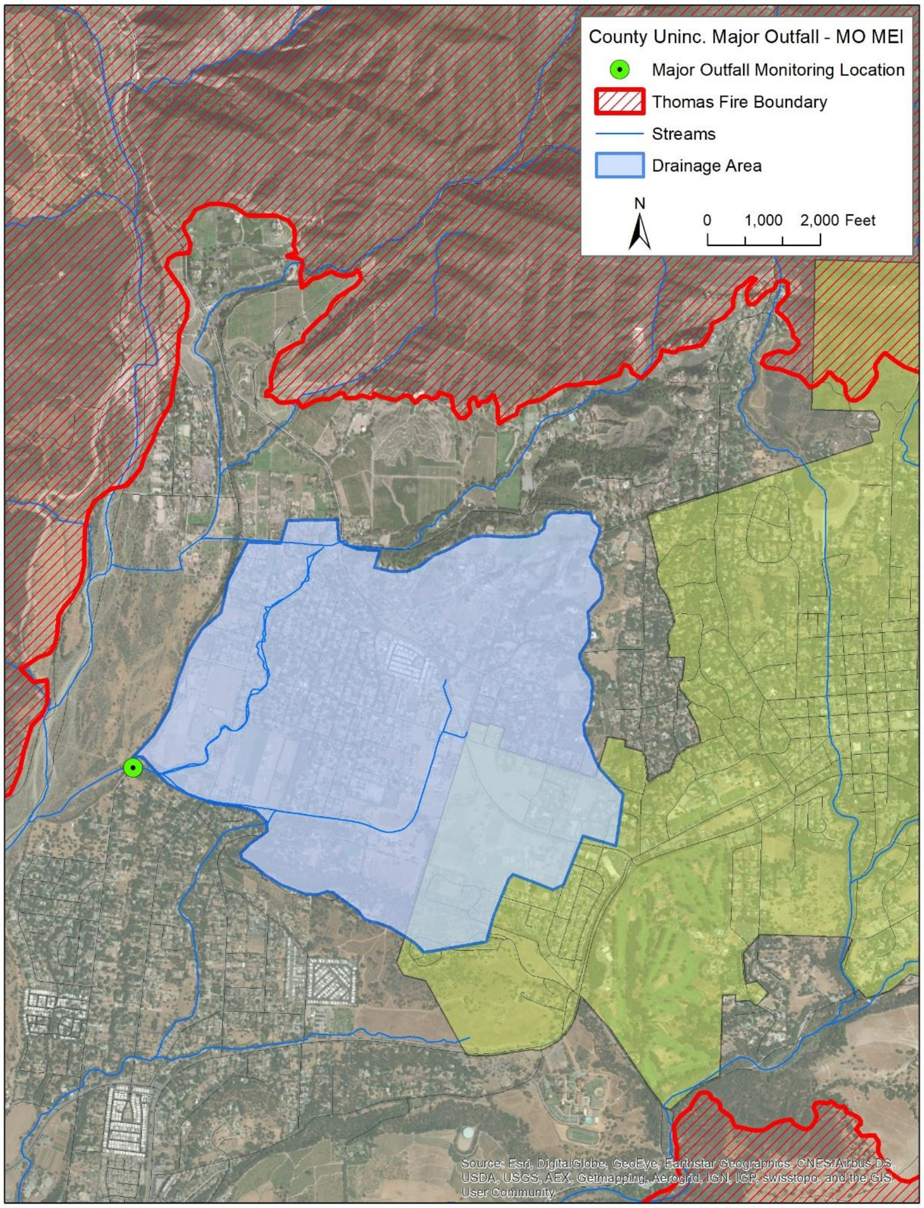
in concentrations of nitrate + nitrite due to the Thomas Fire. Although post-fire data is still fairly limited, average nitrate + nitrite concentrations actually decreased post-fire at MO-MEI and ME-OJA, and only increased slightly at ME-VR2 post-fire. Although, the drainage area for MO-MEI was not burned in the Thomas Fire, it is expected to have received significant ash fall throughout the period of adjacent land burn. Data shown in Table 8 includes wet weather data, and this study focused exclusively on dry weather. However, the comparison between pre and post-Thomas Fire data is still informative of any potential changes in water quality due to the fire.

Table 8. Summary of Post-Thomas Fire Impacts

Sampling Location	Historic Data (pre-fire)					First flush/ post-fire Event (Jan 8-9, 2018)	Post-fire to Present				
	Date Range	n[1]	Nitrate + Nitrite as N (mg/L)			Nitrate + Nitrite (mg/L)	Date Range	n[1]	Nitrate + Nitrite as N (mg/L)		
			Min	Max	Average				Min	Max	Average
ME-VR2	10/14/09 - 1/19/17	26	0.076	1.6	0.53	0.54	1/9/18 - 3/11/18	3	0.49	0.83	0.62
MO-MEI[2]	10/14/09 - 1/19/17	25	0.25	2.1	0.91	0.92	1/9/18 - 3/11/18	3	0.37	0.92	0.58
ME-OJA	10/14/09 - 1/19/17	25	0.01	2.2	0.61	0.4	1/9/18 - 3/11/18	3	0.32	0.4	0.35

[1] n = number of samples

[2] The drainage area of MO-MEI was not burned by the Thomas Fire.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 11. Thomas Fire Impacts – Meiners Oaks Major Outfall Drainage Area (VCWPD, 2018b)

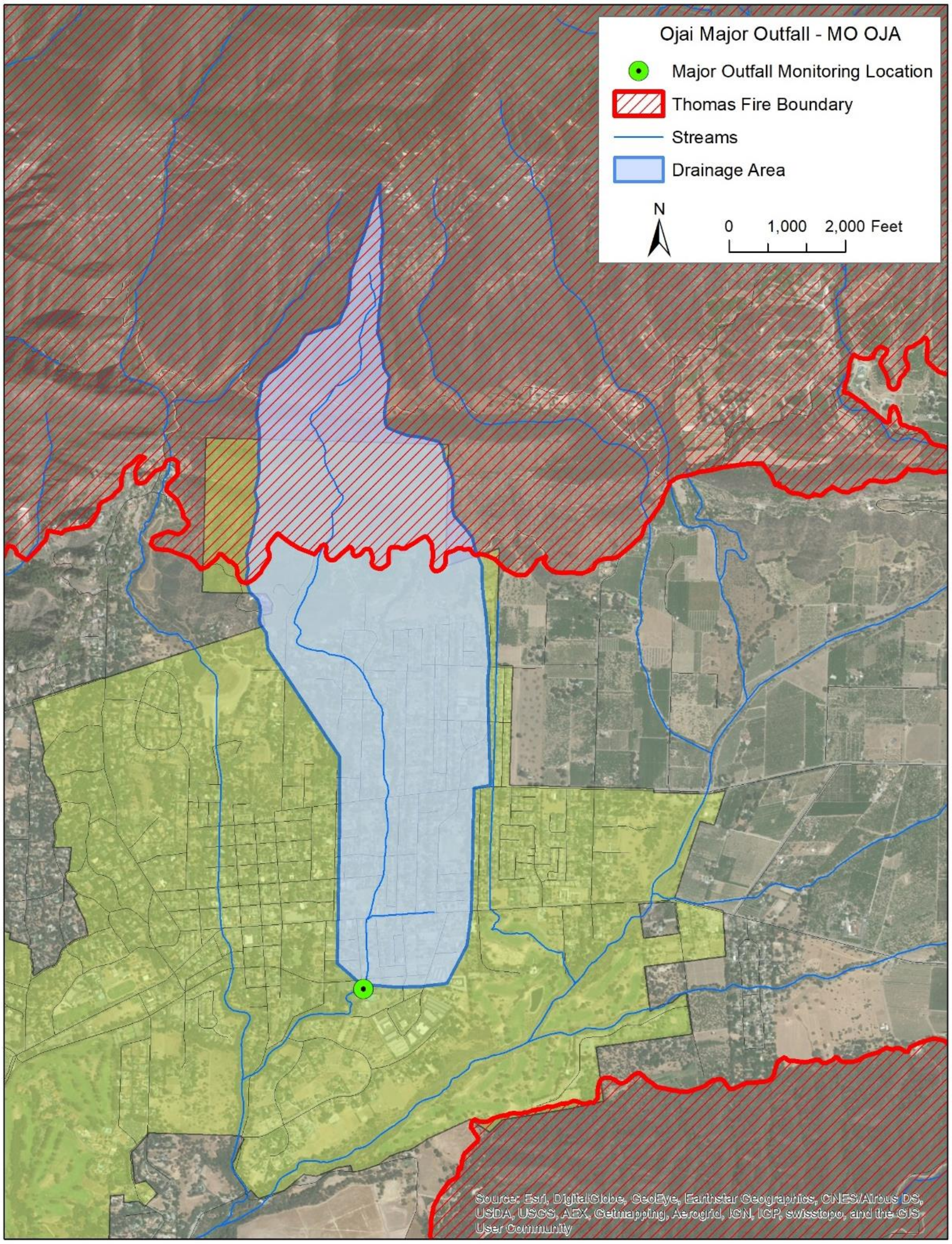


Figure 12. Thomas Fire Impacts – Ojai Major Outfall Drainage Area (VCWPD, 2018b)

Figure 13. Thomas Fire Impacts – Mass Emissions VR2 Drainage Area (VCWPD, 2018b)

2.6 Lab Analyses

Analytical methods were selected from USEPA-approved methods, where possible, to meet Monitoring Plan requirements, including ensuring reporting accuracy and method detection limits. The contracted laboratories supplied certified-clean sample containers for all analyses. Additional information regarding analytical data quality objectives, including accuracy, precision, percent recovery, target reporting limits, and completeness are included in the QAPP (Geosyntec Consultants, 2017b). Table 9 shows the analytical methods, container types, sample volumes, preservative requirements, and holding times for laboratory analyses.

Table 9. Laboratory Analyses

Parameter	Units	Analysis Method	Bottle Type	Bottle Size	Preservative	Holding Time (days)
Nitrate-N	mg/L	EPA 300.0	Polyethylene	500 mL[a] or 1000 mL[b]	< 6°C	2
Nitrite-N	mg/L	EPA 300.0				
Ammonia-N	mg/L	EPA 350.1	Polyethylene	500 mL[a] or 1000 mL[b]	< 6°C, H_2SO_4	28
Total Nitrogen	mg/L	Catalytic Combustion				
PPCPs [c]	ng/L	1694-ESI+	Amber glass	2 x 1000 mL	<4°C, Sodium azide, Ascorbic acid	28
Nitrate isotopes	‰	Adapted from USGS method 2900	HDPE	2 x 100 mL	<4°C, filtered	7

[a] Used for Sampling Event #1
[b] Used for Sampling Events #2 and #3
[c] Full list of PPCPs is included in Section 2.4

2.7 Summary of Sampling Data Collected

Over the course of the three sampling events, samples were collected from 21 groundwater wells and eight surface water locations. Table 10 and Table 11 summarize the number of sampling events where samples were collected for each groundwater monitoring well and surface water sampling location, respectively. Most sites were sampled during all three events; however, due to access limitations to wells and no flow at some surface water sites, some sites were only sampled during one or two events.

Table 10. Sampling Event Summary for Groundwater Wells

Area Geology	Group	Location ID	Number of Samples Collected
Alluvium	A	GW-A-01	3
		GW-A-02	3
		GW-A-03	3
		GW-A-04	3
		GW-A-07	3
Alluvium	B	GW-B-03	3
		GW-B-04	3
		GW-B-05	1
Bedrock/shallow alluvium[a]	C	GW-C-01[b]	1
		GW-C-04	1
		GW-C-07	3
		GW-C-08	3
		GW-C-BK-05	2
		GW-C-BK-06	3
Alluvium	D	GW-D-04	2
		GW-D-05	3
		GW-D-07	3
Alluvium	E	GW-E-02	2
		GW-E-03	3
Bedrock	F	GW-F-02	3
Bedrock	G	GW-G-01	3
		GW-G-02	3
Total			**57**

[a] Located in an area classified as bedrock (i.e., sandstone or mudstone) but where shallow alluvium is likely present (DBS&A, 2018).

[b] Sampled once but not included in analyses because site was determined not representative of unconfined groundwater.

Table 11. Sample Event Summary for Surface Water

Waterbody	Location ID	Corresponding GW Sampling Location Group	Upstream or Downstream of GW Sampling Locations	Number of Samples Collected
Ventura River	SW-01-D	A, G	Downstream	2
	SW-02-D	B	Downstream	1
	SW-02-U	B	Upstream	2
	SW-03-D	C, F	Downstream	3
	SW-03-U	C	Upstream	3
San Antonio Creek	SW-04-D	D	Downstream	2
	SW-04-U	D, G	Upstream, Downstream	2
	SW-05-D	E, G	Downstream, Upstream	2
Total				**17**

3 SAMPLING DATA EVALUATION

Sampling results for nutrients, PPCPs, and nitrate isotopes were each evaluated as three separate potential lines of evidence for OWTS impacts to groundwater and subsequently, surface water. Elevated nutrient levels downgradient of OWTS were investigated in groundwater sampling results to identify areas where groundwater was potentially impacted by OWTS. PPCPs and nitrate isotope ratios were used as supporting lines of evidence that groundwater was impacted by OWTS. Any PPCP result above the laboratory reporting limit was considered evidence of OWTS impacts. Similarly, nitrate isotope ratios within the published range for sewage were considered to be an indication of OWTS impacts. Finally, surface water data near areas of potentially impacted groundwater were examined, for nutrients, PPCPs, and nitrate isotopes, for potential impacts to surface waters due to OWTS.

3.1 Nutrient Sampling Results

Groundwater and surface water samples were analyzed for ammonia, nitrite, nitrate, and total nitrogen. Table 12 shows the average nitrogen concentrations in groundwater (averaged over all sampling events), and Table 13 shows average nitrogen concentrations in surface water (also averaged over sampling events). Figure 14 illustrates average nitrate concentrations for both groundwater and surface water spatially. Although samples were analyzed for ammonia, nitrite, nitrate, and total nitrogen, evaluation of results focused more heavily on nitrate results. Ammonia is high in septic effluent/sewage but is quickly converted to nitrate in the subsurface, which is relatively stable in groundwater (AWWA, 2002). Ammonia was not detected in most samples and nitrite was either not detected or detected at very low concentrations, so these were not likely impacting surface water throughout the VRW. Nitrogen results for all individual samples are included in Appendix A.

In general, nitrogen results show higher nitrate levels in groundwater located within bedrock geology (vs. alluvial), and where there are higher densities of nearby upgradient OWTS. Nitrate levels in surface water appear to be highest in areas not previously identified as upwelling during development of the Monitoring Plan (based on available information). These trends will be discussed further in Section 4.

Table 12. Average Nitrogen Concentrations in Groundwater from Study

Location ID	Group	Geology	Upgradient OWTS Density (#/acre)	Sample Size	Average Concentration in mg/L			
					Ammonia as N	Nitrate as N	Nitrite as N	Total Nitrogen[c]
GW-A-01	A	Alluvium	High (1.4)	3	ND	5.88	ND	8.21
GW-A-02	A	Alluvium	Medium (0.48)	3	0.08	3.36	0.03	4.32
GW-A-03	A	Alluvium	Medium (0.76)	3	ND	4.76	0.03	5.92
GW-A-04	A	Alluvium	Medium (0.40)	3	ND	2.25	0.03	3.22
GW-A-07	A	Alluvium	High (1.0)	3	0.10	11.26	0.03	14.33
GW-B-03	B	Alluvium	Medium (0.42)	3	ND	1.82	0.02	2.46
GW-B-04	B	Alluvium	Medium (0.24)	3	ND	1.14	0.03	1.73
GW-B-05	B	Alluvium	Low (0.070)	1	DNQ	3.05	0.04	6.19
GW-C-04	C	Bedrock/Shallow Alluvium[a]	Medium (0.34)	1	ND	3.25	ND	6.40
GW-C-07	C	Bedrock/Shallow Alluvium[a]	Medium (0.65)	3	ND	1.44	ND	2.26
GW-C-08	C	Bedrock/Shallow Alluvium[a]	High (1.2)	3	ND	1.79	ND	2.44
GW-C-BK-05[b]	C	Bedrock/Shallow Alluvium[a]	Background (0.0085)	2	ND	1.27	0.04	2.49
GW-C-BK-06[b]	C	Bedrock/Shallow Alluvium[a]	Background (0.0055)	3	3.25	0.44	0.04	4.47
GW-D-04	D	Alluvium	Low (0.11)	2	ND/DNQ	2.45	ND	3.77
GW-D-05	D	Alluvium	Low (0.047)	3	3.54	0.19	ND	3.63
GW-D-07	D	Alluvium	Low (0.036)	3	ND	0.29	ND	0.42
GW-E-02	E	Alluvium	Medium (0.35)	2	ND	2.19	ND	2.24
GW-E-03	E	Alluvium	Medium (0.41)	3	1.09	2.19	0.02	5.58
GW-F-02	F	Bedrock	Low (0.073)	3	ND	6.05	0.03	9.49
GW-G-01	G	Bedrock	Medium (0.25)	3	0.03	5.05	ND	7.23
GW-G-02	G	Bedrock	Medium (0.42)	2	ND	13.85	0.03	17.87

[a] Located in an area classified as bedrock (i.e., sandstone or mudstone) but where shallow alluvium is likely present (DBS&A, 2018).

[b] Designated as a background well based on upgradient OWTS density (see Section 2.1.1).

[c] Includes organic nitrogen

Table 13. Average Nitrogen Concentrations in Surface Water from Study

Location ID	Waterbody	Upstream or Downstream of GW Sampling Locations	Corresponding GW Sampling Location Group	Sample Size	Average Concentration in mg/L			
					Ammonia as N	Nitrate as N	Nitrite as N	Total Nitrogen[a]
SW-01-D	Ventura River	Downstream	A, G	2	ND	4.39	ND	4.43
SW-02-D	Ventura River	Downstream	B	1	ND	0.59	ND	0.59
SW-02-U	Ventura River	Upstream	B	2	ND	0.23	ND	0.10
SW-03-D	Ventura River	Downstream	C, F	3	DNQ	1.03	0.03	1.49
SW-03-U	Ventura River	Upstream	C	3	DNQ	1.35	ND	2.01
SW-04-D	San Antonio Creek	Downstream	D	2	ND	0.75	ND	0.79
SW-04-U	San Antonio Creek	Upstream, Downstream	D, G	2	ND	2.65	ND	2.65
SW-05-D	San Antonio Creek	Downstream, Upstream	E, G	2	ND	1.31	ND	1.39

[a] Includes organic nitrogen

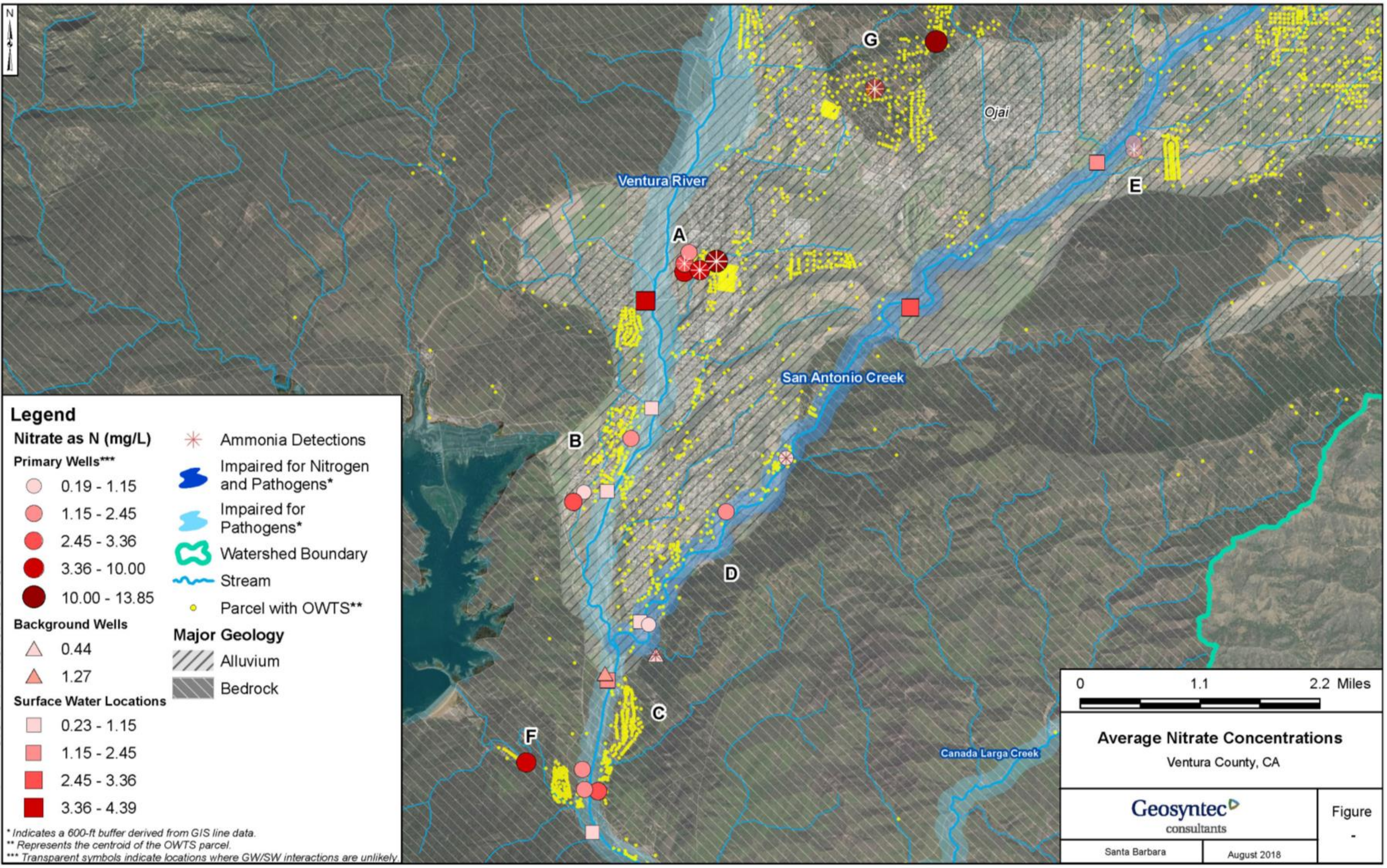


Figure 14. Average Nitrate Concentrations in Groundwater and Surface Water

3.2 PPCP Sampling Results

Samples were also analyzed for a suite of PPCPs commonly associated with sewage and septic effluent (listed in Section 2.4). No PPCPs were detected at any of the surface water locations for any sampling event. Approximately half of the groundwater wells did not have any PPCPs detected during any of the sampling events, while approximately half had detections for one or two PPCPs for one or more of the sampling events, as shown in Table 14. Caffeine was not included in the detection counts for groundwater or surface water due to significant lab and field blank contamination. The PPCP detections observed in groundwater are illustrated in Figure 15.

Table 14. PPCP Detections in Groundwater

Location ID	Geology	Upgradient OWTS Density (#/acre)	PPCPs Detected[ab] (No. Detections / No. Samples)
GW-A-01	Alluvium	High (1.4)	None
GW-A-02	Alluvium	Medium (0.48)	Sucralose (2/3)
GW-A-03	Alluvium	Medium (0.76)	None
GW-A-04	Alluvium	Medium (0.40)	Sucralose (1/3)
GW-A-07	Alluvium	High (1.0)	None
GW-B-03	Alluvium	Medium (0.42)	None
GW-B-04	Alluvium	Medium (0.24)	Sucralose (3/3)
GW-B-05	Alluvium	Low (0.070)	Sucralose (1/1)
GW-C-04	Bedrock/Shallow Alluvium[a]	Medium (0.34)	Sucralose (1/1)
GW-C-07	Bedrock/Shallow Alluvium[a]	Medium (0.65)	None
GW-C-08	Bedrock/Shallow Alluvium[a]	High (1.2)	None
GW-C-BK-05	Bedrock/Shallow Alluvium[a]	Background (0.0085)	Atenolol (1/2)
GW-C-BK-06	Bedrock/Shallow Alluvium[a]	Background (0.0055)	None
GW-D-04	Alluvium	Low (0.11)	None
GW-D-05	Alluvium	Low (0.047)	Azithromycin (1/3), Sucralose (1/3)
GW-D-07	Alluvium	Low (0.036)	None
GW-E-02	Alluvium	Medium (0.35)	Atenolol (1/2)
GW-E-03	Alluvium	Medium (0.41)	Primidone (1/3), Sucralose (1/3)
GW-F-02	Bedrock	Low (0.073)	Sucralose (1/3)
GW-G-01	Bedrock	Medium (0.25)	None
GW-G-02	Bedrock	Medium (0.42)	Azithromycin (1/3), Sucralose (3/3)

[a] PPCPs detected above the Method Detection Limit (MDL) but below the Detection Limit for Reporting (DLR) were not counted as detected.

[b] Caffeine was not included in the detection counts due to significant lab and field blank contamination.

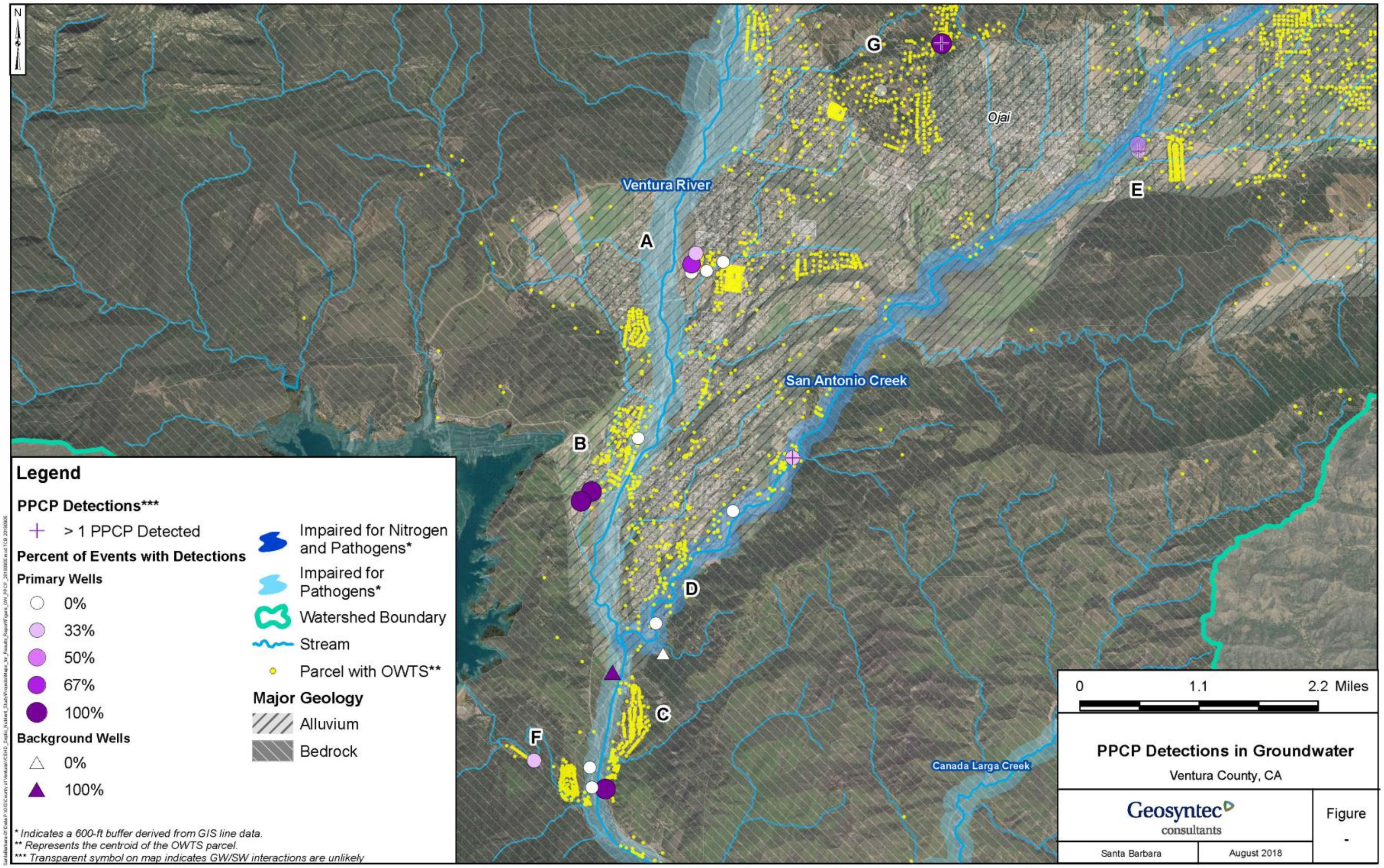


Figure 15. PPCP Detections in Groundwater

3.3 Nitrate Isotopes Sampling Results

Samples from groundwater and surface water were also analyzed for stable nitrate isotopes to help further identify nitrate sources. Nitrate from ammonium fertilizer, soil organic matter, and septic waste have similar values of d^{18}O, so d^{15}N is better used to distinguish among sources. However, for nitrate from nitrate fertilizer or atmospheric sources, d^{18}O is better used to distinguish because d^{15}N values are overlapping. Denitrification, and the degree of it, has an important influence on the isotopic composition of the source water along its pathway to the stream. d^{18}O and d^{15}N values of nitrate can be plotted to aid in identifying the source, as shown in the example (Figure 16) from USGS.

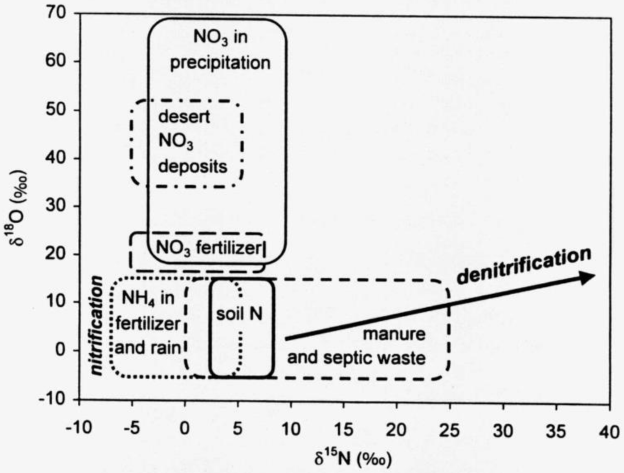


Figure 16.9. Schematic of typical ranges of $\delta^{18}O$ and $\delta^{15}N$ values of nitrate from various sources, simplified from data presented in Figure 16.6. Nitrification of ammonium and/or organic-N in fertilizer, precipitation, and organic waste can produce a large range of δ values, as shown. Soil waters tend to have higher NO_3-$\delta^{18}O$ values, and a larger range of NO_3-$\delta^{18}O$ values, than groundwaters because of the higher $\delta^{18}O$ values of O_2 and/or H_2O in soils.

Figure 16. Example Plot of d^{18}O and d^{15}N

Table 15 shows the average d^{18}O and d^{15}N values for each groundwater sampling well, and Figure 17 illustrates the nitrate isotopes for all groundwater samples, with the different colors representing groups of groundwater wells. The isotopic composition is clustered by groundwater location group, especially for groups A, B, E, F, and G, while C and background locations were clustered but not as tightly and group D locations are less clustered. This clustering of wells by group shows that groundwater within the groups (i.e., geographic location) are isotopically similar and are likely impacted by the same sources. The isotopic ratios for all groundwater samples analyzed was within the range expected for nitrate from animal waste and/or sewage. The isotopic composition of the background locations is higher and less clustered compared to the other groundwater locations[9].

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[9] The well with the PPCP detection (GW-C-BK-05) has a lower ratio than the other background well (GW-C-BK-06).

The higher and wider range of isotope values in background groundwater wells may be the result of denitrification and a longer extent of exposure to anoxic geologic layers.

Table 15. Nitrate Isotopes Summary in Groundwater

Location ID	Geology	Upgradient OWTS Density (#/acre)	Sample Size	Count Low Nitrate	Average d^{15}N (‰)	Average d^{18}O (‰)
GW-A-01	Alluvium	High (1.4)	3	0	7.3	3.6
GW-A-02	Alluvium	Medium (0.48)	3	0	5.9	3.6
GW-A-03	Alluvium	Medium (0.76)	3	0	6.6	3.4
GW-A-04	Alluvium	Medium (0.40)	3	0	5.7	3.7
GW-A-07	Alluvium	High (1.0)	3	0	7.6	3.7
GW-B-03	Alluvium	Medium (0.42)	3	0	5.8	3
GW-B-04	Alluvium	Medium (0.24)	3	0	6.3	3.2
GW-B-05	Alluvium	Low (0.070)	1	0	7	4.4
GW-C-04	Bedrock/Shallow Alluvium[a]	Medium (0.34)	1	0	12	7.4
GW-C-07	Bedrock/Shallow Alluvium[a]	Medium (0.65)	3	0	9.6	5.1
GW-C-08	Bedrock/Shallow Alluvium[a]	High (1.2)	3	0	9.4	5
GW-C-BK-05	Bedrock/Shallow Alluvium[a]	Background (0.0085)	3	1	10	5.8
GW-C-BK-06	Bedrock/Shallow Alluvium[a]	Background (0.0055)	3	1	20	13
GW-D-04	Alluvium	Low (0.11)	2	0	11	5.3
GW-D-05	Alluvium	Low (0.047)	3	0	4.6	4.3
GW-D-07	Alluvium	Low (0.036)	3	1	11	3.3
GW-E-02	Alluvium	Medium (0.35)	2	0	7.8	8.6
GW-E-03	Alluvium	Medium (0.41)	3	0	7	6.7
GW-F-02	Bedrock	Low (0.073)	3	0	8.6	7.3
GW-G-01	Bedrock	Medium (0.25)	3	0	7.3	8.5
GW-G-02	Bedrock	Medium (0.42)	3	0	11	3.7

[a] Samples that the laboratory reported as “low nitrate” and thus no isotopic composition was reported

.

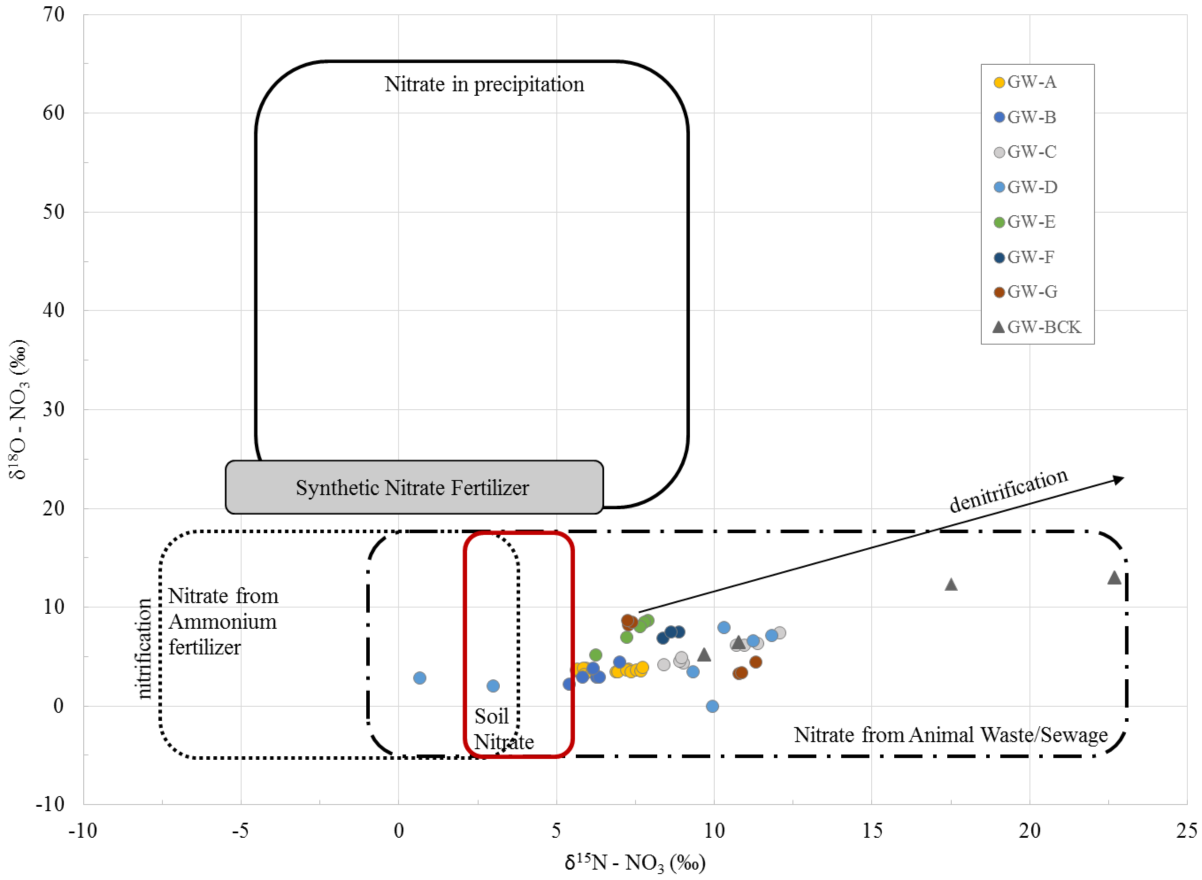

Figure 17. Nitrate Isotopes Summary in Groundwater (by Group)

Table 16 shows average nitrate isotope ratios over the sampled events for surface water locations. Figure 18 illustrates the nitrate isotopes for groundwater and surface water samples in close proximity (both upstream and downstream), if applicable, with the different colors representing the different groups. Similarly to groundwater, the surface water isotopic ratios fell within the expected range for nitrate from animal waste and/or sewage. It is expected that if the surface waters are impacted by nitrate from groundwater then the surface water isotope ratios would be higher than the associated groundwater isotopes due to denitrification along the flow path (because of anoxic creek sediments). This is true for some locations (groups C, D, and E), but not others (groups A and B). Where the isotopic ratios are similar or higher in surface waters than in upgradient wells, this suggests that the same nitrate source is impacting both samples and that groundwater may be impacting surface water.

Table 16. Nitrate Isotopes Summary in Surface Water

Location ID	Waterbody	Upstream or Downstream of GW Sampling Locations	Corresponding GW Sampling Location Group	Sample Size	Count Low Nitrate[a]	Average d^{15}N (‰)	Average d^{18}O (‰)
SW-01-D	Ventura River	Downstream	A, G	2	1	2.6	0.9
SW-02-U	Ventura River	Downstream	B	2	1	4.7	3.5
SW-02-D	Ventura River	Upstream	B	1	0	3.5	1.8
SW-03-U	Ventura River	Downstream	C, F	3	0	8.6	4.9
SW-03-D	Ventura River	Upstream	C	4	0	12	6.8
SW-04-U	San Antonio Creek	Downstream	D	2	1	10	7
SW-04-D	San Antonio Creek	Upstream, Downstream	D, G	2	1	12	7.3
SW-05-D	San Antonio Creek	Downstream, Upstream	E, G	2	0	15	9.8

[a] Samples that the laboratory reported as "low nitrate" and thus no isotopic composition was reported.

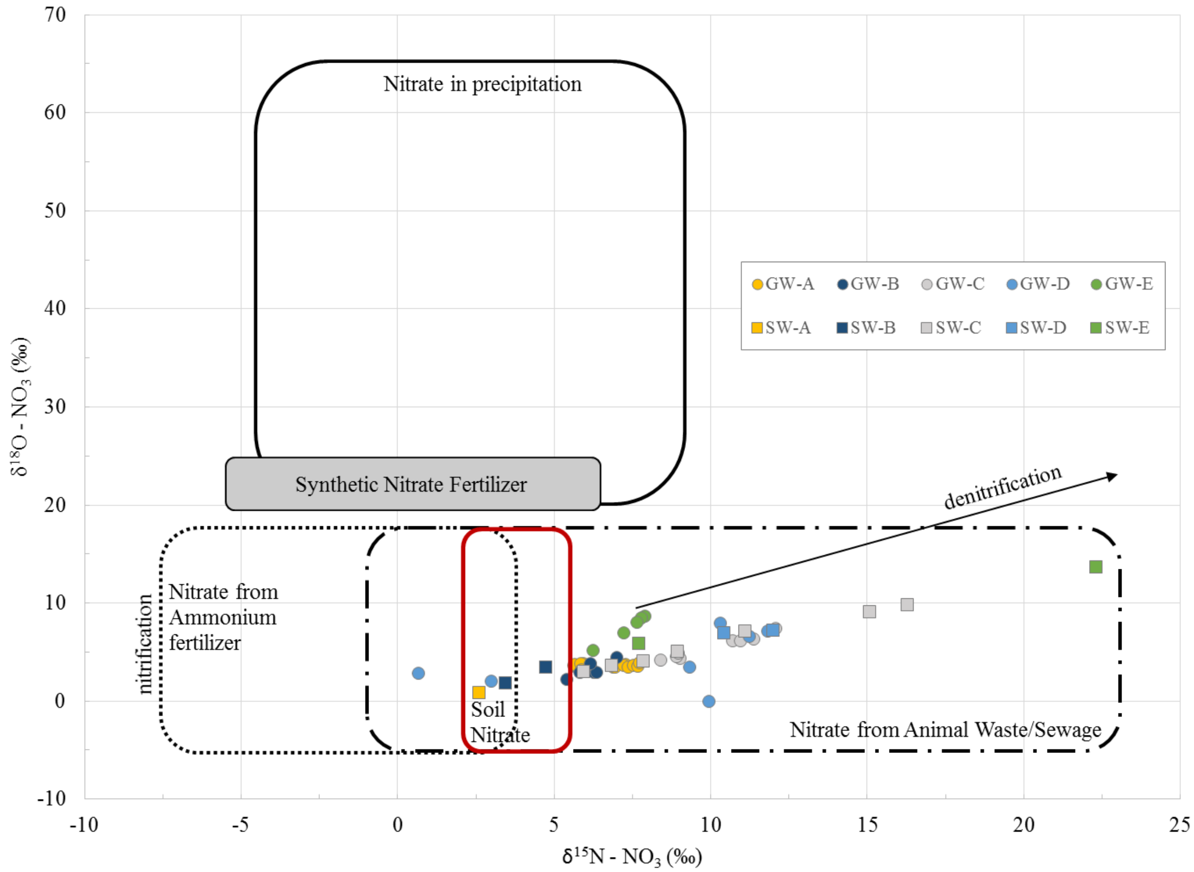

Figure 18. Nitrate Isotopes Summary in Groundwater and Surface Water (by Group)

Table 17 shows the average $d^{18}O$ and $d^{15}N$ values for groundwater wells located in varying geologic features. Figure 19 shows the nitrate isotopes for groundwater samples, separated by geology. Bedrock and bedrock/alluvium locations (areas identified with bedrock geology but most likely have shallow alluvium) tend to have higher values than alluvium geology.

Table 17. Nitrate Isotopes Summary in Groundwater by Geology

Group Geology	Count Samples	Count Low Nitrate[a]	Average $d^{15}N$ (‰)	Average $d^{18}O$ (‰)
Alluvium	35	1	6.9	4.2
Bedrock/shallow alluvium	14	2	12	6.8
Bedrock	9	0	9.0	6.5

[a] Samples that the laboratory reported as "low nitrate" and thus no isotopic composition was reported.

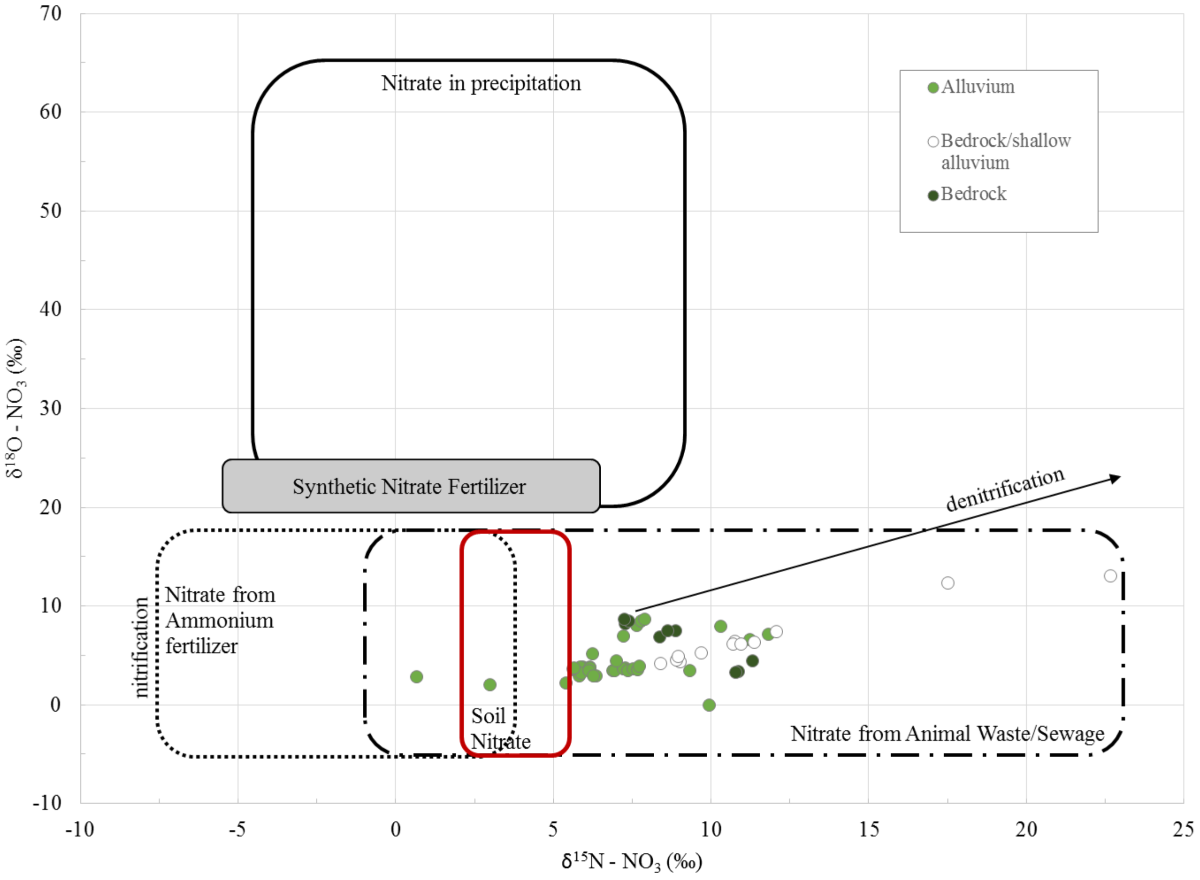

Figure 19. Nitrate Isotopes Summary in Groundwater (by Geology)

4 IDENTIFICATION OF HIGH RISK AREAS

4.1 Approach for Development of Risk Map

As previously described, the purpose of this study is to define the geographic extent of OWTS that are contributing significant nitrogen loads to the TMDL-covered reaches of the Ventura River and its tributaries. The general approach for this is described in this section by study question. Sampling data collected during this study are evaluated and used to answer the study questions, as described in subsequent sections.

> **Are groundwater nitrogen levels elevated downgradient of OWTS areas (and if yes, which areas)?**
>
> Areas with OWTS throughout the VRW were previously identified, and groundwater wells located downgradient of these areas with OWTS were sampled and analyzed for nutrient levels. Areas with high observed nitrate levels were noted. It should be noted that the average nitrate concentration in the background wells was 0.77 mg/L. Therefore, background nitrate levels in groundwater were also considered when evaluating whether nitrate levels were elevated.
>
> **Are these areas also impacted by sewage indicators that would further support OWTS as a source (if yes, which areas)?**
>
> Within the areas that were identified with high nitrate levels in groundwater, it was then determined if these high nutrient levels were potentially caused by OWTS. Analysis of PPCPs (as chemical sewage indicators) and stable nitrate isotopes were conducted. Detections of PPCPs and nitrate isotope ratios matching sewage sources would suggest the presence of sewage (i.e., influence from OWTS) in groundwater.
>
> **Are these impacted groundwaters impacting surface water nitrogen levels at upwelling locations (if yes, downstream of which OWTS areas)?**
>
> Finally, surface water data was also examined to determine if high nitrogen concentrations, in addition to the presence of PPCPs and/or nitrate isotopes matching sewage sources, were present in the areas where influence to groundwater from OWTS was determined to be likely (based on the analyses described above). This is examined in upwelling areas, where groundwater and surface water interaction is likely.

Observations and conclusions from the above analyses in sampled areas were then extrapolated to the entire watershed. Results identifying areas influenced by OWTS were used to identify areas with high and low probability of OWTS influencing surface waters where sampling wasn’t performed.

4.2 Discussion of Sampling Data

Several groundwater wells within a given area were sampled to provide a robust characterization of groundwater in the area. Additionally, surface water sampling locations were selected to correspond to the groundwater sampling locations. The sampling results for these groups of sampling locations (identified as A, B, C, etc.) were evaluated separately in the subsections below, in order to identify conclusions that may differ from group to group. Figure 20 summarizes nutrient and PPCP sampling data for both groundwater and surface water and aids in the overall analysis of sampling data.

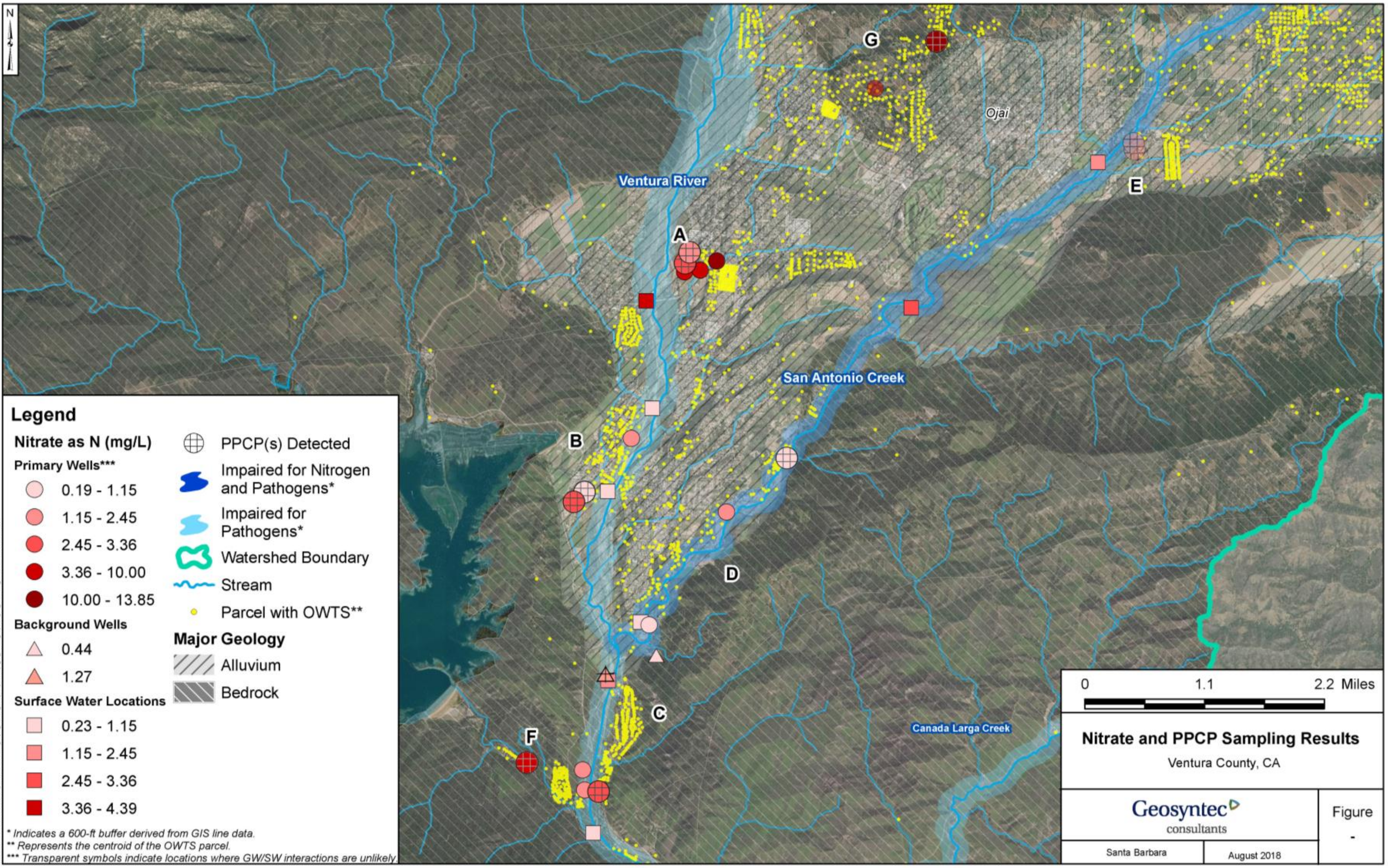

Figure 20. Summary of Nitrate and PPCP Sampling Data

4.2.1 Group A

Group A consists of five groundwater wells in the alluvium; the upgradient area has medium density OWTS, but there is also a small neighborhood with high density. As a result, two sampled wells in Group A were classified as high density upgradient OWTS and the other three wells were considered to have medium density upgradient OWTS.

Differences were noted in nutrient levels by proximity to high density OWTS in the area. The well located directly downgradient and in very close proximity to the neighborhood with high density OWTS had an average nitrate concentration of 11 mg/L. The other well identified as having high density upgradient OWTS, located just downgradient of the well in closest proximity to the highest density OWTS area, had an average nitrate concentration of 5.9 mg/L. Both wells also had ammonia detected. As the distance from this neighborhood with high density OWTS increases (towards the Ventura River), the average nitrate concentration decreases. This is likely due to nitrate undergoing denitrification and/or dilution. One of the wells identified as medium density is located slightly north of the high density neighborhood and likely is not impacted by this area. This well had the lowest concentration of nitrate in groundwater of the group (2.3 mg/L).

Two of the five wells in this group also had detections of PPCPs – sucralose concentrations were above the detection level (5.0 ng/L) twice in GW-A-02 (5.3 ng/L and 7.6 ng/L) and once in GW-A-04 (8.1 ng/L) - suggesting that groundwater in this area is influenced by sewage and/or septic effluent. Within this group, the three wells with the highest average nitrate concentrations did not have any detects of PPCPs, while the two wells with the lowest concentrations of nitrate in groundwater did have detected PPCPs. However, the presence of PPCPs in OWTS is expected to be highly variable with many households having little to no sucralose and other PPCPs in their wastewater. Nitrate isotope analysis identified the nitrate measured in the groundwater in Group A as likely from animal waste and/or sewage source, which is also consistent with OWTS impacts. Therefore, nutrient, PPCP, and nitrate isotope results all suggest that groundwater in group A **is likely** influenced by upgradient OWTS. Sanitary sewer lines are also present immediately upgradient of Group A groundwater wells and therefore it is possible that sanitary sewer leaks may also be impacting this area.

The group A surface water sampling location on the Ventura River, just downstream of the groundwater wells, had the highest average nitrate concentration of all surface water locations. No PPCPs were detected in surface water and the nitrate isotope ratios were lower than that of the nearby groundwater wells, identified as having soil or animal waste and/or sewage sources of nitrate. The high nitrate levels suggest that surface water at this location was **likely** impacted by the groundwater analyzed in group A, but other sources of nitrate could also be potentially impacting surface waters in this stream reach such as land application of animal manure on upgradient croplands and orchards.

4.2.2 Group B

Group B consists of three wells located in the alluvium, and two surface water locations (one upstream and one downstream of the wells). Two of the wells were classified as medium upgradient OWTS density, and the third well was considered to have low upgradient OWTS density. Average nitrate concentrations in these three wells ranged from 1.1 mg/L to 3.1 mg/L. PPCPs were detected in two out of the three wells (5.8 ng/L to 9.3 ng/L of sucralose) suggesting that groundwater in this area is influenced by sewage and/or septic effluent. Nitrate isotope analysis identified the nitrate measured in the groundwater in group B as likely from animal waste and/or sewage sources, which is also consistent with OWTS impacts. Therefore, nutrient, PPCP, and nitrate isotope results all suggest that groundwater in group B **is likely** influenced by upgradient OWTS, although to a lesser extent compared to group A based a lower density of upgradient OWTS and lower average nitrate concentrations in groundwater. There are also some sanitary sewers located upgradient of the wells, and one sanitary sewer pipe is located in very close proximity to GW-B-04, which had three detects of sucralose.

Both the upstream and downstream surface water locations had low average concentrations of nitrate (less than 1.15 mg/L) and no PPCPs were detected. The nitrate isotope ratios in surface water samples were lower than that of the nearby groundwater wells, identified as having soil or animal waste and/or sewage sources of nitrate. These results suggest that surface water in group B was **not likely** impacted by the nearby groundwater analyzed in group B, and that other sources of nitrate are likely impacting surface waters in this stream reach, although not to the extent that nitrogen levels were above the TMDL allowable in-stream concentration during this investigation.

4.2.3 Group C

Group C consists of three groundwater wells that are located in an area classified as bedrock, but where shallow alluvium is most likely present (DBS&A, 2018). Two of the wells are classified as having medium upgradient OWTS density, and the third has high upgradient OWTS density. There are also two surface water sampling locations (located upstream and downstream of the wells), and this group is located within a reach identified as consistently upwelling based on available information. Average nitrate concentrations in groundwater ranged from 1.4 mg/L to 3.3 mg/L, and PPCPs (18 ng/L of sucralose) were detected in the well with the highest nitrate concentration. There were also two background wells identified near group C both with relatively low average nitrate concentrations (0.44 mg/L and 1.3 mg/L). Nitrate isotope analysis identified the nitrate measured in the groundwater as likely from animal waste and/or sewage source. Therefore, nutrient, PPCP, and nitrate isotope results all suggest that groundwater in group C **is likely** influenced by upgradient OWTS at a similar level to group B. However, a sanitary sewer pipe is located in close proximity to GW-C-04 and could potentially be influencing groundwater here.

Surface water locations were relatively low for nitrate. Average concentrations were 1.0 mg/L at the downstream location and 1.4 mg/L nitrate at the upstream location, showing there were nutrient impacts in the upstream area that were impacting surface water above the TMDL allowable in-stream concentration, but that loading from groundwater and other sources in this reach did not result in an increase in concentration on average in this investigation (rather the average concentration decreased to below the TMDL allowable in-stream concentration). No PPCPs were detected in surface water. However, all locations in Group C had sources identified as animal waste and/or sewage based on the analysis of nitrate isotopes. Therefore, surface waters in this area **are not likely** to be influenced by OWTS.

4.2.4 Group D

Group D sampling locations were located in the alluvium and included three groundwater wells, in addition to one upstream and one downstream surface water sampling location. The three wells were all classified as having low upgradient OWTS density. This group of groundwater wells was slightly different from other groups in that the wells were not in close proximity. Average nitrate concentrations ranged from 0.19 mg/L to 2.5 mg/L, and PPCPs were detected in one well (2.4 ng/L of azithromycin and 7.2 ng/L of sucralose). Nitrate isotope analysis identified the nitrate measured in the groundwater as likely from animal waste and/or sewage sources at most wells and in the range of either animal waste and/or sewage sources, soil sources, or ammonium fertilizer sources for two samples. Therefore, nutrient, PPCP, and nitrate isotope results all suggest that groundwater in group C **may be influenced** by upgradient OWTS, although not to the same extent as other groups. There is a sanitary sewer pipe in close proximity to the groundwater wells in group D, which could also potentially be impacting groundwater.

The surface water sampling location located more distant upstream was high in nitrate (average of 2.7 mg/l) and the downstream location was low (0.75 mg/L), suggesting that nutrient loading in this reach was not contributing to TMDL exceedances of nitrogen in the stream. Surface water samples were considered to have animal waste and/or sewage sources based on the nitrate isotope analysis, which was true of all sampling results. Upstream nitrogen loading may be from OWTS and/or animal manure sources from cropland/irrigated pastureland, which is extensive upstream of these locations. The City of Ojai could also be contributing urban runoff and runoff from residential fertilizer use/golf courses. But surface waters downstream are **not likely** to be influenced by OWTS.

4.2.5 Group E

Group E included two groundwater wells along San Antonio Creek, that were considered to have medium density upgradient OWTS, and one downstream surface water location (in the alluvium). Although it was determined that it was unlikely that the collected samples were able to be influenced by OWTS based on the screened depth in the wells and confining layers (but still possible because confined areas can be fed by unconfined areas) (as discussed in Section 2.1.1), PPCPs were detected in both wells (1.3 ng/L of atenolol and 6.5 ng/L of sucralose). This may be due to the persistence of PPCPs in groundwater and the large number of OWTS further upgradient in the watershed loading groundwater in areas beyond this confining layer. A sanitary sewer line is also located in somewhat close proximity and upgradient. Average groundwater nitrate concentrations were 2.2 mg/L for both wells.

The downstream surface water location had an average nitrate concentration of 1.4 mg/L. No PPCPs were detected in surface water. Nitrate isotope results suggest that both groundwater and surface water samples had nitrate sources from animal waste and/or sewage. Large portions of the surrounding area are utilized for orchards and vineyards, so land application of manure may also be a contributing source of nitrate. Based on these results, it **is likely that** groundwater and surface waters in this area are influenced by nearby OWTS.

4.2.6 Group F (Bedrock)

Group F consisted of one groundwater well (with medium density upgradient OWTS) located near Coyote Creek below Casitas Dam in an area with bedrock geology. Groundwater is expected to move slowly in bedrock areas unless fractures allow preferential flow paths providing more rapid transport. These flow paths would be more heterogeneous and unpredictable compared to alluvial areas. The average nitrate concentration in this well was relatively high (6.1 mg/L), and PPCPs were also detected (32 ng/L of sucralose). All of the samples from the groundwater well had sources considered to be animal waste and/or sewage based on the nitrate isotope results.

PPCPs were detected in the groundwater well, and detected sucralose concentrations in groundwater were notably higher than those detected in wells located in alluvium. Groundwater had sources considered to be animal waste and/or sewage based on the nitrate isotope results and the well is not likely to be influenced by sanitary sewer systems.

Therefore, it is **highly likely** based on multiple lines of evidence that groundwater in this bedrock area is influenced by OWTS. This area is not located in close proximity to downgradient flowing surface waters. However, surface waters downgradient of group F were low for nitrate (1.0 mg/L), so surface waters are **likely not** being impacted downstream of group F.

4.2.7 Group G (Bedrock)

Group G sampling locations were also located within bedrock geology. This group consisted of two groundwater wells, both considered to have medium upgradient OWTS density. However, for one of these wells, it was determined that it was unlikely that the collected samples were able to be influenced by OWTS based on the screened depth in the well and confining layers (as discussed in Section 2.1.1). The other well in this group had the highest average nitrate concentration of all sampled wells (13.9 mg/L), and PPCPs were also detected (3.4 ng/L of azithromycin and 23 to 42 ng/L of sucralose).

Based on groups F and G, there was a pattern between geology and nitrate concentrations, where high nitrate concentrations were observed in wells in bedrock areas. Similar to group F, PPCPs were detected, detected sucralose concentrations in groundwater were notably higher than those detected in wells located in alluvium, and both wells had sources considered to be animal waste and/or sewage based on the nitrate isotope results and are not likely to be influenced by sanitary sewer systems.

Therefore, it is **highly likely** based on multiple lines of evidence that groundwater in this bedrock area is influenced by OWTS. Although Group G is located in far proximity to downgradient flowing surface water locations, no septic influence vs distance relationship could be established for bedrock areas in this study. Therefore, it is unknown whether surface waters may be impacted.

4.2.8 Summary of Observations

The evaluation of sampling data by group is summarized in Table 18. The risk of surface water contamination from OWTS based on historical data is described further in Section 4.4.

Table 18. Summary of Sampling Data Conclusions by Group

Group	Groundwater - high nitrate	Groundwater - under influence of OWTS (PPCPs and isotopes)	Surface Water – high downgradient average nitrate	Surface water - risk level of contamination from OWTS	
				This study[1]	Historical[2]
A	✓	✓	✓	High	Low
B	✓	✓	✗	Low	Low
C	✓	✓	✗	Low	Low
D	✓	✓	✗	Low	Low
E	✓	✓	✓	High	High
F	✓	✓	✗	Low	Low
G	✓	✓	Undetermined[3]	Undetermined[3]	Undetermined[3]

[1] Conclusion is based on surface water quality data collected during this study

[2] Conclusion is based on available historical surface water quality data

[3] This medium density area was distant from impaired surface waters. Further investigation is recommended to determine if downgradient surface waters could be impacted.

Based on the sampling data evaluation by group (Sections 4.2.1 to 4.2.6) and the summary of these results (Table 18), each of the study questions (shown in Section 1.2) was answered as follows:

1) **Are groundwater nitrogen levels elevated downgradient of OWTS areas? If yes, which OWTS areas?**

   Nitrate in groundwater was elevated downgradient of areas with OWTS throughout the VRW. The average nitrate concentrations for all groups, except group D (low density OWTS) and the background wells, were above the TMDL allowable in-stream concentration. Group D had one of three wells above the target. The number of OWTS within a certain distance upgradient of each well was found to be significantly correlated with groundwater nitrate concentrations in alluvial areas (r = 0.82, p < 0.00001). Nitrate was also found to be elevated where OWTS were in areas identified as bedrock geology.

2) **Are these areas also impacted by sewage indicators that would further support OWTS as a source? If yes, which OWTS areas?**

   At least one PPCP was detected in groundwater downgradient of OWTS in each groundwater sampling group, with multiple PPCPs detected in some wells. Nitrate isotope ratios also suggested that groundwater was impacted by animal waste and/or human sewage throughout the VRW. Therefore, both chemical (PPCP) and isotope data supports OWTS effluent as a source of nitrate to groundwater in the VRW.

3) **Are these impacted groundwaters impacting surface water nitrogen levels at upwelling locations? If yes, downstream of which OWTS areas?**

   While OWTS influence to groundwater were evident throughout the watershed, the impacts to surface waters during dry weather were not as ubiquitous. At many locations on the impaired streams, average nitrate, both historically and in this study, were below the TMDL allowable in-stream concentration for TN. During this study, the surface waters found to be elevated for nitrogen during dry weather were located downgradient of OWTS Groups A and E, near the community of Mira Monte and east of Ojai, respectively.

The analysis outlined in Section 4.3 was used to extrapolate the data from the areas investigated in this study to other impaired stream reaches and assign the risk of OWTS significantly impacting impaired surface waters.

4.2.9 General Observations

Evaluation of the sampling data resulted in two main observations. First, levels of nutrients increase with the density of upgradient OWTS. To further examine this observation, nitrate concentrations were plotted against upgradient OWTS density for samples collected at sites in alluvium or bedrock/shallow alluvium. Although it is difficult to define the upgradient areas that are potentially contributing to groundwater in the sampling wells (and thus which upgradient OWTS could be affecting water quality in the wells), it was necessary to define an “upgradient area of influence” to each well (as first referenced in Section 2.1.1). If the groundwater influence area is too small, it would not account for more distant OWTS influencing groundwater quality. On the other hand, too large of an influence area would incorrectly account for areas that have minimal influence on groundwater quality. Also, since exact groundwater flow patterns are difficult to predict at a small scale, but groundwater flow (especially in alluvial areas) approximately follows ground surface elevations, it was assumed that groundwater influence areas to a given well should only include areas upgradient (i.e., with a higher ground surface elevation than the ground surface elevation of the well).

To determine the area of OWTS influence, a range of different sized upgradient areas were defined, based on distances ranging from 600 feet to 8,000 feet[10] from the well. Correlations were then examined between nutrient concentrations in groundwater for each sample and the OWTS located within the defined areas of groundwater influence. Specifically, correlation was evaluated for both nitrate and total nitrogen, in addition to both count of OWTS and density (#/acre) within the groundwater influence area. The strongest correlation was observed for nitrate and number (count) of OWTS in the upgradient area defined with a radius of 2,000 feet centered on the well. Figure 21 shows the correlation between nitrate in groundwater and number of OWTS in the upgradient areas of influence for the various sizes of influence examined. Figure 22 shows the correlation between nitrate and number of OWTS in the upgradient area of influence (within 2,000 ft) for each groundwater sample. This plot also shows which of the groundwater results had corresponding high (>1.15 mg/L, the allowable dry weather concentration for total nitrogen that would meet Algae TMDL allowable in-stream concentrations for the receiving water) nitrate levels at the downgradient surface water location.

Therefore, it was concluded that groundwater from within this defined area of influence was significantly influencing groundwater quality at the given well. This analysis only includes data from groundwater wells located in alluvium or bedrock/shallow alluvium geology, as groundwater in bedrock areas were found to have higher levels of nitrate than in alluvium areas and a different relationship between OWTS density and nitrate concentration. However, investigation of groundwater sampling results in bedrock areas also showed the strongest correlation between nitrate and upgradient OWTS using a radius of 2,000 feet.

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[10] Includes 600 ft, 1,000 ft, 1,500 ft, 2,000 ft, 2,500 ft, 3,000 ft, 4,000 ft, 5,000 ft, 6,000 ft, 7,000 ft, and 8,000 ft.

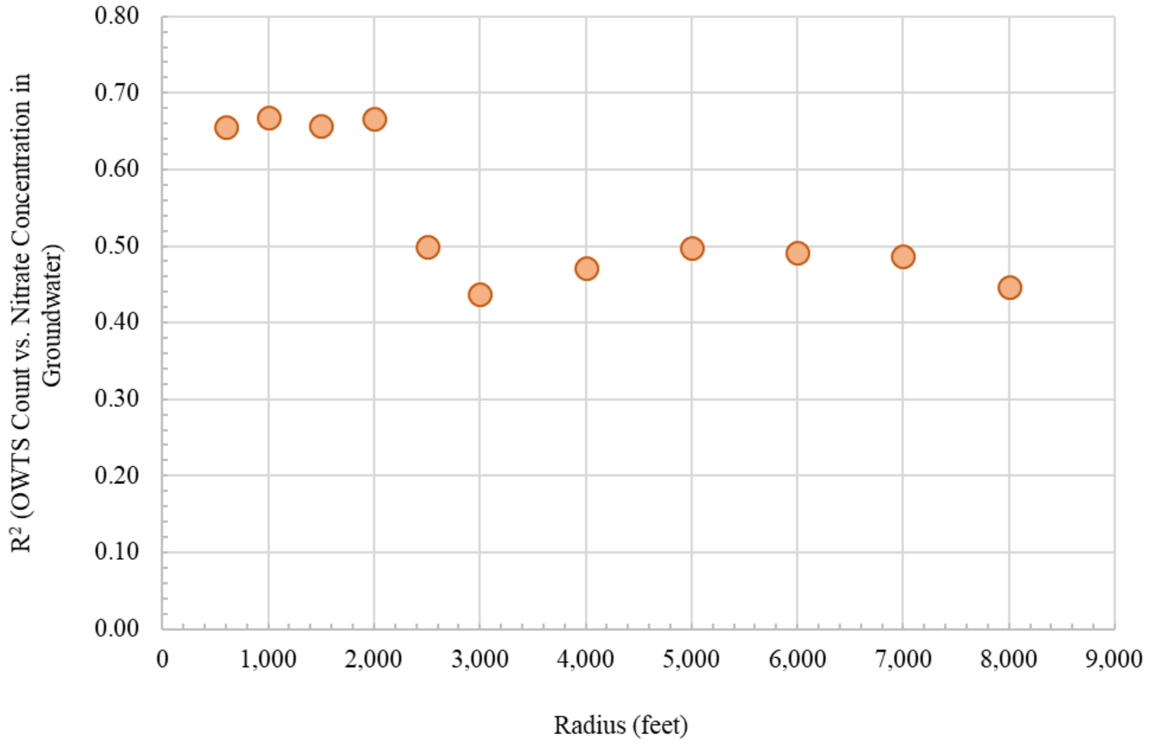


Figure 21. Correlation for Different Sizes of Upgradient Influence Areas (for nitrate in groundwater and count of OWTS)

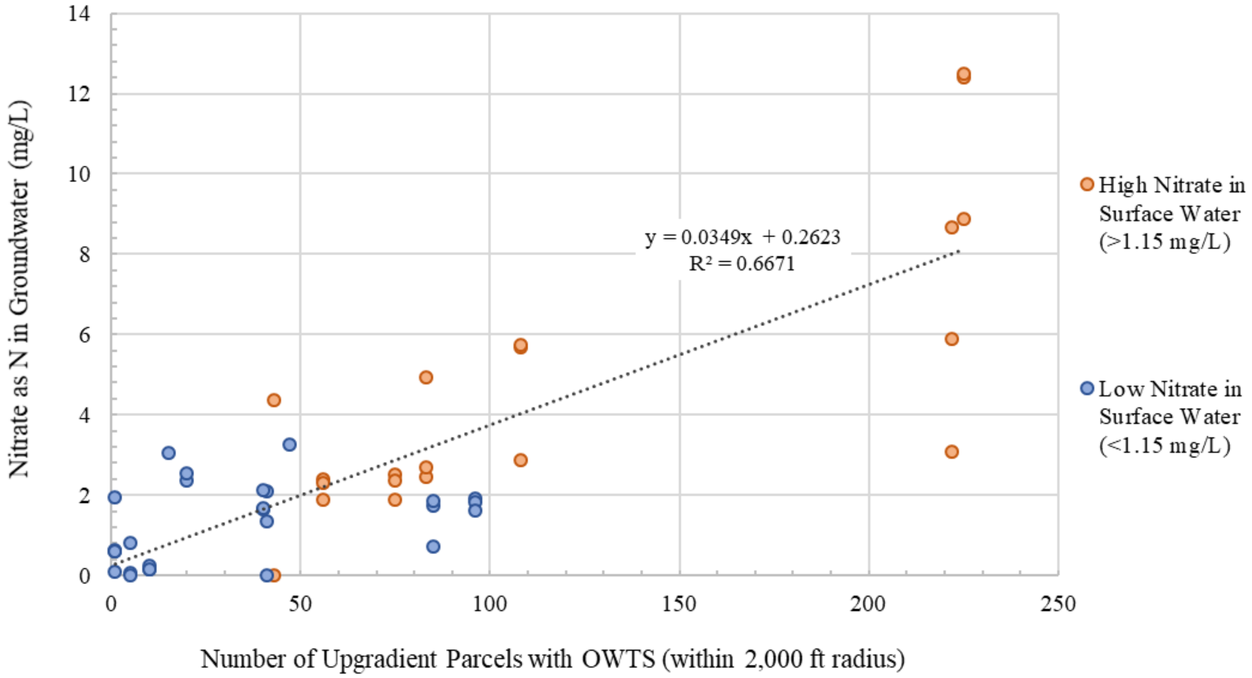


Figure 22. Nitrate vs. Number of OWTS Located in the Upgradient Groundwater Influence Area (within 2,000 ft radius) for Each Groundwater Sample

Statistical testing was performed to determine if the trend of observed nitrate concentrations increasing with OWTS density was statistically significant. The Pearson R value at 2,000 ft is 0.8167, which means there's a strong positive correlation between nitrate concentration and number of upgradient OWTS within 2,000 ft of the given well. The p-value for the Pearson R is <0.00001, which means that the correlation is statistically significant with 99.9+% confidence. Non-parametric correlations (Spearman and Kendall) were also significantly correlated.

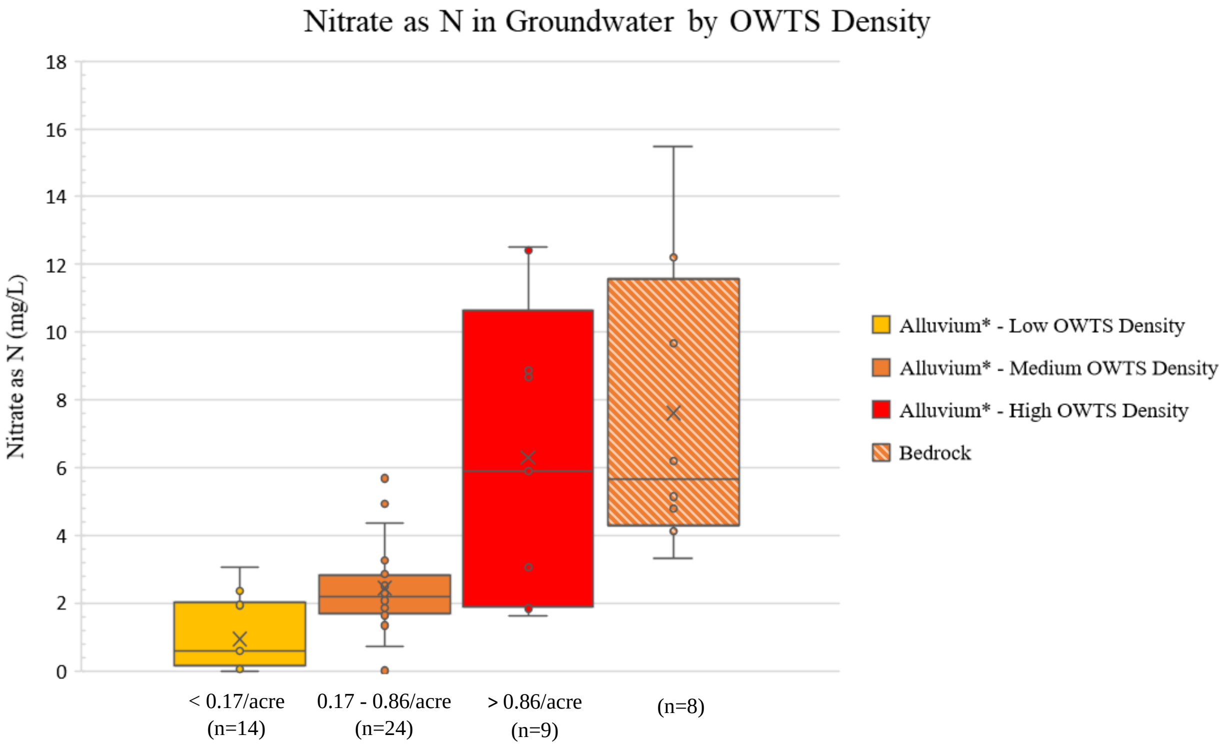
The correlation shown in Figure 22 was used to determine low, medium, and high upgradient OWTS designations. Using the linear regression equation, it was determined that 25.4 OWTS corresponded to a nitrate concentration of 1.15 mg/L, which represents the allowable dry weather concentration for total nitrogen that would meet Algae TMDL allowable in-stream concentrations for the receiving water. Although this limit is for total nitrogen, sampling results from this study show that on average, 95 percent of total nitrogen in surface water consisted of nitrate. Therefore, the total nitrogen limit of 1.15 mg/L was assumed to be an appropriate threshold for assessing nitrate levels as well. The approximate number of OWTS corresponding to the allowable in-stream concentration was used as an upper limit to define "low" OWTS, as shown in Figure 23, such that areas with low OWTS were assumed to have nitrate levels in groundwater less than the allowable in-stream concentration. This number (i.e., count) of OWTS was converted to density (#/acre) (using the average size of the upgradient areas of influence defined for the sampled wells) in order to aid in extrapolation to the entire watershed. The upper end of the number of upgradient OWTS that were classified as medium density was based on the linear regression and a nitrate concentration of 5 mg/L, which corresponded to approximately 135.8 OWTS (and was also converted to density). Any wells with a greater number of OWTS in the upgradient area of influence were classified as high density. Table 19 summarizes the count and density of OWTS corresponding to the low, medium, and high OWTS density designations.

Table 19. OWTS Count and Density Corresponding to Density Designations

OWTS Density Designation	**Number of OWTS**		**OWTS Density (#/acre)[1]**	
	Low Range	High Range	Low Range	High Range
Low	0	25	0	0.16
Medium	26	136	0.17	0.86
High	137	–	0.87	–

[1] Calculated based on the average upgradient area of influence for sampled wells of 158.4 acres.

The boxplot in Figure 23 shows the nitrate levels for groundwater wells classified as low, medium, and high upgradient OWTS density, in addition to groundwater wells located in bedrock geology. There is a significant difference in nitrate levels in each of the three OWTS density groups, with nitrate levels increasing with increasing OWTS density. This was confirmed with t-tests performed on the nitrate levels observed for each density designation, which showed statistically significant differences in the average nitrate concentrations for low (including background) vs. medium upgradient OWTS density ($p < 0.001$) and medium vs. high ($p < 0.05$).



[*] Includes wells in areas classified as Bedrock/Shallow Alluvium.

Figure 23. Boxplots of Nitrate by number of OWTS Located in the Upgradient Area of Groundwater Influence (with 2,000 ft radius)

The second major observation was that nitrate levels, and the presence of PPCPs, appears to be higher in bedrock geology. As previously mentioned, groundwater moves much slower in bedrock than in alluvium (unless fractures allow for more rapid transport). Therefore, if OWTS were contributing nutrients, it would likely persist at high levels in close proximity to the OWTS. Figure 23 shows that groundwater in bedrock areas, which had upgradient OWTS densities ranging from 0.073 to 0.42 OWTS/acre (which would classify them as low to medium densities in alluvial areas), had very similar nitrate concentrations to groundwater in alluvium areas with high OWTS density.

4.3 Areas of Potential OWTS Influence

In order to identify geographic areas in the watershed where OWTS are at risk of contributing to surface water impairment, observations and analysis based on sampling data from the study (as described in the previous sections) were extrapolated to the entire VRW.

The goal of this study was to define the geographic extent of OWTS that are contributing significant nitrogen loads to the TMDL-covered reaches of the Ventura River and its tributaries, and the highest risk of contribution to surface waters was found to be where OWTS are in close proximity to these surface water reaches. Because the correlation between nitrate and OWTS density was found to be the strongest using an upgradient area of influence for the sampled wells within 2,000 feet, an area of impact was drawn around the impaired waterbodies 2,000 feet in length on either side. This represents the area where OWTS have the potential to significantly contribute to surface water impairments due to proximity to these surface waters based on the analysis conducted in this study. Within this buffer, the areas were further evaluated based on OWTS density and surface water sampling results to determine risk of surface water contamination.

A relationship between the nitrate concentration in groundwater and the density of upgradient OWTS was found, and this relationship was extrapolated to unsampled areas of the VRW by first defining the density of OWTS throughout the VRW. The strongest relationship between nitrate and upgradient OWTS for sampled wells was found for an upgradient area of influence within 2,000 feet. To calculate OWTS density, the average upgradient area for sampled wells was used to define areas of influence (of the same size) for locations throughout the VRW[11]. The number of OWTS located within this area was then determined and the OWTS density was calculated for each location in the watershed.

As previously mentioned, the low upgradient OWTS density designation was based on the number of OWTS that would result in groundwater with the allowable dry weather concentration for nitrate that would meet Algae TMDL allowable in-stream concentrations for the receiving water (1.15 mg/L total nitrogen), based on the linear regression between nitrate in groundwater and upgradient OWTS density (shown in Figure 22). The range of OWTS within the area of influence that would result in low, medium, and high upgradient OWTS density classifications were previously determined, as shown in Table 19, and was extrapolated to the entire VRW.

Areas with low density upgradient OWTS were assumed to have a low risk of contribution to surface water impairments, since groundwater levels of nitrate are expected to be below the TMDL numeric limit for total nitrogen. Areas with medium or high density OWTS (within the 2,000 ft buffer of impaired reaches) were examined further to determine risk level to surface water contamination. Surface water sample results (both from this study and historically, as shown in Section 4.4) in close proximity and downgradient (such that groundwater quality would likely influence surface waters in upwelling areas) were examined to determine if average surface water nitrate levels were generally high (i.e., greater than 1.15 mg/L). If groundwater was identified as

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[11] Specifically, a 100 feet by 100 feet grid throughout the watershed. The density for each grid was calculated using an area with a radius of 1,481.9 feet, which results in areas of influence equal in size to the average size of the upgradient areas of groundwater influence for all sampled wells.

being likely influenced by OWTS (based on medium or high density OWTS) but available surface water data just downstream did not suggest surface water impacts (i.e., low nitrate levels), the area was identified as “potential” risk for surface water impairment. However, if an area was identified as likely having influence from OWTS in groundwater (i.e., medium or high density OWTS), and surface water sampling results show elevated levels of nitrate, the area was identified as having high risk of surface water contamination due to OWTS.

It was observed in the study that bedrock geology areas had high nutrient levels (similar to high density OWTS in alluvial areas, as shown in Figure 23) and presence of PPCPs in groundwater. However, based on evaluation of surface water sampling results from this study, there was no evidence that these high observed nutrient levels in groundwater were contributing to high levels in nearby surface waters. Furthermore, most bedrock areas in the VRW are distant from impaired surface waters and/or have low density OWTS. Therefore, bedrock areas were not found to be contributing to surface water contamination.

To summarize, the determinations of risk levels for surface water contamination to the impaired reaches from OWTS for the entire VRW were based on the following:

- Low density OWTS (within 2,000 ft buffer of impaired reaches) or not within 2,000 ft buffer of impaired reaches = **Low** risk of surface water contamination
- Medium and high density OWTS (within 2,000 ft buffer of impaired reaches) = **high** risk or **potential** risk of surface water contamination based on downgradient surface water nitrate levels observed in the study and historically

The final result is a map of the VRW defining potential risk to surface waters as low, potential, or high. Only areas within 2,000 feet of the impaired reaches are shown on the map, as all other areas are assumed to be low risk to surface water impairment based on their far proximity to the impaired reaches.

Based on the results of this study, there are enough data to support that OWTS in the low risk areas are not likely to significantly contribute nitrate to impaired surface waters. Similarly, the results of this study support that OWTS in high risk areas are likely to influence TMDL-listed surface waters. For the areas classified as potential risk, results suggest that groundwater is likely being influenced by OWTS (based on OWTS density) and has the potential to impact surface waters, but there is not evidence of surface water impacts (based on average surface water nitrate concentrations downstream). Further investigation would be required to determine if contributions in these areas are significantly contributing to exceedances of the TMDL allowable in-stream concentration for nitrogen in surface waters. The surface water risk map for the VRW is illustrated in Figure 24.

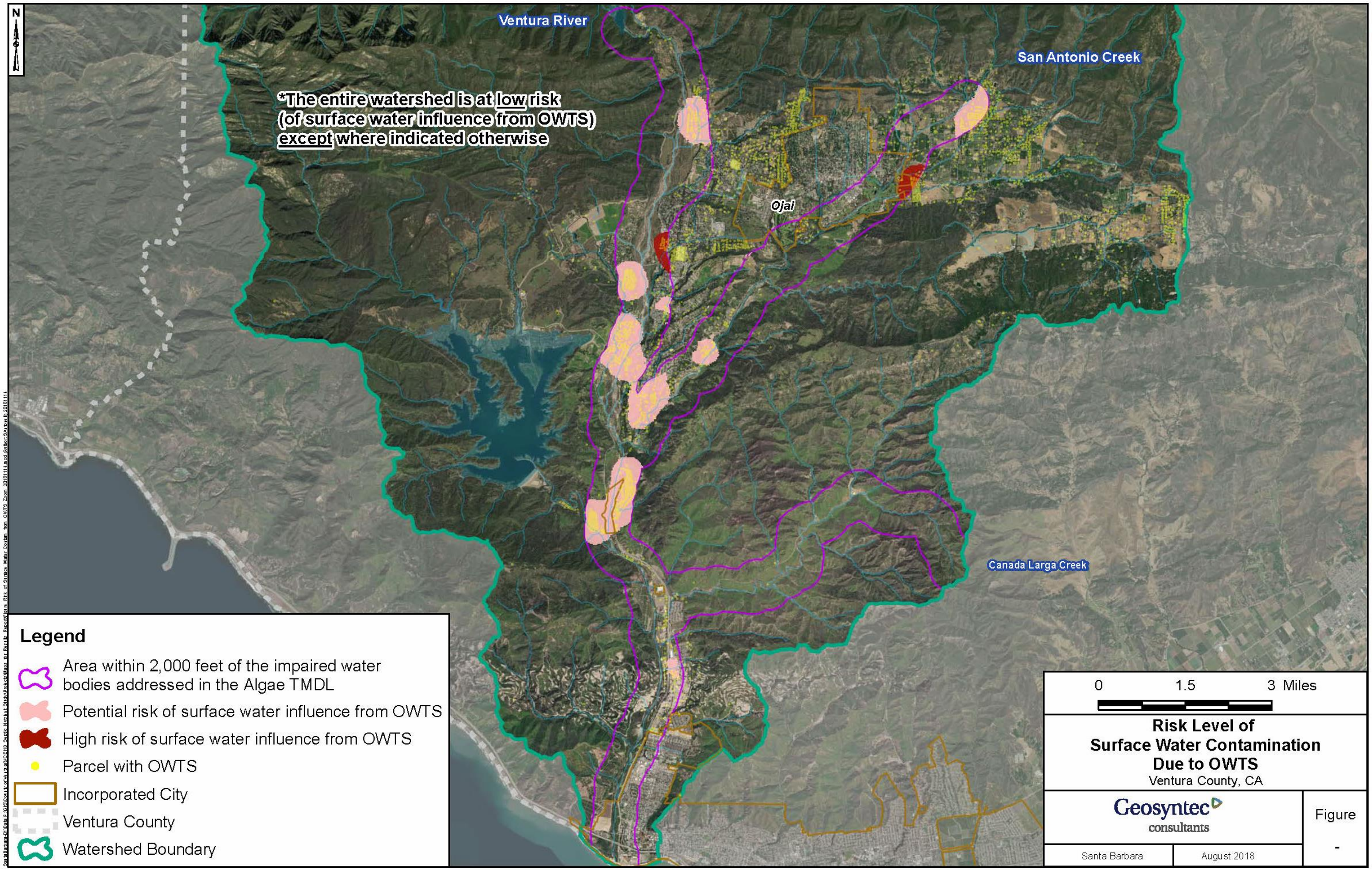

Figure 24. Risk Map: Geographic Areas where OWTS Contamination of Groundwater is Likely Contributing to Impairment of Surface Waters

4.4 Comparison to Historical Water Quality Monitoring Data

Water quality data (specifically for nitrate) were compiled from existing data sources and used to assess historical groundwater and surface water quality throughout the VRW for the purpose of determining whether the study period was representative of longer term water quality conditions and not unusual or anomalous; and evaluate other unsampled surface water or groundwater areas where nitrate is typically elevated. As discussed in the Monitoring Plan, existing surface water data were obtained from the California Environmental Data Exchange Network (CEDEN), Santa Barbara Channel Keeper (SBCK), Ojai Valley Sanitation District (OVSD), and Ventura County Watershed Protection District (VCWPD). Groundwater data were obtained from VCWPD and Groundwater Ambient Monitoring and Assessment Program (GAMA).

The characterization of historical water quality data included in the Monitoring Plan was updated to include recent data collected by the County. Surface water data from June 2000 through April 2018 were used, and groundwater data from May 2005 through December 2017 were used. The updated characterization of water quality data for groundwater and surface water are shown in Figure 25 and Figure 26, respectively. Nitrate levels in groundwater appear to be highest in the northeast portion of the VRW (near the eastern portion/northeast of Ojai). There are a significant number of OWTS and also agricultural parcels in this area. Sampling near this area in this study was limited due to availability of potential wells to sample and limited surface water flow during dry weather. This area of high historical nitrate levels is located within the Ojai Valley groundwater basin, which has a range of unconfined, semi-confined, and confined conditions (Walter, 2015). There were also high historical nitrate levels observed in the far eastern edge of the VRW. However, this area was not sampled in this study due to limited availability of sampling wells and far proximity from the TMDL-listed reaches.

Considering historical surface water quality data shown in Figure 26, concentrations of nitrate are generally higher in groundwater than in surface water and the highest concentrations were observed in San Antonio Creek just south of Ojai and at the confluence of the Ventura River with San Antonio Creek and with Cañada Larga Creek. Concentrations in San Antonio Creek in general were slightly higher than in the Ventura River. Surface waters were also high in nitrate in the upper portions of San Antonio Creek during this study, and levels were moderate at the confluence of San Antonio Creek and the Ventura River (which could be explained by the slightly higher historical concentrations noted in San Antonio Creek). The highest levels of nitrate observed in surface water for this study occurred in the Ventura River as part of Group A sampling locations. However, average historical surface water nitrate concentrations were low in this area of the Ventura River.

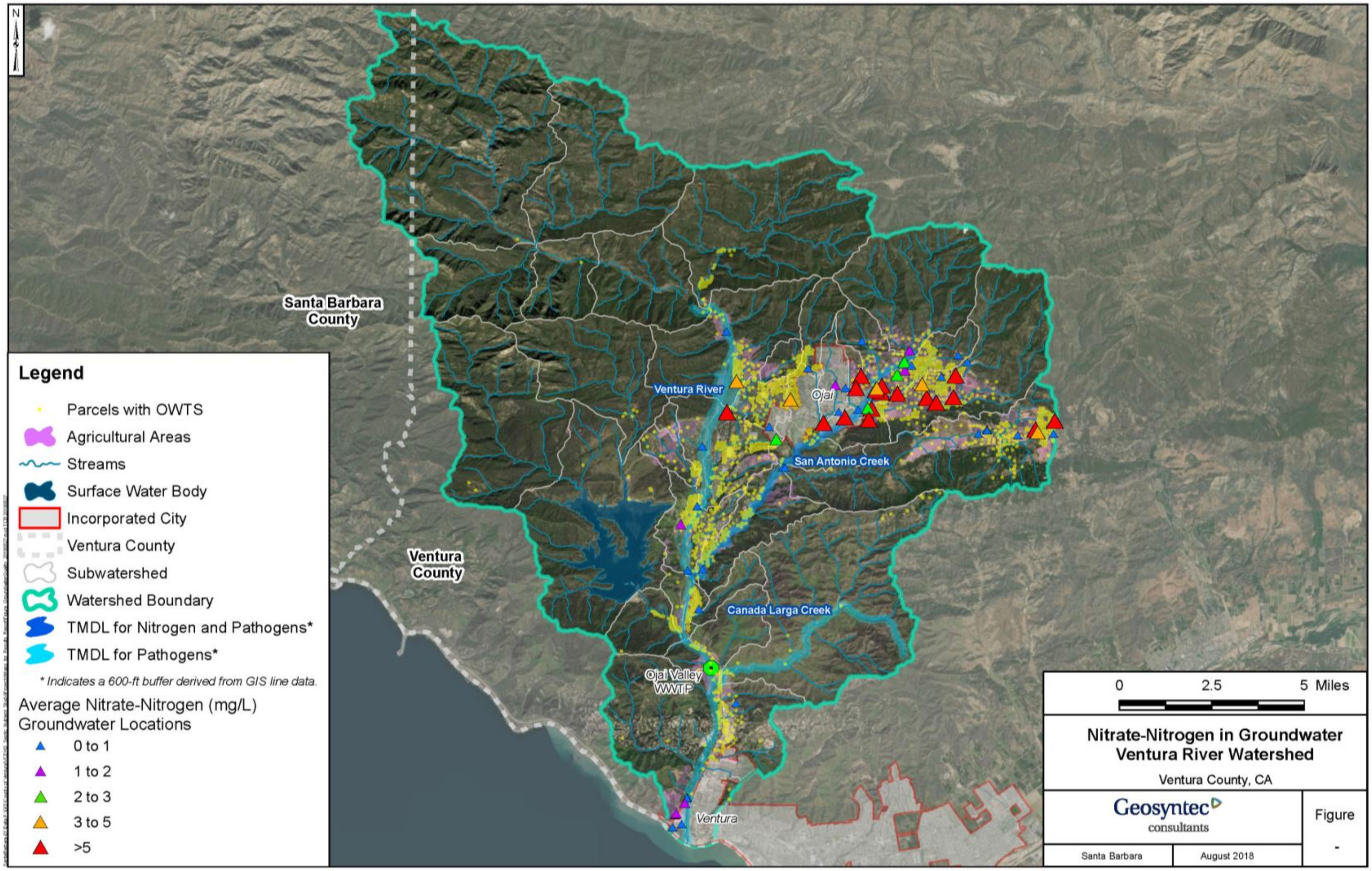

Figure 25. Historical Groundwater Quality in the VRW

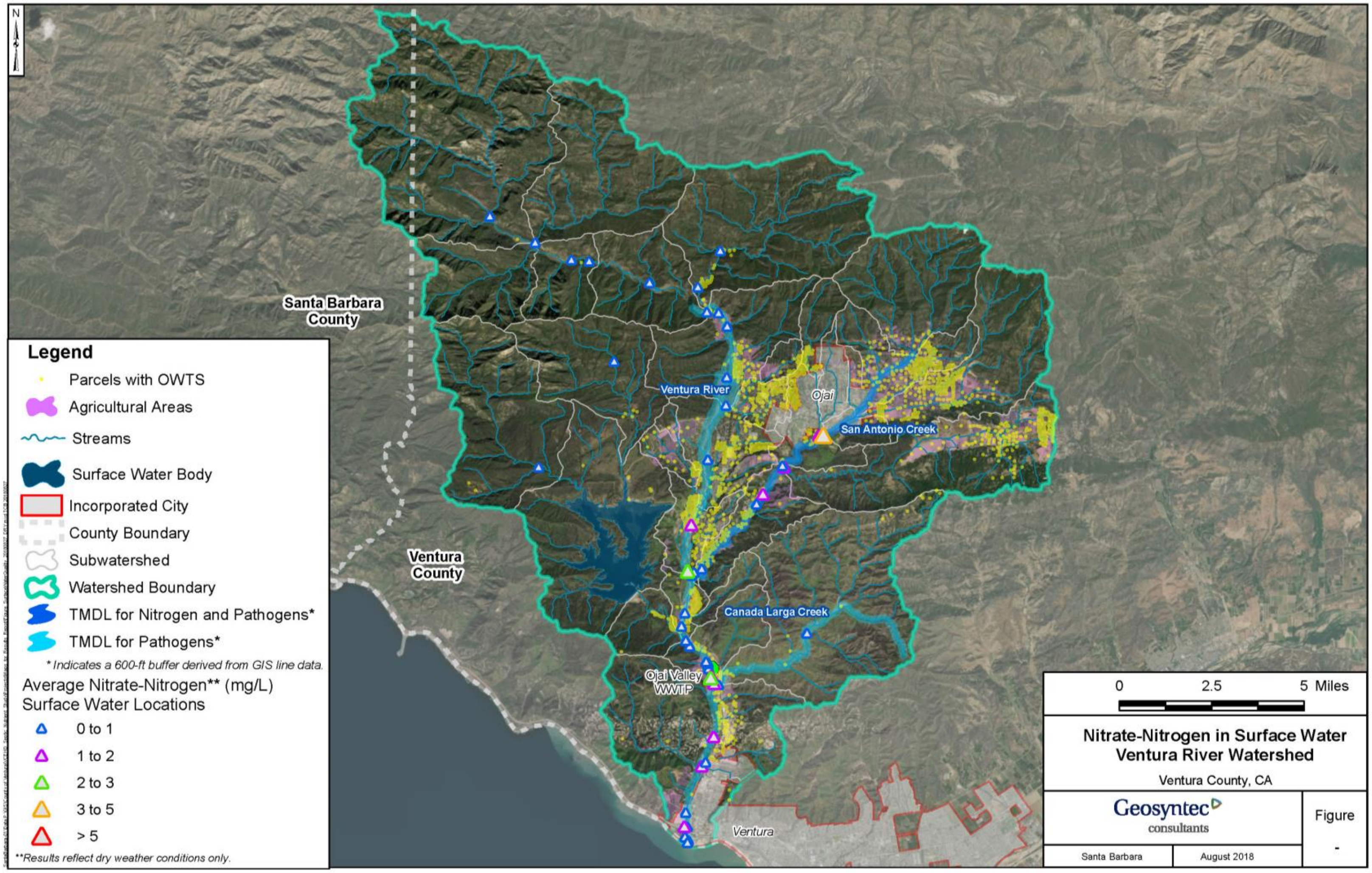

Figure 26. Historical Surface Water Quality in the VRW (Dry Weather Only)

4.5 Uncertainties

There are several sources of uncertainty related to development of the map identifying the spatial extent of high and low risks of OWTS that are contributing significant nitrogen to the Algae TMDL-covered reaches of the Ventura River and its tributaries.

First, in identifying the relationship between nitrate in groundwater (of the wells sampled in this study) and number of OWTS in the upgradient area of influence, there was uncertainty in defining the area of influence. It was assumed that groundwater flow followed the land surface gradient, so the area of influence was determined to be the upgradient area within 2,000 feet of the sampled well. This assumption for groundwater flow is likely a good approximation in alluvial areas, but may vary widely within bedrock geology. Additionally, the 2,000 foot distance was found to be the best approximation of the groundwater influence area based on the correlation with nitrate levels in groundwater. However, this radius is an approximation of the area influencing groundwater nitrate in a given well and in reality, the size of the upgradient influence area likely varies across the watershed. Therefore, the number of OWTS within the defined area of influence for each sampled well may not reflect the true number of OWTS that could be influencing water quality at the sampled well based on actual groundwater flow patterns. However, the correlation between nitrate and OWTS density was strong (and statistically significant) at the specified distance, suggesting the approximation was fairly accurate across the watershed. Because the results of this analysis are highly sensitive to the area of influence determined, it is recommended that the surface water-groundwater model for the VRW currently in development for the SWRCB and RWQCB be used to confirm or refine these approximations in the future.

When identifying OWTS density by grid cell, a circle centered on each cell was used. For these density calculations, the area of influence was not limited to only upgradient areas. Therefore, OWTS that are within this area, may be downgradient of the grid cell. These downgradient OWTS would not impact groundwater in the grid cell, but they would contribute to downgradient locations closer to surface waters. This uncertainty is not expected to have a major impact on the final risk determinations within the 2,000 foot buffer. However, it is advisable to reproduce the estimated areas of influence, verify the 2,000 foot optimal distance, and revise the nitrate vs. OWTS density correlation using the groundwater-surface water model grid, which contains cascading flow properties to allow more accurate defining of areas of influence to each well or grid cell.

Additionally, the point locations of the OWTS were determined based on the centroid of the parcel identified as having an OWTS. The exact location of the OWTS within each parcel is not known. So, especially in very large parcels, the assumed locations of the OWTS for determining upgradient OWTS density may not be accurate. The assumption results in less uncertainty in very small parcels identified as having OWTS, and most parcels with OWTS are on relatively small parcels where this assumption would be insignificant (55% of parcels with OWTS are less than one acre in size and 85% are less than five acres). Overall, this is a very minor uncertainty that has little effect on the final risk map.

Determination of the number of OWTS corresponding to medium and high density OWTS designations is also associated with some uncertainty. The difference between medium and high density (and therefore medium and high risk of groundwater contamination) utilized the linear regression of nitrate concentrations vs. upgradient OWTS in the area of influence for wells sampled in this study and was based on a nitrate concentration of 5 mg/L. This nitrate level is somewhat arbitrary but represents significant nitrate levels in groundwater. This level was not used to determine risk of surface water impacts.

Groundwater flow through bedrock geology is very unpredictable without more detailed investigation of the fractures and groundwater patterns in the area. The correlation analysis of number of upgradient OWTS vs. observed nitrate concentrations (shown in Section 4.2.9) only included data from groundwater wells located in alluvium or bedrock/shallow alluvium geology. Bedrock areas were found to have higher levels of nitrate than in alluvium areas and the relationship between OWTS density and nitrate concentration was different than in alluvium areas (i.e., same increasing trend but much different slope). A full correlation analysis in bedrock areas was not performed due to the limited data collected from bedrock areas. This was due to limited high density upgradient OWTS and groundwater wells in bedrock areas (and the further proximity between bedrocks areas and impaired reaches). Higher resolution transport studies may be warranted in these areas of the VRW to refine their risk level.

Although the purpose of this study was to assess the overall impact of OWTS throughout the watershed, and not solely the small number of failing OWTS, there are several additional sources of data that could potentially be used to help identify areas where OWTS are poorly sited or failing. These sources include OVSD (who routinely reports to VCEHD when evidence of failing OWTS is encountered in the field by workers or inspectors), reports from OWTS inspections (such as conducted when real estate changes hands) on file at VCEHD, and the Ventura County Resource Management Agency (VCRMA) website, which includes pertinent site studies for individual OWTS (such as septic system pumping inspections for existing system certifications or percolation tests included in geotechnical reports for new construction). These data sources could be used to help identify high risk OWTS or areas with high numbers of high risk OWTS but were not evaluated as part of this study.

Although impacts of the Thomas Fire were evaluated as part of this study (as discussed in Section 2.5), there are still uncertainties related to potential fire impacts. The post-fire water quality data analyzed were subject to several drivers that could have obscured high nitrate levels more characteristic of upwelling groundwater in some parts of the VRW. First, there were extended periods of continuous surface flows in the Ventura River post-fire, potentially due to sediment being deposited in the active channel bed that reduced the rate of groundwater recharge through the gravel beds and/or the loss of riparian vegetation resulted in reduced evapotranspiration. Following the single significant post-fire rain event in January, surface flows in the Ventura River did not become discontinuous until the last week of May, which is months later than would be expected after such a curtailed winter rainy season. Second, the dramatically reduced recharge caused an atypical drop in groundwater levels in the spring along the axis of the river. Both phenomena will have affected the location and degree to which groundwater, and any accompanying anthropogenically derived nitrate, upwelled in the sampled reaches.

Finally, this study was conducted following a historic multi-year drought. Although rainfall during the 2016/2017 rainy season was close to average conditions, OWTS impacts may be different under varying conditions (e.g., after multiple years of above average rainfall, raising the groundwater table). Additionally, wet weather impacts of OWTS on surface waters were not evaluated in this study. The transport pathways for nitrate from OWTS are expected to be different in wet weather and could potentially have impacts during dry weather through mobilization of nitrate to groundwater. A follow-up investigation in wet weather would be valuable.

The groundwater-surface water model currently in development for the SWRCB and RWQCB is expected to compute groundwater gradient and velocity for every grid cell in the VRW, in addition to travel time and denitrification from each grid cell to surface water, integrating the complete groundwater and surface water nutrient datasets. Nitrate loads to surface water will be quantified and connected back to original OWTS zones, allowing this risk map to be significantly refined, therefore it would be best to consider the risk map presented herein as a preliminary map subject to refinement after completion of the groundwater surface water model.

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Technical Report

for the Study of Water Quality Impairments Attributable to Onsite Wastewater Treatment Systems (OWTS) in the Ventura River Watershed

Appendix A – Sampling Results

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1 SAMPLING RESULTS

Samples were analyzed for nutrients by PHYSIS Environmental Laboratories, Inc.; the Institute for Integrated Research in Materials, Environments & Society (IIRMES); and Weck Laboraties, Inc. Additionally, samples were analyzed for personal and pharmaceutical care products (PPCPs) by Weck Laboratories, Inc and nitrate isotope ratios by Source Molecular. Appendix A includes lab results, in tabular format, for all groundwater and surface water sampling events. Results are organized by parameter type and sampling event.

Table A-1. Event #1 Nutrient Sampling Results

Sample ID	Type	Group	Site	Concentration in mg/L							
				Ammonia as N		Nitrate as N		Nitrite as N		Total Nitrogen	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag
GW-A-01_170918	GW	A	01	0.012	-	5.9	-	ND	-	13	-
GW-A-02_170824			02	ND	-	2.5	-	0.06	-	5.3	-
GW-A-03_170824			03	ND	-	2.9	-	0.06	-	6.4	-
GW-A-04_170824			04	ND	-	2.5	-	0.06	-	5.4	-
GW-A-07_170824			07	ND	-	8.9	-	0.06	-	18	-
GW-B-03-170920		B	03	ND	-	1.6	-	0.04	-	3.6	-
GW-B-04_170823			04	ND	-	1.3	-	0.06	-	3.0	-
GW-B-05-170921			05	0.009	DNQ	3.1	-	0.04	-	6	-
GW-C-01_170823		C	01	ND	-	1.6	-	0.06	-	3.6	-
GW-C-04-170919			04	ND	-	3.3	-	ND	-	6.4	-
GW-C-BK-05_170825			05	ND	-	1.9	-	0.06	-	4.4	-
GW-C-BK-06-170919			06	2.9	-	0.6	-	0.09	-	4.3	-
GW-C-07-170919			07	ND	-	1.7	-	ND	-	3.7	-
GW-C-08-170919			08	ND	-	1.9	-	ND	-	3.9	-
GW-D-04-170918		D	04	0.009	DNQ	2.4	-	ND	-	5.0	-
GW-D-05-170918			05	5.4	-	0.2	-	ND	-	4.2	-
GW-D-07-170919			07	ND	-	0.05	-	ND	-	0.35	-
GW-E-03-170921		E	03	ND	-	1.9	-	0.04	-	3	-
GW-E-03-170921-DUP			03	0.008	DNQ	1.78	-	0.04	-	4.28	-
GW-F-02_170823		F	02	ND	-	9.7	-	0.06	-	20	-
GW-G-01-170921		G	01	0.024	DNQ	4.14	-	ND	-	8.24	-
GW-G-02-170920			02	ND	-	12	-	0.04	-	23	-
SW-03-D-170825	SW	C	D/S	0.008	DNQ	0.91	-	0.06	-	2.3	-
SW-03-U-170919			U/S	0.011	DNQ	1.3	-	ND	-	2.8	-
SW-03-D_170920-EB			D/S	0.016	DNQ	1.0	-	0.05	-	2.3	-

Table A-2. Event #2 Nutrient Sampling Results

Sample ID	Type	Group	Site	Concentration in mg/L							
				Ammonia as N		Nitrate as N		Nitrite as N		Total Nitrogen	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag
GW-A-01_180403	GW	A	01	ND	-	3.07	-	ND	-	3.07	-
GW-A-02_180403			02	ND	-	4.93	-	ND	-	4.93	-
GW-A-03_180403			03	ND	-	5.68	-	ND	-	5.68	-
GW-A-04_180403			04	ND	-	1.88	-	ND	-	1.88	-
GW-A-07_180404			07	ND	-	12.4	-	ND	-	12.4	-
GW-B-03_180404		B	03	ND	-	2.13	-	ND	-	2.13	-
GW-B-04_180405			04	ND	-	ND	-	ND	-	ND	-
GW-B-04_180405-EQ			04	ND	-	2.17	-	ND	-	2.17	-
GW-C-07_180403		C	07	ND	-	0.72	-	ND	-	1.27	-
GW-C-BK-06_180404			06	6.51	-	0.10	-	ND	-	7.40	-
GW-C-08_180403			08	ND	-	1.84	-	ND	-	1.84	-
GW-D-05_180405		D	05	2.82	-	0.24	-	ND	-	3.54	-
GW-D-05_180405-DUP			05	2.92	-	0.21	-	ND	-	3.51	-
GW-D-07_180404			07	ND	-	0.80	-	ND	-	0.80	-
GW-E-02_180402		E	02	ND	-	4.37	-	ND	-	4.37	-
GW-E-03_180402			03	ND	-	2.40	-	ND	-	2.40	-
GW-F-02_180403		F	02	ND	-	3.32	-	ND	-	3.32	-
GW-G-01_180406		G	01	0.06	-	4.8	-	ND	-	4.9	-
GW-G-02_180405			02	ND	-	15.5	-	ND	-	15.5	-
SW-01-D_180403	SW	A,G	D/S	ND	-	8.76	-	ND	-	8.76	-
SW-02-D_180404		B	D/S	ND	-	0.59	-	ND	-	0.59	-
SW-02-U_180405			U/S	ND	-	0.45	-	ND	-	ND	-
SW-03-D_180402		C,F	D/S	ND	-	1.12	-	ND	-	1.12	-
SW-03-U_180404		C	U/S	ND	-	0.90	-	ND	-	1.42	-
SW-04-D_180402		D	D/S	ND	-	1.48	-	ND	-	1.48	-
SW-04-U_180402		D,G	U/S	ND	-	1.35	-	ND	-	1.35	-
SW-05-D_180402		E,G	D/S	ND	-	1.37	-	ND	-	1.53	-

Table A-3. Event #3 Nutrient Sampling Results

Sample ID	Type	Group	Site	Concentration in mg/L							
				Ammonia as N		Nitrate as N		Nitrite as N		Total Nitrogen	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag
GW-A-01_180515	GW	A	01	ND	-	8.66	-	ND	-	8.66	-
GW-A-02_180515			02	0.212	-	2.70	-	ND	-	2.70	-
GW-A-03_180515			03	ND	-	5.73	-	ND	-	5.73	-
GW-A-04_180515			04	ND	-	2.37	-	ND	-	2.37	-
GW-A-07_180516			07	0.278	-	12.5	-	ND	-	12.5	-
GW-B-03_180516		B	03	ND	-	1.69	-	ND	-	1.69	-
GW-B-03_180516_DUP			03	ND	-	1.69	-	ND	-	1.69	-
GW-B-04_180516			04	ND	-	2.08	-	ND	-	2.08	-
GW-C-BK-05_180514		C	05	ND	-	0.60	-	ND	-	0.60	-
GW-C-BK-05_180514_EB			05	ND	-	ND	-	ND	-	ND	-
GW-C-BK-06_180517			06	0.382	-	0.60	-	ND	-	1.70	-
GW-C-07_180515			07	ND	-	1.86	-	ND	-	1.86	-
GW-C-08_180515			08	ND	-	1.62	-	ND	-	1.62	-
GW-D-04_180517		D	04	ND	-	2.54	-	ND	-	2.54	-
GW-D-05_180517			05	2.39	-	0.16	-	ND	-	3.16	-
GW-D-07_180517			07	ND	-	ND	-	ND	-	ND	-
GW-E-02_180514		E	02	ND	-	ND	-	ND	-	ND	-
GW-E-03_180517			03	3.27	-	2.29	-	ND	-	10.9	-
GW-F-02_180515		F	02	ND	-	5.15	-	ND	-	5.15	-
GW-G-01_180517		G	01	ND	-	6.21	-	ND	-	6.21	-
GW-G-02_180518			02	ND	-	-	-	-	-	15.00	-
SW-01-D_180516	SW	A,G	D/S	ND	-	ND	-	ND	-	ND	-
SW-02-U_180516		B	U/S	ND	-	ND	-	ND	-	ND	-
SW-03-D-180514		C,F	D/S	ND	-	1.05	-	ND	-	1.05	-
SW-03-U-180516		C	U/S	ND	-	1.86	-	ND	-	1.86	-
SW-04-D_180514		D	D/S	ND	-	ND	-	ND	-	ND	-
SW-04-U-180514		D,G	U/S	ND	-	3.94	-	ND	-	3.94	-
SW-05-D_180514		E,G	D/S	ND	-	1.2	-	ND	-	1.2	-

Table A-4. Event #1 PPCP Sampling Results

Sample ID	Type	Group	Site	Concentration in ng/L															
				Acetaminophen		Atenolol		Azithromycin		Caffeine[a]		Carbamazepine		Cotinine		Primidone		Sucralose	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
GW-A-01_170918	GW	A	01	ND	-	ND	-	ND	-	0.77	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-02_170824			02	ND	-	ND	-	ND	-	2.5	-	ND	-	ND	-	ND	-	5.3	-
GW-A-03_170824			03	ND	-	ND	-	ND	-	1.2	-	ND	-	ND	-	ND	-	ND	-
GW-A-04_170824			04	ND	-	ND	-	ND	-	1.2	BC	ND	-	ND	-	ND	-	8.1	-
GW-A-07_170824			07	ND	-	ND	-	ND	-	1.6	-	ND	-	ND	-	ND	-	ND	-
GW-B-03-170920		B	03	ND	-	ND	-	4.5	DNQ	1.1	BC	ND	-	ND	-	ND	-	ND	-
GW-B-04_170823			04	ND	-	ND	-	ND	-	5.6	BC	ND	-	ND	-	ND	-	6.4	-
GW-B-05-170921			05	ND	-	ND	-	ND	-	0.74	DNQ	ND	-	ND	-	ND	-	9.3	-
GW-C-01_170823		C	01	ND	-	ND	-	ND	-	2.2	-	ND	-	ND	-	ND	-	ND	-
GW-C-04-170919			04	ND	-	ND	-	6.1	DNQ	1.6	BC	ND	-	ND	-	ND	-	18	-
GW-C-BK-05_170825			05	ND	-	ND	-	ND	-	2.5	-	ND	-	ND	-	ND	-	ND	-
GW-C-BK-06-170919			06	ND	-	ND	-	ND	-	1.2	-	ND	-	ND	-	ND	-	ND	-
GW-C-07-170919			07	ND	-	ND	-	ND	-	0.73	DNQ	ND	-	ND	-	ND	-	ND	-
GW-C-08-170919			08	ND	-	ND	-	ND	-	3.4	BC	ND	-	ND	-	ND	-	ND	-
GW-D-04-170918		D	04	ND	-	ND	-	ND	-	0.76	DNQ	ND	-	ND	-	ND	-	ND	-
GW-D-05-170918			05	ND	-	ND	-	ND	-	4.7	-	ND	-	ND	-	ND	-	ND	-
GW-D-07-170919			07	ND	-	ND	-	ND	-	0.94	DNQ	ND	-	ND	-	ND	-	ND	-
GW-E-03-170921		E	03	ND	-	ND	-	ND	-	2.4	BC	ND	-	ND	-	ND	-	ND	-
GW-E-03-170921-DUP			03	ND	-	ND	-	ND	-	1.2	BC	ND	-	ND	-	ND	-	ND	-
GW-F-02_170823		F	02	ND	-	ND	-	ND	-	59	-	ND	-	ND	-	ND	-	32	-
GW-G-01-170921		G	01	ND	-	ND	-	3.9	DNQ	0.64	DNQ	ND	-	ND	-	ND	-	ND	-
GW-G-02-170920			02	ND	-	ND	-	ND	-	0.81	DNQ	ND	-	ND	-	ND	-	23	-
SW-03-D-170825	SW	C	D/S	ND	-	ND	-	5.8	DNQ	2.6	-	ND	-	ND	-	ND	-	ND	-
SW-03-U-170919			U/S	ND	-	ND	-	ND	-	5.6	BC	ND	-	ND	-	ND	-	ND	-
SW-03-D_170920-EB			D/S	ND	-	ND	-	ND	-	39	BC	ND	-	ND	-	ND	-	ND	-

[a] Caffeine data was not used in analyses due to significant lab and field blank contamination

Table A-5. Event #2 PPCP Sampling Results

Sample ID	Type	Group	Site	Concentration in ng/L															
				Acetaminophen		Atenolol		Azithromycin		Caffeine[a]		Carbamazepine		Cotinine		Primidone		Sucralose	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
GW-A-01_180403	GW	A	01	ND	-	ND	-	ND	-	0.7	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-02_180403			02	ND	-	ND	-	ND	-	1.3	-	ND	-	ND	-	ND	-	7.6	-
GW-A-03_180403			03	ND	-	ND	-	ND	-	0.9	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-04_180403			04	ND	-	ND	-	ND	-	0.9	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-07_180404			07	ND	-	ND	-	ND	-	1.7	-	ND	-	ND	-	ND	-	ND	-
GW-B-03_180404		B	03	ND	-	ND	-	ND	-	1.6	-	ND	-	ND	-	ND	-	ND	-
GW-B-04_180405			04	ND	-	ND	-	ND	-	ND	-	ND	-	ND	-	ND	-	5.8	-
GW-B-04_180405-EQ			04	ND	-	ND	-	ND	-	16	-	0.25	DNQ	ND	-	ND	-	ND	-
GW-C-07_180403		C	07	ND	-	ND	-	ND	-	1.4	-	ND	-	ND	-	ND	-	ND	-
GW-C-BK-06_180404			06	ND	-	ND	-	ND	-	1.8	-	0.3	DNQ	ND	-	ND	-	ND	-
GW-C-08_180403			08	ND	-	ND	-	ND	-	2.4	-	ND	-	ND	-	ND	-	ND	-
GW-D-05_180405		D	05	ND	-	ND	-	ND	-	1.5	-	ND	-	ND	-	ND	-	7.2	-
GW-D-05_180405-DUP			05	ND	-	ND	-	5.1	-	ND	-	ND	-	ND	-	ND	-	ND	-
GW-D-07_180404			07	ND	-	ND	-	ND	-	1.0	-	ND	-	ND	-	ND	-	ND	-
GW-E-02_180402		E	02	ND	-	ND	-	ND	-	2.3	-	ND	-	ND	-	ND	-	ND	-
GW-E-03_180402			03	ND	-	ND	-	ND	-	1.1	-	ND	-	ND	-	2.1	-	ND	-
GW-F-02_180403		F	02	ND	-	ND	-	ND	-	1.9	-	ND	-	ND	-	ND	-	ND	-
GW-G-01_180406		G	01	ND	-	ND	-	ND	-	0.44	DNQ	0.29	DNQ	ND	-	ND	-	ND	-
GW-G-02_180405			02	ND	-	ND	-	3.4	-	0.46	DNQ	ND	-	ND	-	ND	-	42	-
SW-01-D_180403	SW	A,G	D/S	ND	-	ND	-	ND	-	12	-	ND	-	0.71	DNQ	ND	-	ND	-
SW-02-D_180404		B	D/S	ND	-	ND	-	ND	-	18	-	ND	-	0.62	DNQ	ND	-	ND	-
SW-02-U_180405			U/S	ND	-	ND	-	ND	-	17	-	ND	-	0.88	DNQ	ND	-	ND	-
SW-03-D_180402		C,F	D/S	ND	-	ND	-	ND	-	11	-	ND	-	0.75	DNQ	ND	-	ND	-
SW-03-U_180404		C	U/S	ND	-	ND	-	ND	-	10	-	ND	-	0.66	DNQ	ND	-	ND	-
SW-04-D_180402		D	D/S	ND	-	ND	-	ND	-	12	-	ND	-	ND	-	ND	-	ND	-
SW-04-U_180402		D,G	U/S	ND	-	ND	-	ND	-	14	-	ND	-	ND	-	ND	-	ND	-
SW-05-D_180402		E,G	D/S	ND	-	ND	-	ND	-	14	-	ND	-	0.65	DNQ	ND	-	ND	-

[a] Caffeine data was not used in analyses due to significant lab and field blank contamination

Table A-6. Event #3 PPCP Sampling Results

Sample ID	Type	Group	Site	Concentration in ng/L															
				Acetaminophen		Atenolol		Azithromycin		Caffeine[a]		Carbamazepine		Cotinine		Primidone		Sucralose	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
GW-A-01_180515	GW	A	01	ND	-	ND	-	2.9	DNQ	0.7	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-02_180515			02	ND	-	ND	-	4.9	DNQ	0.93	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-03_180515			03	ND	-	ND	-	6.9	DNQ	2.4	-	ND	-	ND	-	ND	-	ND	-
GW-A-04_180515			04	ND	-	1.0	DNQ	4.1	DNQ	0.8	DNQ	ND	-	ND	-	ND	-	ND	-
GW-A-07_180516			07	ND	-	ND	-	3.3	DNQ	36.0	BC	ND	-	ND	-	ND	-	ND	-
GW-B-03_180516		B	03	ND	-	0.4	DNQ	3.0	DNQ	1.8	DNQ	ND	-	ND	-	ND	-	ND	-
GW-B-03_180516_DUP			03	ND	-	ND	-	2.5	DNQ	0.5	BC	ND	-	ND	-	ND	-	ND	-
GW-B-04_180516			04	ND	-	ND	-	3.7	DNQ	2.6	BC	ND	-	ND	-	ND	-	6.8	-
GW-C-BK-05_180514		C	05	ND	-	ND	-	4.6	DNQ	1.8	DNQ	ND	-	ND	-	ND	-	ND	-
GW-C-BK-05_180514_EB			05	ND	-	ND	-	ND	-	32.0	DNQ	ND	-	0.6	DNQ	ND	-	ND	-
GW-C-BK-06_180517			06	ND	-	ND	-	2.3	DNQ	1.4	BC	0.1	DNQ	ND	-	ND	-	ND	-
GW-C-07_180515			07	ND	-	ND	-	2.5	DNQ	3.2	DNQ	ND	-	ND	-	ND	-	ND	-
GW-C-08_180515			08	ND	-	ND	-	5.6	DNQ	2.0	DNQ	ND	-	ND	-	ND	-	ND	-
GW-D-04_180517		D	04	ND	-	ND	-	2.2	DNQ	2.9	BC	ND	-	ND	-	ND	-	ND	-
GW-D-05_180517			05	ND	-	ND	-	2.4	-	2.8	BC	ND	-	ND	-	ND	-	ND	-
GW-D-07_180517			07	ND	-	ND	-	2.8	DNQ	1.3	BC	0.1	DNQ	ND	-	ND	-	ND	-
GW-E-02_180514		E	02	ND	-	1.3	BC	3.3	DNQ	0.66	DNQ	ND	-	ND	-	ND	-	ND	-
GW-E-03_180517			03	ND	-	ND	-	9.6	DNQ	1.1	BC	ND	-	ND	-	ND	-	6.5	-
GW-F-02_180515		F	02	ND	-	ND	-	ND	-	1.3	-	ND	-	ND	-	ND	-	ND	-
GW-G-01_180517		G	01	ND	-	ND	-	2.9	DNQ	1.3	BC	ND	-	ND	-	ND	-	ND	-
GW-G-02_180518			02	ND	-	ND	-	6.9	DNQ	1.1	BC	0.1	DNQ	ND	-	ND	-	36.0	-
SW-01-D_180516	SW	A,G	D/S	ND	-	ND	-	2.6	DNQ	20	BC	0.18	DNQ	0.8	DNQ	ND	-	ND	-
SW-02-U_180516		B	U/S	ND	-	ND	-	2.8	DNQ	75	-	0.22	DNQ	0.8	DNQ	ND	-	ND	-
SW-03-D-180514		C,F	D/S	ND	-	ND	-	8.2	DNQ	3.4	-	ND	-	0.7	DNQ	ND	-	ND	-
SW-03-U-180516		C	U/S	ND	-	ND	-	3.1	DNQ	3.9	BC	ND	-	ND	-	ND	-	ND	-
SW-04-D_180514		D	D/S	ND	-	ND	-	3.3	DNQ	3.5	-	ND	-	ND	-	ND	-	ND	-
SW-04-U-180514		D,G	U/S	ND	-	ND	-	ND	-	4.6	-	ND	-	ND	-	ND	-	ND	-
SW-05-D_180514		E,G	D/S	ND	-	ND	-	2.6	DNQ	6	-	ND	-	0.9	DNQ	0.8	DNQ	ND	-

[a] Caffeine data was not used in analyses due to significant lab and field blank contamination

Table A-7. Event #1 Nitrate Isotope Ratio Sampling Results

Sample ID	Type	Group	Site	Results in ‰	
				δ^{15}N-NO_3	δ^{18}O-NO_3
GW-A-01_170918	GW	A	01	7.23	3.61
GW-A-02_170824			02	5.63	3.61
GW-A-03_170824			03	5.87	3.24
GW-A-04_170824			04	5.66	3.75
GW-A-07_170824			07	7.54	3.65
GW-B-03_170920		B	03	6.15	3.85
GW-B-04_170823			04	6.15	3.76
GW-B-05_170921			05	7	4.43
GW-C-01_170823		C	01	11.38	6.36
GW-C-04_170919			04	12.08	7.4
GW-C-07_170919			07	10.71	6.18
GW-C-08_170919			08	10.94	6.12
GW-C-BK-05_170825			05	10.76	6.43
GW-C-BK-05_170825-EB			05	Low Nitrate	Low Nitrate
GW-C-BK-06_170919			06	17.5	12.37
GW-D-04_170918		D	04	11.81	7.1
GW-D-05_170918			05	2.98	2.05
GW-D-07_170919			07	Low Nitrate	Low Nitrate
GW-E-03_170921		E	03	7.64	8.01
GW-F-02_170823		F	02	8.61	7.49
GW-G-01_170921		G	01	7.24	8.63
GW-G-02_170920			02	11.32	4.41
SW-03-D_170825	SW	C	D/S	15.08	9.07
SW-03-D_170920			D/S	16.27	9.83
SW-03-U_170919			U/S	11.1	7.1

Table A-8. Event #2 Nitrate Isotope Ratio Sampling Results

Sample ID	Type	Group	Site	Results in ‰	
				$\delta^{15}N\text{-}NO_3$	$\delta^{18}O\text{-}NO_3$
GW-A-01_180403	GW	A	01	7.29	3.71
GW-A-02_180403			02	6.12	3.46
GW-A-03_180403			03	6.88	3.46
GW-A-04_180403			04	5.92	3.81
GW-A-07_180404			07	7.67	3.59
GW-B-03_180404		B	03	5.81	2.93
GW-B-04_180405			04	6.26	2.93
GW-C-07_180403		C	07	9.01	4.33
GW-C-08_180403			08	8.39	4.18
GW-C-BK-06_180404			BK	Low Nitrate	Low Nitrate
GW-D-05_180405		D	05	10.3	7.98
GW-D-07_180404			07	11.22	6.64
GW-E-02_180402		E	02	7.79	8.53
GW-E-03_180402			03	7.21	6.93
GW-F-02_180403		F	02	8.88	7.49
GW-G-01_180406		G	01	7.27	8.22
GW-G-02_180405			02	10.78	3.29
SW-01-D_180403	SW	A,G	D/S	2.59	0.86
SW-02-D_180404		B	D/S	3.45	1.81
SW-02-u_180405			U/S	4.73	3.45
SW-03-D_180402		C,F	D/S	5.93	3.06
SW-03-u_180404		C	U/S	6.83	3.61
SW-04-D_180402		D	D/S	11.98	7.27
SW-04-u_180402		D,G	U/S	10.41	6.98
SW-05-D_180402		E,G	D/S	7.71	5.88

Table A-9. Event #3 Nitrate Isotope Ratio Sampling Results

Sample ID	Type	Group	Site	Results in ‰	
				$\delta^{15}N-NO_3$	$\delta^{18}O-NO_3$
GW-A-01_180515	GW	A	01	7.35	3.44
GW-A-02_180515			02	5.85	3.8
GW-A-03_180515			03	6.93	3.47
GW-A-04_180515			04	5.65	3.55
GW-A-07_180516			07	7.73	3.93
GW-B-03_180516		B	03	5.39	2.19
GW-B-04_180516			04	6.35	2.93
GW-C-BK-05_180514		C	05	8.96	4.86
GW-C-BK-06_180517			06	8.91	4.57
GW-C-07_180515			07	9.68	5.26
GW-C-08_180515			08	22.68	13.05
GW-D-04_180517		D	04	9.32	3.43
GW-D-05_180517			05	0.66	2.88
GW-D-07_180517			07	9.95	-0.05
GW-E-02_180514		E	02	7.89	8.71
GW-E-03_180517			03	6.23	5.14
GW-F-02_180515		F	02	8.38	6.91
GW-G-01_180517		G	01	7.38	8.51
GW-G-02_180518			02	10.86	3.38
SW-01-D_180516	SW	A,G	D/S	Low Nitrate	Low Nitrate
SW-02-u_180516		B	U/S	Low Nitrate	Low Nitrate
SW-03-D_180514		C,F	D/S	8.92	5.06
SW-03-u_180516		C	U/S	7.84	4.13
SW-04-D_180514		D	D/S	Low Nitrate	Low Nitrate
SW-04-u_180514		D,G	U/S	Low Nitrate	Low Nitrate
SW-05-D_180514		E,G	D/S	22.29	13.72

Prepared for

County of Ventura – Environmental Health Division

800 S. Victoria Avenue
Ventura, California 93009-1730

Technical Report

for the Study of Water Quality Impairments Attributable to Onsite Wastewater Treatment Systems (OWTS) in the Ventura River Watershed

Appendix B – Field Forms and Photos

Prepared by

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Project Number LA0391

September 2018

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GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

409 OLD BALDWIN ROAD

Location: VRWD WELL #4
Staff: R. WILSON
Project Name: VCEHDONTS/ALGAETMPL
Date: 8/24/17
Sample ID: GW-A-02_170824
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: STANDARD PUMP OPS
Dedicated: [✓ Y] / N
Time Initiated: 1040
Pump Inlet Depth: —
Initial Water Level: 51.00
One Casing Vol.: —
Level Referenced To: TOC
Total Vol. Purged: 17,600 GAL
GW Elevation: —
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: —
GW Level After Purge: 65.38
Casing Diameter: —
Time Completed: 1110

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(-	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate (GPM)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1040	1100	—	NO PARAMETER TAKEN					—	—
1049	1100	8800	15.64	7.40	0944		8.05	1	
1052	1100	17600	15.66	7.46	0942		8.00	1	
—	SAMPLE	COLLECTED AT 1100						—	→

SAMPLING INFORMATION:

Sample Method: PURGE
Dedicated: [✓ Y] / N
Water Level at Sampling: 65.38
Pump Parameters:
Refill Time (sec): ______
Discharge Time (sec): ______
Pressure Setting (psi): ______
Others ( ): ______
Sample Characteristics: NO ODOR, CLEAR
Comment and Observations: ______

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8/24/17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory: ______
Trip Blank Date: ______
Field Blank Date: ______

GENERAL INFORMATION:

Weather Conditions at Time of Sampling: ______
General Comments and Observations: ______

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

4109 OLD BALDWIN ROAD
Location: VRWD WELL #3
Staff: R WILSON
Project Name: VCEHD OWTS/ALGAE TMD
Date: 8/24/17
Sample ID: GW-A-03-170824
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: NORMAL PUMP OPS
Dedicated: [✓ Y] / N
Time Initiated: 1006
Pump Inlet Depth: —
Initial Water Level: — NOT COLLECTED
One Casing Vol.: —
Level Referenced To: TOC (SAMPLE PORT)
Total Vol. Purged: 5500 GAL
GW Elevation: —
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: —
GW Level After Purge: 58.25
Casing Diameter: —
Time Completed: 1035

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (GPM) (~~360~~)	Total Volume Removed GAL	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1007	370	—	NO PARAMETER TAKEN —						
1012	370	1950	15.80	7.38	0.920		9.09	3	
1017	370	3700	15.68	7.35	0.918		9.96	1	
1022	370	5550	15.84	7.36	0.921		10.23	1	
—	—	SAMPLE COLLECTED @ 1025 —							

SAMPLING INFORMATION:

Sample Method: PURGE
Dedicated: [✓ Y] / N
Water Level at Sampling: 58.25
Pump Parameters:
Refill Time (sec): —
Discharge Time (sec): /
Pressure Setting (psi): /
Others ( ): /
Sample Characteristics: NO ODOR, CLEAR
Comment and Observations: HIGH NITRATES, SCHEDULED FOR ~~DESTRUCTION~~ RW DESTRUCTION, ACCORDING TO GENERAL MANAGER BERT

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8.24.17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

409 OLD BALDWIN RD.

Location: VRWD WELL #1
Staff: R. WILSON
Project Name: VLEHD OWTS / ALGAE TMDL
Date: 8.24.17
Sample ID: GW-A-04_170824
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: NORMAL PUMP OPERATION
Dedicated: [✓ Y] / N
Time Initiated: 11:10
Pump Inlet Depth: –
Initial Water Level: 53.75
One Casing Vol.: –
Level Referenced To: TOC
Total Vol. Purged:
GW Elevation: –
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: –
GW Level After Purge: 5855
Casing Diameter: –
Time Completed: 11:50

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (GPM)	Total Volume Removed GAL	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1112	PUMP PRIMING ~7 MINUTES								
1119	850	– NO PARAMETER TAKEN							
1125	850	5100	15.39	7.50	0.937		7.95	0	
1128	850	7650	15.32	7.50	0.933		9.64	1	
1133	850	11,900	15.33	7.49	0.935		8.20	0	
1136	850	14450	15.48	7.47	0.935		~~9.20~~ RW 8.90	0	
	SAMPLE COLLECTED AT 11:40								

SAMPLING INFORMATION:

Sample Method: PURGE
Dedicated: [✓ Y] / N
Water Level at Sampling: 58.55
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics: NO ODOR, CLEAR
Comment and Observations: CLOSE TO NEIGHBORING SEPTIC TANKS

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8.24.17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~1.49~~ 1.409 mS/cm = 1409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations: DO. NOT REPRESENTATIVE OF WATER QUALITY DUE TO SAMPLING FROM PORT, INTRODUCING NEW ATMOSPHERIC O_2

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 147 BALDWIN
Staff: R. WILSON
Project Name: VCEHD OWTS/ALGAE TMDL
Date: 8/24/17
Sample ID: GW-A-07_170824
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: PUMP OPERATION
Dedicated: [✓ Y] / N
Time Initiated: 0910
Pump Inlet Depth: —
Initial Water Level: —
One Casing Vol.: —
Level Referenced To: —
Total Vol. Purged: 400 GAL
GW Elevation: —
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: —
GW Level After Purge: —
Casing Diameter: 12"?
Time Completed: 0930

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( ) GAL/MIN	Total Volume Removed GAL	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
0912	400	200	16.10	7.23	0.998	|	9.90	3	|
0916	400	400	15.95	7.30	0.990	|	9.85	3	|
—	SAMPLE	COLLECTED	AT	0920				—	—

SAMPLING INFORMATION:

Sample Method: PURGE
Dedicated: [✓ Y] / N
Water Level at Sampling: —
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics: CLEAR, NO ODOR
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8/24/17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations: HIGH FLOW RATE, SAMPLES COLLECTED AFTER PUMP TURNED OFF (3L/PUMP CYCLE)

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 4673 SANTA ANA BLVD
Staff: R WILSON
Project Name: ALGAE TMDL
Date: 8/23/17
Sample ID: GW-B-04-170823
Sample Matrix: WATER

PURGE INFORMATION:

Purge Method: LOW FLOW
Dedicated: Y / [✓ N]
Time Initiated: 1030
Pump Inlet Depth: 49' BTOC
Initial Water Level: 26.37 ~~67~~ 58.96
One Casing Vol.: 191.4
Level Referenced To: TOC
Total Vol. Purged: 22 L
GW Elevation: —
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: 58.96
GW Level After Purge: 26.37
Casing Diameter: 12"
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(58.96	- 26.37)	* 3.14 *	.5	* .5	* 7.48	= 191.4

PURGE DATA:

Time	Purge Rate (500) mL/min	Total Volume Removed (L)	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1202	500	7.5	15.98	7.41	0.965		6.14	2.94	-5.7
1203	500	8.0	16.10	7.38	0.969		6.09	3.14	-2.3
1204	500	8.5	16.10	7.37	0.969		5.97	3.24	1.0
1213	500	13.0	16.10	7.37	0.969		6.13	2.91	6.6
1217	500	15.0	16.18	7.35	0.970		5.99	2.61	
1221	500	17.0	16.27	7.33	0.972		5.89	1.97	20.3
1224	500	18.5	16.27	7.32	0.972		5.83	1.87	25.5
1228	500	20.5	16.32	7.32	0.974		5.66	1.79	28.2
1231	500	22.0	16.44	7.31	0.976		5.35	1.60	32.7

SAMPLE COLLECTED AT 12:48

SAMPLING INFORMATION:

Sample Method: low-flow
Dedicated: Y / [✓ N]
Water Level at Sampling: 26.37
Pump Parameters:
Refill Time (sec): —
Discharge Time (sec): —
Pressure Setting (psi): —
Others ( ): —
Sample Characteristics: Clear, ODORLESS
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8/23/17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.49 mS/cm = 1.49 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date: —
Field Blank Date: —

GENERAL INFORMATION:

Weather Conditions at Time of Sampling: overcast → clear
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 151 RANCH ROAD, VENTURA
Staff: RW
Project Name: ALGAE TMDL
Date: 8/23/17
Sample ID: ② ~~GW-C-01-170823~~ GW-C-01_170823
Sample Matrix: W

PURGE INFORMATION:

Purge Method: DEDICATED PUMP OPS.
Dedicated: [✓ Y] / N
Time Initiated: 1435
Pump Inlet Depth:
Initial Water Level:
One Casing Vol.: -
Level Referenced To:
Total Vol. Purged: -
GW Elevation:
Well Purged to Dryness: Y / [✓ N]
Well Total Depth:
GW Level After Purge: -
Casing Diameter:
Time Completed: |

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate ( ) (l/m)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1440	2		17.63	7.44	1.217		5.45	0.32	
1445	12		17.58	7.47	1.218	5.37 RW	~~4.94~~	0.47	
1448	18		17.58	7.48	1.21		5.35	0.4	
	Sample collected @ 1450								

SAMPLING INFORMATION:

Sample Method: PURGE
Dedicated: [✓ Y] / N
Water Level at Sampling: -
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics: CLEAR, ODORLESS
Comment and Observations: RW

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8/23/17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.49 mS/cm = 1.49 mS/cm

SAMPLE COLLECTION DATA:

Laboratory: -
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 9425 SANTA ANA RD.
Staff: RW - RL
Project Name: VCEHD OWTS/ALGAE TMDL
Date: 8/25/17
Sample ID: GW-C-BK-05-170825
Sample Matrix: H_2O

PURGE INFORMATION:

Purge Method: LOW FLOW
Dedicated: Y [✓ N]
Time Initiated: 0942
Pump Inlet Depth: 50 ~~49.75~~ RL
Initial Water Level: 26.26
One Casing Vol.:
Level Referenced To: TOC
Total Vol. Purged: 325
~~GW Elevation:~~
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: 59.75
GW Level After Purge: 26.33
Casing Diameter: 8"
Time Completed: 1044

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate (L/M)	Total Volume Removed L	Temp. (°C)	pH	Conduct. (uS/cm)	~~TDS (ppm)~~	DO (mg/L)	Turbidity (NTU)	~~ORP (mV)~~
1007	2.5	—	NO PARAMETER TAKEN						—
1012	2.5	125	15.59	7.20	1.003	[illegible]	3.23	2	
10:15	2.5	20	15.62	7.18	1.000		3.23	2	
—	SAMPLE COLLECTED AT 10:20								—

SAMPLING INFORMATION:

Sample Method: LOW FLOW
Dedicated: Y [✓ N]
Water Level at Sampling: 26.33
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics: CLEAR, NO ODOR
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 8.25.17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1409 mS/cm = 1409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 947 Casitas Vista
Project Name: Algae TMDL
Sample ID: GW-F-02-~~08~~ 170823
Staff: RW
Date: 8/23/17
Sample Matrix: W

PURGE INFORMATION:

Purge Method: DEDICATED PUMP OPS.
Time Initiated: 1530
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] / N
Pump Inlet Depth: -
One Casing Vol.: -
Total Vol. Purged: -
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: -
Time Completed: 1600

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate ( ) L/MIN	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1536	3.0		13.07	7.40	1.774	|	8.19	1.71	|
1539	|		14.72	7.30	1.775	|	6.32	1.38	|
1542	|		13.93	7.24	1.734	|	5.48	1.11	|
1545 ~~1545~~	|		14.02	7.19	1.731	|	4.85	1.29	|
1547	|		14.04	7.18	1.731	|	4.73	1.14	|
—	—	SAMPLED	AT	15:50	—	—	—	—	—

SAMPLING INFORMATION:

Sample Method: PURGE
Dedicated: [✓ Y] / N
Water Level at Sampling: /
Pump Parameters:
Refill Time (sec): RW
~~Discharge Time~~ (sec):
Pressure Setting (psi):
~~Others (~~):
Sample Characteristics: CLEAR, ODORLESS
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI556
Serial #: 15M100686
Calibration Date: 8/22/17
Calibration By: RW
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.49 mS/cm = 1.49 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 10406 CREEK BRD.
Staff: R. LUSTIG, R.WILSON
Project Name: VCEHD OWTS
Date: 9.18.17
Sample ID: GW-D-04_170918
Sample Matrix: H_2O

PURGE INFORMATION:

Purge Method: LOW FLOW
Dedicated: Y / [✓ N]
Time Initiated: 0930
Pump Inlet Depth: 29.50
Initial Water Level: 28.80
One Casing Vol.: —
Level Referenced To: WOODEN BOARDS
Total Vol. Purged: ~~40~~ 72
GW Elevation: —
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: ~~30~~ 29.86'
GW Level After Purge: 28.80
Casing Diameter: ~4 ~~FEET~~
Time Completed: 1025

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (L/min)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	~~TDS (ppm)~~	DO (mg/L)	Turbidity (NTU)	~~ORP (mV)~~
10:02	~~44~~ 45	—	13.97	6.89	1.607		4.53	7.40	
10:03	↓	4.5	13.99	6.95	1.606		4.11	10.6	
10:07		22.5	13.98	6.96	1.607		3.91	13.1	
10:12		45.0	13.98	6.95	1.606		3.72	5.3	
10:14		54.0	—	—	—		—	7.7	
10:15		58.5	—	—	—		—	7.46	
10:16		63	13.98	6.95	1.606		3.65	6.59	
		SAMPLE COLLECTED @ 10:18							

SAMPLING INFORMATION:

Sample Method: Low Flow Purge
Dedicated: Y / [✓ N]
Water Level at Sampling: 28.8
Pump Parameters:
Refill Time (sec): ______
Discharge Time (sec): ______
Pressure Setting (psi): ______
Others ( ): ______
Sample Characteristics: ______
Comment and Observations: INITIAL HIGH SOLIDS FROM STIRRING UP SEDIMENT

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.18.17
Calibration By: R.L
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory: ______
Trip Blank Date: ______
Field Blank Date: ______

GENERAL INFORMATION:

Weather Conditions at Time of Sampling: ______
General Comments and Observations: ______

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location: 10808 CREEK RD.
Project Name: VCEHD OWTS
Sample ID: GW-D-05-170918
Staff: R. LUSTIG, R. WILSON
Date: 9.18.17
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: Normal pump operation
Time Initiated: 11:35
Initial Water Level: N/A
Level Referenced To: -
GW Elevation: -
Well Total Depth: -
Casing Diameter: -
Dedicated: [✓ Y] N
Pump Inlet Depth: -
One Casing Vol.: -
Total Vol. Purged: -
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: -
Time Completed: 1200

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
11:43			15.91	7.7	1.964		3.40	0	
11:46			15.18	7.7	1.862		3.21	[illegible]	
11:49			15.23	7.6	1.892		2.92	0	
- SAMPLE COLLECTED AT 11:50 —									

SAMPLING INFORMATION:

Sample Method: NORMAL PUMP OPERATION
Dedicated: [✓ Y] / N
Water Level at Sampling: -
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations: SAMPLE PORT IS IN STORAGE TANK, FILL POINT

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.18.17
Calibration By: RL
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations: VERY SULFUROUS SMELL OF WATER

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location: 1400 PARK DR, OJAI
Staff: R. LUSTIG, R. WILSON
Project Name: VCEHD OVB
Date: 9.18.17
Sample ID: GW-A-01-170918
Sample Matrix: H_2O

PURGE INFORMATION:

Purge Method: NORMAL PUMP OPERATION
Dedicated: [✓ Y] / N
Time Initiated: 14:15
Pump Inlet Depth: —
Initial Water Level: —
One Casing Vol.: —
Level Referenced To: —
Total Vol. Purged: —
GW Elevation: —
Well Purged to Dryness: Y / [✓ N]
Well Total Depth: —
GW Level After Purge: —
Casing Diameter: —
Time Completed: 1435

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
14:17			15.7	7.5	0.951		10.3	1	
14:19			15.6	7.4	0.939		10.3	1	
14:21			15.6	7.3	0.939		10.0	0	
— SAMPLE COLLECTED AT 14:25 —									

SAMPLING INFORMATION:

Sample Method: NORMAL PUMP OPERATION
Dedicated: [✓ Y] / N
Water Level at Sampling: —
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations: COULD NOT MEASURE GW LEVEL DUE TO HITTING PUMP

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.18.17
Calibration By: R.L
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location:
Project Name: VCEND OWTS
Sample ID: GW-C-BK-06_170919
Staff: R.LUSTIG, R.WILSON
Date: 9.19.17
Sample Matrix: H_2O

PURGE INFORMATION:

Purge Method: PUMP OPERATION
Time Initiated: 0940
Initial Water Level: —
Level Referenced To: —
GW Elevation: —
Well Total Depth: ~80
Casing Diameter: —
Dedicated: [✓ Y] / N
Pump Inlet Depth: —
One Casing Vol.: —
Total Vol. Purged: —
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: —
Time Completed: 1010

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate ( ) ?	Total Volume Removed ?	Temp. (°C)	pH	Conduct. (uS/cm)	~~TDS (ppm)~~	DO (mg/L)	Turbidity (NTU)	~~ORP (mV)~~
0950			1495	7.09	1.703		HIGH	2	
0953			1497	7.48	1.634		HIGH	2	
0956			15.10	7.53	1.598		HIGH	1	
—	SAMPLE COLLECTED AT 10:00 —								

SAMPLING INFORMATION:

Sample Method: PUMP OPERATION
Dedicated: [✓ Y] / N
Water Level at Sampling: —
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics: SAMPLE HAS HIGH DO DUE TO HOSEBIBB PRESSURE
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.19
Calibration By: R.L
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: GIRL SCOUT CAMP N. CORNER **Staff:** R.WILSON, R.LUSTIG
Project Name: V CEHD OWTS **Date:** 9.19.17
Sample ID: GW-D-07_170919 **Sample Matrix:** H2O

PURGE INFORMATION:

Purge Method: NORMAL PUMP OPERATION **Dedicated:** [✓ Y] / N
Time Initiated: 10:39 **Pump Inlet Depth:** —
Initial Water Level: — **One Casing Vol.:** —
Level Referenced To: TOC **Total Vol. Purged:** —
GW Elevation: — **Well Purged to Dryness:** Y / [✓ N]
Well Total Depth: ~ 30' **GW Level After Purge:** 22.59
Casing Diameter: — **Time Completed:** 1055

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48 =	

PURGE DATA:

Time	Purge Rate (GPM) ~60-75	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
10:39			17.1	7.5	1.897	\	7.37	0	\
10:42			17.1	7.4	1.890	\	7.38	0	\
10:45			17.0	7.4	1.890	\	7.37	1	\
	SAMPLE COLLECTED AT 10:49a								

SAMPLING INFORMATION:

Sample Method: NORMAL PUMP OPS **Dedicated:** [✓ Y] / N
Water Level at Sampling: 22.59
Pump Parameters:
Refill Time (sec): **Discharge Time (sec):**
Pressure Setting (psi): **Others ( ):**
Sample Characteristics:
Comment and Observations: HIGH FLOWRATE WHILE PUMP IS ACTIVE, HOLD ONTO BOTTLES TIGHTLY

INSTRUMENT DATA:

Meter Type: YSI 556 **Serial #:** 15M100686
Calibration Date: 9.19.17 **Calibration By:** R.L.
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date: **Field Blank Date:**

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec▷
consultants

Location:
Project Name: VCEAD OWTS
Sample ID: GW-C-07-170919

Staff: R.WILSON / R.LUSTIG
Date: 9.19.17
Sample Matrix: H_2O

PURGE INFORMATION:

Purge Method: NORMAL PUMP OPS
Time Initiated: 1310
Initial Water Level: —
Level Referenced To: —
GW Elevation: —
Well Total Depth: —
Casing Diameter: —

Dedicated: [✓ Y] / N
Pump Inlet Depth:
One Casing Vol.: —
Total Vol. Purged: —
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: —
Time Completed: 1325

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (GPM)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1315	950	—	17.06	7.35	1.003	—	5.32	0	—
	SAMPLE COLLECTED AT 1320								

SAMPLING INFORMATION:

Sample Method: NORMAL OPS/SAMPLE PORT
Dedicated: [✓ Y] / N
Water Level at Sampling: —
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.19.17
Calibration By: R.L
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location:
Project Name: VLEADOVTS
Sample ID: GW-C-08
Staff: R. WILSON/R. LUSTIG
Date: 9.19.17
Sample Matrix: H20

PURGE INFORMATION:

Purge Method: NORMAL OPERATION
Time Initiated: 1335
Initial Water Level: –
Level Referenced To: –
GW Elevation: –
Well Total Depth: –
Casing Diameter: –
Dedicated: [✓ Y] / N
Pump Inlet Depth: –
One Casing Vol.: –
Total Vol. Purged: –
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: –
Time Completed: 1353

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1340	619	–	16.75	7.41	1.013	~~4~~	6.13	0	–
	SAMPLE		COLLECTED AT			13:45			

SAMPLING INFORMATION:

Sample Method: NORMAL OPERATION/SAMPLE PORT **Dedicated:** [✓ Y] / N
Water Level at Sampling: –
Pump Parameters:
Refill Time (sec): Discharge Time (sec):
Pressure Setting (psi): Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.19.17
Calibration By: R.L.
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ ~~μS~~/cm = 1.409 ~~μS~~/cm
1.409 mS/cm mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: FOSTER PARK
Project Name: VCEHD OWTS
Sample ID: GW-C-04
Staff: R. LUSTIG / R. WILSON
Date: 9.19.17
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: NORMAL OPERATION
Time Initiated: 1359
Initial Water Level: —
Level Referenced To: —
GW Elevation: —
Well Total Depth: —
Casing Diameter: —
Dedicated: [✓ Y] / N
Pump Inlet Depth: —
One Casing Vol.: —
Total Vol. Purged: —
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: —
Time Completed: 1420

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *		*	* 7.48 =	

PURGE DATA:

Time	Purge Rate (GPM)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1405	124	—	16.45	6.92	1.123	/	2.71	0	/
— SAMPLE COLLECTED 14:10 —									

SAMPLING INFORMATION:

Sample Method: NORMAL PUMP OPERATION / SAMPLE PORT
Dedicated: [✓ Y] / N
Water Level at Sampling: /
Pump Parameters:
Refill Time (sec): /
Discharge Time (sec):
Pressure Setting (psi): /
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15 M 100686
Calibration Date: 9.19.17
Calibration By: RL
Calibration: **PH:** 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location: 4141 RIVERSIDE, OAK VIEW
Project Name: VLEND OWTS
Sample ID: GW-B-03_170920
Staff: R. LUSTIG / R. WILSON
Date: 9.20.17
Sample Matrix: H20

PURGE INFORMATION:

Purge Method: PUMP CYCLING
Time Initiated: 0845
Initial Water Level: 29.72
Level Referenced To: BTOC
GW Elevation: —
Well Total Depth: ~100'
Casing Diameter: —
Dedicated: [✓ Y] / N
Pump Inlet Depth: ~80'
One Casing Vol.: —
Total Vol. Purged: —
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: —
Time Completed: 0915

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(-	)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
0850			15.35	7.58	1.058	—	7.07	2	—
0855			15.34	7.48	1.059	—	7.20	2	—
— SAMPLE COLLECTED AT 0900 —									

SAMPLING INFORMATION:

Sample Method: PUMP OPERATION
Dedicated: [✓ Y] / N
Water Level at Sampling: ✓
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations: WATER LEVEL COLLECTED ~~BEF~~ AFTER PURGE AND SAMPLE

INSTRUMENT DATA:

Meter Type: YSI556
Serial #: 15M100686
Calibration Date: 9.20.17
Calibration By: R.L.
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: 1221 FOOTHILL ROAD
Project Name: VLEAD OWTS
Sample ID: GW-G02_170920
Staff: R. LUSTIG, R. WILSON
Date: 9.20.17
Sample Matrix: H2O

PURGE INFORMATION:

Purge Method: PUMP OPERATION
Time Initiated: 0945
Initial Water Level: —
Level Referenced To: —
GW Elevation: ✓
Well Total Depth: —
Casing Diameter: —
Dedicated: [✓ Y] / N
Pump Inlet Depth: —
One Casing Vol.: —
Total Vol. Purged: ✓
Well Purged to Dryness: Y / [✓ N]
GW Level After Purge: —
Time Completed: 1015

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (GPM)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
0957	4.3		17.34	7.17	1.369	—	8.12	1	—
1000			17.37	7.09	1.392	—	7.78	1	—
1003			17.40	7.07	1.393	—	7.69	1	—
	SAMPLE COLLECTED AT 1005								

SAMPLING INFORMATION:

Sample Method: PUMP OPS / PORT
Dedicated: [✓ Y] / N
Water Level at Sampling: —
Pump Parameters:
Refill Time (sec): ______ Discharge Time (sec): ______
Pressure Setting (psi): ______ Others ( ): ______
Sample Characteristics:
Comment and Observations: ATTACH NPT BARB TO BACKFLOW PORT

INSTRUMENT DATA:

Meter Type: YSI 556
Serial #: 15M100686
Calibration Date: 9.20.17
Calibration By: R.L
Calibration: PH: 4.0 std. = 4.0
Conductivity: ~~4.49~~ 1.409 mS/cm = 1.409 mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date: **Field Blank Date:**

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: Soule
Project Name: YCEHD OWTS
Sample ID: GW-E-02_180402
Staff: RL
Date: 4/2/2018
Sample Matrix: GW

PURGE INFORMATION:

Purge Method: Pump
Time Initiated: 10:25
Initial Water Level: ____
Level Referenced To: ____
GW Elevation: ____
Well Total Depth: ____
Casing Diameter: ____
Dedicated: [✓ Y] N
Pump Inlet Depth: ____
One Casing Vol.: ____
Total Vol. Purged: ____
Well Purged to Dryness: Y / N
GW Level After Purge: ____
Time Completed: 10:35

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm)	Total Volume Removed	Temp. (C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
10:25	100		20.7	7.1	0.92	0.0007	3.1	1.4	146
10:27			21.1	7.1	0.93	0.0007	2.1	0.2	142
10:30			21.1	7.1	0.95	0.0007	2.1	0.4	138
	SAMPLE			TAKEN				10835	

SAMPLING INFORMATION:

Sample Method: ____ Dedicated: Y / N
Water Level at Sampling: ____
Pump Parameters:
Refill Time (sec): ____ Discharge Time (sec): ____
Pressure Setting (psi): ____ Others ( ): ____
Sample Characteristics: ____
Comment and Observations: ____

INSTRUMENT DATA:

Meter Type: ____ Serial #: ____
Calibration Date: ____ Calibration By: ____
Calibration: PH: 4.0 std. = ____
Conductivity: 4.49 mS/cm = ____ mS/cm

SAMPLE COLLECTION DATA:

Laboratory: ____
Trip Blank Date: ____ Field Blank Date: ____

GENERAL INFORMATION:

Weather Conditions at Time of Sampling: ____
General Comments and Observations: ____

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: Sculle
Project Name: VCAHP OWTS
Sample ID: GW-E-03_180407
Staff: RL
Date: 4/2/18
Sample Matrix: GW

PURGE INFORMATION:

Purge Method: Pump
Time Initiated: 10:53
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] / N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed: 1100

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48 =	

PURGE DATA:

Time	Purge Rate (gpm	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ Kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
10:55	1/3		22.1	7.2	0.9	0.0007	6.7	1	132
10:57			21.9	7.2	0.9	0.0007	6.5	1	134
	SAMPLE		TAKEN				AT	11:00	

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y / N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: VRWD
Project Name: VCEHD OWTS
Sample ID: GW-A-03_180403

Staff: RL
Date: 4/3/2018
Sample Matrix: water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated: 853
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:

Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ([illegible])	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) Kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
853	250		18.3	6.8	0.95	0.0007	10.3	1	198
856	|		18.2	7	0.95	0.0007	8	1	185
859	|		18.2	7	0.95	0.0007	8	1	180
902	|		18.2	7	0.95	0.0007	7.7	1	176
		SAMPLE AT 903							

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y / N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

⑭
Location ~~GW~~ VRWD
Project Name NCEHD OWTS
Sample ID GW-A-02-180403
Staff: RL
Date 4/3/2018
Sample Matrix: WATER

PURGE INFORMATION:

Purge Method: Pump
Time Initiated: 920
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed: 931

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate gpm	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ Kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
925	270		18	7	0.96	0.0007	5.9	1	179
927			18.1	7	0.97	0.0007	5.7	1	173
929			18.1	7	0.97	0.0007	5.9	1	171
	SAMPLED				AT		931		

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y / N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: VRWD
Project Name: VCEHD OWTS
Sample ID: GW-A-04-180403

Staff: RL
Date: 4/3/2018
Sample Matrix: Water

PURGE INFORMATION:

Purge Method: pump
Time Initiated: ~~950~~ 947
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth: 350
Casing Diameter:

Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
950	1000		17.6	7.1	0.97	0.0007	6.4	0	166
953			17.6	7.1	0.97	0.0007	6.4	1	164
956			17.6	7.1	0.97	0.0007	6.3	0	164
		SAMPLED			AT			959	

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: WALSH
Project Name: VCEHD
Sample ID: GW-A-01-180403

Staff: RL
Date: 4/3/18
Sample Matrix: WATER

PURGE INFORMATION:

Purge Method: pump
Time Initiated: 1015
Initial Water Level: ______
Level Referenced To: ______
GW Elevation: ______
Well Total Depth: ______
Casing Diameter: ______

Dedicated: [✓ Y] N
Pump Inlet Depth: ______
One Casing Vol.: ______
Total Vol. Purged: ______
Well Purged to Dryness: Y / N
GW Level After Purge: ______
Time Completed: ______

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1020		4gal	17.9	7.1	0.93	0.0007	8	1	164
1023		8gal	18.5	7.1	0.94	0.0007	7.9	1	164
1026		10gal	18.5	7.1	0.94	0.0007	7.8	1	165
		SAMPLED			AT		1030		

SAMPLING INFORMATION:

Sample Method: ______ Dedicated: Y / N
Water Level at Sampling: ______
Pump Parameters:
Refill Time (sec): ______ Discharge Time (sec): ______
Pressure Setting (psi): ______ Others ( ): ______
Sample Characteristics: ______
Comment and Observations: ______

INSTRUMENT DATA:

Meter Type: ______ Serial #: ______
Calibration Date: ______ Calibration By: ______
Calibration: PH: 4.0 std. = ______
Conductivity: 4.49 mS/cm = ______ mS/cm

SAMPLE COLLECTION DATA:

Laboratory: ______
Trip Blank Date: ______ Field Blank Date: ______

GENERAL INFORMATION:

Weather Conditions at Time of Sampling: ______
General Comments and Observations: ______

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: LOBBA
Project Name: VCEHD OZ TS
Sample ID: ~~GW-F02-180403~~ RL GW-F-02_180403
Staff: RL
Date: 4/3/18
Sample Matrix: water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated: 1105
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) *	3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate (gpm)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ Kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1110	60 RL	30	17.5	6.8	1.6	0.0013	3.6	1	182
1112	|	42	16.9	6.7	1.6	0.0013	2.8	1	170
1115	|	60	16.9	6.7	1.6	0.0013	2.7	1	164
	|								
		SAMPLED				At 1117			

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = ______ mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: Vta Water
Staff: RL
Project Name: VCWTD OWTS
Date: 4/3/18
Sample ID: GW-C-07-180403
Sample Matrix: Water

PURGE INFORMATION:

Purge Method: Pump
Dedicated: [✓ Y] N
Time Initiated: ______
Pump Inlet Depth: ______
Initial Water Level: ______
One Casing Vol.: ______
Level Referenced To: ______
Total Vol. Purged: ______
GW Elevation: ______
Well Purged to Dryness: Y N
Well Total Depth: ______
GW Level After Purge: ______
Casing Diameter: ______
Time Completed: ______

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1316			18.9	7.0	1.1	.0008	6.9	1	168
SAMPLED at 1319									

SAMPLING INFORMATION:

Sample Method: ______
Dedicated: Y N
Water Level at Sampling: ______
Pump Parameters:
Refill Time (sec): ______
Discharge Time (sec): ______
Pressure Setting (psi): ______
Others ( ): ______
Sample Characteristics: ______
Comment and Observations: ______

INSTRUMENT DATA:

Meter Type: ______
Serial #: ______
Calibration Date: ______
Calibration By: ______
Calibration: PH: 4.0 std. = ______
Conductivity: 4.49 mS/cm = ______ mS/cm

SAMPLE COLLECTION DATA:

Laboratory: ______
Trip Blank Date: ______
Field Blank Date: ______

GENERAL INFORMATION:

Weather Conditions at Time of Sampling: ______
General Comments and Observations: ______

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: Vita Water
Project Name: VCFHD ONTS
Sample ID: GW-C-08_1804-03
Staff: RL
Date: 4/3/18
Sample Matrix: water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated:
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed RL	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) mg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1335		~~18.3~~	18.3	6.9	1.05	0.0008	6	0	171
		SAMPLED				AT	13	37	

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y / N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others (   ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std. = ______
Conductivity: 4.49 mS/cm = ______ mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: GW-B-03
Project Name: VC EHD OWTS
Sample ID: GW-B-03_180404
Staff: RL
Date: 4/4/18
Sample Matrix: Water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated: 839
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] / N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
852	2	20	17.2	7	0.99	0.0008	7.9	5	160
854	2	24	18	7	1.01	0.0008	7.1	2	150
857	2	30	17.3	7	0.99	0.0008	6.7	5	140
900	2	36	18.1	7	1.01	0.0008	6.6	2	137
		SAMPLED AT					902		

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y / N
Water Level at Sampling:
Pump Parameters
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location: Girl Scouts
Project Name: VCEHD OWTS
Sample ID: GW-CBK-06_180404
Staff: RL
Date: 4/4/18
Sample Matrix: water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated:
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:
Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *		*	* 7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1022			17.5	7.1	1.7	0.0013	5.2	3	-28
1025			17.5	7.1	1.7	0.0013	5.5	3	-19
1027			17.5	7.1	1.7	0.0013	5.3	4	-88

SAMPLED AT 1030

SAMPLING INFORMATION:

Sample Method:
Dedicated: Y N
Water Level at Sampling:
Pump Parameters
Refill Time (sec):
Discharge Time (sec):
Pressure Setting (psi):
Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type:
Serial #:
Calibration Date:
Calibration By:
Calibration: PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date:
Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: GIRL SCOUTS
Project Name: VCEHD OWTS
Sample ID: GW-D-07_180404

Staff: RL
Date: 4/4/18
Sample Matrix: water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated:
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:

Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y / N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1048			15.2	7.1	1.51	0.0012	5.3	1	9.1
1050			15.2	7.2	1.51	0.0012	5.5	0	5.3
1052			15.2	7.2	1.51	0.0012	5.4	1	1.3
			SAMPLED				AT	1055	

SAMPLING INFORMATION:

Sample Method: Dedicated: Y / N
Water Level at Sampling:
Pump Parameters
Refill Time (sec): Discharge Time (sec):
Pressure Setting (psi): Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type: Serial #:
Calibration Date: Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date: Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location: MOCWD
Project Name:
Sample ID: GW-A-07_180404

Staff: RL
Date: 4/4/18
Sample Matrix: water

PURGE INFORMATION:

Purge Method: Pump
Time Initiated:
Initial Water Level:
Level Referenced To:
GW Elevation:
Well Total Depth:
Casing Diameter:

Dedicated: [✓ Y] N
Pump Inlet Depth:
One Casing Vol.:
Total Vol. Purged:
Well Purged to Dryness: Y N
GW Level After Purge:
Time Completed:

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(-	)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate gpm	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1253	400	200	19	7.3	0.9	0.0007	10	5	50
	SAMPLED					AT		1256	

SAMPLING INFORMATION:

Sample Method: Dedicated: Y N
Water Level at Sampling:
Pump Parameters:
Refill Time (sec): Discharge Time (sec):
Pressure Setting (psi): Others ( ):
Sample Characteristics:
Comment and Observations:

INSTRUMENT DATA:

Meter Type: Serial #:
Calibration Date: Calibration By:
Calibration: PH: 4.0 std. =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory:
Trip Blank Date: Field Blank Date:

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location SPAR
Project Name VC EHD OWTS
Sample ID GW-D-05-180405
Staff RL
Date 4/5/18
Sample Matrix Water

PURGE INFORMATION:

Purge Method Pump
Time Initiated
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1050			18	6.5	2	0.0015	6.6	11	185
1053			18	6.7	2	0.0015	4.0	2	160
1055			18	6.8	2	0.0015	2.9	1	151
1058			18	6.8	2	0.0015	2.6	1	119
		SAMPLED				At		1102	

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations Took Duplicate

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location Moss
Project Name VCEHD OWTS
Sample ID GW-G-02_180405
Staff BL
Date 4/5/18
Sample Matrix Water

PURGE INFORMATION:

Purge Method PUMP
Time Initiated 1233
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm [illegible]	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ Kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1239	6	36	20.4	6.6	1.3	0.001	5.2	1	103
1242	6	52	20.3	6.5	1.3	0.001	5.1	1	102
1244	6	64	20.3	6.5	1.3	0.001	5	1	101
		SAMPLED				AT		12	45

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling:
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location Vega
Project Name VEEHD OWTS
Sample ID GW-B-04_180405
Staff RL
Date 4/5/18
Sample Matrix Water

PURGE INFORMATION:

Purge Method Pump
Time Initiated RL ~~33.0~~ 1349
Initial Water Level 33.8
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated Y [✓ N]
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate gpm	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ kg/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1359	0.75	7.5	16.7	7	1.04	0.0008	7.8	2	109
1402	1.0	10.5	18.7	7	1.04	0.0008	7.8	1	109
1404	1.0	12.5	18.7	7	1.04	0.0008	7.5	1	108
	SAMPLED					AT		1406	

SAMPLING INFORMATION:

Sample Method
Dedicated: Y N
Water Level at Sampling:
Pump Parameters
Refill Time (sec):
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics:
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration: PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location Huntslinger
Project Name VC EHD OWTS
Sample ID GW-G-01 - 180406

Staff RL
Date 4/16/18
Sample Matrix Water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 930
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) KS/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
940			22.1	7.2	2.2	0.0015	4	3	160
944			21.7	7.6	2.2	0.0015	2.5	6	150
946			21.2	7.6	2.2	0.0015	2.2	3	140
948			21.1	7.7	2.2	0.0015	2.2	6	138
		SAMPLED AT 950							

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling:
Pump Parameters
Refill Time (sec):
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics:
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5 %
Dissolved Oxygen	2	± 6 %
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

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GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location OVLC
Project Name VCEHD OWTS
Sample ID GW-C-BK-05_180514

Staff RL
Date 5/14/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method Pump
Time Initiated 842
Initial Water Level 36.5
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated: Y [✓ N]
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness: Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (0.5 gpm)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) Sal	DO (mg/L)	Turbidity (NTU)	ORP (mV)
843	|	1	18.8	7.0	1.12	0.6	2.7	0	
847	|	3	18.8	7.0	1.12	0.6	2.3	0	
850	|	4.5	18.8	7.0	1.13	0.6	2.1	1	
SAMPLED AT 853									

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling:
Pump Parameters
Refill Time (sec): Discharge Time (sec)
Pressure Setting (psi): Others ( )
Sample Characteristics
Comment and Observations:

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH: 4.0 std =
Conductivity: 4.49 mS/cm = mS cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date: Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling:
General Comments and Observations:

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location SOULE
Project Name VCEHD OWTS
Sample ID GW-E-02-180514

Staff RL
Date 5/14/18
Sample Matrix GW

PURGE INFORMATION:

Purge Method Pump
Time Initiated
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
	) * 3.14 *		*	*	7.48 =	

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) Sel	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1007			21.9	7.3	1.12	0.59	1.5	1	
1010			21.7	7.3	1.10	0.59	1.2	0	
1013			21.5	7.3	1.10	0.59	1.4	0	
	SAMPLED AT 1016								

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec) Discharge Time (sec)
Pressure Setting (psi) Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS cm = mS cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date: Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location VRWD
Project Name VCEHD OWTS
Sample ID GW-A-03_180515

Staff RL
Date 5/15/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method PUMP
Time Initiated
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm) 300	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
900	300	1500	18.3	6.8	0.88	0.66	9.5	1	
902	|	2100	18.3	6.9	0.89	0.66	9.0	1	
905	|	3000	18.3	6.9	0.89	0.66	8.0	0	

SAMPLED AT 907

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec) Discharge Time (sec)
Pressure Setting (psi) Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date: Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location VR3D
Project Name VCEHD OWTS
Sample ID GW-A-02_180515

Staff RL
Date 5/15/18
Sample Matrix GW

PURGE INFORMATION:

Purge Method Pump
Time Initiated
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
-	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
922	300	6000	18.2	6.7	0.94	0.7	9.6	0	
924		6600	18.2	6.9	0.93	0.7	8.6	0	
926		7200	18.2	6.9	0.93	0.7	7.7	0	
SAMPLED AT 930									

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS cm = mS cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location VRWD
Project Name VCEHD OLUTS
Sample ID GW-A-04_180515
Staff RL
Date 5/15/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method Pump
Time Initiated 950
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate gpm	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
952	1000	4000	17.7	7.0	0.94	0.7	8.0	1	
954		6000	17.7	7.0	0.94	0.7	7.8	0	
957		9000	17.6	7.0	0.93	0.7	/	0	

SAMPLED AT 1000

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location WALSH
Project Name VCEHD OWTS
Sample ID GW-A-01-180515

Staff RL
Date 5/15/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method PUMP
Time Initiated 1019
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
-	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1026			18.6	7.1	0.90	0.66	8.4	1	
1028			18.5	7.1	0.88	0.66	8.0	1	
1030			18.4	7.1	0.88	0.66	7.9	1	
	SAMPLED AT 1033								

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location LOBBA
Project Name VCEHA SWTS
Sample ID GW-F-02-180515
Staff RL
Date 5/15/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method PUMP
Time Initiated 1113
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(-	) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (C)	pH	Conduct. (mS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1115			17	6.7	1.52	1.2	4.4	1	
1118			17	6.8	1.51	1.2	4.2	1	
1120			16.9	6.8	1.51	1.2	3.9	1	

SAMPLED AT 1125

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location VTA WATER
Project Name VCEHD OWTS
Sample ID GW-C-07-180515

Staff RL
Date 5/15/18
Sample Matrix GW

PURGE INFORMATION:

Purge Method PUMP
Time Initiated 1320
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1335			18.6	6.9	1.0	0.74	8.4	0	
1338			18.6	7.1	1.0	0.74	7.0	0	
1341			18.9	7.2	1.0	0.74	/	0	

SAMPLED AT 1343

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location VTA WATER
Project Name VCEHD
Sample ID GW-C-08_180515

Staff RL
Date 5/15/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method PUMP
Time Initiated 1356
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1358			19.0	6.9	1.02	0.75	6.6	0	
1400			18.4	7.1	1.00	0.74	5.9	0	
1402			18.4	7.1	1.00	0.74	5.5	0	

SAMPLED AT 1404

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location LANNING
Project Name VCEHD OWTS
Sample ID GW-B-03_180516
Staff RL
Date 5/16/2018
Sample Matrix GW

PURGE INFORMATION:

Purge Method PUMP
Time Initiated 823
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated Y N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
837			17.5	6.8	0.98	0.74	7.6	2	
840			18	6.9	1.0	0.75	7.3	1	
843			18.3	6.9	1.0	0.75	7.3	1	
846			18.3	7.0	1.0	0.75	6.8	1	

SAMPLED AT 850

*DUPLICATE TAKEN

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location VEGA
Project Name VCEHD OWTS
Sample ID GW-B-04-180516
Staff RL
Date 5/16/18
Sample Matrix GW

PURGE INFORMATION:

Purge Method Pump
Time Initiated 1057
Initial Water Level 28.6
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated Y [✓ N]
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate (gpm) 0.5	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1059	0.5	1	18.8	7.1	1.0	0.78	8.7	1	
1101	|	2	18.8	7.1	1.1	0.78	8.4	0	
1103	|	3	18.8	7.1	1.1	0.77	8.3	1	
1105	|	4	18.8	7.1	1.1	0.77	8.3	0	
	SAMPLED AT						1107		

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location OVSD
Project Name VCEHD OWTS
Sample ID GW-A-07_180516

Staff RL
Date 5/16/18
Sample Matrix GW

PURGE INFORMATION:

Purge Method pump
Time Initiated
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol. Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)		Water Level (ft)		Pi		Well Radius (ft)		Well Radius (ft)		Covert feet to gallons		One Casing Vol (gal)
(	-		) *	3.14	*		*		*	7.48	=	

PURGE DATA:

Time	Purge Rate (gpm)	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1420	400	200	21.8	7.4	1.0	0.7	10.6	5	
1422	↓	300	20.2	7.5	0.97	0.7	8.9	4	
1426	↓	400	19.9	7.3	0.94	0.7	8.9	6	

SAMPLED AT 1430

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec) Discharge Time (sec)
Pressure Setting (psi) Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date: Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location GIRL SCOUTS
Project Name VLEHD OWTS
Sample ID GW-C-BK-06_180517

Staff RL
Date 5/17/18
Sample Matrix water

PURGE INFORMATION:

Purge Method PUMP
Time Initiated
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) *	3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
815			17.7	7.1	1.6	1.2	18	2	
818			17.4	7.1	1.6	1.2	8.1	2	
820			17.4	7.1	1.6	1.2	7.9	2	

SAMPLED AT 822

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 5%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location GIRL SCOUTS
Project Name VC EHD OWTS
Sample ID GW-D-07-180517
Staff RL
Date 5/17/2018
Sample Matrix water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 840
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
-	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
845			16.5	7.1	1.7	1.3	5.6	1	
847			16.5	7.2	1.7	1.3	4.9	1	
850			16.6	7.2	1.7	1.3	4.7	1	

SAMPLED AT 853

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location HUNTSINGER
Project Name VCEHD OCWTS
Sample ID GW-G-01_180517

Staff RL
Date 5/17/2018
Sample Matrix water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 937
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	) * 3.14 *		*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (C)	pH	Conduct. (uS/cm)	TDS (~~ppm~~) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
947			21.8	7.8	1.05	0.73	2.2	3	
950			22.2	7.9	1.07	0.74	2.3	2	

SAMPLED AT 950

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location PRATT
Project Name VCEHD DUCTS
Sample ID GW-D-04_180517

Staff RL
Date 5/17/2018
Sample Matrix water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 1045
Initial Water Level 22.16
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated Y [✓ N]
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
-	) * 3.14 *		•	•	~ 48	=

PURGE DATA:

Time	Purge Rate gpm	Total Volume Removed	Temp. (C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1047	0.75	3	17.7	6.8	1.7	1.3	5.9	0	
1049	1	8	17.7	6.9	1.7	1.3	5.6	0	
1051	1	9	17.7	6.9	1.7	1.3	5.5	0	
SAMPLED AT 1055									

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec) Discharge Time (sec)
Pressure Setting (psi) Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date: Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location SPAR
Project Name VCEHD OWTS
Sample ID GWD-05_180517

Staff RL
Date 5/17/2018
Sample Matrix water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 1151
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter

Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
		) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1153			18.6	7.3	2.0	1.5	5	1	
1155			18.2	7.4	1.9	1.5	3.9	1	
1157			18.1	7.3	1.9	1.4	3.0	1	
1159			18.1	7.4	1.9	1.4	2.9	1	
SAMPLED AT 1201									

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec) Discharge Time (sec)
Pressure Setting (psi) Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS cm = mS cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec consultants

Location Soule
Project Name VCEHD OWTS
Sample ID GW-E-03 _ 180517
Staff RL
Date 5/17/18
Sample Matrix water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 1320
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
	)	* 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (C)	pH	Conduct. (uS/cm)	TDS ~~(ppm)~~ g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
1325			22.1	7.3	1.2	0.81	3	1	
1328			22.3	7.3	1.2	0.81	2	6	
1330			22.1	7.3	1.2	0.79	2	1	
1332			22.1	7.3	1.2	0.81	2	1	

SAMPLED AT 1335

SAMPLING INFORMATION:

Sample Method
Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec)
Discharge Time (sec)
Pressure Setting (psi)
Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type
Serial #
Calibration Date
Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date:
Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

GROUNDWATER SAMPLING - PURGE & SAMPLE FIELD FORM

Geosyntec
consultants

Location Moss
Project Name VCEHD OWTS
Sample ID GW-G-02-180518
Staff RL
Date 5/18/2018
Sample Matrix Water

PURGE INFORMATION:

Purge Method Pump
Time Initiated 910
Initial Water Level
Level Referenced To
GW Elevation
Well Total Depth
Casing Diameter
Dedicated [✓ Y] N
Pump Inlet Depth
One Casing Vol
Total Vol Purged
Well Purged to Dryness Y N
GW Level After Purge
Time Completed

Well Depth (ft)	Water Level (ft)	Pi	Well Radius (ft)	Well Radius (ft)	Covert feet to gallons	One Casing Vol (gal)
(	-	) * 3.14 *	*	*	7.48	=

PURGE DATA:

Time	Purge Rate ( )	Total Volume Removed	Temp. (°C)	pH	Conduct. (uS/cm)	TDS (ppm) g/L	DO (mg/L)	Turbidity (NTU)	ORP (mV)
923			20.1	6.4	1.2	0.88	4.8	1	
927			20.2	6.6	1.2	0.88	6.0	1	
930			20.2	6.6	1.2	0.88	6.0	1	
SAMPLED AT 932									

SAMPLING INFORMATION:

Sample Method Dedicated Y N
Water Level at Sampling
Pump Parameters
Refill Time (sec) Discharge Time (sec)
Pressure Setting (psi) Others ( )
Sample Characteristics
Comment and Observations

INSTRUMENT DATA:

Meter Type Serial #
Calibration Date Calibration By
Calibration PH 4.0 std =
Conductivity 4.49 mS/cm = mS/cm

SAMPLE COLLECTION DATA:

Laboratory
Trip Blank Date Field Blank Date

GENERAL INFORMATION:

Weather Conditions at Time of Sampling
General Comments and Observations

Field Measurement	*Replicates*	*Acceptance Limits*
Temperature	2	± 0.5° C
pH	2	± 0.2 standard units
Turbidity	2	± 5%
Specific Conductivity	2	± 3%
Dissolved Oxygen	2	± 6%
Total Dissolved Solids	2	± 10%
Oxidation-reduction potential	2	± 20 mV

Geosyntec consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: FOSTER PARK

Staff: KW & RLUSTIG

Project Name: VCEHD OWTS STUDY

Date: 8/25/17

Sample ID: SW-03-D-170825

Time: 15:00

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: RW ~~80~~ 83 degrees F

Water Condition: ~~None~~, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, [✓ Algal Blooms], Foam, Other

Water Clarity: [✓ Clear (see bottom)] Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless] Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other

Other Significant Observations: ACTIVE RECREATION UPSTREAM ~ 100YDS

SAMPLE DETAILS

Grab Sample

Sample Time: 15:00

Number of Sample bottles: 6

Approx. Sample Depth (Meters): 0.5 ft

INSTRUMENT DATA

Meter Type: YSI 556

Serial #: 15M100686

Calibration Date: 8.25.17

Calibration By: KW

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	20.61	20.60					± 1.0° C
pH (s.u.)	7.88	7.88					± 0.2 standard units
Specific Conductivity (mS/cm)	1.104	1.104					± 10 %
Turbidity (NTU)	1	1					± 5%
DO (mg/L)	11.75	11:58					± 6 %
Total Dissolved Solids (g/L)	/	/					± 5%
Oxidation-reduction potential (mV)	/	/					± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	13.0														
	Depth (ft)	0.58	1.0	0.83	—											
Velocity (~~ft/sec~~) M/SEC	Top	0.0	0.61	0.0	—											
	Middle	—	—	—	—	—										
	Bottom	—	0.42	—	—											
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations, "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8.", the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: SW-03-U_

Staff: R. LUSTIG, R. WILSON

Project Name: VCEHD OWTS

Date: 9.19.17

Sample ID: ~~SW-03~~ SW-03-U_170919

Time: 11:00

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear] Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: 76 degrees F

Water Condition: [✓ None,] Oil, Grease, Scum, Solids, Sludge Deposits, Trash, Algal Blooms, Foam, Other

Water Clarity: [✓ Clear (see bottom)] Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless,] Green, Yellow, Brown

Water Odor: [✓ None,] Sulfides, Sewage, Petroleum, Mixed, Other

Other Significant Observations:

SAMPLE DETAILS

Grab Sample

Sample Time: 12:30

Number of Sample bottles: 6

Approx. Sample Depth (FT ~~Meters~~): 0.5

INSTRUMENT DATA

Meter Type: YSI 556

Serial #: 15M100686

Calibration Date: 9.19.17

Calibration By: R.L.

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	16.30	16.29	16.29	16.30	16.30	16.30	± 1.0° C
pH (s.u.)	7.80	7.55	7.47	7.42	7.39	7.47	± 0.2 standard units
Specific Conductivity (mS/cm)	1.009	1.005	1.000	1.006	0.998	1.005	± 10 %
Turbidity (NTU)	0	0	0	0	0	0	± 5%
DO (mg/L)	9.22	8.42	8.13	7.97	7.87	8.13	± 6 %
Total Dissolved Solids (g/L)	—	—	—	—	—	—	± 5%
Oxidation-reduction potential (mV)	—	—	—	—	—	—	± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	6' 16' 28'														
	Depth (ft)	1.0' ~~[illegible]~~	1.0'	~~0.45~~ 0.5'												
Velocity (ft/sec)	Top	0.1	0.5	0.5												
	Middle	—	—	—												
	Bottom	0.1	0.3	0.3												

~~Left Bank~~ ~~Right~~ Bank Left Bank Right Bank Left Bank Right Bank

TM ~~LEFT~~ RIGHT LEFT

Note: For surface water sampling locations, "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8.", the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec
consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: SW-03-D

Project Name: VCEHD OWTS

Sample ID: SW-03-D-170920

Staff: R.WILSON/R.LUSTIG

Date: 9.20.17

Time: 1100

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: 71° degrees F

Water Condition: [✓ None], Oil, Grease, Scum, Solids, Sludge Deposits, Trash, Algal Blooms, Foam, Other

Water Clarity: [✓ Clear (see bottom)] Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless] Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other

Other Significant Observations:

SAMPLE DETAILS

Grab Sample

Sample Time: 11:20

Number of Sample bottles: 6

Approx. Sample Depth (~~Meters~~) FT: 0.4

INSTRUMENT DATA

Meter Type: YSI 556

Serial #: 15M100686

Calibration Date: 9.20.17

Calibration By: RL

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	16.37	16.38					± 1.0° C
pH (s.u.)	8.06	7.98					± 0.2 standard units
Specific Conductivity (mS/cm)	1.15	1.15					± 10 %
Turbidity (NTU)	1	1					± 5%
DO (mg/L)	11.23	10.92					± 6 %
Total Dissolved Solids (g/L)	—	—					± 5%
Oxidation-reduction potential (mV)	—	—					± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	2.5' WIDE, MEAS @ 1.25'														
	Depth (ft)	0.8														
Velocity (ft/sec)	Top	1.8														
	Middle	—														
	Bottom	RW ~~0.8~~ 1.9														
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations, "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8.", the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: SW-04-D

Staff: R.LUSTIG

Project Name: VCEHD OLOTS

Date: 4/2/2018

Sample ID: SW-04-D-180402

Time: 9:18A

FIELD OBSERVATIONS

Weather Conditions: Clear, Partly [✓ Cloudy], Overcast, Fog, Smoky, Hazy

Air Temp: ____ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids], Sludge Deposits, Trash, Algal Blooms, Foam, Other ____

Water Clarity: Clear (see bottom) [✓ Cloudy (>4" vis)] Murky (<4" vis)

~~74~~ RL

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ____

Other Significant Observations: ____

SAMPLE DETAILS

Grab Sample

Sample Time: 918

Number of Sample bottles: ____

Approx. Sample Depth (Meters): ____

INSTRUMENT DATA

Meter Type: ____

Serial #: ____

Calibration Date: ____

Calibration By: ____

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	(1)	(2)	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	14.92	14.92	14.93				± 1.0° C
pH (s.u.)	7.97	7.97	7.98				± 0.2 standard units
Specific Conductivity (mS/cm)	1.344	1.344	1.345				± 10 %
Turbidity (NTU)	51.4	50	52				5%
DO (mg/L)	14.2	10.2	9.2				± 6 %
Total Dissolved Solids kg/L (g/L)	0.0011	0.0011	0.0011				± 5%
Oxidation-reduction potential (mV)	154.5	149.6	147				± 20

FLOW MEASUREMENTS

	Segment 1					Segment 2					Segment 3				
Span (ft)	17														
Depth (ft)	0.4	0.6	0.5												
Velocity (ft/sec) Top		1.9													
Velocity (ft/sec) Middle		1.7													
Velocity (ft/sec) Bottom		1.7													
	Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8; the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5

Geosyntec
consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: SOULE

Staff: RL

Project Name: UCEHD OWTS

Date: 4/2/2018

Sample ID: SW-05-D-180402

Time:

FIELD OBSERVATIONS

Weather Conditions: Clear, [✓ Partly Cloudy] Overcast, Fog, Smoky, Hazy

Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids], Sludge Deposits, Trash, Algal Blooms, Foam, Other

Water Clarity: Clear (see bottom) Cloudy (>4" vis) [✓ Murky (<4" vis)]

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other

Other Significant Observations:

SAMPLE DETAILS

Grab Sample

Sample Time: 1155

Number of Sample bottles:

Approx. Sample Depth (Meters):

INSTRUMENT DATA

Meter Type:

Serial #:

Calibration Date:

Calibration By:

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	15.7	15.7					± 1.0° C
pH (s.u.)	8.3	8.3					± 0.2 standard units
Specific Conductivity (mS/cm)	0.8	0.8					± 10 %
Turbidity (NTU)	784	790					± 5%
DO (mg/L)	10.7	8.8					± 6 %
Total Dissolved Solids ~~(g/L)~~ Kg/L	0.0007	0.0007					± 5%
Oxidation-reduction potential (mV)	133	131					± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	9														
	Depth (ft)		0.7													
Velocity (ft/sec)	Top		0.7													
	Middle		0.8													
	Bottom		0.2													
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note For surface water sampling locations. "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8." the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5

SURFACE WATER SAMPLING - FIELD FORM

Location: ~~SW-04-U-180402~~ RL CAMP COMFORT

Staff: RL

Project Name: VCEHO OWTS

Date: 4/2/2018

Sample ID: SW-04-U_180402

Time: 13:20

FIELD OBSERVATIONS

Weather Conditions: Clear, Partly Cloudy, [✓ Overcast,] Fog, Smoky, Hazy

Air Temp: ____________ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids,] Sludge Deposits, Trash, Algal Blooms, Foam, Other ____________

Water Clarity: Clear (see bottom) Cloudy (>4" vis) [✓ Murky (<4" vis)]

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ____________

Other Significant Observations: ____________

SAMPLE DETAILS

Grab Sample

Sample Time: 1330

Number of Sample bottles: ____________

Approx. Sample Depth (Meters): ____________

INSTRUMENT DATA

Meter Type: ____________

Serial #: ____________

Calibration Date: ____________

Calibration By: ____________

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	15.8	15.9	15.9				± 1.0° C
pH (s.u.)	7.9	7.9	8				± 0.2 standard units
Specific Conductivity (mS/cm)	1.08	1.08	1.08				± 10 %
Turbidity (NTU)	272	261	266				± 5%
DO (mg/L)	8.2	7.8	7.6				± 6 %
Total Dissolved Solids (g/L) <5lL	0.0009	0.0009	0.0009				± 5%
Oxidation-reduction potential (mV)	192	182	177				± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	5														
	Depth (ft)		1.6													
Velocity (ft/sec	Top		1													
	Middle		0.6													
	Bottom		0.5													

Left Bank Right Bank Left Bank Right Bank Left Bank Right Bank

Note: For surface water sampling locations. "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 ". the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec
consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: FOSTER PARK

Project Name: VLEAD OUTS

Sample ID: SW-03-D-180402

Staff: R. LUSTIG

Date: 4/2/2018

Time: 1420

FIELD OBSERVATIONS

Weather Conditions: Clear, [✓ Partly Cloudy], [✓ Overcast], Fog, Smoky, Hazy

Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids], Sludge Deposits, Trash, Algal Blooms, Foam, Other ______

Water Clarity: Clear (see bottom) Cloudy (>4" vis) [✓ Murky (<4" vis)]

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ______

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time: 1425

Number of Sample bottles: ______

Approx. Sample Depth (Meters): ______

INSTRUMENT DATA

Meter Type: ______

Serial #: ______

Calibration Date: ______

Calibration By: ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	16.6	16.6					± 1.0° C
pH (s.u.)	8.1	8.2					± 0.2 standard units
Specific Conductivity (mS/cm)	0.9	0.9					± 10 %
Turbidity (NTU)	/	/					5%
DO (mg/L)	8.5	8.1					± 6 %
Total Dissolved Solids (g/L) kg/L	0.0007	0.0007					± 5%
Oxidation-reduction potential (mV)	197	193					± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	25														
	Depth (ft)	0.5	1.5	0.3												
Velocity (ft/sec)	Top		2.3													
	Middle		2.5													
	Bottom		1.9													
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5

Geosyntec
consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: 150/BURNHAM

Staff: RL

Project Name: YCEHD OWTS

Date: 4/3/18

Sample ID: SW-01-D_180403

Time: 1231

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids], Sludge Deposits, Trash, Algal Blooms, Foam, Other ______

Water Clarity: Clear (see bottom), [✓ Cloudy (>4" vis)], Murky (<4" vis)

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ______

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time: 1231

Number of Sample bottles: ______

Approx. Sample Depth (Meters): ______

INSTRUMENT DATA

Meter Type: ______

Serial #: ______

Calibration Date: ______

Calibration By: ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	19	19.1					± 1.0° C
pH (s.u.)	8.2	8.2					± 0.2 standard units
Specific Conductivity (mS/cm)	1.02	1.02					± 10 %
Turbidity (NTU)	248 ~~[illegible]~~ (RL)	254					± 5%
DO (mg/L)	7.5	7.5					± 6 %
Total Dissolved Solids (g/L) kg/L	0.0008	0.0008					± 5%
Oxidation-reduction potential (mV)	142	141					± 20

FLOW MEASUREMENTS

	Segment 1					Segment 2					Segment 3				
Span (ft)	11														
Depth (ft)		0.5													
Velocity (ft/sec) Top		0.7													
Velocity (ft/sec) Middle															
Velocity (ft/sec) Bottom															
	Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 - the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: 33/Sulphur

Staff: BL

Project Name: VC EHD OWTS

Date: 4/4/18

Sample ID: SW-03-U_180404

Time: 1211

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ____ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids], Sludge Deposits, Trash, Algal Blooms, Foam, Other ____

Water Clarity: Clear (see bottom) Cloudy (>4" vis) [✓ Murky (<4" vis)]

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ____

Other Significant Observations: ____

SAMPLE DETAILS

Grab Sample

Sample Time: 1211

Number of Sample bottles: ____

Approx. Sample Depth (Meters): ____

INSTRUMENT DATA

Meter Type: ____

Serial #: ____

Calibration Date: ____

Calibration By: ____

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	17.3	17.4					± 1.0 °C
pH (s.u.)	7.7	7.7					± 0.2 standard units
Specific Conductivity (mS/cm)	1.09	1.09					± 10 %
Turbidity (NTU)	84	88					5%
DO (mg/L)	7.06	6.9					± 6 %
Total Dissolved Solids (~~g~~ kg/L)	0.0008	0.0008					± 5%
Oxidation-reduction potential (mV)	32	29					± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	30														
	Depth (ft)	0.5	1	0.6												
Velocity (ft/sec)	Top		2.1													
	Middle		2													
	Bottom		1.1													
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations: "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8" the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5

SURFACE WATER SAMPLING - FIELD FORM

Location: Santa Ana Bridge
Staff: RL

Project Name VC EHD OWTS
Date: 4/4/18

Sample ID: SW-02-D_180404
Time: 1322

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear] Partly Cloudy, Overcast, Fog, Smoky, Hazy
Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids,] Sludge Deposits, Trash, Algal Blooms, Foam, Other ______

Water Clarity: Clear (see bottom) Cloudy (>4" vis) [✓ Murky (<4" vis)]

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ______

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time 1327
Number of Sample bottles ______

Approx. Sample Depth (Meters) ______

INSTRUMENT DATA

Meter Type ______
Serial # ______

Calibration Date ______
Calibration By ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Temperature (°C)	21.5	21.5					± 1.0 °C
pH (s.u.)	8.2	8.2					± 0.2 standard units
Specific Conductivity (mS/cm)	1.06	1.06					± 10%
Turbidity (NTU)	152	145					5%
DO (mg/L)	7.3	7.4					± 10%
Total Dissolved Solids (g/L) Kg/L	0.0007	0.007					± 5%
Oxidation-reduction potential (mV)	92	89					± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	15														
	Depth (ft)	0.3	0.3	0.3												
Velocity (ft/sec)	Top	1.1	0.1	1.1												
	Middle															
	Bottom															
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 – the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

SURFACE WATER SAMPLING - FIELD FORM

Location: BURNHAM / RIVERSIDE

Staff: RL

Project Name: VC END OWTS

Date: 4/5/18

Sample ID: SW-02-U — 180405

Time: 933

FIELD OBSERVATIONS

Weather Conditions: Clear, [✓ Partly Cloudy], Overcast, Fog, Smoky, Hazy

Air Temp: ________ degrees F

Water Condition: None, Oil, Grease, Scum, [✓ Solids], Sludge Deposits, Trash, Algal Blooms, Foam, Other ________

Water Clarity: Clear (see bottom), [✓ Cloudy (<4" vis)], Murky (>4" vis)

Water Color: Colorless, Green, Yellow, [✓ Brown]

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ________

Other Significant Observations: ________

SAMPLE DETAILS

Grab Sample

Sample Time 938

Number of Sample bottles ________

Approx. Sample Depth (Meters) ________

INSTRUMENT DATA

Meter Type ________

Serial # ________

Calibration Date ________

Calibration By ________

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	16.3	16.3					± 1.0 °C
pH (s.u.)	8.1	8.1					± 0.2 standard units
Specific Conductivity (mS/cm)	0.94	0.94					± 10 %
Turbidity (NTU)	110	104					5%
DO (mg/L)	10.7	10.5					± 6 %
Total Dissolved Solids (g/L) kg/L	0.0007	0.0007					± 5 %
Oxidation-reduction potential (mV)	160	160					± 20

FLOW MEASUREMENTS

	Segment 1					Segment 2					Segment 3				
Span (ft)	15														
Depth (ft)	0.3														
Velocity (ft/sec) Top	0.4														
Velocity (ft/sec) Middle															
Velocity (ft/sec) Bottom															
	Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 – the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec
consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: SOULE
Staff: RL
Project Name: VCEHD OWTS
Date: 5/14/2018
Sample ID: SW-05-D-180514
Time: 1038

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy
Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, Algal Blooms, Foam, Other ______

Water Clarity: [✓ Clear (see bottom)], Cloudy (<4" vis), Murky (<4" vis)

Water Color: [✓ Colorless], Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other ______

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time: 1038
Number of Sample bottles: ______

Approx. Sample Depth (Meters): ______

INSTRUMENT DATA

Meter Type: ______
Serial #: ______
Calibration Date: ______
Calibration By: ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	(1)	(2)	(3)	(4)	(5)	Sample Median	Acceptance Limits
Temperature (°C)	19.9	19.9	19.8				± 1.0 °C
pH (s.u.)	8	8	8				± 0.2 standard units
Specific Conductivity (mS/cm)	1.4	1.4	1.4				± 10 %
Turbidity (NTU)	1	2	1				5%
DO (mg/L)	12.8	12.4	11.7				± 6 %
Total Dissolved Solids (g/L) Sal	0.8	0.8	0.8				± 5 %
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	3														
	Depth (ft)	<0.1														
Velocity (ft/sec)	Top	0														
	Middle	0														
	Bottom	0														
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations. Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 or the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

Geosyntec
consultants

SURFACE WATER SAMPLING - FIELD FORM

Location: Camp Comfort

Staff: RL

Project Name: VCEHD OWTS

Date: 5/14/18

Sample ID: SW-04-U_180514

Time: 1158

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear] Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ________ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, [✓ Algal Blooms], Foam, Other ________

Water Clarity: [✓ Clear] (see bottom) Cloudy (<4" vis) Murky (<4" vis)

Water Color: [✓ Colorless], Green, Yellow, Brown

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other ________

Other Significant Observations: ________

SAMPLE DETAILS

Grab Sample

Sample Time 1202

Number of Sample bottles ________

Approx. Sample Depth (Meters): ________

INSTRUMENT DATA

Meter Type ________

Serial # ________

Calibration Date ________

Calibration By ________

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	20.4	20.5	20.5				± 1.0 °C
pH (s.u.)	7.8	7.9	7.9				± 0.2 standard units
Specific Conductivity (mS/cm)	1.63	1.63	1.63				± 10%
Turbidity (NTU)	1	1	0				5%
DO (mg/L)	11.9	11.3	10.8				± 6%
Total Dissolved Solids ~~(g/L)~~ Sal	0.91	0.91	0.91				± 5%
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	5														
	Depth (ft)	0.6														
Velocity (ft/sec)	Top	0.4														
	Middle	0.2														
	Bottom	0.2														
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations. Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 – the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

SURFACE WATER SAMPLING - FIELD FORM

Location: CREEK RD

Staff: RL

Project Name: VCEHD OWTS

Date: 5/14/2018

Sample ID: SW-04-D_180514

Time: 1245

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ________ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, [✓ Algal Blooms], Foam, Other ________

Water Clarity: [✓ Clear] (see bottom) Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless], Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other ________

Other Significant Observations: ________

SAMPLE DETAILS

Grab Sample

Sample Time: 1250

Number of Sample bottles: ________

Approx. Sample Depth (Meters): ________

INSTRUMENT DATA

Meter Type: ________

Serial #: ________

Calibration Date: ________

Calibration By: ________

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	20.1	20.1	20.2				± 1.0 °C
pH (s.u.)	7.8	7.9	7.9				± 0.2 standard units
Specific Conductivity (mS/cm)	1.79	1.79	1.80				± 10 %
Turbidity (NTU)	1	1	1				5%
DO (mg/L)	21.0	18.0	17.5				± 6 %
Total Dissolved Solids ~~(g/L)~~ Sal	1.01	1.01	1.01				± 5%
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	12														
	Depth (ft)	0.7														
Velocity (ft/sec)	Top	0.6														
	Middle	0.4														
	Bottom	0.2														
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note For surface water sampling locations. Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8, the flow is too high for measurement due to safety concerns

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5

SURFACE WATER SAMPLING - FIELD FORM

Location: FOSTER PARK

Staff: RL

Project Name: VCEHD OWTS

Date: 5/14/18

Sample ID: SW-03-D_180514

Time: 1335

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear], Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, [✓ Algal Blooms], Foam, Other ______

Water Clarity: [✓ Clear (see bottom)] Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless], Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other ______

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time: 1343

Number of Sample bottles: ______

Approx. Sample Depth (Meters): ______

INSTRUMENT DATA

Meter Type: ______

Serial #: ______

Calibration Date: ______

Calibration By: ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	(1)	(2)	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	19.9	20	20				± 1.0° C
pH (s.u.)	7.7	7.8	7.9				± 0.2 standard units
Specific Conductivity (mS/cm)	1.07	1.07	1.07				± 10 %
Turbidity (NTU)	1	1	1				± 5%
DO (mg/L)	14.1	12.8	12.6				± 6 %
Total Dissolved Solids (~~g/L~~) Sal	0.59	0.59	0.59				± 5%
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	30														
	Depth (ft)	1.3														
Velocity (ft/sec)	Top	1.0														
	Middle	0.8														
	Bottom	0.8														
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations, "Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8," the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

SURFACE WATER SAMPLING - FIELD FORM

Location: 1501 BURNHAM

Staff: RL

Project Name: VC END OUTS

Date: 5/16/2018

Sample ID: SW-01-D_180516

Time: 1002

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear] Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ________ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, Algal Blooms, Foam, Other ________

Water Clarity: [✓ Clear] (see bottom) Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless] Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other ________

Other Significant Observations: ________

SAMPLE DETAILS

Grab Sample

Sample Time 1002

Number of Sample bottles ________

Approx. Sample Depth (Meters) ________

INSTRUMENT DATA

Meter Type ________

Serial # ________

Calibration Date ________

Calibration By ________

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	18.3	18.4					± 1.0 °C
pH (s.u.)	8.2	8.2					± 0.2 standard units
Specific Conductivity (mS/cm)	0.98	0.98					± 10 %
Turbidity (NTU)	1	1					5%
DO (mg/L)	10.1	10.1					± 6 %
Total Dissolved Solids (g/L)	0.73	0.73					± 5%
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

		Segment 1 RW					Segment 2					Segment 3				
	Span (ft)	6					6									
	Depth (ft)	0.6					0.5									
Velocity (ft/sec)	Top	0.3					0.6									
	Middle	0.2					0.6									
	Bottom	0					0.2									
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 - the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

SURFACE WATER SAMPLING - FIELD FORM

Location: 33/Sulphur

Staff: RL

Project Name: VCEHD OWTS

Date: 5/16/18

Sample ID: SW-03-U-180516

Time: 1206

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear] Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, Algal Blooms, Foam, Other ______

Water Clarity: [✓ Clear] (see bottom) Cloudy (<4" vis) Murky (<4" vis)

Water Color: [✓ Colorless], Green, Yellow, Brown

Water Odor: [✓ None], Sulfides, Sewage, Petroleum, Mixed, Other ______

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time 1206

Number of Sample bottles ______

Approx. Sample Depth (Meters): ______

INSTRUMENT DATA

Meter Type ______

Serial # ______

Calibration Date ______

Calibration By ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	1	2	(3)	(4)	(5)	Sample Median	Acceptance Limits
Tempature (°C)	18.5	18.5					± 1.0 °C
pH (s.u.)	7.4	7.4					± 0.2 standard units
Specific Conductivity (mS/cm)	1.12	1.12					± 10 %
Turbidity (NTU)	1	1					5%
DO (mg/L)	8.1	8.1					± 6 %
Total Dissolved Solids (g/L)	0.83	0.83					± 5%
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

		Segment 1					Segment 2					Segment 3				
	Span (ft)	20 ft														
	Depth (ft)	0.3		0.8		0.4										
Velocity (ft/sec)	Top			1.3												
	Middle			1.0		[illegible]										
	Bottom			0.8												
		Left Bank				Right Bank	Left Bank				Right Bank	Left Bank				Right Bank

Note: For surface water sampling locations. Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 – the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

SURFACE WATER SAMPLING - FIELD FORM

Location: BURNHAM RD.

Staff: RL

Project Name: VCEHD OWTS

Date: 5/16/2018

Sample ID: SW-02-U_180516

Time: 1355

FIELD OBSERVATIONS

Weather Conditions: [✓ Clear] Partly Cloudy, Overcast, Fog, Smoky, Hazy

Air Temp: ______ degrees F

Water Condition: None, Oil, Grease, Scum, Solids, Sludge Deposits, Trash, Algal Blooms, Foam, Other ______

Water Clarity: [✓ Clear (see bottom)] Cloudy (>4" vis) Murky (<4" vis)

Water Color: [✓ Colorless], Green, Yellow, Brown

Water Odor: None, Sulfides, Sewage, Petroleum, Mixed, Other FROGS

Other Significant Observations: ______

SAMPLE DETAILS

Grab Sample

Sample Time 1355

Number of Sample bottles ______

Approx. Sample Depth (Meters): ______

INSTRUMENT DATA

Meter Type ______

Serial # ______

Calibration Date ______

Calibration By ______

SURFACE WATER SAMPLING - FIELD FORM (PG 2)

FIELD MEASUREMENTS

	(1)	(2)	(3)	(4)	(5)	Sample Median	Acceptance Limits
Temperature (°C)	25.6	25.6	25.3				± 1.0 °C
pH (s.u.)	8.4	8.5	8.5				± 0.2 standard units
Specific Conductivity (mS/cm)	1.1	1.1	1.1				± 10 %
Turbidity (NTU)	3	4	3				5%
DO (mg/L)	8.1	7.7	7.8				± 6 %
Total Dissolved Solids (g/L)	0.73	0.73	0.73				± 5%
Oxidation-reduction potential (mV)							± 20

FLOW MEASUREMENTS

<table>
<tr><th></th><th></th><th colspan="5">Segment 1</th><th colspan="5">Segment 2</th><th colspan="5">Segment 3</th></tr>
<tr><td colspan="2">Span (ft)</td><td colspan="5">2</td><td colspan="5"></td><td colspan="5"></td></tr>
<tr><td colspan="2">Depth (ft)</td><td>0.1</td><td>0.5</td><td>0.1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Velocity (ft/sec)</td><td>Top</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Middle</td><td></td><td>0.2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Bottom</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>Left Bank</td><td></td><td></td><td></td><td>Right Bank</td><td>Left Bank</td><td></td><td></td><td></td><td>Right Bank</td><td>Left Bank</td><td></td><td></td><td></td><td>Right Bank</td></tr>
</table>

Note: For surface water sampling locations: Do not wade in water where the estimated depth in feet times the velocity in feet per second is equal to or greater than 8 – the flow is too high for measurement due to safety concerns.

A.5 SOPs

Established Standard Operating Procedures (SOPs) should be reviewed by at least one member of the sampling team prior to sampling. The applicable SOPs, for both surface water and groundwater sampling, are referenced below in Table A-5.

3 FIELD PHOTOS

This section includes photos taken during Sampling Event #1. Figures A-1 through A-13 show groundwater sampling wells and Figures A-14 and A-15 show surface water sampling locations.

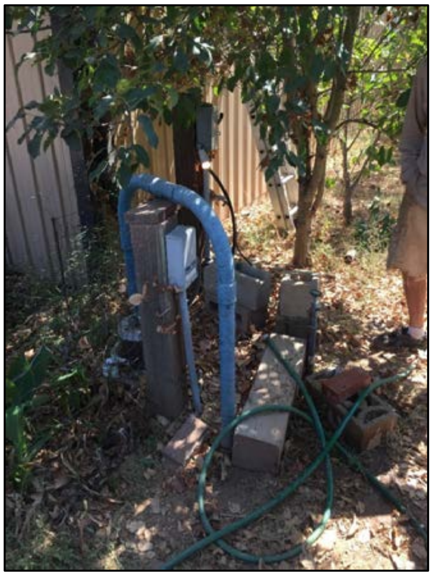

Figure A-1. Groundwater Sampling Well GW-A-01. Photo taken during sampling event #1, September 2017.

Figure A-2. Groundwater Sampling Well GW-A-02. Photos taken during Sampling Event #1, August 2017.

Figure A-3. Groundwater Sampling Well GW-A-03. Photos taken during Sampling Event #1, August 2017.

Figure A-4. Groundwater Sampling Well GW-A-05. Photos taken during Sampling Event #1, August 2017.

Figure A-5. Groundwater Sampling Well GW-A-07. Photos taken during Sampling Event #1, August 2017.

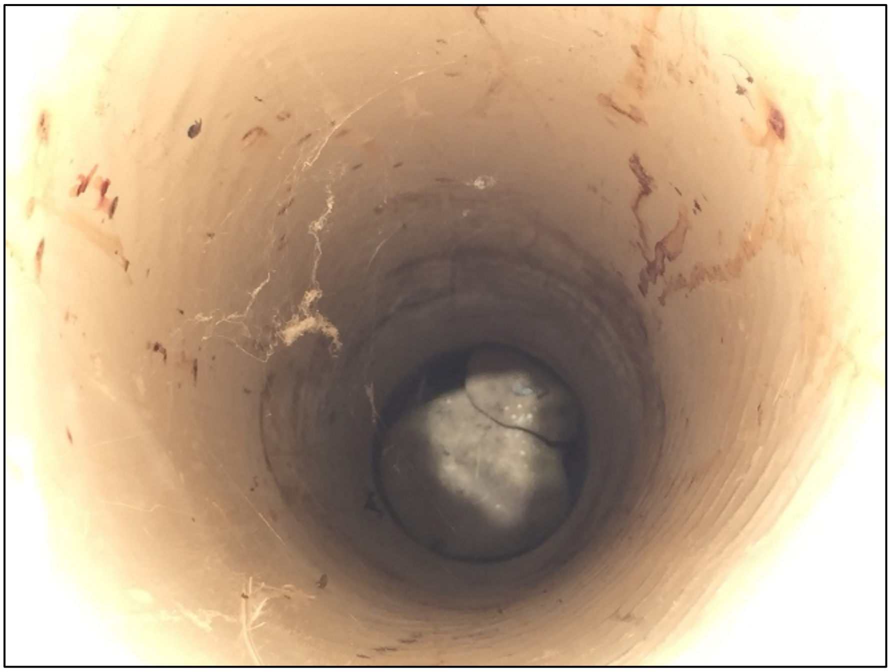

Figure A-6. Groundwater Sampling Well GW-B-01. Photo taken during Sampling Event #1, August 2017.

Figure A-7. Groundwater Sampling Well GW-B-03. Photos taken during Sampling Event #1, September 2017.

Figure A-8. Groundwater Sampling Well GW-B-04. Photo taken during Sampling Event #1, August 2017.

Figure A-9. Groundwater Sampling Well GW-D-04. Photos taken during Sampling Event #1, September 2017**.**

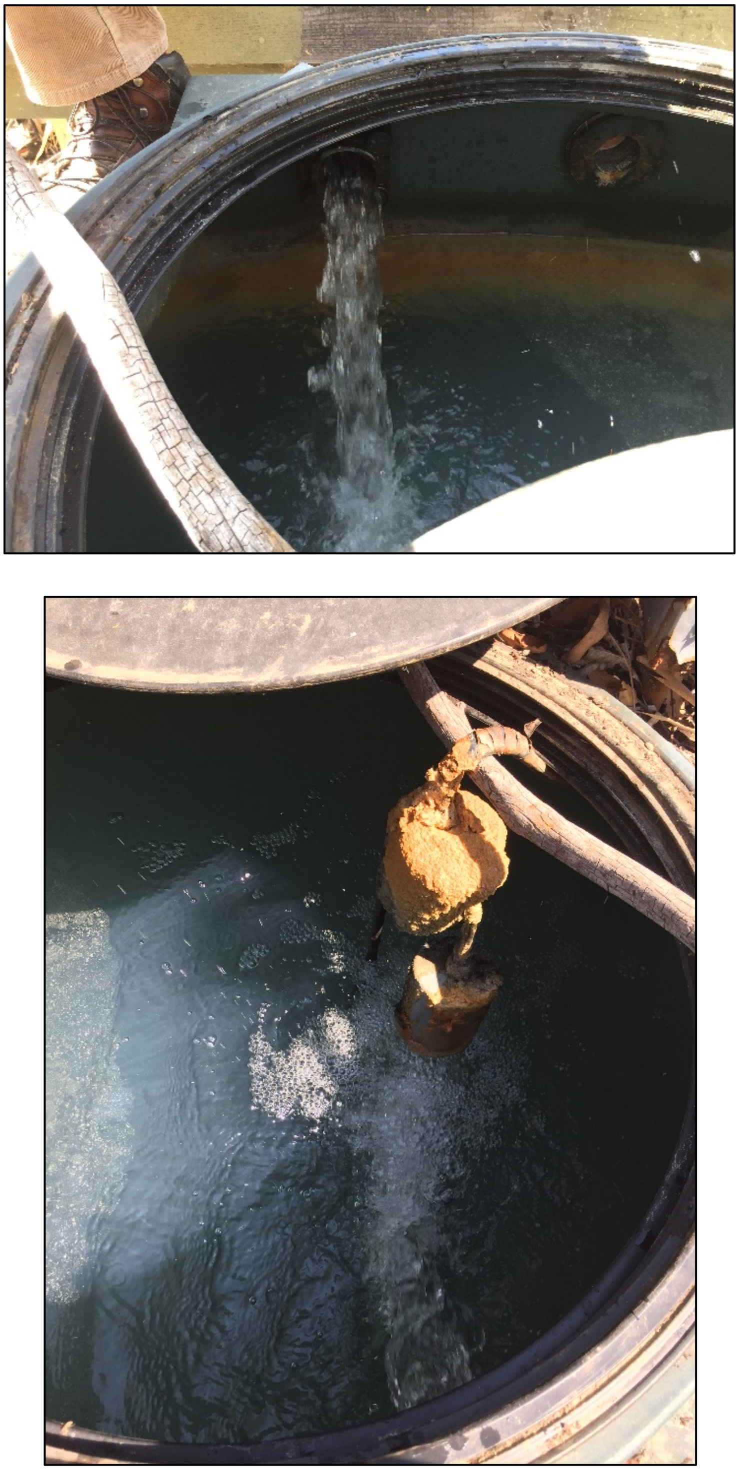

Figure A-10. Groundwater Sampling Well GW-D-05. Photos taken during Sampling Event #1, September 2017.

Figure A-11. Groundwater Sampling Well GW-D-07. Photos taken during Sampling Event #1, September 2017.

Figure A-12. Groundwater Sampling Well GW-F-02. Photos taken during Sampling Event #1, August 2017.

Figure A-13. Groundwater Sampling Well GW-G-02. Photos taken during Sampling Event #1, September 2017.

Figure A-14. Surface Water Sampling Location SW-03-D. Photos taken during Sampling Event #1, August and September 2017.

Figure A-15. Surface Water Sampling Location SW-03-U. Photo taken during Sampling Event #1, September 2017.

Prepared for

County of Ventura – Environmental Health Division

800 S. Victoria Avenue
Ventura, California 93009-1730

Technical Report

for the Study of Water Quality Impairments Attributable to Onsite Wastewater Treatment Systems (OWTS) in the Ventura River Watershed

Appendix C – Laboratory Reports and COCs

Prepared by

Geosyntec consultants

engineers | scientists | innovators

924 Anacapa Street, Suite 4A

Santa Barbara, CA 93101

Project Number LA0391

September 2018

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PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

October 26, 2017

Alex Long
IIRMES
1250 Bellflower Blvd
Long Beach, CA 90840-

Project Name:	VCEHD OWTS Study (LA0391)
Physis Project ID:	1708004-001

Dear Alex,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 8/25/2017. A total of 7 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Nitrite as N by EPA 300.0
Nitrate as N by EPA 300.0
Ammonia as N by SM 4500-NH3 D
Organics
Total Nitrogen by Direct Method

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
Extension 202
714-335-5918 cell
mistymercier@physislabs.com

PROJECT SAMPLE LIST

IIRMES PHYSIS Project ID: 1708004-001

VCEHD OWTS Study (LA0391) Total Samples: 7

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
48114	GW-B-04_170823	Groundwater	8/23/2017	12:45	Freshwater
48115	GW-C-01_170823	Groundwater	8/23/2017	14:50	Freshwater
48116	GW-F-02_170823	Groundwater	8/23/2017	15:50	Freshwater
48117	GW-A-07_170824	Groundwater	8/24/2017	9:20	Freshwater
48118	GW-A-03_170824	Groundwater	8/24/2017	10:25	Freshwater
48119	GW-A-02_170824	Groundwater	8/24/2017	11:00	Freshwater
48120	GW-A-04_170824	Groundwater	8/24/2017	11:40	Freshwater

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

PHYSIS QUALIFIER CODES

CODE	*DEFINITION*
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

ANALYTICAL REPORT

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 48114-R1	**GW-B-04_170823 Groundwater**	**Matrix: Freshwater**		**Sampled: 23-Aug-17 12:45**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	1.34	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	3	0.14	0.2	mg/L	
Sample ID: 48115-R1	**GW-C-01_170823 Groundwater**	**Matrix: Freshwater**		**Sampled: 23-Aug-17 14:50**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	1.62	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	3.6	0.14	0.2	mg/L	
Sample ID: 48116-R1	**GW-F-02_170823 Groundwater**	**Matrix: Freshwater**		**Sampled: 23-Aug-17 15:50**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	9.67	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	20	0.14	0.2	mg/L	
Sample ID: 48117-R1	**GW-A-07_170824 Groundwater**	**Matrix: Freshwater**		**Sampled: 24-Aug-17 9:20**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	8.87	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	18.1	0.14	0.2	mg/L	
Sample ID: 48118-R1	**GW-A-03_170824 Groundwater**	**Matrix: Freshwater**		**Sampled: 24-Aug-17 10:25**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	2.86	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	6.36	0.14	0.2	mg/L	
Sample ID: 48119-R1	**GW-A-02_170824 Groundwater**	**Matrix: Freshwater**		**Sampled: 24-Aug-17 11:00**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	2.45	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	5.33	0.14	0.2	mg/L	
Sample ID: 48120-R1	**GW-A-04_170824 Groundwater**	**Matrix: Freshwater**		**Sampled: 24-Aug-17 11:40**		**Received: 25-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30077		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34048		Prepared: 25-Aug-17		Analyzed: 25-Aug-17
Nitrate as N	NA	2.51	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	5.42	0.14	0.2	mg/L	

QUALITY CONTROL REPORT

Conventionals

QUALITY CONTROL REPORT

SAMPLE ID		BATCH ID	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	ACCURACY LIMITS		PRECISION %	PRECISION LIMITS		QA CODE
Ammonia as N		**Method: SM 4500-NH3 D**				**Fraction: NA**			**Prepared: 20-Sep-17**			**Analyzed: 20-Sep-17**			
48113-B1	QAQC Procedural Blank	C-30077	ND	0.007	0.03	mg/L									
48113-BS1	QAQC Procedural Blank	C-30077	0.254	0.007	0.03	mg/L	0.25	0	102	62 - 157%	PASS				
48113-BS2	QAQC Procedural Blank	C-30077	0.281	0.007	0.03	mg/L	0.25	0	112	62 - 157%	PASS	9	30	PASS	
48114-MS1	GW-B-04_170823	C-30077	0.3	0.007	0.03	mg/L	0.25	0	120	17 - 186%	PASS				
48114-MS2	GW-B-04_170823	C-30077	0.298	0.007	0.03	mg/L	0.25	0	119	17 - 186%	PASS	1	30	PASS	
48114-R2	GW-B-04_170823	C-30077	ND	0.007	0.03	mg/L						0	30	PASS	
Nitrate as N		**Method: EPA 300.0**				**Fraction: NA**			**Prepared: 25-Aug-17**			**Analyzed: 25-Aug-17**			
48113-B1	QAQC Procedural Blank	C-34048	ND	0.01	0.05	mg/L									
48113-BS1	QAQC Procedural Blank	C-34048	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136%	PASS				
48113-BS2	QAQC Procedural Blank	C-34048	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136%	PASS	0	30	PASS	
48114-MS1	GW-B-04_170823	C-34048	1.81	0.01	0.05	mg/L	0.5	1.34	94	76 - 121%	PASS				
48114-MS2	GW-B-04_170823	C-34048	1.82	0.01	0.05	mg/L	0.5	1.34	96	76 - 121%	PASS	2	30	PASS	
48114-R2	GW-B-04_170823	C-34048	1.34	0.01	0.05	mg/L						0	30	PASS	
Nitrite as N		**Method: EPA 300.0**				**Fraction: NA**			**Prepared: 25-Aug-17**			**Analyzed: 25-Aug-17**			
48113-B1	QAQC Procedural Blank	C-34048	ND	0.01	0.03	mg/L									
48113-BS1	QAQC Procedural Blank	C-34048	0.46	0.01	0.03	mg/L	0.5	0	92	24 - 155%	PASS				
48113-BS2	QAQC Procedural Blank	C-34048	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155%	PASS	2	30	PASS	
48114-MS1	GW-B-04_170823	C-34048	0.49	0.01	0.03	mg/L	0.5	0.06	86	63 - 126%	PASS				
48114-MS2	GW-B-04_170823	C-34048	0.49	0.01	0.03	mg/L	0.5	0.06	86	63 - 126%	PASS	0	30	PASS	
48114-R2	GW-B-04_170823	C-34048	0.06	0.01	0.03	mg/L						0	30	PASS	
Total Nitrogen		**Method: Direct Method**				**Fraction: NA**			**Prepared: 20-Sep-17**			**Analyzed: 20-Sep-17**			
48113-B1	QAQC Procedural Blank	O-16007	ND	0.14	0.2	mg/L									
48113-BS1	QAQC Procedural Blank	O-16007	3.01	0.14	0.2	mg/L	2.5	0	120	70 - 130%	PASS				
48113-BS2	QAQC Procedural Blank	O-16007	2.89	0.14	0.2	mg/L	2.5	0	116	70 - 130%	PASS	3	30	PASS	
48114-MS1	GW-B-04_170823	O-16007	5.71	0.14	0.2	mg/L	2.5	3	108	70 - 130%	PASS				
48114-MS2	GW-B-04_170823	O-16007	5.68	0.14	0.2	mg/L	2.5	3	107	70 - 130%	PASS	1	30	PASS	
48114-R2	GW-B-04_170823	O-16007	2.99	0.14	0.2	mg/L						0	30	PASS	

CHAIN OF CUSTODY

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.

CHAIN of CUSTODY

COMPANY NAME: Geosyntec

EMAIL: Jervin@Geosyntec.com

PROJECT NAME / NUMBER: VCEHD OWTS Study (LA0391)

COC PAGE 1 of

PROJECT MANAGER: Jared Ervin

FAX:

PO #:

PHYSIS SOS #:

TYPE OF ICE USED: ☑ WET ☐ BLUE ☐ DRY

COMPANY ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101

PHONE:
805-979-9129 office
805-619-8034 cell

SAMPLED BY: Reese Wilson

SHIPPED VIA: ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other

TURNAROUND TIME: ☑ STANDARD (15-20 business days) ☐ RUSH business days

REPORT FORMAT: ☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other

SPECIAL INSTRUCTIONS:

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES

SW = seawater FW = freshwater RW = rainwater
WW = wastewater DW = drinking water
S = sediment T = tissue E = extract O = other (specify)

REQUESTED ANALYSES

PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	SAMPLE time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-B-04_170823	Groundwater	8.23.17	12:45	FW	2	x	x
2	GW-C-01_170823	|	8.23.17	14:50	FW	2	x	x
3	GW-F-02_170823	|	8.23.17	15:50	FW	2	x	x
4								
5								
6								
7								
8								
9								
10								

RELINQUISHED BY

print	signature	company	date & time
REESE WILSON		GEOSYNTEC	8.23.17 18:15

RECEIVED BY

print	signature	company	date & time
Richard Hunken		~~FEDEX~~ Physis	8/25/17 745

PHYSIS
ENVIRONMENTAL LABORATORIES, INC.

CHAIN of CUSTODY

COMPANY NAME: Geosyntec
PROJECT MANAGER: Jared Ervin
COMPANY ADDRESS: 924 Anacapa St., Suite 4A
Santa Barbara, CA 93101
EMAIL: Jervin@Geosyntec.com
FAX:
PHONE: 805-979-9129 office
805-619-8034 cell
PROJECT NAME / NUMBER: VCEHD OWTS Study (LA0391)
COC PAGE: 1 of
PO #:
PHYSIS SOS #:
TYPE OF ICE USED: ☑ WET ☐ BLUE ☐ DRY
SAMPLED BY: Reese Wilson
SHIPPED VIA: ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other

TURNAROUND TIME: ☑ STANDARD (15-20 business days) ☐ RUSH business days
REPORT FORMAT: ☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other

SPECIAL INSTRUCTIONS:

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES
SW = seawater **FW** = freshwater **RW** = rainwater
WW = wastewater **DW** = drinking water
S = sediment **T** = tissue **E** = extract **O** = other (specify)

REQUESTED ANALYSES

PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	SAMPLE time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-A-07_170824	Groundwater	8.24.17	0920	FW	2	x	x
2	GW-A-03_170824	↓	↓	1025	↓	2	x	x
3	GW-A-02_170824			1100		2	x	x
4	GW-A-04_170824			1140		2	x	x
5							~~x~~	~~x~~
6								
7								
8								
9								
10								

RELINQUISHED BY

print	signature	company	date & time
REESE WILSON		GEOSYNTEC	8.24.17 1645

RECEIVED BY

print	signature	company	date & time
Richard Hanken	Richard H	FED EX Physis	8/25/17 745

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1708004-001

Sample Receipt Summary

Client: IIRMES Date Received: 8/25/2017 Received By: RGH Inspected By: RGH

Courier:

☐ Physis ☑ FEDEX ☐ UPS ☐ Client
Start End ☐ Other:

Cooler:

☑ Cooler ☐ Box Total #: 2
☐ Other :

Temperature:

☐ BLUE ☑ WET ☐ DRY
☐ None 1.4 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out……Yes
2. All sample containers arrived intact……Yes
3. All samples listed on COC(s) are present……Yes
4. Information on containers consistent with information on COC(s)……Yes
5. Correct containers and volume for all analyses indicated……Yes
6. All samples received within method holding time……Yes
7. Correct preservation used for all analyses indicated……Yes
8. Name of sampler included on COC(s)……Yes

Notes:

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

October 27, 2017

Alex Long
IIRMES
1250 Bellflower Blvd
Long Beach, CA 90840-

Project Name: VCEHD OWTS Study (LA0391)
Physis Project ID: 1708004-002

Dear Alex,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 8/26/2017. A total of 3 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Nitrite as N by EPA 300.0
Nitrate as N by EPA 300.0
Ammonia as N by SM 4500-NH3 D
Organics
Total Nitrogen by Direct Method

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
Extension 202
714-335-5918 cell
mistymercier@physislabs.com

PROJECT SAMPLE LIST

IIRMES PHYSIS Project ID: 1708004-002

VCEHD OWTS Study (LA0391) Total Samples: 3

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
48128	GW-C-BK-05_170825	Ground Water	8/25/2017	10:20	Freshwater
48129	GW-C-BK-05_170825-EB	Ground Water	8/25/2017	11:00	Freshwater
48130	SW-03-D_170825	SURFACE WATER	8/25/2017	15:00	Freshwater

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

PHYSIS QUALIFIER CODES

CODE	*DEFINITION*
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

ANALYTICAL REPORT

PHYSIS ENVIRONMENTAL LABORATORIES, INC.

Innovative Solutions for Nature

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 48128-R1	**GW-C-BK-05_170825 Ground Water**	**Matrix: Freshwater**		**Sampled: 25-Aug-17 10:20**		**Received: 26-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30078		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34057		Prepared: 26-Aug-17		Analyzed: 26-Aug-17
Nitrate as N	NA	1.94	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	4.37	0.14	0.2	mg/L	
Sample ID: 48129-R1	**GW-C-BK-05_170825-EB Ground Water**	**Matrix: Freshwater**		**Sampled: 25-Aug-17 11:00**		**Received: 26-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30078		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34057		Prepared: 26-Aug-17		Analyzed: 26-Aug-17
Nitrate as N	NA	ND	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	ND	0.14	0.2	mg/L	
Sample ID: 48130-R1	**SW-03-D_170825 SURFACE WATER**	**Matrix: Freshwater**		**Sampled: 25-Aug-17 15:00**		**Received: 26-Aug-17**
	Method: SM 4500-NH3 D	Batch ID: C-30078		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Ammonia as N	NA	0.008	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34057		Prepared: 26-Aug-17		Analyzed: 26-Aug-17
Nitrate as N	NA	0.91	0.01	0.05	mg/L	
Nitrite as N	NA	0.06	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	2.31	0.14	0.2	mg/L	

QUALITY CONTROL REPORT

Conventionals QUALITY CONTROL REPORT

SAMPLE ID		BATCH ID	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	ACCURACY LIMITS	PRECISION %	PRECISION LIMITS	QA CODE
Ammonia as N			**Method: SM 4500-NH3 D**			**Fraction: NA**		**Prepared: 22-Sep-17**			**Analyzed: 22-Sep-17**		
48127-B1	QAQC Procedural Blank	C-30078	ND	0.007	0.03	mg/L							
48127-BS1	QAQC Procedural Blank	C-30078	0.247	0.007	0.03	mg/L	0.25	0	99	62 - 157% PASS			
48127-BS2	QAQC Procedural Blank	C-30078	0.237	0.007	0.03	mg/L	0.25	0	95	62 - 157% PASS	4	30 PASS	
48129-MS1	GW-C-BK-05_170825-E	C-30078	0.281	0.007	0.03	mg/L	0.25	0	112	17 - 186% PASS			
48129-MS2	GW-C-BK-05_170825-E	C-30078	0.27	0.007	0.03	mg/L	0.25	0	108	17 - 186% PASS	4	30 PASS	
48129-R2	GW-C-BK-05_170825-E	C-30078	ND	0.007	0.03	mg/L					0	30 PASS	
Nitrate as N			**Method: EPA 300.0**			**Fraction: NA**		**Prepared: 26-Aug-17**			**Analyzed: 26-Aug-17**		
48127-B1	QAQC Procedural Blank	C-34057	ND	0.01	0.05	mg/L							
48127-BS1	QAQC Procedural Blank	C-34057	0.43	0.01	0.05	mg/L	0.5	0	86	62 - 136% PASS			
48127-BS2	QAQC Procedural Blank	C-34057	0.42	0.01	0.05	mg/L	0.5	0	84	62 - 136% PASS	2	30 PASS	
48130-MS1	SW-03-D_170825	C-34057	1.37	0.01	0.05	mg/L	0.5	0.91	92	76 - 121% PASS			
48130-MS2	SW-03-D_170825	C-34057	1.35	0.01	0.05	mg/L	0.5	0.91	88	76 - 121% PASS	4	30 PASS	
48130-R2	SW-03-D_170825	C-34057	0.91	0.01	0.05	mg/L					0	30 PASS	
Nitrite as N			**Method: EPA 300.0**			**Fraction: NA**		**Prepared: 26-Aug-17**			**Analyzed: 26-Aug-17**		
48127-B1	QAQC Procedural Blank	C-34057	ND	0.01	0.03	mg/L							
48127-BS1	QAQC Procedural Blank	C-34057	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155% PASS			
48127-BS2	QAQC Procedural Blank	C-34057	0.44	0.01	0.03	mg/L	0.5	0	88	24 - 155% PASS	2	30 PASS	
48130-MS1	SW-03-D_170825	C-34057	0.47	0.01	0.03	mg/L	0.5	0.06	82	63 - 126% PASS			
48130-MS2	SW-03-D_170825	C-34057	0.47	0.01	0.03	mg/L	0.5	0.06	82	63 - 126% PASS	0	30 PASS	
48130-R2	SW-03-D_170825	C-34057	0.06	0.01	0.03	mg/L					0	30 PASS	
Total Nitrogen			**Method: Direct Method**			**Fraction: NA**		**Prepared: 20-Sep-17**			**Analyzed: 20-Sep-17**		
48127-B1	QAQC Procedural Blank	O-16007	ND	0.14	0.2	mg/L							
48127-BS1	QAQC Procedural Blank	O-16007	3.01	0.14	0.2	mg/L	2.5	0	120	70 - 130% PASS			
48127-BS2	QAQC Procedural Blank	O-16007	2.89	0.14	0.2	mg/L	2.5	0	116	70 - 130% PASS	3	30 PASS	

CHAIN OF CUSTODY

PHYSIS
ENVIRONMENTAL LABORATORIES, INC

CHAIN of CUSTODY

COMPANY NAME: Geosyntec
EMAIL: Jervin@Geosyntec.com
PROJECT NAME / NUMBER: VCEHD OWTS Study (LA0391)
COC PAGE 1 of 1
PROJECT MANAGER: Jared Ervin
FAX:
PO #:
PHYSIS SOS #:
TYPE OF ICE USED: ☑ WET ☐ BLUE ☐ DRY
COMPANY ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101
PHONE: 805-979-9129 office
805-619-8034 cell
SAMPLED BY: Reese Wilson
SHIPPED VIA: ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other
TURNAROUND TIME: ☑ STANDARD (15-20 business days) ☐ RUSH business days
REPORT FORMAT: ☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other
SPECIAL INSTRUCTIONS:

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES
SW = seawater FW = freshwater RW = rainwater
WW = wastewater DW = drinking water
S = sediment T = tissue E = extract O = other (specify)

REQUESTED ANALYSES

PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	SAMPLE time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-C-BK-05_170825	Groundwater	825.17	10:20	FW	2	x	x
2	GW-C-BK-05_170825-EB	↓	│	11:00	│	2	X	X
3	SW-03-D_170825	SURFACE VATER	↓	15:00	│	2	X	X
4								
5								
6								
7								
8								
9								
10								

RELINQUISHED BY

print	signature	company	date & time
REESE WILSON		GSC	825.17 16:15

RECEIVED BY

print	signature	company	date & time
CEASAR NWADIWE		PHYSIS	8/26/17 1055

Physis Project ID
1708004-002

Sample Receipt Summary

Client: IIRMES
Date Received: 8/26/2017
Received By: CN
Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start End ☐ Other:	☐ Other :	☐ None 0.8 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out...Yes
2. All sample containers arrived intact..Yes
3. All samples listed on COC(s) are present..Yes
4. Information on containers consistent with information on COC(s)...............................Yes
5. Correct containers and volume for all analyses indicated...Yes
6. All samples received within method holding time...Yes
7. Correct preservation used for all analyses indicated..Yes
8. Name of sampler included on COC(s)...Yes

Notes:

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

October 27, 2017

Alex Long
IIRMES
1250 Bellflower Blvd
Long Beach, CA 90840-

Project Name:	VCEHD OWTS Study (LA0391)
Physis Project ID:	1708004-003

Dear Alex,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 9/19/2017. A total of 3 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Nitrite as N by EPA 300.0
Nitrate as N by EPA 300.0
Ammonia as N by SM 4500-NH3 D
Organics
Total Nitrogen by Direct Method

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
Extension 202
714-335-5918 cell
mistymercier@physislabs.com

PROJECT SAMPLE LIST

IIRMES PHYSIS Project ID: 1708004-003

VCEHD OWTS Study (LA0391) Total Samples: 3

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
48496	GW-D-04-170918	Groundwater	9/18/2017	10:18	Freshwater
48497	GW-D-05-170918	Groundwater	9/18/2017	11:50	Freshwater
48498	GW-D-01-170918	Groundwater	9/18/2017	14:25	Freshwater

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

PHYSIS QUALIFIER CODES

CODE	*DEFINITION*
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

ANALYTICAL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 48496-R1	**GW-D-04-170918 Groundwater**	**Matrix: Freshwater**		**Sampled: 18-Sep-17 10:18**		**Received: 19-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	0.009	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34056		Prepared: 19-Sep-17		Analyzed: 19-Sep-17
Nitrate as N	NA	2.35	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	5	0.14	0.2	mg/L	
Sample ID: 48497-R1	**GW-D-05-170918 Groundwater**	**Matrix: Freshwater**		**Sampled: 18-Sep-17 11:50**		**Received: 19-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	5.4	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34056		Prepared: 19-Sep-17		Analyzed: 19-Sep-17
Nitrate as N	NA	0.16	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	4.18	0.14	0.2	mg/L	
Sample ID: 48498-R1	**GW-D-01-170918 Groundwater**	**Matrix: Freshwater**		**Sampled: 18-Sep-17 14:25**		**Received: 19-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	0.012	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34056		Prepared: 19-Sep-17		Analyzed: 19-Sep-17
Nitrate as N	NA	5.9	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Total Nitrogen	NA	12.9	0.14	0.2	mg/L	

QUALITY CONTROL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature
1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Conventionals QUALITY CONTROL REPORT

SAMPLE ID		BATCH ID	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	ACCURACY LIMITS		PRECISION %	PRECISION LIMITS		QA CODE
Ammonia as N		**Method: SM 4500-NH3 D**				**Fraction: NA**		**Prepared: 16-Oct-17**				**Analyzed: 16-Oct-17**			
48495-B1	QAQC Procedural Blank	C-30093	ND	0.007	0.03	mg/L									
48495-BS1	QAQC Procedural Blank	C-30093	0.267	0.007	0.03	mg/L	0.25	0	107	62 - 157%	PASS				
48495-BS2	QAQC Procedural Blank	C-30093	0.293	0.007	0.03	mg/L	0.25	0	117	62 - 157%	PASS	9	30	PASS	
48496-MS1	GW-D-04-170918	C-30093	0.279	0.007	0.03	mg/L	0.25	0.01	108	17 - 186%	PASS				
48496-MS2	GW-D-04-170918	C-30093	0.282	0.007	0.03	mg/L	0.25	0.01	109	17 - 186%	PASS	1	30	PASS	
48496-R2	GW-D-04-170918	C-30093	0.01	0.007	0.03	mg/L						11	30	PASS	J
Nitrate as N		**Method: EPA 300.0**				**Fraction: NA**		**Prepared: 19-Sep-17**				**Analyzed: 19-Sep-17**			
48495-B1	QAQC Procedural Blank	C-34056	ND	0.01	0.05	mg/L									
48495-BS1	QAQC Procedural Blank	C-34056	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136%	PASS				
48495-BS2	QAQC Procedural Blank	C-34056	0.45	0.01	0.05	mg/L	0.5	0	90	62 - 136%	PASS	2	30	PASS	
48496-MS1	GW-D-04-170918	C-34056	2.83	0.01	0.05	mg/L	0.5	2.36	94	76 - 121%	PASS				
48496-MS2	GW-D-04-170918	C-34056	2.87	0.01	0.05	mg/L	0.5	2.36	102	76 - 121%	PASS	8	30	PASS	
48496-R2	GW-D-04-170918	C-34056	2.38	0.01	0.05	mg/L						1	30	PASS	
Nitrite as N		**Method: EPA 300.0**				**Fraction: NA**		**Prepared: 19-Sep-17**				**Analyzed: 19-Sep-17**			
48495-B1	QAQC Procedural Blank	C-34056	ND	0.01	0.03	mg/L									
48495-BS1	QAQC Procedural Blank	C-34056	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155%	PASS				
48495-BS2	QAQC Procedural Blank	C-34056	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155%	PASS	0	30	PASS	
48496-MS1	GW-D-04-170918	C-34056	0.45	0.01	0.03	mg/L	0.5	0	90	63 - 126%	PASS				
48496-MS2	GW-D-04-170918	C-34056	0.46	0.01	0.03	mg/L	0.5	0	92	63 - 126%	PASS	2	30	PASS	
48496-R2	GW-D-04-170918	C-34056	ND	0.01	0.03	mg/L						0	30	PASS	
Total Nitrogen		**Method: Direct Method**				**Fraction: NA**		**Prepared: 20-Sep-17**				**Analyzed: 20-Sep-17**			
48495-B1	QAQC Procedural Blank	O-16007	ND	0.14	0.2	mg/L									
48495-BS1	QAQC Procedural Blank	O-16007	3.01	0.14	0.2	mg/L	2.5	0	120	70 - 130%	PASS				
48495-BS2	QAQC Procedural Blank	O-16007	2.89	0.14	0.2	mg/L	2.5	0	116	70 - 130%	PASS	3	30	PASS	

CHAIN OF CUSTODY

PHYSIS
ENVIRONMENTAL LABORATORIES, INC.

CHAIN of CUSTODY

1708004-003

COMPANY NAME: Geosyntec
PROJECT MANAGER: Jared Ervin
COMPANY ADDRESS: 924 Anacapa St., Suite 4A
Santa Barbara, CA 93101
EMAIL: Jervin@Geosyntec.com
FAX:
PHONE: 805-979-9129 office
805-619-8034 cell
PROJECT NAME / NUMBER: VCEHD OWTS Study (LA0391)
COC PAGE 1 of 1
PO #:
PHYSIS SOS #:
TYPE OF ICE USED: ☑ WET ☐ BLUE ☐ DRY
SAMPLED BY: Reese Wilson
SHIPPED VIA: ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other

TURNAROUND TIME: ☑ STANDARD (15-20 business days) ☐ RUSH business days
REPORT FORMAT: ☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other

SPECIAL INSTRUCTIONS:

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES
SW = seawater **FW** = freshwater **RW** = rainwater
WW = wastewater **DW** = drinking water
S = sediment **T** = tissue **E** = extract **O** = other (specify)

REQUESTED ANALYSES
PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	SAMPLE time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-D-04-170918	Groundwater	9/18/17	10:18	FW	2	x	x
2	GW-D-05_170918	|	9/18/17	11:50	FW	2	x	x
3	GW-D-01_170918	|	9/18/17	14:25	FW	2	✓	x
4								
5								
6								
7								
8								
9								
10								

RELINQUISHED BY

print	signature	company	date & time
REBECCA LUSTIG	Rebecca Lustig	VCEHD	9/18/17; 1500
REESE WILSON		GEOSYNTEC	9.18.17 1530

RECEIVED BY

print	signature	company	date & time
REESE WILSON		GEOSYNTEC	9.18.17 ~~1445~~ RW 15:0
FED EX			
Richard Harker		Physis	9/19/17 955

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1708004-003

Sample Receipt Summary

Client: IIRMES

Date Received: 9/19/2017

Received By: RGH

Inspected By: RGH

Courier:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client
Start End ☐ Other:

Cooler:
☑ Cooler ☐ Box Total #: 1
☐ Other :

Temperature:
☐ BLUE ☑ WET ☐ DRY
☐ None 2.7 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out....................Yes
2. All sample containers arrived intact....................Yes
3. All samples listed on COC(s) are present....................Yes
4. Information on containers consistent with information on COC(s)....................Yes
5. Correct containers and volume for all analyses indicated....................Yes
6. All samples received within method holding time....................Yes
7. Correct preservation used for all analyses indicated....................Yes
8. Name of sampler included on COC(s)....................Yes

Notes:

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

October 26, 2017

Alex Long
IIRMES
1250 Bellflower Blvd
Long Beach, CA 90840-

Project Name: VCEHD OWTS Study (LA0391)
Physis Project ID: 1708004-004

Dear Alex,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 9/20/2017. A total of 6 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Nitrite as N by EPA 300.0
Nitrate as N by EPA 300.0
Ammonia as N by SM 4500-NH3 D
Organics
Total Nitrogen by Direct Method

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
Extension 202
714-335-5918 cell
mistymercier@physislabs.com

PROJECT SAMPLE LIST

IIRMES
PHYSIS Project ID: 1708004-00

VCEHD OWTS Study (LA0391)
Total Samples: 6

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
48516	GW-C-BK-06-170919	Groundwater	9/19/2017	10:00	Freshwater
48517	GW-D-07-170919	Groundwater	9/19/2017	10:49	Freshwater
48518	SW-03-U-170919	Groundwater	9/19/2017	12:30	Freshwater
48519	GW-C-07-170919	Groundwater	9/19/2017	13:20	Freshwater
48520	GW-C-08-170919	Groundwater	9/19/2017	13:45	Freshwater
48521	GW-C-04-170919	Groundwater	9/19/2017	14:10	Freshwater

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

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LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

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the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

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TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

PHYSIS QUALIFIER CODES

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ND	analyte not detected at or above the MDL
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M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
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NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

ANALYTICAL
REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 48516-R1	**GW-C-BK-06-170919 Groundwater**	**Matrix: Freshwater**		**Sampled: 19-Sep-17 10:00**		**Received: 20-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	2.86	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34064		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Nitrate as N	NA	0.62	0.01	0.05	mg/L	
Nitrite as N	NA	0.09	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	4.32	0.14	0.2	mg/L	
Sample ID: 48517-R1	**GW-D-07-170919 Groundwater**	**Matrix: Freshwater**		**Sampled: 19-Sep-17 10:49**		**Received: 20-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34064		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Nitrate as N	NA	0.05	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	0.35	0.14	0.2	mg/L	
Sample ID: 48518-R1	**SW-03-U-170919 Groundwater**	**Matrix: Freshwater**		**Sampled: 19-Sep-17 12:30**		**Received: 20-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	0.011	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34064		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Nitrate as N	NA	1.29	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	2.76	0.14	0.2	mg/L	
Sample ID: 48519-R1	**GW-C-07-170919 Groundwater**	**Matrix: Freshwater**		**Sampled: 19-Sep-17 13:20**		**Received: 20-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34064		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Nitrate as N	NA	1.74	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	

Conventionals

ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
	Method: Direct Method	Batch ID: O-16007		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	3.66	0.14	0.2	mg/L	
Sample ID: 48520-R1	**GW-C-08-170919 Groundwater**	**Matrix: Freshwater**		**Sampled: 19-Sep-17 13:45**		**Received: 20-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34064		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Nitrate as N	NA	1.92	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	3.87	0.14	0.2	mg/L	
Sample ID: 48521-R1	**GW-C-04-170919 Groundwater**	**Matrix: Freshwater**		**Sampled: 19-Sep-17 14:10**		**Received: 20-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30093		Prepared: 16-Oct-17		Analyzed: 16-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34064		Prepared: 20-Sep-17		Analyzed: 20-Sep-17
Nitrate as N	NA	3.25	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16007		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	6.4	0.14	0.2	mg/L	

QUALITY CONTROL REPORT

Conventionals QUALITY CONTROL REPORT

SAMPLE ID		BATCH ID	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	LIMITS		PRECISION %	LIMITS		QA CODE
Ammonia as N		**Method: SM 4500-NH3 D**				**Fraction: NA**			**Prepared: 16-Oct-17**			**Analyzed: 16-Oct-17**			
48515-B1	QAQC Procedural Blank	C-30093	ND	0.007	0.03	mg/L									
48515-BS1	QAQC Procedural Blank	C-30093	0.267	0.007	0.03	mg/L	0.25	0	107	62 - 157%	PASS				
48515-BS2	QAQC Procedural Blank	C-30093	0.293	0.007	0.03	mg/L	0.25	0	117	62 - 157%	PASS	9	30	PASS	
Nitrate as N		**Method: EPA 300.0**				**Fraction: NA**			**Prepared: 20-Sep-17**			**Analyzed: 20-Sep-17**			
48515-B1	QAQC Procedural Blank	C-34064	ND	0.01	0.05	mg/L									
48515-BS1	QAQC Procedural Blank	C-34064	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136%	PASS				
48515-BS2	QAQC Procedural Blank	C-34064	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136%	PASS	0	30	PASS	
48518-MS1	SW-03-U-170919	C-34064	1.79	0.01	0.05	mg/L	0.5	1.29	100	76 - 121%	PASS				
48518-MS2	SW-03-U-170919	C-34064	1.78	0.01	0.05	mg/L	0.5	1.29	98	76 - 121%	PASS	2	30	PASS	
48518-R2	SW-03-U-170919	C-34064	1.29	0.01	0.05	mg/L						0	30	PASS	
Nitrite as N		**Method: EPA 300.0**				**Fraction: NA**			**Prepared: 20-Sep-17**			**Analyzed: 20-Sep-17**			
48515-B1	QAQC Procedural Blank	C-34064	ND	0.01	0.03	mg/L									
48515-BS1	QAQC Procedural Blank	C-34064	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155%	PASS				
48515-BS2	QAQC Procedural Blank	C-34064	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155%	PASS	0	30	PASS	
48518-MS1	SW-03-U-170919	C-34064	0.47	0.01	0.03	mg/L	0.5	0	94	63 - 126%	PASS				
48518-MS2	SW-03-U-170919	C-34064	0.47	0.01	0.03	mg/L	0.5	0	94	63 - 126%	PASS	0	30	PASS	
48518-R2	SW-03-U-170919	C-34064	ND	0.01	0.03	mg/L						0	30	PASS	
Total Nitrogen		**Method: Direct Method**				**Fraction: NA**			**Prepared: 17-Oct-17**			**Analyzed: 17-Oct-17**			
48515-B1	QAQC Procedural Blank	O-16007	ND	0.14	0.2	mg/L									
48515-BS1	QAQC Procedural Blank	O-16007	3.01	0.14	0.2	mg/L	2.5	0	120	70 - 130%	PASS				
48515-BS2	QAQC Procedural Blank	O-16007	2.89	0.14	0.2	mg/L	2.5	0	116	70 - 130%	PASS	3	30	PASS	

CHAIN OF CUSTODY

PHYSIS
ENVIRONMENTAL LABORATORIES, INC.

CHAIN of CUSTODY

COMPANY NAME Geosyntec	EMAIL Jervin@Geosyntec.com	PROJECT NAME / NUMBER VCEHD OWTS Study (LA0391)	COC PAGE 1 of
PROJECT MANAGER Jared Ervin	FAX	PO # PHYSIS SOS #	TYPE OF ICE USED ☑ WET ☐ BLUE ☐ DRY
COMPANY ADDRESS 924 Anacapa St., Suite 4A Santa Barbara, CA 93101	PHONE 805-979-9129 office 805-619-8034 cell	SAMPLED BY Reese Wilson	SHIPPED VIA ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other

TURNAROUND TIME
☑ STANDARD (15-20 business days) ☐ RUSH business days

REPORT FORMAT
☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other

SPECIAL INSTRUCTIONS

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES

SW = seawater FW = freshwater RW = rainwater
WW = wastewater DW = drinking water
S = sediment T = tissue E = extract O = other (specify)

REQUESTED ANALYSES

PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	SAMPLE time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-C-BK-06_170919	Groundwater	9/19/17	10:00	FW	2	x	x
2	GW-D-07_170919		9/19/17	10:49	FW	2	x	x
3	SW-03-U-170919			12:30			X	X
4	GW-C-07_170919			1320			X	X
5	GW-C-08_170919			13:45			x	X
6	GW-C-04_170919			14:10			X	X
7								
8								
9								
10								

RELINQUISHED BY

print	signature	company	date & time
REESE WILSON		GEOSYNTEC	9.19.17 16:30

RECEIVED BY

print	signature	company	date & time
FED EX			
Richard Hartken		Physis	9/20/17 1011

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1708004-004

Sample Receipt Summary

Client: IIRMES
Date Received: 9/20/2017
Received By: RGH
Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start End ☐ Other:	☐ Other :	☐ None 3.1 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out……………………………Yes
2. All sample containers arrived intact……………………………Yes
3. All samples listed on COC(s) are present……………………………Yes
4. Information on containers consistent with information on COC(s)……………………………Yes
5. Correct containers and volume for all analyses indicated……………………………Yes
6. All samples received within method holding time……………………………Yes
7. Correct preservation used for all analyses indicated……………………………Yes
8. Name of sampler included on COC(s)……………………………Yes

Notes:

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

October 29, 2017

Alex Long
IIRMES
1250 Bellflower Blvd
Long Beach, CA 90840-

Project Name: VCEHD OWTS Study (LA0391)
Physis Project ID: 1708004-005

Dear Alex,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 9/21/2017. A total of 4 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Nitrite as N by EPA 300.0
Nitrate as N by EPA 300.0
Ammonia as N by SM 4500-NH3 D
Organics
Total Nitrogen by Direct Method

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
Extension 202
714-335-5918 cell
mistymercier@physislabs.com

PROJECT SAMPLE LIST

IIRMES PHYSIS Project ID: 1708004-005

VCEHD OWTS Study (LA0391) Total Samples: 4

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
48523	GW-B-03-170920	Groundwater	9/20/2017	9:00	Freshwater
48524	GW-G-02-170920	Groundwater	9/20/2017	10:05	Freshwater
48525	SW-03-D-170920	Groundwater	9/20/2017	11:20	Freshwater
48526	GW-G-02-170920-EB	Groundwater	9/20/2017	14:12	Freshwater

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
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E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
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ANALYTICAL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 48523-R1	**GW-B-03-170920 Groundwater**	**Matrix: Freshwater**		**Sampled: 20-Sep-17**	**9:00**	**Received: 21-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34065		Prepared: 21-Sep-17		Analyzed: 21-Sep-17
Nitrate as N	NA	1.64	0.01	0.05	mg/L	
Nitrite as N	NA	0.04	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	3.56	0.14	0.2	mg/L	
Sample ID: 48524-R1	**GW-G-02-170920 Groundwater**	**Matrix: Freshwater**		**Sampled: 20-Sep-17**	**10:05**	**Received: 21-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34065		Prepared: 21-Sep-17		Analyzed: 21-Sep-17
Nitrate as N	NA	12.2	0.01	0.05	mg/L	
Nitrite as N	NA	0.04	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	23.1	0.14	0.2	mg/L	
Sample ID: 48525-R1	**SW-03-D-170920 Groundwater**	**Matrix: Freshwater**		**Sampled: 20-Sep-17**	**11:20**	**Received: 21-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	0.016	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34065		Prepared: 21-Sep-17		Analyzed: 21-Sep-17
Nitrate as N	NA	0.96	0.01	0.05	mg/L	
Nitrite as N	NA	0.05	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	2.29	0.14	0.2	mg/L	
Sample ID: 48526-R1	**GW-G-02-170920-EB Groundwater**	**Matrix: Freshwater**		**Sampled: 20-Sep-17**	**14:12**	**Received: 21-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34065		Prepared: 21-Sep-17		Analyzed: 21-Sep-17
Nitrate as N	NA	ND	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	ND	0.14	0.2	mg/L	

QUALITY CONTROL REPORT

Conventionals

QUALITY CONTROL REPORT

SAMPLE ID		BATCH ID	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	ACCURACY			PRECISION			QA CODE
							LEVEL	RESULT	%	LIMITS		%	LIMITS		
Ammonia as N		**Method: SM 4500-NH3 D**				**Fraction: NA**			**Prepared: 18-Oct-17**			**Analyzed: 18-Oct-17**			
48522-B1	QAQC Procedural Blank	C-30094	ND	0.007	0.03	mg/L									
48522-BS1	QAQC Procedural Blank	C-30094	0.259	0.007	0.03	mg/L	0.25	0	104	62 - 157%	PASS				
48522-BS2	QAQC Procedural Blank	C-30094	0.273	0.007	0.03	mg/L	0.25	0	109	62 - 157%	PASS	5	30	PASS	
48523-MS1	GW-B-03-170920	C-30094	0.298	0.007	0.03	mg/L	0.25	0	119	17 - 186%	PASS				
48523-MS2	GW-B-03-170920	C-30094	0.294	0.007	0.03	mg/L	0.25	0	118	17 - 186%	PASS	1	30	PASS	
48523-R2	GW-B-03-170920	C-30094	ND	0.007	0.03	mg/L						0	30	PASS	
Nitrate as N		**Method: EPA 300.0**				**Fraction: NA**			**Prepared: 21-Sep-17**			**Analyzed: 21-Sep-17**			
48522-B1	QAQC Procedural Blank	C-34065	ND	0.01	0.05	mg/L									
48522-BS1	QAQC Procedural Blank	C-34065	0.43	0.01	0.05	mg/L	0.5	0	86	62 - 136%	PASS				
48522-BS2	QAQC Procedural Blank	C-34065	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136%	PASS	2	30	PASS	
48523-MS1	GW-B-03-170920	C-34065	2.15	0.01	0.05	mg/L	0.5	1.64	102	76 - 121%	PASS				
48523-MS2	GW-B-03-170920	C-34065	2.16	0.01	0.05	mg/L	0.5	1.64	104	76 - 121%	PASS	2	30	PASS	
48523-R2	GW-B-03-170920	C-34065	1.63	0.01	0.05	mg/L						1	30	PASS	
Nitrite as N		**Method: EPA 300.0**				**Fraction: NA**			**Prepared: 21-Sep-17**			**Analyzed: 21-Sep-17**			
48522-B1	QAQC Procedural Blank	C-34065	ND	0.01	0.03	mg/L									
48522-BS1	QAQC Procedural Blank	C-34065	0.44	0.01	0.03	mg/L	0.5	0	88	24 - 155%	PASS				
48522-BS2	QAQC Procedural Blank	C-34065	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155%	PASS	2	30	PASS	
48523-MS1	GW-B-03-170920	C-34065	0.47	0.01	0.03	mg/L	0.5	0.04	86	63 - 126%	PASS				
48523-MS2	GW-B-03-170920	C-34065	0.47	0.01	0.03	mg/L	0.5	0.04	86	63 - 126%	PASS	0	30	PASS	
48523-R2	GW-B-03-170920	C-34065	0.04	0.01	0.03	mg/L						0	30	PASS	
Total Nitrogen		**Method: Direct Method**				**Fraction: NA**			**Prepared: 17-Oct-17**			**Analyzed: 17-Oct-17**			
48522-B1	QAQC Procedural Blank	O-16008	ND	0.14	0.2	mg/L									
48522-BS1	QAQC Procedural Blank	O-16008	2.87	0.14	0.2	mg/L	2.5	0	115	70 - 130%	PASS				
48522-BS2	QAQC Procedural Blank	O-16008	2.81	0.14	0.2	mg/L	2.5	0	112	70 - 130%	PASS	3	30	PASS	
48523-MS1	GW-B-03-170920	O-16008	5.83	0.14	0.2	mg/L	2.5	3.56	91	70 - 130%	PASS				
48523-MS2	GW-B-03-170920	O-16008	5.9	0.14	0.2	mg/L	2.5	3.56	94	70 - 130%	PASS	3	30	PASS	
48523-R2	GW-B-03-170920	O-16008	3.56	0.14	0.2	mg/L						0	30	PASS	

CHAIN OF CUSTODY

PHYSIS
TERRA FAUNA FLORA AQUA
ENVIRONMENTAL LABORATORIES, INC

CHAIN of CUSTODY

1708004-005

COMPANY NAME Geosyntec	EMAIL Jervin@Geosyntec.com	PROJECT NAME / NUMBER VCEHD OWTS Study (LA0391)	COC PAGE 1 of 1
PROJECT MANAGER Jared Ervin	FAX	PO # / PHYSIS SOS #	TYPE OF ICE USED ☑ WET ☐ BLUE ☐ DRY
COMPANY ADDRESS 924 Anacapa St., Suite 4A Santa Barbara, CA 93101	PHONE 805-979-9129 office 805-619-8034 cell	SAMPLED BY Reese Wilson	SHIPPED VIA ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other

TURNAROUND TIME
☑ STANDARD (15-20 business days) ☐ RUSH business days

REPORT FORMAT
☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other

SPECIAL INSTRUCTIONS

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES
SW = seawater **FW** = freshwater **RW** = rainwater
WW = wastewater **DW** = drinking water
S = sediment **T** = tissue **E** = extract **O** = other (specify)

REQUESTED ANALYSES

PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen																	
1	GW-B-03_170920	Groundwater	9/20/17	0900	FW	2	x	x																	
2	GW-G-02_170920	↓	↓	1005	↓	2	x	x																	
3	SW-03-D_170920			1120		2	x	x																	
4	GW-G-02_170920-EB			1412		2	x	x																	
5																									
6																									
7																									
8																									
9																									
10																									

RELINQUISHED BY print	signature	company	date & time	RECEIVED BY print	signature	company	date & time
REBECCA LUSTIG	Rebecca Lustig	VCEHD	9/20/17 15:15	FED EX			
				Richard Hanken		Physis	9/21/17 9:40

Physis Project ID

1708004-005

Sample Receipt Summary

Client: IIRMES   Date Received: 9/21/2017   Received By: RGH   Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start End ☐ Other:	☐ Other :	☐ None 3.3 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out......Yes
2. All sample containers arrived intact......Yes
3. All samples listed on COC(s) are present......Yes
4. Information on containers consistent with information on COC(s)......Yes
5. Correct containers and volume for all analyses indicated......Yes
6. All samples received within method holding time......Yes
7. Correct preservation used for all analyses indicated......Yes
8. Name of sampler included on COC(s)......Yes

Notes:

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

October 29, 2017

Alex Long
IIRMES
1250 Bellflower Blvd
Long Beach, CA 90840-

Project Name: VCEHD OWTS Study (LA0391)
Physis Project ID: 1708004-006

Dear Alex,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 9/22/2017. A total of 4 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventionals
Nitrite as N by EPA 300.0
Nitrate as N by EPA 300.0
Ammonia as N by SM 4500-NH3 D
Organics
Total Nitrogen by Direct Method

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
Extension 202
714-335-5918 cell
mistymercier@physislabs.com

PROJECT SAMPLE LIST

IIRMES PHYSIS Project ID: 1708004-006

VCEHD OWTS Study (LA0391) Total Samples: 4

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
48587	GW-B-05-170921	Groundwater	9/21/2017	8:30	Freshwater
48588	GW-G-01-170921	Groundwater	9/21/2017	10:17	Freshwater
48589	GW-E-03-170921	Groundwater	9/21/2017	13:45	Freshwater
48590	GW-E-03-170921-DUP	Groundwater	9/21/2017	13:45	Freshwater

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

PHYSIS QUALIFIER CODES

CODE	DEFINITION
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis’ QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

ANALYTICAL
REPORT

Conventionals ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
Sample ID: 48587-R1	**GW-B-05-170921 Groundwater**	**Matrix: Freshwater**		**Sampled: 21-Sep-17**	**8:30**	**Received: 22-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	0.009	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34066		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Nitrate as N	NA	3.05	0.01	0.05	mg/L	
Nitrite as N	NA	0.04	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	6.19	0.14	0.2	mg/L	
Sample ID: 48588-R1	**GW-G-01-170921 Groundwater**	**Matrix: Freshwater**		**Sampled: 21-Sep-17**	**10:17**	**Received: 22-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	0.024	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34066		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Nitrate as N	NA	4.14	0.01	0.05	mg/L	
Nitrite as N	NA	ND	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	8.24	0.14	0.2	mg/L	
Sample ID: 48589-R1	**GW-E-03-170921 Groundwater**	**Matrix: Freshwater**		**Sampled: 21-Sep-17**	**13:45**	**Received: 22-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	ND	0.007	0.03	mg/L	
	Method: EPA 300.0	Batch ID: C-34066		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Nitrate as N	NA	1.88	0.01	0.05	mg/L	
Nitrite as N	NA	0.04	0.01	0.03	mg/L	
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	3.43	0.14	0.2	mg/L	
Sample ID: 48590-R1	**GW-E-03-170921-DUP Groundwater**	**Matrix: Freshwater**		**Sampled: 21-Sep-17**	**13:45**	**Received: 22-Sep-17**
	Method: SM 4500-NH3 D	Batch ID: C-30094		Prepared: 18-Oct-17		Analyzed: 18-Oct-17
Ammonia as N	NA	0.008	0.007	0.03	mg/L	J
	Method: EPA 300.0	Batch ID: C-34066		Prepared: 22-Sep-17		Analyzed: 22-Sep-17
Nitrate as N	NA	1.78	0.01	0.05	mg/L	
Nitrite as N	NA	0.04	0.01	0.03	mg/L	

Conventionals

ANALYTICAL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	QA CODE
	Method: Direct Method	Batch ID: O-16008		Prepared: 17-Oct-17		Analyzed: 17-Oct-17
Total Nitrogen	NA	4.28	0.14	0.2	mg/L	

QUALITY CONTROL REPORT

Conventionals QUALITY CONTROL REPORT

SAMPLE ID		BATCH ID	RESULT	MDL	RL	UNITS	SPIKE	SOURCE	ACCURACY		PRECISION		QA CODE
							LEVEL	RESULT	%	LIMITS	%	LIMITS	
Ammonia as N			**Method: SM 4500-NH3 D**			**Fraction: NA**			**Prepared: 18-Oct-17**		**Analyzed: 18-Oct-17**		
48586-B1	QAQC Procedural Blank	C-30094	ND	0.007	0.03	mg/L							
48586-BS1	QAQC Procedural Blank	C-30094	0.259	0.007	0.03	mg/L	0.25	0	104	62 - 157% PASS			
48586-BS2	QAQC Procedural Blank	C-30094	0.273	0.007	0.03	mg/L	0.25	0	109	62 - 157% PASS	5	30 PASS	
Nitrate as N			**Method: EPA 300.0**			**Fraction: NA**			**Prepared: 22-Sep-17**		**Analyzed: 22-Sep-17**		
48586-B1	QAQC Procedural Blank	C-34066	ND	0.01	0.05	mg/L							
48586-BS1	QAQC Procedural Blank	C-34066	0.45	0.01	0.05	mg/L	0.5	0	90	62 - 136% PASS			
48586-BS2	QAQC Procedural Blank	C-34066	0.44	0.01	0.05	mg/L	0.5	0	88	62 - 136% PASS	2	30 PASS	
48587-MS1	GW-B-05-170921	C-34066	3.52	0.01	0.05	mg/L	0.5	3.05	94	76 - 121% PASS			
48587-MS2	GW-B-05-170921	C-34066	3.5	0.01	0.05	mg/L	0.5	3.05	90	76 - 121% PASS	4	30 PASS	
48587-R2	GW-B-05-170921	C-34066	3.04	0.01	0.05	mg/L					0	30 PASS	
Nitrite as N			**Method: EPA 300.0**			**Fraction: NA**			**Prepared: 22-Sep-17**		**Analyzed: 22-Sep-17**		
48586-B1	QAQC Procedural Blank	C-34066	ND	0.01	0.03	mg/L							
48586-BS1	QAQC Procedural Blank	C-34066	0.45	0.01	0.03	mg/L	0.5	0	90	24 - 155% PASS			
48586-BS2	QAQC Procedural Blank	C-34066	0.44	0.01	0.03	mg/L	0.5	0	88	24 - 155% PASS	2	30 PASS	
48587-MS1	GW-B-05-170921	C-34066	0.47	0.01	0.03	mg/L	0.5	0.04	86	63 - 126% PASS			
48587-MS2	GW-B-05-170921	C-34066	0.46	0.01	0.03	mg/L	0.5	0.04	84	63 - 126% PASS	2	30 PASS	
48587-R2	GW-B-05-170921	C-34066	0.04	0.01	0.03	mg/L					0	30 PASS	
Total Nitrogen			**Method: Direct Method**			**Fraction: NA**			**Prepared: 17-Oct-17**		**Analyzed: 17-Oct-17**		
48586-B1	QAQC Procedural Blank	O-16008	ND	0.14	0.2	mg/L							
48586-BS1	QAQC Procedural Blank	O-16008	2.87	0.14	0.2	mg/L	2.5	0	115	70 - 130% PASS			
48586-BS2	QAQC Procedural Blank	O-16008	2.81	0.14	0.2	mg/L	2.5	0	112	70 - 130% PASS	3	30 PASS	

CHAIN OF CUSTODY

PHYSIS ENVIRONMENTAL LABORATORIES, INC.

CHAIN of CUSTODY

1708004-006

COMPANY NAME Geosyntec	EMAIL Jervin@Geosyntec.com	PROJECT NAME / NUMBER VCEHD OWTS Study (LA0391)	COC PAGE 1 of 1
PROJECT MANAGER Jared Ervin	FAX	PO # / PHYSIS SOS #	TYPE OF ICE USED ☑ WET ☐ BLUE ☐ DRY
COMPANY ADDRESS 924 Anacapa St., Suite 4A Santa Barbara, CA 93101	PHONE 805-979-9129 office 805-619-8034 cell	SAMPLED BY Reese Wilson	SHIPPED VIA ☑ FEDEX ☐ UPS ☐ USPS ☐ Client ☐ Physis ☐ other

TURNAROUND TIME

☑ STANDARD (15-20 business days) ☐ RUSH business days

REPORT FORMAT

☑ PHYSIS PDF/EDD ☐ SWAMP EDD ☐ other

SPECIAL INSTRUCTIONS

Total Nitrogen analysis by Catalytic Combustion

PHYSIS MATRIX CODES

SW = seawater **FW** = freshwater **RW** = rainwater
WW = wastewater **DW** = drinking water
S = sediment **T** = tissue **E** = extract **O** = other (specify)

REQUESTED ANALYSES

PLEASE SEE PHYSIS SOS

	SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE date	SAMPLE time	physis matrix code	# of bottles	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-B-05_170921	Groundwater	9/21/17	0830	FW	2	x	x
2	GW-GD1_170921		9/21/17	1017	FW	2	x	x
3	GW-E03_170921		9/21/17	1345	FW	2	x	x
4	GW-E-03_170921-DUP		9/21/17	1345	FW	2	x	x
5								
6								
7								
8								
9								
10								

RELINQUISHED BY print	signature	company	date & time	RECEIVED BY print	signature	company	date & time
REBECCA LUSTIG		VCEHD	9/21/17 1600	FED EX			
				Richard Hanken		Physis	9/22/17 909

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1708004-006

Sample Receipt Summary

Client: IIRMES
Date Received: 9/22/2017
Received By: RGH
Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start End ☐ Other:	☐ Other :	☐ None 4 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out........Yes
2. All sample containers arrived intact........Yes
3. All samples listed on COC(s) are present........Yes
4. Information on containers consistent with information on COC(s)........Yes
5. Correct containers and volume for all analyses indicated........Yes
6. All samples received within method holding time........Yes
7. Correct preservation used for all analyses indicated........Yes
8. Name of sampler included on COC(s)........Yes

Notes:

INSTITUTE FOR INTEGRATED RESEARCH IN MATERIALS, ENVIRONMENTS & SOCIETY

June 17, 2018

Los Angeles Regional Water Quality Control Board
320 W. 4th Street
Los Angeles, CA 90013

Re: IIRMES Project ID: 121-18-03 April 2018 Samples
Los Angeles Regional Water Quality C Project ID: VCEHD OWTS Study

ATTN: Shana Rapoport

IIRMES is pleased to provide you with the enclosed analytical data report for your VCEHD OWTS Study project. According to the chain-of-custody, 26 samples were received intact at IIRMES the week of 4/2/2018 . Per your instructions, the samples were analyzed for:

Please don't hesitate to contact your project manger if you have any questions and thank you very much for using our laboratory for your analtytical needs.

Regards,

Alexander Long

Reviewed and Approved ______________________

California State University, Long Beach, 1250 Bellflower Blvd., Long Beach, CA 90840 (562-985-2469)

Project Sample List

Los Angeles Regional Water Quality Control Board

IIRMES Project ID: **121-18-03 April 2018 Samples**

Project Officer: Shana Rapoport

Project Description: VCEHD OWTS Study

Sample ID#	*Client Sample ID*	*Sample Description*	*Date Sampled*	*Matrix*
16675	SW-04-D_180402		02-Apr-18	Freshwater
16676	GW-E-02_180402		02-Apr-18	Freshwater
16677	GW-E-03_180402		02-Apr-18	Freshwater
16678	SW-05-D_180402		02-Apr-18	Freshwater
16679	SW-04-U_180402		02-Apr-18	Freshwater
16680	SW-03-D_180402		02-Apr-18	Freshwater
16681	GW-A-03_180403		03-Apr-18	Freshwater
16682	GW-A-02_180403		03-Apr-18	Freshwater
16683	GW-A-04_180403		03-Apr-18	Freshwater
16684	GW-A-01_180403		03-Apr-18	Freshwater
16685	GW-F-02_180403		03-Apr-18	Freshwater
16686	SW-01-D_180403		03-Apr-18	Freshwater
16687	GW-C-07_180403		03-Apr-18	Freshwater
16688	GW-C-08_180403		03-Apr-18	Freshwater
16689	GW-B-03_180404		04-Apr-18	Freshwater
16690	GW-C-BK-06_180404		04-Apr-18	Freshwater
16691	GW-D-07_180404		04-Apr-18	Freshwater
16692	SW-03-U_180404		04-Apr-18	Freshwater
16693	GW-A-07_180404		04-Apr-18	Freshwater
16694	SW-02-D_180404		04-Apr-18	Freshwater
16737	SW-02-U_180405		05-Apr-18	Freshwater
16739	GW-D-05-180405		05-Apr-18	Freshwater
16740	GW-D-05_180405_DUP		05-Apr-18	Freshwater
16741	GW-G-02_180405		05-Apr-18	Freshwater

Project Sample List

Los Angeles Regional Water Quality Control Board

IIRMES Project ID: **121-18-03 April 2018 Samples**

Project Officer: Shana Rapoport

Project Description: VCEHD OWTS Study

16742	GW-B-04-180405	05-Apr-18	Freshwater
16743	GW-B-04-180405_EQ	05-Apr-18	Freshwater

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Quality Assurance Summary

Laboratory Batch: The IIRMES Quality Manual (QM) defines a laboratory batch as a group of 20 or fewer samples of similar matrix that are processed together under the same conditions using the same reagents. QC samples are associated with each batch and are used to assess the validity of the sample analyses.

Procedural Blank: Potential laboratory contamination during sample processing and analysis is monitored through the analysis of procedural blanks at a minimum frequency of 1 per batch. The IIRMES QM requires that all measurable procedural blank constituents be less than 10x the MDL and that any detectable constituents be flagged in the project sample results with a *B* qualifier.

Accuracy: Accuracy of the project data is indicated by the analysis of a combination of blank spikes (BS), matrix spikes (MS), laboratory control spikes (LCS), certified reference materials (CRM), and/or surrogate spikes at a minimum frequency of 1 per batch. The IIRMES QM requires that 95% of the compounds greater than 10x the MDL be within the specified acceptance limits.

Precision: Precision of the project data is determined by the analysis of duplicate matrix spikes, blank spikes, and/or duplicate test sample analysis on a minimum frequency of 1 per batch. The IIRMES QM requires that for 95% of the compounds greater than 10x the MDL, the relative percent difference (RPD) be within the specified acceptance range.

Holding Time: The IIRMES QM requires that all samples be processed and analyzed within the method specific recommended holding times. Those sample analyses falling outside that specified holding time will be flagged in the sample results with a *H*.

Total/Dissolved Fraction: In some instances the results for the dissolved fraction may be higher than the total fraction for a particular analyte. This is typically caused by the corresponding analytical variation for each result and indicates the target analyte is primarily in the dissolved phase of the sample.

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IIRMES Qualifier Codes

Code	***Definition***
ND	Analyte not detected at or above the listed MDL
B	Analyte was detected in the associated procedural blank
H	Sample was received and/or analyzed past the recommended holding time
J	Analyte was detected at a concentration above the MDL but below the RL, therefore the reported value is estimated
N	Insufficient sample, analysis could not be performed
M	Analyte was outside the specified recovery and/or RPD acceptance limits due to matrix interference. The associated blank spikes were within limits, therefore the sample data was reported without further clarification
Q1	Analyte concentration in the sample exceeded the spike concentration, therefore the MS recovery and/or RPD limits do not apply
Q2	Analyte results for R1 and/or R2 were lower than 10x the MDL, therefore the RPD limits do not apply
NH	Sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory procedures, therefore the corresponding RPD was outside the specified acceptance limits.

SUB-CONTRACT LAB REPORT

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900   Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE
ENVIRONMENTAL

Client: IIRMES
Address: 1250 Bellflower Blvd.
Long Beach, CA 90840

Attn: Alex Long

Comments: 121-18-03
P.O. #: C1023-180403-01

Lab Request: 401307
Report Date: 04/10/2018
Date Received: 04/03/2018
Client ID: 14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	**Client Sample ID**
401307-001	SW-04-D_180402
401307-002	GW-E-02_180402
401307-003	GW-E-03_180402
401307-004	SW-05-D_180402
401307-005	SW-04-U_180402
401307-006	SW-03-D_180402

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/02/2018 09:18	**Site:**			
Sample #:	**401307-001**	**Client Sample #:**	SW-04-D_180402	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.48**	1	0.5	mg/L		04/10/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189655		
Nitrate, as Nitrogen	**1.48**	1	0.1	mg/L	04/02/18	04/03/18 18:00	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/02/18	04/03/18 18:00	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1189743		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/04/18	04/04/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189889		
Coliform, E. Coli	**50**	1		MPN/100ml	04/03/18 15:13	04/06/18 17:35	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/02/2018 10:35	**Site:**			
Sample #:	**401307-002**	**Client Sample #:**	GW-E-02_180402	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**4.37**	1	0.5	mg/L		04/10/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189655		
Nitrate, as Nitrogen	**4.37**	1	0.1	mg/L	04/02/18	04/03/18 18:16	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/02/18	04/03/18 18:16	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1189743		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/04/18	04/04/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189889		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/03/18 15:13	04/05/18 18:10	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/02/2018 11:00	**Site:**			
Sample #:	**401307-003**	**Client Sample #:**	GW-E-03_180402	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.40**	1	0.5	mg/L		04/10/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189655		
Nitrate, as Nitrogen	**2.40**	1	0.1	mg/L	04/02/18	04/03/18 18:33	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/02/18	04/03/18 18:33	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1189743		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/04/18	04/04/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189889		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/03/18 15:13	04/06/18 17:35	SK	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/02/2018 11:55 **Site:**
Sample #: **401307-004** **Client Sample #:** SW-05-D_180402 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025 Prep Method: None						QCBatchID:		
Total Nitrogen	**1.53**	1	0.5	mg/L		04/10/18	SLL	
Method: EPA 300.0 Prep Method: Method						QCBatchID: QC1189655		
Nitrate, as Nitrogen	**1.37**	1	0.1	mg/L	04/02/18	04/03/18 18:49	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/02/18	04/03/18 18:49	JP	
Method: EPA 350.1 Prep Method: Method						QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2 Prep Method: Method						QCBatchID: QC1189743		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/04/18	04/04/18	TP	
Method: SM 9221-F Prep Method: Method						QCBatchID: QC1189889		
Coliform, E. Coli	**300**	1		MPN/100ml	04/03/18 15:13	04/06/18 17:35	SK	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/02/2018 13:30 **Site:**
Sample #: **401307-005** **Client Sample #:** SW-04-U_180402 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025 Prep Method: None						QCBatchID:		
Total Nitrogen	**1.35**	1	0.5	mg/L		04/10/18	SLL	
Method: EPA 300.0 Prep Method: Method						QCBatchID: QC1189655		
Nitrate, as Nitrogen	**1.35**	1	0.1	mg/L	04/02/18	04/03/18 19:06	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/02/18	04/03/18 19:06	JP	
Method: EPA 350.1 Prep Method: Method						QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2 Prep Method: Method						QCBatchID: QC1189743		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/04/18	04/04/18	TP	
Method: SM 9221-F Prep Method: Method						QCBatchID: QC1189889		
Coliform, E. Coli	**50**	1		MPN/100ml	04/03/18 15:13	04/06/18 17:35	SK	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/02/2018 14:25 **Site:**
Sample #: **401307-006** **Client Sample #:** SW-03-D_180402 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025 Prep Method: None						QCBatchID:		
Total Nitrogen	**1.12**	1	0.5	mg/L		04/10/18	SLL	
Method: EPA 300.0 Prep Method: Method						QCBatchID: QC1189655		
Nitrate, as Nitrogen	**1.12**	1	0.1	mg/L	04/02/18	04/03/18 19:22	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/02/18	04/03/18 19:22	JP	
Method: EPA 350.1 Prep Method: Method						QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2 Prep Method: Method						QCBatchID: QC1189743		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/04/18	04/04/18	TP	
Method: SM 9221-F Prep Method: Method						QCBatchID: QC1189889		
Coliform, E. Coli	**80**	1		MPN/100ml	04/03/18 15:13	04/06/18 17:35	SK	T3

QCBatchID: QC1189655 **Analyst:** JParedes **Method:** EPA 300.0

Matrix: Water **Analyzed:** 04/02/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189655MB1						
Chloride	ND	mg/L		1		
Nitrate + Nitrite, as Nitrogen	ND	mg/L		0.44		
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrite, as Nitrogen	ND	mg/L		0.1		
Sulfate	ND	mg/L		0.5		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1189655LCS1											
Chloride	100		102		mg/L	102			90-110		
Nitrate, as Nitrogen	9.03		9.20		mg/L	102			90-110		
Nitrite, as Nitrogen	9.15		9.05		mg/L	99			90-110		
Sulfate	50		49.4		mg/L	99			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1189655MS1, QC1189655MSD1												**Source: 401248-001**
Chloride	78.6	100	100	174	175	mg/L	95	96	0.6	80-120	20	
Nitrate, as Nitrogen	ND	9.03	9.03	9.20	9.18	mg/L	102	102	0.2	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.97	8.94	mg/L	98	98	0.3	80-120	20	
Sulfate	12.8	50	50	62.6	62.8	mg/L	100	100	0.3	80-120	20	
QC1189655MS2												**Source: 401252-001**
Chloride	86.2	100		182		mg/L	96			80-120		
Nitrate, as Nitrogen	ND	9.03		9.23		mg/L	102			80-120		
Nitrite, as Nitrogen	ND	9.15		9.02		mg/L	99			80-120		
Sulfate	12.7	50		63.0		mg/L	101			80-120		

QCBatchID:	**QC1189743**	**Analyst:**	trinh	**Method:**	EPA 351.2
Matrix:	Water	**Analyzed:**	04/04/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189743MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries			Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD	RPD	%Rec	RPD	
QC1189743LCS1											
Total Kjeldahl Nitrogen	2.5		2.3		mg/L	92			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries			Limits		Notes
		MS	MSD	MS	MSD		MS	MSD	RPD	%Rec	RPD	
QC1189743MS1, QC1189743MSD1											**Source:**	**401307-001**
Total Kjeldahl Nitrogen	ND	12.5	12.5	9.6	10	mg/L	77	80	4.1	80-120	20	M

QCBatchID: QC1189950 **Analyst:** trinh **Method:** EPA 350.1
Matrix: Water **Analyzed:** 04/10/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189950MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1189950LCS1											
Ammonia, as Nitrogen	5		4.68		mg/L	94			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1189950MS1, QC1189950MSD1											**Source:**	**401307-003**
Ammonia, as Nitrogen	ND	5	5	4.77	4.81	mg/L	95	96	0.8	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

Institute for Integrated Research in Materials, Environments, and Society

1250 Bellflower Blvd., Long Beach, CA, 90840, 562-985-2469, www.iirmes.org

CHAIN-OF-CUSTODY

page 1 of 1

Client Name IIRMES
Address 1250 Bellflower Blvd
Long Beach, CA 90840
Project Contact Name Alex Long
Email Address along56@gmail.com
Phone (310) 408-2985
Project Name/Number 121-18-03
P.O. Number C1023-180403-01
Sampled By RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen									
1	SW-04-D_180402	4/2/2018	09:18	Freshwater	3	Various	x	x	x	x	x	x									
2	GW-E-02_180402	4/2/2018	10:35	Freshwater	3	Various	x	x	x	x	x	x									
3	GW-E-03_180402	4/2/2018	11:00	Freshwater	3	Various	x	x	x	x	x	x									
4	SW-05-D_180402	4/2/2018	11:55	Freshwater	3	Various	x	x	x	x	x	x									
5	SW-04-U_180402	4/2/2018	13:30	Freshwater	3	Various	x	x	x	x	x	x									
6	SW-03-D_180402	4/2/2018	14:25	Freshwater	3	Various	x	x	x	x	x	x									
7																					
8																					
9																					
10																					

Type of Ice used:	Wet	Blue	None	▨
Sample Preservative:	Yes	No		
TURNAROUND TIME NEEDED:	Standard			

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# 401307

RELINQUISHED BY

Signature:
Print: Mounga Nona
Company: IIRMES
DATE: 4/3/18
TIME: 2:53

RECEIVED BY

Signature:
Print: G Kim
Company: EA
DATE: 4/3/18
TIME: 1453

0.8/0.2

ENTHALPY
ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES

Project: 121-18-03

Date Received: 4/3/18

Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2)

Sample Temp (°C) (No Cooler): ______

Sample Temp (°C), One from each cooler: #1: 0.8 #2: ______ #3: ______ #4: ______

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: ______

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other ______

Cooler Temp (°C): #1: 0.2 #2: ______ #3: ______ #4: ______

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Okay to run past holding time

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: ______ Date/Time ______

☐ Email (email sent to/on): ______ / ______

Project Manager's response:

Completed By: ______ Date: 4/3/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal
Sample Acceptance Checklist – Rev 4, 8/8/2017

Enthalpy Analytical, LLC

931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900   Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

Client: IIRMES
Address: 1250 Bellflower Blvd.
Long Beach, CA 90840

Attn: Alex Long

Comments: 121-18-03b
P.O. #: C1023-180404-02

Lab Request: 401365
Report Date: 04/12/2018
Date Received: 04/04/2018
Client ID: 14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	**Client Sample ID**
401365-001	GW-A-03_180403
401365-002	GW-A-02_180403
401365-003	GW-A-04_180403
401365-004	GW-A-01_180403
401365-005	GW-F-02_180403
401365-006	SW-01-D_180403
401365-007	GW-C-07_180403
401365-008	GW-C-08_180403

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 09:03	**Site:**			
Sample #:	**401365-001**	**Client Sample #:**	GW-A-03_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**5.68**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189764		
Nitrate, as Nitrogen	**5.68**	1	0.1	mg/L	04/04/18	04/04/18 18:27	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 18:27	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1190021		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189891		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/06/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 09:31	**Site:**			
Sample #:	**401365-002**	**Client Sample #:**	GW-A-02_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**4.93**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189764		
Nitrate, as Nitrogen	**4.93**	1	0.1	mg/L	04/04/18	04/04/18 18:44	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 18:44	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1190021		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189891		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/06/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 09:59	**Site:**			
Sample #:	**401365-003**	**Client Sample #:**	GW-A-04_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.88**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189764		
Nitrate, as Nitrogen	**1.88**	1	0.1	mg/L	04/04/18	04/04/18 19:00	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 19:00	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1190021		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189891		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/06/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 10:30	**Site:**			
Sample #:	**401365-004**	**Client Sample #:**	GW-A-01_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**3.07**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189764	
Nitrate, as Nitrogen	**3.07**	1	0.1	mg/L	04/04/18	04/04/18 19:16	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 19:16	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189950	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190021	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189891	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/06/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 11:17	**Site:**			
Sample #:	**401365-005**	**Client Sample #:**	GW-F-02_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**3.32**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189764	
Nitrate, as Nitrogen	**3.32**	1	0.1	mg/L	04/04/18	04/04/18 20:55	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 20:55	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189950	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190021	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189891	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/07/18 19:20	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 12:31	**Site:**			
Sample #:	**401365-006**	**Client Sample #:**	SW-01-D_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**8.76**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189764	
Nitrate, as Nitrogen	**8.76**	1	0.1	mg/L	04/04/18	04/04/18 21:12	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 21:12	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189950	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190021	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189891	
Coliform, E. Coli	**30**	1		MPN/100ml	04/04/18 18:50	04/07/18 19:20	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 13:19	**Site:**			
Sample #:	**401365-007**	**Client Sample #:**	GW-C-07_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.27**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189764		
Nitrate, as Nitrogen	**0.72**	1	0.1	mg/L	04/04/18	04/04/18 21:28	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 21:28	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1190021		
Total Kjeldahl Nitrogen	**0.550**	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189891		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/06/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/03/2018 13:37	**Site:**			
Sample #:	**401365-008**	**Client Sample #:**	GW-C-08_180403	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.84**	1	0.5	mg/L		04/12/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1189764		
Nitrate, as Nitrogen	**1.84**	1	0.1	mg/L	04/04/18	04/04/18 21:44	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/04/18	04/04/18 21:44	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1189950		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1190021		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1189891		
Coliform, E. Coli	**<2**	1		MPN/100ml	04/04/18 18:50	04/06/18 17:45	SK	T3

QCBatchID: QC1189764 **Analyst:** JParedes **Method:** EPA 300.0

Matrix: Water **Analyzed:** 04/04/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189764MB1						
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrite, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries			Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD	RPD	%Rec	RPD	
QC1189764LCS1											
Nitrate, as Nitrogen	9.03		9.01		mg/L	100			90-110		
Nitrite, as Nitrogen	9.15		9.02		mg/L	99			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries			Limits		Notes
		MS	MSD	MS	MSD		MS	MSD	RPD	%Rec	RPD	
QC1189764MS1, QC1189764MSD1											**Source:**	**401365-004**
Nitrate, as Nitrogen	3.07	9.03	9.03	12.0	12.2	mg/L	99	101	1.7	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.96	9.17	mg/L	98	100	2.3	80-120	20	

QCBatchID:	QC1189950	**Analyst:**	trinh	**Method:**	EPA 350.1
Matrix:	Water	**Analyzed:**	04/10/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189950MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1189950LCS1											
Ammonia, as Nitrogen	5		4.68		mg/L	94			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1189950MS1, QC1189950MSD1											**Source:**	**401307-003**
Ammonia, as Nitrogen	ND	5	5	4.77	4.81	mg/L	95	96	0.8	80-120	20	

QCBatchID: QC1190021 **Analyst:** trinh **Method:** EPA 351.2
Matrix: Water **Analyzed:** 04/12/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1190021MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1190021LCS1, QC1190021LCSD1											
Total Kjeldahl Nitrogen	2.5	2.5	2.7	2.7	mg/L	108	108	0	80-120	20	

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1190021MS1, QC1190021MSD1												**Source: 400589-051**
Total Kjeldahl Nitrogen	1.4	12.5	12.5	14	15	mg/L	101	109	6.9	80-120	20	

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1190021DUP1						**Source: 400589-051**
Total Kjeldahl Nitrogen	1.4	1.4	mg/L	0.0	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client’s instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client’s request.
T4	Sample was analyzed out of hold time per client’s request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

Institute for Integrated Research in Materials, Environments, and Society

1250 Bellflower Blvd., Long Beach, CA, 90840, 562-985-2469, www.iirmes.org

CHAIN-OF-CUSTODY

page 1 of 1

Client Name	IIRMES
Address	1250 Bellflower Blvd Long Beach, CA 90840
Project Contact Name	Alex Long
Email Address	along56@gmail.com
Phone	(310) 408-2985
Project Name/Number	121-18-03b
P.O. Number	C1023-180404-02
Sampled By	RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen								
1	GW-A-03_180403	4/3/2018	09:03	Freshwater	3	Various	x	x	x	x	x	x								
2	GW-A-02_180403	4/3/2018	09:31	Freshwater	3	Various	x	x	x	x	x	x								
3	GW-A-04_180403	4/3/2018	09:59	Freshwater	3	Various	x	x	x	x	x	x								
4	GW-A-01_180403	4/3/2018	10:30	Freshwater	3	Various	x	x	x	x	x	x								
5	GW-F-02_180403	4/3/2018	11:17	Freshwater	3	Various	x	x	x	x	x	x								
6	SW-01-D_180403	4/3/2018	12:31	Freshwater	3	Various	x	x	x	x	x	x								
7	GW-C-07_180403	4/3/2018	13:19	Freshwater	3	Various	x	x	x	x	x	x								
8	GW-C-08_180403	4/3/2018	13:37	Freshwater	3	Various	x	x	x	x	x	x								
9																				
10																				

Type of Ice used:	Wet	Blue	None	▨
Sample Preservative:	Yes	No		
TURNAROUND TIME NEEDED:	Standard			

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# 401365

RELINQUISHED BY

Signature:

DATE: 04/04/18

Print: Mounga Nony

TIME: 3:32

Company: IIRMES

RECEIVED BY

Signature:

DATE: 04/04/18

Print: Guerry Kim

TIME: 15:32

Company: EA

0.7 / -0.1

ENTHALPY
ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES
Project: C1023-180404-02
Date Received: 4/4/18
Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2)
Sample Temp (°C) (No Cooler): _____
Sample Temp (°C), One from each cooler: #1: 0.7 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam
☐ Paper ☐ None ☐ Other _____
Cooler Temp (°C): #1: -0.1 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

E. coli is past holding time.

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____
☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 4/4/18

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE
ENVIRONMENTAL

Client: IIRMES
Address: 1250 Bellflower Blvd.
Long Beach, CA 90840

Attn: Alex Long

Comments: 121-18-03c
P.O. #: C1023-180405-01

Lab Request: 401403
Report Date: 04/13/2018
Date Received: 04/05/2018
Client ID: 14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	**Client Sample ID**
401403-001	GW-B-03_180404
401403-002	GW-C-BK-06_180404
401403-003	GW-D-07_180404
401403-004	SW-03-U_180404
401403-005	GW-A-07_180404
401403-006	SW-02-D_180404

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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ACCREDITED IN ACCORDANCE WITH nelac

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/04/2018 09:02 **Site:**
Sample #: **401403-001** **Client Sample #:** GW-B-03_180404 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.13**	1	0.5	mg/L		04/13/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1189809
Nitrate, as Nitrogen	**2.13**	1	0.1	mg/L	04/05/18	04/05/18 17:07	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/05/18	04/05/18 17:07	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1189951
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1190021
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1189892
Coliform, E. Coli	**<2**	1		MPN/100ml	04/05/18 18:45	04/07/18 17:55	IP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/04/2018 10:30 **Site:**
Sample #: **401403-002** **Client Sample #:** GW-C-BK-06_180404 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**7.40**	1	0.5	mg/L		04/13/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1189809
Nitrate, as Nitrogen	**0.10**	1	0.1	mg/L	04/05/18	04/05/18 17:23	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/05/18	04/05/18 17:23	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1189951
Ammonia, as Nitrogen	**6.51**	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1190021
Total Kjeldahl Nitrogen	**7.3**	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1189892
Coliform, E. Coli	**2**	1		MPN/100ml	04/05/18 18:45	04/08/18 17:35	MG	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/04/2018 10:55 **Site:**
Sample #: **401403-003** **Client Sample #:** GW-D-07_180404 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**0.80**	1	0.5	mg/L		04/13/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1189809
Nitrate, as Nitrogen	**0.80**	1	0.1	mg/L	04/05/18	04/05/18 17:40	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/05/18	04/05/18 17:40	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1189951
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1190021
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1189892
Coliform, E. Coli	**2**	1		MPN/100ml	04/05/18 18:45	04/08/18 17:35	MG	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/04/2018 12:11 **Site:**
Sample #: **401403-004** **Client Sample #:** SW-03-U_180404 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.42**	1	0.5	mg/L		04/13/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189809	
Nitrate, as Nitrogen	**0.90**	1	0.1	mg/L	04/05/18	04/05/18 17:56	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/05/18	04/05/18 17:56	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190021	
Total Kjeldahl Nitrogen	**0.518**	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189892	
Coliform, E. Coli	**30**	1		MPN/100ml	04/05/18 18:45	04/08/18 17:35	MG	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/04/2018 12:56 **Site:**
Sample #: **401403-005** **Client Sample #:** GW-A-07_180404 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**12.4**	1	0.5	mg/L		04/13/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189809	
Nitrate, as Nitrogen	**12.4**	1	0.1	mg/L	04/05/18	04/05/18 18:13	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/05/18	04/05/18 18:13	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190021	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189892	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/05/18 18:45	04/07/18 17:55	IP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/04/2018 13:27 **Site:**
Sample #: **401403-006** **Client Sample #:** SW-02-D_180404 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**0.59**	1	0.5	mg/L		04/13/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189809	
Nitrate, as Nitrogen	**0.59**	1	0.1	mg/L	04/05/18	04/05/18 18:29	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/05/18	04/05/18 18:29	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190021	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189892	
Coliform, E. Coli	**17**	1		MPN/100ml	04/05/18 18:45	04/08/18 17:35	MG	T3

QCBatchID: QC1189809 **Analyst:** JParedes **Method:** EPA 300.0
Matrix: Water **Analyzed:** 04/05/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189809MB1						
Bromide	ND	mg/L		0.3		
Chloride	ND	mg/L		1		
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrite, as Nitrogen	ND	mg/L		0.1		
Sulfate	ND	mg/L		0.5		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1189809LCS1											
Bromide	15		14.5		mg/L	97			90-110		
Chloride	100		99.6		mg/L	100			90-110		
Nitrate, as Nitrogen	9.03		9.06		mg/L	100			90-110		
Nitrite, as Nitrogen	9.15		8.92		mg/L	97			90-110		
Sulfate	50		50.3		mg/L	101			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1189809MS1, QC1189809MSD1											**Source:**	**401250-001**
Bromide	0.424	15	15	14.7	14.7	mg/L	95	95	0.0	80-120	20	
Chloride	84.4	100	100	179	178	mg/L	95	94	0.6	80-120	20	
Nitrate, as Nitrogen	ND	9.03	9.03	9.12	9.17	mg/L	101	102	0.5	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.57	8.58	mg/L	94	94	0.1	80-120	20	
Sulfate	12.9	50	50	62.9	62.8	mg/L	100	100	0.2	80-120	20	
QC1189809MS2											**Source:**	**401253-001**
Bromide	0.397	15		14.7		mg/L	95			80-120		
Chloride	86.3	100		180		mg/L	94			80-120		
Nitrate, as Nitrogen	ND	9.03		9.18		mg/L	102			80-120		
Nitrite, as Nitrogen	ND	9.15		8.52		mg/L	93			80-120		
Sulfate	12.9	50		63.0		mg/L	100			80-120		

QCBatchID:	QC1189951	**Analyst:**	trinh	**Method:**	EPA 350.1
Matrix:	Water	**Analyzed:**	04/10/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189951MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1189951LCS1											
Ammonia, as Nitrogen	5		4.83		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1189951MS1, QC1189951MSD1										**Source:**	**401403-001**	
Ammonia, as Nitrogen	ND	5	5	5.35	5.38	mg/L	107	108	0.6	80-120	20	

QCBatchID:	QC1190021	**Analyst:**	trinh	**Method:**	EPA 351.2
Matrix:	Water	**Analyzed:**	04/12/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1190021MB1					
Total Kjeldahl Nitrogen	ND	mg/L		0.4	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1190021LCS1, QC1190021LCSD1											
Total Kjeldahl Nitrogen	2.5	2.5	2.7	2.7	mg/L	108	108	0	80-120	20	

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1190021MS1, QC1190021MSD1												**Source: 400589-051**
Total Kjeldahl Nitrogen	1.4	12.5	12.5	14	15	mg/L	101	109	6.9	80-120	20	

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1190021DUP1						**Source: 400589-051**
Total Kjeldahl Nitrogen	1.4	1.4	mg/L	0.0	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client’s instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client’s request.
T4	Sample was analyzed out of hold time per client’s request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

Institute for Integrated Research in Materials, Environments, and Society

401403

1250 Bellflower Blvd., Long Beach, CA, 90840, 562-985-2469, www.iirmes.org

CHAIN-OF-CUSTODY

page 1 of 1

Client Name IIRMES
Address 1250 Bellflower Blvd
Long Beach, CA 90840
Project Contact Name Alex Long
Email Address along56@gmail.com
Phone (310) 408-2985
Project Name/Number 121-18-03c
P.O. Number C1023-180405-01
Sampled By RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen
1	GW-B-03_180404	4/4/2018	09:02	Freshwater	3	Various	x	x	x	x	x	x
2	GW-C-BK-06_180404	4/4/2018	10:30	Freshwater	3	Various	x	x	x	x	x	x
3	GW-D-07_180404	4/4/2018	10:55	Freshwater	3	Various	x	x	x	x	x	x
4	SW-03-U_180404	4/4/2018	12:11	Freshwater	3	Various	x	x	x	x	x	x
5	GW-A-07_180404	4/4/2018	12:56	Freshwater	3	Various	x	x	x	x	x	x
6	SW-02-D_180404	4/4/2018	13:27	Freshwater	3	Various	x	x	x	x	x	x
7												
8												
9												
10												

Type of Ice used:	Wet	Blue	None	▨
Sample Preservative:	Yes	No		
TURNAROUND TIME NEEDED:	Standard			

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# ____________

RELINQUISHED BY

Signature:
Print: Lindsey Jeans-Shaw
Company: IIRMES
DATE: 4/5/18
TIME: 15:17

RECEIVED BY

Signature:
Print: ZAYD PADILLA
Company: ENTHALPY
DATE: 4/05/18
TIME: 15:17

0.8/1.8.

ENTHALPY
ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES

Project: 121-18-03c

Date Received: 4/5/18

Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2)

Sample Temp (°C) (No Cooler): ______

Sample Temp (°C), One from each cooler: #1: 1.8 #2: ______ #3: ______ #4: ______

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: ______

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other ______

Cooler Temp (°C): #1: 0.3 #2: ______ #3: ______ #4: ______

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: ______ Date/Time ______

☐ Email (email sent to/on): ______ / ______

Project Manager's response:

Completed By: ______ Date: 04/05/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal
Sample Acceptance Checklist – Rev 4, 8/8/2017

Enthalpy Analytical, LLC

931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900   Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

Client:	IIRMES	Lab Request:	401461
Address:	1250 Bellflower Blvd. Long Beach, CA 90840	Report Date:	04/16/2018
		Date Received:	04/06/2018
		Client ID:	14135
Attn:	Alex Long		
Comments:	121-18-03d P.O. #: C1023-180406-01		

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
401461-001	SW-02-U_180405
401461-002	GW-D-05_180405
401461-003	GW-D-05_180405-DUP
401461-004	GW-G-02_180405
401461-005	GW-B-04_180405
401461-006	GW-B-04_180405-EQ

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/05/2018 09:38	**Site:**			
Sample #:	**401461-001**	**Client Sample #:**	SW-02-U_180405	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		04/16/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189859	
Nitrate, as Nitrogen	**0.45**	1	0.1	mg/L	04/06/18	04/06/18 21:59	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 21:59	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190022	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189895	
Coliform, E. Coli	**30**	1		MPN/100ml	04/06/18 18:30	04/09/18 15:15	IP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/05/2018 11:02	**Site:**			
Sample #:	**401461-002**	**Client Sample #:**	GW-D-05_180405	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**3.54**	1	0.5	mg/L		04/16/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189859	
Nitrate, as Nitrogen	**0.24**	1	0.1	mg/L	04/06/18	04/06/18 22:15	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 22:15	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	**2.82**	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190022	
Total Kjeldahl Nitrogen	**3.3**	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189895	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/06/18 18:30	04/08/18 16:20	MG	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	04/05/2018 11:02	**Site:**			
Sample #:	**401461-003**	**Client Sample #:**	GW-D-05_180405-DUP	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**3.51**	1	0.5	mg/L		04/16/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189859	
Nitrate, as Nitrogen	**0.21**	1	0.1	mg/L	04/06/18	04/06/18 22:32	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 22:32	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	**2.92**	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190022	
Total Kjeldahl Nitrogen	**3.3**	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189895	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/06/18 18:30	04/08/18 16:20	MG	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/05/2018 12:45 **Site:**
Sample #: **401461-004** **Client Sample #:** GW-G-02_180405 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**15.5**	1	0.5	mg/L		04/16/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189859	
Nitrate, as Nitrogen	**15.5**	1	0.1	mg/L	04/06/18	04/06/18 22:49	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 22:49	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190022	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189895	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/06/18 18:30	04/09/18 15:15	MG	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/05/2018 14:06 **Site:**
Sample #: **401461-005** **Client Sample #:** GW-B-04_180405 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		04/16/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189859	
Nitrate, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 23:06	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 23:06	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190022	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189895	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/06/18 18:30	04/09/18 15:15	IP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 04/05/2018 14:06 **Site:**
Sample #: **401461-006** **Client Sample #:** GW-B-04_180405-EQ **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.17**	1	0.5	mg/L		04/16/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1189859	
Nitrate, as Nitrogen	**2.17**	1	0.1	mg/L	04/06/18	04/06/18 23:23	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	04/06/18	04/06/18 23:23	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1189951	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	04/09/18	04/10/18	TD	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1190022	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	04/11/18	04/12/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1189895	
Coliform, E. Coli	**<2**	1		MPN/100ml	04/06/18 18:30	04/09/18 15:15	IP	T3

QCBatchID:	**QC1189859**	**Analyst:**	JParedes	**Method:**	EPA 300.0
Matrix:	Water	**Analyzed:**	04/06/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189859MB1						
Bromide	ND	mg/L		0.3		
Chloride	ND	mg/L		1		
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrate, as NO3	ND	mg/L		0.44		
Nitrite, as Nitrogen	ND	mg/L		0.1		
Nitrite, as NO2	ND	mg/L		0.33		
Sulfate	ND	mg/L		0.5		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1189859LCS1											
Bromide	15		14.8		mg/L	99			90-110		
Chloride	100		100		mg/L	100			90-110		
Nitrate, as Nitrogen	9.03		9.09		mg/L	101			90-110		
Nitrate, as NO3	40		40.3		mg/L	101			90-110		
Nitrite, as Nitrogen	9.15		9.12		mg/L	100			90-110		
Nitrite, as NO2	30		29.9		mg/L	100			90-110		
Sulfate	50		50.4		mg/L	101			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1189859MS1, QC1189859MSD1										**Source:**	**401346-001**	
Bromide	0.426	15	15	15.3	15.5	mg/L	99	100	1.3	80-120	20	
Chloride	82.5	100	100	181	182	mg/L	99	100	0.6	80-120	20	
Nitrate, as Nitrogen	ND	9.03	9.03	9.47	9.60	mg/L	105	106	1.4	80-120	20	
Nitrate, as NO3	ND	40	40	41.9	42.5	mg/L	105	106	1.4	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.96	9.11	mg/L	98	100	1.7	80-120	20	
Nitrite, as NO2	ND	30	30	29.4	29.9	mg/L	98	100	1.7	80-120	20	
Sulfate	12.2	50	50	63.4	64.3	mg/L	102	104	1.4	80-120	20	
QC1189859MS2										**Source:**	**401349-001**	
Bromide	0.406	15		15.5		mg/L	101			80-120		
Chloride	77.8	100		178		mg/L	100			80-120		
Nitrate, as Nitrogen	ND	9.03		9.60		mg/L	106			80-120		
Nitrate, as NO3	ND	40		42.5		mg/L	106			80-120		
Nitrite, as Nitrogen	ND	9.15		9.10		mg/L	99			80-120		
Nitrite, as NO2	ND	30		29.8		mg/L	99			80-120		
Sulfate	12.6	50		64.1		mg/L	103			80-120		

QCBatchID: QC1189951 **Analyst:** trinh **Method:** EPA 350.1

Matrix: Water **Analyzed:** 04/10/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1189951MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1189951LCS1											
Ammonia, as Nitrogen	5		4.83		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1189951MS1, QC1189951MSD1										**Source:**	**401403-001**	
Ammonia, as Nitrogen	ND	5	5	5.35	5.38	mg/L	107	108	0.6	80-120	20	

QCBatchID: QC1190022 **Analyst:** trinh **Method:** EPA 351.2

Matrix: Water **Analyzed:** 04/12/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1190022MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1190022LCS1											
Total Kjeldahl Nitrogen	2.5		2.5		mg/L	100			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1190022MS1, QC1190022MSD1											**Source:**	**401455-002**
Total Kjeldahl Nitrogen	0.278	12.5	12.5	14	14	mg/L	110	110	0.0	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client’s instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client’s request.
T4	Sample was analyzed out of hold time per client’s request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

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401461

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CHAIN-OF-CUSTODY

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Client Name	IIRMES
Address	1250 Bellflower Blvd Long Beach, CA 90840
Project Contact Name	Alex Long
Email Address	along56@gmail.com
Phone	(310) 408-2985
Project Name/Number	121-18-03d
P.O. Number	**C1023-180406-01**
Sampled By	RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container		E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen									
					Quantity	Type															
1	SW-02-U_180405	4/5/2018	09:38	Freshwater	3	Various	x	x	x	x	x	x									
2	GW-D-05_180405	4/5/2018	11:02	Freshwater	3	Various	x	x	x	x	x	x									
3	GW-D-05_180405-DUP	4/5/2018	11:02	Freshwater	3	Various	x	x	x	x	x	x									
4	GW-G-02_180405	4/5/2018	12:45	Freshwater	3	Various	x	x	x	x	x	x									
5	GW-B-04_180405	4/5/2018	14:06	Freshwater	3	Various	x	x	x	x	x	x									
6	GW-B-04_180405-EQ	4/5/2018	14:06	Freshwater	3	Various	x	x	x	x	x	x									
7																					
8																					
9																					
10																					

Type of Ice used:	[✓ Wet]	Blue	None
Sample Preservative:	[✓ Yes]	No	
TURNAROUND TIME NEEDED:	**Standard**		

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# ____________

RELINQUISHED BY

Signature:

DATE: 4/6/18

Print: Lindsey Jeans-Shaw

TIME: 15:35

Company: IIRMES

RECEIVED BY

Signature:

DATE: 4/6/18

Print: G Kim

TIME: 1535

Company: EA

0.8/0.2

ENTHALPY
ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES Project:

Date Received: 4/6/18 Sampler's Name Present: ☒ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler) :

Sample Temp (°C), One from each cooler: #1: 0.8 #2: #3: #4:

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information:

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other

Cooler Temp (°C): #1: 0.2 #2: #3: #4:

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: Date/Time
☐ Email (email sent to/on): /

Project Manager's response:

Completed By: Date: 04/06/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal
Sample Acceptance Checklist – Rev 4, 8/8/2017

CHAIN-OF-CUSTODY

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 4/3/18

Temperature: 4 **°C**

[✓ *Wet Ice*] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* [✓ *Not Applicable*]

COC received with samples? **Yes** ☒ **No** ☐

COC signed and dated? **Yes** ☒ **No** ☐

Analyses requested on COC? **Yes** ☒ **No** ☐

Correct sample containers used? **Yes** ☒ **No** ☐

Container labels match COC? **Yes** ☒ **No** ☐

Adequate sample volumes received? **Yes** ☒ **No** ☐

Sample containers received intact? **Yes** ☒ **No** ☐

Number of Samples Received: 6

Notes:

Samples checked by:

Date: 4/3/18

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CHAIN-OF-CUSTODY

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Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli														
1	SW-04-D_180402	4/2/18	918	FW	1		X														
2	GW-E-02_1804[illegible]	4/2/18	1035	|	1		X														
3	GW-E-03_180402	|	1100	|	|		X														
4	SW-05-D_180402	|	1155	|	|		X														
5	SW-04-U_180402	|	1330	|	|		X														
6	SW-03-D_180402	|	1425	|	|		X														
7																					
8																					
9																					
10																					

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No THIOSULPHATE
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ______________

RELINQUISHED BY

Signature:
DATE: 4/2/18
Print: REBECCA LUSTIG
TIME: 1600
Company: VCEHD

RECEIVED BY

Signature: SHIPPED BY FEDEX
DATE: 4/3/18
Print:
TIME: 14:00
Company: IIRMES

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Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	SW-04-D-180402	4/2/18	918	FW	1	1L	X	X
2	GW-E-02_180402		1035				X	X
3	GW-E-03_180402		1100				X	X
4	SW-05-D_180402		1155				X	X
5	SW_04-U-180402		1330				X	X
6	SW-03-D_180402		1425				X	X
7								
8								
9								
10								

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: Yes [✓ No]

TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature:
Print: REBECCA LUSTIG
Company: VCEHD
DATE: 4/2/18
TIME: 1600

RECEIVED BY

Signature: SHIPPED BY FEDEX
Print:
Company: IIRMES
DATE: 4/3/18
TIME: 14.00

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 4/4/18

Temperature: 5 °C

[✓ *Wet Ice*] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* [✓ *Not Applicable*]

COC received with samples?	**Yes** ☒	**No** ☐
COC signed and dated?	**Yes** ☒	**No** ☐
Analyses requested on COC?	**Yes** ☒	**No** ☐
Correct sample containers used?	**Yes** ☒	**No** ☐
Container labels match COC?	**Yes** ☒	**No** ☐
Adequate sample volumes received?	**Yes** ☒	**No** ☐
Sample containers received intact?	**Yes** ☒	**No** ☐

Number of Samples Received: 8

Notes:

Samples checked by:

Date: 4/4/18

Institute for Integrated Research in Materials, Environments, and Society

1250 Bellflower Blvd., Long Beach, CA, 90840, 562-985-2469, www.iirmes.org

CHAIN-OF-CUSTODY

page 1 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli														
1	GW-A-03_180403	4/3/18	903	FW	1		X														
2	GW-A-02_180403	4/3/18	931		1		X														
3	GW-A-04_180403	4/3/18	959		1		X														
4	GW-A-01_180403	4/3/18	1030		1		X														
5	GW-F-02_180403	4/3/18	1117		1		X														
6	SW-01-D_180403	4/3/18	1231		1		X														
7	GW-C-07_180403	4/3/18	1319		1		X														
8	GW-C-08_180403	4/3/18	1337		1		X														
9																					
10																					

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No THIOSULFATE
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: Rebecca Lustig
DATE: 4/3/18
Print: REBECCA LUSTIG
TIME: 1530
Company: VC EHD

RECEIVED BY

Signature: SHIPPED BY FEDEX
DATE: 4/4/18
Print:
TIME:
Company:

Institute for Integrated Research in Materials, Environments, and Society

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(RL)

CHAIN-OF-CUSTODY

page 2 ~~1~~ of 2

Client Name Geosyntec

Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101

Project Contact Name Jared Ervin

Email Address jervin@geosyntec.com

Phone 805-979-9129

Project Name/Number VCEHD OWTS Study

P.O. Number

Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-A-03_180403	4/3/18	903	FW	1	1L	X	X
2	GW-A-02_180403		931		1		X	X
3	GW-A-04_180403		959		1		X	X
4	GW-A-01_180403		1030		1		X	X
5	GW-F-02_180403		1117		1		X	X
6	SW-01-D_180403		1231		1		X	X
7	GW-C-07_180403		1319		1		X	X
8	GW-C-08_180403		1337		1		X	X
9								
10								

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: Yes [✓ No]

TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: Rebecca Lustig

Print: REBECCA LUSTIG

Company: VC EHD

DATE: 4/3/18

TIME: 1530

RECEIVED BY

Signature: SHIPPED BY FEDEX

Print:

Company:

DATE: 4/4/18

TIME:

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 4/5/18

Temperature: 4 °C

[✓ *Wet Ice*] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* [✓ *Not Applicable*]

COC received with samples? **Yes** ☒ **No** ☐

COC signed and dated? **Yes** ☒ **No** ☐

Analyses requested on COC? **Yes** ☒ **No** ☐

Correct sample containers used? **Yes** ☒ **No** ☐

Container labels match COC? **Yes** ☒ **No** ☐

Adequate sample volumes received? **Yes** ☒ **No** ☐

Sample containers received intact? **Yes** ☒ **No** ☐

Number of Samples Received: 6

Notes:

Samples checked by:

Date: 4/5/18

Institute for Integrated Research in Materials, Environments, and Society

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CHAIN-OF-CUSTODY

page 1 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-B-03_180404	4/4/18	902	FW	1	1L	X	X
2	GW-C-BK-06_180404	↓	1030	↓	1	↓	X	X
3	GW-D-07_180404	↓	1055	↓	1	↓	X	X
4	SW-03-U_180404	↓	1211	↓	1	↓	X	X
5	GW-A-07_180404	↓	1256	↓	1	↓	X	X
6	SW-02-D_180404	↓	1327	↓	1	↓	X	X
7								
8								
9								
10								

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: Yes [✓ No]

TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: Rebecca Lustig
Print: REBECCA LUSTIG
Company: VCEHD
DATE: 4/4/18
TIME: 1520

RECEIVED BY

Signature:
Print:
Company:
DATE: 4/5/18
TIME: 15:00

Institute for Integrated Research in Materials, Environments, and Society

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CHAIN-OF-CUSTODY

page 2 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli
1	GW-B-03_180404	4/4/18	902	FW	1		x
2	GW-C-BK-06_180404	4/4/18	1030	|	1		X
3	GW-D-07_180404	4/4/18	1055	|	1		X
4	SW-03-U_180404	4/4/18	1211	|	1		X
5	GW-A-07_180404	4/4/18	1256	|	1		X
6	SW-02-D_180404	4/4/18	1327	✓	1		X
7							
8							
9							
10							

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: Rebecca Lustig
Print: REBECCA LUSTIG
Company: VCEHD
DATE: 4/4/18
TIME: 1520

RECEIVED BY

Signature: SHIPPED BY FEDEX
Print:
Company:
DATE: 4/5/18
TIME: 15:00

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 4/6/18

Temperature: 5 °C

[✓ Wet Ice] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* *[✓ Not Applicable]*

COC received with samples? **Yes** ☒ **No** ☐

COC signed and dated? **Yes** ☒ **No** ☐

Analyses requested on COC? **Yes** ☒ **No** ☐

Correct sample containers used? **Yes** ☒ **No** ☐

Container labels match COC? **Yes** ☒ **No** ☐

Adequate sample volumes received? **Yes** ☒ **No** ☐

Sample containers received intact? **Yes** ☒ **No** ☐

Number of Samples Received: 6

Notes:

Samples checked by:

Date: 4/6/18

Institute for Integrated Research in Materials, Environments, and Society

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CHAIN-OF-CUSTODY

page 1 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	SW-02-U_180405	4/5/18	938	FW	1	1L	X	X
2	GW-D-05_180405	4/5/18	1102	↓	1	↓	X	X
3	GW-D-05_180405_DUP	4/5/18	1102		1		X	X
4	GW-G-02_180405	4/5/18	1245		1		X	X
5	GW-B-04_180405	4/5/18	1406		1		X	X
6	GW-B-04_180405_EQ	4/5/18	1496		1		X	X
7								
8								
9								
10								

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: Yes [✓ No]

TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: R Lustig
Print: REBECCA LUSTIG
Company: VCEHD
DATE: 4/5/18
TIME: 1845

RECEIVED BY

Signature: SHIPPED BY FED EX
Print:
Company:
DATE: 4/6/18
TIME: 14:00

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CHAIN-OF-CUSTODY

page 2 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli
1	SW-02-U_180405	4/5/18	938	FW	1		X
2	GW-D-05_180405		1102		1		X
3	GW-D-05_180405_DUP	↓	1102	↓	1		X
4	GW-G 02_180405		1245		1		X
5	GW-B-04_180405		1406		1		X
6	GW-B-04_180405_EQ		1406		1		X
7							
8							
9							
10							

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: [✓ Yes] No

TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature:
DATE: 4/5/18
Print: REBECCA LUSTIG
TIME: 1545
Company: VC EHD

RECEIVED BY

Signature: SHIPPED BY FED EX
DATE: 4/6/18
Print:
TIME: 14:00
Company:

INSTITUTE FOR INTEGRATED RESEARCH IN MATERIALS, ENVIRONMENTS & SOCIETY

June 17, 2018

Los Angeles Regional Water Quality Control Board
320 W. 4th Street
Los Angeles, CA 90013

Re: IIRMES Project ID: 121-18-03 May 2018 Samples
Los Angeles Regional Water Quality C Project ID: VCEHD OWTS Study

ATTN: Shana Rapoport

IIRMES is pleased to provide you with the enclosed analytical data report for your VCEHD OWTS Study project. According to the chain-of-custody, 27 samples were received intact at IIRMES the week of 5/14/2018 . Per your instructions, the samples were analyzed for:

Please don't hesitate to contact your project manger if you have any questions and thank you very much for using our laboratory for your analtytical needs.

Regards,

Alexander Long

Reviewed and Approved ____

Project Sample List

Los Angeles Regional Water Quality Control Board

IIRMES Project ID: **121-18-03 May 2018 Samples**

Project Officer: Shana Rapoport

Project Description: VCEHD OWTS Study

Sample ID#	Client Sample ID	Sample Description	Date Sampled	Matrix
16784	GW-C-BK-05_180514_EB		14-May-18	Freshwater
16785	GW-C-BK-05_180514		14-May-18	Freshwater
16786	GW-E-02_180514		14-May-18	Freshwater
16787	SW-05-D_180514		14-May-18	Freshwater
16788	SW-04-U_180514		14-May-18	Freshwater
16789	SW-04-D_180514		14-May-18	Freshwater
16790	SW-03-D_180514		14-May-18	Freshwater
16791	GW-A-03_180515		15-May-18	Freshwater
16792	GW-A-02_180515		15-May-18	Freshwater
16793	GW-A-04_180515		15-May-18	Freshwater
16794	GW-A-01_180515		15-May-18	Freshwater
16795	GW-F-02_180515		15-May-18	Freshwater
16796	GW-C-07_180515		15-May-18	Freshwater
16797	GW-C-08_180515		15-May-18	Freshwater
16798	GW-B-03_180516		16-May-18	Freshwater
16799	GW-B-03_180516_DUP		16-May-18	Freshwater
16800	SW-01-D_180516		16-May-18	Freshwater
16801	GW-B-04_180516		16-May-18	Freshwater
16802	SW-03-U_180516		16-May-18	Freshwater
16803	SW-02-U_180516		16-May-18	Freshwater
16804	GW-A-07_180516		16-May-18	Freshwater
16805	GW-C-BK-06_180517		17-May-18	Freshwater
16806	GW-D-07_180517		17-May-18	Freshwater
16807	GW-G-01_180517		17-May-18	Freshwater

Project Sample List

Los Angeles Regional Water Quality Control Board

IIRMES Project ID: **121-18-03 May 2018 Samples**

Project Officer: Shana Rapoport

Project Description: VCEHD OWTS Study

16808	GW-D-04_180517	17-May-18	Freshwater
16809	GW-D-05_180517	17-May-18	Freshwater
16810	GW-E-03_180517	17-May-18	Freshwater

Institute for Integrated Research in Materials, Environments, and Society

Quality Assurance Summary

Laboratory Batch: The IIRMES Quality Manual (QM) defines a laboratory batch as a group of 20 or fewer samples of similar matrix that are processed together under the same conditions using the same reagents. QC samples are associated with each batch and are used to assess the validity of the sample analyses.

Procedural Blank: Potential laboratory contamination during sample processing and analysis is monitored through the analysis of procedural blanks at a minimum frequency of 1 per batch. The IIRMES QM requires that all measurable procedural blank constituents be less than 10x the MDL and that any detectable constituents be flagged in the project sample results with a *B* qualifier.

Accuracy: Accuracy of the project data is indicated by the analysis of a combination of blank spikes (BS), matrix spikes (MS), laboratory control spikes (LCS), certified reference materials (CRM), and/or surrogate spikes at a minimum frequency of 1 per batch. The IIRMES QM requires that 95% of the compounds greater than 10x the MDL be within the specified acceptance limits.

Precision: Precision of the project data is determined by the analysis of duplicate matrix spikes, blank spikes, and/or duplicate test sample analysis on a minimum frequency of 1 per batch. The IIRMES QM requires that for 95% of the compounds greater than 10x the MDL, the relative percent difference (RPD) be within the specified acceptance range.

Holding Time: The IIRMES QM requires that all samples be processed and analyzed within the method specific recommended holding times. Those sample analyses falling outside that specified holding time will be flagged in the sample results with a *H*.

Total/Dissolved Fraction: In some instances the results for the dissolved fraction may be higher than the total fraction for a particular analyte. This is typically caused by the corresponding analytical variation for each result and indicates the target analyte is primarily in the dissolved phase of the sample.

Institute for Integrated Research in Materials, Environments, and Society

IIRMES Qualifier Codes

Code	***Definition***
ND	Analyte not detected at or above the listed MDL
B	Analyte was detected in the associated procedural blank
H	Sample was received and/or analyzed past the recommended holding time
J	Analyte was detected at a concentration above the MDL but below the RL, therefore the reported value is estimated
N	Insufficient sample, analysis could not be performed
M	Analyte was outside the specified recovery and/or RPD acceptance limits due to matrix interference. The associated blank spikes were within limits, therefore the sample data was reported without further clarification
Q1	Analyte concentration in the sample exceeded the spike concentration, therefore the MS recovery and/or RPD limits do not apply
Q2	Analyte results for R1 and/or R2 were lower than 10x the MDL, therefore the RPD limits do not apply
NH	Sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory procedures, therefore the corresponding RPD was outside the specified acceptance limits.

SUB-CONTRACT LAB REPORT

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900   Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE
ENVIRONMENTAL

Client:	IIRMES
Address:	1250 Bellflower Blvd. Long Beach, CA 90840
Attn:	Alex Long
Comments:	121-18-03e P.O. #: C1023-180514-01

Lab Request:	402649
Report Date:	05/23/2018
Date Received:	05/15/2018
Client ID:	14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
402649-001	GW-C-BK-05_180514
402649-002	GW-C-BK-05_180514_EB
402649-003	GW-E-02_180514
402649-004	SW-05-D_180514
402649-005	SW-04-U-180514
402649-006	SW-04-D-180514
402649-007	SW-03-D-180514

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

ACCREDITED IN ACCORDANCE WITH nelac

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/14/2018 08:53	**Site:**			
Sample #:	**402649-001**	**Client Sample #:**	GW-C-BK-05_180514	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**0.60**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1191141	
Nitrate, as Nitrogen	**0.60**	1	0.1	mg/L	05/15/18	05/15/18 22:24	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/15/18 22:24	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1191365	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1191311	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1191154	
Coliform, E. Coli	**<2**	1		MPN/100ml	05/15/18 16:30	05/18/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/14/2018 08:53	**Site:**			
Sample #:	**402649-002**	**Client Sample #:**	GW-C-BK-05_180514_EB	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1191141	
Nitrate, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/15/18 22:41	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/15/18 22:41	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1191365	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1191311	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1191154	
Coliform, E. Coli	**<2**	1		MPN/100ml	05/15/18 16:30	05/17/18 16:55	CO	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/14/2018 10:16	**Site:**			
Sample #:	**402649-003**	**Client Sample #:**	GW-E-02_180514	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:	QC1191141	
Nitrate, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/15/18 23:30	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/15/18 23:30	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:	QC1191365	
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:	QC1191311	
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:	QC1191154	
Coliform, E. Coli	**<2**	1		MPN/100ml	05/15/18 16:30	05/17/18 16:55	CO	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/14/2018 10:38 **Site:**
Sample #: **402649-004** **Client Sample #:** SW-05-D_180514 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.24**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191141		
Nitrate, as Nitrogen	**1.24**	1	0.1	mg/L	05/15/18	05/15/18 23:47	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/15/18 23:47	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191365		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191154		
Coliform, E. Coli	**900**	1		MPN/100ml	05/15/18 16:30	05/18/18 17:45	SK	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/14/2018 12:02 **Site:**
Sample #: **402649-005** **Client Sample #:** SW-04-U-180514 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**3.94**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191141		
Nitrate, as Nitrogen	**3.94**	1	0.1	mg/L	05/15/18	05/16/18 00:04	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/16/18 00:04	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191365		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191154		
Coliform, E. Coli	**90**	1		MPN/100ml	05/15/18 16:30	05/18/18 17:45	SK	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/14/2018 12:50 **Site:**
Sample #: **402649-006** **Client Sample #:** SW-04-D-180514 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191141		
Nitrate, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/16/18 00:20	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/16/18 00:20	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191380		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191154		
Coliform, E. Coli	**50**	1		MPN/100ml	05/15/18 16:30	05/18/18 17:45	SK	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/14/2018 13:45	**Site:**			
Sample #:	**402649-007**	**Client Sample #:**	SW-03-D-180514	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.05**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191141		
Nitrate, as Nitrogen	**1.05**	1	0.1	mg/L	05/15/18	05/16/18 00:37	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/15/18	05/16/18 00:37	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191365		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191154		
Coliform, E. Coli	**110**	1		MPN/100ml	05/15/18 16:30	05/18/18 17:45	SK	T3

QCBatchID: QC1191141 **Analyst:** JParedes **Method:** EPA 300.0
Matrix: Water **Analyzed:** 05/15/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191141MB1						
Bromide	ND	mg/L		0.3		
Chloride	ND	mg/L		1		
Nitrate + Nitrite, as Nitrogen	ND	mg/L		0.44		
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrite, as Nitrogen	ND	mg/L		0.1		
Sulfate	ND	mg/L		0.5		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191141LCS1											
Bromide	15		14.4		mg/L	96			90-110		
Chloride	100		98.5		mg/L	99			90-110		
Nitrate, as Nitrogen	9.03		8.87		mg/L	98			90-110		
Nitrite, as Nitrogen	9.15		8.62		mg/L	94			90-110		
Sulfate	50		50.1		mg/L	100			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191141MS1, QC1191141MSD1										**Source:**	**402632-001**	
Bromide	0.282	15	15	13.7	13.7	mg/L	89	89	0.0	80-120	20	
Chloride	69.3	100	100	164	164	mg/L	95	95	0.0	80-120	20	
Nitrate, as Nitrogen	ND	9.03	9.03	9.19	9.23	mg/L	102	102	0.4	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.01	7.96	mg/L	88	87	0.6	80-120	20	
Sulfate	12.3	50	50	61.5	61.6	mg/L	98	99	0.2	80-120	20	

QCBatchID:	QC1191311	**Analyst:**	trinh	**Method:**	EPA 351.2
Matrix:	Water	**Analyzed:**	05/21/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191311MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191311LCS1											
Total Kjeldahl Nitrogen	2.5		2.6		mg/L	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191311MS1, QC1191311MSD1										**Source:**	**402679-001**	
Total Kjeldahl Nitrogen	0.108	12.5	12.5	12	12	mg/L	95	95	0.0	80-120	20	

QCBatchID:	**QC1191365**	**Analyst:**	trinh	**Method:**	EPA 350.1
Matrix:	Water	**Analyzed:**	05/22/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191365MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1191365LCS1											
Ammonia, as Nitrogen	5		4.82		mg/L	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1191365MS1, QC1191365MSD1											**Source:**	**402756-003**
Ammonia, as Nitrogen	ND	5	5	5.99	5.99	mg/L	120	120	0.0	80-120	20	

QCBatchID:	QC1191380	**Analyst:**	trinh	**Method:**	EPA 350.1
Matrix:	Water	**Analyzed:**	05/22/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191380MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries			Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD	RPD	%Rec	RPD	
QC1191380LCS1											
Ammonia, as Nitrogen	5		4.84		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries			Limits		Notes
		MS	MSD	MS	MSD		MS	MSD	RPD	%Rec	RPD	
QC1191380MS1, QC1191380MSD1											**Source:**	**402789-001**
Ammonia, as Nitrogen	0.382	5	5	4.03	4.01	mg/L	73	73	0.5	80-120	20	M

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

Institute for Integrated Research in Materials, Environments, and Society

1250 Bellflower Blvd., Long Beach, CA, 90840, 562-985-2469, www.iirmes.org

CHAIN-OF-CUSTODY

page 1 of 1

Client Name IIRMES

Address 1250 Bellflower Blvd
Long Beach, CA 90840

Project Contact Name Alex Long

Email Address along56@gmail.com

Phone (310) 408-2985

Project Name/Number 121-18-03e

P.O. Number C1023-180514-01

Sampled By RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container		E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen									
					Quantity	Type															
1	GW-C-BK-05_180514	5/14/2018	08:53	Freshwater	3	Various	x	x	x	x	x	x									
2	GW-C-BK-05_180514_EB	5/14/2018	08:53	Freshwater	3	Various	x	x	x	x	x	x									
3	GW-E-02_180514	5/14/2018	10:16	Freshwater	3	Various	x	x	x	x	x	x									
4	SW-05-D_180514	5/14/2018	10:38	Freshwater	3	Various	x	x	x	x	x	x									
5	SW-04-U-180514	5/14/2018	12:02	Freshwater	3	Various	x	x	x	x	x	x									
6	SW-04-D-180514	5/14/2018	12:50	Freshwater	3	Various	x	x	x	x	x	x									
7	SW-03-D-180514	5/14/2018	13:43	Freshwater	3	Various	x	x	x	x	x	x									
8																					
9																					
10																					

Type of Ice used:	Wet	Blue	None	
Sample Preservative:	Yes	No		
TURNAROUND TIME NEEDED:	Standard			

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# 402649

RELINQUISHED BY

Signature:

Print: Lindsey Jeans-Shaw

Company: IIRMES

DATE: 5/15/18

TIME: 15:02

RECEIVED BY

Signature:

Print: C Kim

Company: EA

DATE: 5/15/18

TIME: 1502

ENTHALPY
ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES

Project: 121-18-03e

Date Received: 5/15/18

Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2)

Sample Temp (°C) (No Cooler): ______

Sample Temp (°C), One from each cooler: #1: 2.3 #2: ______ #3: ______ #4: ______

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: ______

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other ______

Cooler Temp (°C): #1: 2.4 #2: ______ #3: ______ #4: ______

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Past holding time for E. coli.

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: ______ Date/Time ______

☐ Email (email sent to/on): ______ / ______

Project Manager's response:

Completed By: ______ Date: ~~5/22/18~~ 5/15/18 5/15/18

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900   Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

Client: IIRMES
Address: 1250 Bellflower Blvd.
Long Beach, CA 90840

Attn: Alex Long

Comments: 121-18-03f
P.O. #: C1023-180516-01

Lab Request: 402696
Report Date: 05/24/2018
Date Received: 05/16/2018
Client ID: 14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	**Client Sample ID**
402696-001	GW-A-01_180515
402696-002	GW-A-02_180515
402696-003	GW-A-03_180515
402696-004	GW-A-04_180515
402696-005	GW-F-02_180515
402696-006	GW-C-07_180515
402696-007	GW-C-08_180515

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 10:33	**Site:**			
Sample #:	**402696-001**	**Client Sample #:**	GW-A-01_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**8.66**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191238		
Nitrate, as Nitrogen	**8.66**	1	0.1	mg/L	05/16/18	05/16/18 19:28	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 19:28	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191365		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191227		
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 09:30	**Site:**			
Sample #:	**402696-002**	**Client Sample #:**	GW-A-02_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.70**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191238		
Nitrate, as Nitrogen	**2.70**	1	0.1	mg/L	05/16/18	05/16/18 20:18	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 20:18	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191365		
Ammonia, as Nitrogen	**0.212**	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191227		
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 09:07	**Site:**			
Sample #:	**402696-003**	**Client Sample #:**	GW-A-03_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**5.73**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191238		
Nitrate, as Nitrogen	**5.73**	1	0.1	mg/L	05/16/18	05/16/18 20:34	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 20:34	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191365		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191311		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191227		
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 10:00	**Site:**			
Sample #:	**402696-004**	**Client Sample #:**	GW-A-04_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.37**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191238
Nitrate, as Nitrogen	**2.37**	1	0.1	mg/L	05/16/18	05/16/18 20:51	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 20:51	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191365
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191311
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191227
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 11:25	**Site:**			
Sample #:	**402696-005**	**Client Sample #:**	GW-F-02_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**5.15**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191238
Nitrate, as Nitrogen	**5.15**	1	0.1	mg/L	05/16/18	05/16/18 21:08	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 21:08	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191365
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191311
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191227
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 13:43	**Site:**			
Sample #:	**402696-006**	**Client Sample #:**	GW-C-07_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.86**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191238
Nitrate, as Nitrogen	**1.86**	1	0.1	mg/L	05/16/18	05/16/18 21:24	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 21:24	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191365
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191311
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191227
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/15/2018 14:04	**Site:**			
Sample #:	**402696-007**	**Client Sample #:**	GW-C-08_180515	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025 Prep Method: None						QCBatchID:		
Total Nitrogen	**1.62**	1	0.5	mg/L		05/22/18	SLL	
Method: EPA 300.0 Prep Method: Method						QCBatchID:		QC1191238
Nitrate, as Nitrogen	**1.62**	1	0.1	mg/L	05/16/18	05/16/18 22:14	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/16/18	05/16/18 22:14	JP	
Method: EPA 350.1 Prep Method: Method						QCBatchID:		QC1191365
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2 Prep Method: Method						QCBatchID:		QC1191311
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F Prep Method: Method						QCBatchID:		QC1191227
Coliform, E. Coli	**<2**	1		MPN/100ml	05/16/18 17:05	05/19/18 19:50	IPP	T3

QCBatchID:	**QC1191238**	**Analyst:**	JParedes	**Method:**	EPA 300.0
Matrix:	Water	**Analyzed:**	05/16/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1191238MB1					
Nitrate, as Nitrogen	ND	mg/L		0.1	
Nitrite, as Nitrogen	ND	mg/L		0.1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191238LCS1											
Nitrate, as Nitrogen	9.03		8.81		mg/L	98			90-110		
Nitrite, as Nitrogen	9.15		8.59		mg/L	94			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191238MS1, QC1191238MSD1											**Source:**	**402696-001**
Nitrate, as Nitrogen	8.66	9.03	9.03	16.8	16.8	mg/L	90	90	0.0	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	7.85	7.99	mg/L	86	87	1.8	80-120	20	

QCBatchID: QC1191311 **Analyst:** trinh **Method:** EPA 351.2

Matrix: Water **Analyzed:** 05/21/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191311MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191311LCS1											
Total Kjeldahl Nitrogen	2.5		2.6		mg/L	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191311MS1, QC1191311MSD1												**Source: 402679-001**
Total Kjeldahl Nitrogen	0.108	12.5	12.5	12	12	mg/L	95	95	0.0	80-120	20	

QCBatchID: QC1191365 **Analyst:** trinh **Method:** EPA 350.1

Matrix: Water **Analyzed:** 05/22/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191365MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1191365LCS1											
Ammonia, as Nitrogen	5		4.82		mg/L	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1191365MS1, QC1191365MSD1											**Source:**	**402756-003**
Ammonia, as Nitrogen	ND	5	5	5.99	5.99	mg/L	120	120	0.0	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client’s instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client’s request.
T4	Sample was analyzed out of hold time per client’s request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

402696

Institute for Integrated Research in Materials, Environments, and Society

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CHAIN-OF-CUSTODY

page 1 of 1

Client Name IIRMES
Address 1250 Bellflower Blvd
Long Beach, CA 90840
Project Contact Name Alex Long
Email Address along56@gmail.com
Phone (310) 408-2985
Project Name/Number 121-18-03f
P.O. Number C1023-180516-01
Sampled By RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen									
1	GW-A-01_180515	5/15/2018	10:33	Freshwater	3	Various	x	x	x	x	x	x									
2	GW-A-02_180515	5/15/2018	09:30	Freshwater	3	Various	x	x	x	x	x	x									
3	GW-A-03_180515	5/15/2018	09:07	Freshwater	3	Various	x	x	x	x	x	x									
4	GW-A-04_180515	5/15/2018	10:00	Freshwater	3	Various	x	x	x	x	x	x									
5	GW-F-02_180515	5/15/2018	11:25	Freshwater	3	Various	x	x	x	x	x	x									
6	GW-C-07_180515	5/15/2018	13:43	Freshwater	3	Various	x	x	x	x	x	x									
7	GW-C-08_180515	5/15/2018	14:04	Freshwater	3	Various	x	x	x	x	x	x									
8																					
9																					
10																					

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No
TURNAROUND TIME NEEDED: Standard

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

3.6/-2.1

Project ID# ____________

RELINQUISHED BY

Signature:
Print: MouNGA NONY
Company: IIRMES
DATE: 05/16/18
TIME: 3:36

RECEIVED BY

Signature:
Print: G. Kim
Company: EA
DATE: 5/16/18
TIME: 1536

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES Project: 121-18-03f

Date Received: 05/16/18 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler) : ______

Sample Temp (°C), One from each cooler: #1: 3.6 #2: ______ #3: ______ #4: ______

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: ______

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other ______

Cooler Temp (°C): #1: -2.1 #2: ______ #3: ______ #4: ______

Section 4	YES	NO	N/A
Was a COC received?	✓		▨
Are sample IDs present?	✓		▨
Are sampling dates & times present?	✓		▨
Is a relinquished signature present?	✓		▨
Are the tests required clearly indicated on the COC?	✓		▨
Are custody seals present?		✓	▨
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		▨
Did all bottle labels agree with COC? (ID, dates and times)	✓		▨
Were the samples collected in the correct containers for the required tests?	✓		▨
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		▨

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: ______ Date/Time ______

☐ Email (email sent to/on): ______ / ______

Project Manager's response:

Completed By: ______ Date: 05/16/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal
Sample Acceptance Checklist – Rev 4, 8/8/2017

Enthalpy Analytical, LLC

931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

Client: IIRMES
Address: 1250 Bellflower Blvd.
Long Beach, CA 90840

Attn: Alex Long

Comments: 121-18-03g
P.O. #: C1023-180517-01

Lab Request: 402742
Report Date: 05/24/2018
Date Received: 05/17/2018
Client ID: 14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	**Client Sample ID**
402742-001	GW-B-03_180516
402742-002	GW-B-03_180516_Dup
402742-003	SW-01-D_180516
402742-004	GW-B-04_180516
402742-005	SW-03-U_180516
402742-006	SW-02-U_180516
402742-007	GW-A-07_180516

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/16/2018 08:50 **Site:**
Sample #: **402742-001** **Client Sample #:** GW-B-03_180516 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.69**	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191240
Nitrate, as Nitrogen	**1.69**	1	0.1	mg/L	05/17/18	05/17/18 15:01	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 15:01	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191262
Coliform, E. Coli	**<2**	1		MPN/100ml	05/17/18 17:55	05/19/18 18:15	IPP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/16/2018 08:50 **Site:**
Sample #: **402742-002** **Client Sample #:** GW-B-03_180516_Dup **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.69**	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191240
Nitrate, as Nitrogen	**1.69**	1	0.1	mg/L	05/17/18	05/17/18 15:18	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 15:18	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191262
Coliform, E. Coli	**<2**	1		MPN/100ml	05/17/18 17:55	05/19/18 18:15	IPP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/16/2018 10:06 **Site:**
Sample #: **402742-003** **Client Sample #:** SW-01-D_180516 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191240
Nitrate, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 15:34	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 15:34	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191262
Coliform, E. Coli	**23**	1		MPN/100ml	05/17/18 17:55	05/20/18 18:19	IPP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/16/2018 11:07 **Site:**
Sample #: **402742-004** **Client Sample #:** GW-B-04_180516 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.08**	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191240		
Nitrate, as Nitrogen	**2.08**	1	0.1	mg/L	05/17/18	05/17/18 15:51	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 15:51	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191380		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191312		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191262		
Coliform, E. Coli	**<2**	1		MPN/100ml	05/17/18 17:55	05/20/18 18:19	IPP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/16/2018 12:06 **Site:**
Sample #: **402742-005** **Client Sample #:** SW-03-U_180516 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.86**	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191240		
Nitrate, as Nitrogen	**1.86**	1	0.1	mg/L	05/17/18	05/17/18 16:08	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 16:08	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191380		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191312		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191262		
Coliform, E. Coli	**80**	1		MPN/100ml	05/17/18 17:55	05/20/18 18:19	IPP	T3

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/16/2018 13:55 **Site:**
Sample #: **402742-006** **Client Sample #:** SW-02-U_180516 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191240		
Nitrate, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 16:24	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 16:24	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191380		
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191312		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191262		
Coliform, E. Coli	**13**	1		MPN/100ml	05/17/18 17:55	05/20/18 18:19	IPP	T3

Matrix:	Water	**Client:**	IIRMES	**Collector:**	Client
Sampled:	05/16/2018 14:30	**Site:**			
Sample #:	**402742-007**	**Client Sample #:**	GW-A-07_180516	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**12.5**	1	0.5	mg/L		05/24/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID: QC1191240		
Nitrate, as Nitrogen	**12.5**	1	0.1	mg/L	05/17/18	05/17/18 16:41	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/17/18	05/17/18 16:41	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID: QC1191380		
Ammonia, as Nitrogen	**0.278**	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID: QC1191312		
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID: QC1191262		
Coliform, E. Coli	**<2**	1		MPN/100ml	05/17/18 17:55	05/19/18 18:15	IPP	T3

QCBatchID:	<u>**QC1191240**</u>	**Analyst:**	JParedes	**Method:**	EPA 300.0
Matrix:	Water	**Analyzed:**	05/17/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191240MB1						
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrite, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191240LCS1											
Nitrate, as Nitrogen	9.03		8.85		mg/L	98			90-110		
Nitrite, as Nitrogen	9.15		8.97		mg/L	98			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191240MS1, QC1191240MSD1											**Source:**	**402742-003**
Nitrate, as Nitrogen	ND	9.03	9.03	8.88	8.94	mg/L	98	99	0.7	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.03	8.07	mg/L	88	88	0.5	80-120	20	

QCBatchID: QC1191312 **Analyst:** trinh **Method:** EPA 351.2
Matrix: Water **Analyzed:** 05/21/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191312MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191312LCS1											
Total Kjeldahl Nitrogen	2.5		2.6		mg/L	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191312MS1, QC1191312MSD1										**Source:**	**402756-001**	
Total Kjeldahl Nitrogen	ND	12.5	12.5	10	11	mg/L	80	88	9.5	80-120	20	

QCBatchID:	QC1191380	**Analyst:**	trinh	**Method:**	EPA 350.1
Matrix:	Water	**Analyzed:**	05/22/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191380MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	LCSD	Spike Result LCS	LCSD	Units	Recoveries LCS	LCSD	RPD	Limits %Rec	RPD	Notes
QC1191380LCS1											
Ammonia, as Nitrogen	5		4.84		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	MSD	Spike Result MS	MSD	Units	Recoveries MS	MSD	RPD	Limits %Rec	RPD	Notes
QC1191380MS1, QC1191380MSD1											**Source:**	**402789-001**
Ammonia, as Nitrogen	0.382	5	5	4.03	4.01	mg/L	73	73	0.5	80-120	20	M

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client’s instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client’s request.
T4	Sample was analyzed out of hold time per client’s request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

Institute for Integrated Research in Materials, Environments, and Society

1250 Bellflower Blvd., Long Beach, CA, 90840, 562-985-2469, www.iirmes.org

CHAIN-OF-CUSTODY

page 1 of 1

Client Name IIRMES
Address 1250 Bellflower Blvd
Long Beach, CA 90840
Project Contact Name Alex Long
Email Address along56@gmail.com
Phone (310) 408-2985
Project Name/Number 121-18-03g
P.O. Number C1023-180517-01
Sampled By RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen									
1	GW-B-03_180516	5/16/2018	08:50	Freshwater	3	Various	x	x	x	x	x	x									
2	GW-B-03_180516_Dup	5/16/2018	08:50	Freshwater	3	Various	x	x	x	x	x	x									
3	SW-01-D_180516	5/16/2018	10:06	Freshwater	3	Various	x	x	x	x	x	x									
4	GW-B-04_180516	5/16/2018	11:07	Freshwater	3	Various	x	x	x	x	x	x									
5	SW-03-U_180516	5/16/2018	12:06	Freshwater	3	Various	x	x	x	x	x	x									
6	SW-02-U_180516	5/16/2018	13:55	Freshwater	3	Various	x	x	x	x	x	x									
7	GW-A-07_180516	5/16/2018	14:30	Freshwater	3	Various	x	x	x	x	x	x									
8																					
9																					
10																					

Type of Ice used:	Wet	Blue	None	
Sample Preservative:	Yes	No		
TURNAROUND TIME NEEDED:	Standard			

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# 400742

RELINQUISHED BY

Signature:
Print: Lindsey Jeans-Shaw
Company: IIRMES
DATE: 5/17/18
TIME: 13:40

RECEIVED BY

Signature:
Print: G Kim
Company: EA
DATE: 5/17/18
TIME: 1340

2.6/0.9

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES

Project: 121-18-03g

Date Received: 5/17/18

Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2)

Sample Temp (°C) (No Cooler):

Sample Temp (°C), One from each cooler: #1: 2.6 #2: #3: #4:

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information:

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other

Cooler Temp (°C): #1: 0.9 #2: #3: #4:

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Proceed to run E. coli out of holding time

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: Date/Time

☐ Email (email sent to/on): /

Project Manager's response:

Completed By:

Date: 5/17/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal
Sample Acceptance Checklist – Rev 4, 8/8/2017

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

Client:	IIRMES
Address:	1250 Bellflower Blvd. Long Beach, CA 90840
Attn:	Alex Long
Comments:	121-18-03h P.O. #: C1023-180518-06

Lab Request:	402789
Report Date:	05/29/2018
Date Received:	05/18/2018
Client ID:	14135

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
402789-001	GW-C-BK-06_180517
402789-002	GW-D-07_180517
402789-003	GW-G-01_180517
402789-004	GW-D-04_180517
402789-005	GW-D-05_180517
402789-006	GW-E-03_180517

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Christopher Myrter

Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/17/2018 08:22 **Site:**
Sample #: **402789-001** **Client Sample #:** GW-C-BK-06_180517 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**1.70**	1	0.5	mg/L		05/23/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191296
Nitrate, as Nitrogen	**0.60**	1	0.1	mg/L	05/18/18	05/18/18 15:59	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 15:59	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	**0.382**	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	**1.1**	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191304
Coliform, E. Coli	**<2**	1		MPN/100ml	05/18/08 18:42	05/20/18 19:19	IPP	

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/17/2018 08:53 **Site:**
Sample #: **402789-002** **Client Sample #:** GW-D-07_180517 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	ND	1	0.5	mg/L		05/23/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191296
Nitrate, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 16:49	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 16:49	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191304
Coliform, E. Coli	**<2**	1		MPN/100ml	05/18/08 18:42	05/21/18 19:16	IPP	

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/17/2018 09:50 **Site:**
Sample #: **402789-003** **Client Sample #:** GW-G-01_180517 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**6.21**	1	0.5	mg/L		05/23/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191296
Nitrate, as Nitrogen	**6.21**	1	0.1	mg/L	05/18/18	05/18/18 17:05	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 17:05	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191304
Coliform, E. Coli	**<2**	1		MPN/100ml	05/18/08 18:42	05/21/18 19:16	IPP	

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/17/2018 10:55 **Site:**
Sample #: **402789-004** **Client Sample #:** GW-D-04_180517 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**2.54**	1	0.5	mg/L		05/23/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191296
Nitrate, as Nitrogen	**2.54**	1	0.1	mg/L	05/18/18	05/18/18 17:22	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 17:22	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	ND	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191304
Coliform, E. Coli	**23**	1		MPN/100ml	05/18/08 18:42	05/21/18 19:16	IPP	

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/17/2018 12:01 **Site:**
Sample #: **402789-005** **Client Sample #:** GW-D-05_180517 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**3.16**	1	0.5	mg/L		05/23/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191296
Nitrate, as Nitrogen	**0.16**	1	0.1	mg/L	05/18/18	05/18/18 17:39	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 17:39	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	**2.39**	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	**3.0**	1	0.4	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191304
Coliform, E. Coli	**<2**	1		MPN/100ml	05/18/08 18:42	05/20/18 19:19	IPP	

Matrix: Water **Client:** IIRMES **Collector:** Client
Sampled: 05/17/2018 13:35 **Site:**
Sample #: **402789-006** **Client Sample #:** GW-E-03_180517 **Sample Type:**

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**10.9**	1	0.5	mg/L		05/23/18	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1191296
Nitrate, as Nitrogen	**2.29**	1	0.1	mg/L	05/18/18	05/18/18 17:55	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	05/18/18	05/18/18 17:55	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1191380
Ammonia, as Nitrogen	**3.27**	1	0.1	mg/L	05/21/18	05/22/18	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1191312
Total Kjeldahl Nitrogen	**8.6**	2	0.8	mg/L	05/19/18	05/21/18	TP	
Method: SM 9221-F	Prep Method: Method					QCBatchID:		QC1191304
Coliform, E. Coli	**<2**	1		MPN/100ml	05/18/08 18:42	05/21/18 19:16	IPP	

QCBatchID: QC1191296 **Analyst:** JParedes **Method:** EPA 300.0
Matrix: Water **Analyzed:** 05/18/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191296MB1						
Chloride	ND	mg/L		1		
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrate, as NO3	ND	mg/L		0.44		
Nitrite, as Nitrogen	ND	mg/L		0.1		
Nitrite, as NO2	ND	mg/L		0.33		
Sulfate	ND	mg/L		0.5		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1191296LCS1											
Chloride	100		98.4		mg/L	98			90-110		
Nitrate, as Nitrogen	9.03		8.88		mg/L	98			90-110		
Nitrate, as NO3	40		39.4		mg/L	99			90-110		
Nitrite, as Nitrogen	9.15		8.60		mg/L	94			90-110		
Nitrite, as NO2	30		28.2		mg/L	94			90-110		
Sulfate	50		49.9		mg/L	100			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1191296MS1, QC1191296MSD1											**Source:**	**402729-001**
Chloride	80.2	100	100	169	172	mg/L	89	92	1.8	80-120	20	
Nitrate, as Nitrogen	ND	9.03	9.03	8.63	8.87	mg/L	96	98	2.7	80-120	20	
Nitrate, as NO3	ND	40	40	38.2	39.3	mg/L	96	98	2.8	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	7.50	7.70	mg/L	82	84	2.6	80-120	20	
Nitrite, as NO2	ND	30	30	24.6	25.2	mg/L	82	84	2.4	80-120	20	
Sulfate	12.4	50	50	59.7	61.0	mg/L	95	97	2.2	80-120	20	
QC1191296MS2											**Source:**	**402778-001**
Chloride	68.2	100		164		mg/L	96			80-120		
Nitrate, as Nitrogen	ND	9.03		9.15		mg/L	101			80-120		
Nitrate, as NO3	ND	40		40.5		mg/L	101			80-120		
Nitrite, as Nitrogen	ND	9.15		8.11		mg/L	89			80-120		
Nitrite, as NO2	ND	30		26.6		mg/L	89			80-120		
Sulfate	11.5	50		61.3		mg/L	100			80-120		

QCBatchID:	QC1191312	**Analyst:**	trinh	**Method:**	EPA 351.2
Matrix:	Water	**Analyzed:**	05/21/2018	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191312MB1						
Total Kjeldahl Nitrogen	ND	mg/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1191312LCS1											
Total Kjeldahl Nitrogen	2.5		2.6		mg/L	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1191312MS1, QC1191312MSD1											**Source:**	**402756-001**
Total Kjeldahl Nitrogen	ND	12.5	12.5	10	11	mg/L	80	88	9.5	80-120	20	

QCBatchID: QC1191380 **Analyst:** trinh **Method:** EPA 350.1

Matrix: Water **Analyzed:** 05/22/2018 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1191380MB1						
Ammonia, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	LCS	LCSD	LCS	LCSD	Units	LCS	LCSD	RPD	%Rec	RPD	Notes
QC1191380LCS1											
Ammonia, as Nitrogen	5		4.84		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

	Sample	Spike Amount		Spike Result			Recoveries			Limits		
Analyte	Amount	MS	MSD	MS	MSD	Units	MS	MSD	RPD	%Rec	RPD	Notes
QC1191380MS1, QC1191380MSD1											**Source:**	**402789-001**
Ammonia, as Nitrogen	0.382	5	5	4.03	4.01	mg/L	73	73	0.5	80-120	20	M

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

402/184

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CHAIN-OF-CUSTODY

page 1 of 1

Client Name	IIRMES
Address	1250 Bellflower Blvd Long Beach, CA 90840
Project Contact Name	Alex Long
Email Address	along56@gmail.com
Phone	(310) 408-2985
Project Name/Number	121-18-03h
P.O. Number	C1023-180518-06
Sampled By	RL

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container		E. Coli	Ammonia	TKN	Nitrate	Nitrite	Total Nitrogen									
					Quantity	Type															
1	GW-C-BK-06_180517	5/17/2018	08:22	Freshwater	3	Various	x	x	x	x	x	x									
2	GW-D-07_180517	5/17/2018	08:53	Freshwater	3	Various	x	x	x	x	x	x									
3	GW-G-01_180517	5/17/2018	09:50	Freshwater	3	Various	x	x	x	x	x	x									
4	GW-D-04_180517	5/17/2018	10:55	Freshwater	3	Various	x	x	x	x	x	x									
5	GW-D-05_180517	5/17/2018	12:01	Freshwater	3	Various	x	x	x	x	x	x									
6	GW-E-03_180517	5/17/2018	13:35	Freshwater	3	Various	x	x	x	x	x	x									
7																					
8																					
9																					
10																					

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: [✓ Yes] No

TURNAROUND TIME NEEDED: Standard

COMMENTS:

TKN Preserved with Sulfuric Acid

Please analyze E. coli even though it is past holding time

Project ID# ____________

RELINQUISHED BY

Signature:

Print: Lindsey Jeans-Shaw

Company: IIRMES

DATE: 5/18/18

TIME: 15:22

RECEIVED BY

Signature:

Print:

Company: E.A.

DATE: 05/19/18

TIME: 15:22

ST: 0.1°C / CT: 4.2°C

ENTHALPY
ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: IIRMES　　　Project:

Date Received: 05/18/18　　　Sampler's Name Present: ☐ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1　☐ No (skip section 2)　　Sample Temp (°C) (No Cooler) :

Sample Temp (°C), One from each cooler: #1: 0.1 #2: #3: #4:

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information:

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other

Cooler Temp (°C): #1: 4.2 #2: #3: #4:

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: Date/Time

☐ Email (email sent to/on): /

Project Manager's response:

Completed By:　　　Date: 5/18/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal
Sample Acceptance Checklist – Rev 4, 8/8/2017

CHAIN-OF-CUSTODY

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 5/15/18

Temperature: 4 °C

[✓ Wet Ice] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* *[✓ Not Applicable]*

COC received with samples?	**Yes**	☒	**No**	☐
COC signed and dated?	**Yes**	☒	**No**	☐
Analyses requested on COC?	**Yes**	☒	**No**	☐
Correct sample containers used?	**Yes**	☒	**No**	☐
Container labels match COC?	**Yes**	☒	**No**	☐
Adequate sample volumes received?	**Yes**	☒	**No**	☐
Sample containers received intact?	**Yes**	☒	**No**	☐

Number of Samples Received: 7

Notes:

Samples checked by: Max

Date: 5/15/18

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CHAIN-OF-CUSTODY

page 1 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli														
1	GW-C-BK-05_180514_EB	5/14/18	853	FW	1		X														
2	GW-C-BK-05_180514	↓	853	↓	1		X														
3	GW-E-02_180514		1016		1		X														
4	SW-05-D_180514		1038		1		X														
5	SW-04-U_180514		1202		1		X														
6	SW-04-D_180514		1250		1		X														
7	SW-03-D_180514		1343		1																
8																					
9																					
10																					

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: Rebecca Lustig
DATE: 5/14/2018
Print: REBECCA LUSTIG
TIME: 1540
Company: VC EHD

RECEIVED BY

Signature: SHIPPED BY FED EX
DATE: 5/15/18
Print:
TIME:
Company:

Institute for Integrated Research in Materials, Environments, and Society

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page 2 of 2

Client Name Geosyntec

Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101

Project Contact Name Jared Ervin

Email Address jervin@geosyntec.com

Phone 805-979-9129

Project Name/Number VCEHD OWTS Study

P.O. Number

Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen													
1	GW-C-BK-05_180514	5/14/18	853	FW	1	1L	X	X													
2	GW-C-BK-05_180514_EB		853		1		X	X													
3	GW-E-02_180514		1014		1		X	X													
4	SW-05-D_180514		1038		1		X	X													
5	SW-04-U_180514		1202		1		X	X													
6	SW-04-D_180514		1250		1		X	X													
7	SW-03-D_180514		1343		1		X	X													
8																					
9																					
10																					

Type of Ice used: [✓ Wet] Blue None

Sample Preservative: Yes [✓ No]

TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ______________

RELINQUISHED BY

Signature: Rebecca Lustig

Print: REBECCA LUSTIG

Company: VCEHD

DATE: 5/14/2018

TIME: 1540

RECEIVED BY

Signature: SHIPPED BY FED EX

Print:

Company:

DATE: 5/15/18

TIME:

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 5/16/18

Temperature: 4 °C

[✓ *Wet Ice*] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* [✓ *Not Applicable*]

COC received with samples? Yes ☒ No ☐

COC signed and dated? Yes ☒ No ☐

Analyses requested on COC? Yes ☒ No ☐

Correct sample containers used? Yes ☒ No ☐

Container labels match COC? Yes ☒ No ☐

Adequate sample volumes received? Yes ☒ No ☐

Sample containers received intact? Yes ☒ No ☐

Number of Samples Received: 7

Notes:

Samples checked by:

Date: 5/16/18

Institute for Integrated Research in Materials, Environments, and Society

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page 1 of 2

Client Name Geosyntec
Address 924 Anacapa St Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-A-03_180515	5/15/18	907	FW	1	1L	X	X
2	GW-A-02_180515	↓	930	↓	↓	↓	X	X
3	GW-A-04_180515	↓	1000	↓	↓	↓	X	X
4	GW-A-01_180515	↓	1033	↓	↓	↓	X	X
5	GW-F-02_180515	↓	1125	↓	↓	↓	X	X
6	GW-C-07_180515	↓	1343	↓	↓	↓	X	X
7	GW-C-08_180515	↓	1404	↓	↓	↓	X	X
8								
9								
10								

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: Yes [✓ No]
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: Rebecca Lustig
DATE: 5/15/2018
Print: REBECCA LUSTIG
TIME: 1535
Company: VENTURA CO. EHD

RECEIVED BY

Signature: SHIPPED BY FED EX
DATE: 5/16/18
Print:
TIME:
Company:

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Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli
1	GW-A-03_180515	5/15/18	907	FW	1	Plastic	X
2	GW-A-02_180515		930				X
3	GW-A-04_180515		1000				X
4	GW-A-01_180515		1033				X
5	GW-F-02_180515		1125				X
6	GW-C-07_180515		1343				X
7	GW-C-08_180515		1404				X
8							
9							
10							

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY
Signature: Rebecca Lustig
Print: REBECCA LUSTIG
Company: VENTURA CO. EHD
DATE: 5/15/2018
TIME: 1535

RECEIVED BY
Signature: SHIPPED BY FED EX
Print:
Company:
DATE: 5/16/18
TIME:

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 5/17/18

Temperature: 4 **°C**

[✓ Wet Ice] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* *[✓ Not Applicable]*

COC received with samples?	**Yes**	☒	**No**	☐
COC signed and dated?	**Yes**	☒	**No**	☐
Analyses requested on COC?	**Yes**	☒	**No**	☐
Correct sample containers used?	**Yes**	☒	**No**	☐
Container labels match COC?	**Yes**	☒	**No**	☐
Adequate sample volumes received?	**Yes**	☒	**No**	☐
Sample containers received intact?	**Yes**	☒	**No**	☐

Number of Samples Received: 7

Notes:

Samples checked by:

Date: 5/17/18

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page 1 of 2

Client Name Geosyntec
Address 924 Anacapa St Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen
1	GW-B-03_180516	5/16/18	850	FW	1	1L	X	X
2	GW-B-03_180516_DUP	↓	850	↓	↓	↓	X	X
3	SW-01-D_180516	↓	1006	↓	↓	↓	X	X
4	GW-B-04_180516	↓	1107	↓	↓	↓	X	X
5	SW-03-U_180516	↓	1206	↓	↓	↓	X	X
6	SW-02-U_180516	↓	1355	↓	↓	↓	X	X
7	GW-A-07_180516	↓	1430	↓	↓	↓	X	X
8								
9								
10								

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: Yes [✓ No]
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY
Signature: R Lustig
Print: REBECCA LUSTIG
Company: VC EHD
DATE: 5/16/2018
TIME: 1356

RECEIVED BY
Signature: SHIPPED BY FED EX
Print:
Company:
DATE: 5/17/18
TIME:

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CHAIN-OF-CUSTODY

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Client Name Geosyntec
Address 924 Anacapa St Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	E. coli
1	GW-B-03_180516	5/16/18	850	FW	1		x
2	GW-B-03_180516_DUP	↓	850	↓	↓		X
3	SW-01-D_180516		1006				X
4	GW-B-04_180516		1107				X
5	SW-03-U_180516		1206				X
6	SW-02-U_180516		1355				X
7	GW-A-07_180516		1430				X
8							
9							
10							

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: R Lustig
Print: REBECCA LUSTIG
Company: VC EHD
DATE: 5/16/2018
TIME: 1356

RECEIVED BY

Signature: SHIPPED BY FED EX
Print:
Company:
DATE: 5/17/18
TIME:

Sample Receipt Form

Institute for Integrated Research in Materials, Environments, and Society (IIRMES)

Client: LARWQCB

Date Received: 5/18/18

Temperature: 4 °C

[✓ Wet Ice] *Blue Ice* *Dry Ice* *N/A*

Custody seals present and intact? *Yes* *No* *[✓ Not Applicable]*

COC received with samples? Yes ☒ No ☐

COC signed and dated? Yes ☒ No ☐

Analyses requested on COC? Yes ☒ No ☐

Correct sample containers used? Yes ☒ No ☐

Container labels match COC? Yes ☒ No ☐

Adequate sample volumes received? Yes ☒ No ☐

Sample containers received intact? Yes ☒ No ☐

Number of Samples Received: 6

Notes:

Samples checked by:

Date: 5/18/18

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CHAIN-OF-CUSTODY

page **1 of** 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container Quantity	Container Type	Nitrate & Nitrite (EPA 300.0)	Ammonia (EPA 350.1) & Total Nitrogen														
1	GW-C-BK-06_180517	5/17/18	822	FW	1	1L	X	X														
2	GW-D-07_180517	↓	853	↓	↓	↓	X	X														
3	GW-G-01_180517	↓	950	↓	↓	↓	X	X														
4	GW-D-04_180517	↓	1055	↓	↓	↓	X	X														
5	GW-D-05_180517	↓	1201	↓	↓	↓	X	X														
6	GW-E-03_180517	↓	1335	↓	↓	↓	X	X														
7																						
8																						
9																						
10																						

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: Yes [✓ No]
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: R Lustig
DATE: 5/17/2018
Print: REBECCA LUSTIG
TIME: 1546
Company: VC EHD

RECEIVED BY

Signature: SHIPPED BY FED EX
DATE: 5/18/18
Print:
TIME:
Company:

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CHAIN-OF-CUSTODY

page 2 of 2

Client Name Geosyntec
Address 924 Anacapa St. Suite 4A
Santa Barbara, CA 93101
Project Contact Name Jared Ervin
Email Address jervin@geosyntec.com
Phone 805-979-9129
Project Name/Number VCEHD OWTS Study
P.O. Number
Sampled By Rebecca Lustig

REQUESTED ANALYSES

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix	Container		E. coli
					Quantity	Type	
1	GW-EBK-06_180517	5/17/18	822	FW			X
2	GW-D-07_180517		853				X
3	GW-G-01_180517		950				X
4	GW-D-04_180517		1055				X
5	GW-D-05_180517		1201				X
6	GW-E-03_180517		1335				X
7							
8							
9							
10							

Type of Ice used: [✓ Wet] Blue None
Sample Preservative: [✓ Yes] No
TURNAROUND TIME NEEDED:

COMMENTS:

Project ID# ____________

RELINQUISHED BY

Signature: R. Lustig
Print: REBECCA LUSTIG
Company: VCEHD
DATE: 5/17/2018
TIME: 1546

RECEIVED BY

Signature: SHIPPED BY FED EX
Print:
Company:
DATE: 5/18/18
TIME:

4967 SW 75th Avenue
Miami, FL 33143
Phone: (1) 786-220-0379
Fax: (1) 786-513-2733

Nitrogen Source Tracking

Determination of Nitrogen and Oxygen Isotopic Ratios of Nitrate by Isotope-Ratio Mass Spectrometry

Submitter: Geosyntec Consultants
Samples Received: 8/26/2017
Report Generated: 7/20/2018

SM #	Sample ID	$\delta^{18}O$-NO_3 Results ‰	$\delta^{15}N$-NO_3 Results ‰
SM-7H26001	GW-B-04_170823	3.76	6.15
SM-7H26002	GW-C-01_170823	6.36	11.38
SM-7H26003	GW-F-02_170823	7.49	8.61
SM-7H26004	GW-A-07_170824	3.65	7.54
SM-7H26005	GW-A-03_170824	3.24	5.87
SM-7H26006	GW-A-02_170824	3.61	5.63
SM-7H26007	GW-A-04_170824	3.75	5.66
SM-7H26008	GW-C-BK-05_170825-EB	Low Nitrate	Low Nitrate
SM-7H26010	SW-03-D_170825	9.07	15.08
SM-7J18017	GW-C-BK-05_170825	6.43	10.76

Rationale:

Nutrient source tracking is a method used to determine the sources of nutrient pollution in the environment. Knowing the source of the pollution is important for effective remediation. Nitrogen isotopes are effective tracers of nutrient source identification. Different sources of nutrients have distinctive isotope ratios and these serve as unique markers in order to trace them.

Method

Nitrate samples are analyzed by bacterial conversion of nitrate to nitrous oxide and subsequent measurement on a continuous flow isotope ratio mass spectrometer (Sigman and others, 2001; Casciotti and others, 2002; Coplen and others, 2004; Revesz and Casciotti, 2007).

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Reporting of Nitrogen Isotope Ratios

Nitrogen isotope ratios are reported in parts per thousand (per mill) relative to N2 in air (Mariotti, 1983). The nitrogen isotopic compositions of nitrogen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples, are in accord with Böhlke and Coplen (1995) and Böhlke and others (2003):

N2 in air		0 (exactly)
IAEA-NO-3	KNO3	+4.72
USGS32	KNO3	+180 (exactly)
USGS34	KNO3	-1.8
USGS35	NaNO3	+2.7

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of nitrogen isotopic results is 0.5 per mill, unless otherwise indicated. This means that if the same sample were resubmitted for isotopic analysis, the newly measured value would lie within the uncertainty bounds 95 percent of the time. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Users should be aware that atmospheric nitrate is enriched in O-17 by mass-independent processes (Michalski and Thiemens, 2000; Galanter and others, 2000) and that this bacterial method for nitrate isotope measurements may overestimate the nitrogen isotope ratio of atmospheric nitrate samples by as much as 1 to 2 per mil (Sigman and others et al., 2001). For samples that users suspect may contain more than about 20 percent atmospheric nitrate, users should contact the Reston Stable Isotope Laboratory about methods to resolve this problem. Methods are currently being developed to quantify the mass-independent O-17/O-16 enrichment, and this independent oxygen isotope ratio may be of use in investigating processes forming nitrate.

Oxygen Isotope Ratios

Oxygen isotope ratios are reported in per mil relative to VSMOW reference water and normalized on a scale such that SLAP reference water is -55.5 per mil (Coplen, 1988; Coplen, 1994). The oxygen isotopic compositions of oxygen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples are:

VSMOW	water	0 (exactly)
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IAEA-NO-3	KNO3	+25.6
USGS32	KNO3	+25.7
USGS34	KNO3	-27.9
USGS35	NaNO3	+57.5

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of oxygen isotopic results of nitrates is 1.0 per mil unless otherwise indicated. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Analyses were performed and described by subcontracted USGS RSIL.

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Source Molecular

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Nitrogen Source Tracking

Determination of Nitrogen and Oxygen Isotopic Ratios of Nitrate by Isotope-Ratio Mass Spectrometry

Submitter: Geosyntec Consultants
Samples Received: 9/22/2017
Report Generated: 7/20/2018

SM #	Sample ID	$\delta^{18}O-NO_3$ Results ‰	$\delta^{15}N-NO_3$ Results ‰
SM-7I22028	GW-D-04_170918	7.1	11.81
SM-7I22029	GW-D-05_170918	2.05	2.98
SM-7I22030	GW-A-01_170918	3.61	7.23
SM-7I22031	GW-C-BK-06_170919	12.37	17.5
SM-7I22032	GW-D-07_170919	Low Nitrate	Low Nitrate
SM-7I22033	SW-03-U_170919	7.1	11.1
SM-7I22034	GW-C-07_170919	6.18	10.71
SM-7I22035	GW-C-08_170919	6.12	10.94
SM-7I22036	GW-C-04_170919	7.4	12.08
SM-7I22037	GW-B-03_170920	3.85	6.15
SM-7I22038	GW-G-02_170920	4.41	11.32
SM-7I22039	SW-03-D_170920	9.83	16.27
SM-7I22040	GW-B-05_170921	4.43	7
SM-7I22041	GW-G-01_170921	8.63	7.24
SM-7I22042	GW-E-03_170921	8.01	7.64

Rationale:

Nutrient source tracking is a method used to determine the sources of nutrient pollution in the environment. Knowing the source of the pollution is important for effective remediation. Nitrogen isotopes are effective tracers of nutrient source identification. Different sources of nutrients have distinctive isotope ratios and these serve as unique markers in order to trace them.

Method

Nitrate samples are analyzed by bacterial conversion of nitrate to nitrous oxide and subsequent measurement on a continuous flow isotope ratio mass spectrometer (Sigman and others, 2001; Casciotti and others, 2002; Coplen and others, 2004; Revesz and Casciotti, 2007).

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Submitter: Geosyntec Consultants

Reporting of Nitrogen Isotope Ratios

Nitrogen isotope ratios are reported in parts per thousand (per mill) relative to N2 in air (Mariotti, 1983). The nitrogen isotopic compositions of nitrogen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples, are in accord with Böhlke and Coplen (1995) and Böhlke and others (2003):

N2 in air		0 (exactly)
IAEA-NO-3	KNO3	+4.72
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USGS34	KNO3	-1.8
USGS35	NaNO3	+2.7

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of nitrogen isotopic results is 0.5 per mill, unless otherwise indicated. This means that if the same sample were resubmitted for isotopic analysis, the newly measured value would lie within the uncertainty bounds 95 percent of the time. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Users should be aware that atmospheric nitrate is enriched in O-17 by mass-independent processes (Michalski and Thiemens, 2000; Galanter and others, 2000) and that this bacterial method for nitrate isotope measurements may overestimate the nitrogen isotope ratio of atmospheric nitrate samples by as much as 1 to 2 per mil (Sigman and others et al., 2001). For samples that users suspect may contain more than about 20 percent atmospheric nitrate, users should contact the Reston Stable Isotope Laboratory about methods to resolve this problem. Methods are currently being developed to quantify the mass-independent O-17/O-16 enrichment, and this independent oxygen isotope ratio may be of use in investigating processes forming nitrate.

Oxygen Isotope Ratios

Oxygen isotope ratios are reported in per mil relative to VSMOW reference water and normalized on a scale such that SLAP reference water is -55.5 per mil (Coplen, 1988; Coplen, 1994). The oxygen isotopic compositions of oxygen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples are:

VSMOW	water	0 (exactly)
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USGS32	KNO3	+25.7
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USGS35	NaNO3	+57.5

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of oxygen isotopic results of nitrates is 1.0 per mil unless otherwise indicated. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Analyses were performed and described by subcontracted USGS RSIL.

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Source Molecular

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Nitrogen Source Tracking

Determination of Nitrogen and Oxygen Isotopic Ratios of Nitrate by Isotope-Ratio Mass Spectrometry

Submitter: Geosyntec Consultants
Samples Received: 4/5/2018
Report Generated: 7/20/2018

SM #	Sample ID	$\delta^{18}O\text{-}NO_3$ Results ‰	$\delta^{15}N\text{-}NO_3$ Results ‰
SM-8D05001	SW-04-D_180402	7.27	11.98
SM-8D05002	GW-E-02_180402	8.53	7.79
SM-8D05003	GW-E-03_180402	6.93	7.21
SM-8D05004	SW-05-D_180402	5.88	7.71
SM-8D05005	SW-04-u_180402	6.98	10.41
SM-8D05006	SW-03-D_180402	3.06	5.93
SM-8D05007	GW-A-03_180403	3.46	6.88
SM-8D05008	GW-A-02_180403	3.46	6.12
SM-8D05009	GW-A-04_180403	3.81	5.92
SM-8D05010	GW-A-01_180403	3.71	7.29
SM-8D05011	GW-F-02_180403	7.49	8.88
SM-8D05012	SW-01-D_180403	0.86	2.59
SM-8D05013	GW-C-07_180403	4.33	9.01
SM-8D05014	GW-C-08_180403	4.18	8.39
SM-8D05015	GW-B-03_180404	2.93	5.81
SM-8D05016	GW-C-BK-06_180404	Low Nitrate	Low Nitrate
SM-8D05017	GW-D-07_180404	6.64	11.22
SM-8D05018	SW-03-u_180404	3.61	6.83
SM-8D05019	GW-A-07_180404	3.59	7.67
SM-8D05020	SW-02-D_180404	1.81	3.45

Rationale:

Nutrient source tracking is a method used to determine the sources of nutrient pollution in the environment. Knowing the source of the pollution is important for effective remediation. Nitrogen isotopes are effective tracers of nutrient source identification. Different sources of nutrients have distinctive isotope ratios and these serve as unique markers in order to trace them.

Method

Nitrate samples are analyzed by bacterial conversion of nitrate to nitrous oxide and subsequent measurement on a continuous flow isotope ratio mass spectrometer (Sigman and others, 2001; Casciotti and others, 2002; Coplen and others, 2004; Revesz and Casciotti, 2007).

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N2 in air		0 (exactly)
IAEA-NO-3	KNO3	+4.72
USGS32	KNO3	+180 (exactly)
USGS34	KNO3	-1.8
USGS35	NaNO3	+2.7

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of nitrogen isotopic results is 0.5 per mill, unless otherwise indicated. This means that if the same sample were resubmitted for isotopic analysis, the newly measured value would lie within the uncertainty bounds 95 percent of the time. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Users should be aware that atmospheric nitrate is enriched in O-17 by mass-independent processes (Michalski and Thiemens, 2000; Galanter and others, 2000) and that this bacterial method for nitrate isotope measurements may overestimate the nitrogen isotope ratio of atmospheric nitrate samples by as much as 1 to 2 per mil (Sigman and others et al., 2001). For samples that users suspect may contain more than about 20 percent atmospheric nitrate, users should contact the Reston Stable Isotope Laboratory about methods to resolve this problem. Methods are currently being developed to quantify the mass-independent O-17/O-16 enrichment, and this independent oxygen isotope ratio may be of use in investigating processes forming nitrate.

Oxygen Isotope Ratios

Oxygen isotope ratios are reported in per mil relative to VSMOW reference water and normalized on a scale such that SLAP reference water is -55.5 per mil (Coplen, 1988; Coplen, 1994). The oxygen isotopic compositions of oxygen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples are:

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Submitter: Geosyntec Consultants
Samples Received: 4/7/2018
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SM #	Sample ID	$\delta^{18}O\text{-}NO_3$ Results ‰	$\delta^{15}N\text{-}NO_3$ Results ‰
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SM-8D07002	GW-D-05_180405	7.98	10.3
SM-8D07003	GW-G-02_180405	3.29	10.78
SM-8D07004	GW-B-04_180405	2.93	6.26
SM-8D07005	GW-G-01_180406	8.22	7.27

Rationale:

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USGS35	NaNO3	+57.5

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of oxygen isotopic results of nitrates is 1.0 per mil unless otherwise indicated. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Analyses were performed and described by subcontracted USGS RSIL.

References

Böhlke, J.K., and Coplen, T.B., 1995, Interlaboratory comparison of secondary reference materials for nitrogen-isotope-ratio measurements, in Reference and intercomparison materials for stable isotopes of light elements: Vienna, Austria, International Atomic Energy Agency, IAEA-TECDOC-825, p. 51-66.

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Coplen, T. B., 1994. Reporting of Stable Hydrogen, Carbon, and Oxygen Isotopic Abundances, Pure and Applied Chemistry, v. 66, p. 273-276. http://media.iupac.org/publications/pac/1994/pdf/6602x0273.pdf

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Galanter, M., Sigman, D. M., Levy, H., Böhlke, J. K., Lipshultz, F., and Steig, E., 2000, Controls on the oxygen isotopic composition of atmospherically-derived nitrate (abstract): EOS, Transactions of the American Geophysical Union, v. 81, p. F191.

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Source Molecular

4967 SW 75th Avenue
Miami, FL 33143
Phone: (1) 786-220-0379
Fax: (1) 786-513-2733

Nitrogen Source Tracking

Determination of Nitrogen and Oxygen Isotopic Ratios of Nitrate by Isotope-Ratio Mass Spectrometry

Submitter: Geosyntec Consultants
Samples Received: 5/16/2018
Report Updated: 8/10/2018

SM #	Sample ID	$\delta^{18}O-NO_3$ Results ‰	$\delta^{15}N-NO_3$ Results ‰
SM-8E16001	GW-C-BK-05_180514	5.26	9.68
SM-8E16002	GW-E-02_180514	8.71	7.89
SM-8E16003	SW-05-D_180514	13.72	22.29
SM-8E16006	SW-04-u_180514	Low Nitrate	Low Nitrate
SM-8E16007	SW-04-D_180514	Low Nitrate	Low Nitrate
SM-8E16008	SW-03-D_180514	5.06	8.92
SM-8E16009	GW-A-03_180515	3.47	6.93
SM-8E16010	GW-A-02_180515	3.8	5.85
SM-8E16012	GW-A-04_180515	3.55	5.65
SM-8E16013	GW-A-01_180515	3.44	7.35
SM-8E16016	GW-F-02_180515	6.91	8.38
SM-8E16017	GW-C-07_180515	4.86	8.96
SM-8E16018	GW-C-08_180515	4.57	8.91

Rationale:

Nutrient source tracking is a method used to determine the sources of nutrient pollution in the environment. Knowing the source of the pollution is important for effective remediation. Nitrogen isotopes are effective tracers of nutrient source identification. Different sources of nutrients have distinctive isotope ratios and these serve as unique markers in order to trace them.

Method

Nitrate samples are analyzed by bacterial conversion of nitrate to nitrous oxide and subsequent measurement on a continuous flow isotope ratio mass spectrometer (Sigman and others, 2001; Casciotti and others, 2002; Coplen and others, 2004; Revesz and Casciotti, 2007).

Nitrogen Source Tracking

Determination of Nitrogen and Oxygen Isotopic Ratios of Nitrate by Isotope-Ratio Mass Spectrometry

Submitter: Geosyntec Consultants

Reporting of Nitrogen Isotope Ratios

Nitrogen isotope ratios are reported in parts per thousand (per mill) relative to N2 in air (Mariotti, 1983). The nitrogen isotopic compositions of nitrogen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples, are in accord with Böhlke and Coplen (1995) and Böhlke and others (2003):

N2 in air		0 (exactly)
IAEA-NO-3	KNO3	+4.72
USGS32	KNO3	+180 (exactly)
USGS34	KNO3	-1.8
USGS35	NaNO3	+2.7

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of nitrogen isotopic results is 0.5 per mill, unless otherwise indicated. This means that if the same sample were resubmitted for isotopic analysis, the newly measured value would lie within the uncertainty bounds 95 percent of the time. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Users should be aware that atmospheric nitrate is enriched in O-17 by mass-independent processes (Michalski and Thiemens, 2000; Galanter and others, 2000) and that this bacterial method for nitrate isotope measurements may overestimate the nitrogen isotope ratio of atmospheric nitrate samples by as much as 1 to 2 per mil (Sigman and others et al., 2001). For samples that users suspect may contain more than about 20 percent atmospheric nitrate, users should contact the Reston Stable Isotope Laboratory about methods to resolve this problem. Methods are currently being developed to quantify the mass-independent O-17/O-16 enrichment, and this independent oxygen isotope ratio may be of use in investigating processes forming nitrate.

Oxygen Isotope Ratios

Oxygen isotope ratios are reported in per mil relative to VSMOW reference water and normalized on a scale such that SLAP reference water is -55.5 per mil (Coplen, 1988; Coplen, 1994). The oxygen isotopic compositions of oxygen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples are:

VSMOW	water	0 (exactly)
SLAP	water	-55.5 (exactly)
IAEA-NO-3	KNO3	+25.6
USGS32	KNO3	+25.7
USGS34	KNO3	-27.9
USGS35	NaNO3	+57.5

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of oxygen isotopic results of nitrates is 1.0 per mil unless otherwise indicated. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Analyses were performed and described by subcontracted USGS RSIL.

References

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Source Molecular

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Nitrogen Source Tracking

Determination of Nitrogen and Oxygen Isotopic Ratios of Nitrate by Isotope-Ratio Mass Spectrometry

Submitter: Geosyntec Consultants
Samples Received: 5/19/2018
Report Updated: 8/10/2018

SM #	Sample ID	$\delta^{18}O-NO_3$ Results ‰	$\delta^{15}N-NO_3$ Results ‰
SM-8E19001	GW-B-03_180516	2.19	5.39
SM-8E19002	SW-01-D_180516	Low Nitrate	Low Nitrate
SM-8E19003	GW-B-04_180516	2.93	6.35
SM-8E19004	SW-03-u_180516	4.13	7.84
SM-8E19006	SW-02-u_180516	Low Nitrate	Low Nitrate
SM-8E19007	GW-A-07_180516	3.93	7.73
SM-8E19008	GW-C-BK-06_180517	13.05	22.68
SM-8E19009	GW-D-07_180517	-0.05	9.95
SM-8E19010	GW-G-01_180517	8.51	7.38
SM-8E19011	GW-D-04_180517	3.43	9.32
SM-8E19014	GW-D-05_180517	2.88	0.66
SM-8E19015	GW-E-03_180517	5.14	6.23
SM-8E19016	GW-G-02_180518	3.38	10.86

Rationale:

Nutrient source tracking is a method used to determine the sources of nutrient pollution in the environment. Knowing the source of the pollution is important for effective remediation. Nitrogen isotopes are effective tracers of nutrient source identification. Different sources of nutrients have distinctive isotope ratios and these serve as unique markers in order to trace them.

Method

Nitrate samples are analyzed by bacterial conversion of nitrate to nitrous oxide and subsequent measurement on a continuous flow isotope ratio mass spectrometer (Sigman and others, 2001; Casciotti and others, 2002; Coplen and others, 2004; Revesz and Casciotti, 2007).

Nitrogen Source Tracking

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For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of nitrogen isotopic results is 0.5 per mill, unless otherwise indicated. This means that if the same sample were resubmitted for isotopic analysis, the newly measured value would lie within the uncertainty bounds 95 percent of the time. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Users should be aware that atmospheric nitrate is enriched in O-17 by mass-independent processes (Michalski and Thiemens, 2000; Galanter and others, 2000) and that this bacterial method for nitrate isotope measurements may overestimate the nitrogen isotope ratio of atmospheric nitrate samples by as much as 1 to 2 per mil (Sigman and others et al., 2001). For samples that users suspect may contain more than about 20 percent atmospheric nitrate, users should contact the Reston Stable Isotope Laboratory about methods to resolve this problem. Methods are currently being developed to quantify the mass-independent O-17/O-16 enrichment, and this independent oxygen isotope ratio may be of use in investigating processes forming nitrate.

Oxygen Isotope Ratios

Oxygen isotope ratios are reported in per mil relative to VSMOW reference water and normalized on a scale such that SLAP reference water is -55.5 per mil (Coplen, 1988; Coplen, 1994). The oxygen isotopic compositions of oxygen-bearing internationally distributed isotopic reference materials, had they been analyzed in this laboratory with your samples are:

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USGS34	KNO3	-27.9
USGS35	NaNO3	+57.5

For samples with nitrate concentrations of at least 0.06 mg/kg as N, the 2-sigma uncertainty of oxygen isotopic results of nitrates is 1.0 per mil unless otherwise indicated. The uncertainty for nitrate samples with concentrations less than 0.06 mg/kg as N is twice that indicated above.

Analyses were performed and described by subcontracted USGS RSIL.

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WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 7H28063

Project: VCEHD OWTS Study (LA0391)

Attn: Jared Ervin

Client: Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Report Date: 11/10/2017

Received Date: 8/28/2017

Turnaround Time: Normal

Phones: (805) 979-9129

Fax: (805) 899-8689

P.O. #:

Billing Code:

DoD-ELAP #L2457 • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Jared Ervin,

Enclosed are the results of analyses for samples received 8/28/17 with the Chain-of-Custody document. The samples were received in good condition, at 3.1 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Brandon Gee
Operations Manager/Senior PM

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
GW-B-04-170823	Reese Wilson	7H28063-01	Water	08/23/17 12:45	
GW-C-01-170823	Reese Wilson	7H28063-02	Water	08/23/17 14:50	
GW-F-02-170823	Reese Wilson	7H28063-03	Water	08/23/17 15:50	
GW-A-07-170824	Reese Wilson	7H28063-04	Water	08/24/17 09:20	
GW-A-03-170824	Reese Wilson	7H28063-05	Water	08/24/17 10:25	
GW-A-02-170824	Reese Wilson	7H28063-06	Water	08/24/17 11:00	
GW-A-04-170824	Reese Wilson	7H28063-07	Water	08/24/17 11:40	
GW-C-BK-05-170825	Reese Wilson	7H28063-08	Water	08/25/17 10:20	
GW-C-BK-05-170825-EB	Reese Wilson	7H28063-09	Water	08/25/17 11:00	
SW-03-D-170825	Reese Wilson	7H28063-10	Water	08/25/17 15:00	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Sample Results

Sample: GW-B-04-170823
7H28063-01 (Water)

Sampled: 08/23/17 12:45 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/13/17 23:03	
Amoxicillin	ND	2.0	10	ng/l	1	10/13/17 23:03	
Atenolol	ND	0.20	1.0	ng/l	1	10/13/17 23:03	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/13/17 23:03	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 19:15	
Caffeine	**5.6**	0.31	1.0	ng/l	1	10/13/17 23:03	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/13/17 23:03	
Ciprofloxacin	**2.7**	1.4	5.0	ng/l	1	10/20/17 19:15	J
Cotinine	ND	0.59	2.0	ng/l	1	10/13/17 23:03	
DEET	**6.1**	0.060	1.0	ng/l	1	10/13/17 23:03	
Diazepam	ND	0.14	1.0	ng/l	1	10/13/17 23:03	
Fluoxetine	**0.17**	0.080	1.0	ng/l	1	10/13/17 23:03	J
Meprobamate	ND	0.36	1.0	ng/l	1	10/13/17 23:03	
Methadone	ND	0.040	1.0	ng/l	1	10/13/17 23:03	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 19:15	
Primidone	ND	0.60	1.0	ng/l	1	10/13/17 23:03	
Sucralose	**6.4**	5.0	5.0	ng/l	1	10/20/17 19:15	
Sulfamethoxazole	**2.9**	0.19	1.0	ng/l	1	10/13/17 23:03	
TCEP	**0.88**	0.34	1.0	ng/l	1	10/20/17 19:15	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 19:15	
TDCPP	**0.72**	0.47	1.0	ng/l	1	10/20/17 19:15	J
Trimethoprim	**0.35**	0.24	1.0	ng/l	1	10/13/17 23:03	J

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Sample Results

(Continued)

Sample: GW-C-01-170823
7H28063-02 (Water)

Sampled: 08/23/17 14:50 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/13/17 23:36	
Amoxicillin	ND	2.0	10	ng/l	1	10/13/17 23:36	
Atenolol	ND	0.20	1.0	ng/l	1	10/13/17 23:36	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/13/17 23:36	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 19:31	
Caffeine	**2.2**	0.31	1.0	ng/l	1	10/13/17 23:36	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/13/17 23:36	
Ciprofloxacin	**3.6**	1.4	5.0	ng/l	1	10/20/17 19:31	J
Cotinine	ND	0.59	2.0	ng/l	1	10/13/17 23:36	
DEET	**1.4**	0.060	1.0	ng/l	1	10/13/17 23:36	
Diazepam	ND	0.14	1.0	ng/l	1	10/13/17 23:36	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/13/17 23:36	
Meprobamate	ND	0.36	1.0	ng/l	1	10/13/17 23:36	
Methadone	ND	0.040	1.0	ng/l	1	10/13/17 23:36	
Phenytoin (Dilantin)	**0.49**	0.33	1.0	ng/l	1	10/20/17 19:31	J
Primidone	ND	0.60	1.0	ng/l	1	10/13/17 23:36	
Sucralose	ND	5.0	5.0	ng/l	1	10/20/17 19:31	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/13/17 23:36	
TCEP	ND	0.34	1.0	ng/l	1	10/20/17 19:31	
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 19:31	
TDCPP	ND	0.47	1.0	ng/l	1	10/20/17 19:31	
Trimethoprim	**0.26**	0.24	1.0	ng/l	1	10/13/17 23:36	J

Sample Results

(Continued)

Sample: GW-F-02-170823
7H28063-03 (Water)

Sampled: 08/23/17 15:50 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/13/17 23:52	
Amoxicillin	ND	2.0	10	ng/l	1	10/13/17 23:52	
Atenolol	ND	0.20	1.0	ng/l	1	10/13/17 23:52	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/13/17 23:52	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 19:48	
Caffeine	**59**	0.31	1.0	ng/l	1	10/13/17 23:52	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/13/17 23:52	
Ciprofloxacin	**2.2**	1.4	5.0	ng/l	1	10/20/17 19:48	J
Cotinine	ND	0.59	2.0	ng/l	1	10/13/17 23:52	
DEET	**2.1**	0.060	1.0	ng/l	1	10/13/17 23:52	
Diazepam	ND	0.14	1.0	ng/l	1	10/13/17 23:52	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/13/17 23:52	
Meprobamate	ND	0.36	1.0	ng/l	1	10/13/17 23:52	
Methadone	ND	0.040	1.0	ng/l	1	10/13/17 23:52	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 19:48	
Primidone	ND	0.60	1.0	ng/l	1	10/13/17 23:52	
Sucralose	**32**	5.0	5.0	ng/l	1	10/20/17 19:48	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/13/17 23:52	
TCEP	**3.2**	0.34	1.0	ng/l	1	10/20/17 19:48	
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 19:48	
TDCPP	**8.0**	0.47	1.0	ng/l	1	10/20/17 19:48	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/13/17 23:52	

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924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Sample Results

(Continued)

Sample: GW-A-07-170824
7H28063-04 (Water)

Sampled: 08/24/17 9:20 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 00:25	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 00:25	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 00:25	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 00:25	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 20:04	
Caffeine	**1.6**	0.31	1.0	ng/l	1	10/14/17 00:25	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 00:25	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	10/20/17 20:04	
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 00:25	
DEET	**2.3**	0.060	1.0	ng/l	1	10/14/17 00:25	
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 00:25	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 00:25	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 00:25	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 00:25	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 20:04	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 00:25	
Sucralose	ND	5.0	5.0	ng/l	1	10/20/17 20:04	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 00:25	
TCEP	**0.52**	0.34	1.0	ng/l	1	10/20/17 20:04	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 20:04	
TDCPP	ND	0.47	1.0	ng/l	1	10/20/17 20:04	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 00:25	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 11/10/2017 12:18

Sample Results

(Continued)

Sample: GW-A-03-170824
7H28063-05 (Water)

Sampled: 08/24/17 10:25 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 00:42	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 00:42	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 00:42	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 00:42	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 20:21	
Caffeine	**1.2**	0.31	1.0	ng/l	1	10/14/17 00:42	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 00:42	
Ciprofloxacin	**1.6**	1.4	5.0	ng/l	1	10/20/17 20:21	J
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 00:42	
DEET	**0.70**	0.060	1.0	ng/l	1	10/14/17 00:42	J
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 00:42	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 00:42	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 00:42	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 00:42	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 20:21	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 00:42	
Sucralose	ND	5.0	5.0	ng/l	1	10/20/17 20:21	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 00:42	
TCEP	**0.36**	0.34	1.0	ng/l	1	10/20/17 20:21	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 20:21	
TDCPP	ND	0.47	1.0	ng/l	1	10/20/17 20:21	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 00:42	

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Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Sample Results

(Continued)

Sample: GW-A-02-170824
7H28063-06 (Water)

Sampled: 08/24/17 11:00 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 01:15	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 01:15	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 01:15	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 01:15	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 20:37	
Caffeine	**2.5**	0.31	1.0	ng/l	1	10/14/17 01:15	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 01:15	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	10/20/17 20:37	
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 01:15	
DEET	**0.96**	0.060	1.0	ng/l	1	10/14/17 01:15	J
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 01:15	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 01:15	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 01:15	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 01:15	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 20:37	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 01:15	
Sucralose	**5.3**	5.0	5.0	ng/l	1	10/20/17 20:37	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 01:15	
TCEP	**0.38**	0.34	1.0	ng/l	1	10/20/17 20:37	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 20:37	
TDCPP	**0.60**	0.47	1.0	ng/l	1	10/20/17 20:37	J
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 01:15	

Sample Results

(Continued)

Sample: GW-A-04-170824
7H28063-07 (Water)

Sampled: 08/24/17 11:40 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 01:31	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 01:31	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 01:31	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 01:31	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 20:54	
Caffeine	**1.2**	0.31	1.0	ng/l	1	10/14/17 01:31	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 01:31	
Ciprofloxacin	**1.7**	1.4	5.0	ng/l	1	10/20/17 20:54	J
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 01:31	
DEET	**3.4**	0.060	1.0	ng/l	1	10/14/17 01:31	
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 01:31	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 01:31	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 01:31	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 01:31	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 20:54	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 01:31	
Sucralose	**8.1**	5.0	5.0	ng/l	1	10/20/17 20:54	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 01:31	
TCEP	**0.35**	0.34	1.0	ng/l	1	10/20/17 20:54	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 20:54	
TDCPP	**0.47**	0.47	1.0	ng/l	1	10/20/17 20:54	J
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 01:31	

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Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

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11/10/2017 12:18

Sample Results

(Continued)

Sample: GW-C-BK-05-170825
7H28063-08 (Water)

Sampled: 08/25/17 10:20 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 02:04	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 02:04	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 02:04	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 02:04	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 21:10	
Caffeine	**2.5**	0.31	1.0	ng/l	1	10/14/17 02:04	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 02:04	
Ciprofloxacin	**1.7**	1.4	5.0	ng/l	1	10/20/17 21:10	J
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 02:04	
DEET	**1.8**	0.060	1.0	ng/l	1	10/14/17 02:04	
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 02:04	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 02:04	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 02:04	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 02:04	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 21:10	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 02:04	
Sucralose	ND	5.0	5.0	ng/l	1	10/20/17 21:10	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 02:04	
TCEP	**0.46**	0.34	1.0	ng/l	1	10/20/17 21:10	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 21:10	
TDCPP	**2.7**	0.47	1.0	ng/l	1	10/20/17 21:10	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 02:04	

Sample Results

(Continued)

Sample: GW-C-BK-05-170825-EB
7H28063-09 (Water)

Sampled: 08/25/17 11:00 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 02:21	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 02:21	
Atenolol	**4.2**	0.20	1.0	ng/l	1	10/14/17 02:21	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 02:21	
Azithromycin	ND	2.2	10	ng/l	1	10/20/17 21:27	
Caffeine	**2.0**	0.31	1.0	ng/l	1	10/14/17 02:21	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 02:21	
Ciprofloxacin	**3.5**	1.4	5.0	ng/l	1	10/20/17 21:27	J
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 02:21	
DEET	**0.94**	0.060	1.0	ng/l	1	10/14/17 02:21	J
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 02:21	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 02:21	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 02:21	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 02:21	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 21:27	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 02:21	
Sucralose	ND	5.0	5.0	ng/l	1	10/20/17 21:27	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 02:21	
TCEP	**0.75**	0.34	1.0	ng/l	1	10/20/17 21:27	J
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 21:27	
TDCPP	**1.2**	0.47	1.0	ng/l	1	10/20/17 21:27	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 02:21	

Geosyntec Consultants - Santa Barbara
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Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Sample Results

(Continued)

Sample: SW-03-D-170825
7H28063-10 (Water)

Sampled: 08/25/17 15:00 by Reese Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1075 **Prepared:** 09/20/17 07:45 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 03:27	
Amoxicillin	**2.2**	2.0	10	ng/l	1	10/14/17 03:27	J
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 03:27	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/14/17 03:27	
Azithromycin	**5.8**	2.2	10	ng/l	1	10/20/17 22:33	J
Caffeine	**2.6**	0.31	1.0	ng/l	1	10/14/17 03:27	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 03:27	
Ciprofloxacin	**11**	1.4	5.0	ng/l	1	10/20/17 22:33	B
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 03:27	
DEET	**1.4**	0.060	1.0	ng/l	1	10/14/17 03:27	
Diazepam	**0.16**	0.14	1.0	ng/l	1	10/14/17 03:27	J
Fluoxetine	**0.57**	0.080	1.0	ng/l	1	10/14/17 03:27	J
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 03:27	
Methadone	**0.62**	0.040	1.0	ng/l	1	10/14/17 03:27	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/20/17 22:33	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 03:27	
Sucralose	ND	5.0	5.0	ng/l	1	10/20/17 22:33	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 03:27	
TCEP	ND	0.34	1.0	ng/l	1	10/20/17 22:33	
TCPP	ND	0.27	1.0	ng/l	1	10/20/17 22:33	
TDCPP	ND	0.47	1.0	ng/l	1	10/20/17 22:33	
Trimethoprim	**1.6**	0.24	1.0	ng/l	1	10/14/17 03:27	

Quality Control Results

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7J1075 - EPA 1694M-ESI+											
Blank (W7J1075-BLK1)					**Prepared: 09/20/17 Analyzed: 10/13/17**						
Acetaminophen	ND	1.4	20	ng/l							
Atenolol	ND	0.20	1.0	ng/l							
Caffeine	0.952	0.31	1.0	ng/l							J
Carbamazepine	ND	0.080	1.0	ng/l							
Cotinine	ND	0.59	2.0	ng/l							
Primidone	ND	0.60	1.0	ng/l							
Blank (W7J1075-BLK2)					**Prepared: 09/20/17 Analyzed: 10/20/17**						
Azithromycin	ND	2.2	10	ng/l							QC-2
LCS (W7J1075-BS1)					**Prepared: 09/20/17 Analyzed: 10/13/17**						
Acetaminophen	228	1.4	20	ng/l	200		114	66-156			
Amoxicillin	111	2.0	10	ng/l	100		111	14-167			
Atenolol	11.3	0.20	1.0	ng/l	10.0		113	56-164			
Atorvastatin	6.77	0.11	1.0	ng/l	10.0		68	0.1-173			
Caffeine	12.7	0.31	1.0	ng/l	10.0		127	55-152			
Carbamazepine	12.7	0.080	1.0	ng/l	10.0		127	60-135			
Cotinine	12.1	0.59	2.0	ng/l	10.0		121	68-155			
DEET	12.5	0.060	1.0	ng/l	10.0		125	45-135			
Diazepam	11.5	0.14	1.0	ng/l	10.0		115	58-127			
Fluoxetine	12.3	0.080	1.0	ng/l	10.0		123	55-150			
Meprobamate	20.5	0.36	1.0	ng/l	10.0		205	11-166			BS-H
Methadone	12.5	0.040	1.0	ng/l	10.0		125	62-137			
Primidone	11.4	0.60	1.0	ng/l	10.0		114	54-147			
Sulfamethoxazole	12.8	0.19	1.0	ng/l	10.0		128	60-133			
Trimethoprim	10.3	0.24	1.0	ng/l	10.0		103	67-139			
LCS (W7J1075-BS2)					**Prepared: 09/20/17 Analyzed: 10/20/17**						
Azithromycin	116	2.2	10	ng/l	100		116	52-166			QC-2
Ciprofloxacin	54.3	1.4	5.0	ng/l	50.0		109	51-168			QC-2
Phenytoin (Dilantin)	13.0	0.33	1.0	ng/l	10.0		130	69-138			QC-2
TCEP	7.92	0.34	1.0	ng/l	10.0		79	25-149			QC-2
TCPP	3.02	0.27	1.0	ng/l	10.0		30	24-149			QC-2
TDCPP	8.80	0.47	1.0	ng/l	10.0		88	20-158			QC-2
LCS Dup (W7J1075-BSD1)					**Prepared: 09/20/17 Analyzed: 10/13/17**						
Acetaminophen	236	1.4	20	ng/l	200		118	66-156	3	30	
Amoxicillin	120	2.0	10	ng/l	100		120	14-167	8	30	
Atenolol	10.7	0.20	1.0	ng/l	10.0		107	56-164	5	30	
Atorvastatin	73.7	0.11	1.0	ng/l	10.0		737	0.1-173	166	30	BS-04
Caffeine	13.1	0.31	1.0	ng/l	10.0		131	55-152	3	30	

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7J1075 - EPA 1694M-ESI+ (Continued)											
LCS Dup (W7J1075-BSD1)					**Prepared: 09/20/17 Analyzed: 10/13/17**						
Carbamazepine	12.1	0.080	1.0	ng/l	10.0		121	60-135	5	30	
Cotinine	11.0	0.59	2.0	ng/l	10.0		110	68-155	10	30	
DEET	19.9	0.060	1.0	ng/l	10.0		199	45-135	46	30	BS-04
Diazepam	11.0	0.14	1.0	ng/l	10.0		110	58-127	4	30	
Fluoxetine	9.87	0.080	1.0	ng/l	10.0		99	55-150	22	30	
Meprobamate	21.4	0.36	1.0	ng/l	10.0		214	11-166	4	30	BS-H
Methadone	11.3	0.040	1.0	ng/l	10.0		113	62-137	10	30	
Primidone	14.3	0.60	1.0	ng/l	10.0		143	54-147	23	30	
Sulfamethoxazole	11.2	0.19	1.0	ng/l	10.0		112	60-133	13	30	
Trimethoprim	11.1	0.24	1.0	ng/l	10.0		111	67-139	7	30	
LCS Dup (W7J1075-BSD2)					**Prepared: 09/20/17 Analyzed: 10/20/17**						
Azithromycin	115	2.2	10	ng/l	100		115	52-166	0.9	30	QC-2
Ciprofloxacin	60.1	1.4	5.0	ng/l	50.0		120	51-168	10	30	QC-2
Phenytoin (Dilantin)	9.81	0.33	1.0	ng/l	10.0		98	69-138	28	30	QC-2
TCEP	6.53	0.34	1.0	ng/l	10.0		65	25-149	19	30	QC-2
TCPP	2.97	0.27	1.0	ng/l	10.0		30	24-149	2	30	QC-2
TDCPP	10.2	0.47	1.0	ng/l	10.0		102	20-158	15	30	QC-2

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/10/2017 12:18

Notes and Definitions

Item	Definition
B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
BS-04	The recovery of this analyte in LCS or LCSD was outside control limit. Sample was accepted based on the remaining LCS, LCSD or LCS-LL.
BS-H	The recovery of this analyte in the BS/LCS was over the control limit. Sample result is suspect.
J	Estimated conc. detected <MRL and >MDL.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964
14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD 7H28063

Page 1 Of 1

CLIENT NAME: Geosyntec
PROJECT: VCEHD OWTS Study (LA0391)

ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101

PHONE: Jared Ervin: 805-979-9129
FAX:
EMAIL: Jervin@Geosyntec.com

PROJECT MANAGER: Jared Ervin
SAMPLER: Reese Wilson

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☐ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	ANALYSES REQUESTED: PPCPs by EPA 1694-ESI+
	8/23/17	1245	AQ	GW-B-04_170823	2	X
	↓	14:50	AQ	GW-C-01_170823	2	X
		15:50	AQ	GW-F-02_170823	2	X
	8/24/17	09:20	AQ	GW-A-07_170824	2	X
	↓	10:25	AQ	GW-A-03_170824	2	X
		11:00	AQ	GW-A-02_170824	2	X
		11:40	AQ	GW-A-04_170824	2	X
	8/25/17	10:20	AQ	GW-C-BK-05_170825	2	X
	↓	11:00	AQ	GW-C-BK05_170825-EB	2	X
		1500	AQ	GW-03-D_170825	2	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
REESE WILSON GSC	8.25.17 17:15	REBECCA LUSTIG ~~[illegible]~~ EHD
REBECCA LUSTIG EHD	82817 11:30	Sanchez 8-28-17 11:30
Sanchez	8-28-17 13:22	8/28/17 1322

SAMPLE CONDITION:
Actual Temperature: 3.1°C
Received On Ice [✓ Y] / N
Preserved Y / [✓ N]
Evidence Seals Present Y / [✓ N]
Container Attacked Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY
OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042707

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	7I22107
Project:	VCEHD OWTS Study (LA0391)
Attn:	Jared Ervin
Client:	Geosyntec Consultants - Santa Barbara 924 Anacapa Street, Ste 4A Santa Barbara, CA 93101

Report Date:	11/29/2017
Received Date:	9/22/2017
Turnaround Time:	Normal
Phones:	(805) 979-9129
Fax:	(805) 899-8689
P.O. #:	
Billing Code:	

DoD-ELAP #L2457 • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Jared Ervin,

Enclosed are the results of analyses for samples received 9/22/17 with the Chain-of-Custody document. The samples were received in good condition, at 3.2 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Brandon Gee
Operations Manager/Senior PM

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
GW-D-04_170918	R. Lustig/ R. Wilson	7I22107-01	Water	09/18/17 10:18	
GW-D-05_170918	R. Lustig/ R. Wilson	7I22107-02	Water	09/18/17 11:50	
GW-A-01_170918	R. Lustig/ R. Wilson	7I22107-03	Water	09/18/17 14:25	
GW-C-BK-06_170919	R. Lustig/ R. Wilson	7I22107-04	Water	09/19/17 10:00	
GW-D-07_170919	R. Lustig/ R. Wilson	7I22107-05	Water	09/19/17 10:49	
SW-03-V-_170919	R. Lustig/ R. Wilson	7I22107-06	Water	09/19/17 12:30	
GW-C-07-_170919	R. Lustig/ R. Wilson	7I22107-07	Water	09/19/17 13:20	
GW-C-08-_170919	R. Lustig/ R. Wilson	7I22107-08	Water	09/19/17 13:45	
GW-C-04-_170919	R. Lustig/ R. Wilson	7I22107-09	Water	09/19/17 14:10	
GW-B-03-_170920	R. Lustig/ R. Wilson	7I22107-10	Water	09/20/17 09:00	
GW-G-02_170920	R. Lustig/ R. Wilson	7I22107-11	Water	09/20/17 10:05	
SW-03-D_170920-EB	R. Lustig/ R. Wilson	7I22107-12	Water	09/20/17 11:20	
GW-G-02_170920-EB	R. Lustig/ R. Wilson	7I22107-13	Water	09/20/17 14:12	
GW-B-05_170921	Client	7I22107-14	Water	09/21/17 08:30	
GW-G-01_170921	R. Lustig/ R. Wilson	7I22107-15	Water	09/21/17 10:17	
GW-E-03_170921	R. Lustig/ R. Wilson	7I22107-16	Water	09/21/17 13:45	
GW-E-03_170921-DUP	R. Lustig/ R. Wilson	7I22107-17	Water	09/21/17 13:45	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/29/2017 12:44

Sample Results

Sample: GW-D-04_170918
7I22107-01 (Water)

Sampled: 09/18/17 10:18 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1076 **Prepared:** 09/25/17 09:53 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 13:03	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 13:03	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 13:03	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/21/17 05:58	
Azithromycin	ND	2.2	10	ng/l	1	10/21/17 05:58	
Caffeine	**0.76**	0.31	1.0	ng/l	1	10/14/17 13:03	J
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 13:03	
Ciprofloxacin	**2.2**	1.4	5.0	ng/l	1	10/21/17 05:58	J
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 13:03	
DEET	**0.41**	0.060	1.0	ng/l	1	10/14/17 13:03	J
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 13:03	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 13:03	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 13:03	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 13:03	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/21/17 05:58	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 13:03	
Sucralose	ND	5.0	5.0	ng/l	1	10/21/17 05:58	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 13:03	
TCEP	ND	0.34	1.0	ng/l	1	10/21/17 05:58	
TCPP	ND	0.27	1.0	ng/l	1	10/21/17 05:58	
TDCPP	**0.82**	0.47	1.0	ng/l	1	10/21/17 05:58	J
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 13:03	

Sample Results

(Continued)

Sample: GW-D-05_170918
7I22107-02 (Water)

Sampled: 09/18/17 11:50 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1076 **Prepared:** 09/25/17 09:53 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 14:09	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 14:09	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 14:09	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/21/17 07:04	
Azithromycin	ND	2.2	10	ng/l	1	10/21/17 07:04	
Caffeine	**4.7**	0.31	1.0	ng/l	1	10/14/17 14:09	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 14:09	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	10/21/17 07:04	
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 14:09	
DEET	**1.1**	0.060	1.0	ng/l	1	10/14/17 14:09	B
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 14:09	
Fluoxetine	**0.91**	0.080	1.0	ng/l	1	10/14/17 14:09	J
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 14:09	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 14:09	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/21/17 07:04	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 14:09	
Sucralose	ND	5.0	5.0	ng/l	1	10/21/17 07:04	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 14:09	
TCEP	ND	0.34	1.0	ng/l	1	10/21/17 07:04	
TCPP	ND	0.27	1.0	ng/l	1	10/21/17 07:04	
TDCPP	**3.4**	0.47	1.0	ng/l	1	10/21/17 07:04	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 14:09	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/29/2017 12:44

Sample Results

(Continued)

Sample: GW-A-01_170918 Sampled: 09/18/17 14:25 by R. Lustig/ R. Wilson

7I22107-03 (Water)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1076 **Prepared:** 09/25/17 09:53 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 14:26	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 14:26	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 14:26	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/21/17 07:20	
Azithromycin	ND	2.2	10	ng/l	1	10/21/17 07:20	
Caffeine	**0.77**	0.31	1.0	ng/l	1	10/14/17 14:26	J
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 14:26	
Ciprofloxacin	**3.4**	1.4	5.0	ng/l	1	10/21/17 07:20	J
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 14:26	
DEET	**1.2**	0.060	1.0	ng/l	1	10/14/17 14:26	B
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 14:26	
Fluoxetine	**0.26**	0.080	1.0	ng/l	1	10/14/17 14:26	J
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 14:26	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 14:26	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/21/17 07:20	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 14:26	
Sucralose	ND	5.0	5.0	ng/l	1	10/21/17 07:20	
Sulfamethoxazole	**0.53**	0.19	1.0	ng/l	1	10/14/17 14:26	J
TCEP	ND	0.34	1.0	ng/l	1	10/21/17 07:20	
TCPP	ND	0.27	1.0	ng/l	1	10/21/17 07:20	
TDCPP	ND	0.47	1.0	ng/l	1	10/21/17 07:20	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 14:26	

Sample Results

(Continued)

Sample: GW-C-BK-06_170919
7I22107-04 (Water)

Sampled: 09/19/17 10:00 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1076 **Prepared:** 09/25/17 09:53 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 14:59	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 14:59	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 14:59	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/21/17 07:37	
Azithromycin	ND	2.2	10	ng/l	1	10/21/17 07:37	
Caffeine	**1.2**	0.31	1.0	ng/l	1	10/14/17 14:59	
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 14:59	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	10/21/17 07:37	
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 14:59	
DEET	**1.1**	0.060	1.0	ng/l	1	10/14/17 14:59	B
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 14:59	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 14:59	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 14:59	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 14:59	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/21/17 07:37	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 14:59	
Sucralose	ND	5.0	5.0	ng/l	1	10/21/17 07:37	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 14:59	
TCEP	ND	0.34	1.0	ng/l	1	10/21/17 07:37	
TCPP	ND	0.27	1.0	ng/l	1	10/21/17 07:37	
TDCPP	ND	0.47	1.0	ng/l	1	10/21/17 07:37	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 14:59	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/29/2017 12:44

Sample Results

(Continued)

Sample: GW-D-07_170919
7I22107-05 (Water)

Sampled: 09/19/17 10:49 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J1076 **Prepared:** 09/25/17 09:53 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	10/14/17 15:15	
Amoxicillin	ND	2.0	10	ng/l	1	10/14/17 15:15	
Atenolol	ND	0.20	1.0	ng/l	1	10/14/17 15:15	
Atorvastatin	ND	0.11	1.0	ng/l	1	10/21/17 07:53	
Azithromycin	ND	2.2	10	ng/l	1	10/21/17 07:53	
Caffeine	**0.94**	0.31	1.0	ng/l	1	10/14/17 15:15	J
Carbamazepine	ND	0.080	1.0	ng/l	1	10/14/17 15:15	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	10/21/17 07:53	
Cotinine	ND	0.59	2.0	ng/l	1	10/14/17 15:15	
DEET	**0.83**	0.060	1.0	ng/l	1	10/14/17 15:15	J
Diazepam	ND	0.14	1.0	ng/l	1	10/14/17 15:15	
Fluoxetine	ND	0.080	1.0	ng/l	1	10/14/17 15:15	
Meprobamate	ND	0.36	1.0	ng/l	1	10/14/17 15:15	
Methadone	ND	0.040	1.0	ng/l	1	10/14/17 15:15	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	10/21/17 07:53	
Primidone	ND	0.60	1.0	ng/l	1	10/14/17 15:15	
Sucralose	ND	5.0	5.0	ng/l	1	10/21/17 07:53	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	10/14/17 15:15	
TCEP	ND	0.34	1.0	ng/l	1	10/21/17 07:53	
TCPP	ND	0.27	1.0	ng/l	1	10/21/17 07:53	
TDCPP	ND	0.47	1.0	ng/l	1	10/21/17 07:53	
Trimethoprim	ND	0.24	1.0	ng/l	1	10/14/17 15:15	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 11/29/2017 12:44

Sample Results

(Continued)

Sample: SW-03-V-_170919
7I22107-06 (Water)

Sampled: 09/19/17 12:30 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/17/17 22:37	
Amoxicillin	ND	2.0	10	ng/l	1	11/17/17 22:37	
Atenolol	ND	0.20	1.0	ng/l	1	11/17/17 22:37	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/17/17 22:37	
Azithromycin	ND	2.2	10	ng/l	1	11/17/17 22:37	
Caffeine	**5.6**	0.31	1.0	ng/l	1	11/17/17 22:37	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/17/17 22:37	
Ciprofloxacin	**8.0**	1.4	5.0	ng/l	1	11/17/17 22:37	B
Cotinine	ND	0.59	2.0	ng/l	1	11/17/17 22:37	
DEET	**0.67**	0.060	1.0	ng/l	1	11/17/17 22:37	J
Diazepam	**0.14**	0.14	1.0	ng/l	1	11/17/17 22:37	J
Fluoxetine	ND	0.080	1.0	ng/l	1	11/17/17 22:37	
Meprobamate	ND	0.36	1.0	ng/l	1	11/17/17 22:37	
Methadone	ND	0.040	1.0	ng/l	1	11/17/17 22:37	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/17/17 22:37	
Primidone	ND	0.60	1.0	ng/l	1	11/17/17 22:37	
Sucralose	ND	5.0	5.0	ng/l	1	11/17/17 22:37	
Sulfamethoxazole	**0.87**	0.19	1.0	ng/l	1	11/17/17 22:37	J
TCEP	ND	0.34	1.0	ng/l	1	11/17/17 22:37	
TCPP	**3.0**	0.27	1.0	ng/l	1	11/17/17 22:37	B
TDCPP	**0.80**	0.47	1.0	ng/l	1	11/17/17 22:37	J
Trimethoprim	ND	0.24	1.0	ng/l	1	11/17/17 22:37	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 11/29/2017 12:44

Sample Results

(Continued)

Sample: GW-C-07-_170919
7I22107-07 (Water)

Sampled: 09/19/17 13:20 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/17/17 22:54	
Amoxicillin	ND	2.0	10	ng/l	1	11/17/17 22:54	
Atenolol	ND	0.20	1.0	ng/l	1	11/17/17 22:54	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/17/17 22:54	
Azithromycin	ND	2.2	10	ng/l	1	11/17/17 22:54	
Caffeine	**0.73**	0.31	1.0	ng/l	1	11/17/17 22:54	J
Carbamazepine	ND	0.080	1.0	ng/l	1	11/17/17 22:54	
Ciprofloxacin	**2.9**	1.4	5.0	ng/l	1	11/17/17 22:54	J
Cotinine	ND	0.59	2.0	ng/l	1	11/17/17 22:54	
DEET	**0.98**	0.060	1.0	ng/l	1	11/17/17 22:54	J
Diazepam	ND	0.14	1.0	ng/l	1	11/17/17 22:54	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/17/17 22:54	
Meprobamate	ND	0.36	1.0	ng/l	1	11/17/17 22:54	
Methadone	ND	0.040	1.0	ng/l	1	11/17/17 22:54	
Phenytoin (Dilantin)	**0.34**	0.33	1.0	ng/l	1	11/17/17 22:54	J
Primidone	ND	0.60	1.0	ng/l	1	11/17/17 22:54	
Sucralose	ND	5.0	5.0	ng/l	1	11/17/17 22:54	
Sulfamethoxazole	**0.45**	0.19	1.0	ng/l	1	11/17/17 22:54	J
TCEP	ND	0.34	1.0	ng/l	1	11/17/17 22:54	
TCPP	**2.4**	0.27	1.0	ng/l	1	11/17/17 22:54	B
TDCPP	**0.92**	0.47	1.0	ng/l	1	11/17/17 22:54	J
Trimethoprim	ND	0.24	1.0	ng/l	1	11/17/17 22:54	

Sample Results

(Continued)

Sample: GW-C-08-_170919
7I22107-08 (Water)

Sampled: 09/19/17 13:45 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/17/17 23:10	
Amoxicillin	ND	2.0	10	ng/l	1	11/17/17 23:10	
Atenolol	ND	0.20	1.0	ng/l	1	11/17/17 23:10	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/17/17 23:10	
Azithromycin	ND	2.2	10	ng/l	1	11/17/17 23:10	
Caffeine	**3.4**	0.31	1.0	ng/l	1	11/17/17 23:10	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/17/17 23:10	
Ciprofloxacin	**10**	1.4	5.0	ng/l	1	11/17/17 23:10	B
Cotinine	ND	0.59	2.0	ng/l	1	11/17/17 23:10	
DEET	**0.50**	0.060	1.0	ng/l	1	11/17/17 23:10	J
Diazepam	ND	0.14	1.0	ng/l	1	11/17/17 23:10	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/17/17 23:10	
Meprobamate	ND	0.36	1.0	ng/l	1	11/17/17 23:10	
Methadone	ND	0.040	1.0	ng/l	1	11/17/17 23:10	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/17/17 23:10	
Primidone	ND	0.60	1.0	ng/l	1	11/17/17 23:10	
Sucralose	ND	5.0	5.0	ng/l	1	11/17/17 23:10	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/17/17 23:10	
TCEP	ND	0.34	1.0	ng/l	1	11/17/17 23:10	
TCPP	ND	0.27	1.0	ng/l	1	11/17/17 23:10	
TDCPP	**0.86**	0.47	1.0	ng/l	1	11/17/17 23:10	J
Trimethoprim	ND	0.24	1.0	ng/l	1	11/17/17 23:10	

Sample Results

(Continued)

Sample: GW-C-04-_170919 Sampled: 09/19/17 14:10 by R. Lustig/ R. Wilson

7I22107-09 (Water)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/17/17 23:27	
Amoxicillin	ND	2.0	10	ng/l	1	11/17/17 23:27	
Atenolol	ND	0.20	1.0	ng/l	1	11/17/17 23:27	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/17/17 23:27	
Azithromycin	**6.1**	2.2	10	ng/l	1	11/17/17 23:27	J
Caffeine	**1.6**	0.31	1.0	ng/l	1	11/17/17 23:27	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/17/17 23:27	
Ciprofloxacin	**16**	1.4	5.0	ng/l	1	11/17/17 23:27	B
Cotinine	ND	0.59	2.0	ng/l	1	11/17/17 23:27	
DEET	**0.88**	0.060	1.0	ng/l	1	11/17/17 23:27	J
Diazepam	ND	0.14	1.0	ng/l	1	11/17/17 23:27	
Fluoxetine	**0.70**	0.080	1.0	ng/l	1	11/17/17 23:27	J
Meprobamate	ND	0.36	1.0	ng/l	1	11/17/17 23:27	
Methadone	ND	0.040	1.0	ng/l	1	11/17/17 23:27	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/17/17 23:27	
Primidone	ND	0.60	1.0	ng/l	1	11/17/17 23:27	
Sucralose	**18**	5.0	5.0	ng/l	1	11/17/17 23:27	
Sulfamethoxazole	**1.8**	0.19	1.0	ng/l	1	11/17/17 23:27	
TCEP	ND	0.34	1.0	ng/l	1	11/17/17 23:27	
TCPP	ND	0.27	1.0	ng/l	1	11/17/17 23:27	
TDCPP	**1.0**	0.47	1.0	ng/l	1	11/17/17 23:27	B
Trimethoprim	**0.35**	0.24	1.0	ng/l	1	11/17/17 23:27	J

Sample Results

(Continued)

Sample: GW-B-03-_170920
7I22107-10 (Water)

Sampled: 09/20/17 9:00 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/17/17 23:43	
Amoxicillin	ND	2.0	10	ng/l	1	11/17/17 23:43	
Atenolol	ND	0.20	1.0	ng/l	1	11/17/17 23:43	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/17/17 23:43	
Azithromycin	**4.5**	2.2	10	ng/l	1	11/17/17 23:43	J
Caffeine	**1.1**	0.31	1.0	ng/l	1	11/17/17 23:43	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/17/17 23:43	
Ciprofloxacin	**16**	1.4	5.0	ng/l	1	11/17/17 23:43	B
Cotinine	ND	0.59	2.0	ng/l	1	11/17/17 23:43	
DEET	**1.2**	0.060	1.0	ng/l	1	11/17/17 23:43	
Diazepam	**0.28**	0.14	1.0	ng/l	1	11/17/17 23:43	J
Fluoxetine	**0.97**	0.080	1.0	ng/l	1	11/17/17 23:43	J
Meprobamate	ND	0.36	1.0	ng/l	1	11/17/17 23:43	
Methadone	**0.51**	0.040	1.0	ng/l	1	11/17/17 23:43	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/17/17 23:43	
Primidone	ND	0.60	1.0	ng/l	1	11/17/17 23:43	
Sucralose	ND	5.0	5.0	ng/l	1	11/17/17 23:43	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/17/17 23:43	
TCEP	ND	0.34	1.0	ng/l	1	11/17/17 23:43	
TCPP	**1.3**	0.27	1.0	ng/l	1	11/17/17 23:43	B
TDCPP	**0.77**	0.47	1.0	ng/l	1	11/17/17 23:43	J
Trimethoprim	ND	0.24	1.0	ng/l	1	11/17/17 23:43	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 11/29/2017 12:44

Sample Results

(Continued)

Sample: GW-G-02_170920
7I22107-11 (Water)

Sampled: 09/20/17 10:05 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 00:00	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 00:00	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 00:00	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 00:00	
Azithromycin	ND	2.2	10	ng/l	1	11/18/17 00:00	
Caffeine	**0.81**	0.31	1.0	ng/l	1	11/18/17 00:00	J
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 00:00	
Ciprofloxacin	**6.0**	1.4	5.0	ng/l	1	11/18/17 00:00	B
Cotinine	ND	0.59	2.0	ng/l	1	11/18/17 00:00	
DEET	**0.50**	0.060	1.0	ng/l	1	11/18/17 00:00	J
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 00:00	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/18/17 00:00	
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 00:00	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 00:00	
Phenytoin (Dilantin)	**2.3**	0.33	1.0	ng/l	1	11/18/17 00:00	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 00:00	
Sucralose	**23**	5.0	5.0	ng/l	1	11/18/17 00:00	
Sulfamethoxazole	**6.3**	0.19	1.0	ng/l	1	11/18/17 00:00	
TCEP	ND	0.34	1.0	ng/l	1	11/18/17 00:00	
TCPP	**0.73**	0.27	1.0	ng/l	1	11/18/17 00:00	J
TDCPP	**0.92**	0.47	1.0	ng/l	1	11/18/17 00:00	J
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 00:00	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 11/29/2017 12:44

Sample Results

(Continued)

Sample: SW-03-D_170920-EB
7I22107-12 (Water)

Sampled: 09/20/17 11:20 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 00:49	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 00:49	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 00:49	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 00:49	
Azithromycin	ND	2.2	10	ng/l	1	11/18/17 00:49	
Caffeine	**39**	0.31	1.0	ng/l	1	11/18/17 00:49	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 00:49	
Ciprofloxacin	**2.8**	1.4	5.0	ng/l	1	11/18/17 00:49	J
Cotinine	ND	0.59	2.0	ng/l	1	11/18/17 00:49	
DEET	**0.75**	0.060	1.0	ng/l	1	11/18/17 00:49	J
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 00:49	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/18/17 00:49	
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 00:49	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 00:49	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/18/17 00:49	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 00:49	
Sucralose	ND	5.0	5.0	ng/l	1	11/18/17 00:49	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/18/17 00:49	
TCEP	ND	0.34	1.0	ng/l	1	11/18/17 00:49	
TCPP	ND	0.27	1.0	ng/l	1	11/18/17 00:49	
TDCPP	**4.9**	0.47	1.0	ng/l	1	11/18/17 00:49	B
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 00:49	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/29/2017 12:44

Sample Results

(Continued)

Sample: GW-G-02_170920-EB

7I22107-13 (Water)

Sampled: 09/20/17 14:12 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 01:22	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 01:22	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 01:22	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 01:22	
Azithromycin	ND	2.2	10	ng/l	1	11/18/17 01:22	
Caffeine	**30**	0.31	1.0	ng/l	1	11/18/17 01:22	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 01:22	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	11/18/17 01:22	
Cotinine	**1.8**	0.59	2.0	ng/l	1	11/18/17 01:22	J
DEET	**110**	0.060	1.0	ng/l	1	11/18/17 01:22	E-01
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 01:22	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/18/17 01:22	
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 01:22	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 01:22	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/18/17 01:22	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 01:22	
Sucralose	ND	5.0	5.0	ng/l	1	11/18/17 01:22	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/18/17 01:22	
TCEP	**24**	0.34	1.0	ng/l	1	11/18/17 01:22	
TCPP	**100**	0.27	1.0	ng/l	1	11/18/17 01:22	
TDCPP	**41**	0.47	1.0	ng/l	1	11/18/17 01:22	
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 01:22	

Sample Results

(Continued)

Sample: GW-B-05_170921
7I22107-14 (Water)

Sampled: 09/21/17 8:30 by Client

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 01:55	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 01:55	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 01:55	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 01:55	
Azithromycin	ND	2.2	10	ng/l	1	11/18/17 01:55	
Caffeine	**0.74**	0.31	1.0	ng/l	1	11/18/17 01:55	J
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 01:55	
Ciprofloxacin	**3.5**	1.4	5.0	ng/l	1	11/18/17 01:55	J
Cotinine	ND	0.59	2.0	ng/l	1	11/18/17 01:55	
DEET	**0.63**	0.060	1.0	ng/l	1	11/18/17 01:55	J
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 01:55	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/18/17 01:55	
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 01:55	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 01:55	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/18/17 01:55	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 01:55	
Sucralose	**9.3**	5.0	5.0	ng/l	1	11/18/17 01:55	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/18/17 01:55	
TCEP	**3.0**	0.34	1.0	ng/l	1	11/18/17 01:55	
TCPP	**2.4**	0.27	1.0	ng/l	1	11/18/17 01:55	B
TDCPP	**0.67**	0.47	1.0	ng/l	1	11/18/17 01:55	J
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 01:55	

Sample Results

(Continued)

Sample: GW-G-01_170921
7I22107-15 (Water)

Sampled: 09/21/17 10:17 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 02:28	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 02:28	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 02:28	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 02:28	
Azithromycin	**3.9**	2.2	10	ng/l	1	11/18/17 02:28	J
Caffeine	**0.64**	0.31	1.0	ng/l	1	11/18/17 02:28	J
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 02:28	
Ciprofloxacin	**5.4**	1.4	5.0	ng/l	1	11/18/17 02:28	B
Cotinine	ND	0.59	2.0	ng/l	1	11/18/17 02:28	
DEET	**0.69**	0.060	1.0	ng/l	1	11/18/17 02:28	J
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 02:28	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/18/17 02:28	
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 02:28	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 02:28	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/18/17 02:28	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 02:28	
Sucralose	ND	5.0	5.0	ng/l	1	11/18/17 02:28	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/18/17 02:28	
TCEP	ND	0.34	1.0	ng/l	1	11/18/17 02:28	
TCPP	**2.4**	0.27	1.0	ng/l	1	11/18/17 02:28	B
TDCPP	**1.6**	0.47	1.0	ng/l	1	11/18/17 02:28	B
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 02:28	

Sample Results

(Continued)

Sample: GW-E-03_170921
7I22107-16 (Water)

Sampled: 09/21/17 13:45 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 03:01	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 03:01	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 03:01	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 03:01	
Azithromycin	ND	2.2	10	ng/l	1	11/18/17 03:01	
Caffeine	**2.4**	0.31	1.0	ng/l	1	11/18/17 03:01	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 03:01	
Ciprofloxacin	**3.8**	1.4	5.0	ng/l	1	11/18/17 03:01	J
Cotinine	ND	0.59	2.0	ng/l	1	11/18/17 03:01	
DEET	**2.6**	0.060	1.0	ng/l	1	11/18/17 03:01	
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 03:01	
Fluoxetine	**0.17**	0.080	1.0	ng/l	1	11/18/17 03:01	J
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 03:01	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 03:01	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/18/17 03:01	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 03:01	
Sucralose	ND	5.0	5.0	ng/l	1	11/18/17 03:01	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/18/17 03:01	
TCEP	ND	0.34	1.0	ng/l	1	11/18/17 03:01	
TCPP	**1.3**	0.27	1.0	ng/l	1	11/18/17 03:01	B
TDCPP	**1.6**	0.47	1.0	ng/l	1	11/18/17 03:01	B
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 03:01	

Sample Results

(Continued)

Sample: GW-E-03_170921-DUP
7I22107-17 (Water)

Sampled: 09/21/17 13:45 by R. Lustig/ R. Wilson

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W7J0492 **Prepared:** 10/10/17 08:21 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	11/18/17 03:34	
Amoxicillin	ND	2.0	10	ng/l	1	11/18/17 03:34	
Atenolol	ND	0.20	1.0	ng/l	1	11/18/17 03:34	
Atorvastatin	ND	0.11	1.0	ng/l	1	11/18/17 03:34	
Azithromycin	ND	2.2	10	ng/l	1	11/18/17 03:34	
Caffeine	**1.2**	0.31	1.0	ng/l	1	11/18/17 03:34	B
Carbamazepine	ND	0.080	1.0	ng/l	1	11/18/17 03:34	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	11/18/17 03:34	
Cotinine	ND	0.59	2.0	ng/l	1	11/18/17 03:34	
DEET	**0.72**	0.060	1.0	ng/l	1	11/18/17 03:34	J
Diazepam	ND	0.14	1.0	ng/l	1	11/18/17 03:34	
Fluoxetine	ND	0.080	1.0	ng/l	1	11/18/17 03:34	
Meprobamate	ND	0.36	1.0	ng/l	1	11/18/17 03:34	
Methadone	ND	0.040	1.0	ng/l	1	11/18/17 03:34	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	11/18/17 03:34	
Primidone	ND	0.60	1.0	ng/l	1	11/18/17 03:34	
Sucralose	ND	5.0	5.0	ng/l	1	11/18/17 03:34	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	11/18/17 03:34	
TCEP	ND	0.34	1.0	ng/l	1	11/18/17 03:34	
TCPP	**1.5**	0.27	1.0	ng/l	1	11/18/17 03:34	B
TDCPP	**5.3**	0.47	1.0	ng/l	1	11/18/17 03:34	B
Trimethoprim	ND	0.24	1.0	ng/l	1	11/18/17 03:34	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
11/29/2017 12:44

Quality Control Results

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7J0492 - EPA 1694M-ESI+											
Blank (W7J0492-BLK1)					**Prepared: 10/10/17 Analyzed: 11/17/17**						
Acetaminophen	ND	1.4	20	ng/l							
Amoxicillin	ND	2.0	10	ng/l							
Atenolol	ND	0.20	1.0	ng/l							
Atorvastatin	0.314	0.11	1.0	ng/l							J
Azithromycin	212	2.2	10	ng/l							B
Caffeine	5.85	0.31	1.0	ng/l							B
Carbamazepine	ND	0.080	1.0	ng/l							
Ciprofloxacin	105	1.4	5.0	ng/l							B
Cotinine	1.32	0.59	2.0	ng/l							J
DEET	0.786	0.060	1.0	ng/l							J
Diazepam	0.144	0.14	1.0	ng/l							J
Fluoxetine	0.459	0.080	1.0	ng/l							J
Meprobamate	0.582	0.36	1.0	ng/l							J
Methadone	ND	0.040	1.0	ng/l							
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l							
Primidone	ND	0.60	1.0	ng/l							
Sulfamethoxazole	ND	0.19	1.0	ng/l							
TCEP	0.407	0.34	1.0	ng/l							J
TCPP	1.43	0.27	1.0	ng/l							B
TDCPP	1.66	0.47	1.0	ng/l							B
Trimethoprim	ND	0.24	1.0	ng/l							
LCS (W7J0492-BS1)					**Prepared: 10/10/17 Analyzed: 11/17/17**						
Acetaminophen	209	1.4	20	ng/l	200		104	66-156			
Amoxicillin	134	2.0	10	ng/l				14-167			
Atenolol	10.2	0.20	1.0	ng/l	10.0		102	56-164			
Atorvastatin	7.82	0.11	1.0	ng/l	10.0		78	0.1-173			
Azithromycin	119	2.2	10	ng/l	100		119	52-166			
Caffeine	11.6	0.31	1.0	ng/l	10.0		116	55-152			
Carbamazepine	9.86	0.080	1.0	ng/l	10.0		99	60-135			
Ciprofloxacin	82.9	1.4	5.0	ng/l	50.0		166	51-168			
Cotinine	10.4	0.59	2.0	ng/l	10.0		104	68-155			
DEET	12.4	0.060	1.0	ng/l	10.0		124	45-135			
Diazepam	10.3	0.14	1.0	ng/l	10.0		103	58-127			
Fluoxetine	9.48	0.080	1.0	ng/l	10.0		95	55-150			
Meprobamate	34.6	0.36	1.0	ng/l	10.0		346	11-166			BS-H
Methadone	10.4	0.040	1.0	ng/l	10.0		104	62-137			
Phenytoin (Dilantin)	10.9	0.33	1.0	ng/l	10.0		109	69-138			

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7J0492 - EPA 1694M-ESI+ (Continued)											
LCS (W7J0492-BS1)					**Prepared: 10/10/17 Analyzed: 11/17/17**						
Primidone	9.11	0.60	1.0	ng/l	10.0		91	54-147			
Sulfamethoxazole	11.2	0.19	1.0	ng/l	10.0		112	60-133			
TCEP	8.83	0.34	1.0	ng/l	10.0		88	25-149			
TCPP	7.31	0.27	1.0	ng/l	10.0		73	24-149			
TDCPP	9.96	0.47	1.0	ng/l	10.0		100	20-158			
Trimethoprim	10.7	0.24	1.0	ng/l	10.0		107	67-139			
LCS Dup (W7J0492-BSD1)					**Prepared: 10/10/17 Analyzed: 11/17/17**						
Acetaminophen	222	1.4	20	ng/l	200		111	66-156	6	30	
Amoxicillin	147	2.0	10	ng/l				14-167	9	30	
Atenolol	10.4	0.20	1.0	ng/l	10.0		104	56-164	2	30	
Atorvastatin	4.05	0.11	1.0	ng/l	10.0		40	0.1-173	64	30	Q-12
Azithromycin	124	2.2	10	ng/l	100		124	52-166	4	30	
Caffeine	12.2	0.31	1.0	ng/l	10.0		122	55-152	5	30	
Carbamazepine	12.0	0.080	1.0	ng/l	10.0		120	60-135	20	30	
Ciprofloxacin	78.8	1.4	5.0	ng/l	50.0		158	51-168	5	30	
Cotinine	10.6	0.59	2.0	ng/l	10.0		106	68-155	2	30	
DEET	12.4	0.060	1.0	ng/l	10.0		124	45-135	0	30	
Diazepam	9.98	0.14	1.0	ng/l	10.0		100	58-127	3	30	
Fluoxetine	10.4	0.080	1.0	ng/l	10.0		104	55-150	9	30	
Meprobamate	30.6	0.36	1.0	ng/l	10.0		306	11-166	12	30	BS-H
Methadone	12.5	0.040	1.0	ng/l	10.0		125	62-137	18	30	
Phenytoin (Dilantin)	10.5	0.33	1.0	ng/l	10.0		105	69-138	4	30	
Primidone	12.9	0.60	1.0	ng/l	10.0		129	54-147	34	30	Q-12
Sulfamethoxazole	12.4	0.19	1.0	ng/l	10.0		124	60-133	10	30	
TCEP	17.3	0.34	1.0	ng/l	10.0		173	25-149	65	30	BS-04
TCPP	12.9	0.27	1.0	ng/l	10.0		129	24-149	55	30	Q-12
TDCPP	34.3	0.47	1.0	ng/l	10.0		343	20-158	110	30	BS-04
Trimethoprim	9.88	0.24	1.0	ng/l	10.0		99	67-139	8	30	
Batch: W7J1076 - EPA 1694M-ESI+											
Blank (W7J1076-BLK1)					**Prepared: 09/25/17 Analyzed: 10/14/17**						
Acetaminophen	ND	1.4	20	ng/l							
Amoxicillin	ND	2.0	10	ng/l							
Atenolol	ND	0.20	1.0	ng/l							
Caffeine	0.871	0.31	1.0	ng/l							J
Carbamazepine	ND	0.080	1.0	ng/l							
Cotinine	ND	0.59	2.0	ng/l							
DEET	1.03	0.060	1.0	ng/l							B

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7J1076 - EPA 1694M-ESI+ (Continued)											
Blank (W7J1076-BLK1)					**Prepared: 09/25/17 Analyzed: 10/14/17**						
Diazepam	ND	0.14	1.0	ng/l							
Fluoxetine	ND	0.080	1.0	ng/l							
Meprobamate	ND	0.36	1.0	ng/l							
Methadone	ND	0.040	1.0	ng/l							
Primidone	ND	0.60	1.0	ng/l							
Sulfamethoxazole	ND	0.19	1.0	ng/l							
Trimethoprim	ND	0.24	1.0	ng/l							
Blank (W7J1076-BLK2)					**Prepared: 09/25/17 Analyzed: 10/21/17**						
Atorvastatin	ND	0.11	1.0	ng/l							QC-2
Azithromycin	ND	2.2	10	ng/l							QC-2
Ciprofloxacin	4.91	1.4	5.0	ng/l							QC-2, J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l							QC-2
TCEP	ND	0.34	1.0	ng/l							QC-2
TCPP	ND	0.27	1.0	ng/l							QC-2
TDCPP	ND	0.47	1.0	ng/l							QC-2
LCS (W7J1076-BS1)					**Prepared: 09/25/17 Analyzed: 10/14/17**						
Acetaminophen	233	1.4	20	ng/l	200		116	66-156			
Amoxicillin	87.7	2.0	10	ng/l				14-167			
Atenolol	13.4	0.20	1.0	ng/l	10.0		134	56-164			
Caffeine	11.6	0.31	1.0	ng/l	10.0		116	55-152			
Carbamazepine	13.5	0.080	1.0	ng/l	10.0		135	60-135			
Cotinine	12.6	0.59	2.0	ng/l	10.0		126	68-155			
DEET	12.1	0.060	1.0	ng/l	10.0		121	45-135			
Diazepam	12.1	0.14	1.0	ng/l	10.0		121	58-127			
Fluoxetine	12.8	0.080	1.0	ng/l	10.0		128	55-150			
Meprobamate	17.2	0.36	1.0	ng/l	10.0		172	11-166			BS-H
Methadone	11.7	0.040	1.0	ng/l	10.0		117	62-137			
Primidone	10.4	0.60	1.0	ng/l	10.0		104	54-147			
Sulfamethoxazole	12.7	0.19	1.0	ng/l	10.0		127	60-133			
Trimethoprim	10.1	0.24	1.0	ng/l	10.0		101	67-139			
LCS (W7J1076-BS2)					**Prepared: 09/25/17 Analyzed: 10/21/17**						
Atorvastatin	6.23	0.11	1.0	ng/l	10.0		62	0.1-173			QC-2
Azithromycin	115	2.2	10	ng/l	100		115	52-166			QC-2
Ciprofloxacin	54.4	1.4	5.0	ng/l	50.0		109	51-168			QC-2
Phenytoin (Dilantin)	13.3	0.33	1.0	ng/l	10.0		133	69-138			QC-2
TCEP	12.2	0.34	1.0	ng/l	10.0		122	25-149			QC-2
TCPP	3.75	0.27	1.0	ng/l	10.0		38	24-149			QC-2

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W7J1076 - EPA 1694M-ESI+ (Continued)											
LCS (W7J1076-BS2)					**Prepared: 09/25/17 Analyzed: 10/21/17**						
TDCPP	11.9	0.47	1.0	ng/l	10.0		119	20-158			QC-2
LCS Dup (W7J1076-BSD1)					**Prepared: 09/25/17 Analyzed: 10/14/17**						
Acetaminophen	227	1.4	20	ng/l	200		114	66-156	3	30	
Amoxicillin	116	2.0	10	ng/l				14-167	28	30	
Atenolol	13.8	0.20	1.0	ng/l	10.0		138	56-164	3	30	
Caffeine	12.9	0.31	1.0	ng/l	10.0		129	55-152	11	30	
Carbamazepine	12.3	0.080	1.0	ng/l	10.0		123	60-135	9	30	
Cotinine	10.0	0.59	2.0	ng/l	10.0		100	68-155	23	30	
DEET	13.9	0.060	1.0	ng/l	10.0		139	45-135	14	30	Q-ME
Diazepam	11.2	0.14	1.0	ng/l	10.0		112	58-127	8	30	
Fluoxetine	11.0	0.080	1.0	ng/l	10.0		110	55-150	15	30	
Meprobamate	32.4	0.36	1.0	ng/l	10.0		324	11-166	61	30	BS-H
Methadone	10.5	0.040	1.0	ng/l	10.0		105	62-137	11	30	
Primidone	10.1	0.60	1.0	ng/l	10.0		101	54-147	3	30	
Sulfamethoxazole	11.0	0.19	1.0	ng/l	10.0		110	60-133	14	30	
Trimethoprim	10.0	0.24	1.0	ng/l	10.0		100	67-139	1	30	
LCS Dup (W7J1076-BSD2)					**Prepared: 09/25/17 Analyzed: 10/21/17**						
Atorvastatin	3.98	0.11	1.0	ng/l	10.0		40	0.1-173	44	30	Q-12, QC-2
Azithromycin	107	2.2	10	ng/l	100		107	52-166	7	30	QC-2
Ciprofloxacin	50.0	1.4	5.0	ng/l	50.0		100	51-168	8	30	QC-2
Phenytoin (Dilantin)	13.1	0.33	1.0	ng/l	10.0		131	69-138	2	30	QC-2
TCEP	7.56	0.34	1.0	ng/l	10.0		76	25-149	47	30	Q-12, QC-2
TCPP	1.03	0.27	1.0	ng/l	10.0		10	24-149	114	30	BS-04, QC-2
TDCPP	9.61	0.47	1.0	ng/l	10.0		96	20-158	21	30	QC-2

Notes and Definitions

Item	Definition
B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
BS-04	The recovery of this analyte in LCS or LCSD was outside control limit. Sample was accepted based on the remaining LCS, LCSD or LCS-LL.
BS-H	The recovery of this analyte in the BS/LCS was over the control limit. Sample result is suspect.
E-01	The concentration indicated for this analyte is an estimated value above the calibration range.
J	Estimated conc. detected <MRL and >MDL.
Q-12	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on the percent recoveries and/or other acceptable QC data.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
Q-ME	Acceptable QC with marginal exceedance
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

7122107

WL Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 2

CLIENT NAME: Geosyntec

PROJECT: VCEHD OWTS Study (LA0391)

ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101

PHONE: Jared Ervin: 805-979-9129
FAX:
EMAIL: Jervin@Geosyntec.com

PROJECT MANAGER: Jared Ervin

SAMPLER: R LUSTIG / R. WILSON

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☐ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	PPCPs by EPA 1694-ESI+
	9/18/17	10:18	AQ	GW-D-04_170918	2	X
	9/18/17	11:50	AQ	GW-D-05_170918	2	X
	9/18/17	14:25	AQ	GW-A-01_170918	2	X
	9/19/17	10:00	AQ	GW-C-BK-06_170919	2	X
	9/19/17	10:49	AQ	GW-D-07_170919	2	X
	9/19/17	12:30	AQ	SW-03-U_170919	2	X
	9/19/17	13:20	AQ	GW-C-07_170919	2	X
	9/19/17	13:45	AQ	GW-C-08_170919	2	X
	9/19/17	14:10	AQ	GW-C-04_170919	2	X
	9/20/17	0900	AQ	GW-B-03_170920	2	X
	9/20/17	1005	AQ	GW-G-02_170920	2	X
	9/20/17	1120	AQ	SW-03-D_170920	2	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Rebecca Lustig	9/18/17 / 1500	Reese Wilson GSC 9.18.17 1500
Reese Wilson GSC	9/20/17 14:58	Rebecca Lustig
Rebecca Lustig	9/22/17 / 10:11	

SAMPLE CONDITION:
Actual Temperature: 3.2°
Received On Ice Y N
Preserved Y N
Evidence Seals Present Y N
Container Attacked Y N
Preserved at Lab Y N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY
OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

Jandmen 9/22/17 1440

COC version 042707

9/22/17 240

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14859 East Clark Avenue : Industry : CA 91745
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CHAIN OF CUSTODY RECORD

STANDARD

Page 2 Of 2

CLIENT NAME: Geosyntec

ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101

PROJECT MANAGER: Jared Ervin

PROJECT: VCEHD OWTS Study (LA0391)

PHONE: Jared Ervin: 805-979-9129
FAX:
EMAIL: Jervin@Geosyntec.com

SAMPLER: R.LUSTIG / R.WILSON

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	PPCPs by EPA 1694-ESI+
	9/20/17	1412	AQ	GW-G-02_170920-EB	2	X
	9/21/17	0830	AQ	GW-B-05_170921	2	X
	9/21/17	1017	AQ	GW-G-01_170921	2	X
	9/21/17	1345	AQ	GW-E-03_170921	2	X
	9/21/17	1345	AQ	GW-E-03_170921-DUP	2	X

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☐ 10 - 15 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Rebecca Lustig	9/~~20~~22/17 / 10:11	
	9/22/17 270	Jandmes 9/22/17 1440

SAMPLE CONDITION:

Actual Temperature:

Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Attacked Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY
OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042707

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	8D06080	**Report Date:**	6/27/2018
		Received Date:	4/6/2018
Project:	VCEHD OWTS Study (LA0391)	**Turnaround Time:**	Normal
		Phones:	(805) 979-9129
		Fax:	(805) 899-8689
Attn:	Jared Ervin	**P.O. #:**	
Client:	Geosyntec Consultants - Santa Barbara 924 Anacapa Street, Ste 4A Santa Barbara, CA 93101	**Billing Code:**	

DoD-ELAP #L2457 • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Jared Ervin,

Enclosed are the results of analyses for samples received 4/06/18 with the Chain-of-Custody document. The samples were received in good condition, at 4.7 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Brandon Gee
Operations Manager/Senior PM

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SW-04-D_180402	RebeccaL.	8D06080-01	Water	04/02/18 09:18	
GW-E-02_180402	RebeccaL.	8D06080-02	Water	04/02/18 10:35	
GW-E-03_180402	RebeccaL.	8D06080-03	Water	04/02/18 11:00	
SW-05-D_180402	RebeccaL.	8D06080-04	Water	04/02/18 11:55	
SW-04-U_180402	RebeccaL.	8D06080-05	Water	04/02/18 13:30	
SW-03-D_180402	RebeccaL.	8D06080-06	Water	04/02/18 14:25	
GW-A-03_180403	RebeccaL.	8D06080-07	Water	04/03/18 09:03	
GW-A-02_180403	RebeccaL.	8D06080-08	Water	04/03/18 09:31	
GW-A-04_180403	RebeccaL.	8D06080-09	Water	04/03/18 09:59	
GW-A-01_180403	RebeccaL.	8D06080-10	Water	04/03/18 10:30	
GW-F-02_180403	RebeccaL.	8D06080-11	Water	04/03/18 11:17	
SW-01-D_180403	RebeccaL.	8D06080-12	Water	04/03/18 12:31	
GW-C-07_180403	RebeccaL.	8D06080-13	Water	04/03/18 13:19	
GW-C-08_180403	RebeccaL.	8D06080-14	Water	04/03/18 13:37	
GW-B-03_180404	RebeccaL.	8D06080-15	Water	04/04/18 09:02	
GW-C-BK-06_180404	RebeccaL.	8D06080-16	Water	04/04/18 10:30	
GW-D-07_180404	RebeccaL.	8D06080-17	Water	04/04/18 10:55	
SW-03-U_180404	RebeccaL.	8D06080-18	Water	04/04/18 12:11	
GW-A-07_180404	RebeccaL.	8D06080-19	Water	04/04/18 12:56	
SW-02-D_180404	RebeccaL.	8D06080-20	Water	04/04/18 13:27	
SW-02-U_180405	RebeccaL.	8D06080-21	Water	04/05/18 09:38	
GW-D-05_180405	RebeccaL.	8D06080-22	Water	04/05/18 11:02	
GW-D-05_180405_DUP	RebeccaL.	8D06080-23	Water	04/05/18 11:02	
GW-0-02_180405	RebeccaL.	8D06080-24	Water	04/05/18 12:45	
GW-B-04_180405	RebeccaL.	8D06080-25	Water	04/05/18 14:06	
GW-B-04_180405_EQ	RebeccaL.	8D06080-26	Water	04/05/18 14:06	
GW-G-01_180406	RebeccaL.	8D06080-27	Water	04/06/18 09:50	
GW-G-01_180406	Rebecca L.	8D06080-28	Water	04/06/18 09:50	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Results

Sample: SW-04-D_180402
8D06080-01 (Water)

Sampled: 04/02/18 9:18 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 20:24	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 20:24	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 20:24	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 20:24	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 20:24	
Caffeine	**12**	0.31	1.0	ng/l	1	05/30/18 20:24	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 20:24	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/30/18 20:24	
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 20:24	
DEET	**1.4**	0.060	1.0	ng/l	1	05/30/18 20:24	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 20:24	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 20:24	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 18:40	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 20:24	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 20:24	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 20:24	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 20:24	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 20:24	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 20:24	
TCPP	**12**	0.27	1.0	ng/l	1	05/14/18 18:40	
TDCPP	**13**	0.47	1.0	ng/l	1	05/14/18 18:40	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 20:24	

Sample Results

(Continued)

Sample: GW-E-02_180402
8D06080-02 (Water)

Sampled: 04/02/18 10:35 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 20:40	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 20:40	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 20:40	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 20:40	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 20:40	
Caffeine	**2.3**	0.31	1.0	ng/l	1	05/30/18 20:40	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 20:40	
Ciprofloxacin	**2.0**	1.4	5.0	ng/l	1	05/30/18 20:40	J
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 20:40	
DEET	**1.1**	0.060	1.0	ng/l	1	05/30/18 20:40	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 20:40	
Fluoxetine	**0.23**	0.080	1.0	ng/l	1	05/30/18 20:40	J
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 18:57	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 20:40	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 20:40	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 20:40	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 20:40	
Sulfamethoxazole	**0.95**	0.19	1.0	ng/l	1	05/30/18 20:40	J
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 20:40	
TCPP	**4.6**	0.27	1.0	ng/l	1	05/14/18 18:57	
TDCPP	**1.2**	0.47	1.0	ng/l	1	05/14/18 18:57	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 20:40	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-E-03_180402
8D06080-03 (Water)

Sampled: 04/02/18 11:00 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 20:57	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 20:57	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 20:57	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 20:57	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 20:57	
Caffeine	**1.1**	0.31	1.0	ng/l	1	05/30/18 20:57	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 20:57	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/30/18 20:57	
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 20:57	
DEET	**0.81**	0.060	1.0	ng/l	1	05/30/18 20:57	J
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 20:57	
Fluoxetine	**0.22**	0.080	1.0	ng/l	1	05/30/18 20:57	J
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 19:13	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 20:57	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 20:57	
Primidone	**2.1**	0.60	1.0	ng/l	1	05/30/18 20:57	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 20:57	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 20:57	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 20:57	
TCPP	**2.5**	0.27	1.0	ng/l	1	05/14/18 19:13	
TDCPP	**2.3**	0.47	1.0	ng/l	1	05/14/18 19:13	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 20:57	

Sample Results

(Continued)

Sample: SW-05-D_180402
8D06080-04 (Water)

Sampled: 04/02/18 11:55 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 21:13	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 21:13	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 21:13	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 21:13	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 21:13	
Caffeine	**14**	0.31	1.0	ng/l	1	05/30/18 21:13	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 21:13	
Ciprofloxacin	**1.6**	1.4	5.0	ng/l	1	05/30/18 21:13	J
Cotinine	**0.65**	0.59	2.0	ng/l	1	05/30/18 21:13	J
DEET	**1.1**	0.060	1.0	ng/l	1	05/30/18 21:13	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 21:13	
Fluoxetine	**0.34**	0.080	1.0	ng/l	1	05/30/18 21:13	J
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 19:30	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 21:13	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 21:13	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 21:13	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 21:13	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 21:13	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 21:13	
TCPP	**2.9**	0.27	1.0	ng/l	1	05/14/18 19:30	
TDCPP	ND	0.47	1.0	ng/l	1	05/14/18 19:30	
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 21:13	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Results

(Continued)

Sample: SW-04-U_180402
8D06080-05 (Water)

Sampled: 04/02/18 13:30 by RebeccaL.

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
PPCPs - Pharmaceuticals by LC/MSMS-ESI+							
Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan							
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 21:30	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 21:30	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 21:30	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 21:30	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 21:30	
Caffeine	**14**	0.31	1.0	ng/l	1	05/30/18 21:30	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 21:30	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/30/18 21:30	
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 21:30	
DEET	**1.1**	0.060	1.0	ng/l	1	05/30/18 21:30	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 21:30	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 21:30	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 19:46	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 21:30	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 21:30	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 21:30	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 21:30	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 21:30	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 21:30	
TCPP	**4.7**	0.27	1.0	ng/l	1	05/14/18 19:46	
TDCPP	ND	0.47	1.0	ng/l	1	05/14/18 19:46	
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 21:30	

Sample Results

(Continued)

Sample: SW-03-D_180402
8D06080-06 (Water)

Sampled: 04/02/18 14:25 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 21:46	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 21:46	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 21:46	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 21:46	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 21:46	
Caffeine	**11**	0.31	1.0	ng/l	1	05/30/18 21:46	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 21:46	
Ciprofloxacin	**1.4**	1.4	5.0	ng/l	1	05/30/18 21:46	J
Cotinine	**0.75**	0.59	2.0	ng/l	1	05/30/18 21:46	J
DEET	**3.0**	0.060	1.0	ng/l	1	05/30/18 21:46	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 21:46	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 21:46	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 20:03	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 21:46	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 21:46	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 21:46	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 21:46	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 21:46	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 21:46	
TCPP	**7.5**	0.27	1.0	ng/l	1	05/14/18 20:03	
TDCPP	**0.54**	0.47	1.0	ng/l	1	05/14/18 20:03	J
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 21:46	

Sample Results

(Continued)

Sample: GW-A-03_180403
8D06080-07 (Water)

Sampled: 04/03/18 9:03 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 22:03	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 22:03	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 22:03	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 22:03	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 22:03	
Caffeine	**0.93**	0.31	1.0	ng/l	1	05/30/18 22:03	J
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 22:03	
Ciprofloxacin	**2.0**	1.4	5.0	ng/l	1	05/30/18 22:03	J
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 22:03	
DEET	**1.4**	0.060	1.0	ng/l	1	05/30/18 22:03	
Diazepam	**0.17**	0.14	1.0	ng/l	1	05/30/18 22:03	J
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 22:03	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 20:19	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 22:03	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 22:03	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 22:03	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 22:03	
Sulfamethoxazole	**0.74**	0.19	1.0	ng/l	1	05/30/18 22:03	J
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 22:03	
TCPP	**2.4**	0.27	1.0	ng/l	1	05/14/18 20:19	
TDCPP	**1.3**	0.47	1.0	ng/l	1	05/14/18 20:19	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 22:03	

Geosyntec Consultants - Santa Barbara
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Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-A-02_180403
8D06080-08 (Water)

Sampled: 04/03/18 9:31 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 22:19	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 22:19	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 22:19	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 22:19	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 22:19	
Caffeine	**1.3**	0.31	1.0	ng/l	1	05/30/18 22:19	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 22:19	
Ciprofloxacin	**1.8**	1.4	5.0	ng/l	1	05/30/18 22:19	J
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 22:19	
DEET	**1.1**	0.060	1.0	ng/l	1	05/30/18 22:19	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 22:19	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 22:19	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 20:36	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 22:19	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 22:19	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 22:19	
Sucralose	**7.6**	5.0	5.0	ng/l	1	05/30/18 22:19	
Sulfamethoxazole	**0.63**	0.19	1.0	ng/l	1	05/30/18 22:19	J
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 22:19	
TCPP	**1.0**	0.27	1.0	ng/l	1	05/14/18 20:36	
TDCPP	**2.5**	0.47	1.0	ng/l	1	05/14/18 20:36	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 22:19	

Geosyntec Consultants - Santa Barbara
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Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-A-04_180403
8D06080-09 (Water)

Sampled: 04/03/18 9:59 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 23:09	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 23:09	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 23:09	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 23:09	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 23:09	
Caffeine	**0.85**	0.31	1.0	ng/l	1	05/30/18 23:09	J
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 23:09	
Ciprofloxacin	**1.9**	1.4	5.0	ng/l	1	05/30/18 23:09	J
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 23:09	
DEET	**0.79**	0.060	1.0	ng/l	1	05/30/18 23:09	J
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 23:09	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 23:09	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 21:25	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 23:09	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 23:09	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 23:09	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 23:09	
Sulfamethoxazole	**0.55**	0.19	1.0	ng/l	1	05/30/18 23:09	J
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 23:09	
TCPP	**0.51**	0.27	1.0	ng/l	1	05/14/18 21:25	J
TDCPP	**2.6**	0.47	1.0	ng/l	1	05/14/18 21:25	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 23:09	

Sample Results

(Continued)

Sample: GW-A-01_180403
8D06080-10 (Water)

Sampled: 04/03/18 10:30 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 23:25	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 23:25	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 23:25	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 23:25	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 23:25	
Caffeine	**0.70**	0.31	1.0	ng/l	1	05/30/18 23:25	J
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 23:25	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/30/18 23:25	
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 23:25	
DEET	**0.90**	0.060	1.0	ng/l	1	05/30/18 23:25	J
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 23:25	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 23:25	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 21:42	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 23:25	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 23:25	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 23:25	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 23:25	
Sulfamethoxazole	**0.41**	0.19	1.0	ng/l	1	05/30/18 23:25	J
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 23:25	
TCPP	**1.9**	0.27	1.0	ng/l	1	05/14/18 21:42	
TDCPP	**2.2**	0.47	1.0	ng/l	1	05/14/18 21:42	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 23:25	

Sample Results

(Continued)

Sample: GW-F-02_180403 Sampled: 04/03/18 11:17 by RebeccaL.
8D06080-11 (Water)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 23:42	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 23:42	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 23:42	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 23:42	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 23:42	
Caffeine	**1.9**	0.31	1.0	ng/l	1	05/30/18 23:42	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 23:42	
Ciprofloxacin	**4.2**	1.4	5.0	ng/l	1	05/30/18 23:42	J
Cotinine	ND	0.59	2.0	ng/l	1	05/30/18 23:42	
DEET	**0.77**	0.060	1.0	ng/l	1	05/30/18 23:42	J
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 23:42	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 23:42	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 21:58	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 23:42	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/30/18 23:42	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 23:42	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 23:42	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 23:42	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 23:42	
TCPP	ND	0.27	1.0	ng/l	1	05/14/18 21:58	
TDCPP	**1.5**	0.47	1.0	ng/l	1	05/14/18 21:58	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 23:42	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 06/27/2018 15:41

Sample Results

(Continued)

Sample: SW-01-D_180403
8D06080-12 (Water)

Sampled: 04/03/18 12:31 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/30/18 23:58	
Amoxicillin	ND	2.0	10	ng/l	1	05/30/18 23:58	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/30/18 23:58	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/30/18 23:58	
Azithromycin	ND	2.2	10	ng/l	1	05/30/18 23:58	
Caffeine	**12**	0.31	1.0	ng/l	1	05/30/18 23:58	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/30/18 23:58	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/30/18 23:58	
Cotinine	**0.71**	0.59	2.0	ng/l	1	05/30/18 23:58	J
DEET	**4.3**	0.060	1.0	ng/l	1	05/30/18 23:58	
Diazepam	ND	0.14	1.0	ng/l	1	05/30/18 23:58	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/30/18 23:58	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 22:15	
Methadone	ND	0.040	1.0	ng/l	1	05/30/18 23:58	
Phenytoin (Dilantin)	**3.3**	0.33	1.0	ng/l	1	05/30/18 23:58	
Primidone	ND	0.60	1.0	ng/l	1	05/30/18 23:58	
Sucralose	ND	5.0	5.0	ng/l	1	05/30/18 23:58	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/30/18 23:58	
TCEP	ND	0.34	1.0	ng/l	1	05/30/18 23:58	
TCPP	ND	0.27	1.0	ng/l	1	05/14/18 22:15	
TDCPP	**1.3**	0.47	1.0	ng/l	1	05/14/18 22:15	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/30/18 23:58	

Sample Results

(Continued)

Sample: GW-C-07_180403
8D06080-13 (Water)

Sampled: 04/03/18 13:19 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/31/18 00:15	
Amoxicillin	ND	2.0	10	ng/l	1	05/31/18 00:15	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/31/18 00:15	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/31/18 00:15	
Azithromycin	ND	2.2	10	ng/l	1	05/31/18 00:15	
Caffeine	**1.4**	0.31	1.0	ng/l	1	05/31/18 00:15	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/31/18 00:15	
Ciprofloxacin	**2.3**	1.4	5.0	ng/l	1	05/31/18 00:15	J
Cotinine	ND	0.59	2.0	ng/l	1	05/31/18 00:15	
DEET	**0.63**	0.060	1.0	ng/l	1	05/31/18 00:15	J
Diazepam	ND	0.14	1.0	ng/l	1	05/31/18 00:15	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/31/18 00:15	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 22:31	
Methadone	**0.073**	0.040	1.0	ng/l	1	05/31/18 00:15	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/31/18 00:15	
Primidone	ND	0.60	1.0	ng/l	1	05/31/18 00:15	
Sucralose	ND	5.0	5.0	ng/l	1	05/31/18 00:15	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/31/18 00:15	
TCEP	ND	0.34	1.0	ng/l	1	05/31/18 00:15	
TCPP	**3.4**	0.27	1.0	ng/l	1	05/14/18 22:31	
TDCPP	**3.2**	0.47	1.0	ng/l	1	05/14/18 22:31	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/31/18 00:15	

Sample Results

(Continued)

Sample: GW-C-08_180403
8D06080-14 (Water)

Sampled: 04/03/18 13:37 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/31/18 00:31	
Amoxicillin	ND	2.0	10	ng/l	1	05/31/18 00:31	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/31/18 00:31	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/31/18 00:31	
Azithromycin	ND	2.2	10	ng/l	1	05/31/18 00:31	
Caffeine	**2.4**	0.31	1.0	ng/l	1	05/31/18 00:31	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/31/18 00:31	
Ciprofloxacin	**1.8**	1.4	5.0	ng/l	1	05/31/18 00:31	J
Cotinine	ND	0.59	2.0	ng/l	1	05/31/18 00:31	
DEET	**0.66**	0.060	1.0	ng/l	1	05/31/18 00:31	J
Diazepam	ND	0.14	1.0	ng/l	1	05/31/18 00:31	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/31/18 00:31	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 22:48	
Methadone	ND	0.040	1.0	ng/l	1	05/31/18 00:31	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/31/18 00:31	
Primidone	ND	0.60	1.0	ng/l	1	05/31/18 00:31	
Sucralose	ND	5.0	5.0	ng/l	1	05/31/18 00:31	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/31/18 00:31	
TCEP	ND	0.34	1.0	ng/l	1	05/31/18 00:31	
TCPP	**4.4**	0.27	1.0	ng/l	1	05/14/18 22:48	
TDCPP	**1.8**	0.47	1.0	ng/l	1	05/14/18 22:48	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/31/18 00:31	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-B-03_180404
8D06080-15 (Water)

Sampled: 04/04/18 9:02 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/31/18 00:48	
Amoxicillin	ND	2.0	10	ng/l	1	05/31/18 00:48	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/31/18 00:48	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/31/18 00:48	
Azithromycin	ND	2.2	10	ng/l	1	05/31/18 00:48	
Caffeine	**1.6**	0.31	1.0	ng/l	1	05/31/18 00:48	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/31/18 00:48	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/31/18 00:48	
Cotinine	ND	0.59	2.0	ng/l	1	05/31/18 00:48	
DEET	**0.72**	0.060	1.0	ng/l	1	05/31/18 00:48	J
Diazepam	ND	0.14	1.0	ng/l	1	05/31/18 00:48	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/31/18 00:48	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 23:04	
Methadone	ND	0.040	1.0	ng/l	1	05/31/18 00:48	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/31/18 00:48	
Primidone	ND	0.60	1.0	ng/l	1	05/31/18 00:48	
Sucralose	ND	5.0	5.0	ng/l	1	05/31/18 00:48	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/31/18 00:48	
TCEP	ND	0.34	1.0	ng/l	1	05/31/18 00:48	
TCPP	**3.6**	0.27	1.0	ng/l	1	05/14/18 23:04	
TDCPP	**1.5**	0.47	1.0	ng/l	1	05/14/18 23:04	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/31/18 00:48	

Sample Results

(Continued)

Sample: GW-C-BK-06_180404
8D06080-16 (Water)

Sampled: 04/04/18 10:30 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 19:41	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 19:41	I-05
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 19:41	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 19:41	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 19:41	
Caffeine	**1.8**	0.31	1.0	ng/l	1	06/03/18 19:41	
Carbamazepine	**0.30**	0.080	1.0	ng/l	1	06/03/18 19:41	J
Ciprofloxacin	ND	1.4	5.0	ng/l	1	06/03/18 19:41	
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 19:41	
DEET	**2.4**	0.060	1.0	ng/l	1	06/03/18 19:41	
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 19:41	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 19:41	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 19:41	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 19:41	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 19:41	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 19:41	
Sucralose	ND	5.0	5.0	ng/l	1	06/01/18 15:25	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	06/03/18 19:41	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 19:41	
TCPP	ND	0.27	1.0	ng/l	1	06/03/18 19:41	
TDCPP	ND	0.47	1.0	ng/l	1	06/01/18 15:25	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 19:41	

Sample Results

(Continued)

Sample: GW-D-07_180404
8D06080-17 (Water)

Sampled: 04/04/18 10:55 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 19:58	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 19:58	I-05
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 19:58	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 19:58	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 19:58	
Caffeine	**1.0**	0.31	1.0	ng/l	1	06/03/18 19:58	
Carbamazepine	ND	0.080	1.0	ng/l	1	06/03/18 19:58	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	06/03/18 19:58	
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 19:58	
DEET	**0.28**	0.060	1.0	ng/l	1	06/03/18 19:58	J
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 19:58	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 19:58	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 19:58	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 19:58	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 19:58	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 19:58	
Sucralose	ND	5.0	5.0	ng/l	1	06/01/18 15:41	
Sulfamethoxazole	**0.90**	0.19	1.0	ng/l	1	06/03/18 19:58	J
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 19:58	
TCPP	ND	0.27	1.0	ng/l	1	06/03/18 19:58	
TDCPP	ND	0.47	1.0	ng/l	1	06/01/18 15:41	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 19:58	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 06/27/2018 15:41

Sample Results

(Continued)

Sample: SW-03-U_180404
8D06080-18 (Water)

Sampled: 04/04/18 12:11 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/31/18 01:04	
Amoxicillin	ND	2.0	10	ng/l	1	05/31/18 01:04	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/31/18 01:04	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/31/18 01:04	
Azithromycin	ND	2.2	10	ng/l	1	05/31/18 01:04	
Caffeine	**10**	0.31	1.0	ng/l	1	05/31/18 01:04	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/31/18 01:04	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/31/18 01:04	
Cotinine	**0.66**	0.59	2.0	ng/l	1	05/31/18 01:04	J
DEET	**2.7**	0.060	1.0	ng/l	1	05/31/18 01:04	
Diazepam	ND	0.14	1.0	ng/l	1	05/31/18 01:04	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/31/18 01:04	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 23:21	
Methadone	ND	0.040	1.0	ng/l	1	05/31/18 01:04	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/31/18 01:04	
Primidone	ND	0.60	1.0	ng/l	1	05/31/18 01:04	
Sucralose	ND	5.0	5.0	ng/l	1	05/31/18 01:04	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/31/18 01:04	
TCEP	ND	0.34	1.0	ng/l	1	05/31/18 01:04	
TCPP	**6.2**	0.27	1.0	ng/l	1	05/14/18 23:21	
TDCPP	**3.8**	0.47	1.0	ng/l	1	05/14/18 23:21	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/31/18 01:04	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-A-07_180404
8D06080-19 (Water)

Sampled: 04/04/18 12:56 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/31/18 01:21	
Amoxicillin	ND	2.0	10	ng/l	1	05/31/18 01:21	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/31/18 01:21	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/31/18 01:21	
Azithromycin	ND	2.2	10	ng/l	1	05/31/18 01:21	
Caffeine	**1.7**	0.31	1.0	ng/l	1	05/31/18 01:21	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/31/18 01:21	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/31/18 01:21	
Cotinine	ND	0.59	2.0	ng/l	1	05/31/18 01:21	
DEET	**0.77**	0.060	1.0	ng/l	1	05/31/18 01:21	J
Diazepam	ND	0.14	1.0	ng/l	1	05/31/18 01:21	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/31/18 01:21	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 23:37	
Methadone	ND	0.040	1.0	ng/l	1	05/31/18 01:21	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/31/18 01:21	
Primidone	ND	0.60	1.0	ng/l	1	05/31/18 01:21	
Sucralose	ND	5.0	5.0	ng/l	1	05/31/18 01:21	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/31/18 01:21	
TCEP	ND	0.34	1.0	ng/l	1	05/31/18 01:21	
TCPP	**4.7**	0.27	1.0	ng/l	1	05/14/18 23:37	
TDCPP	**2.5**	0.47	1.0	ng/l	1	05/14/18 23:37	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/31/18 01:21	

Sample Results

(Continued)

Sample: SW-02-D_180404
8D06080-20 (Water)

Sampled: 04/04/18 13:27 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1411 **Instr:** LCMS02 **Prepared:** 04/24/18 10:31 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	05/31/18 01:37	
Amoxicillin	ND	2.0	10	ng/l	1	05/31/18 01:37	I-05
Atenolol	ND	0.20	1.0	ng/l	1	05/31/18 01:37	
Atorvastatin	ND	0.11	1.0	ng/l	1	05/31/18 01:37	
Azithromycin	ND	2.2	10	ng/l	1	05/31/18 01:37	
Caffeine	**18**	0.31	1.0	ng/l	1	05/31/18 01:37	
Carbamazepine	ND	0.080	1.0	ng/l	1	05/31/18 01:37	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	05/31/18 01:37	
Cotinine	**0.62**	0.59	2.0	ng/l	1	05/31/18 01:37	J
DEET	**3.5**	0.060	1.0	ng/l	1	05/31/18 01:37	
Diazepam	ND	0.14	1.0	ng/l	1	05/31/18 01:37	
Fluoxetine	ND	0.080	1.0	ng/l	1	05/31/18 01:37	
Meprobamate	ND	0.36	1.0	ng/l	1	05/14/18 23:54	
Methadone	ND	0.040	1.0	ng/l	1	05/31/18 01:37	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	05/31/18 01:37	
Primidone	ND	0.60	1.0	ng/l	1	05/31/18 01:37	
Sucralose	ND	5.0	5.0	ng/l	1	05/31/18 01:37	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	05/31/18 01:37	
TCEP	ND	0.34	1.0	ng/l	1	05/31/18 01:37	
TCPP	**2.8**	0.27	1.0	ng/l	1	05/14/18 23:54	
TDCPP	**3.8**	0.47	1.0	ng/l	1	05/14/18 23:54	B
Trimethoprim	ND	0.24	1.0	ng/l	1	05/31/18 01:37	

Sample Results

(Continued)

Sample: SW-02-U_180405
8D06080-21 (Water)

Sampled: 04/05/18 9:38 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 20:14	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 20:14	I-05
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 20:14	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 20:14	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 20:14	
Caffeine	**17**	0.31	1.0	ng/l	1	06/03/18 20:14	
Carbamazepine	ND	0.080	1.0	ng/l	1	06/03/18 20:14	
Ciprofloxacin	**1.5**	1.4	5.0	ng/l	1	06/03/18 20:14	J
Cotinine	**0.88**	0.59	2.0	ng/l	1	06/03/18 20:14	J
DEET	**3.2**	0.060	1.0	ng/l	1	06/03/18 20:14	
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 20:14	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 20:14	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 20:14	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 20:14	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 20:14	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 20:14	
Sucralose	ND	5.0	5.0	ng/l	1	06/01/18 15:58	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	06/03/18 20:14	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 20:14	
TCPP	ND	0.27	1.0	ng/l	1	06/03/18 20:14	
TDCPP	**1.4**	0.47	1.0	ng/l	1	06/01/18 15:58	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 20:14	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-D-05_180405
8D06080-22 (Water)

Sampled: 04/05/18 11:02 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 20:31	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 20:31	I-05
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 20:31	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 20:31	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 20:31	
Caffeine	**1.5**	0.31	1.0	ng/l	1	06/03/18 20:31	
Carbamazepine	ND	0.080	1.0	ng/l	1	06/03/18 20:31	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	06/03/18 20:31	
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 20:31	
DEET	**0.28**	0.060	1.0	ng/l	1	06/03/18 20:31	J
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 20:31	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 20:31	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 20:31	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 20:31	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 20:31	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 20:31	
Sucralose	**7.2**	5.0	5.0	ng/l	1	06/01/18 16:14	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	06/03/18 20:31	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 20:31	
TCPP	ND	0.27	1.0	ng/l	1	06/03/18 20:31	
TDCPP	ND	0.47	1.0	ng/l	1	06/01/18 16:14	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 20:31	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 06/27/2018 15:41

Sample Results

(Continued)

Sample: GW-D-05_180405_DUP
8D06080-23 (Water)

Sampled: 04/05/18 11:02 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 20:47	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 20:47	I-05
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 20:47	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 20:47	
Azithromycin	**5.1**	2.2	10	ng/l	1	06/03/18 20:47	J
Caffeine	ND	0.31	1.0	ng/l	1	06/03/18 20:47	
Carbamazepine	ND	0.080	1.0	ng/l	1	06/03/18 20:47	
Ciprofloxacin	**31**	1.4	5.0	ng/l	1	06/03/18 20:47	B
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 20:47	
DEET	**0.26**	0.060	1.0	ng/l	1	06/03/18 20:47	J
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 20:47	
Fluoxetine	**1.3**	0.080	1.0	ng/l	1	06/03/18 20:47	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 20:47	
Methadone	**0.41**	0.040	1.0	ng/l	1	06/03/18 20:47	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 20:47	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 20:47	
Sucralose	ND	5.0	5.0	ng/l	1	06/01/18 16:31	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	06/03/18 20:47	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 20:47	
TCPP	**2.6**	0.27	1.0	ng/l	1	06/03/18 20:47	B
TDCPP	**2.9**	0.47	1.0	ng/l	1	06/01/18 16:31	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 20:47	

Sample Results

(Continued)

Sample: GW-0-02_180405
8D06080-24 (Water)

Sampled: 04/05/18 12:45 by RebeccaL.

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
PPCPs - Pharmaceuticals by LC/MSMS-ESI+							
Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan							
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 21:04	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 21:04	I-05
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 21:04	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 21:04	
Azithromycin	**3.4**	2.2	10	ng/l	1	06/03/18 21:04	J
Caffeine	**0.46**	0.31	1.0	ng/l	1	06/03/18 21:04	J
Carbamazepine	ND	0.080	1.0	ng/l	1	06/03/18 21:04	
Ciprofloxacin	**6.9**	1.4	5.0	ng/l	1	06/03/18 21:04	B
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 21:04	
DEET	**0.62**	0.060	1.0	ng/l	1	06/03/18 21:04	J
Diazepam	**0.32**	0.14	1.0	ng/l	1	06/03/18 21:04	J
Fluoxetine	**3.0**	0.080	1.0	ng/l	1	06/03/18 21:04	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 21:04	
Methadone	**1.8**	0.040	1.0	ng/l	1	06/03/18 21:04	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 21:04	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 21:04	
Sucralose	**42**	5.0	5.0	ng/l	1	06/01/18 16:47	
Sulfamethoxazole	**3.8**	0.19	1.0	ng/l	1	06/03/18 21:04	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 21:04	
TCPP	ND	0.27	1.0	ng/l	1	06/03/18 21:04	
TDCPP	ND	0.47	1.0	ng/l	1	06/01/18 16:47	
Trimethoprim	**1.2**	0.24	1.0	ng/l	1	06/03/18 21:04	

Sample Results

(Continued)

Sample: GW-B-04_180405
8D06080-25 (Water)

Sampled: 04/05/18 14:06 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 21:20	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 21:20	
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 21:20	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 21:20	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 21:20	
Caffeine	ND	0.31	1.0	ng/l	1	06/03/18 21:20	
Carbamazepine	ND	0.080	1.0	ng/l	1	06/03/18 21:20	
Ciprofloxacin	**1.6**	1.4	5.0	ng/l	1	06/03/18 21:20	J
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 21:20	
DEET	**1.4**	0.060	1.0	ng/l	1	06/03/18 21:20	
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 21:20	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 21:20	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 21:20	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 21:20	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 21:20	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 21:20	
Sucralose	**5.8**	5.0	5.0	ng/l	1	06/01/18 17:04	
Sulfamethoxazole	**1.1**	0.19	1.0	ng/l	1	06/03/18 21:20	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 21:20	
TCPP	**4.4**	0.27	1.0	ng/l	1	06/03/18 21:20	B
TDCPP	**5.3**	0.47	1.0	ng/l	1	06/01/18 17:04	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 21:20	

Sample Results

(Continued)

Sample: GW-B-04_180405_EQ
8D06080-26 (Water)

Sampled: 04/05/18 14:06 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 21:37	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 21:37	
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 21:37	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 21:37	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 21:37	
Caffeine	**16**	0.31	1.0	ng/l	1	06/03/18 21:37	
Carbamazepine	**0.25**	0.080	1.0	ng/l	1	06/03/18 21:37	J
Ciprofloxacin	**1.7**	1.4	5.0	ng/l	1	06/03/18 21:37	J
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 21:37	
DEET	**1.0**	0.060	1.0	ng/l	1	06/03/18 21:37	
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 21:37	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 21:37	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 21:37	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 21:37	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 21:37	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 21:37	
Sucralose	ND	5.0	5.0	ng/l	1	06/01/18 17:20	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	06/03/18 21:37	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 21:37	
TCPP	**4.5**	0.27	1.0	ng/l	1	06/03/18 21:37	B
TDCPP	**25**	0.47	1.0	ng/l	1	06/01/18 17:20	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 21:37	

Certificate of Analysis

FINAL REPORT

Sample Results

(Continued)

Sample: GW-G-01_180406
8D06080-27 (Water)

Sampled: 04/06/18 9:50 by RebeccaL.

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8D1530 **Instr:** LCMS02 **Prepared:** 04/25/18 13:06 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	06/03/18 21:53	
Amoxicillin	ND	2.0	10	ng/l	1	06/03/18 21:53	
Atenolol	ND	0.20	1.0	ng/l	1	06/03/18 21:53	
Atorvastatin	ND	0.11	1.0	ng/l	1	06/03/18 21:53	
Azithromycin	ND	2.2	10	ng/l	1	06/03/18 21:53	
Caffeine	**0.44**	0.31	1.0	ng/l	1	06/03/18 21:53	J
Carbamazepine	**0.29**	0.080	1.0	ng/l	1	06/03/18 21:53	J
Ciprofloxacin	**1.6**	1.4	5.0	ng/l	1	06/03/18 21:53	J
Cotinine	ND	0.59	2.0	ng/l	1	06/03/18 21:53	
DEET	**0.58**	0.060	1.0	ng/l	1	06/03/18 21:53	J
Diazepam	ND	0.14	1.0	ng/l	1	06/03/18 21:53	
Fluoxetine	ND	0.080	1.0	ng/l	1	06/03/18 21:53	
Meprobamate	ND	0.36	1.0	ng/l	1	06/03/18 21:53	
Methadone	ND	0.040	1.0	ng/l	1	06/03/18 21:53	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	06/03/18 21:53	
Primidone	ND	0.60	1.0	ng/l	1	06/03/18 21:53	
Sucralose	ND	5.0	5.0	ng/l	1	06/01/18 17:37	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	06/03/18 21:53	
TCEP	ND	0.34	1.0	ng/l	1	06/03/18 21:53	
TCPP	**2.8**	0.27	1.0	ng/l	1	06/03/18 21:53	B
TDCPP	**5.4**	0.47	1.0	ng/l	1	06/01/18 17:37	
Trimethoprim	ND	0.24	1.0	ng/l	1	06/03/18 21:53	

Sample Results

(Continued)

Sample: GW-G-01_180406
8D06080-28 (Water)

Sampled: 04/06/18 9:50 by Rebecca L.

Anions by IC, EPA Method 300.0

Method: EPA 300.0 **Batch ID:** W8D0426 **Instr:** LC12 **Prepared:** 04/07/18 09:34 **Analyst:** jan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Nitrate as N	**4800**	20	110	ug/l	1	04/07/18 13:22	
Nitrite as N	ND	20	150	ug/l	1	04/07/18 13:22	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: _Various **Batch ID:** [CALC] **Instr:** [CALC] **Prepared:** 04/12/18 17:59 **Analyst:** ymt

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Nitrogen, Total	**4.9**		0.20	mg/l	1	04/16/18 12:27	

Method: EPA 350.1 **Batch ID:** W8D0487 **Instr:** Inst **Prepared:** 04/09/18 13:50 **Analyst:** mnq

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Ammonia as N	**0.056**	0.048	0.10	mg/l	1	04/09/18 18:31	J

Method: EPA 351.2 **Batch ID:** W8D0788 **Instr:** AA06 **Prepared:** 04/12/18 17:59 **Analyst:** ymt

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
TKN	ND	0.050	0.10	mg/l	1	04/16/18 12:27	

Method: EPA 353.2 **Batch ID:** W8D0527 **Instr:** AA01 **Prepared:** 04/10/18 08:21 **Analyst:** AJK

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
NO2+NO3 as N	**4900**	83	200	ug/l	1	04/10/18 14:54	

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D0426 - EPA 300.0											
Blank (W8D0426-BLK1)					**Prepared & Analyzed: 04/07/18**						
Nitrate as N	ND	20	110	ug/l							
Nitrite as N	23.0	20	150	ug/l							B-07, J
LCS (W8D0426-BS1)					**Prepared & Analyzed: 04/07/18**						
Nitrate as N	1960	20	110	ug/l	2000		98	90-110			
Nitrite as N	2000	20	150	ug/l	2000		100	90-110			
Matrix Spike (W8D0426-MS1)	**Source: 8D05078-01**				**Prepared & Analyzed: 04/07/18**						
Nitrate as N	20500	200	1100	ug/l	20000	912	98	84-115			
Nitrite as N	20200	200	1500	ug/l	20000	ND	101	87-108			
Matrix Spike Dup (W8D0426-MSD1)	**Source: 8D05078-01**				**Prepared & Analyzed: 04/07/18**						
Nitrate as N	20600	200	1100	ug/l	20000	912	99	84-115	0.7	20	
Nitrite as N	20400	200	1500	ug/l	20000	ND	102	87-108	0.9	20	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D0487 - EPA 350.1											
Blank (W8D0487-BLK1)					**Prepared & Analyzed: 04/09/18**						
Ammonia as N	ND	0.048	0.10	mg/l							
LCS (W8D0487-BS1)					**Prepared & Analyzed: 04/09/18**						
Ammonia as N	0.260	0.048	0.10	mg/l	0.250		104	90-110			
Matrix Spike (W8D0487-MS1)	**Source: 8D06080-28**				**Prepared & Analyzed: 04/09/18**						
Ammonia as N	0.318	0.048	0.10	mg/l	0.250	0.0557	105	90-110			
Matrix Spike Dup (W8D0487-MSD1)	**Source: 8D06080-28**				**Prepared & Analyzed: 04/09/18**						
Ammonia as N	0.317	0.048	0.10	mg/l	0.250	0.0557	104	90-110	0.3	15	
Batch: W8D0527 - EPA 353.2											
Blank (W8D0527-BLK1)					**Prepared & Analyzed: 04/10/18**						
NO2+NO3 as N	ND	83	200	ug/l							
LCS (W8D0527-BS1)					**Prepared & Analyzed: 04/10/18**						
NO2+NO3 as N	985	83	200	ug/l	1000		98	90-110			
Matrix Spike (W8D0527-MS1)	**Source: 8D09069-01**				**Prepared & Analyzed: 04/10/18**						
NO2+NO3 as N	7030	83	200	ug/l	2000	5140	94	90-110			
Matrix Spike (W8D0527-MS2)	**Source: 8D09071-11**				**Prepared & Analyzed: 04/10/18**						
NO2+NO3 as N	4030	83	200	ug/l	2000	2080	98	90-110			
Matrix Spike Dup (W8D0527-MSD1)	**Source: 8D09069-01**				**Prepared & Analyzed: 04/10/18**						
NO2+NO3 as N	7080	83	200	ug/l	2000	5140	97	90-110	0.7	20	
Matrix Spike Dup (W8D0527-MSD2)	**Source: 8D09071-11**				**Prepared & Analyzed: 04/10/18**						
NO2+NO3 as N	4030	83	200	ug/l	2000	2080	98	90-110	0	20	
Batch: W8D0788 - EPA 351.2											

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D0788 - EPA 351.2 (Continued)											
Blank (W8D0788-BLK1)					**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	ND	0.050	0.10	mg/l							
Blank (W8D0788-BLK2)					**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	ND	0.050	0.10	mg/l							
LCS (W8D0788-BS1)					**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	1.03	0.050	0.10	mg/l	1.00		103	90-110			
LCS (W8D0788-BS2)					**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	1.04	0.050	0.10	mg/l	1.00		104	90-110			
Matrix Spike (W8D0788-MS1)	**Source: 8D11053-01**				**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	1.35	0.050	0.10	mg/l	1.00	0.329	102	90-110			
Matrix Spike (W8D0788-MS2)	**Source: 8D11053-02**				**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	1.33	0.050	0.10	mg/l	1.00	0.307	103	90-110			
Matrix Spike Dup (W8D0788-MSD1)	**Source: 8D11053-01**				**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	1.44	0.050	0.10	mg/l	1.00	0.329	111	90-110	6	10	MS-01
Matrix Spike Dup (W8D0788-MSD2)	**Source: 8D11053-02**				**Prepared: 04/12/18**	**Analyzed: 04/16/18**					
TKN	1.38	0.050	0.10	mg/l	1.00	0.307	107	90-110	3	10	

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D1411 - EPA 1694M-ESI+											
Blank (W8D1411-BLK1)					**Prepared: 04/24/18 Analyzed: 05/14/18**						
Meprobamate	ND	0.36	1.0	ng/l							
TCPP	0.283	0.27	1.0	ng/l							J
TDCPP	4.01	0.47	1.0	ng/l							B
Blank (W8D1411-BLK2)					**Prepared: 04/24/18 Analyzed: 05/30/18**						
Acetaminophen	ND	1.4	20	ng/l							QC-2
Amoxicillin	ND	2.0	10	ng/l							QC-2
Atenolol	ND	0.20	1.0	ng/l							QC-2
Atorvastatin	ND	0.11	1.0	ng/l							QC-2
Azithromycin	ND	2.2	10	ng/l							QC-2
Caffeine	0.884	0.31	1.0	ng/l							QC-2, J
Carbamazepine	ND	0.080	1.0	ng/l							QC-2
Ciprofloxacin	10.3	1.4	5.0	ng/l							B-06, QC-2
Cotinine	1.06	0.59	2.0	ng/l							QC-2, J
DEET	0.611	0.060	1.0	ng/l							QC-2, J
Diazepam	ND	0.14	1.0	ng/l							QC-2
Fluoxetine	ND	0.080	1.0	ng/l							QC-2
Methadone	ND	0.040	1.0	ng/l							QC-2
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l							QC-2
Primidone	ND	0.60	1.0	ng/l							QC-2
Sulfamethoxazole	ND	0.19	1.0	ng/l							QC-2
TCEP	ND	0.34	1.0	ng/l							QC-2
Trimethoprim	ND	0.24	1.0	ng/l							QC-2
LCS (W8D1411-BS1)					**Prepared: 04/24/18 Analyzed: 05/14/18**						
Meprobamate	17.4	0.36	1.0	ng/l	10.0		174	11-166			Q-08
TCPP	8.54	0.27	1.0	ng/l	10.0		85	24-149			
TDCPP	15.1	0.47	1.0	ng/l	10.0		151	20-158			
LCS (W8D1411-BS2)					**Prepared: 04/24/18 Analyzed: 05/30/18**						
Acetaminophen	219	1.4	20	ng/l	200		110	66-156			QC-2
Amoxicillin	175	2.0	10	ng/l	100		175	14-167			Q-08, QC-2
Atenolol	10.5	0.20	1.0	ng/l	10.0		105	56-164			QC-2
Atorvastatin	6.80	0.11	1.0	ng/l	10.0		68	0.1-173			QC-2
Azithromycin	91.3	2.2	10	ng/l	100		91	52-166			QC-2
Caffeine	11.4	0.31	1.0	ng/l	10.0		114	55-152			QC-2
Carbamazepine	10.0	0.080	1.0	ng/l	10.0		100	60-135			QC-2
Ciprofloxacin	30.8	1.4	5.0	ng/l	50.0		62	51-168			QC-2
Cotinine	10.9	0.59	2.0	ng/l	10.0		109	68-155			QC-2
DEET	11.3	0.060	1.0	ng/l	10.0		113	45-135			QC-2

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D1411 - EPA 1694M-ESI+ (Continued)											
LCS (W8D1411-BS2)					**Prepared: 04/24/18 Analyzed: 05/30/18**						
Diazepam	9.72	0.14	1.0	ng/l	10.0		97	58-127			QC-2
Fluoxetine	11.5	0.080	1.0	ng/l	10.0		115	55-150			QC-2
Methadone	11.5	0.040	1.0	ng/l	10.0		115	62-137			QC-2
Phenytoin (Dilantin)	10.0	0.33	1.0	ng/l	10.0		100	69-138			QC-2
Primidone	11.8	0.60	1.0	ng/l	10.0		118	54-147			QC-2
Sulfamethoxazole	11.3	0.19	1.0	ng/l	10.0		113	60-133			QC-2
TCEP	8.22	0.34	1.0	ng/l	10.0		82	25-149			QC-2
Trimethoprim	12.0	0.24	1.0	ng/l	10.0		120	67-139			QC-2
LCS Dup (W8D1411-BSD1)					**Prepared: 04/24/18 Analyzed: 05/14/18**						
Meprobamate	25.8	0.36	1.0	ng/l	10.0		258	11-166	39	30	Q-08
TCPP	14.5	0.27	1.0	ng/l	10.0		145	24-149	52	30	Q-12
TDCPP	15.1	0.47	1.0	ng/l	10.0		151	20-158	0	30	
LCS Dup (W8D1411-BSD2)					**Prepared: 04/24/18 Analyzed: 05/30/18**						
Acetaminophen	269	1.4	20	ng/l	200		134	66-156	20	30	QC-2
Amoxicillin	343	2.0	10	ng/l	100		343	14-167	65	30	Q-08, QC-2
Atenolol	13.6	0.20	1.0	ng/l	10.0		136	56-164	26	30	QC-2
Atorvastatin	3.10	0.11	1.0	ng/l	10.0		31	0.1-173	75	30	Q-12, QC-2
Azithromycin	98.9	2.2	10	ng/l	100		99	52-166	8	30	QC-2
Caffeine	10.6	0.31	1.0	ng/l	10.0		106	55-152	7	30	QC-2
Carbamazepine	12.9	0.080	1.0	ng/l	10.0		129	60-135	25	30	QC-2
Ciprofloxacin	32.1	1.4	5.0	ng/l	50.0		64	51-168	4	30	QC-2
Cotinine	15.4	0.59	2.0	ng/l	10.0		154	68-155	34	30	Q-12, QC-2
DEET	11.2	0.060	1.0	ng/l	10.0		112	45-135	0.9	30	QC-2
Diazepam	9.05	0.14	1.0	ng/l	10.0		90	58-127	7	30	QC-2
Fluoxetine	9.51	0.080	1.0	ng/l	10.0		95	55-150	19	30	QC-2
Methadone	10.8	0.040	1.0	ng/l	10.0		108	62-137	6	30	QC-2
Phenytoin (Dilantin)	11.1	0.33	1.0	ng/l	10.0		111	69-138	10	30	QC-2
Primidone	12.9	0.60	1.0	ng/l	10.0		129	54-147	9	30	QC-2
Sulfamethoxazole	11.5	0.19	1.0	ng/l	10.0		115	60-133	2	30	QC-2
TCEP	10.5	0.34	1.0	ng/l	10.0		105	25-149	24	30	QC-2
Trimethoprim	10.8	0.24	1.0	ng/l	10.0		108	67-139	11	30	QC-2
Batch: W8D1530 - EPA 1694M-ESI+											
Blank (W8D1530-BLK1)					**Prepared: 04/25/18 Analyzed: 06/01/18**						
TDCPP	ND	0.47	1.0	ng/l							
Blank (W8D1530-BLK2)					**Prepared: 04/25/18 Analyzed: 06/03/18**						
Acetaminophen	ND	1.4	20	ng/l							QC-2
Amoxicillin	ND	2.0	10	ng/l							QC-2

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VCEHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 06/27/2018 15:41

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D1530 - EPA 1694M-ESI+ (Continued)											
Blank (W8D1530-BLK2)					**Prepared: 04/25/18 Analyzed: 06/03/18**						
Atenolol	ND	0.20	1.0	ng/l							QC-2
Atorvastatin	ND	0.11	1.0	ng/l							QC-2
Azithromycin	ND	2.2	10	ng/l							QC-2
Caffeine	0.745	0.31	1.0	ng/l							QC-2, J
Carbamazepine	0.438	0.080	1.0	ng/l							QC-2, J
Ciprofloxacin	8.00	1.4	5.0	ng/l							B, QC-2
Cotinine	1.27	0.59	2.0	ng/l							QC-2, J
DEET	0.526	0.060	1.0	ng/l							QC-2, J
Diazepam	0.242	0.14	1.0	ng/l							QC-2, J
Fluoxetine	ND	0.080	1.0	ng/l							QC-2
Meprobamate	ND	0.36	1.0	ng/l							QC-2
Methadone	0.391	0.040	1.0	ng/l							QC-2, J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l							QC-2
Primidone	ND	0.60	1.0	ng/l							QC-2
Sulfamethoxazole	ND	0.19	1.0	ng/l							QC-2
TCEP	ND	0.34	1.0	ng/l							QC-2
TCPP	5.94	0.27	1.0	ng/l							B, QC-2
Trimethoprim	ND	0.24	1.0	ng/l							QC-2
LCS (W8D1530-BS1)					**Prepared: 04/25/18 Analyzed: 06/01/18**						
TDCPP	15.2	0.47	1.0	ng/l	10.0		152	20-158			
LCS (W8D1530-BS2)					**Prepared: 04/25/18 Analyzed: 06/03/18**						
Acetaminophen	197	1.4	20	ng/l	200		98	66-156			QC-2
Amoxicillin	254	2.0	10	ng/l	100		254	14-167			Q-08, QC-2
Atenolol	8.67	0.20	1.0	ng/l	10.0		87	56-164			QC-2
Atorvastatin	5.13	0.11	1.0	ng/l	10.0		51	0.1-173			QC-2
Azithromycin	83.6	2.2	10	ng/l	100		84	52-166			QC-2
Caffeine	9.65	0.31	1.0	ng/l	10.0		96	55-152			QC-2
Carbamazepine	8.71	0.080	1.0	ng/l	10.0		87	60-135			QC-2
Ciprofloxacin	28.2	1.4	5.0	ng/l	50.0		56	51-168			QC-2
Cotinine	10.7	0.59	2.0	ng/l	10.0		107	68-155			QC-2
DEET	8.95	0.060	1.0	ng/l	10.0		90	45-135			QC-2
Diazepam	9.71	0.14	1.0	ng/l	10.0		97	58-127			QC-2
Fluoxetine	10.1	0.080	1.0	ng/l	10.0		101	55-150			QC-2
Meprobamate	20.0	0.36	1.0	ng/l	10.0		200	11-166			BS-H, QC-2
Methadone	8.33	0.040	1.0	ng/l	10.0		83	62-137			QC-2
Phenytoin (Dilantin)	7.15	0.33	1.0	ng/l	10.0		72	69-138			QC-2

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8D1530 - EPA 1694M-ESI+ (Continued)											
LCS (W8D1530-BS2)					**Prepared: 04/25/18 Analyzed: 06/03/18**						
Primidone	9.63	0.60	1.0	ng/l	10.0		96	54-147			QC-2
Sulfamethoxazole	10.5	0.19	1.0	ng/l	10.0		105	60-133			QC-2
TCEP	9.96	0.34	1.0	ng/l	10.0		100	25-149			QC-2
TCPP	12.4	0.27	1.0	ng/l	10.0		124	24-149			QC-2
Trimethoprim	10.2	0.24	1.0	ng/l	10.0		102	67-139			QC-2
LCS Dup (W8D1530-BSD1)					**Prepared: 04/25/18 Analyzed: 06/01/18**						
TDCPP	9.58	0.47	1.0	ng/l	10.0		96	20-158	45	30	Q-12
LCS Dup (W8D1530-BSD2)					**Prepared: 04/25/18 Analyzed: 06/03/18**						
Acetaminophen	219	1.4	20	ng/l	200		110	66-156	11	30	QC-2
Amoxicillin	213	2.0	10	ng/l	100		213	14-167	18	30	Q-08, QC-2
Atenolol	10.7	0.20	1.0	ng/l	10.0		107	56-164	21	30	QC-2
Atorvastatin	27.3	0.11	1.0	ng/l	10.0		273	0.1-173	137	30	BS-04, QC-2
Azithromycin	91.5	2.2	10	ng/l	100		92	52-166	9	30	QC-2
Caffeine	17.3	0.31	1.0	ng/l	10.0		173	55-152	57	30	QC-2, BS-04
Carbamazepine	9.68	0.080	1.0	ng/l	10.0		97	60-135	11	30	QC-2
Ciprofloxacin	32.9	1.4	5.0	ng/l	50.0		66	51-168	15	30	QC-2
Cotinine	11.0	0.59	2.0	ng/l	10.0		110	68-155	3	30	QC-2
DEET	11.6	0.060	1.0	ng/l	10.0		116	45-135	26	30	QC-2
Diazepam	10.9	0.14	1.0	ng/l	10.0		109	58-127	12	30	QC-2
Fluoxetine	12.2	0.080	1.0	ng/l	10.0		122	55-150	19	30	QC-2
Meprobamate	19.6	0.36	1.0	ng/l	10.0		196	11-166	2	30	BS-H, QC-2
Methadone	11.7	0.040	1.0	ng/l	10.0		117	62-137	34	30	Q-12, QC-2
Phenytoin (Dilantin)	8.85	0.33	1.0	ng/l	10.0		88	69-138	21	30	QC-2
Primidone	10.6	0.60	1.0	ng/l	10.0		106	54-147	10	30	QC-2
Sulfamethoxazole	9.96	0.19	1.0	ng/l	10.0		100	60-133	5	30	QC-2
TCEP	9.69	0.34	1.0	ng/l	10.0		97	25-149	3	30	QC-2
TCPP	8.13	0.27	1.0	ng/l	10.0		81	24-149	42	30	Q-12, QC-2
Trimethoprim	11.5	0.24	1.0	ng/l	10.0		115	67-139	12	30	QC-2

Notes and Definitions

Item	Definition
B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
B-07	This analyte was found in the method blank at levels above the MDL but below the reporting limit.
BS-04	The recovery of this analyte in LCS or LCSD was outside control limit. Sample was accepted based on the remaining LCS, LCSD or LCS-LL.
BS-H	The recovery of this analyte in the BS/LCS was over the control limit. Sample result is suspect.
I-05	Low internal standard recovery possibly due to matrix interference. The result is suspect.
J	Estimated conc. detected <MRL and >MDL.
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
Q-08	High bias in the QC sample does not affect sample result since analyte was not detected or below the reporting limit.
Q-12	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on the percent recoveries and/or other acceptable QC data.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

8D06080

STANDARD

Page 1 Of 3

CLIENT NAME: Geosyntec

PROJECT: VCEHD OWTS Study (LA0391)

ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101

PHONE: Jared Ervin: 805-979-9129
FAX:
EMAIL: Jervin@Geosyntec.com

PROJECT MANAGER: Jared Ervin

SAMPLER: REBECCA LUSTIG

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☐ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	ANALYSES REQUESTED PPCPs by EPA 1694-ESI+
	4/2/18	918	AQ	SW-04-D_180402	2	X
		1035	AQ	GW-E-02_180402	2	X
		1100	AQ	GW-E-03_180402	2	X
		1155	AQ	SW-05-D_180402	2	X
		1330	AQ	SW-04-U_180402	2	X
		1425	AQ	SW-03-D_180402	2	X
	4/3/18	903	AQ	GW-A-03_180403	2	X
		931	AQ	GW-A-02_180403	2	X
		959	AQ	GW-A-04_180403	2	X
		1030	AQ	GW-A-01_180403	2	X
		1117	AQ	GW-F-02_180403	2	X
		1231	AQ	SW-01-D_180403	2	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
REBECCA LUSTIG	4/6/18 1401	
	4/6/18 16:29	4/06/18 16:29

SAMPLE CONDITION:

Actual Temperature: 4.7

Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Attacked Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042707

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Analytical Laboratory Services - Since 1964
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Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

8D06020

STANDARD

Page 2 Of 3

CLIENT NAME: Geosyntec

PROJECT: VCEHD OWTS Study (LA0391)

ADDRESS:
924 Anacapa St., Suite 4A
Santa Barbara, CA 93101

PHONE: Jared Ervin: 805-979-9129
FAX:
EMAIL: Jervin@Geosyntec.com

PROJECT MANAGER: Jared Ervin

SAMPLER: REBECCA LUSTIG

ANALYSES REQUESTED

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☐ 10 - 15 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	PPCPs by EPA 1694-ESI+
	4/3/18	1319	AQ	GW-C-07_180403	2	X
	↓	1337	↓	GW-C-08_180403	2	X
	4/4/18	902	↓	GW-B-03_180404	1	X
	↓	1030	↓	GW-C-BK-06_180404	1	X
	↓	1055	↓	GW-D-07_180404	1	X
	↓	1211	↓	SW-03-U_180404	1	X
	↓	1256	↓	GW-A-07_180404	1	X
	↓	1327	↓	SW-02-D_180404	1	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
REBECCA LUSTIG	4/6/18 1401	
	4/6/18 16:29	4/06/18 16:29

SAMPLE CONDITION:
Actual Temperature: 4.7
Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Attacked Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

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SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042707

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Analytical Laboratory Services - Since 1964
14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

Standard CHAIN OF CUSTODY RECORD

WECK WKO# 8D06080

CLIENT NAME: **GEOSYNTEC**
ADDRESS: **924 ANACAPA ST. SUITE 4A**
SANTA BARBARA, CA 93101
PROJECT MANAGER: Jared Ervin

PROJECT: VC EHD OWTS Study (LA0391)
PHONE: Jared Ervin 805 979-9129
FAX:
EMAIL: Jervin@Geosyntec.com
SAMPLER: Rebecca Lustig

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☐ 10 - 15 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:

ANALYSES REQUESTED

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl₂ Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	PPCPs by EPA 1694-ESI+	Nitrate & Nitrite	Ammonia & Total Nitrogen									COMMENTS
	4/5/18	938	AQ	N	SW-02-U_180405	2	X											1L Amber
	↓	1102	↓	↓	GW-D-05_180405	↓	X											↓
		1102			GW-D-05-180405_DUP		X											
		1245			GW-G-02_180405		X											
		1406			GW-B-04_180405		X											
		1406			GW-B-04-180405_EQ		X											
	4/6/18	950	AQ	N	GW-G-01_180406	2	X											
	4/6/18	950	AQ	N	GW-G-01_180406	1		X	X									1L plastic

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
REBECCA LUSTIG	4/6/18 1401		
	4/6/18 16:29	16:29	4/06/18

SAMPLE CONDITION:
Actual Temperature: 4.7
Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Attacked Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY
OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8E18098

Project: VC EHD OWTS Study (LA0391)

Attn: Jared Ervin

Client: Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Report Date: 8/13/2018
Received Date: 5/18/2018
Turnaround Time: Normal
Phones: (805) 979-9129
Fax: (805) 899-8689
P.O. #:
Billing Code:

DoD-ELAP #L2457 • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Jared Ervin,

Enclosed are the results of analyses for samples received 5/18/18 with the Chain-of-Custody document. The samples were received in good condition, at 4.1 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Brandon Gee
Operations Manager/Senior PM

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
GW-C-BK-05-180514	Rebecca Lustig	8E18098-01	Water	05/14/18 08:53	
GW-C-BK-05-180514-EB	Rebecca Lustig	8E18098-02	Water	05/14/18 08:53	
GW-E-02-180514	Rebecca Lustig	8E18098-03	Water	05/14/18 10:16	
SW-05-D-180514	Rebecca Lustig	8E18098-04	Water	05/14/18 10:38	
SW-04-U-180514	Rebecca Lustig	8E18098-05	Water	05/14/18 12:02	
SW-04-D-180514	Rebecca Lustig	8E18098-06	Water	05/14/18 12:50	
SW-03-D-180514	Rebecca Lustig	8E18098-07	Water	05/14/18 13:43	
GW-A-03-180515	Rebecca Lustig	8E18098-08	Water	05/15/18 09:07	
GW-A-04-180515	Rebecca Lustig	8E18098-09	Water	05/15/18 10:00	
GW-A-01-180515	Rebecca Lustig	8E18098-10	Water	05/15/18 10:33	
GW-F-02-180515	Rebecca Lustig	8E18098-11	Water	05/15/18 11:25	
GW-C-07-180515	Rebecca Lustig	8E18098-12	Water	05/15/18 13:43	
GW-C-08-180515	Rebecca Lustig	8E18098-13	Water	05/15/18 14:04	
GW-A-02-180515	Rebecca Lustig	8E18098-14	Water	05/15/18 09:30	
GW-B-03-180516	Rebecca Lustig	8E18098-15	Water	05/16/18 08:50	
GW-B-03-180516-DUP	Rebecca Lustig	8E18098-16	Water	05/16/18 08:50	
SW-01-D-180516	Rebecca Lustig	8E18098-17	Water	05/16/18 10:06	
GW-B-04-180516	Rebecca Lustig	8E18098-18	Water	05/16/18 11:07	
SW-03-U-180516	Rebecca Lustig	8E18098-19	Water	05/16/18 12:06	
SW-02-U-180516	Rebecca Lustig	8E18098-20	Water	05/16/18 13:55	
GW-A-07-180516	Rebecca Lustig	8E18098-21	Water	05/16/18 14:30	
GW-C-BK-06-180517	Rebecca Lustig	8E18098-22	Water	05/17/18 08:22	
GW-D-07-180517	Rebecca Lustig	8E18098-23	Water	05/17/18 08:53	
GW-G-01-180517	Rebecca Lustig	8E18098-24	Water	05/17/18 09:50	
GW-D-04-180517	Rebecca Lustig	8E18098-25	Water	05/17/18 10:55	
GW-D-05-180517	Rebecca Lustig	8E18098-26	Water	05/17/18 12:01	
GW-E-03-180517	Rebecca Lustig	8E18098-27	Water	05/17/18 13:35	
GW-G-02-180518	Rebecca Lustig	8E18098-28	Water	05/18/18 09:32	
GW-G-02-180518	Rebecca Lustig	8E18098-29	Water	05/18/18 09:32	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 08/13/2018 16:15

Sample Results

Sample: GW-C-BK-05-180514
8E18098-01 (Water)

Sampled: 05/14/18 8:53 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 21:03	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 21:03	
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 21:03	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 21:03	
Azithromycin	**4.6**	2.2	10	ng/l	1	07/08/18 21:03	J
Caffeine	**1.8**	0.31	1.0	ng/l	1	07/08/18 21:03	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 21:03	
Ciprofloxacin	**4.7**	1.4	5.0	ng/l	1	07/08/18 21:03	J
Cotinine	ND	0.59	2.0	ng/l	1	07/08/18 21:03	
DEET	**2.3**	0.060	1.0	ng/l	1	07/08/18 21:03	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 21:03	
Fluoxetine	**1.1**	0.080	1.0	ng/l	1	07/08/18 21:03	
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 21:03	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 21:03	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 21:03	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 21:03	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 21:03	
Sulfamethoxazole	**0.74**	0.19	1.0	ng/l	1	07/08/18 21:03	J
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 21:03	
TCPP	**4.3**	0.27	1.0	ng/l	1	07/08/18 21:03	
TDCPP	**5.5**	0.47	1.0	ng/l	1	06/20/18 01:01	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 21:03	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-C-BK-05-180514-EB
8E18098-02 (Water)

Sampled: 05/14/18 8:53 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 21:19	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 21:19	
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 21:19	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 21:19	
Azithromycin	ND	2.2	10	ng/l	1	07/08/18 21:19	
Caffeine	**32**	0.31	1.0	ng/l	1	07/08/18 21:19	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 21:19	
Ciprofloxacin	**1.4**	1.4	5.0	ng/l	1	07/08/18 21:19	J
Cotinine	**0.62**	0.59	2.0	ng/l	1	07/08/18 21:19	J
DEET	**4.4**	0.060	1.0	ng/l	1	07/08/18 21:19	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 21:19	
Fluoxetine	**0.33**	0.080	1.0	ng/l	1	07/08/18 21:19	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 21:19	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 21:19	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 21:19	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 21:19	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 21:19	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/08/18 21:19	
TCEP	**1.6**	0.34	1.0	ng/l	1	07/08/18 21:19	
TCPP	**4.0**	0.27	1.0	ng/l	1	07/08/18 21:19	
TDCPP	**14**	0.47	1.0	ng/l	1	06/20/18 01:17	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 21:19	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-E-02-180514
8E18098-03 (Water)

Sampled: 05/14/18 10:16 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 21:36	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 21:36	
Atenolol	**1.3**	0.20	1.0	ng/l	1	07/08/18 21:36	B
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 21:36	
Azithromycin	**3.3**	2.2	10	ng/l	1	07/08/18 21:36	J
Caffeine	**0.66**	0.31	1.0	ng/l	1	07/08/18 21:36	J
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 21:36	
Ciprofloxacin	**1.4**	1.4	5.0	ng/l	1	07/08/18 21:36	J
Cotinine	ND	0.59	2.0	ng/l	1	07/08/18 21:36	
DEET	**0.67**	0.060	1.0	ng/l	1	07/08/18 21:36	J
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 21:36	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/08/18 21:36	
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 21:36	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 21:36	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 21:36	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 21:36	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 21:36	
Sulfamethoxazole	**0.54**	0.19	1.0	ng/l	1	07/08/18 21:36	J
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 21:36	
TCPP	ND	0.27	1.0	ng/l	1	07/08/18 21:36	
TDCPP	**2.4**	0.47	1.0	ng/l	1	06/20/18 01:33	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 21:36	

Sample Results

(Continued)

Sample: SW-05-D-180514
8E18098-04 (Water)

Sampled: 05/14/18 10:38 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 21:52	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 21:52	
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 21:52	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 21:52	
Azithromycin	**2.6**	2.2	10	ng/l	1	07/08/18 21:52	J
Caffeine	**6.0**	0.31	1.0	ng/l	1	07/08/18 21:52	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 21:52	
Ciprofloxacin	**1.9**	1.4	5.0	ng/l	1	07/08/18 21:52	J
Cotinine	**0.90**	0.59	2.0	ng/l	1	07/08/18 21:52	J
DEET	**1.3**	0.060	1.0	ng/l	1	07/08/18 21:52	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 21:52	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/08/18 21:52	
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 21:52	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 21:52	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 21:52	
Primidone	**0.81**	0.60	1.0	ng/l	1	07/08/18 21:52	J
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 21:52	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/08/18 21:52	
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 21:52	
TCPP	**1.4**	0.27	1.0	ng/l	1	07/08/18 21:52	
TDCPP	**1.4**	0.47	1.0	ng/l	1	06/20/18 01:50	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 21:52	

Sample Results

(Continued)

Sample: SW-04-U-180514
8E18098-05 (Water)

Sampled: 05/14/18 12:02 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 22:09	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 22:09	
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 22:09	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 22:09	
Azithromycin	ND	2.2	10	ng/l	1	07/08/18 22:09	
Caffeine	**4.6**	0.31	1.0	ng/l	1	07/08/18 22:09	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 22:09	
Ciprofloxacin	**2.4**	1.4	5.0	ng/l	1	07/08/18 22:09	J
Cotinine	ND	0.59	2.0	ng/l	1	07/08/18 22:09	
DEET	**0.75**	0.060	1.0	ng/l	1	07/08/18 22:09	J
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 22:09	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/08/18 22:09	
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 22:09	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 22:09	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 22:09	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 22:09	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 22:09	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/08/18 22:09	
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 22:09	
TCPP	ND	0.27	1.0	ng/l	1	07/08/18 22:09	
TDCPP	**4.0**	0.47	1.0	ng/l	1	06/20/18 02:06	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 22:09	

Sample Results

(Continued)

Sample: SW-04-D-180514
8E18098-06 (Water)

Sampled: 05/14/18 12:50 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 22:25	
Amoxicillin	**7.8**	2.0	10	ng/l	1	07/08/18 22:25	J
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 22:25	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 22:25	
Azithromycin	**3.3**	2.2	10	ng/l	1	07/08/18 22:25	J
Caffeine	**3.5**	0.31	1.0	ng/l	1	07/08/18 22:25	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 22:25	
Ciprofloxacin	**5.3**	1.4	5.0	ng/l	1	07/08/18 22:25	B
Cotinine	ND	0.59	2.0	ng/l	1	07/08/18 22:25	
DEET	**1.3**	0.060	1.0	ng/l	1	07/08/18 22:25	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 22:25	
Fluoxetine	**0.43**	0.080	1.0	ng/l	1	07/08/18 22:25	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 22:25	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 22:25	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 22:25	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 22:25	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 22:25	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/08/18 22:25	
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 22:25	
TCPP	ND	0.27	1.0	ng/l	1	07/08/18 22:25	
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 02:23	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 22:25	

Sample Results

(Continued)

Sample: SW-03-D-180514
8E18098-07 (Water)

Sampled: 05/14/18 13:43 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 23:15	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 23:15	
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 23:15	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 23:15	
Azithromycin	**8.2**	2.2	10	ng/l	1	07/08/18 23:15	J
Caffeine	**3.4**	0.31	1.0	ng/l	1	07/08/18 23:15	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 23:15	
Ciprofloxacin	**11**	1.4	5.0	ng/l	1	07/08/18 23:15	B
Cotinine	**0.74**	0.59	2.0	ng/l	1	07/08/18 23:15	J
DEET	**5.4**	0.060	1.0	ng/l	1	07/08/18 23:15	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 23:15	
Fluoxetine	**1.3**	0.080	1.0	ng/l	1	07/08/18 23:15	
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 23:15	
Methadone	**0.24**	0.040	1.0	ng/l	1	07/08/18 23:15	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 23:15	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 23:15	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 23:15	
Sulfamethoxazole	**0.33**	0.19	1.0	ng/l	1	07/08/18 23:15	J
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 23:15	
TCPP	ND	0.27	1.0	ng/l	1	07/08/18 23:15	
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 03:12	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 23:15	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-A-03-180515
8E18098-08 (Water)

Sampled: 05/15/18 9:07 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 23:31	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 23:31	
Atenolol	ND	0.20	1.0	ng/l	1	07/08/18 23:31	
Atorvastatin	**0.52**	0.11	1.0	ng/l	1	07/08/18 23:31	J
Azithromycin	**6.9**	2.2	10	ng/l	1	07/08/18 23:31	J
Caffeine	**2.4**	0.31	1.0	ng/l	1	07/08/18 23:31	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 23:31	
Ciprofloxacin	**10**	1.4	5.0	ng/l	1	07/08/18 23:31	B
Cotinine	ND	0.59	2.0	ng/l	1	07/08/18 23:31	
DEET	**1.8**	0.060	1.0	ng/l	1	07/08/18 23:31	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 23:31	
Fluoxetine	**1.5**	0.080	1.0	ng/l	1	07/08/18 23:31	
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 23:31	
Methadone	**0.90**	0.040	1.0	ng/l	1	07/08/18 23:31	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 23:31	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 23:31	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 23:31	
Sulfamethoxazole	**0.29**	0.19	1.0	ng/l	1	07/08/18 23:31	J
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 23:31	
TCPP	ND	0.27	1.0	ng/l	1	07/08/18 23:31	
TDCPP	**1.6**	0.47	1.0	ng/l	1	06/20/18 03:29	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 23:31	

Certificate of Analysis

FINAL REPORT

Sample Results

(Continued)

Sample: GW-A-04-180515 Sampled: 05/15/18 10:00 by Rebecca Lustig

8E18098-09 (Water)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/08/18 23:48	
Amoxicillin	ND	2.0	10	ng/l	1	07/08/18 23:48	
Atenolol	**0.95**	0.20	1.0	ng/l	1	07/08/18 23:48	J
Atorvastatin	ND	0.11	1.0	ng/l	1	07/08/18 23:48	
Azithromycin	**4.1**	2.2	10	ng/l	1	07/08/18 23:48	J
Caffeine	**0.81**	0.31	1.0	ng/l	1	07/08/18 23:48	J
Carbamazepine	ND	0.080	1.0	ng/l	1	07/08/18 23:48	
Ciprofloxacin	**1.9**	1.4	5.0	ng/l	1	07/08/18 23:48	J
Cotinine	ND	0.59	2.0	ng/l	1	07/08/18 23:48	
DEET	**2.3**	0.060	1.0	ng/l	1	07/08/18 23:48	
Diazepam	ND	0.14	1.0	ng/l	1	07/08/18 23:48	
Fluoxetine	**0.28**	0.080	1.0	ng/l	1	07/08/18 23:48	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/08/18 23:48	
Methadone	ND	0.040	1.0	ng/l	1	07/08/18 23:48	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/08/18 23:48	
Primidone	ND	0.60	1.0	ng/l	1	07/08/18 23:48	
Sucralose	ND	5.0	5.0	ng/l	1	07/08/18 23:48	
Sulfamethoxazole	**0.28**	0.19	1.0	ng/l	1	07/08/18 23:48	J
TCEP	ND	0.34	1.0	ng/l	1	07/08/18 23:48	
TCPP	ND	0.27	1.0	ng/l	1	07/08/18 23:48	
TDCPP	**1.0**	0.47	1.0	ng/l	1	06/20/18 03:45	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/08/18 23:48	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-A-01-180515
8E18098-10 (Water)

Sampled: 05/15/18 10:33 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 00:04	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 00:04	
Atenolol	ND	0.20	1.0	ng/l	1	07/09/18 00:04	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 00:04	
Azithromycin	**2.9**	2.2	10	ng/l	1	07/09/18 00:04	J
Caffeine	**0.70**	0.31	1.0	ng/l	1	07/09/18 00:04	J
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 00:04	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	07/09/18 00:04	
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 00:04	
DEET	**0.89**	0.060	1.0	ng/l	1	07/09/18 00:04	J
Diazepam	ND	0.14	1.0	ng/l	1	07/09/18 00:04	
Fluoxetine	**0.42**	0.080	1.0	ng/l	1	07/09/18 00:04	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 00:04	
Methadone	ND	0.040	1.0	ng/l	1	07/09/18 00:04	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 00:04	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 00:04	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 00:04	
Sulfamethoxazole	**0.39**	0.19	1.0	ng/l	1	07/09/18 00:04	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 00:04	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 00:04	
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 04:02	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 00:04	

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Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-F-02-180515
8E18098-11 (Water)

Sampled: 05/15/18 11:25 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 00:21	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 00:21	
Atenolol	ND	0.20	1.0	ng/l	1	07/09/18 00:21	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 00:21	
Azithromycin	ND	2.2	10	ng/l	1	07/09/18 00:21	
Caffeine	**1.3**	0.31	1.0	ng/l	1	07/09/18 00:21	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 00:21	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	07/09/18 00:21	
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 00:21	
DEET	**3.4**	0.060	1.0	ng/l	1	07/09/18 00:21	
Diazepam	ND	0.14	1.0	ng/l	1	07/09/18 00:21	
Fluoxetine	**0.30**	0.080	1.0	ng/l	1	07/09/18 00:21	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 00:21	
Methadone	ND	0.040	1.0	ng/l	1	07/09/18 00:21	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 00:21	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 00:21	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 00:21	
Sulfamethoxazole	**0.40**	0.19	1.0	ng/l	1	07/09/18 00:21	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 00:21	
TCPP	**0.94**	0.27	1.0	ng/l	1	07/09/18 00:21	J
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 04:18	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 00:21	

Sample Results

(Continued)

Sample: GW-C-07-180515
8E18098-12 (Water)

Sampled: 05/15/18 13:43 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 00:37	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 00:37	
Atenolol	ND	0.20	1.0	ng/l	1	07/09/18 00:37	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 00:37	
Azithromycin	**2.5**	2.2	10	ng/l	1	07/09/18 00:37	J
Caffeine	**3.2**	0.31	1.0	ng/l	1	07/09/18 00:37	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 00:37	
Ciprofloxacin	**3.8**	1.4	5.0	ng/l	1	07/09/18 00:37	J
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 00:37	
DEET	**4.3**	0.060	1.0	ng/l	1	07/09/18 00:37	
Diazepam	ND	0.14	1.0	ng/l	1	07/09/18 00:37	
Fluoxetine	**0.39**	0.080	1.0	ng/l	1	07/09/18 00:37	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 00:37	
Methadone	ND	0.040	1.0	ng/l	1	07/09/18 00:37	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 00:37	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 00:37	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 00:37	
Sulfamethoxazole	**0.51**	0.19	1.0	ng/l	1	07/09/18 00:37	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 00:37	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 00:37	
TDCPP	**2.1**	0.47	1.0	ng/l	1	06/20/18 04:35	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 00:37	

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Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

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Sample Results

(Continued)

Sample: GW-C-08-180515
8E18098-13 (Water)

Sampled: 05/15/18 14:04 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 00:53	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 00:53	
Atenolol	ND	0.20	1.0	ng/l	1	07/09/18 00:53	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 00:53	
Azithromycin	**5.6**	2.2	10	ng/l	1	07/09/18 00:53	J
Caffeine	**2.0**	0.31	1.0	ng/l	1	07/09/18 00:53	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 00:53	
Ciprofloxacin	**6.2**	1.4	5.0	ng/l	1	07/09/18 00:53	B
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 00:53	
DEET	**2.7**	0.060	1.0	ng/l	1	07/09/18 00:53	
Diazepam	ND	0.14	1.0	ng/l	1	07/09/18 00:53	
Fluoxetine	**0.44**	0.080	1.0	ng/l	1	07/09/18 00:53	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 00:53	
Methadone	ND	0.040	1.0	ng/l	1	07/09/18 00:53	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 00:53	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 00:53	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 00:53	
Sulfamethoxazole	**0.43**	0.19	1.0	ng/l	1	07/09/18 00:53	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 00:53	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 00:53	
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 04:51	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 00:53	

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Project Manager: Jared Ervin

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Sample Results

(Continued)

Sample: GW-A-02-180515
8E18098-14 (Water)

Sampled: 05/15/18 9:30 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 01:10	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 01:10	
Atenolol	ND	0.20	1.0	ng/l	1	07/09/18 01:10	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 01:10	
Azithromycin	**4.9**	2.2	10	ng/l	1	07/09/18 01:10	J
Caffeine	**0.93**	0.31	1.0	ng/l	1	07/09/18 01:10	J
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 01:10	
Ciprofloxacin	**4.4**	1.4	5.0	ng/l	1	07/09/18 01:10	J
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 01:10	
DEET	**2.9**	0.060	1.0	ng/l	1	07/09/18 01:10	
Diazepam	**0.27**	0.14	1.0	ng/l	1	07/09/18 01:10	J
Fluoxetine	**0.34**	0.080	1.0	ng/l	1	07/09/18 01:10	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 01:10	
Methadone	**0.16**	0.040	1.0	ng/l	1	07/09/18 01:10	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 01:10	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 01:10	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 01:10	
Sulfamethoxazole	**0.37**	0.19	1.0	ng/l	1	07/09/18 01:10	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 01:10	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 01:10	
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 05:08	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 01:10	

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Sample Results

(Continued)

Sample: GW-B-03-180516
8E18098-15 (Water)

Sampled: 05/16/18 8:50 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 01:26	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 01:26	
Atenolol	**0.41**	0.20	1.0	ng/l	1	07/09/18 01:26	J
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 01:26	
Azithromycin	**3.0**	2.2	10	ng/l	1	07/09/18 01:26	J
Caffeine	**1.8**	0.31	1.0	ng/l	1	07/09/18 01:26	
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 01:26	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	07/09/18 01:26	
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 01:26	
DEET	**1.8**	0.060	1.0	ng/l	1	07/09/18 01:26	
Diazepam	ND	0.14	1.0	ng/l	1	07/09/18 01:26	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/09/18 01:26	
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 01:26	
Methadone	ND	0.040	1.0	ng/l	1	07/09/18 01:26	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 01:26	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 01:26	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 01:26	
Sulfamethoxazole	**0.21**	0.19	1.0	ng/l	1	07/09/18 01:26	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 01:26	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 01:26	
TDCPP	**0.55**	0.47	1.0	ng/l	1	06/20/18 05:24	J
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 01:26	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
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Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-B-03-180516-DUP
8E18098-16 (Water)

Sampled: 05/16/18 8:50 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8E1718 **Instr:** LCMS02 **Prepared:** 05/31/18 13:11 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/09/18 01:43	
Amoxicillin	ND	2.0	10	ng/l	1	07/09/18 01:43	
Atenolol	ND	0.20	1.0	ng/l	1	07/09/18 01:43	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 01:43	
Azithromycin	**2.5**	2.2	10	ng/l	1	07/09/18 01:43	J
Caffeine	**0.49**	0.31	1.0	ng/l	1	07/09/18 01:43	J
Carbamazepine	ND	0.080	1.0	ng/l	1	07/09/18 01:43	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	07/09/18 01:43	
Cotinine	ND	0.59	2.0	ng/l	1	07/09/18 01:43	
DEET	**1.7**	0.060	1.0	ng/l	1	07/09/18 01:43	
Diazepam	ND	0.14	1.0	ng/l	1	07/09/18 01:43	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/09/18 01:43	
Meprobamate	ND	0.36	1.0	ng/l	1	07/09/18 01:43	
Methadone	ND	0.040	1.0	ng/l	1	07/09/18 01:43	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/09/18 01:43	
Primidone	ND	0.60	1.0	ng/l	1	07/09/18 01:43	
Sucralose	ND	5.0	5.0	ng/l	1	07/09/18 01:43	
Sulfamethoxazole	**0.38**	0.19	1.0	ng/l	1	07/09/18 01:43	J
TCEP	ND	0.34	1.0	ng/l	1	07/09/18 01:43	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 01:43	
TDCPP	ND	0.47	1.0	ng/l	1	06/20/18 05:41	
Trimethoprim	ND	0.24	1.0	ng/l	1	07/09/18 01:43	

Sample Results

(Continued)

Sample: SW-01-D-180516 | Sampled: 05/16/18 10:06 by Rebecca Lustig

8E18098-17 (Water)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 22:13	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 22:13	
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 22:13	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 23:19	
Azithromycin	**2.6**	2.2	10	ng/l	1	07/20/18 22:13	J
Caffeine	**20**	0.31	1.0	ng/l	1	07/20/18 22:13	B
Carbamazepine	**0.18**	0.080	1.0	ng/l	1	07/20/18 22:13	J
Ciprofloxacin	**3.8**	1.4	5.0	ng/l	1	07/20/18 22:13	J
Cotinine	**0.77**	0.59	2.0	ng/l	1	07/20/18 22:13	J
DEET	**15**	0.060	1.0	ng/l	1	07/20/18 22:13	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 22:13	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/20/18 22:13	
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 22:13	
Methadone	ND	0.040	1.0	ng/l	1	07/20/18 22:13	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 22:13	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 22:13	
Sucralose	ND	5.0	5.0	ng/l	1	07/20/18 22:13	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/20/18 22:13	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 22:13	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 23:19	
TDCPP	**21**	0.47	1.0	ng/l	1	07/20/18 22:13	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/20/18 22:13	

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Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-B-04-180516
8E18098-18 (Water)

Sampled: 05/16/18 11:07 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 22:30	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 22:30	
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 22:30	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 23:35	
Azithromycin	**3.7**	2.2	10	ng/l	1	07/20/18 22:30	J
Caffeine	**2.6**	0.31	1.0	ng/l	1	07/20/18 22:30	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/20/18 22:30	
Ciprofloxacin	**3.8**	1.4	5.0	ng/l	1	07/20/18 22:30	J
Cotinine	ND	0.59	2.0	ng/l	1	07/20/18 22:30	
DEET	**2.7**	0.060	1.0	ng/l	1	07/20/18 22:30	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 22:30	
Fluoxetine	**0.41**	0.080	1.0	ng/l	1	07/20/18 22:30	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 22:30	
Methadone	**0.10**	0.040	1.0	ng/l	1	07/20/18 22:30	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 22:30	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 22:30	
Sucralose	**6.8**	5.0	5.0	ng/l	1	07/20/18 22:30	
Sulfamethoxazole	**2.4**	0.19	1.0	ng/l	1	07/20/18 22:30	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 22:30	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 23:35	
TDCPP	**12**	0.47	1.0	ng/l	1	07/20/18 22:30	B
Trimethoprim	**0.31**	0.24	1.0	ng/l	1	07/20/18 22:30	J

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: SW-03-U-180516
8E18098-19 (Water)

Sampled: 05/16/18 12:06 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 22:46	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 22:46	
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 22:46	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/09/18 23:52	
Azithromycin	**3.1**	2.2	10	ng/l	1	07/20/18 22:46	J
Caffeine	**3.9**	0.31	1.0	ng/l	1	07/20/18 22:46	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/20/18 22:46	
Ciprofloxacin	**6.8**	1.4	5.0	ng/l	1	07/20/18 22:46	B
Cotinine	ND	0.59	2.0	ng/l	1	07/20/18 22:46	
DEET	**2.2**	0.060	1.0	ng/l	1	07/20/18 22:46	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 22:46	
Fluoxetine	**0.55**	0.080	1.0	ng/l	1	07/20/18 22:46	J
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 22:46	
Methadone	**0.12**	0.040	1.0	ng/l	1	07/20/18 22:46	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 22:46	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 22:46	
Sucralose	ND	5.0	5.0	ng/l	1	07/20/18 22:46	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/20/18 22:46	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 22:46	
TCPP	ND	0.27	1.0	ng/l	1	07/09/18 23:52	
TDCPP	**11**	0.47	1.0	ng/l	1	07/20/18 22:46	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/20/18 22:46	

Sample Results

(Continued)

Sample: SW-02-U-180516
8E18098-20 (Water)

Sampled: 05/16/18 13:55 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 23:03	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 23:03	
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 23:03	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 00:08	
Azithromycin	**2.8**	2.2	10	ng/l	1	07/20/18 23:03	J
Caffeine	**75**	0.31	1.0	ng/l	1	07/20/18 23:03	
Carbamazepine	**0.22**	0.080	1.0	ng/l	1	07/20/18 23:03	J
Ciprofloxacin	**3.2**	1.4	5.0	ng/l	1	07/20/18 23:03	J
Cotinine	**0.84**	0.59	2.0	ng/l	1	07/20/18 23:03	J
DEET	**16**	0.060	1.0	ng/l	1	07/20/18 23:03	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 23:03	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/20/18 23:03	
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 23:03	
Methadone	ND	0.040	1.0	ng/l	1	07/20/18 23:03	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 23:03	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 23:03	
Sucralose	ND	5.0	5.0	ng/l	1	07/20/18 23:03	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/20/18 23:03	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 23:03	
TCPP	**3.2**	0.27	1.0	ng/l	1	07/10/18 00:08	
TDCPP	**11**	0.47	1.0	ng/l	1	07/20/18 23:03	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/20/18 23:03	

Sample Results

(Continued)

Sample: GW-A-07-180516
8E18098-21 (Water)

Sampled: 05/16/18 14:30 by Rebecca Lustig

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
PPCPs - Pharmaceuticals by LC/MSMS-ESI+							
Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan							
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 23:19	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 23:19	
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 23:19	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 00:25	
Azithromycin	**3.3**	2.2	10	ng/l	1	07/20/18 23:19	J
Caffeine	**36**	0.31	1.0	ng/l	1	07/20/18 23:19	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/20/18 23:19	
Ciprofloxacin	**2.3**	1.4	5.0	ng/l	1	07/20/18 23:19	J
Cotinine	ND	0.59	2.0	ng/l	1	07/20/18 23:19	
DEET	**1.4**	0.060	1.0	ng/l	1	07/20/18 23:19	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 23:19	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/20/18 23:19	
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 23:19	
Methadone	ND	0.040	1.0	ng/l	1	07/20/18 23:19	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 23:19	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 23:19	
Sucralose	ND	5.0	5.0	ng/l	1	07/20/18 23:19	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/20/18 23:19	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 23:19	
TCPP	**1.3**	0.27	1.0	ng/l	1	07/10/18 00:25	
TDCPP	**8.7**	0.47	1.0	ng/l	1	07/20/18 23:19	B
Trimethoprim	**0.29**	0.24	1.0	ng/l	1	07/20/18 23:19	J

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-C-BK-06-180517
8E18098-22 (Water)

Sampled: 05/17/18 8:22 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 23:36	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 23:36	I-05
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 23:36	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 00:41	
Azithromycin	**2.3**	2.2	10	ng/l	1	07/20/18 23:36	J
Caffeine	**1.4**	0.31	1.0	ng/l	1	07/20/18 23:36	B
Carbamazepine	**0.10**	0.080	1.0	ng/l	1	07/20/18 23:36	J
Ciprofloxacin	**20**	1.4	5.0	ng/l	1	07/20/18 23:36	B
Cotinine	ND	0.59	2.0	ng/l	1	07/20/18 23:36	
DEET	**2.0**	0.060	1.0	ng/l	1	07/20/18 23:36	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 23:36	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/20/18 23:36	
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 23:36	
Methadone	ND	0.040	1.0	ng/l	1	07/20/18 23:36	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 23:36	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 23:36	
Sucralose	ND	5.0	5.0	ng/l	1	07/20/18 23:36	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/20/18 23:36	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 23:36	
TCPP	**1.3**	0.27	1.0	ng/l	1	07/10/18 00:41	
TDCPP	**13**	0.47	1.0	ng/l	1	07/20/18 23:36	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/20/18 23:36	

Certificate of Analysis

FINAL REPORT

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-D-07-180517
8E18098-23 (Water)

Sampled: 05/17/18 8:53 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/20/18 23:52	
Amoxicillin	ND	2.0	10	ng/l	1	07/20/18 23:52	I-05
Atenolol	ND	0.20	1.0	ng/l	1	07/20/18 23:52	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 00:57	
Azithromycin	**2.8**	2.2	10	ng/l	1	07/20/18 23:52	J
Caffeine	**1.3**	0.31	1.0	ng/l	1	07/20/18 23:52	B
Carbamazepine	**0.082**	0.080	1.0	ng/l	1	07/20/18 23:52	J
Ciprofloxacin	**4.6**	1.4	5.0	ng/l	1	07/20/18 23:52	J
Cotinine	ND	0.59	2.0	ng/l	1	07/20/18 23:52	
DEET	**1.9**	0.060	1.0	ng/l	1	07/20/18 23:52	
Diazepam	ND	0.14	1.0	ng/l	1	07/20/18 23:52	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/20/18 23:52	
Meprobamate	ND	0.36	1.0	ng/l	1	07/20/18 23:52	
Methadone	ND	0.040	1.0	ng/l	1	07/20/18 23:52	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/20/18 23:52	
Primidone	ND	0.60	1.0	ng/l	1	07/20/18 23:52	
Sucralose	ND	5.0	5.0	ng/l	1	07/20/18 23:52	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/20/18 23:52	
TCEP	ND	0.34	1.0	ng/l	1	07/20/18 23:52	
TCPP	ND	0.27	1.0	ng/l	1	07/10/18 00:57	
TDCPP	**12**	0.47	1.0	ng/l	1	07/20/18 23:52	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/20/18 23:52	

Sample Results

(Continued)

Sample: GW-G-01-180517
8E18098-24 (Water)

Sampled: 05/17/18 9:50 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/21/18 00:09	
Amoxicillin	ND	2.0	10	ng/l	1	07/21/18 00:09	
Atenolol	ND	0.20	1.0	ng/l	1	07/21/18 00:09	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 01:14	
Azithromycin	**2.9**	2.2	10	ng/l	1	07/21/18 00:09	J
Caffeine	**1.3**	0.31	1.0	ng/l	1	07/21/18 00:09	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/21/18 00:09	
Ciprofloxacin	**1.4**	1.4	5.0	ng/l	1	07/21/18 00:09	J
Cotinine	ND	0.59	2.0	ng/l	1	07/21/18 00:09	
DEET	**3.6**	0.060	1.0	ng/l	1	07/21/18 00:09	
Diazepam	ND	0.14	1.0	ng/l	1	07/21/18 00:09	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/21/18 00:09	
Meprobamate	ND	0.36	1.0	ng/l	1	07/21/18 00:09	
Methadone	ND	0.040	1.0	ng/l	1	07/21/18 00:09	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/21/18 00:09	
Primidone	ND	0.60	1.0	ng/l	1	07/21/18 00:09	
Sucralose	ND	5.0	5.0	ng/l	1	07/21/18 00:09	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/21/18 00:09	
TCEP	**0.80**	0.34	1.0	ng/l	1	07/21/18 00:09	J
TCPP	ND	0.27	1.0	ng/l	1	07/10/18 01:14	
TDCPP	**43**	0.47	1.0	ng/l	1	07/21/18 00:09	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/21/18 00:09	

Sample Results

(Continued)

Sample: GW-D-04-180517
8E18098-25 (Water)

Sampled: 05/17/18 10:55 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/21/18 00:25	
Amoxicillin	ND	2.0	10	ng/l	1	07/21/18 00:25	
Atenolol	ND	0.20	1.0	ng/l	1	07/21/18 00:25	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 01:30	
Azithromycin	**2.2**	2.2	10	ng/l	1	07/21/18 00:25	J
Caffeine	**2.9**	0.31	1.0	ng/l	1	07/21/18 00:25	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/21/18 00:25	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	07/21/18 00:25	
Cotinine	ND	0.59	2.0	ng/l	1	07/21/18 00:25	
DEET	**2.9**	0.060	1.0	ng/l	1	07/21/18 00:25	
Diazepam	ND	0.14	1.0	ng/l	1	07/21/18 00:25	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/21/18 00:25	
Meprobamate	ND	0.36	1.0	ng/l	1	07/21/18 00:25	
Methadone	ND	0.040	1.0	ng/l	1	07/21/18 00:25	
Phenytoin (Dilantin)	**0.56**	0.33	1.0	ng/l	1	07/21/18 00:25	J
Primidone	ND	0.60	1.0	ng/l	1	07/21/18 00:25	
Sucralose	ND	5.0	5.0	ng/l	1	07/21/18 00:25	
Sulfamethoxazole	**1.4**	0.19	1.0	ng/l	1	07/21/18 00:25	
TCEP	ND	0.34	1.0	ng/l	1	07/21/18 00:25	
TCPP	**1.5**	0.27	1.0	ng/l	1	07/10/18 01:30	
TDCPP	**15**	0.47	1.0	ng/l	1	07/21/18 00:25	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/21/18 00:25	

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported:
08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-D-05-180517
8E18098-26 (Water)

Sampled: 05/17/18 12:01 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/21/18 00:42	
Amoxicillin	ND	2.0	10	ng/l	1	07/21/18 00:42	I-05
Atenolol	ND	0.20	1.0	ng/l	1	07/21/18 00:42	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 01:47	
Azithromycin	**2.4**	2.2	10	ng/l	1	07/21/18 00:42	J
Caffeine	**2.8**	0.31	1.0	ng/l	1	07/21/18 00:42	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/21/18 00:42	
Ciprofloxacin	ND	1.4	5.0	ng/l	1	07/21/18 00:42	
Cotinine	ND	0.59	2.0	ng/l	1	07/21/18 00:42	
DEET	**3.0**	0.060	1.0	ng/l	1	07/21/18 00:42	
Diazepam	ND	0.14	1.0	ng/l	1	07/21/18 00:42	
Fluoxetine	ND	0.080	1.0	ng/l	1	07/21/18 00:42	
Meprobamate	ND	0.36	1.0	ng/l	1	07/21/18 00:42	
Methadone	ND	0.040	1.0	ng/l	1	07/21/18 00:42	
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/21/18 00:42	
Primidone	ND	0.60	1.0	ng/l	1	07/21/18 00:42	
Sucralose	ND	5.0	5.0	ng/l	1	07/21/18 00:42	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/21/18 00:42	
TCEP	ND	0.34	1.0	ng/l	1	07/21/18 00:42	
TCPP	ND	0.27	1.0	ng/l	1	07/10/18 01:47	
TDCPP	**12**	0.47	1.0	ng/l	1	07/21/18 00:42	B
Trimethoprim	ND	0.24	1.0	ng/l	1	07/21/18 00:42	

Sample Results

(Continued)

Sample: GW-E-03-180517
8E18098-27 (Water)

Sampled: 05/17/18 13:35 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/21/18 01:31	
Amoxicillin	ND	2.0	10	ng/l	1	07/21/18 01:31	
Atenolol	ND	0.20	1.0	ng/l	1	07/21/18 01:31	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 02:36	
Azithromycin	**9.6**	2.2	10	ng/l	1	07/21/18 01:31	J
Caffeine	**1.1**	0.31	1.0	ng/l	1	07/21/18 01:31	B
Carbamazepine	ND	0.080	1.0	ng/l	1	07/21/18 01:31	
Ciprofloxacin	**9.2**	1.4	5.0	ng/l	1	07/21/18 01:31	B
Cotinine	ND	0.59	2.0	ng/l	1	07/21/18 01:31	
DEET	**2.7**	0.060	1.0	ng/l	1	07/21/18 01:31	
Diazepam	**0.21**	0.14	1.0	ng/l	1	07/21/18 01:31	J
Fluoxetine	**1.1**	0.080	1.0	ng/l	1	07/21/18 01:31	
Meprobamate	ND	0.36	1.0	ng/l	1	07/21/18 01:31	
Methadone	**0.27**	0.040	1.0	ng/l	1	07/21/18 01:31	J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l	1	07/21/18 01:31	
Primidone	ND	0.60	1.0	ng/l	1	07/21/18 01:31	
Sucralose	**6.5**	5.0	5.0	ng/l	1	07/21/18 01:31	
Sulfamethoxazole	ND	0.19	1.0	ng/l	1	07/21/18 01:31	
TCEP	ND	0.34	1.0	ng/l	1	07/21/18 01:31	
TCPP	ND	0.27	1.0	ng/l	1	07/10/18 02:36	
TDCPP	**6.8**	0.47	1.0	ng/l	1	07/21/18 01:31	B
Trimethoprim	**0.38**	0.24	1.0	ng/l	1	07/21/18 01:31	J

Sample Results

(Continued)

Sample: GW-G-02-180518
8E18098-28 (Water)

Sampled: 05/18/18 9:32 by Rebecca Lustig

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Method: EPA 1694M-ESI+ **Batch ID:** W8F0636 **Instr:** LCMS02 **Prepared:** 06/12/18 07:55 **Analyst:** kan

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Acetaminophen	ND	1.4	20	ng/l	1	07/21/18 01:47	
Amoxicillin	ND	2.0	10	ng/l	1	07/21/18 01:47	
Atenolol	ND	0.20	1.0	ng/l	1	07/21/18 01:47	
Atorvastatin	ND	0.11	1.0	ng/l	1	07/10/18 02:53	
Azithromycin	**6.9**	2.2	10	ng/l	1	07/21/18 01:47	J
Caffeine	**1.1**	0.31	1.0	ng/l	1	07/21/18 01:47	B
Carbamazepine	**0.11**	0.080	1.0	ng/l	1	07/21/18 01:47	J
Ciprofloxacin	**15**	1.4	5.0	ng/l	1	07/21/18 01:47	B
Cotinine	ND	0.59	2.0	ng/l	1	07/21/18 01:47	
DEET	**3.3**	0.060	1.0	ng/l	1	07/21/18 01:47	
Diazepam	**0.41**	0.14	1.0	ng/l	1	07/21/18 01:47	J
Fluoxetine	**1.4**	0.080	1.0	ng/l	1	07/21/18 01:47	
Meprobamate	ND	0.36	1.0	ng/l	1	07/21/18 01:47	
Methadone	**1.1**	0.040	1.0	ng/l	1	07/21/18 01:47	
Phenytoin (Dilantin)	**0.96**	0.33	1.0	ng/l	1	07/21/18 01:47	J
Primidone	ND	0.60	1.0	ng/l	1	07/21/18 01:47	
Sucralose	**36**	5.0	5.0	ng/l	1	07/21/18 01:47	
Sulfamethoxazole	**6.5**	0.19	1.0	ng/l	1	07/21/18 01:47	
TCEP	ND	0.34	1.0	ng/l	1	07/21/18 01:47	
TCPP	**1.7**	0.27	1.0	ng/l	1	07/10/18 02:53	
TDCPP	**11**	0.47	1.0	ng/l	1	07/21/18 01:47	B
Trimethoprim	**0.71**	0.24	1.0	ng/l	1	07/21/18 01:47	J

Geosyntec Consultants - Santa Barbara
924 Anacapa Street, Ste 4A
Santa Barbara, CA 93101

Project Number: VC EHD OWTS Study (LA0391)

Project Manager: Jared Ervin

Reported: 08/13/2018 16:15

Sample Results

(Continued)

Sample: GW-G-02-180518
8E18098-29 (Water)

Sampled: 05/18/18 9:32 by Rebecca Lustig

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0							
Method: EPA 300.0 **Batch ID:** W8E1060 **Instr:** LC12 **Prepared:** 05/18/18 16:44 **Analyst:** jan							
NO2+NO3 as N	**15**	0.020	0.11	mg/l	1	05/18/18 21:02	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: _Various **Batch ID:** [CALC] **Instr:** [CALC] **Prepared:** 05/24/18 10:34 **Analyst:** ymt							
Nitrogen, Total	**15**		0.20	mg/l	1	05/30/18 15:49	
Method: EPA 350.1 **Batch ID:** W8E1030 **Instr:** AA06 **Prepared:** 05/18/18 11:15 **Analyst:** mnq							
Ammonia as N	ND	0.048	0.10	mg/l	1	05/18/18 18:38	
Method: EPA 351.2 **Batch ID:** W8E1357 **Instr:** AA06 **Prepared:** 05/24/18 10:34 **Analyst:** ymt							
TKN	ND	0.050	0.10	mg/l	1	05/30/18 15:49	
Method: EPA 353.2 **Batch ID:** W8F0619 **Instr:** Inst **Prepared:** 05/18/18 21:02 **Analyst:** jan							
NO2+NO3 as N	**15000**	83	200	ug/l	1	05/18/18 21:02	

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8E1060 - EPA 300.0											
Blank (W8E1060-BLK1)					**Prepared & Analyzed: 05/18/18**						
NO2+NO3 as N	0.0410	0.020	0.11	mg/l							B-07, J
LCS (W8E1060-BS1)					**Prepared & Analyzed: 05/18/18**						
NO2+NO3 as N	4.19	0.020	0.11	mg/l	4.00		105	90-110			
Matrix Spike (W8E1060-MS1)	**Source: 8E18096-01**				**Prepared & Analyzed: 05/18/18**						
NO2+NO3 as N	42.1	0.20	1.1	mg/l	40.0	0.343	104	84-115			
Matrix Spike Dup (W8E1060-MSD1)	**Source: 8E18096-01**				**Prepared & Analyzed: 05/18/18**						
NO2+NO3 as N	41.8	0.20	1.1	mg/l	40.0	0.343	104	84-115	0.7	20	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8E1030 - EPA 350.1											
Blank (W8E1030-BLK1)					**Prepared & Analyzed: 05/18/18**						
Ammonia as N	ND	0.048	0.10	mg/l							
Blank (W8E1030-BLK2)					**Prepared & Analyzed: 05/18/18**						
Ammonia as N	ND	0.048	0.10	mg/l							
LCS (W8E1030-BS1)					**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.266	0.048	0.10	mg/l	0.250		107	90-110			
LCS (W8E1030-BS2)					**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.264	0.048	0.10	mg/l	0.250		105	90-110			
Duplicate (W8E1030-DUP1)	**Source: 8E17090-01**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	ND	0.048	0.10	mg/l		ND				15	
Matrix Spike (W8E1030-MS1)	**Source: 8E17073-01**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.267	0.048	0.10	mg/l	0.250	ND	107	90-110			
Matrix Spike (W8E1030-MS2)	**Source: 8E17073-02**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.260	0.048	0.10	mg/l	0.250	ND	104	90-110			
Matrix Spike (W8E1030-MS3)	**Source: 8E18066-01**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.264	0.048	0.10	mg/l	0.250	ND	105	90-110			
Matrix Spike Dup (W8E1030-MSD1)	**Source: 8E17073-01**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.264	0.048	0.10	mg/l	0.250	ND	106	90-110	0.9	15	
Matrix Spike Dup (W8E1030-MSD2)	**Source: 8E17073-02**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.262	0.048	0.10	mg/l	0.250	ND	105	90-110	0.7	15	
Matrix Spike Dup (W8E1030-MSD3)	**Source: 8E18066-01**				**Prepared & Analyzed: 05/18/18**						
Ammonia as N	0.262	0.048	0.10	mg/l	0.250	ND	105	90-110	0.6	15	
Batch: W8E1357 - EPA 351.2											
Blank (W8E1357-BLK1)					**Prepared: 05/24/18 Analyzed: 05/30/18**						
TKN	ND	0.050	0.10	mg/l							
Blank (W8E1357-BLK2)					**Prepared: 05/24/18 Analyzed: 05/30/18**						

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8E1357 - EPA 351.2 (Continued)											
Blank (W8E1357-BLK2)					**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	ND	0.050	0.10	mg/l							
LCS (W8E1357-BS1)					**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	0.988	0.050	0.10	mg/l	1.00		99	90-110			
LCS (W8E1357-BS2)					**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	0.958	0.050	0.10	mg/l	1.00		96	90-110			
Duplicate (W8E1357-DUP1)	**Source: 8E22012-03**				**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	0.182	0.050	0.10	mg/l		0.186			2	10	
Matrix Spike (W8E1357-MS1)	**Source: 8E22012-01**				**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	1.21	0.050	0.10	mg/l	1.00	0.241	97	90-110			
Matrix Spike (W8E1357-MS2)	**Source: 8E22012-02**				**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	1.16	0.050	0.10	mg/l	1.00	0.192	96	90-110			
Matrix Spike Dup (W8E1357-MSD1)	**Source: 8E22012-01**				**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	1.20	0.050	0.10	mg/l	1.00	0.241	95	90-110	1	10	
Matrix Spike Dup (W8E1357-MSD2)	**Source: 8E22012-02**				**Prepared: 05/24/18**	**Analyzed: 05/30/18**					
TKN	1.19	0.050	0.10	mg/l	1.00	0.192	99	90-110	3	10	

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8E1718 - EPA 1694M-ESI+											
Blank (W8E1718-BLK1)					**Prepared: 05/31/18 Analyzed: 06/19/18**						
TDCPP	4.28	0.47	1.0	ng/l							B
Blank (W8E1718-BLK2)					**Prepared: 05/31/18 Analyzed: 07/08/18**						
Acetaminophen	ND	1.4	20	ng/l							QC-2
Amoxicillin	ND	2.0	10	ng/l							QC-2
Atenolol	5.26	0.20	1.0	ng/l							B, QC-2
Atorvastatin	0.611	0.11	1.0	ng/l							QC-2, J
Azithromycin	6.00	2.2	10	ng/l							QC-2, J
Caffeine	0.739	0.31	1.0	ng/l							QC-2, J
Carbamazepine	ND	0.080	1.0	ng/l							QC-2
Ciprofloxacin	8.52	1.4	5.0	ng/l							B, QC-2
Cotinine	0.905	0.59	2.0	ng/l							QC-2, J
DEET	0.777	0.060	1.0	ng/l							QC-2, J
Diazepam	ND	0.14	1.0	ng/l							QC-2
Fluoxetine	0.895	0.080	1.0	ng/l							QC-2, J
Meprobamate	ND	0.36	1.0	ng/l							QC-2
Methadone	0.132	0.040	1.0	ng/l							QC-2, J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l							QC-2
Primidone	ND	0.60	1.0	ng/l							QC-2
Sulfamethoxazole	ND	0.19	1.0	ng/l							QC-2
TCEP	ND	0.34	1.0	ng/l							QC-2
TCPP	ND	0.27	1.0	ng/l							QC-2
Trimethoprim	0.361	0.24	1.0	ng/l							QC-2, J
LCS (W8E1718-BS1)					**Prepared: 05/31/18 Analyzed: 06/19/18**						
TDCPP	12.4	0.47	1.0	ng/l	10.0		124	20-158			
LCS (W8E1718-BS2)					**Prepared: 05/31/18 Analyzed: 07/08/18**						
Acetaminophen	235	1.4	20	ng/l	200		118	66-156			QC-2
Amoxicillin	159	2.0	10	ng/l	100		159	14-167			QC-2
Atenolol	14.4	0.20	1.0	ng/l	10.0		144	56-164			QC-2
Atorvastatin	6.99	0.11	1.0	ng/l	10.0		70	0.1-173			QC-2
Azithromycin	116	2.2	10	ng/l	100		116	52-166			QC-2
Caffeine	10.3	0.31	1.0	ng/l	10.0		103	55-152			QC-2
Carbamazepine	12.6	0.080	1.0	ng/l	10.0		126	60-135			QC-2
Ciprofloxacin	68.4	1.4	5.0	ng/l	50.0		137	51-168			QC-2
Cotinine	12.7	0.59	2.0	ng/l	10.0		127	68-155			QC-2
DEET	9.13	0.060	1.0	ng/l	10.0		91	45-135			QC-2
Diazepam	13.2	0.14	1.0	ng/l	10.0		132	58-127			BS-04, QC-2

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8E1718 - EPA 1694M-ESI+ (Continued)											
LCS (W8E1718-BS2)					**Prepared: 05/31/18 Analyzed: 07/08/18**						
Fluoxetine	11.4	0.080	1.0	ng/l	10.0		114	55-150			QC-2
Meprobamate	14.7	0.36	1.0	ng/l	10.0		147	11-166			QC-2
Methadone	10.6	0.040	1.0	ng/l	10.0		106	62-137			QC-2
Phenytoin (Dilantin)	14.5	0.33	1.0	ng/l	10.0		145	69-138			BS-04, QC-2
Primidone	11.1	0.60	1.0	ng/l	10.0		111	54-147			QC-2
Sulfamethoxazole	13.6	0.19	1.0	ng/l	10.0		136	60-133			BS-04, QC-2
TCEP	18.1	0.34	1.0	ng/l	10.0		181	25-149			BS-H, QC-2
TCPP	8.04	0.27	1.0	ng/l	10.0		80	24-149			QC-2
Trimethoprim	8.96	0.24	1.0	ng/l	10.0		90	67-139			QC-2
LCS Dup (W8E1718-BSD1)					**Prepared: 05/31/18 Analyzed: 06/19/18**						
TDCPP	8.86	0.47	1.0	ng/l	10.0		89	20-158	33	30	Q-12
LCS Dup (W8E1718-BSD2)					**Prepared: 05/31/18 Analyzed: 07/08/18**						
Acetaminophen	245	1.4	20	ng/l	200		122	66-156	4	30	QC-2
Amoxicillin	154	2.0	10	ng/l	100		154	14-167	3	30	QC-2
Atenolol	11.8	0.20	1.0	ng/l	10.0		118	56-164	20	30	QC-2
Atorvastatin	8.43	0.11	1.0	ng/l	10.0		84	0.1-173	19	30	QC-2
Azithromycin	98.4	2.2	10	ng/l	100		98	52-166	16	30	QC-2
Caffeine	10.7	0.31	1.0	ng/l	10.0		107	55-152	4	30	QC-2
Carbamazepine	12.9	0.080	1.0	ng/l	10.0		129	60-135	2	30	QC-2
Ciprofloxacin	70.9	1.4	5.0	ng/l	50.0		142	51-168	4	30	QC-2
Cotinine	11.6	0.59	2.0	ng/l	10.0		116	68-155	9	30	QC-2
DEET	14.8	0.060	1.0	ng/l	10.0		148	45-135	47	30	BS-04, QC-2
Diazepam	12.2	0.14	1.0	ng/l	10.0		122	58-127	8	30	QC-2
Fluoxetine	14.1	0.080	1.0	ng/l	10.0		141	55-150	21	30	QC-2
Meprobamate	49.3	0.36	1.0	ng/l	10.0		493	11-166	108	30	BS-04, QC-2
Methadone	12.1	0.040	1.0	ng/l	10.0		121	62-137	13	30	QC-2
Phenytoin (Dilantin)	12.7	0.33	1.0	ng/l	10.0		127	69-138	13	30	QC-2
Primidone	12.6	0.60	1.0	ng/l	10.0		126	54-147	13	30	QC-2
Sulfamethoxazole	12.9	0.19	1.0	ng/l	10.0		129	60-133	5	30	QC-2
TCEP	18.2	0.34	1.0	ng/l	10.0		182	25-149	0.6	30	BS-H, QC-2
TCPP	9.64	0.27	1.0	ng/l	10.0		96	24-149	18	30	QC-2
Trimethoprim	10.3	0.24	1.0	ng/l	10.0		103	67-139	14	30	QC-2
Batch: W8F0636 - EPA 1694M-ESI+											
Blank (W8F0636-BLK1)					**Prepared: 06/12/18 Analyzed: 07/09/18**						
Atorvastatin	ND	0.11	1.0	ng/l							

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8F0636 - EPA 1694M-ESI+ (Continued)											
Blank (W8F0636-BLK1)					**Prepared: 06/12/18 Analyzed: 07/09/18**						
TCPP	ND	0.27	1.0	ng/l							
Blank (W8F0636-BLK2)					**Prepared: 06/12/18 Analyzed: 07/20/18**						
Acetaminophen	ND	1.4	20	ng/l							QC-2
Amoxicillin	ND	2.0	10	ng/l							QC-2
Atenolol	ND	0.20	1.0	ng/l							QC-2
Azithromycin	10.4	2.2	10	ng/l							B-06, QC-2
Caffeine	4.43	0.31	1.0	ng/l							B, QC-2
Carbamazepine	0.0825	0.080	1.0	ng/l							QC-2, J
Ciprofloxacin	21.9	1.4	5.0	ng/l							B, QC-2
Cotinine	1.35	0.59	2.0	ng/l							QC-2, J
DEET	0.682	0.060	1.0	ng/l							QC-2, J
Diazepam	ND	0.14	1.0	ng/l							QC-2
Fluoxetine	0.492	0.080	1.0	ng/l							QC-2, J
Meprobamate	ND	0.36	1.0	ng/l							QC-2
Methadone	0.126	0.040	1.0	ng/l							QC-2, J
Phenytoin (Dilantin)	ND	0.33	1.0	ng/l							QC-2
Primidone	ND	0.60	1.0	ng/l							QC-2
Sulfamethoxazole	0.517	0.19	1.0	ng/l							QC-2, J
TCEP	ND	0.34	1.0	ng/l							QC-2
TDCPP	6.42	0.47	1.0	ng/l							B, QC-2
Trimethoprim	ND	0.24	1.0	ng/l							QC-2
LCS (W8F0636-BS1)					**Prepared: 06/12/18 Analyzed: 07/09/18**						
Atorvastatin	7.42	0.11	1.0	ng/l	10.0		74	0.1-173			
TCPP	7.79	0.27	1.0	ng/l	10.0		78	24-149			
LCS (W8F0636-BS2)					**Prepared: 06/12/18 Analyzed: 07/20/18**						
Acetaminophen	251	1.4	20	ng/l	200		126	66-156			QC-2
Amoxicillin	257	2.0	10	ng/l	100		257	14-167			Q-08, QC-2
Atenolol	12.2	0.20	1.0	ng/l	10.0		122	56-164			QC-2
Azithromycin	105	2.2	10	ng/l	100		105	52-166			QC-2
Caffeine	12.0	0.31	1.0	ng/l	10.0		120	55-152			QC-2
Carbamazepine	10.7	0.080	1.0	ng/l	10.0		107	60-135			QC-2
Ciprofloxacin	56.9	1.4	5.0	ng/l	50.0		114	51-168			QC-2
Cotinine	11.6	0.59	2.0	ng/l	10.0		116	68-155			QC-2
DEET	13.3	0.060	1.0	ng/l	10.0		133	45-135			QC-2
Diazepam	12.2	0.14	1.0	ng/l	10.0		122	58-127			QC-2
Fluoxetine	11.9	0.080	1.0	ng/l	10.0		119	55-150			QC-2
Meprobamate	15.7	0.36	1.0	ng/l	10.0		157	11-166			QC-2

Quality Control Results

(Continued)

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8F0636 - EPA 1694M-ESI+ (Continued)											
LCS (W8F0636-BS2)					**Prepared: 06/12/18 Analyzed: 07/20/18**						
Methadone	10.8	0.040	1.0	ng/l	10.0		108	62-137			QC-2
Phenytoin (Dilantin)	13.4	0.33	1.0	ng/l	10.0		134	69-138			QC-2
Primidone	9.21	0.60	1.0	ng/l	10.0		92	54-147			QC-2
Sulfamethoxazole	12.3	0.19	1.0	ng/l	10.0		123	60-133			QC-2
TCEP	16.3	0.34	1.0	ng/l	10.0		163	25-149			BS-04, QC-2
TDCPP	18.5	0.47	1.0	ng/l	10.0		185	20-158			BS-H, QC-2
Trimethoprim	8.25	0.24	1.0	ng/l	10.0		82	67-139			QC-2
LCS Dup (W8F0636-BSD1)					**Prepared: 06/12/18 Analyzed: 07/09/18**						
Atorvastatin	7.17	0.11	1.0	ng/l	10.0		72	0.1-173	3	30	
TCPP	8.09	0.27	1.0	ng/l	10.0		81	24-149	4	30	
LCS Dup (W8F0636-BSD2)					**Prepared: 06/12/18 Analyzed: 07/20/18**						
Acetaminophen	247	1.4	20	ng/l	200		124	66-156	2	30	QC-2
Amoxicillin	251	2.0	10	ng/l	100		251	14-167	2	30	Q-08, QC-2
Atenolol	12.9	0.20	1.0	ng/l	10.0		129	56-164	6	30	QC-2
Azithromycin	98.2	2.2	10	ng/l	100		98	52-166	7	30	QC-2
Caffeine	12.0	0.31	1.0	ng/l	10.0		120	55-152	0	30	QC-2
Carbamazepine	13.2	0.080	1.0	ng/l	10.0		132	60-135	21	30	QC-2
Ciprofloxacin	56.6	1.4	5.0	ng/l	50.0		113	51-168	0.5	30	QC-2
Cotinine	12.3	0.59	2.0	ng/l	10.0		123	68-155	6	30	QC-2
DEET	12.3	0.060	1.0	ng/l	10.0		123	45-135	8	30	QC-2
Diazepam	11.8	0.14	1.0	ng/l	10.0		118	58-127	3	30	QC-2
Fluoxetine	14.9	0.080	1.0	ng/l	10.0		149	55-150	22	30	QC-2
Meprobamate	25.3	0.36	1.0	ng/l	10.0		253	11-166	47	30	BS-04, QC-2
Methadone	11.9	0.040	1.0	ng/l	10.0		119	62-137	10	30	QC-2
Phenytoin (Dilantin)	16.0	0.33	1.0	ng/l	10.0		160	69-138	18	30	BS-04, QC-2
Primidone	14.6	0.60	1.0	ng/l	10.0		146	54-147	45	30	QC-2, Q-12
Sulfamethoxazole	12.3	0.19	1.0	ng/l	10.0		123	60-133	0	30	QC-2
TCEP	14.9	0.34	1.0	ng/l	10.0		149	25-149	9	30	QC-2
TDCPP	26.8	0.47	1.0	ng/l	10.0		268	20-158	37	30	BS-H, QC-2
Trimethoprim	9.74	0.24	1.0	ng/l	10.0		97	67-139	17	30	QC-2

Notes and Definitions

Item	Definition
B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
B-07	This analyte was found in the method blank at levels above the MDL but below the reporting limit.
BS-04	The recovery of this analyte in LCS or LCSD was outside control limit. Sample was accepted based on the remaining LCS, LCSD or LCS-LL.
BS-H	The recovery of this analyte in the BS/LCS was over the control limit. Sample result is suspect.
I-05	Low internal standard recovery possibly due to matrix interference. The result is suspect.
J	Estimated conc. detected <MRL and >MDL.
Q-08	High bias in the QC sample does not affect sample result since analyte was not detected or below the reporting limit.
Q-12	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on the percent recoveries and/or other acceptable QC data.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

W L

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Standard CHAIN OF CUSTODY RECORD

WECK WKO# 8E18098

CLIENT NAME:
GEOSYNTEC

ADDRESS:
924 ANACAPA ST. SUITE 4A
SANTA BARBARA, CA 93101

PROJECT MANAGER
Jared Ervin

PROJECT:
VC EHD OWTS Study (LA0391)

PHONE: Jared Ervin 805 979-9129

FAX:

EMAIL: Jervin@Geosyntec.com

SAMPLER
Rebecca Lustig

ANALYSES REQUESTED

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	PPCPs by EPA 1694-ESI+
	5/14/18	853	AQ		GW-C-BK-05_180514	2	X
		853			GW-C-BK-05_180514_EB	1	X
		1016			GW-E-02_180514	2	X
		1038			SW-05-D_180514	2	X
		1202			SW-04-U_180514	2	X
		1250			SW-04-D_180514	2	X
	↓	1343	↓		SW-03-D_180514	2	X
	5/15/18	907	AQ		GW-A-03_180515	2	X
		1000			GW-A-04_180515	2	X
		1033			GW-A-01_180515	2	X
		1125			GW-F-02_180515	2	X
	↓	1343	↓		GW-C-07_180515	2	X

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☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☐ 10 - 15 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
Rebecca Lustig	5/18/2018 1228		5/18/18 12:28
	5/18/18 14:57		5/18/18 14:57

SAMPLE CONDITION:
Actual Temperature: 4.1°C

Received On Ice [✓ Y] N
Preserved [✓ Y] N
Evidence Seals Present Y [✓ N]
Container Attacked Y [✓ N]
Preserved at Lab Y [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

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FAX:
EMAIL: Jervin@Geosyntec.com

PROJECT MANAGER: Jared Ervin

SAMPLER: Rebecca Lustig

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- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☐ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT	PPCPs by EPA 1694-ESI+	COMMENTS
	5/15/18	1404	AQ		GW-C-08_180515	2	X	
	5/15/18	930	AQ		GW-A-02_180515	2	X	
	5/16/18	850			GW-B-03_180516	2	X	
		850			GW-B-03_180516_DUP	2	X	
		1006			SW-01-D_180516	2	X	
		1107			GW-B-04_180516	2	X	
		1206			SW-03-U_180516	1	X	
		1355			SW-02-U_180516	2	X	
	↓	1430	↓		GW-A-07_180516	2	X	
	5/17/18	822	AQ		GW-CBK-06_180517	2	X	
		833			GW-D-07_180517	2	X	
	↓	950	↓		GW-G-01_180517	2	X	

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
Rebecca Lustig	5/18/2018 1228		5/18/18 12:28
	5/18/18 14:57		5/18/18 14:57

SAMPLE CONDITION:
Actual Temperature: 4.1°C
Received On Ice [✓ Y] N
Preserved Y [✓ N]
Evidence Seals Present [✓ Y] N
Container Attacked Y [✓ N]
Preserved at Lab Y [✓ N]

SAMPLE TYPE CODE:
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NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

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PHONE: Jared Ervin 805 979-9129

FAX:

EMAIL: Jervin@Geosyntec.com

PROJECT MANAGER: Jared Ervin

SAMPLER: Rebecca Lustig

SPECIAL HANDLING

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☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☐ 10 - 15 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl$_2$ Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	PPCPs by EPA 1694-ESI+	Nitrate + Nitrite (300.0)	Ammonia (350.1)+	TOTAL N	COMMENTS
	5/17/18	1055	AQ		GW-D-04_180517	2	X				
	↓	1201	↓		GW-D-05_180517	2	X				
	↓	1335	↓		GW-E-03_180517	2	X				
	5/18/18	932	↓		GW-G-02_180518	2	X				
	5/18/18	932	AQ		GW-G-02_180518	1		X	X	X	1L Plastic bottle

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
Rebecca Lustig	5/18/2018 1228		5/18/18 12:28
	5/18/18 14:57		5/18/18 14:57

SAMPLE CONDITION:

Actual Temperature: 4.1°C

Received On Ice [✓ Y] N
Preserved [✓ Y] N
Evidence Seals Present Y [✓ N]
Container Attacked Y [✓ N]
Preserved at Lab Y [✓ N]

SAMPLE TYPE CODE:

AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
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Appendix 3-2: TAC Comments on September 2018 Draft Technical Report

(Letters from Ojai Valley Sanitary District and Regional Water Quality Control Board)

OJAI VALLEY SANITARY DISTRICT
A Public Agency
1072 Tico Road, Ojai, California 93023
(805) 646-5548 • FAX (805) 640-0842
www.ojaisan.org

October 10, 2018

Charles Genkel, Manager
Technical Services Section
Environmental Health Division
County of Ventura
800 S. Victoria Avenue
Ventura, CA 93009-1730

RE: SEPTEMBER 2018 TECHNICAL REPORT RELATED TO THE STUDY OF WATER QUALITY IMPAIRMENTS ATTRIBUTABLE TO ONSITE WASTEWATER TREATMENT SYSTEMS IN THE VENTURA RIVER WATERSHED

OVSD has reviewed the draft Technical Report, dated September 2018 from Geosyntec Consultants related to the Study of Water Quality Impairments Attributable to Onsite Wastewater Treatment Systems in the Ventura River Watershed. While the report outlines the completed surface water, groundwater and analysis, we would like to provide comments related to the overall water quality conditions in the Watershed and other related studies and efforts to characterize the nutrient impacts on the watershed.

OVSD General Comments are as follows:

1. The Study appears to have not included a large area of properties in the Arbolada area and did not include any septic served properties in the entire City of Ojai.
2. There are extensive natural creeks and improved drainages in the Arbolada area that drain directly to San Antonio Creek and to the Stewart Canyon drain where historically high nitrate levels have been observed.
3. One well was sampled within Area G, close to the Arbolada which showed elevated nutrients. The nearest surface water sample was in Area D, well downstream of the Arbolada.
4. Historical groundwater and surface water quality sampling by other groups and parties, dating back a decade or more do not appear to be included or referenced in great detail in the report. The Santa Barbara Channel Keeper Stream Team, UCSB and OVSD have compiled an extensive list of samples showing significant nutrient water quality issues.

5. The Study does not appear to reference any known information from septic failures or pumping that would be contained in required reporting databases.

6. The Study conclusions do not appear to include any data from the Ventura County Watershed Protection District, Groundwater Section Annual Report for the groundwater quality. Known wells and sampling data indicate Nitrate tests between 2.7 – 37.2 in various well samples.

7. The Study conclusions based on the historical groundwater and surface water samples illustrated in Figures 25 & 26 appear to be inaccurate. Figures 25 & 26 indicate some of the highest nitrate samples downstream of City/County septic properties in the Arbolada, near the intersection of Stewart Canyon and San Antonio Creek. Yet this sample data was not discussed in the analysis

8. The 600 foot and 2000-foot buffers along the impaired waterways show relatively very low concentrations of septic properties. Most of the septic properties are outside the buffer areas, yet the waterways are impaired. How can a relatively few properties in the buffer areas be connected to the impairment but the many properties located outside the buffer areas be listed as "low" probability of impacting the water quality?

9. Historically, there is common knowledge of contaminated water and odors located in septic areas, flooded leach fields and septic backups into homes in wet years.

We believe, and data shows, that septic systems contribute to groundwater and surface water quality impairments to a greater degree than concluded in the Study. Additional detailed comments are provided below.

Poor graphic quality of maps

The maps provided in the report are pivotal to understanding the approach and conclusions of the study. However, the size and resolution of the maps in the document is so low (there is no ability to zoom in to examine any detail) that it severely hampers review and interpretation. The maps should be provided as large format (e.g., tabloid size) high resolution images to allow for detailed inspection on the computer screen. This could have been accomplished using an appendix if the resulting file size was too large. It is also very hard to distinguish the Upper Ventura River groundwater basin boundary from the Lower Ventura River basin boundary.

Misuse of a regulatory term

Throughout the report, a concentration of 1.15 mg/L for total N, or sometimes for nitrate, is referred to as a TMDL *target*, and it is implied that the TMDL directly regulates the concentration of nitrate in surface waters. In the context of TMDLs, numeric targets have a very specific regulatory meaning and are values assigned to the parameters that are used to determine attainment of the TMDL. *The actual adopted Algae TMDL did not establish targets for any nutrient parameters.* Instead, the TMDL established targets for macroalgal biomass, macroalgal cover, phytoplankton biomass, DO and pH. As adopted, the TMDL can be attained if the targets for algal biomass, etc. are met in the stream, regardless of nutrient concentrations.

Nitrate in stream water does not indicate degree of loading to the stream

Nitrate is reasonably conservative and highly mobile in soils below the root zone, provided anaerobic conditions are not encountered. However, nitrate is highly **non**-conservative in surface waters. Use of nitrate concentrations in stream water is an inappropriate indicator of nitrate loading for this study, and thus the assessments of risk of OWTS loading based on down gradient stream water chemistry are highly compromised. Especially during the spring and summer months (when algae and aquatic macrophytes are most active), nitrate entering the streams from groundwater or surface runoff will be rapidly taken up into biomass. The unsuitability of nitrate as an indicator of nutrient loading is one of the reasons biomass-related targets were included in the TMDL instead of nutrient concentration targets. At the least, data for TN should have been used in stream water instead of nitrate. However, *even TN is a poor indicator of loading to streams*, as it also fails to account for nitrogen incorporated into the biomass of heterotrophic microbes or primary producers.

Other sources of data that could be used to identify risk

There are several sources of data in the public sphere that could have been leveraged to identify areas where OWTS are failing or poorly sited. OVSD, and likely other public agencies, routinely reports to EHD when evidence of failing septic tanks is encountered in the field by workers or inspectors. OVSD staff are familiar with sites in the Ojai area where evidence of failed OWTS (odors, actual leaking of septage) is obvious during wet weather or encountered during construction and have reported such locations to EHD It might have been advantageous to interview OVSD staff to identify known OWTS problem areas as a part of this study. Reports from septic tank inspections (such as conducted when real estate changes hands) should be on file at EHD. Per the VCRMA website, there are three basic permits for OWTS in Ventura County, construction or repair permits for conventional systems, construction or repair permits for alternative systems, and certifications of existing systems. The VCRMA website includes a search tool for records on individual OWTS for 1978-2016 that uses filters such as address, area, and APN. Results of pertinent site studies (such as septic tank pumping inspections for existing system certifications, percolation tests included in geotechnical reports for new construction) are available for individual OWTS through the search tool. Although we recognize that use of these types of information were not included in the scope or budget of the current study, the report should contain an acknowledgment of other data sets for identifying high-risk OWTS, and recommendations for their use.

Assumptions about potential interference of OVSD sewer mains

Proximity to sanitary sewer lines, and the possibility of groundwater contamination from leaking sewer lines, was used in the report to qualify data from wells in Groups A, B, C, D, and E (see comments on p. 45-47). OVSD could have been contacted directly to provide specifics about the likelihood of sanitary sewer or private lateral leaks in the vicinity of wells used in this study. OVSD's program for addressing inflow and infiltration (I/I) started with development of its Sanitary Sewer Maintenance Program (SSMP) and includes an aggressive program of sanitary sewer line inspections and testing. Since the certification of the SSMP in July 2009, OVSD has developed a comprehensive I/I reduction program. The I/I reduction program has almost halved peak influent flows during rain events. OVSD continues to monitor "Enhanced Maintenance Areas (Hot Spots)" and known High Ground Water areas and utilizes targeted flow metering. In addition, in 2014, OVSD completed a pilot project to repair 33 deficient private sewer laterals, which successfully reduced I/I from these laterals. Therefore, on September 28, 2015, OVSD adopted Ordinance No. OVSD-78 which established Guidelines for Private Sewer Laterals (PSL) to reduce potential discharges and protect the environment. Since 2014, a total of 870 PSL pipelines have been inspected and 373 deficient PSL pipelines have been repaired.

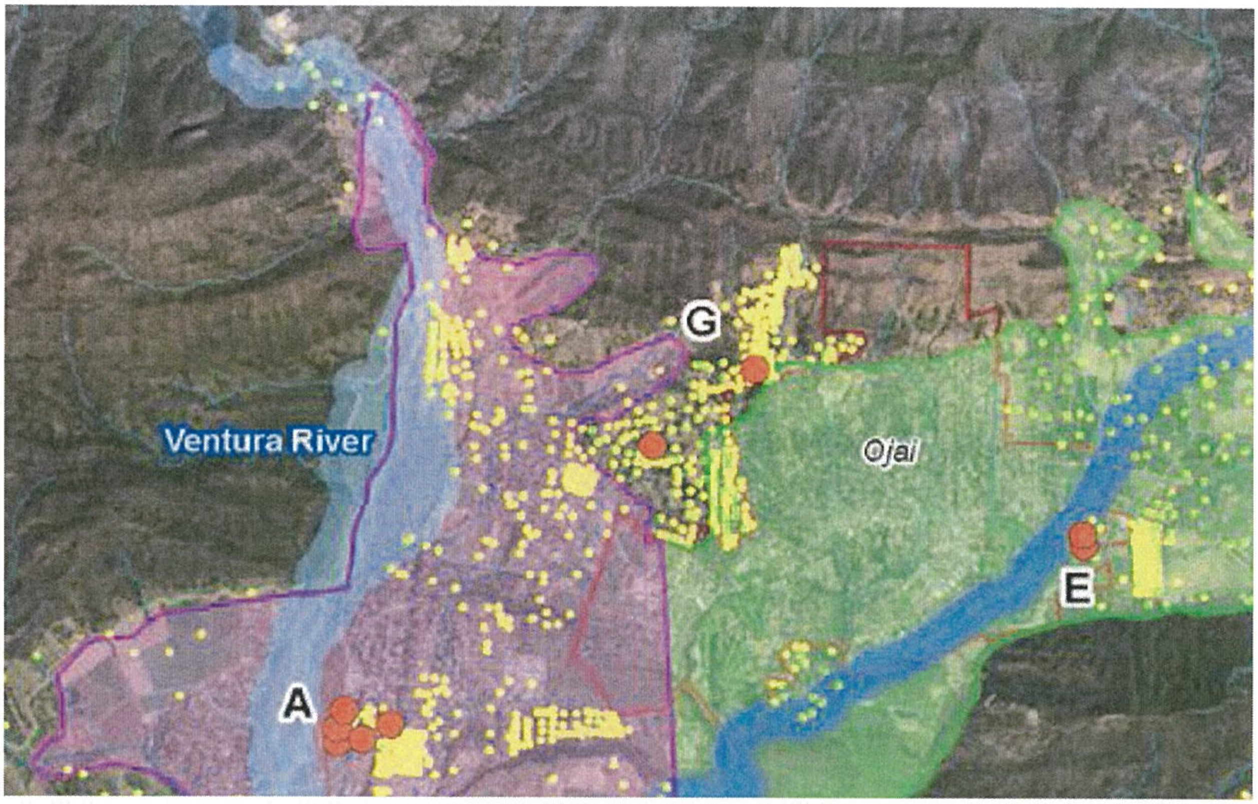
Issues with the sampling period

Effect of prolonged drought: The collection of the groundwater and surface water data used to derive the 2000 ft radius of influence occurred during the 6th year of an exceptional drought. Conclusions regarding the distance between wells and culprit OWTS may have been very different if the data sets were obtained when water tables were higher and the hydraulic connection between leach fields and well capture zones was more pronounced.

Thomas Fire anomalies: Some post-Thomas Fire runoff data from the MS4 mass emission station (ME-VR2) and the two major outfall stations (MO-MEI and ME-OJA) were presented in the report (in Table 8), presumably to address the question of whether nitrate in stream samples taken in April and May 2018 were distorted by post-fire processes. The historic averages from the three MS4 sites provided for context (from 2009-2017) included wet weather data, and the post-fire data shown was for only three events starting with the first post fire event on 1/9/18 through 3/1/18. This is not a great data set to place the April and May stream samples from the OWTS study into context. The post-fire quality of surface water was subject to several drivers that could have worked together to obscure high nitrate levels more characteristic of upwelling groundwater in some of the locations in the watershed. First, as is now a well-discussed phenomenon among water purveyors in the watershed, the post-fire rain event in early January deposited a layer of sediment in the active channel bed that effectively capped the aquifer, dramatically reducing the rate of groundwater recharge through the gravel beds, and causing runoff to “slide” on top of the new deposits down the entire main stem rather than infiltrating. This led to an abnormally extended period of continuous surface flows in the Ventura River with the result that water from the undeveloped Matilija drainages constituted a much greater proportion of the surface water sampled in the lower reaches in April and May than would ordinarily be the case. Following the single significant post-fire rain event in January, surface flows in the Ventura River did not become discontinuous until the last week of May – months later than would be expected after a such scant and curtailed winter rain season. Second, the dramatically reduced recharge caused an atypical drop in groundwater levels in the spring along the axis of the river. Both phenomena will have changed the location and degree to which groundwater – and any accompanying anthropogenically derived nitrate - upwelled in the sampled reaches.

The study appears to have omitted OWTS located within the City of Ojai

Figure 7 in the report (close up provided below), appears to indicate that OWTS within the City of Ojai were not considered in the study.



Close up from Figure 7 in the report. The faint red line is Ojai City limits

However, there are areas of OWTS within the City of Ojai – especially in the Arbolada neighborhood - which are not illustrated in the report maps. The areas including OWTS within the City of Ojai are located in the unsewered areas marked by orange fill in Figure 8 from OVSD's 2011 study of sources of N and P in the Ventura River Watershed (reproduced below).

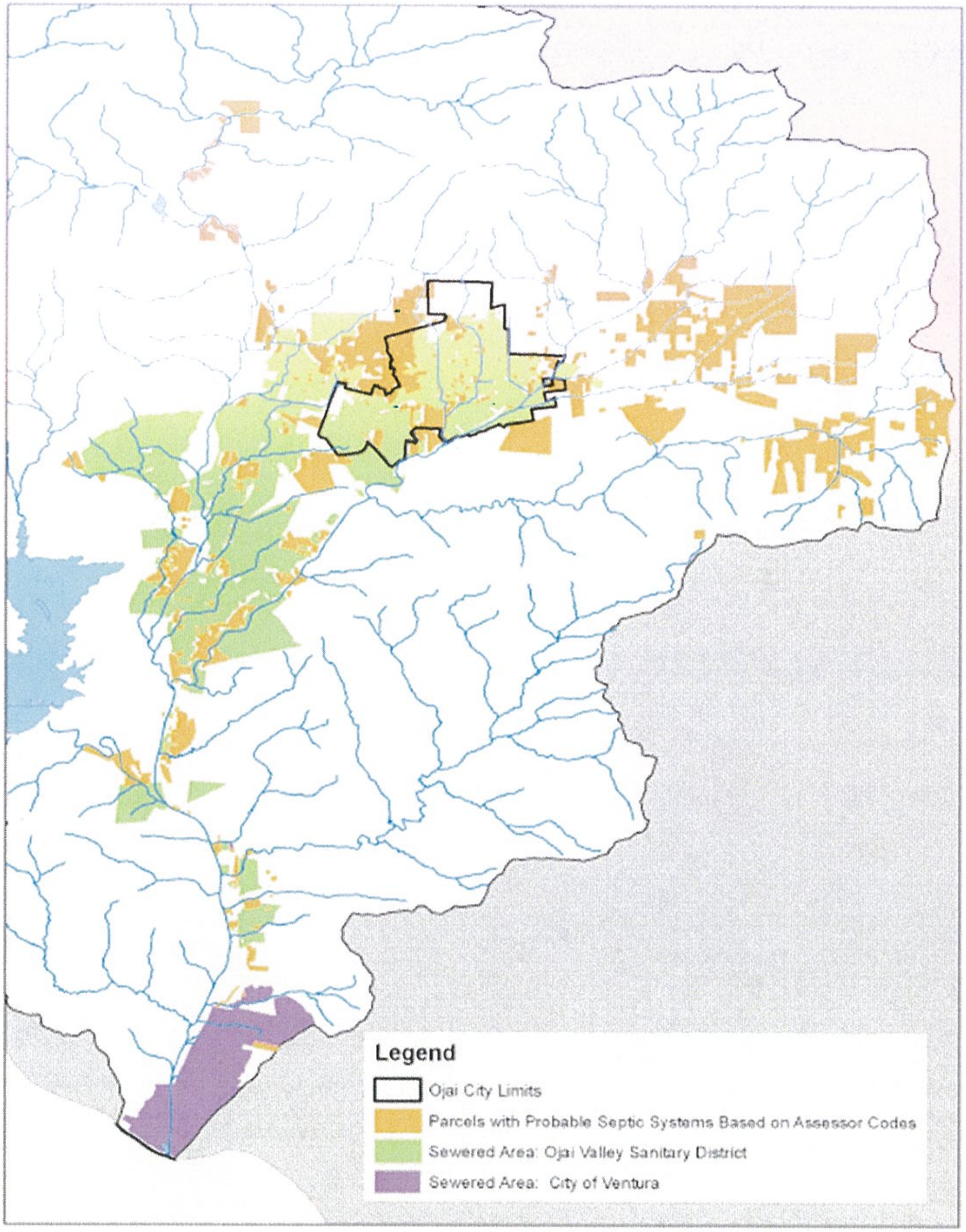


Figure 8. Sewered Areas and Parcels with Potential On-Site Septic Systems in the Ventura River Watershed. Septic tank locations were derived using County Assessor Parcel Land Use Codes.

Figure excerpted from Larry Walker Associates (2011) *Corrected Source Assessment Report: Nitrogen and Phosphorus in the Ventura River Watershed*. Prepared for Ojai Valley Sanitary District, Aug. 9, 2011.

Direct OWTS discharges in groundwater basin recharge zones

The EHD study relies on an assumption that OWTS-related nitrate making its way into stream water primarily originates from leach fields in upland parcels adjacent to live stream reaches. This approach may be overly simplistic. The approach does not acknowledge the specific importance of (sometimes peripheral) groundwater basin recharge zones as entry points for anthropogenic nitrate, nor the potential for nitrate (and other mobile pollutants) to migrate underground between recharge zones and upwelling locations following pathways not captured by use of topographically determined zones of influence and/or not predicted by upstream surface water chemistry.

The study approach may have biased conclusions in the San Antonio Creek watershed to a greater extent than in the Ventura River reaches. The groundwater sampling wells in the Ojai Valley Basin were limited to the "E" location, close to where San Antonio Creek intersects with the boundary of the City of Ojai (see Figure 7 in the report). Relationships between OWTS density and well nitrate concentrations were not investigated in the eastern end of the Ojai Valley Basin, nor down-gradient from the unsewered Arbolada neighborhood straddling the western boundary of the City of Ojai[1], presumably because they were judged to be too far from an impaired stream reach. However, the more thorough historic groundwater data set illustrated in Figure 25 shows a widespread constellation of wells in the east end of the valley with nitrate-N levels >3 mg/L. In addition, given the paucity of nitrate data for groundwater underlying the City of Ojai (see Figure 25), it cannot be ruled out that long-term average nitrate concentrations > 3 mg/L may also be present in groundwater underlying the OWTS-rich neighborhoods within and bordering the City of Ojai (such as the Arbolada neighborhood). Inclusion of OWTS locations and well data from the east end of the valley and the unsewered areas in and near the City of Ojai may have revealed zones of influence with a longer radius than 2000 ft, which may also have changed the conclusions in Section 4.2.4 regarding whether OWTS in the City of Ojai were contributing to surface water impairments in San Antonio Creek in location D.

Many of the OWTS in the east end of the valley are probably situated over unconfined groundwater in the alluvial fan heads where Horn Canyon (Thatcher Creek), Gridley Canyon, Senior Canyon, and Reeves Creek enter the Ojai Valley basin. Stream channels traversing the basin that are tributary to San Antonio Creek are also important sources of recharge. These basin recharge areas are not captured by drawing a buffer zone around San Antonio Creek. If not reduced by anoxic conditions, nitrate from OWTS situated over unconfined alluvial fans or along tributary creeks may migrate to the basin boundary where San Antonio Creek traverses over the Arroyo Parida-Santa Ana Fault and groundwater rises and "spills" into San Antonio Creek (see yellow star in figure below). Perhaps not coincidentally, this "spill over" point is not far from the SW-04-U stream sampling site in the study where the second highest concentrations of nitrate-N and total N were reported for the VR watershed (both 2.65 mg/L). The potential for OWTS that are in basin recharge zones (but outside a San Antonio Creek buffer zone) to contribute nitrate to upwelling groundwater in the San Antonio Creek should be given more consideration.

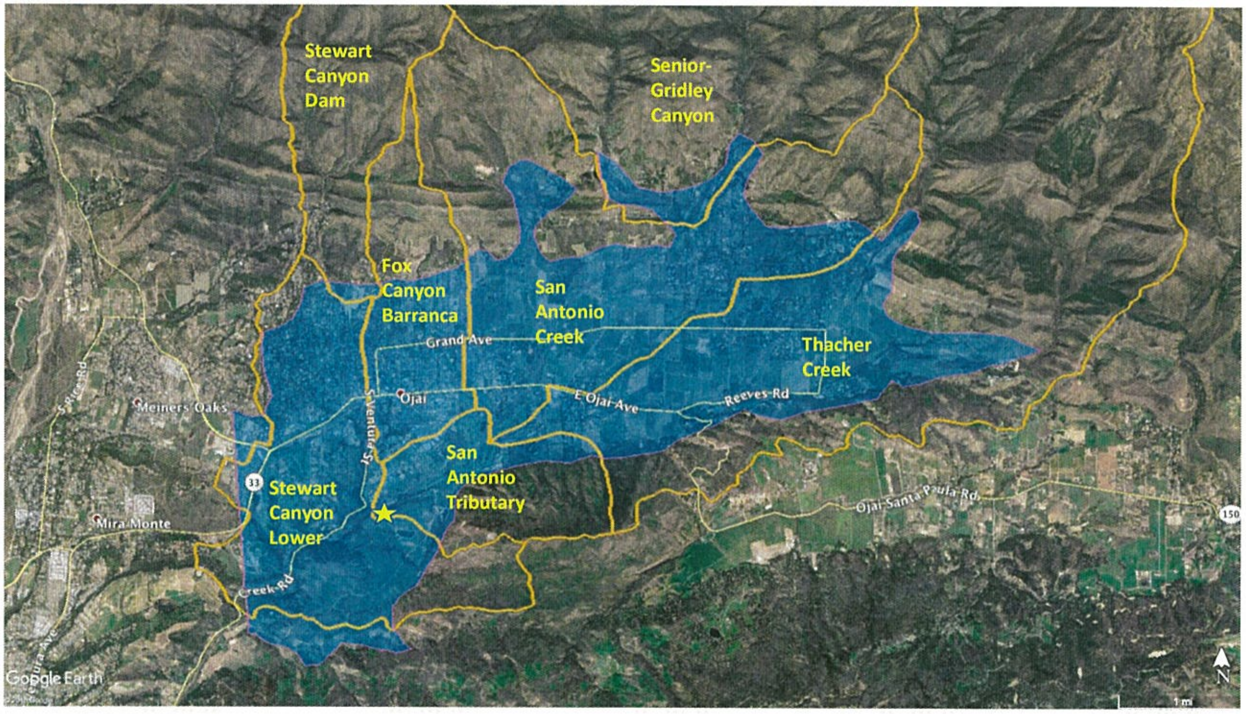
---

[1] Figure 25 in the report appears to indicate available nitrate data from at least one well located down-gradient from the Arbolada neighborhood.

Lack of consideration of translocated OWTS discharges during wet weather

The figure below shows the sub-watersheds that drain to San Antonio Creek that also overlie the Ojai Valley groundwater basin. As stated already, many concentrated areas of OWTS within the San Antonio Creek watershed that drain to creeks were not evaluated in the study, including those within the boundaries of the City of Ojai in the Arbolada neighborhood which drains to Stewart Canyon Creek. Recharge of groundwater along stream beds is an important process both during wet weather and for variable periods of days to months after winter rains in both the Ventura River and San Antonio Creek drainages. It is reasonable to suspect that defective or poorly sited OWTS in urban locations in Ojai are discharging nitrate to surface runoff during wet weather. Unsewered, but urban, locations in Ojai that exhibit upwelling septage during wet weather are known to OVSD staff.

The role of wet weather is important in the context of OWTS risk assessment because during and after wet weather, nitrate from some OWTS may be mobilized in saturated conditions, enter stream water in seepage or overland flows, *migrate in surface waters considerably downstream from the leach fields where it originated,* and re-enter groundwater in recharge. With a temporal and spatial lag, the nitrate thus entering groundwater is potentially able to contribute to nitrate-laden upwelling occurring at some distance from its origin, later in the season when algae-related impairments are of greater concern and baseflow is supported primarily by groundwater inputs.



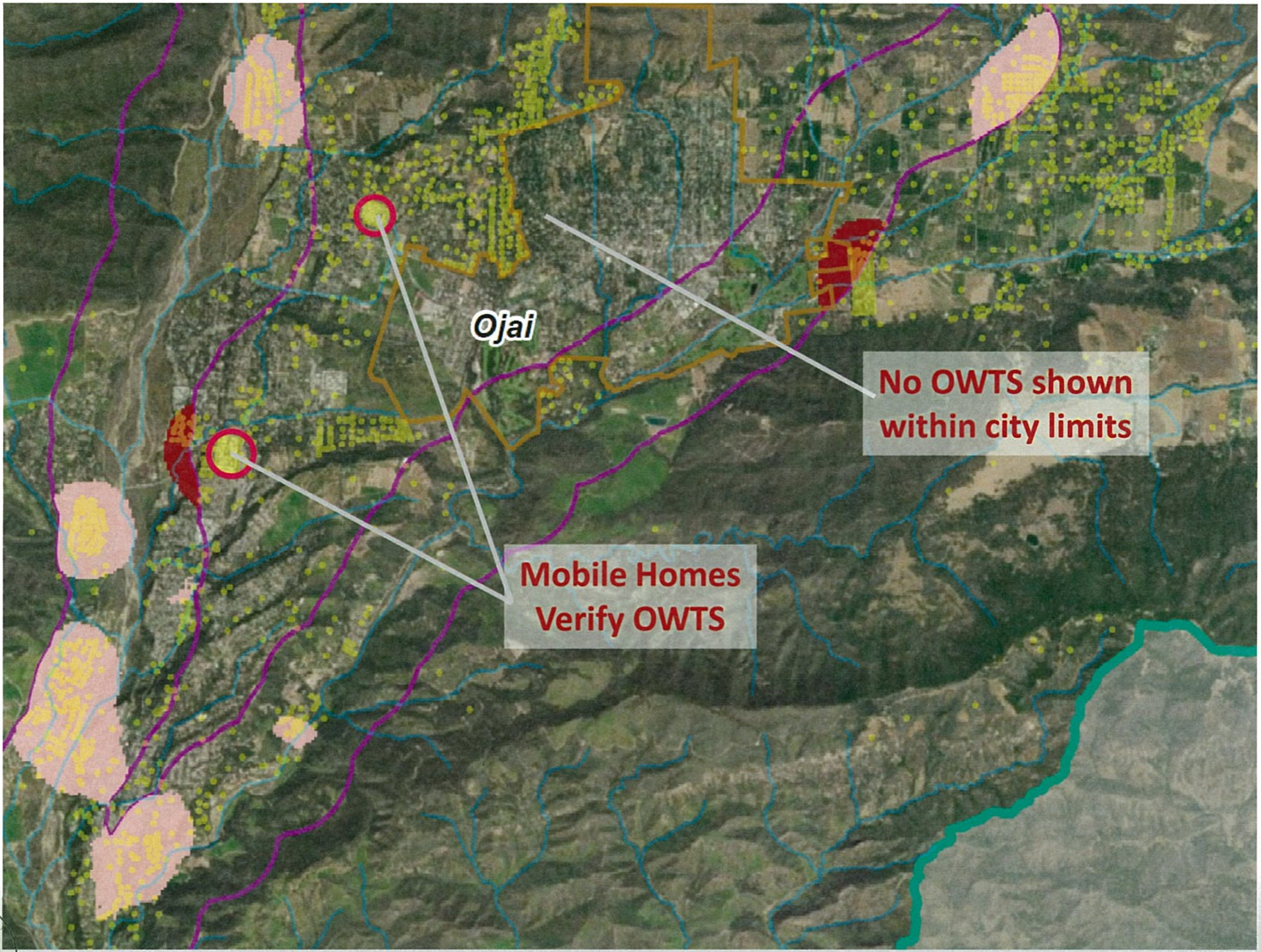
Juxtaposition of the Ojai Valley Groundwater Basin (blue polygon) and sub-watersheds draining to San Antonio Creek (orange boundaries). The yellow star indicates the location where the groundwater basin spills into San Antonio Creek owing to the Arroyo Parida-Santa Ana Fault. The groundwater basin boundary does not reflect the 2016 DWR basin boundary modification that excludes some of the area to the west and south of the spill-over point.

Over the past decade or so, there has been extensive water quality monitoring throughout the watershed. This data shows continuous and widespread high nitrate samples. The Study included some additional testing and in a limited way confirmed the previously collected data. To limit the conclusions and analysis to only the newly collected data appears to miss the historical nitrate perspective.

San Antonio Creek historically has most of and widespread high nitrate samples. Yet, the Study conclusions appear to focus nearly all higher risk areas in the Ventura River area. Since the entire septic property database for the City of Ojai is missing and considering the higher nitrate samples observed in the San Antonio Creek area, a more balanced set of conclusions appears to be appropriate.

Please contact me at (805) 646-5548 is you would like to discuss these issues.

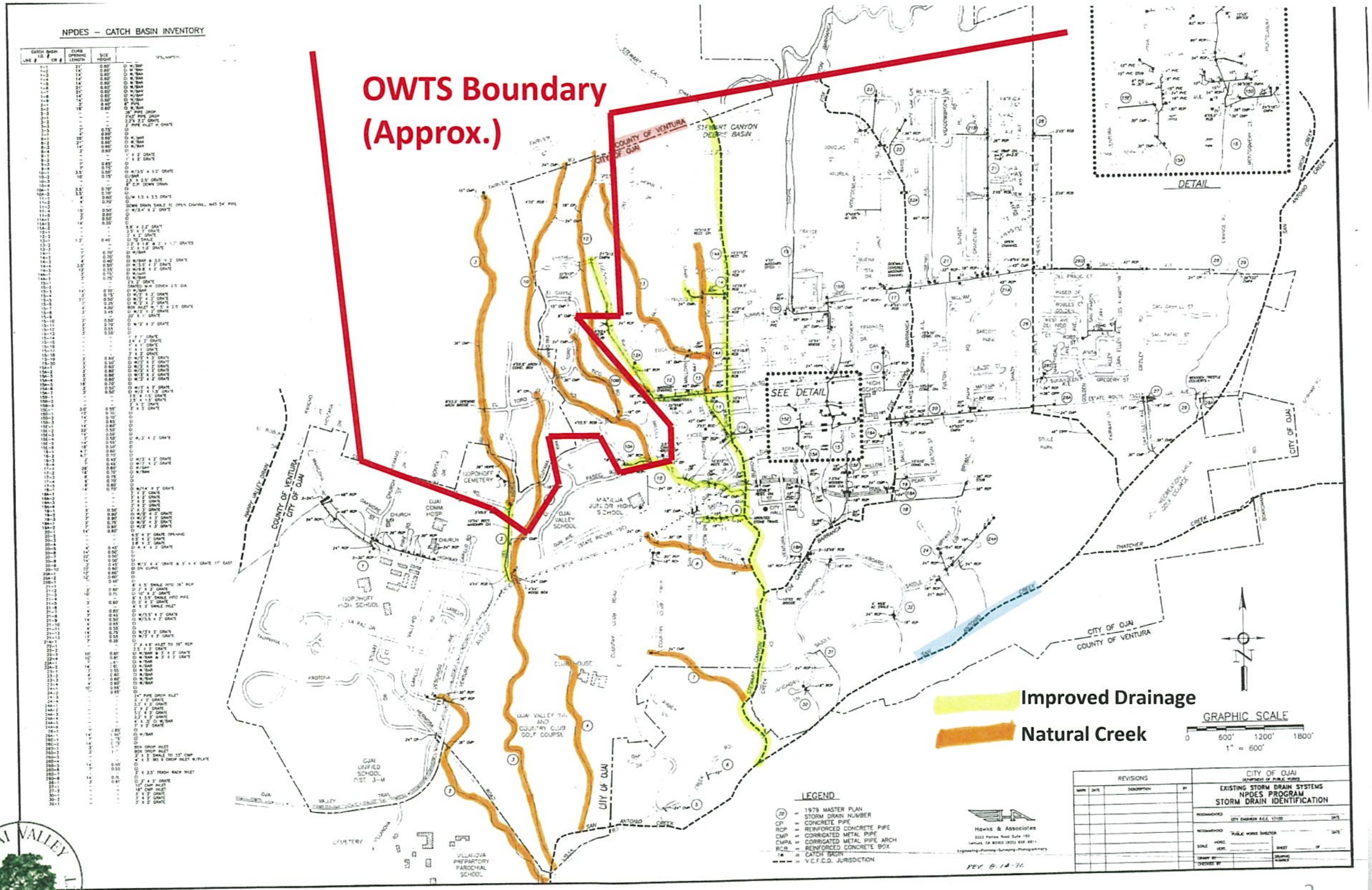
Jeff Palmer
General Manager



No OWTS shown within city limits

Mobile Homes Verify OWTS

Arbolada Area NPDES Map



OWTS Boundary (Approx.)

Improved Drainage

Natural Creek

3.2.11 - Lower Ventura River Basin

The Lower Ventura River Basin has few remaining active water wells available for sampling. Depth to the water bearing unit is 3 to 13 feet in the floodplain and deeper as the ground surface elevation increases towards the edge of the basin. The two wells sampled this year are located in river alluvium near the coast. Total dissolved solids and sulfate concentrations are above the MCL, otherwise, both have relatively good water quality. Water samples from both wells were analyzed for inorganic chemicals (Title 22 metals). No inorganic constituent was above the MCL. Figure 3-14 shows approximate well locations and concentrations of total dissolved solids (TDS), chloride (Cl^-), nitrate (NO_3^-), and sulfate (SO_4^{2-}) for wells sampled in the Lower Ventura River basin.

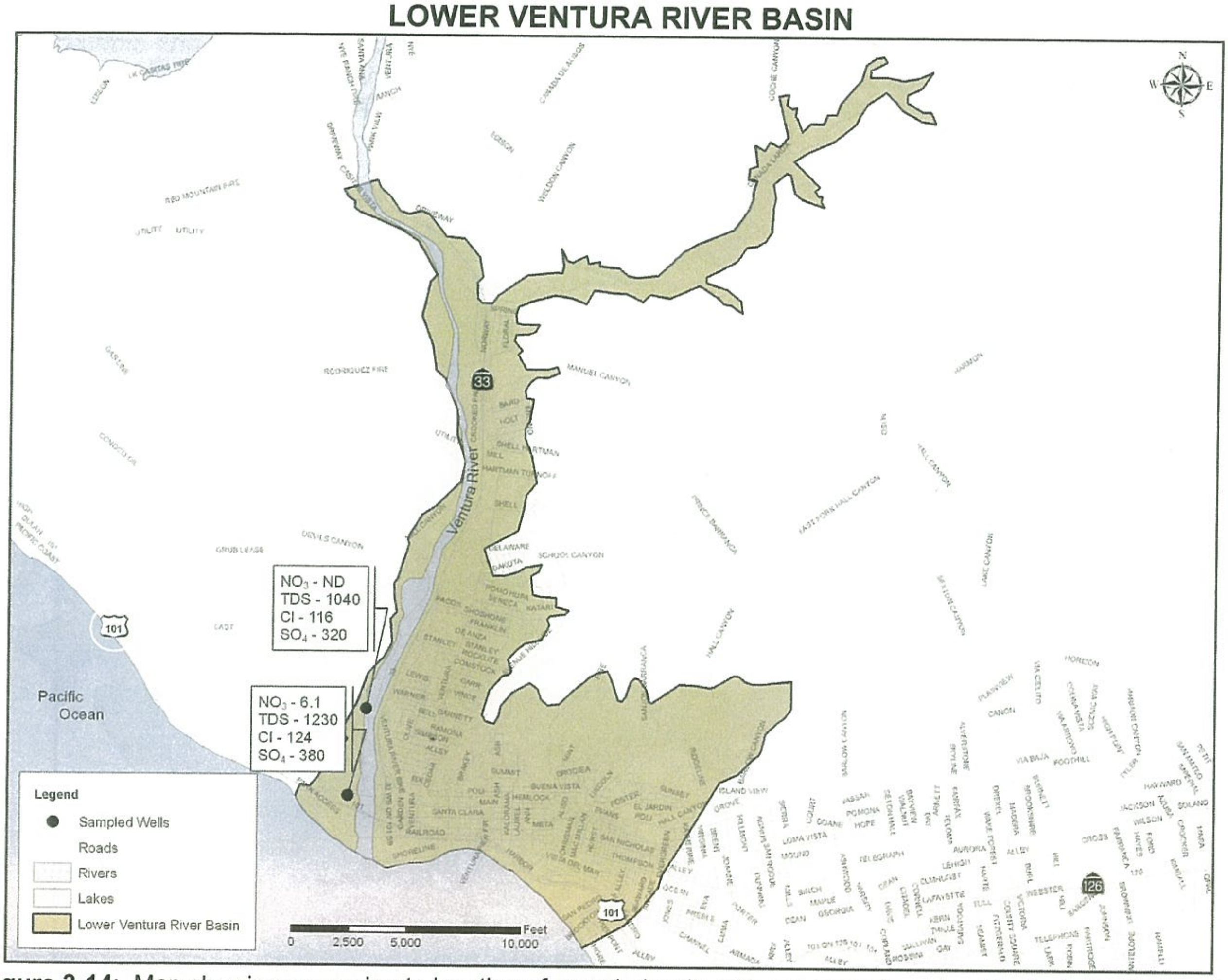


Figure 3-14: Map showing approximate location of sampled wells with concentrations (mg/l) of selected inorganic constituents.

3.2.20 - Upper Ventura River Basin

The Upper Ventura River Basin is mainly composed of thin alluvial deposits. The wells sampled are all less than 125 feet deep, and all have good water quality. The only constituent that exceeds the MCL for drinking water is TDS, a secondary MCL, with an average concentration of 750 mg/l. Groundwater from the three wells was also analyzed for inorganic chemicals and none of the constituents was above the MCL.

VCWPD is involved in the Matilija Dam Ecosystem Restoration Project, and as part of that project giant arundo is being removed along Matilija Creek above Matilija Dam using an herbicide called Glyphosate. Water from two wells downstream from the dam was tested for evidence of Glyphosate and results for both wells were non-detect. Figure 3-28 shows approximate well locations and concentrations of total dissolved solids (TDS), chloride (Cl^-), nitrate (NO_3^-), and sulfate (SO_4^{2-}) for wells sampled in the Upper Ventura River basin.

Upper Ventura River Basin

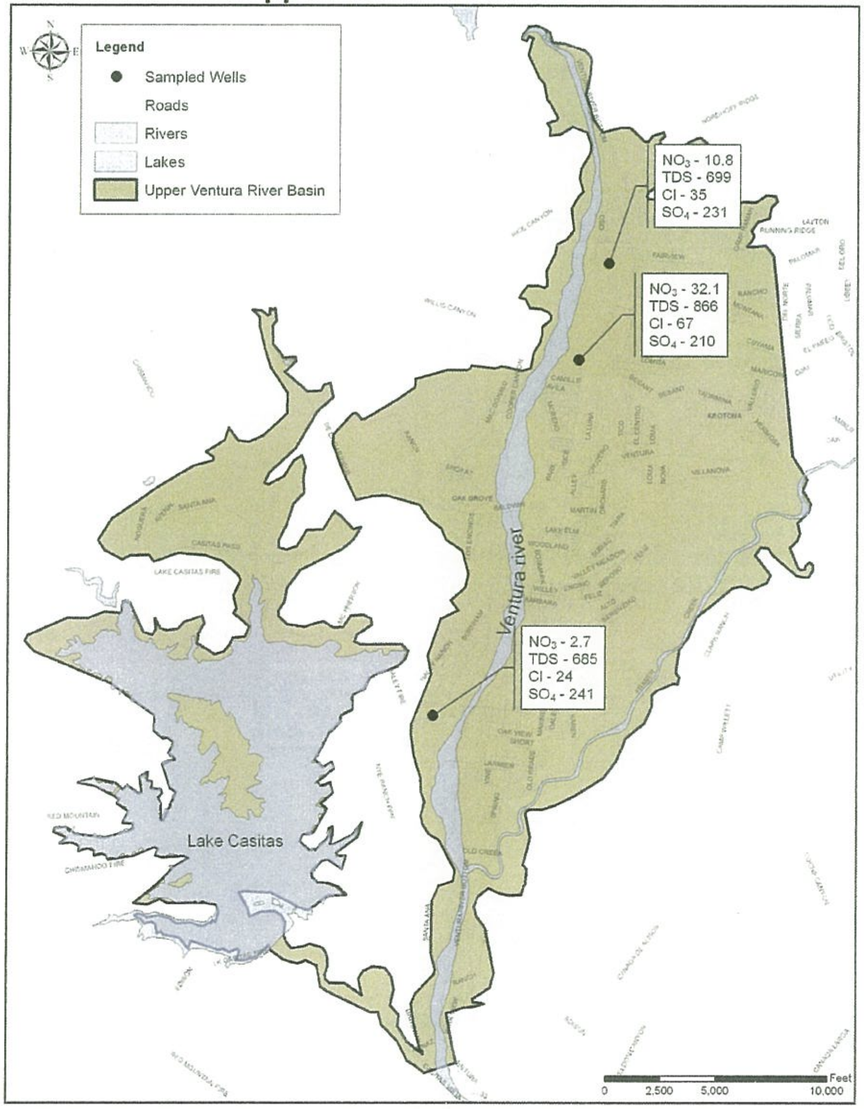
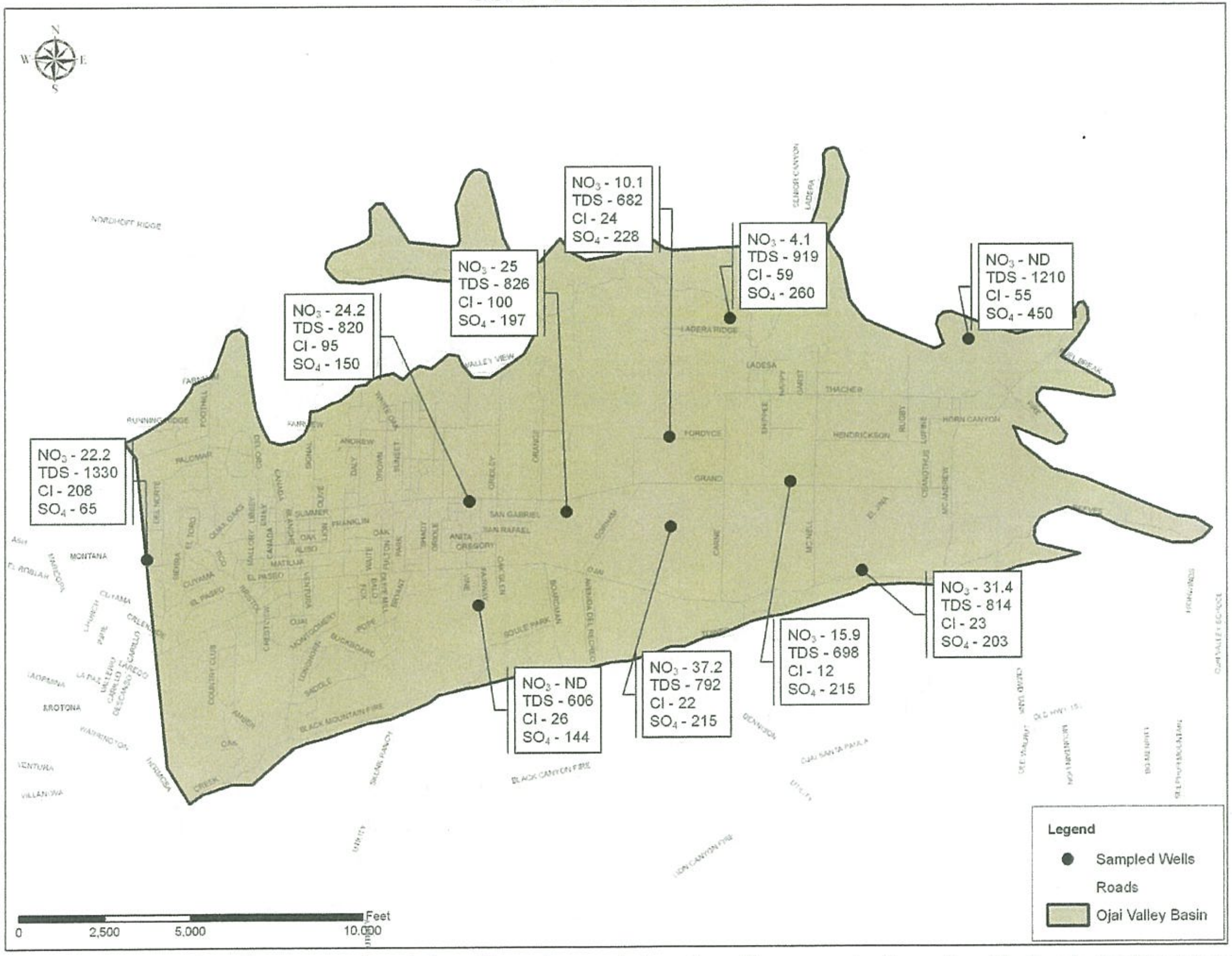


Figure 3-26: Map showing approximate location of sampled wells with concentrations (mg/l) of selected inorganic constituents.

3.2.17 - Ojai Valley Basin

The Ojai Valley Basin water quality is considered good. Average TDS is 870 mg/l and ranges from 606 to 1300 mg/l. In the past, one well has consistently had an extremely high chloride concentration; two to three times the MCL. That is not the case this year. Further study is required to determine the reason for this sudden change. Water samples from six wells were analyzed for inorganic chemicals. No constituent was above the MCL. Depth to water bearing material is generally between 25 to 30 feet below ground surface. Figure 3-24 shows approximate well locations and concentrations of total dissolved solids (TDS), chloride (Cl^-), nitrate (NO_3^-), and sulfate (SO_4^{2-}) for wells sampled in the Ojai Valley basin.

OJAI VALLEY BASIN



<u>Figure 3-22</u>: Map showing approximate location of sampled wells with concentrations (mg/l) of selected inorganic constituents.

Regional Board Feedback: Technical Report for Study of Water Quality Impairments Attributable to OWTS in the Ventura River Watershed – Submitted September 2018

1. Please better describe the rationale for the 2000 foot buffer, including:
    - Can a sensitivity analysis be performed for the 2000 foot buffer designation?
    - What OWTS would be affected if the buffer was 3000 feet?
    - What if there was no buffer?
    - Are bedrock areas included in the buffer?
    - Please clarify in the technical report that data from bedrock was not used in calculating the 2000 foot buffer and discuss the uncertainty in applying the buffer in bedrock areas
    - Please clarify in the axis titles for Figure 21 whether nitrate is in groundwater or surface water.
    - In Figures 21 and 22, are site replicates averaged or shown as individual samples?
2. How much variability is there in the data from each sample site?
3. Have studies been conducted in other watersheds to define geographic parameters of OWTS influence? If so, how do the results of this study compare to those in other places?
4. Is the maximum extent of upwelling identified in Figure 4 based on samples collected for this study or historical samples as well? Did sample locations for this study coincide with the highest wetted upstream areas in the watershed?
5. If the surface water and ground water are not linked, is it possible the reaches are not upwelling?
6. The most recent annual report for the Ventura River Algae TMDL shows fluctuations in nitrate concentrations that include nutrient-related impairments in all reaches. Please consider in the analysis that all surface waters exceed the numeric target for nitrogen in the TMDL. How would this influence the conclusions in Table 18 and the risk rankings throughout the watershed?
7. Please explain the rationale for considering PPCP samples above the method detection limit (MDL) but below the detection limit for reporting (DLR) not to be present (Table 14). Please include in the report all samples above the MDL and discuss how the findings change if PPCPs are treated as present in these samples.
8. How does the presence of PPCPS found in this study compare with literature values from other watersheds?
9. Please provide supporting information for the analysis of Figure 18 discussed on page 39. There appear to be surface water samples from each group except group C that fall outside the range of ground water samples (contradicting analysis in paragraph). Isotopic ratios measured for surface water do not appear greater than those found in ground water for groups A and B (contradicting the included analysis).
10. What is the basis for considering 2.2 mg/L nitrate in groundwater to be low (page 48)?
11. Please provide the results of statistical analyses referenced in the statement: “The number of OWTS within a certain distance upgradient of each well was found to be significantly correlated with groundwater nitrate concentrations in alluvial areas.” (page 49)
12. Please clarify how the upper bound of 143 OWTS was selected for medium density of OWTS (pages 52-53). How were boundaries determined for the area of OWTS influence in the OWTS density calculation (page 53)?
13. How much will changes in how the OWTS density is treated affect the priority area designations? At what OWTS density being considered critical would more areas be potential contributors to nutrient loading in the watershed? Can a sensitivity analysis be performed?
14. Please discuss which original sites from the monitoring plan were inaccessible and which back-up sites were used?

15. Please provide the Regional Board with GIS layers that were compiled for this project.

The following questions are for discussion purposes and do not necessarily need clarification in the technical report:

16. Is Figure 6 intended to show the 600 foot buffer discussed in the previous paragraph?
17. Is laboratory and field contamination of samples a typical issue for caffeine? Are there additional precautions that can be taken in future studies? What is the likeliness of being able to collect and analyze clean caffeine samples in the future?
18. Could the determination that some sites may not be affected by OWTS, discussed on page 18 paragraph 2 and page 30 footnote b, been made during the site selection process?
19. How do the nitrate concentrations in groundwater within bedrock in this study compare with literature values for groundwater in bedrock?

The following changes are needed to the Technical Report:

- 303(d) listings on page 7 appear to be based on a previous 303(d) list. The following changes are needed:
    - Add to footnote: Ventura River Reach 1 – Benthic Community Effects, Ventura River Reach 3 - Toxicity
    - Remove from footnote: Ventura River Reach 3 – TDS, pumping, water diversion; Ventura River Reach 4 – water diversion and pumping
- Page 9, paragraph 1, Line 7 - Typo “results” → “result”
- Page 12, Table 2 - Charles Genkel is also a member of the TAC
- Page 62- Please remove the final two sentences of the report. These are policy recommendations that the Regional Board would prefer to evaluate with Ventura County outside of the Technical Report.

Appendix 3-3: Responses to Technical Report TAC and Regional Board Comments

Draft Technical Report (September 2018) Comments and Responses from Geosyntec Consultants

Jeff Palmer, OVSD			The Study appears to have not included a large area of properties in the Arbolada area and did not include any septic served properties in the entire City of Ojai.	We used the most updated/accurate OWTS file available to us, and it was presented in the Study Plan. It is not possible to revise the study based on a different septic file at this point. The Arbolada area is distant from both our representative areas sampled and downgradient impaired surface waters, and the inclusion of OWTS in this area would therefore not impact the results of the study. The results from other areas investigated suggest that the distance of the Arbolada to San Antonio Creek make it a low risk of impacting surface waters through groundwater during dry weather. However, there may be local variations in subsurface flow that could results in a greater impact and further investigation would be needed to fully evaluate this area. Impacts in wet weather when OWTS may be more likely to fail and ephemeral streams flow from the Arbolada to San Antonio Creek could also results in greater impact.
Jeff Palmer, OVSD			There are extensive natural creeks and improved drainages in the Arbolada area that drain directly to San Antonio Creek and to the Stewart Canyon drain where historically high nitrate levels have been observed.	Available surface water quality data for dry weather was summarized in the report. Other than one location at the far upstream end of San Antonio Creek (which is downgradient of the Arbolada area) surface water concentrations were not obviously higher than that of other areas in the watershed. Surface water data from this study was also elevated at the upstream end of San Antonio Creek and study results suggested that this was likely due to OWTS closer to the creek in group E and upstream of this point. However, further investigation would be needed to fully evaluate the influence of upgradient OWTS in the Arbolada.

Jeff Palmer, OVSD			One well was sampled within Area G, close to the Arbolada which showed elevated nutrients. The nearest surface water sample was in Area D, well downstream of the Arbolada.	Yes, this well was upgradient of the City of Ojai, and downgradient of OWTS in bedrock geology. No groundwater was sampled between this location and San Antonio Creek and results from other areas of the watershed suggest that downgradient surface waters would not be impacted from this area due to the groundwater travel distance through alluvial geology. Analysis of hydrogeology and travel times and distances for groundwater from areas such as the Arbolada is outside the scope of this study, but is a major part of the current GW-SW modeling project being conducted for the State. Thus, this area can be further investigated through this complementary project.
Jeff Palmer, OVSD	4.4		Historical groundwater and surface water quality sampling by other groups and parties, dating back a decade or more do not appear to be included or referenced in great detail in the report. The Santa Barbara Channel Keeper Stream Team, UCSB and OVSD have compiled an extensive list of samples showing significant nutrient water quality issues.	Recent historical data from multiple sources were used in both the planning of this study and the interpretation of study results. Added two sentences to page 59 with the data sources rather than just referencing the monitoring plan. "As discussed in the Monitoring Plan, surface water data were obtained from the California Environmental Data Exchange Network (CEDEN), Santa Barbara Channel Keeper (SBCK), Ojai Valley Sanitation District (OVSD), and Ventura County Watershed Protection District (VCWPD). Groundwater data were obtained from VCWPD and Groundwater Ambient Monitoring and Assessment Program (GAMA)."
Jeff Palmer, OVSD			The Study does not appear to reference any known information from septic failures or pumping that would be contained in required reporting databases.	An investigation of OWTS failure and pumping was outside the scope of this project. While OWTS failure can certainly have an impact on surface waters, particularly during wet weather, this study was designed to evaluate the impact of OWTS throughout the watershed rather than just those with records of failure.
Jeff Palmer, OVSD			The Study conclusions do not appear to include any data from the Ventura County Watershed Protection District, Groundwater Section Annual Report for the groundwater quality. Known wells and sampling data indicate Nitrate tests between 2.7— 37.2 in various well samples.	The majority of groundwater water quality data summarized in this study was from the VCWPD groundwater section. Average concentrations in wells from 2005 to 2017 are shown and were used in the planning and interpretation of this study.

Jeff Palmer, OVSD	4.4	59, 60	The Study conclusions based on the historical groundwater and surface water samples illustrated in Figures 25 & 26 appear to be inaccurate. Figures 25 & 26 indicate some of the highest nitrate samples downstream of City/County septic properties in the Arbolada, near the intersection of Stewart Canyon and San Antonio Creek. Yet this sample data was not discussed in the analysis	Samples were not collected downgradient of the Arbolada area. Therefore, an evaluation of OWTS impacts through multiple lines of evidence (nitrate, chemical indicators, isotopes) could not be performed. The risk map was developed based on data collected in this study, and historical groundwater quality data was used to support study conclusions.
Jeff Palmer, OVSD			The 600 foot and 2000-foot buffers along the impaired waterways show relatively very low concentrations of septic properties. Most of the septic properties are outside the buffer areas, yet the waterways are impaired. How can a relatively few properties in the buffer areas be connected to the impairment but the many properties located outside the buffer areas be listed as “low” probability of impacting the water quality?	Analysis of results from this study showed that distance and density were both important factors on the impact of OWTS on surface waters. Nitrate in groundwater is diluted and reduced through denitrification as it travels through the subsurface and into surface waters. Therefore, the OWTS that are closest to a stream will have the greatest impact. Further, as the TMDL's mass balance noted, OWTS contribute a relatively minor overall load to TN in the watershed. The GW-SW modeling study currently being conducted will allow for this finding to be reevaluated.
Jeff Palmer, OVSD			Historically, there is common knowledge of contaminated water and odors located in septic areas, flooded leach fields and septic backups into homes in wet years.	OWTS failures and the impact of OWTS on surface waters during wet weather were not evaluated in this study. However, the TMDL describes eutrophications as primarily a dry weather phenomenon in the watershed.
Jeff Palmer, OVSD			**Poor graphic quality of maps**. Maps should be provided as large format (e.g., tabloid size) high resolution images to allow for detailed inspection.	Higher quality images will be provided either within the main document or as an attachment.

Jeff Palmer, OVSD			**Misuse of a regulatory term**. Throughout the report, a concentration of 1.15 mg/L for total N, or sometimes for nitrate, is referred to as a TMDL target, and it is implied that the TMDL directly regulates the concentration of nitrate in surface waters. In the context of TMDLs, numeric targets have a very specific regulatory meaning and are values assigned to the parameters that are used to determine attainment of the TMDL. The actual adopted Algae TMDL did not establish targets for any nutrient parameters. Instead, the TMDL established targets for macroalgal biomass, macroalgal cover, phytoplankton biomass, DO and pH. As adopted, the TMDL can be attained if the targets for algal biomass, etc. are met in the stream, regardless of nutrient concentrations.	You are correct, we've been misusing this term. The term used in the TMDL staff report is "allowable in-stream concentration". While this is not a regulatory target, it is the concentration for total nitrogen at which the algal biomass target is modeled to be met and is useful for comparison to our surface and groundwater quality concentrations in this study. This term will be revised throughout the report.

Jeff Palmer, OVSD			**Nitrate in stream water does not indicate degree of loading to the stream.** Nitrate is reasonably conservative and highly mobile in soils below the root zone, provided an aerobic conditions are not encountered. However, nitrate is highly non-conservative in surface waters. Use of nitrate concentrations in stream water is an inappropriate indicator of nitrate loading for this study, and thus the assessments of risk of OWTS loading based on down gradient stream water chemistry are highly compromised. Especially during the spring and summer months (when algae and aquatic macrophytes are most active), nitrate entering the streams from groundwater or surface runoff will be rapidly taken up into biomass. The unsuitability of nitrate as an indicator of nutrient loading is one of the reasons biomass-related targets were included in the TMDL instead of nutrient concentration targets. At the least, data for TN should have been used in stream water instead of nitrate. However, even TN is a poor indicator of loading to streams, as it also fails to account for nitrogen incorporated into the biomass of heterotrophic microbes or primary producers.	The use of nitrate concentrations in downgradient surface waters was the best way to conclusively show the link between elevated nitrate in groundwater and surface water. The TMDL also identified allowable in-stream TN concentrations that were modeled to meet algal biomass targets. Uptake of nitrate in stream sediments and biomass could certainly reduce the concentrations. This is one reason why if average concentrations downgradient were not elevated, the areas was not ruled out as impacting surface waters. Instead the area was designated as "potential risk" of impacting surface waters. An analysis of algal biomass as an indication of downgradient impacts was not performed and algal biomass data collection was outside the scope of this study. Total nitrogen concentrations were evaluated as a potentially better measure of impacts, but the correlations in groundwater were not as strong and 95% of surface water total nitrogen was made up of nitrate.

Jeff Palmer, OVSD	4		**Other sources of data that could be used to identify risk.** There are several sources of data in the public sphere that could have been leveraged to identify areas where OWTS are failing or poorly sited. OVSD, and likely other public agencies, routinely reports to EHD when evidence of failing septic tanks is encountered in the field by workers or inspectors. OVSD staff are familiar with sites in the Ojai area where evidence of failed OWTS (odors, actual leaking of septage) is obvious during wet weather or encountered during construction and have reported such locations to EHD It might have been advantageous to interview OVSD staff to identify known OWTS problem areas as a part of this study. Reports from septic tank inspections (such as conducted when real estate changes hands) should be on file at EHD. Per the VCRMA website, there are three basic permits for OWTS in Ventura County, construction or repair permits for conventional systems, construction or repair permits for alternative systems, and certifications of existing systems. The VCRMA website includes a search tool for records on individual OWTS for 1978-2016 that uses filters such as address, area, and APN. Results of pertinent site studies (such as septic tank pumping inspections for existing system certifications, percolation tests included in geotechnical reports for new construction) are available for individual OWTS through the search tool. Although we recognize that use of these types of information were not included in the scope or budget of the current study, the report should contain an acknowledgment of other data sets for identifying high-risk OWTS, and recommendations for their use.	See response to comment #5. A note will be added to the uncertainties section that these data sources exist, but were not evaluated as part of this study to identify risk. An analysis using these records to identify the risk of septic failure could be valuable to the County as a basis for following up with septic owners about inspection, maintenance, or initiating some other form of enforcement action. However, that was not the purpose of this study. The purpose of this study was more about loading through groundwater to surface water from OWTS across the watershed in general, wheras failure routes tend to occur on the land surface.

Jeff Palmer, OVSD		45-47	**Assumptions about potential interference of OVSD sewer mains.** Proximity to sanitary sewer lines, and the possibility of groundwater contamination from leaking sewer lines, was used in the report to qualify data from wells in Groups A, B, C, D, and E (see comments on p. 45-47). OVSD could have been contacted directly to provide specifics about the likelihood of sanitary sewer or private lateral leaks in the vicinity of wells used in this study. OVSD's program for addressing inflow and infiltration (III) started with development of its Sanitary Sewer Maintenance Program (SSMP) and includes an aggressive program of sanitary sewer line inspections and testing. Since the certification of the SSMP in July 2009, OVSD has developed a comprehensive III reduction program. The III reduction program has almost halved peak influent flows during rain events. OVSD continues to monitor "Enhanced Maintenance Areas (Hot Spots)" and known High Ground Water areas and utilizes targeted flow metering. In addition, in 2014, OVSD completed a pilot project to repair 33 deficient private sewer laterals, which successfully reduced III from these laterals. Therefore, on September 28, 2015, OVSD adopted Ordinance No. OVSD-78 which established Guidelines for Private Sewer Laterals (PSL) to reduce potential discharges and protect the environment. Since 2014, a total of 870 PSL pipelines have been inspected and 373 deficient PSL pipelines have been repaired.	We understand OVSD has put tremendous effort into maintenance of sanitary sewers and it's I&I and IDDE programs. However, we felt it was necessary to acknowledge where sanitary sewers were near our wells. The analysis suggests that OWTS are impacting groundwater nitrate concentrations and no analysis of impacts due to sewers was performed. Furthermore, the TMDL does not establish load reduction requirements for sewers, so there's no concern being raised here about contamination from sewer leaks being significant relative to the many other nutrient sources that are being regulated across this watershed.
Jeff Palmer, OVSD	4.2.8		**Effect of prolonged drought**: The collection of the groundwater and surface water data used to derive the 2000 ft radius of influence occurred during the 6th year of an exceptional drought. Conclusions regarding the distance between wells and culprit OWTS may have been very different if the data sets were obtained when water tables were higher and the hydraulic connection between leach fields and well capture zones was more pronounced.	This is a good point, the analysis performed in this study is valid for the period of study and results may be different if conditions were very different in the watershed (e.g., after years with above average rainfall). This will be acknowledged in the uncertainties section.

Jeff Palmer, OVSD	2.5		**Thomas Fire anomalies**: Some post-Thomas Fire runoff data from the M54 mass emission station (ME-VR2) and the two major outfall stations (MO-MEl and ME-OJA) were presented in the report (in Table 8), presumably to address the question of whether nitrate in stream samples taken in April and May 2018 were distorted by post-fire processes. The historic averages from the three MS4 sites provided for context (from 2009-2017) included wet weather data, and the post-fire data shown was for only three events starting with the first post fire event on 1/9/18 through 3/1/18. This is not a great data set to place the April and May stream samples from the OWTS study into context. The post4ire quality of surface water was subject to several drivers that could have worked together to obscure high nitrate levels more characteristic of upwelling groundwater in some of the locations in the watershed. First, as is now a well-discussed phenomenon among water purveyors in the watershed, the post-fire rain event in early January deposited a layer of sediment in the active channel bed that effectively capped the aquifer, dramatically reducing the rate of groundwater recharge through the gravel beds, and causing runoff to "slide" on top of the new deposits down the entire main stem rather than infiltrating. This led to an abnormally extended period of continuous surface flows in the Ventura River with the result that water from the undeveloped Matilija drainages constituted a much greater proportion of the surface water sampled in the lower reaches in April and May than would ordinarily be the case. Following the single significant post-fire rain event in January, surface flows in the Ventura River did not become discontinuous until the last week of May — months later than would be expected after a such scant and curtailed winter rain season. Second, the dramatically reduced recharge caused an atypical drop in groundwater levels in the spring along the axis of the river. Both phenomena will have changed the location and degree to which groundwater — and any accompanying anthropogenically derived nitrate - upwelled in the sampled reaches.	Also a good point, although the limited data we reviewed suggested that nitrate levels in surface waters were not impacted by the Thomas Fire, the fire caused many impacts such as changes in transport and groundwater surface water interaction that could not be evaluated. This will be acknowledged in the uncertainties section.

Jeff Palmer, OVSD			**The study appears to have omitted OWTS located within the City of Ojai.** Figure 7 in the report (close up provided below), appears to indicate that OWTS within the City of Ojai were not considered in the study. However, there are areas of OWTS within the City of Ojai — especially in the Arbolada neighborhood - which are not illustrated in the report maps. The areas including OWTS within the City of Ojai are located in the unsewered areas marked by orange fill in Figure 8 from OVSD's 2011 study of sources of N and P in the Ventura River Watershed (reproduced below).	See response to comment #1. We used the most updated/accurate OWTS file available to us, and it was presented in the Study Plan. It is not possible to revise the study based on a different septic file at this point.

Jeff Palmer, OVSD	4.2		**Direct OWTS discharges in groundwater basin recharge zones.** The EHD study relies on an assumption that OWTS-related nitrate making its way into stream water primarily originates from leach fields in upland parcels adjacent to live stream reaches. This approach may be overly simplistic. The approach does not acknowledge the specific importance of (sometimes peripheral) groundwater basin recharge zones as entry points for anthropogenic nitrate, nor the potential for nitrate (and other mobile pollutants) to migrate underground between recharge zones and upwelling locations following pathways not captured by use of topographically determined zones of influence and/or not predicted by upstream surface water chemistry. The study approach may have biased conclusions in the San Antonio Creek watershed to a greater extent than in the Ventura River reaches. The groundwater sampling wells in the Ojai Valley Basin were limited to the “E” location, close to where San Antonio Creek intersects with the boundary of the City of Ojai (see Figure 7 in the report). Relationships between OWTS density and well nitrate concentrations were not investigated in the eastern end of the Ojai Valley Basin, nor down-gradient from the unsewered Arbolada neighborhood straddling the western boundary of the City of Ojai1, presumably because they were judged to be too far from an impaired stream reach. However, the more thorough historic groundwater data set illustrated in Figure 25 shows a widespread constellation of wells in the east end of the valley with nitrate-N levels >3 mg/L. In addition, given the paucity of nitrate data for groundwater underlying the City of Ojai (see Figure 25), it cannot be ruled out that long-term average nitrate concentrations > 3 mg/L may also be present in groundwater underlying the OWTS-rich neighborhoods within and bordering the City of Ojai (such as the Arbolada neighborhood). Inclusion of OWTS locations and well data from the east end of the valley and the unsewered areas in and near the City of Ojai may have revealed zones of influence with a longer radius than 2000 ft, which may also have changed the conclusions in Section 4.2.4 regarding whether OWTS in the City of Ojai were contributing to surface water impairments in San Antonio Creek in location D. Many of the OWTS in the east end of the valley are probably situated over unconfined ground water in the alluvial fan heads.	Groundwater data collected in this study supports the assumption/hypothesis that OWTS closer to streams are likely to have a greater impact on those streams. A full hydrogeological analysis of groundwater flow (including recharge zones and upswelling areas) and interaction with surface water was outside the scope of this study, but is currently being conducted as part of the State funded modeling study. For this reason, one of our final recommendations if for the OWTS impacts to be further refined based on the results of the modeling study, which would allow for nutrient transport from areas such as the Arbolada to be investigated.

Jeff Palmer, OVSD			**Lack of consideration of translocated OWTS discharges during wet weather.** The figure below shows the sub-watersheds that drain to San Antonio Creek that also overlie the Ojai Valley groundwater basin. As stated already, many concentrated areas of OWTS within the San Antonio Creek watershed that drain to creeks were not evaluated in the study, including those within the boundaries of the City of Ojai in the Arbolada neighborhood which drains to Stewart Canyon Creek. Recharge of groundwater along stream beds is an important process both during wet weather and for variable periods of days to months after winter rains in both the Ventura River and San Antonio Creek drainages. It is reasonable to suspect that defective or poorly sited OWTS in urban locations in Ojai are discharging nitrate to surface runoff during wet weather. Unsewered, but urban, locations in Ojai that exhibit upwelling septage during wet weather are known to OVSD staff. The role of wet weather is important in the context of OWTS risk assessment because during and after wet weather, nitrate from some OWTS may be mobilized in saturated conditions, enter stream water in seepage or overland flows, migrate in surface waters considerably downstream from the leach fields where it originated~ and re-enter groundwater in recharge. With a temporal and spatial lag, the nitrate thus entering groundwater is potentially able to contribute to nitrate laden upwelling occurring at some distance from its origin, later in the season when algae-related impairments are of greater concern and baseflow is supported primarily by groundwater inputs. Over the past decade or so, there has been extensive water quality monitoring throughout the watershed. This data shows continuous and widespread high nitrate samples. The Study included some additional testing and in a limited way confirmed the previously collected data. To limit the conclusions and analysis to only the newly collected data appears to miss the historical nitrate perspective. San Antonio Creek historically has most of and widespread high nitrate samples. Yet, the Study conclusions appear to focus nearly all higher risk areas in the Ventura River area. Since the entire septic property database for the City of Ojai is missing and considering the higher nitrate samples observed in the San Antonio Creek area, a more balanced set of conclusions	An investigation of wet weather impacts on in-stream (and groundwater) nitrate impacts from OWTS was outside the scope of this study. The transport pathways for nitrate from OWTS are very different in wet weather compared to dry weather and therefore an investigation of wet weather impacts would be a valuable follow-up to this study. This lack of knowledge on wet weather impacts and their potential impact during dry weather periods will be acknowledged in the uncertainties section.

Regional Board	4.2.8		Please better describe the rationale for the 2000 foot buffer, including: **1.** Can a sensitivity analysis be performed for the 2000 foot buffer designation? **2.** What OWTS would be affected if the buffer was 3000 feet? **3.** What if there was no buffer? **4.** Are bedrock areas included in the buffer? **5.** Please clarify in the technical report that data from bedrock was not used in calculating the 2000 foot buffer and discuss the uncertainty in applying the buffer in bedrock areas **6.** Please clarify in the axis titles for Figure 21 whether nitrate is in groundwater or surface water. **7.** In Figures 21 and 22, are site replicates averaged or shown as individual samples?	**1.** Multiple distances were evaluated to determine that 2,000 feet had the strongest correlation between upgradient OWTS and GW nitrate concentration. An analysis of how the final risk map would change if different buffer distances were used would be straigtforward to perform, but would require significant time to reanalyze data and create new maps, which is outside the scope and remaining budget of this project. **2.** Extending the distance would add more OWTS to the risk areas identified. Areas with an OWTS density greater than 0.2/acre within 3,000 feet would be included. **3.** No buffer would result in the risk determination only being based on density and not distance. All areas in the watershed with septic density greater than 0.2/acre would be at risk of impacting downgradient groundwater. **4.** There are some bedrock areas within the 2,000 foot buffer, but the OWTS density is low in these areas. Added clarification at the end of the 2nd sentence in section 4.2.8:"To further examine this observation, nitrate concentrations were plotted against upgradient OWTS density for samples collected at sites in alluvium or bedrock/shallow alluvium." **5.** This is stated in section 4.2.8 and discussion will be added in the uncertainties section. **6**. Added "Groundwater" to the axis title **7.** Individual samples. Added clarification ("for each sample") in-text for Figure 21 (page 51) and in the figure caption for Figure 22 (page 52)
Regional Board	3		How much variability is there in the data from each sample site?	The event to event variability in GW nitrate concentrations can be seen in Figure 22. Each well has a constant number of upgradient parcels with OWTS and the vertical spread in results at that number is the event to event variability. Averaging of results across events improves the correlation. Full results are in Appendix A.

Regional Board			Have studies been conducted in other watersheds to define geographic parameters of OWTS influence? If so, how do the results of this study compare to those in other places?	It is our understanding that this is a first of its kind study in terms of the use of nutrient source tracking tools to evaluate surface water OWTS impacts. Correlations have been observed in other studies between OWTS and bacteria and nutrient concentrations in surface waters. A full literature review of OWTS studies conducted in other watersheds is outside the scope and remaining budget of this project.
Regional Board		6	Is the maximum extent of upwelling identified in Figure 4 based on samples collected for this study or historical samples as well? Did sample locations for this study coincide with the highest wetted upstream areas in the watershed?	It was based on both, samples from this study as well as historical samples. Surface water sample locations corresponded with just upstream and downstream of groundwater sampling locations (which were mainly determined by areas of high OWTS density), assuming those surface water locations were flowing. Flowing areas in both the Ventura River and San Antonio Creek vary throughout the year and from year to year, but the most upstream sampling locations on both streams were close to the furthest upstream areas with connected flow in April and May 2018. These locations were dry in the August/September 2017 sampling event.
Regional Board			If the surface water and ground water are not linked, is it possible the reaches are not upwelling?	Yes, some reaches identified as potentially upwelling due to the presence of surface flow could actually be downwelling and not linked to GW. It is expected that there are multiple upwelling and downwelling areas along these streams and that these areas change from year to year based on GW levels. Therefore, the conservative assumption is that where flow is observed there is the potential for this to be an upwelling area. This is one area the GW-SW interaction model will help better determine these areas spatially and how they are linked to GW.

Regional Board	4.2.7	49	The most recent annual report for the Ventura River Algae TMDL shows fluctuations in nitrate concentrations that include nutrient-related impairments in all reaches. Please consider in the analysis that all surface waters exceed the numeric target for nitrogen in the TMDL. How would this influence the conclusions in Table 18 and the risk rankings throughout the watershed?	We did not have this data at the time the technical report was written. However, if all surface waters are considered to be elevated for nitrogen (or above targets for algal biomass due to nitrogen loading), then all the "potential risk" areas identified in Figure 24 would change to "high risk".
Regional Board		35	Please explain the rationale for considering PPCP samples above the method detection limit (MDL) but below the detection limit for reporting (DLR) not to be present (Table 14). Please include in the report all samples above the MDL and discuss how the findings change if PPCPs are treated as present in these samples.	The reporting limit was selected as the cutoff because this is the level the lab uses to identify contamination in its internal controls and the level we used in our QAQC of field samples. Most PPCPs had detections in lab and field blanks below the reporting limit and therefore concentrations in samples at that level do not indicate the presence of that analyte. To be used as a line of evidence for OWTS impact, we wanted to be certain that the concentration seen in GW was not due to background or contamination. Including below reporting limit detections in the analysis would result in many more PPCP detections, but would not change the final result because it was determined that all representative areas were impacted by PPCPs to some degree and that this was a line of evidence supporting OWTS impacts in GW.
Regional Board			How does the presence of PPCPS found in this study compare with literature values from other watersheds?	PPCPs including those analyzed in this study have been found at higher levels in GW in urban areas. However, analysis of PPCPs in watersheds where OWTS are the primary source is much more limited. A full literature review of PPCP concentrations measured in groundwater and surface water in other unsewered and/or sewered watersheds is outside the scope of this project.

Regional Board		39	Please provide supporting information for the analysis of Figure 18 discussed on page 39. There appear to be surface water samples from each group except group C that fall outside the range of ground water samples (contradicting analysis in paragraph). Isotopic ratios measured for surface water do not appear greater than those found in ground water for groups A and B (contradicting the included analysis).	Sentence stating that "surface water isotopic compositions fall within the range of isotopic compositions of the associated groundwater group, with the exception of group A" removed. Replaced with text stating that all surface water ratios fall within the expected range for nitrate from OWTS. The next sentence notes that groups A and B have lower ratios in surface water than GW, potentially signifying the influence of other sources.
Regional Board		48	What is the basis for considering 2.2 mg/L nitrate in groundwater to be low (page 48)?	"relatively low" removed from this sentence.
Regional Board		49	Please provide the results of statistical analyses referenced in the statement: "The number of OWTS within a certain distance upgradient of each well was found to be significantly correlated with groundwater nitrate concentrations in alluvial areas." (page 49)	Added statistical results in parentheses, "(r = 0.8167, p < 0.00001)" on page 49
Regional Board		52-53	Please clarify how the upper bound of 143 OWTS was selected for medium density of OWTS (pages 52-53). How were boundaries determined for the area of OWTS influence in the OWTS density calculation (page 53)?	It corresponded to a nitrate concentration of 5 mg/L (based on the correlation between number of upgradient OWTS and observed nitrate levels in groundwater from the study). The 5 mg/L was somewhat arbitrary, but helped to demonstrate the difference in nitrate concentration by density shown in Figure 23. No risk determinations were made based on the difference between medium and high OWTS density.

Regional Board			How much will changes in how the OWTS density is treated affect the priority area designations? At what OWTS density being considered critical would more areas be potential contributors to nutrient loading in the watershed? Can a sensitivity analysis be performed?	The critical OWTS density of 0.2/acre was determined by the correlation with nitrate in groundwater at a concentration of 1.15 mg/L (the allowable in-stream concentration for TN in the TMDL staff report). Any change to this density or the concentration used to determine the density would result in a change in the OWTS that are included in the at risk areas. Recreating the risk map for different densities (or different buffer areas) is not difficult but requires time to conduct analysis and create the map that is outside the scope and remaining budget in this project.
Regional Board	2.1		Please discuss which original sites from the monitoring plan were inaccessible and which back-up sites were used?	Added the following footnotes for inaccessible and added sites respectively: "This includes GW-B-01, GW-B-02, GW-C-01, GW-C-02, GW-C-03, GW-D-01, GW-D-02, GW-D-03, GW-E-01, GW-F-01, GW-G-03, GW-A-BK-05, and GW-B-BK-04. " "Specifically, GW-A-07, GW-B-04, GW-B-05, GW-C-07, GW-C-08, GW-D-04, GW-D-05, GW-D-07, GW-F-02, and GW-C-BK-06".
Regional Board			Please provide the Regional Board with GIS layers that were compiled for this project	GIS files will be provide with the finalized technical report.
Regional Board			(just for discussion) Is Figure 6 intended to show the 600 foot buffer discussed in the previous paragraph?	Yes, the 600 foot buffer is shown in Figure 6.
Regional Board			(just for discussion) Is laboratory and field contamination of samples a typical issue for caffeine? Are there additional precautions that can be taken in future studies? What is the likeliness of being able to collect and analyze clean caffeine samples in the future?	Yes, we have had contamination issues with caffeine on other projects as well. Additional field precautions would not help because the issue is also seen in laboratory blanks. I've been in contact with Weck Labs to discuss this, but no solution has yet been found (detection in blanks seems sporadic) and the use of this analyte is therefore limited at this point (at least using this method at this lab).
Regional Board		18, 30	(just for discussion) Could the determination that some sites may not be affected by OWTS, discussed on page 18 paragraph 2 and page 30 footnote b, been made during the site selection process?	If review of well boring logs was performed prior to site selection, this determination could have been made then. However, boring log review was not included in our scope, the logs were obtained through the modeling study, and data from these wells turned out to be valuable (e.g., showed some impacted groundwater even when there were some semi-confining layers present).

Regional Board			(just for discussion) How do the nitrate concentrations in groundwater within bedrock in this study compare with literature values for groundwater in bedrock?	Groundwater nitrate concentrations vary by watershed, but elevated levels have been observed in bedrock in other areas. A literature review of bedrock groundwater concentrations is outside the scope of this study.
Regional Board		7	303(d) listings on page 7 appear to be based on a previous 303(d) list. The following changes are needed: oAdd to footnote: Ventura River Reach 1 – Benthic Community Effects, Ventura River Reach 3 - Toxicity oRemove from footnote: Ventura River Reach 3 – TDS, pumping, water diversion; Ventura River Reach 4 – water diversion and pumping	Updated the footnote on page 7
Regional Board		9	Page 9, paragraph 1, Line 7 - Typo “results” → “result”	Fixed the typo on page 9
Regional Board		12	Page 12, Table 2 - Charles Genkel is also a member of the TAC	Added Charles Genkel to Table 2
Regional Board		62	Please remove the final two sentences of the report. These are policy recommendations that the Regional Board would prefer to evaluate with Ventura County outside of the Technical Report.	Removed final two sentences on page 62
Rebecca Lustig, EHD	3.3?		Provide simplified statement/paragraph clarifying how the nitrate isotope ratios and PPCPs relate to the levels of total nitrogen, nitrate, nitrite. (Jared, we briefly talked about this on the phone a couple weeks ago)	PPCPs and nitrate isotope ratios were used as supporting lines of evidence that groundwater was impacted by OWTS. Any PPCP results above the laboratory reporting limit was considered evidence of OWTS impacts. Similarly, nitrate isotope ratios within the published range for sewage were considered to be an indication of OWTS impacts.
Rebecca Lustig, EHD		9	Page 9, paragraph 2: replace the word “septic tanks” with “septic systems”	Replaced tanks with systems

Rebecca Lustig, EHD		29	Page 29, Table 9: bottle size for nitrate-N, nitrite-N, total N, and ammonia-N was 500-mL (Aug and Sept) and 1000-mL (April and May), not 250-mL	Updated bottle sizes in Table 9
Rebecca Lustig, EHD		43	Page 43, paragraph 1: replace “levels is groundwater” with “levels in groundwater”	Fixed the typo on page 43
Rebecca Lustig, EHD		48	Page 48, section 4.2.6: recommend discussing Groups F and G separately to be consistent with how the other Groups were presented.	Groups F and G will be divided into two sections
Rebecca Lustig, EHD		62	Page 62, paragraph 3:Remove the following statement: “*In addition to the refinement of the analysis and risk map, it is also recommended that the County allow individual OWTS owners a path to demonstrate that they are not significantly contributing nitrogen to surface waters. This could be done through surface and/or groundwater sampling downgradient of the owner’s leach field and may require consultation with a hydrologist to determine local groundwater flow characteristics* .”	Removed final two sentences on page 62

Final Technical Report (November 2018) Regional Board Comments and Responses

Document	Comment	Response
Tech Report	What does the flag "BC" represent in Table A-6?	Blank Contamination
Tech Report	What does "low nitrate" mean in Tables A-7, A-8, and A-9?	This term was how Source Molecular reported the value for these results. It was below their established reporting limit.
Tech Report - OVSD letter	Please acknowledge references provided by OVSD in Technical Report or Draft Report.	Addressed in final report section 3.2.5
Tech Report - OVSD letter	Failing OWTS are referenced in multiple OVSD comments. Is there a current mechanism for addressing? Can this be referenced in the Prescriptive Plan?	Addressed in Prescriptive Plan and overview of LAMP.
Tech Report - OVSD letter	Are there outstanding concerns from OVSD regarding this question?	As stated by Geosyntec, VC WPD data was utilized while developing the study. Staff from VC WPD were part of TAC.
Tech Report - OVSD letter	Please acknowledge the late receipt of information in the technical report so that those utilizing the report in the future will be aware of the data gap. Note the lack of OWTS identified in the City of Ojai/Arbolada and the need to confirm whether or not areas identified as mobile homes by OVSD indeed have OWTS as well as any additional information not incorporated in the map.	Addressed in final report section 3.2.5
Tech Report - OVSD letter	Please enlarge box to make full text visible.	Discussed with Regional Board staff on 12/26/2018.
Tech Report - OVSD letter	Would any of the City of Ojai/Arbolada OWTS fall in potentially or likely impacted areas?	Yes, the high-risk area near Group E overlaps the city limits.
Tech Report - RB Comment	The Technical Report would be much stronger if information was included regarding the sensitivity of the risk recommendations provided in the report.	Discussed with Regional Board staff on 12/26/2018.
Tech Report - RB Comment	The response to this question raises a concern that the points plotted in Figure 22 do not represent independent samples as all samples with the same x-value are from the same site. The line and accompanying formula may not be appropriately representative of the data.	Geosyntec responded with their rationale for using averages. EHD cannot speak to the appropriateness of using averages instead of individual results, or if individual results would significantly change the conclusions. Brief discussion added in final report section 3.3.3

Tech Report - RB Comment	Historical data utilized in the TMDL also indicate more surface water impairment than identified in this study. The discrepancy between waters identified as impaired in this study and those identified by the Regional Board is likely due to the use of averages in this study.	Addressed in section final report 3.3.3
Tech Report - RB Comment	Responses address ground water. Surface water response not provided.	Discussed with Regional Board staff on 12/26/2018.
Tech Report - RB Comment	Consider acknowledging the following comment from OVSD in the final project report: “We believe, and data shows, that septic systems contribute to groundwater and surface water quality impairments to a greater degree than concluded in the Study.”	Including this comment was discussed. EHD does not want to include this statement because we do not agree with this statement as it is written, namely that "data shows septic systems contribute to surface water impairments to a greater degree...". Historical data does not definitively point to OWTS as the source of nitrate impairments. Section 3.2.5 and section 4.1 of the final report, and the Prescriptive Plan include statements which acknowledge data gaps.

Appendix 4: Field Sampling Photographs

1. Sampling location GW-C-07

Obtained water sample and parameters from sample port.

- Photo taken by Rebecca Lustig, Ventura County Environmental Health Division)

2. Sampling location GW-G-02

Attached flow cell to closest water valve to take sample and parameters.

- Photo taken by Rebecca Lustig, Ventura County Environmental Health Division

3. Sampling location GW-F-02

Obtained water sample and parameters from fill pipe at top of storage tank adjacent to the water well.

- Photo taken by Diane Wahl, Ventura County Environmental Health Division

4. Sampling location GW-C-BK-05

Well did not have a dedicated pump. Pump with tubing was lowered into well head to obtain water sample and parameters.

- Photo taken by Diane Wahl, Ventura County Environmental Health Division

5. Sampling location SW-03-D

Surface water sample taken from section of Ventura River within Foster Park which flows year-round.

- Photo taken by Rebecca Lustig, Ventura County Environmental Health Division

6. and 7. Sampling location SW-04-D

Surface water sample taken from San Antonio Creek. Creek was dry during the August 2017 and September 2017 sampling events (6), and flowing during the April 2018 and May 2018 sampling events (7).

- Photo taken by Rebecca Lustig, Ventura County Environmental Health Division

Appendix 5: CEQA Documentation

Notice of Exemption (NOE) for Grant Projects
State Water Resource Control Board Concurrence

Agreement Number: D1513402
Date NOE Filed: 9-29-2016 (County); 10-3-2018 (OPR)
Grantee: Ventura County Environmental Health Division
County: Ventura
Lead Agency: Ventura County Environmental Health Division
State Clearinghouse #: 2018108068

Project Title: TMDL Study for Septic Systems in the Ventura River Watershed
Project Location (attach map, if applicable): ☐
Project Description: Conduct field sampling for a Total Maximum Daily Load (TMDL) Special Study. The purpose of this study is to create a map of septic system areas that are contributing substantive nutrient loads to the Ventura River and its tributaries.

CEQA Categorical/Statutory Exemptions: Check all exemptions the project meets:

☐ **Section 15301: Class 1 Existing Facilities**	Operation, repair, maintenance and/or minor alteration of an existing structure
☐ **Section 15302: Class 2 Replacement or Reconstruction**	Replacement or reconstruction of an existing structure where the new or replacement structure is located on the same site
☐ **Section 15303: Class 3 New Construction or Conversion of Small Structures**	Construction or remodification of a limited number of new or existing small structures
☐ **Section 15304: Class 4 Minor Alteration to Land**	Minor alteration to the condition of land, water and or vegetation with no negative impact to existing scenic trees
X Section 15306: Class 6 Information Collection	Basic data collection and research with no disturbance to an environmental resource
☐ **Section 15262: Feasibility and Planning Studies**	A project involving only feasibility or planning studies
☐ **Section 15269: Emergency Projects**	A project that is deemed an emergency as described in Section 15269
☐ **Section 15333: Class 33 Small Habitat Restoration Projects**	Project is five acres or less and ensures a positive impact for fish, plants or wildlife
☐ **Other**	Provide Section number and description:

Exceptions to NOE: Must mark box indicating whether statement applies. If you mark "yes" then the NOE does not apply – call your GM

Yes	**No**	
☐	X	Location – Is the project located in a particularly sensitive environment where location exception applies? (for class 3,4,6)
☐	X	Cumulative Impact – Will there or have there been successive projects of the same type in the same place, and over time is becoming environmentally significant?
☐	X	Significant Effect – Is there a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances?
☐	X	Scenic Highway – Could the project cause damage to the environment within a highway officially designated as a state scenic highway?
☐	X	Hazardous Waste Site – Is the project located on a site which is included on any list compiled pursuant to Section 65962.5 of the Government Code?
☐	X	Historical Resources – Could the project cause a substantial adverse change in the significance of a historical resource?

I certify to the best of my knowledge the information in this form is correct and the project is exempt from CEQA and will not result in any significant effect on the environment:

Grantee:	**Grant Manager Concurrence:**	**State Water Board Concurrence:**
Print: William Stratton	**Print:** S. Rapaport	**Print:** Leslie Laudon
Signature:	**Signature:** S. Rapaport	**Signature:** Leslie Laudon
Date: 10/4/2018	**Date:** 10/5/18	**Date:** 11/14/18

Print Form

2018108068

Notice of Exemption

Appendix E

To: Office of Planning and Research
P.O. Box 3044, Room 113
Sacramento, CA 95812-3044

County Clerk
County of: Ventura
800 S. Victoria Ave.
Ventura, CA 93009

From: (Public Agency): Ventura County
Environmental Health Division
800 S. Victoria Ave, Ventura, CA 93009-1730
(Address)

FILED
DATE: SEP 29 2016
MARK A. LUNN
Ventura County Clerk and Recorder
By: LAURA BROWN, Deputy

Project Title: TMDL Study for Septic Systems in the Ventura River Watershed

Project Applicant: Ventura County Environmental Health Division (VC EHD)

Project Location - Specific:

Ventura River and its Tributaries, Ventura County

Project Location - City: Ojai/Oakview Project Location - County: Ventura

Description of Nature, Purpose and Beneficiaries of Project:
Conduct field sampling for a Total Maximum Daily Load (TMDL) Special Study to compile a list of septic systems that are contributing substantive nutrient loads to the Ventura River and its tributaries. Results will assist the VC EHD in developing a Prescriptive Plan to reduce nutrient pollution attributable to septic systems in the area.

Name of Public Agency Approving Project: Ventura County Environmental Health Division

Name of Person or Agency Carrying Out Project: Ventura County Environmental Health Division

Exempt Status: **(check one):**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: Sec. 15306 class 6- Information Collection
- ☐ Statutory Exemptions. State code number:

Reasons why project is exempt:
TMDL Special Study is exempt pursuant to CEQA Guidelines Section 15306 Information Collection because this study will involve only data collection activities which will not result in an environmental impact. The results of this study may result in further action by the Ventura County Environmental Health Division, however, the possible action(s) have not been approved, adopted or funded.

Lead Agency
Contact Person: William Stratton Area Code/Telephone/Extension: (805)654-2813

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project?. ☐ Yes ☐ No

Signature: Date: 9/22/16 Title: Director, Env Health Div.

☐ Signed by Lead Agency ☑ Signed by Applicant

Authority cited: Sections 21083 and 21110, Public Resources Code.
Reference Sections 21108, 21152, and 21152.1, Public Resources Code

Date Received for filing at OPR:

POSTED
SEP 29 2016
MARK A. LUNN
Ventura County Clerk and Recorder
By: Mora, Deputy

Governor's Office of Planning & Research
OCT 03 2018
STATE CLEARINGHOUSE

Revised 2011

20160929-10018810-0 1/1
Ventura County Clerk and Recorder
MARK A. LUNN
09/29/2016 03:46:41 PM
1115861 $50.00 BR

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

2016 ENVIRONMENTAL FILING FEE CASH RECEIPT

Complete the information and submit with each set of documents presented for filing. Please provide an original set and (3) three sets of copies for filing.

Project Title: TMDL study for Septic Systems in the Ventura River Watershed

Name of Agency filing attached document: Ventura County Environmental Health Division (VC EHD)

The above named agency is filing as: ● Lead Agency ○ Responsible Agency ○ Trustee Agency

Address of Filing Agency: 800 S. Victoria Ave. Ventura, CA 93009-1730

Document Type (check one): ○ Environmental Impact Report ○ Negative Declaration ○ Mitigated Neg. Declaration ● Exemption

Project Applicant: Ventura County Environmental Health Division

Project Applicant Address: 800 S. Victoria Ave. Ventura, CA 93009-1730

Project Applicant Phone Number: (805) 654-2813

Project Applicant is (check one): ● Local Public Agency ○ School District ○ Other Special District ○ State Agency ○ Private Entity

If the agency presenting this document is filing as the responsible agency, **provide a copy** of the Lead Agency's filed documents and complete the following:

Lead Agency:
Lead Agency's Project Title:
Lead Agency's State Receipt #:
Lead Agency's Document #:

Check Applicable Fees (check all that apply):

○ Negative Declaration ($2,210.25)
○ Environmental Impact Report ($3,070.00)
● County Administrative Fee ($50.00)
○ Filed by responsible agency; fees paid by lead agency (Attach a copy of Lead Agency's filing & receipt).
○ Fees have already been paid (Attach a copy of the prior filing and proof of payment).
● Categorically Exempt
○ Statutorily Exempt
○ No Effect Determination Form

Prepared by: William Stratton — Print Name
VC EHD Director — Print Title

Signature
9/29/16 — Date
654-2818 — Phone #

DO NOT WRITE BELOW THIS LINE

The following will be completed by the Ventura County Clerk's Office.

Signature of person receiving payment: LAURA BROWN
Deputy County Clerk

Total Received: $ 50

Posted: SEP 29 2016 through

(FWtrnsmtl 2016)

Appendix 6: Advisory Notice for Septic Systems in the Siete Robles Tract

Ventura County Environmental Health Division
800 S. Victoria Ave., Ventura CA 93009-1730
TELEPHONE: 805/654-2813 or FAX: 805/654-2480
Internet Web Site Address: *www.ventura.org/envhealth*

ADVISORY NOTICE

SEPTIC SYSTEMS IN THE SIETE ROBLES TRACT

The Siete Robles tract is located in the Ojai Valley, East of the City of Ojai and South of Ojai Avenue (Highway 150). If your residence is located on Avenida de la Entrada, Avenida de la Vereda, Avenida de la Cruzada, Avenida del Recreo, or Camino Arroyo, you may be affected by the information appearing in this advisory.

Elevated groundwater conditions have reduced the ability of soil to receive and treat the sewage discharges from many of the septic systems in the Siete Robles tract. The inability of the soil to adequately receive and treat sewage can result in insanitary conditions leading to foul odors and potential human health risk. In some cases, existing septic systems in this tract do not meet current Ventura County Building Code (VCBC) and Los Angeles Regional Water Quality Control Board minimum requirements for separation of septic systems from underlying groundwater.

As provided for in the VCBC, Appendix Chapter K, Section K-1(f), new or additional discharges of sewage to the soil in this tract will not be allowed, unless engineering data and test reports satisfactory to the Environmental Health Division have been submitted and approved. Existing discharges to septic systems in this tract are not affected by this notice.

FREQUENTLY ASKED QUESTIONS

1. My septic system is working properly, and I am not planning any changes to my home. Am I affected by this notice?

No; residents may continue to use their existing septic systems.

2. My septic system is not working properly; can I obtain a septic system repair permit?

Yes, however, no increase in discharge or system capacity beyond what currently exists will be allowed.

3. ***My home was damaged in the flooding event of 2005. Can I rebuild my home and continue to use my existing septic system?***

Yes, as long as the system complies with the following:

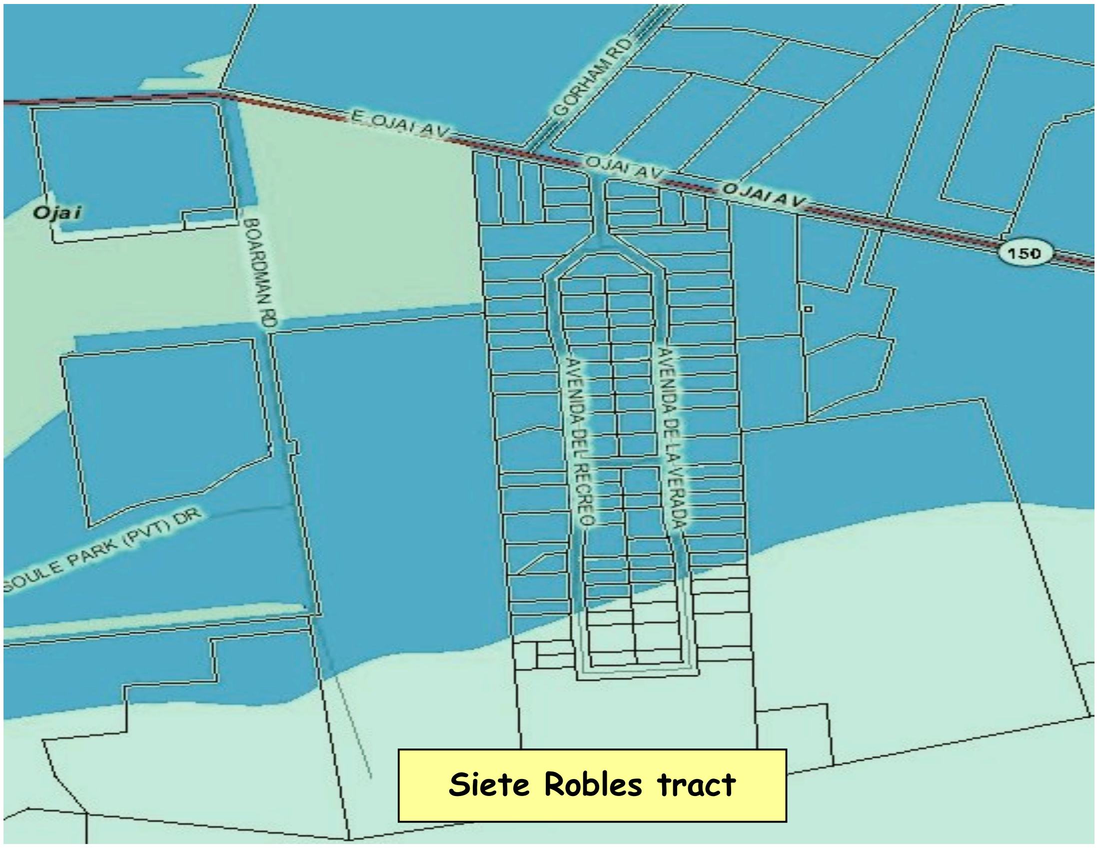
- the system is not in failure (sewage does not back up into house);
- sewage is not being discharged on the ground or surface water sources;
- the proposed construction will not result in an increase in the number of bedroom(s), bedroom equivalents (rooms that can be used as bedrooms), and plumbing fixtures over what previously existed as determined by the Environmental Health Division; and,
- the proposed construction does not reconfigure the structure in a manner that encroaches upon the setbacks to the existing septic system and the 100% expansion area.

4. ***I would like to remodel my home. Does this notice affect me?***

Yes; the remodel cannot result in an increase to the number of bedroom(s), bedroom equivalents, and/or plumbing fixtures over what currently exists; and the building footprint can not be reconfigured in a manner that encroaches upon the setbacks to the existing septic system and the 100% expansion area.

5. ***I believe that my proposed home/proposed remodel is in an area that can meet the sewage discharge/groundwater separation requirements. How can I avoid the building restrictions appearing in this notice?***

There are two options available. The first is to connect the structure(s) to a public sewer system. If a public sewer connection is not available, the second option is to provide site-specific engineering data and test reports, satisfactory to the Environmental Health Division, demonstrating that an adequate septic system/groundwater separation will be maintained at all times. This data typically includes the results of soils exploration, surface elevation and topography information, and may require the results of wet-weather groundwater level monitoring via an engineered groundwater monitoring well or wells.



If you have any questions, please call the Environmental Health Division at 805/654-2813