



TWENTYNINE PALMS WATER DISTRICT

4 February 2022

Ms. Cathy Sanford, P.G., REA II
Engineering Geologist
Regional Water Quality Control Board
Colorado River Basin Region
73-720 Fred Waring Drive, Suite 100
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Dear Ms. Sanford,

Attached is the revised 2019 Annual Groundwater Monitoring Report for Twentynine Palms Water District's (District) Salt Nutrient Management Plan that was originally submitted on 5 March 2021. The revisions were requested in a comment letter dated 26 August 2021 from the Colorado River Basin Region Regional Water Quality Control Board.

Sincerely,

Ray Kolisz
General Manager

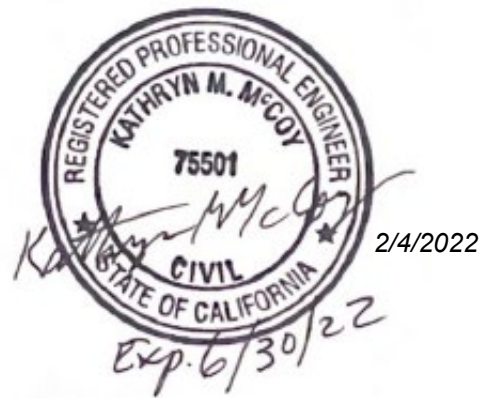


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SNMP
2019 Groundwater
Monitoring Report

5 March 2021
Revised 4 February 2022



Prepared for

Twentynine Palms Water District
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KJ Project No. 2165029*00

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Section 1: Introduction

This 2019 Groundwater Monitoring Report summarizes the activities conducted for the first two phases of the Twentynine Palms Water District's (District) Groundwater Monitoring Implementation Plan (Implementation Plan). This report includes: (1) a summary of monitoring and data collection efforts performed; (2) table and charts of the monitoring results; and (3) recommended changes to the monitoring program including the implementation of Phase 3 and Phase 4 monitoring efforts.

The report is organized as follows:

- Section 2 - Background information about the District and the origin of this Implementation Plan
- Section 3 - Details about the activities conducted in the 2019 calendar year
- Section 4 - An assessment describing the groundwater conditions in each of the subbasins along with any notes or recommendations for improving the effectiveness of the groundwater monitoring plan.

Section 2: Background

The District is located in the high desert of southern California, approximately 72 miles due east of the City of San Bernardino and 35 miles northeast of the City of Palm Springs. It is located within the jurisdiction of the Colorado River Basin Regional Water Quality Control Board (Regional Water Board) and adheres to the water quality standards and control measures for surface and ground waters of the Colorado River Basin Region. These standards and control measures are contained in the Regional Water Board's Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) (RWQCB 2019). This plan designates the beneficial uses for water bodies and establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses.

In June 2014, the District submitted a Salt and Nutrient Management Plan (SNMP) (KJC 2014) to develop a strategy for the District, along with the City of Twentynine Palms (City), to monitor and protect the groundwater resources in the Twentynine Palms area. The need to develop the SNMP was cited in the State Water Resources Control Board's (State Water Board) Resolution No. 2009-0011, amended in 2013 (Resolution No. 2013-0003) and again in 2018 (Resolution No. 2018-0057). The SNMP recognized and addressed the increased need to assess potential groundwater quality impacts from salt and nutrient sources that are derived primarily from regional septic tanks.

In 2017, the City and District submitted the Implementation Plan (KJC 2017) that included a detailed monitoring plan and time schedule for the groundwater monitoring activities discussed in the SNMP. The Implementation Plan was approved by the Regional Water Board in a letter dated 10 December 2019 and consists of four phases:

- Phase 1 – Increase Sampling Frequency of the District's Existing Production Wells
- Phase 2 – Establish a Water Quality Monitoring Well Network Using Existing Wells
- Phase 3 – Installation of New Monitoring Wells
- Phase 4 – Conduct a One-Time Existing Conditions Sampling Event

2.1 District Services

The District service area encompasses approximately 87 square miles and includes the City (see Figure 1). Residential development is currently the single largest land use within the District, with the remaining land use made up of some multi-family residential units, commercial properties, and minor light industry. As of 2015, the District serves 6,759 active connections, all of which are metered accounts with greater than 90% being residential. Commercial connections account for approximately 4%, and landscape irrigation and fire protection/non-potable connections account for less than 1% of the District's total connections.

The District's mission is to provide a safe and adequate supply of water at the lowest feasible cost to the people of the District and to preserve and protect the water resources within the established boundaries of the District. But potable water is limited in the District due to:

- Drought conditions
- Negligible infiltration of direct precipitation in thick alluvial deposit areas
- Substantial runoff lost to evaporation
- Naturally occurring soluble minerals, such as fluoride, hexavalent chromium, and arsenic.

2.2 Water Use Characteristics

Water provided by the District to its customers is derived solely from groundwater pumped from supply wells located along the southern limit of the service area. The District provides potable water treatment services. Additional details are provided in the following subsections.

2.2.1 Groundwater Use

The District overlies two non-adjudicated groundwater basins, the Twentynine Palms Valley Basin and the Joshua Tree Basin. Within the Twentynine Palms Valley Basin are the Mesquite Lake and Mainside subbasins. Within the Joshua Tree Basin are three subbasins, the Indian Cove, Fortynine Palms, and Eastern subbasins. The District also overlies a portion of the Dale Valley Basin, but there is little to no pumping or historical data from this basin and the District has no production wells in this basin. Except for the Dale Valley Basin, the location of the subbasins and the District wells are shown on Figure 2.

The District had 18 total groundwater production wells in its history. There are currently seven (7) active production wells. The remaining wells are inactive and/or used for groundwater monitoring. Available information indicates that more than 400 private wells have also been constructed within the District's service area. Most of these wells are not currently operated. The District collects groundwater level, water quality and water production data from its seven active production wells for use in groundwater management and other reporting purposes.

2.2.2 Groundwater Quality Trends

Groundwater quality in the region is quite variable. Minerals are added to the groundwater as it flows through the aquifer; water that spends more time in the aquifer tends to have higher concentrations of chemical constituents than does water with a low residence time. Water near the mountain fronts, which gets recharged frequently, tends to be of high quality, with low concentrations of chemical constituents. This is the case in the Indian Cove, Fortynine Palms, and Eastern Subbasins, where groundwater is close to its source area. In the Mesquite Lake Subbasin, groundwater has had a longer residence time and, therefore, tends to have higher concentrations of minerals. A general summary of the spatial trends in groundwater quality, for the subbasins within the District's service area, is summarized in Section 2.2.4 of the Implementation Plan.

2.2.3 District Water Treatment

The District has been historically pumping from the Indian Cove, Fortynine Palms and Eastern Subbasins in the south because of the generally good water quality in these areas. However, the District does have to treat water from certain wells for naturally-occurring constituents including fluoride and arsenic.

The following information is summarized from Section 2.3 of the Implementation Plan:

- Elevated fluoride concentrations above the maximum contaminant level (MCL) are widespread across the District's service area.
- The District was granted a variance in 1993 from the California Primary MCL for fluoride¹.
- Fluoride concentrations in the Indian Cove, Fortynine Palms and Eastern Subbasins generally averages below 2 milligrams per liter (mg/L), but several average above 3 mg/L. Use of this groundwater is allowed without fluoride treatment because of the variance.
- Fluoride concentrations in the Mesquite Lake Subbasin groundwater are generally well above 3 mg/L. Water is treated through the Twentynine Palms Fluoride Removal Water Treatment Plant.
- The MCL for arsenic was reduced from 50 micrograms per liter (µg/L) down to 10 µg/L by the State Water Resources Control Board (SWRCB), Division of Drinking Water (DDW) in 2008. The District has been required to install an arsenic treatment system to comply.
- Three of eight production wells were shut down in 2014 due to the low total chromium MCL; two of them are still physically connected to the distribution system.
- A wellhead hexavalent chromium treatment system is still pending (Senate Bill 385) until a new MCL is established.

2.2.4 Wastewater Management

There is no community sewage system within the District service area and wastewater is disposed of through individual septic tank and tile field disposal systems. There are two major categories of onsite wastewater treatment systems in the Twentynine Palms area – residential and non-residential. Single family and multifamily households all fall under the residential category. A variety of commercial (e.g., restaurants and hotels) and institutional (e.g., school) establishments and facilities fall into the non-residential wastewater category.

¹ "The District shall not serve water containing fluoride levels in excess of 3.0 milligrams per liter (mg/L) or 75 percent of the U.S. Environmental Protection Agency (USEPA) Primary Drinking Water Standard (currently at 4.0 mg/L), whichever is higher." The variance is set to expire in 2023.

Section 3: Overview of Implementation Plan

The Implementation Plan is part of the SNMP and intended to provide water quality data to help determine, in part, if a sewer system would be required to protect public health and water quality in the District. It provides an adaptive approach for data collection efforts needed to make more informed decisions on the effects of septic tanks on groundwater supply. A sufficient amount of time is needed to collect and analyze the data to determine if, based on scientific evidence, groundwater pollution and degradation in the area are caused by septic tanks. Existing wells that are in good condition, well documented, and in representative locations are used for this program.

The Implementation Plan includes the following activities to collect groundwater level and water quality data:

- 1) Document groundwater level and groundwater quality trends through time
- 2) Identify salt and nutrient constituents of concern
- 3) Identify potential sources of salts and nutrients
- 4) Identify existing monitoring well locations that will be used to track potential changes in water quality over time
- 5) Conduct fate/transport evaluations of the constituents of concern.

3.1 Phased Approach

As mentioned in Section 2, the Implementation Plan consists of four phases. Phase 1 has been implemented. Implementation of Phases 2 and 3 activities have not yet begun. Minor activities have begun for Phase 4, but full implementation is awaiting the acquisition of additional funds. The following subsections discuss the details and progress made for these four phases of the Implementation Plan.

3.1.1 Phase 1 – Increase Sampling Frequency of District’s Existing District Production Wells

Historically, the District collected water quality samples from the active groundwater production wells at least every 3 years as required by DDW. Although the Implementation Plan’s recommendation to increase this sampling frequency to annually was made in 2017, the District made the switch in 2015 after the 2014 SNMP was submitted. A list of the District’s active and inactive production wells is provided below.

CURRENT GROUNDWATER MONITORING BY TWENTYNINE PALMS WATER DISTRICT

Well Name	Well Type	Water Levels	Water Quality – Other Constituents
4	Inactive	Not measured	Not analyzed
6	Inactive	Not measured	Not analyzed
7	Destroyed	Not measured	Not analyzed
8	Inactive	Not measured	Not analyzed
9 ^a	Inactive	Not measured	Not analyzed
10	Inactive	Not measured	Not analyzed
11 ^a	Destroyed	Not measured	Not analyzed
11-B ^(a)	Active water supply	Not measured	Not analyzed
12	Active water supply	Monthly	Annually since 2015
14	Active water supply	Monthly	Annually since 2015
15	Active water supply	Monthly	Annually since 2015
16	Active water supply	Monthly	Annually since 2015
17	Active water supply	Monthly	Annually since 2015 every 6 years for VOCs
WTP-1	Active water supply	Monthly	Annually since 2015

Note:

- (a) Well 11 was taken out of service in 2016 after the sampling event due to well casing failure and replaced with Well 11-B in 2018. Well 11-B was not yet put into service to be included with the 2019 sampling activities.

As noted in the table above, the annual sampling activities were conducted on six of the seven active wells. The sampling and analysis plan proposed in the Implementation Plan for the wells is provided below.

PROPOSED SAMPLING AND ANALYSIS PLAN – LIST OF PARAMETERS FOR ACTIVE PRODUCTION WELLS ONLY

Analyte	Units	EPA Test Method	Typical Lab PQL
General Minerals, Cations, and Anions			
Boron	mg/L	200.7	0.3
Calcium	mg/L	200.7	0.3
Total Iron	mg/L	200.7	0.05
Manganese	mg/L	200.7	0.1
Potassium	mg/L	200.7	0.2
Total Alkalinity	mg/L	310.1	0.3
Bicarbonate	mg/L	310.1	10
Carbonate	mg/L	310.1	10
Hydroxide	mg/L	310.1	10
Bromide	mg/L	300	10
Chloride	mg/L	300	1
Fluoride	mg/L	340.2	50
Nitrate	mg/L	300	0.1
Nitrite	mg/L	354.1	0.1
Orthophosphate	mg/L	365.2	0.01
pH	s.u.	150.1	0.2

Analyte	Units	EPA Test Method	Typical Lab PQL
Sodium	mg/L	200.7	0.01
Specific Conductivity	µmhos/cm	120.1	1
Sulfate	mg/L	300	1
TDS	mg/L	160.1	50
Total organic carbon	mg/L	SM5310C	40
Field Sampling			
Dissolved Oxygen	mg/L	Field Probe	NA
Temperature	F	Field Probe	NA
Microbiological Analysis			
Total Coliform	MPN/100 ml	SM9223B	2
Fecal Coliform	MPN/100 ml	SM9223B	2
Anthropogenic Analytes			
Sucralose	µg/L	Non-standard	0.01
Caffeine	µg/L	8270M/SIMS	0.01
17B-estradiol	µg/L	Non-standard	0.001
NDMA	µg/L	Non-standard	0.002
Triclosan	µg/L	Non-standard	0.05
DEET	µg/L	Non-standard	0.05

Historically, samples collected from the production wells were analyzed for the general minerals, cation, and anion constituents. The additional constituents proposed in the table above would be added for the samples collected after approval of the Implementation Plan, which was 10 December 2019. The production wells were sampled on 17 January 2019, so these additional constituents are not included in Table 1, which provides the laboratory analytical data since the annual monitoring activities began in 2015.

In addition to monitoring for general minerals, cation, and anion constituents, water level measurements from these wells are collected monthly, the data of which are not included in this report. Inactive wells listed are not currently monitored.

A discussion of the monitoring results is provided in Section 4.

3.1.2 Phase 2 – Establishing a Water Quality Monitoring Well Network

Phase 2 of the groundwater monitoring program consists of establishing a network of existing monitoring locations throughout the Twentynine Palms area with appropriate spatial distribution to be able to define the nature and extent of constituents of concern (COCs) related to septic systems discharges. The purpose is to define existing conditions and to collect long-term monitoring data to assess the potential future impacts to the beneficial use of groundwater. The objectives of the monitoring well network include the following:

- Establish background conditions for COCs. The monitoring network should include sufficient wells upgradient of Twentynine Palms to establish COC concentrations relatively unaffected by higher density septic density areas.

- Monitor COC concentrations in high-density areas. The monitoring network should include sufficient wells to establish concentrations for the high-density areas.
- Define downgradient concentrations especially for high-density areas. The monitoring network should include sufficient wells to establish downgradient COC concentrations especially for the high-density areas.

Each of the different groundwater subbasins have separate well networks that can be used to establish the distribution of COCs.

The groundwater monitoring network should preferably consist of wells that have either a sufficient well construction record or have a long-term monitoring history. Currently, groundwater level monitoring is currently performed by the United States Geological Survey (USGS) primarily associated with the Marine Base but includes several wells in the Twentynine Palms area. Using wells with a history of groundwater level measurements is highly desirable, as measurements from these facilities provide a means to evaluate water quality in context with overall groundwater basin conditions. Of the recently monitored (within last 5 years) USGS wells, three are in the Indian Cove Subbasin, one is in the Fortynine Palms Subbasin, eight are in the Eastern Subbasin, nineteen are in the Mesquite Lake subbasin, and three are in the Dale Basin. Available information indicates that more than 400 private wells have also been constructed within the District's service area. The District has located and inspected about 250 private wells. See Figure 3 for a schematic of the wells in the Twentynine Palms area. Figure 4 shows potential groundwater monitoring locations.

The Phase 2 activities will include the collection of water quality samples from a representative number of these wells in the appropriate areas. Coordination with the USGS and private well owners will be required to access these wells for this study.

Initiation of Phase 2 activities would have begun after the Implementation Plan was approved. However, no activities for this phase began in 2019 since SWRCB approval of the plan was not granted until 10 December. Planning discussions for this phase, however, include reaching out to the USGS and investigating the private wells located within the District's service area. Additionally, the City is planning to install three monitoring wells in high density housing areas which is anticipated to become part of this well monitoring network in the future.

3.1.3 Phase 3 – Installation of New Monitoring Wells

Phase 3 consists of a more focused monitoring network located in a limited number of areas where elevated nitrates have been detected. The purpose of Phase 3 is to define the vertical extent of nitrates and how the local geology and vertical mixing within the aquifer may affect COC concentrations. It is also recommended to install a cluster of monitoring wells in key areas where elevated concentrations of COCs have been detected. The purpose of these monitoring well clusters is to provide more detailed geology, groundwater, and water quality data in these areas.

This data will be used to support additional analysis of the influence of the geology and other factors on the movement and attenuation of COCs in the Twentynine Palms area. For example, the underlying geology includes former lake deposits that may form barriers to vertical flow

through the vadose zone and the presence of organics and other constituents may lead to denitrification and losses that may potentially limit the transport of COCs to the groundwater. This could also create stratification within the aquifer so that COCs may be found in the shallow groundwater but not be able to reach deeper portions of the groundwater aquifer. The objective is to collect data to improve our understanding of the fate and transport of COCs through the vadose zone and groundwater aquifers.

Four areas have been identified for further assessment as shown in Figure 4. These include the following:

- Luckie Park is located along Utah Trail in the eastern part of Twentynine Palms. Existing shallow monitoring wells show elevated COC concentrations. This area is located near the former Shortz Playa and may have elevated naturally occurring total dissolved solids (TDS). The purpose is to evaluate vertical and horizontal mixing and possible influence of geologic layering. Two monitoring well locations are planned with one near the Luckie Park well and another about 1,000 feet downgradient.
- Saddlehorn Drive area is located along Utah Trail near the golf course. Elevated COC concentrations in a single well were attributed to poor well construction. This area is also near the former Shortz Playa. The purpose is to evaluate vertical and horizontal distribution of COCs and possible influence of geologic layering from lake deposits. A single well cluster is planned.
- The District Well #4 has had elevated COC concentrations relative to other District wells. It is unclear if this is a regional or well specific issue. The purpose is to evaluate vertical and horizontal distribution of COCs near Well #4. A single well cluster is planned.
- The high-density residential area located near 2 Mile Road and Mesquite Springs Road is located in an area of thick vadose zone and potentially thin saturated interval of alluvial sediments. The purpose is to evaluate the potential for attenuation of COCs in these areas. Two monitoring well locations are needed, one near the edge of the residential area and a second about 1,000 feet downgradient.

Monitoring will require one or more wells at each of the targeted areas. An initial deep pilot borehole will be drilled that will be geologically logged by a California licensed geologist and have a suite of borehole geophysical logs run to provide detailed geologic data for each of these locations. Based on this information, the number of potential monitoring wells in the cluster at each location will be determined. A downgradient monitoring well cluster will be added as appropriate. Downgradient locations are anticipated for the Luckie Park and the 2 Mile Road and Mesquite Springs Road locations. The monitoring wells will be constructed in a manner consistent with obtaining regular high-quality water quality data. The Sampling Plan detailed in Section 4 for this phase will be implemented once funding is approved for this phase.

When funding opportunities are available (see Section 6 for more details), efforts will be made to acquire access, implement the design, installation and testing of at these proposed locations.

3.1.4 Phase 4 – Conduct a One-Time Existing Conditions Sampling Event

Collecting a one-time sample for COCs from as many existing domestic wells as possible will require coordination and outreach to local property owners to obtain water quality samples. It is recommended that a single event sampling program be conducted that will obtain data from a large number of private wells from various parts of the study area to establish what is the areal extent of COCs and potential impact to beneficial uses. The purpose of this is to collect a onetime sample for COCs from as many existing domestic wells as possible to establish the areal extent of COCs and assess the potential impact to beneficial uses.

This will require coordination and outreach to local property owners to obtain water quality samples. The District will facilitate the procurement of these data, based on local knowledge and receptivity of private landowners to allow their wells to be inspected and sampled for water quality.

In addition, this outreach program would provide a mechanism to evaluate the condition and construction of existing wells. This provides a means to evaluate whether wells are acting as vertical conduits that may allow septage to flow down the well annulus due to poor well construction, causing areas of locally high nitrate and TDS concentrations. Additional details about public participation and educational outreach are provided in Section 5.

Initiation of Phase 4 activities were slowly being developed in 2019 however since the Implementation Plan was approved in late 2019 (December), there is little progress to report. The significant challenges to District staff and the community in 2020 as a result of COVID-19 will be discussed in the 2020 report.

Section 4: Assessment of Implementation Plan Activities

Water quality data gathered in the last 5 years is used in this section to provide an assessment of the Phase I activities from the Implementation Plan. The assessment includes a summary of the monitoring and data collection efforts performed and a description of the groundwater conditions in each of the subbasins, as seen in the data collected. Lastly, a discussion is provided on ways to improve the effectiveness of the groundwater monitoring plan, which could include suggestions about the overall monitoring program and the future implementation of Phases 2, 3, and 4.

4.1 Constituents of Concerns

The primary COCs related to septic system discharge are nitrate and salts which are related to sewage. Salts can be monitored as individual constituents and as TDS and general minerals. Other COCs are included that will help identify potential septic system influences from residential and commercial/industrial areas.

Samples from the District's current production wells were collected for analysis of the General Minerals, Cations, and Anions constituents listed in Section 3.1.1, except for bromide, orthophosphate, and total organic carbon (TOC). The sampling event was conducted before the Implementation Plan was approved so only the historical analyses were conducted in 2019.

A discussion of the results of these key COCs is provided in the subsequent sections.

4.1.1 Nitrates

Anthropogenic groundwater nitrate sources can come from a number of sources but are typically related to agriculture and wastewater. DDW has set the MCL for nitrate in drinking water at 45 mg/L for nitrate as nitrate (as NO_3) or 10 mg/L for nitrate as nitrogen (as N). These values are stoichiometrically equivalent. Nitrate concentrations in public drinking water supplies exceeding the MCL require water system actions to provide safe drinking water.

Nitrate concentrations in the samples collected in 2019 were below the MCL. The same trend is apparent in the samples collected in the previous 4 years as well.

4.1.2 General Mineral Analysis

The general mineral analysis provides a means of characterizing the groundwater within each production zone and comparing the groundwater in each of the production zones in which a particular well is screened. A comparison of the data in 2019 shows an apparent difference in the chemical character makeup in groundwater from the Mesquite Lake Subbasin compared to the other subbasins, except for the Eastern subbasin since there is no production well in that subbasin. A closer look at the constituents detected in samples from the six active production wells in 2019 follows:

- Of the minerals and metals analyzed, the following constituents were higher in Well WTP-1 than the other five wells:

- Total alkalinity	- Fluoride	- Potassium
- Bicarbonate	- TDS	- Sodium
- Chloride	- Arsenic	- Vanadium
- Electrical conductivity	- Boron	
- Concentrations of Fluoride, TDS and Sodium were comparatively lower in Well 15 compared to the other wells.
- Concentrations of Sulfate were comparatively higher in Well 17 compared to the other wells.
- Concentrations of Calcium and Manganese were comparatively higher in Well 16 compared to the other wells.

4.1.3 Coliforms

Total coliform is a measurement of general coliform bacteria, the presence of which indicates that the water has had contact with plant or animal life. General coliforms are universally present and can be found in soil, animals, insects, etc. At high levels, coliforms indicate the presence of some type of waste which could include pathogens. Fecal coliforms indicate that the water has had contact with mammal or bird feces. The presence of total and fecal coliforms is an indication of human or animal waste; however, this does not conclusively indicate infiltration from septic tanks. For the purposes of this study, the presence of coliforms could indicate septic influence on the groundwater.

Analysis of coliforms is on the proposed analytical list, as shown in Section 3.1.1. Since the sampling event occurred before the Implementation Plan was approved, these constituents were not analyzed in the samples collected for the 2019 annual sampling event.

4.1.4 Natural Constituents

Fluoride (F) naturally occurs in the local groundwater and is a constituent of concern for the water delivery system in the District's service area. The DDW-mandated MCL for fluoride in drinking water is 2.0 mg/L. A discussion of the concentrations found in the six active production wells in 2019 is provided below:

- Fluoride concentrations are below the MCL in the Indian Cove and Fortynine Palms Subbasins (Wells 12 and 14-17).
- Groundwater in the Mesquite Lake Subbasin has a different chemical character with substantially higher fluoride concentrations. Fluoride was measured in Well WTP-1 in the Mesquite Lake Subbasin at 5.9 mg/L.

The same trends are apparent in the samples collected in the previous 4 years, although there were some detections above the MCL in the Indian Cove Subbasin in Wells 9 and 11 before they became inactive in 2016. There is no production well in the Eastern Subbasin.

Arsenic (As) is a naturally occurring element in groundwater that forms from the erosion and breakdown of geologic deposits; however, arsenic is less commonly associated with contaminant plumes. The primary MCL for arsenic is 10 µg/L. The occurrence of arsenic in the Twentynine Palms area is from natural sources.

There were no detections of Arsenic above the MCL in the samples collected in 2019 from the six active production wells. The same trend is apparent in the samples collected in the previous 4 years, except for the samples collected from Well 11 which was 15 µg/L. In 2008, the District was granted a permit amendment from the California Department of Public Health (DPH) to operate an arsenic removal system to remove elevated levels of arsenic present in water pumped from Well 11. In 2016, Well 11 was rendered inactive due to well casing failure. A new well, Well 11-B, was drilled on the existing site and was completed in 2018. No samples were collected from Well 11-B because it had not been put in service in 2019.

Section 5: Public Participation and Educational Outreach

No public participation or educational outreach activities specific to the Implementation Plan were conducted in 2019. The Implementation Plan was not approved until late in the year which was not enough time to effectively work on this part of Phase 4. For future reports, this section will discuss the specific tactical approaches that may be utilized to deliver activities, messages, and any recommendations to the public. However, such activities and efforts are dependent on the acquisition of appropriate funds to perform the work.

Section 6: Funding Opportunities

6.1 Proposition 1 Disadvantaged Community Grant Program

In 2016, the District began working with the Mojave Water Agency Integrated Regional Water Management Plan group to access funding made available by the California Department of Water Resources (DWR) for water related projects to assist disadvantaged communities.

In 2018, Mojave Water Agency (Agency) was awarded a grant from the DWR in the amount of \$407,000 (Grant Agreement No. 4600012245). Of that grant amount, \$50,000 was allocated to the District to assist with the activities necessary to implement Phase 4 of the Implementation Plan.

Quarterly reports have been submitted, through the Agency, to DWR documenting the District's progress on the monitoring activities.

Annual costs submitted to DWR for reimbursement to date, which are mainly grant administration costs are \$900 in 2018 and \$2,644.01 in 2019 for a total of \$3,544.01.

References

- (KJC 2014) Kennedy/Jenks Consultants 2014. *Twentynine Palms Salt and Nutrient Management Plan, Final Report*. City of Twentynine Palms and Twentynine Palms Water District. KJ 1283001.00. 30 June.
- (KJC 2017) Kennedy/Jenks Consultants 2017. *Twentynine Palms Water District Groundwater Monitoring Implementation Plan*. Twentynine Palms Water District. KJ 1744007.00. 27 December.
- (RWQCB 2019) State of California Colorado River Basin Regional Water Quality Control Board. *Water Quality Control Plan for the Colorado River Basin Region*. 8 January.
https://www.waterboards.ca.gov/coloradoriver/water_issues/programs/basin_planning/

Table

Table 1: Historical Groundwater Analytical Data - Since 2015^(a)

		Field Sampling		General Physical			General Ch													
Well ID	Sample Date	Dissolved Oxygen (mg/l)	Temperature °F	Apparent Color (color units)	Odor Threshold (ton)	Turbidity (NTU)	Total Alkalinity (as CaCO3) (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	Langelier Index at Source Temp.	Langelier Index at 60°C	Aggressive Index	Cn (µg/L)	EC (µmhos/cm)	F (mg/l)	Hydroxide (mg/l)	MBAS (mg/l)	NO3-N (mg/l)	NO3-N + NO2-N (mg/l)
Well 9	1/21/2015	N/A	74.12	ND	1	ND	78	95	ND	10.0	-0.3	0.26	11.43	ND	240	2.1	ND	ND	2.5	2.5
Well 9 ^(b)	1/20/2016	N/A	68.00	NS	NS	NS	84	100	ND	9.9	-0.47	0.14	11.32	ND	260	1.9	ND	ND	2.9	2.9
Well 11	1/21/2015	N/A	74.48	ND	1	ND	100	130	ND	10.0	-0.08	0.48	11.66	ND	290	2.3	ND	ND	2.7	2.8
Well 11 ^(b)	1/20/2016	N/A	68.00	NS	NS	NS	100	120	ND	8.1	-0.33	0.28	11.46	ND	290	2.4	ND	ND	2.3	2.4
Well 11	1/18/2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11-B ^(b)	1/17/2018	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11-B	1/17/2019	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/21/2015	N/A	73.94	ND	1	ND	76	93	ND	9.3	-0.23	0.33	11.5	ND	220	1.2	ND	ND	1.8	1.8
Well 12	1/20/2016	N/A	68.00	NS	NS	NS	86	100	ND	8.8	-0.38	0.22	11.4	ND	250	1.2	ND	ND	2.0	2.0
Well 12	1/18/2017	N/A	73.80	ND	1	ND	90	110	ND	8.8	0.09	0.65	11.82	ND	240	1.7	ND	ND	2.1	2.1
Well 12	1/17/2018	N/A	74.50	ND	1	0.5	84	100	ND	13.0	-0.23	0.32	11.50	ND	300	1.0	ND	ND	2.4	2.4
Well 12	1/17/2019	N/A	64.80	ND	1	ND	82	99	ND	14.0	-0.0003	0.63	11.83	ND	380	1.3	ND	ND	1.7	1.7
Well 14	1/21/2015	N/A	76.10	ND	1	ND	92	110	ND	13.0	-0.14	0.49	11.58	ND	280	0.74	ND	ND	3.2	3.2
Well 14	1/20/2016	N/A	68.00	NS	NS	NS	89	110	ND	10.0	-0.36	0.24	11.43	ND	270	0.78	ND	ND	2.7	2.7
Well 14	1/18/2017	N/A	74.90	ND	1	ND	94	120	ND	11.0	0.07	0.61	11.80	ND	280	0.81	ND	ND	2.7	2.7
Well 14	1/17/2018	N/A	80.30	ND	1	0.1	92	110	ND	14.0	-0.12	0.38	11.57	ND	300	0.75	ND	ND	3.8	3.8
Well 14	1/17/2019	N/A	69.40	ND	1	ND	80	98	ND	17.0	-0.03	0.56	11.77	ND	420	0.89	ND	ND	1.9	1.9
Well 15	1/21/2015	N/A	69.08	ND	1	1.4	69	84	ND	8.0	-0.79	-0.19	10.98	ND	210	0.33	ND	ND	2.9	2.9
Well 15	1/20/2016	N/A	68.00	NS	NS	NS	70	86	ND	8.0	-0.87	-0.26	10.91	ND	210	0.32	ND	ND	2.8	2.8
Well 15	1/18/2017	N/A	70.40	ND	1	ND	70	85	ND	7.3	-0.48	0.11	11.27	ND	210	0.35	ND	ND	3.0	3.0
Well 15	1/17/2018	N/A	80.90	ND	1	0.3	64	78	ND	7.7	-0.7	-0.20	10.97	ND	210	0.31	ND	ND	3.0	3.0
Well 15	1/17/2019	N/A	68.00	ND	1	ND	77	94	ND	5.8	-0.53	0.08	11.24	ND	200	0.31	ND	ND	2.8	2.8
Well 16	1/21/2015	N/A	77.36	ND	1	ND	94	120	ND	11.0	-0.16	0.37	11.55	ND	290	1.7	ND	ND	1.6	1.6
Well 16	1/20/2016	N/A	68.00	NS	NS	NS	110	130	ND	9.2	-0.39	0.22	11.4	ND	300	1.7	ND	ND	1.6	1.6
Well 16	1/18/2017	N/A	74.40	ND	1	ND	120	150	ND	9.1	0.14	0.69	11.88	ND	290	1.7	ND	ND	1.6	1.6
Well 16	1/17/2018	N/A	72.50	ND	1	0.2	110	130	ND	11.0	-0.18	0.38	11.57	ND	300	1.8	ND	ND	1.7	1.7
Well 16	1/17/2019	N/A	69.80	ND	1	ND	87	110	ND	17.0	0.18	0.77	11.97	ND	430	1.5	ND	ND	1.5	1.5
Well 17	1/21/2015	N/A	77.18	ND	1	ND	83	100	ND	9.8	-0.3	0.23	11.4	ND	220	0.7	ND	ND	1.9	1.9
Well 17	1/20/2016	N/A	68.00	NS	NS	NS	83	100	ND	8.0	-0.55	0.05	11.23	ND	230	0.75	ND	ND	2.1	2.1
Well 17	1/18/2017	N/A	73.90	ND	1	ND	81	98	ND	9.5	-0.13	0.43	11.61	ND	260	0.83	ND	ND	1.8	1.8
Well 17	1/17/2018	N/A	81.00	ND	1	ND	80	98	ND	8.9	-0.31	0.19	11.36	ND	220	0.7	ND	ND	2.0	2.0
Well 17	1/17/2019	N/A	69.30	ND	1	ND	72	88	ND	20.0	-0.06	0.54	11.75	ND	480	0.97	ND	ND	1.4	1.4
Well TP1	1/21/2015	N/A	78.44	ND	1	ND	160	190	ND	29.0	0.32	0.84	12.06	ND	630	6.1	ND	ND	1.1	1.1
Well TP1	1/20/2016	N/A	68.00	NS	NS	NS	160	200	ND	28.0	0.05	0.66	11.88	ND	640	6.2	ND	ND	1.2	1.2
Well TP1	1/18/2017	N/A	77.70	ND	1	ND	170	200	ND	29.0	0.44	0.97	12.19	ND	640	5.7	ND	ND	1.3	1.3
Well TP1	1/17/2018	N/A	82.50	ND	1	ND	160	190	ND	31.0	0.23	0.71	11.94	ND	650	6.1	ND	ND	1.3	1.3
Well TP1	1/17/2019	N/A	71.20	ND	1	ND	160	200	ND	28.0	0.42	1	12.23	ND	610	5.9	ND	ND	1.2	1.2

Table 1: Historical Groundwater Analytical Data - Since 2015^(a)

General Chemical									Metals															
Well ID	Sample Date	NO2-N	ClO4 (µg/L)	pH std units	SO4 (mg/l)	TDS (mg/l)	Ortho- phosphate (mg/l)	TOC (mg/l)	Al (µg/L)	Sb (µg/L)	As (µg/L)	Ba (µg/L)	Be (µg/L)	B (µg/L)	Br (µg/L)	Cd (µg/L)	Ca (µg/L)	Cr (+6) (µg/L)	Total Cr (µg/L)	Cu (µg/L)	Fe (µg/L)	Pb (µg/L)	Mg (µg/L)	Mn (µg/L)
Well 9	1/21/2015	ND	ND	8.0	11.0	140	N/A	N/A	ND	ND	9.6	ND	ND	120	N/A	ND	15	NS	ND	ND	ND	ND	1.2	ND
Well 9 ^(a)	1/20/2016	ND	ND	7.8	12.0	140	N/A	N/A	ND	ND	9.8	ND	ND	110	N/A	ND	15	ND	ND	ND	950	ND	1.3	ND
Well 11	1/21/2015	ND	ND	8.1	13.0	160	N/A	N/A	ND	ND	15	ND	ND	110	N/A	ND	15	NS	23	ND	ND	ND	1.8	ND
Well 11 ^(b)	1/20/2016	ND	ND	7.9	12.0	180	N/A	N/A	ND	ND	15.0	ND	ND	120	N/A	ND	14	NS	13	ND	ND	ND	1.7	33
Well 11	1/18/2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11-B ^(b)	1/17/2018	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11-B	1/17/2019	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/21/2015	ND	ND	7.9	9.8	160	N/A	N/A	ND	ND	7	ND	ND	ND	N/A	ND	19	NS	ND	ND	ND	ND	1.8	ND
Well 12	1/20/2016	ND	ND	7.7	11.0	160	N/A	N/A	ND	ND	6	ND	ND	120	N/A	ND	21	NS	ND	ND	ND	ND	1.9	ND
Well 12	1/18/2017	ND	ND	8.2	9.7	170	N/A	N/A	ND	ND	7.2	ND	ND	ND	N/A	ND	19	9.9	ND	ND	ND	ND	1.6	ND
Well 12	1/17/2018	ND	ND	7.9	30.0	180	N/A	N/A	ND	ND	4.3	ND	ND	130	N/A	ND	21	4.0	ND	ND	ND	ND	2.9	ND
Well 12	1/17/2019	ND	ND	8.2	72.0	260	N/A	N/A	ND	ND	4.7	ND	ND	210	N/A	ND	23	5.5	ND	ND	ND	ND	2.6	ND
Well 14	1/21/2015	ND	ND	7.8	15.0	180	N/A	N/A	ND	ND	2.9	ND	ND	ND	N/A	ND	28	NS	ND	ND	ND	ND	4.9	ND
Well 14	1/20/2016	ND	ND	7.7	13.0	160	N/A	N/A	ND	ND	ND	ND	ND	130	N/A	ND	25	NS	ND	ND	ND	ND	4.4	ND
Well 14	1/18/2017	ND	ND	8.0	14.0	170	N/A	N/A	ND	ND	ND	ND	ND	ND	N/A	ND	26	5.2	ND	ND	ND	ND	4.5	ND
Well 14	1/17/2018	ND	ND	7.8	15.0	170	N/A	N/A	ND	ND	2.5	ND	ND	110	N/A	ND	28	4.6	ND	ND	ND	ND	4.9	ND
Well 14	1/17/2019	ND	ND	8.0	86.0	290	N/A	N/A	ND	ND	ND	ND	ND	180	N/A	ND	30	5.2	ND	ND	ND	ND	4.9	ND
Well 15	1/21/2015	ND	ND	7.4	10.0	120	N/A	N/A	ND	ND	ND	ND	ND	ND	N/A	ND	22	NS	ND	ND	ND	ND	4.3	ND
Well 15	1/20/2016	ND	ND	7.3	9.1	110	N/A	N/A	ND	ND	ND	ND	ND	100	N/A	ND	23	NS	ND	ND	360	ND	4.3	ND
Well 15	1/18/2017	ND	ND	7.7	8.9	120	N/A	N/A	ND	ND	ND	ND	ND	ND	N/A	ND	22	ND	ND	ND	ND	ND	4.1	ND
Well 15	1/17/2018	ND	ND	7.4	9.5	130	N/A	N/A	ND	ND	ND	ND	ND	ND	N/A	ND	21	ND	ND	ND	ND	ND	4.2	ND
Well 15	1/17/2019	ND	ND	7.6	8.1	110	N/A	N/A	ND	ND	ND	ND	ND	110	N/A	ND	23	ND	ND	ND	ND	ND	4.3	ND
Well 16	1/21/2015	ND	ND	7.8	17.0	170	N/A	N/A	ND	ND	2.5	ND	ND	ND	N/A	ND	27	NS	ND	ND	ND	ND	4.8	ND
Well 16	1/20/2016	ND	ND	7.5	16.0	190	N/A	N/A	ND	ND	ND	ND	ND	130	N/A	ND	28	NS	ND	ND	ND	ND	4.8	ND
Well 16	1/18/2017	ND	ND	8.0	16.0	190	N/A	N/A	ND	ND	ND	ND	ND	ND	N/A	ND	26	5.1	ND	ND	ND	ND	4.6	ND
Well 16	1/17/2018	ND	ND	7.7	17.0	170	N/A	N/A	ND	ND	2.1	ND	ND	120	N/A	ND	25	4.6	ND	ND	ND	ND	4.4	ND
Well 16	1/17/2019	ND	ND	8.1	87.0	280	N/A	N/A	ND	ND	ND	ND	ND	200	N/A	ND	36	6.1	ND	ND	ND	ND	5.9	ND
Well 17	1/21/2015	ND	ND	7.8	10.0	140	N/A	N/A	ND	ND	3.3	ND	ND	ND	N/A	ND	20	NS	ND	ND	ND	ND	3.6	ND
Well 17	1/20/2016	ND	ND	7.6	9.7	140	N/A	N/A	ND	ND	2.3	ND	ND	ND	N/A	ND	20	ND	ND	ND	ND	ND	3.4	ND
Well 17	1/18/2017	ND	ND	8.0	23.0	180	N/A	N/A	ND	ND	2.1	ND	ND	ND	N/A	ND	21	5.2	ND	ND	ND	ND	3.4	ND
Well 17	1/17/2018	ND	ND	7.8	9.2	130	N/A	N/A	ND	ND	3.2	ND	ND	ND	N/A	ND	19	5.5	10	ND	ND	ND	3.3	ND
Well 17	1/17/2019	ND	ND	8.1	130.0	330	N/A	N/A	ND	ND	2.1	ND	ND	230	N/A	ND	26	5.2	ND	ND	ND	ND	4.1	ND
Well TP1	1/21/2015	ND	ND	8.2	85.0	340	N/A	N/A	ND	ND	5.7	ND	ND	380	N/A	ND	19	NS	ND	ND	ND	ND	4.1	ND
Well TP1	1/20/2016	ND	ND	8.0	89.0	400	N/A	N/A	ND	ND	4.3	ND	ND	410	N/A	ND	20	ND	ND	ND	ND	ND	4.3	ND
Well TP1	1/18/2017	ND	ND	8.3	90.0	380	N/A	N/A	ND	ND	4.0	ND	ND	350	N/A	ND	19	6.6	ND	ND	ND	ND	4.2	ND
Well TP1	1/17/2018	ND	ND	8.1	92	390	N/A	N/A	ND	ND	4.5	ND	ND	400	N/A	ND	19	5.3	ND	ND	ND	ND	4.1	ND
Well TP1	1/17/2019	ND	ND	8.3	86	380	N/A	N/A	ND	ND	4.8	ND	ND	400	N/A	ND	21	6.1	ND	ND	ND	ND	4.2	ND

Table 1: Historical Groundwater Analytical Data - Since 2015^(a)

Metals											Anion/Cation Balance			Microbiological Analysis		Anthropogenic Analysis					
Well ID	Sample Date	Hg (µg/L)	Ni (µg/L)	K (µg/L)	Se (µg/L)	Ag (µg/L)	Na (µg/L)	Tl (µg/L)	V (µg/L)	Zn (µg/L)	Hardness, Total (as CaCO3) (mg/l)	Total Anions (meq/l)	Total Cations (meq/l)	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)	Sucralose (µg/L)	Caffeine (µg/L)	17B-Estradiol (µg/L)	NDMA (µg/L)	Triclosan (µg/L)	DEET (µg/L)
Well 9	1/21/2015	ND	ND	1.3	ND	ND	37	ND	3.5	ND	41	2.36	2.49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 9 ^(b)	1/20/2016	ND	ND	1.4	ND	ND	45	ND	6.5	ND	42	2.48	2.85	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11	1/21/2015	ND	ND	1.8	ND	ND	46	ND	6.6	ND	44	3.00	2.95	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11 ^(b)	1/20/2016	ND	ND	1.7	ND	ND	54	ND	5.9	ND	42	2.73	3.23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11	1/18/2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11-B ^(b)	1/17/2018	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 11-B	1/17/2019	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/21/2015	ND	ND	1.3	ND	ND	24	ND	5.9	ND	55	2.18	2.18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/20/2016	ND	ND	1.5	ND	ND	30	ND	4.5	ND	61	2.32	2.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/18/2017	ND	ND	1.5	ND	ND	35	ND	4.7	ND	54	2.34	2.64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/17/2018	ND	ND	1.7	ND	ND	37	ND	6.0	ND	64	2.68	2.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 12	1/17/2019	ND	ND	1.6	ND	ND	54	ND	4.2	ND	67	3.58	3.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 14	1/21/2015	ND	ND	1.5	ND	ND	25	ND	10.0	ND	90	2.75	2.93	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 14	1/20/2016	ND	ND	1.6	ND	ND	25	ND	7.6	ND	80	2.59	2.74	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 14	1/18/2017	ND	ND	1.7	ND	ND	28	ND	6.9	ND	84	2.61	2.93	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 14	1/17/2018	ND	ND	1.8	ND	ND	25	ND	8.4	ND	90	2.55	2.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 14	1/17/2019	ND	ND	1.8	ND	ND	52	ND	6.3	ND	94	3.92	4.21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 15	1/21/2015	ND	ND	1.4	ND	ND	14	ND	6.7	ND	73	2.04	2.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 15	1/20/2016	ND	ND	1.4	ND	ND	15	ND	5.1	ND	74	2.04	2.19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 15	1/18/2017	ND	ND	1.5	ND	ND	15	ND	4.5	ND	72	1.80	2.13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 15	1/17/2018	ND	ND	1.7	ND	ND	14	ND	6.1	ND	69	1.71	2.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 15	1/17/2019	ND	ND	1.0	ND	ND	12	ND	5.3	ND	75	1.89	2.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 16	1/21/2015	ND	ND	1.9	ND	ND	27	ND	12.0	ND	89	2.84	2.97	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 16	1/20/2016	ND	ND	2.1	ND	ND	32	ND	9.6	ND	89	2.93	3.24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 16	1/18/2017	ND	ND	2.0	ND	ND	30	ND	9.5	ND	83	3.14	3.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 16	1/17/2018	ND	ND	2.1	ND	ND	31	ND	11.0	ND	81	2.89	3.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 16	1/17/2019	ND	ND	2.0	ND	ND	49	ND	8.2	ND	110	4.17	4.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 17	1/21/2015	ND	ND	1.4	ND	ND	21	ND	11.0	ND	64	2.30	2.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 17	1/20/2016	ND	ND	1.5	ND	ND	24	ND	8.2	ND	63	2.26	2.36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 17	1/18/2017	ND	ND	1.7	ND	ND	31	ND	8.3	ND	67	2.40	2.72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 17	1/17/2018	ND	ND	1.6	ND	ND	23	ND	9.8	ND	62	2.09	2.26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well 17	1/17/2019	ND	ND	1.9	ND	ND	69	ND	7	ND	81	4.76	4.69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well TP1	1/21/2015	ND	ND	2.7	ND	ND	110	ND	24.0	ND	64	6.10	6.14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well TP1	1/20/2016	ND	ND	2.7	ND	ND	120	ND	23.0	ND	68	6.33	6.64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well TP1	1/18/2017	ND	ND	2.8	ND	ND	120	ND	19.0	ND	66	6.27	6.59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well TP1	1/17/2018	ND	ND	2.7	ND	ND	120	ND	22.0	ND	65	6.22	6.58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Well TP1	1/17/2019	ND	ND	2.8	ND	ND	100	ND	22.0	ND	69	6.17	5.82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Abbreviations:

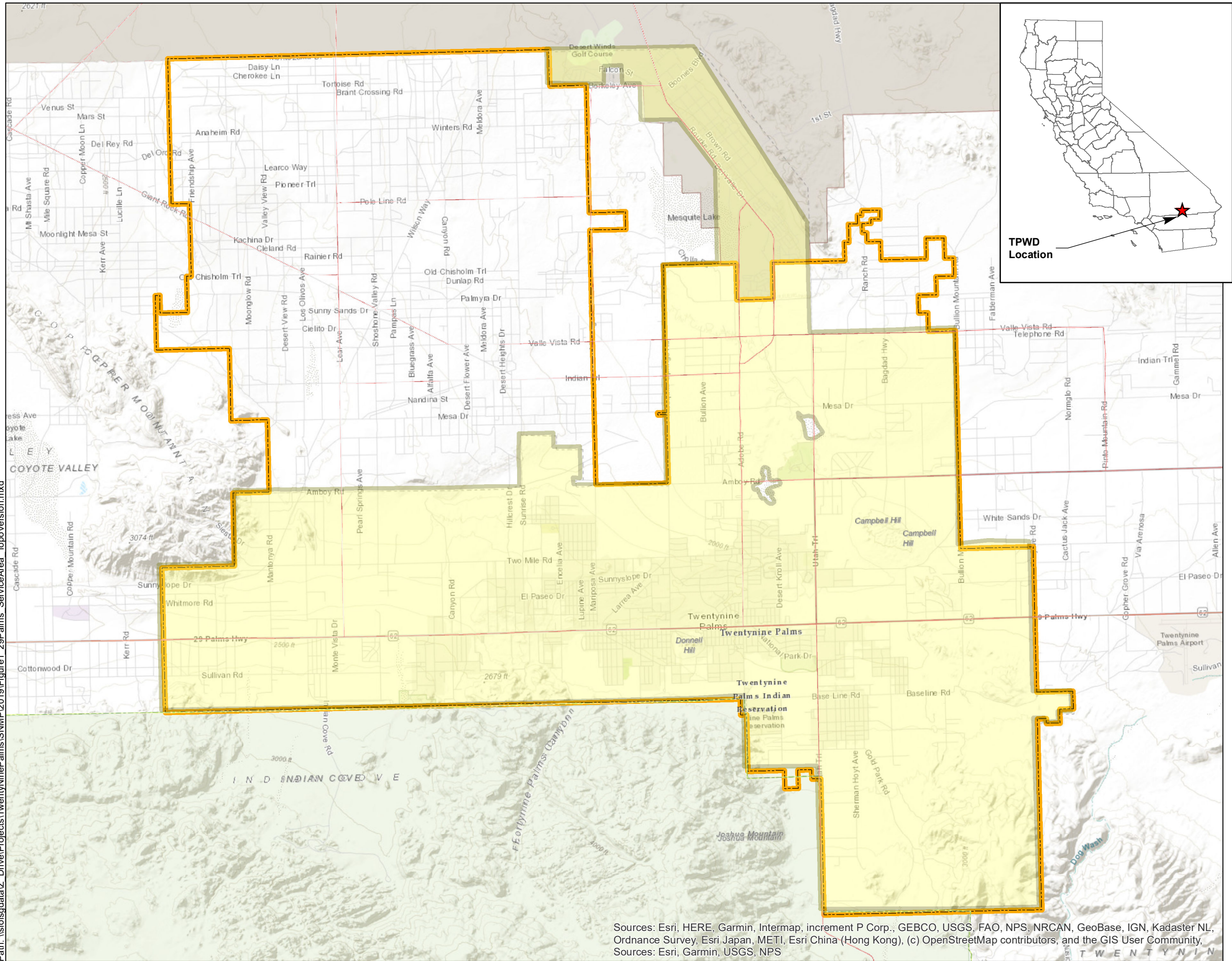
Ag = Silver
Al = Aluminum
As = Arsenic
B = Boron
Ba = Barium
Be = Beryllium
Br = Bromium
Ca = Calcium
CaCO3 = Calcium Carbonate
Cd = Cadmium
Cl = Chloride
ClO4 = Perchlorate
Cn = Cyanide
CO3 = Carbonate
Cr (+6) = Chromium VI
Total Cr = Total Chromium
DEET = N, N-Diethyl-meta-toluamide
EC = Electrical Conductivity
F = Fluoride
Fe = Iron
HCO3= Bicarbonate
Hg = Mercury
K = Potassium
MBAS = Methylene Blue Active Substance
mg/l = milligrams per liter
MPN/100 ml = Most Probable Number per 100 ml

Mg = Magnesium
Mn = Manganese
pH = Negative logarithm (hydrogen ion concentration), in standard units
Na = Sodium
N/A = Not Analyzed
ND = Not detected above laboratory detection limit
NDMA = N-Nitrosodimethylamine
Ni = Nickel
NS = Not sampled
NTU = Nephelometric Turbidity Units
NO3-N = Nitrate as Nitrogen
NO3-N + NO2-N = Nitrate and Nitrite as Nitrogen
NO2-N = Nitrite as Nitrogen
OH = Hydroxide
Pb = Lead
Sb = Antimony
Se = Selenium
SO4 = Sulfate
TDS = Total Dissolved Solids
Tl = Thallium
TOC = Total Organic Carbon
Total Hardness = (Ca + Mg as CaCO₃)
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter
V = Vanadium
Z = Zinc

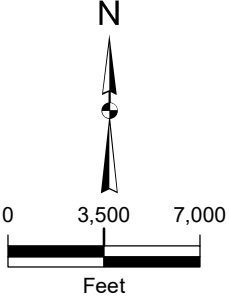
Notes:

- (a) Historical analytical results for groundwater monitoring well samples collected at the Twentynine Palms Water District over the past 5 years.
The general chemical and metal analytical data can be found in the laboratory reports in the appendix of the annual report. Temperature values measured by laboratory.
- (b) Well became inactive after 2016 sampling event. Well 11 was replaced in 2018 with Well 11-B in the same location but not yet put into service.
- (c) Median is calculated for the pH instead of average.

Figures



- Legend**
- City of Twenty-nine Palms
 - Twenty-nine Palms Water District Boundary



Kennedy Jenks

Twenty-nine Palms Water District
SNMP - 2019 Groundwater Monitoring Report
Twenty-nine Palms, CA

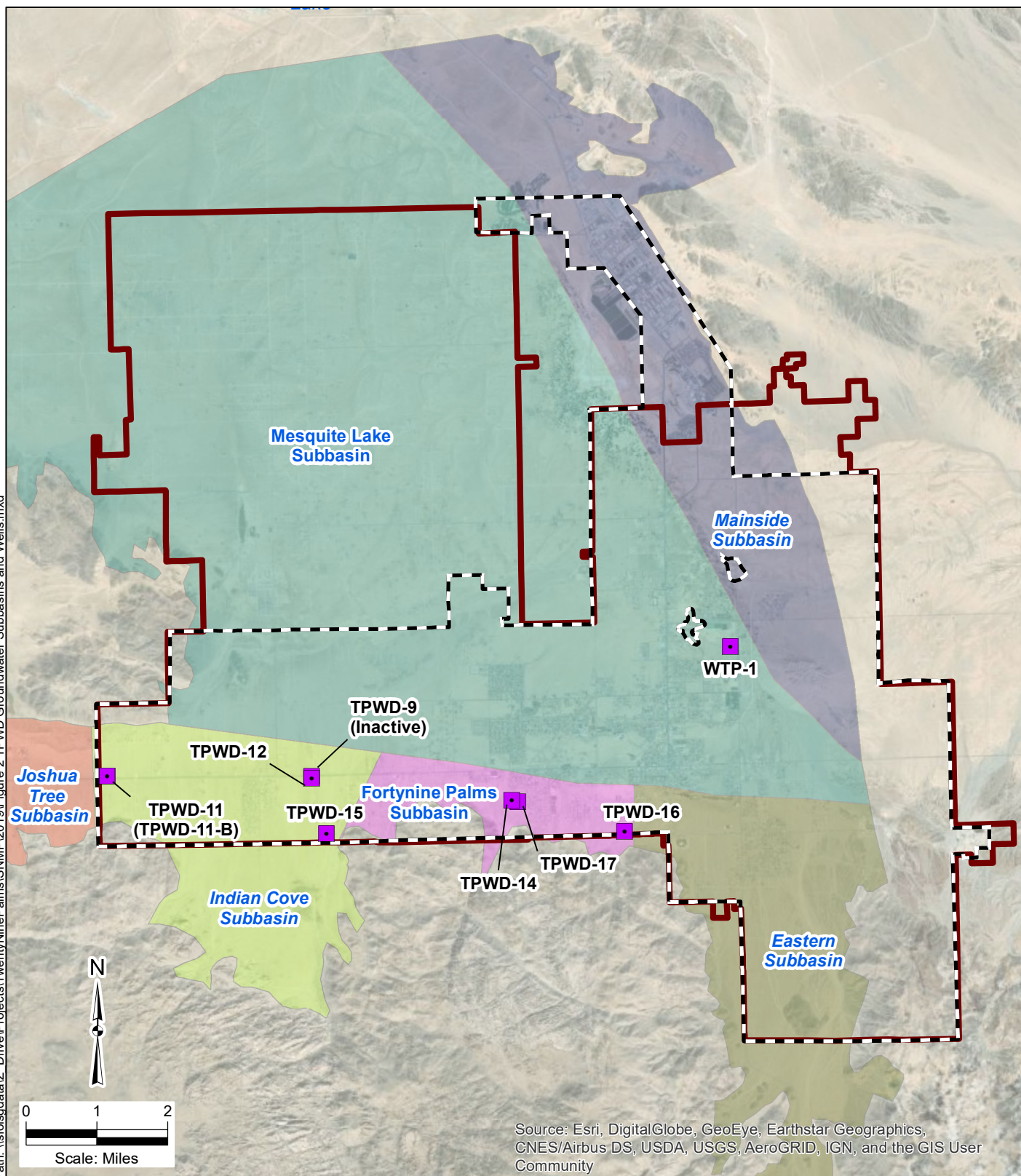
**Twenty-nine Palms Water District
Service Area Boundary**

KJ 2165029.00

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Sources: Esri, Garmin, USGS, NPS

Figure 1

Path: \\sfosdata\Z_Drive\Projects\TwentyNinePalms\SNMP\2019\Figure 2 TPWD Groundwater Subbasins and Wells.mxd



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- TPWD Active Water Supply Well
- City Limit
- Water District Boundary

Note:

1. Wells TPWD-9 and TPWD-11 became inactive in 2016. Well TPWD-11 was replaced with Well TPWD-11-B in 2018.

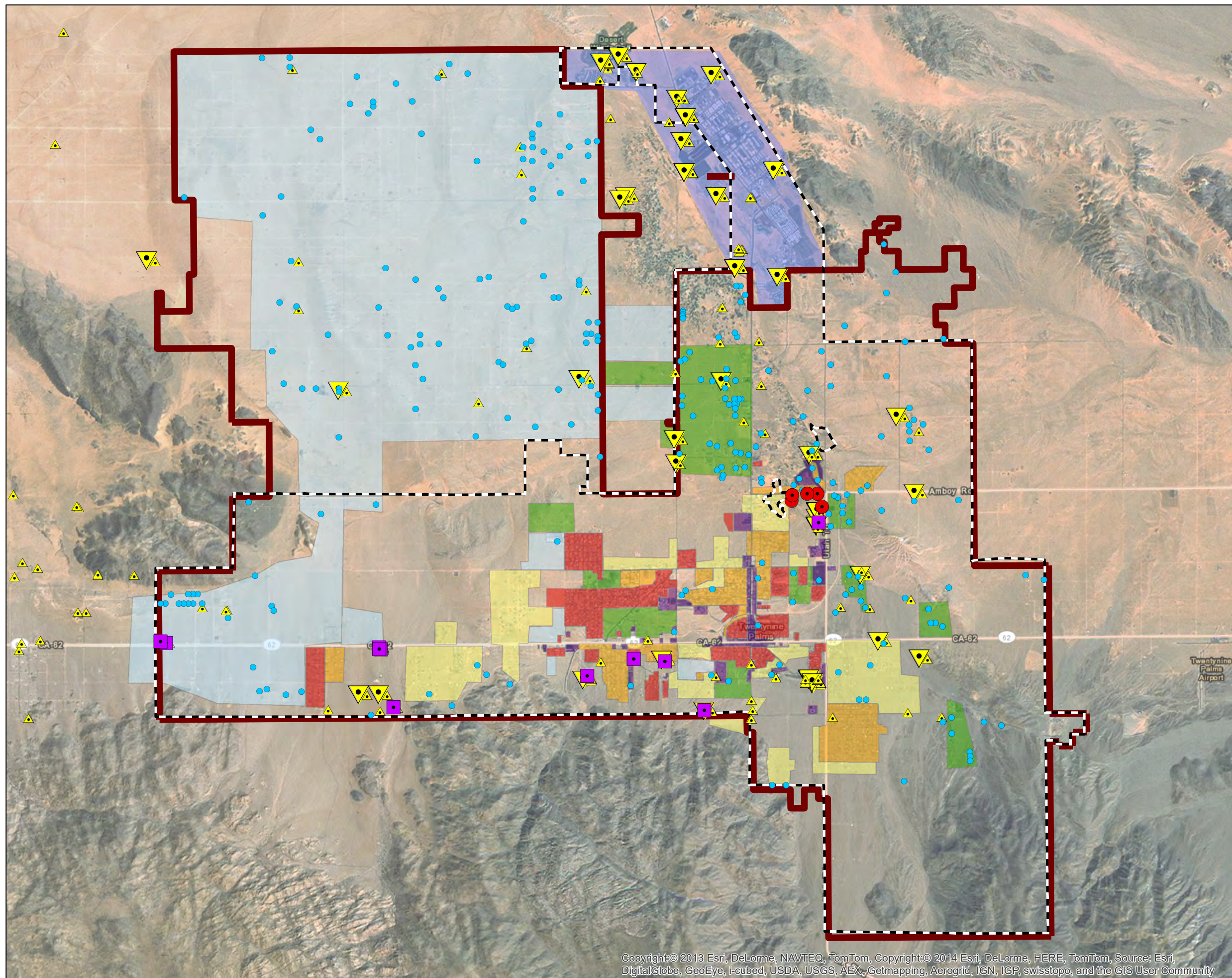
KJ Kennedy Jenks

Twentynine Palms Water District
SNMP - 2019 Groundwater Monitoring Report
Twentynine Palms, CA

TPWD Groundwater Subbasins and Wells

K/J 2165029.00

Figure 2



LEGEND

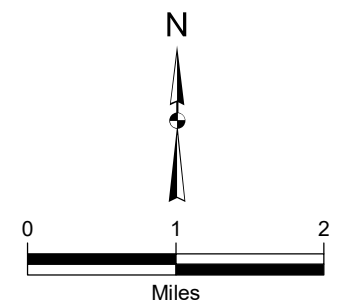
- TPWD Monitoring Well
- TPWD Production Well
- Private Well
- USGS Monitored Well
- Current USGS Monitored Well
- City Limit
- Water District Boundary

Current Land Use

- Zone A
- Zone B
- Zone C
- Zone D
- Zone E
- Commercial Area
- Military Base

- Zone A = High Density Residential (> 2 du/acre)
- Zone B = High Density Residential (1 - 2 du/acre)
- Zone C = Moderate Density Residential (0.5 - 1 du/acre)
- Zone D = Low Density Residential (0.1 - 0.5 du/acre)
- Zone E = Low Density Residential (< 0.1 du/acre)

Note: Data compiled from 2012 air photo analysis



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Twentynine Palms Water District
SNMP - 2019 Groundwater Monitoring Report
Twentynine Palms, California

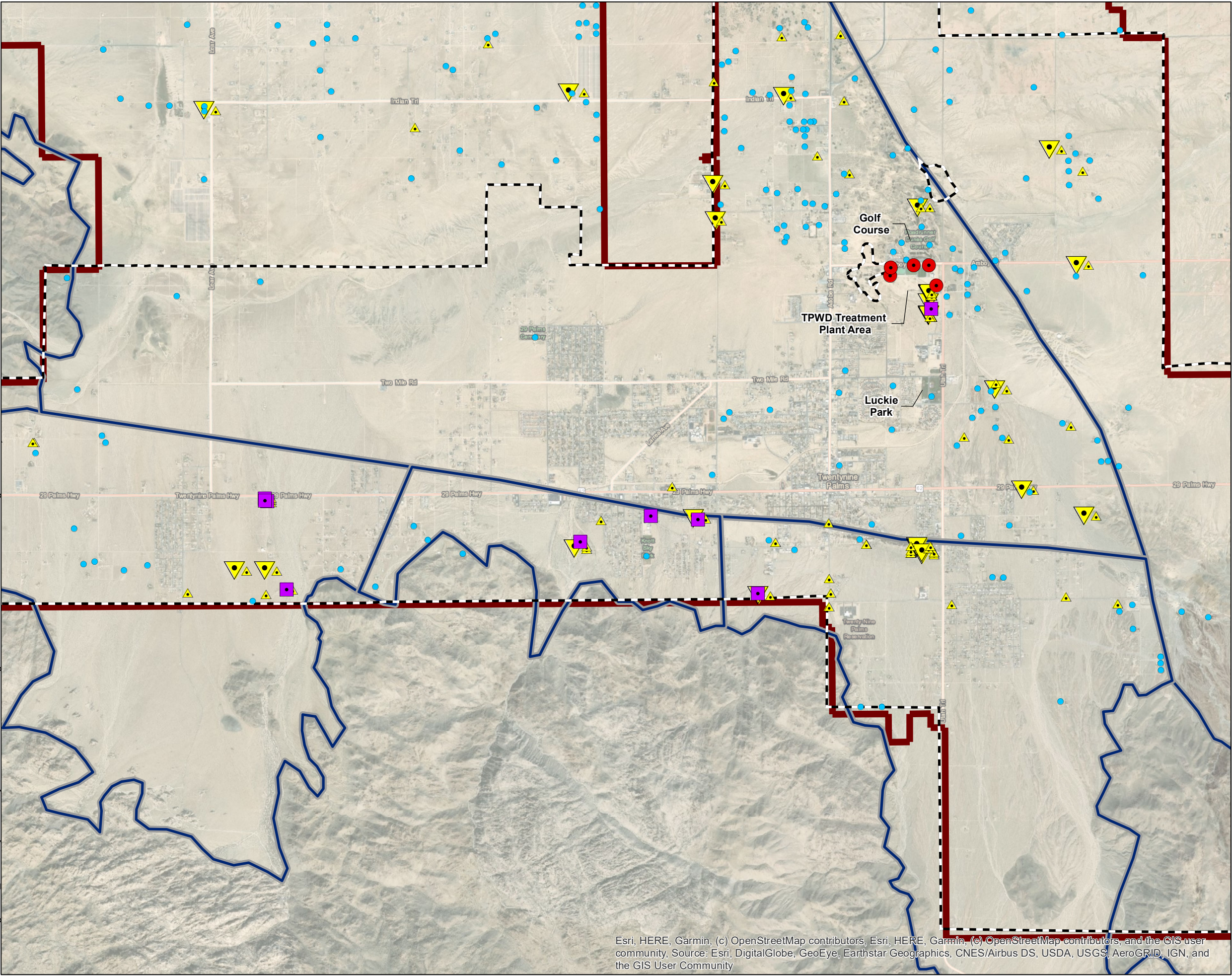
Wells in the Twentynine Palms Area

KJ 2165029*00

Copyright© 2013 Esri, DeLorme, NAVTEQ, TomTom, Copyright© 2014 Esri, DeLorme, HERE, TomTom, Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3

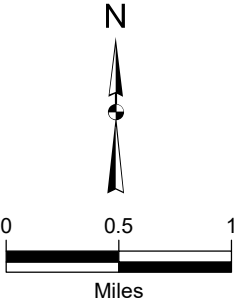
Path: \\sfoidata\Z Drive\Projects\TwentyNinePalms\SNMP\2019\Figure 4 Potential Groundwater Monitoring Locations.mxd



LEGEND

- TPWD Monitoring Well
- TPWD Production Well
- Private Well
- USGS Monitored Well
- Current USGS Monitored Well
- City Limit
- Groundwater Basin Boundary
- Water District Boundary

Note:
1. The well locations shown on this figure are potential groundwater monitoring locations that the District could consider for Phase 4 of the Groundwater Implementation Plan.



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Twenty nine Palms Water District
SNMP - 2019 Groundwater Monitoring Report
Twenty nine Palms, CA

Potential Groundwater Monitoring Locations

KJ 2165029.00

Figure 4

Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix A

Active Production Well Sample Laboratory Reports - 2019

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 12 19A1527-01 (Water) Sample Date: 01/17/19 8:53 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Field Analyses

Temperature (Field)	Field	64.8			°F	01/17/19	01/17/19	1903135	
Temperature (Field)	Field	18.2			°C	01/17/19	01/23/19	1903127	

General Physical Analyses

Apparent Color	SM 2120BM	ND	3.0	15	Color Units	01/17/19	01/17/19	1903152	
Odor Threshold	EPA 140.1-M	1	1	3	TON	01/17/19	01/17/19	1903152	
Turbidity	EPA 180.1	ND	0.1	5	NTU	01/17/19	01/17/19	1903152	

General Chemical Analyses

Alkalinity, Total (as CaCO ₃)	SM 2320 B	82	5.0		mg/L	01/23/19	01/23/19	1903127	
Bicarbonate (HCO ₃)	SM 2320 B	99	5.0		mg/L	01/23/19	01/23/19	1903127	
Carbonate (CO ₃)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
Chloride (Cl)	EPA 300.0	14	1.0	500	mg/L	01/17/19	01/17/19	1903104	
Langelier Index at Source Tmp	SM 203	-0.0003				01/17/19	01/23/19	1903127	
Langelier Index at 60 C	SM 203	0.63				01/17/19	01/23/19	1903127	
Aggressive Index	SM 203	11.83				01/17/19	01/23/19	1903127	
Cyanide (CN)	SM4500CNF	ND	100	150	ug/L	01/18/19	01/18/19	1903142	
Specific Conductance (E.C.)	SM 2510B	380	2.0	1600	umhos/cm	01/23/19	01/23/19	1903127	
Fluoride (F)	EPA 300.0	1.3	0.10	2	mg/L	01/17/19	01/17/19	1903104	
Hydroxide (OH)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
MBAS (LAS Mole. Wt 340.0)	SM 5540C	ND	0.10	0.5	mg/L	01/18/19	01/18/19	1903134	
Nitrate as N (NO ₃ -N)	EPA 300.0	1.7	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrate + Nitrite (as N)	EPA 300.0	1.7	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrite as N (NO ₂ -N)	EPA 300.0	ND	0.40	1	mg/L	01/17/19	01/17/19	1903104	
Perchlorate (ClO ₄)	EPA 314.0	ND	4.0	6	ug/L	01/24/19	01/24/19	1904107	
pH (Lab)	SM 4500HB	8.2			pH Units	01/17/19	01/23/19	1903127	
Sulfate (SO ₄)	EPA 300.0	72	0.50	500	mg/L	01/17/19	01/17/19	1903104	
Total Filterable Residue/TDS	SM 2540C	260	5.0	1000	mg/L	01/23/19	01/24/19	1904078	

Metals

Aluminum (Al)	EPA 200.7	ND	50	200	ug/L	01/23/19	01/23/19	1904077	
Antimony (Sb)	EPA 200.8	ND	6.0	6	ug/L	01/23/19	01/23/19	1904080	
Arsenic (As)	EPA 200.8	4.7	2.0	10	ug/L	01/23/19	01/23/19	1904080	
Barium (Ba)	EPA 200.7	ND	100	1000	ug/L	01/23/19	01/23/19	1904077	
Beryllium (Be)	EPA 200.8	ND	1.0	4	ug/L	01/23/19	01/23/19	1904080	
Boron (B)	EPA 200.7	210	100		ug/L	01/23/19	01/23/19	1904077	
Cadmium (Cd)	EPA 200.8	ND	1.0	5	ug/L	01/23/19	01/23/19	1904080	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 12

19A1527-01 (Water)

Sample Date: 01/17/19 8:53

Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Metals

Calcium (Ca)	EPA 200.7	23	1.0		mg/L	01/23/19	01/24/19	1904075	
Chromium (+6)	EPA 218.6	5.5	1.0		ug/L	01/17/19	01/25/19	1903078	
Chromium (Total Cr)	EPA 200.8	ND	10	50	ug/L	01/23/19	01/23/19	1904080	
Copper (Cu)	EPA 200.7	ND	50	1000	ug/L	01/23/19	01/23/19	1904077	
Iron (Fe)	EPA 200.7	ND	100	300	ug/L	01/23/19	01/23/19	1904077	
Lead (Pb)	EPA 200.8	ND	5.0		ug/L	01/23/19	01/23/19	1904080	
Magnesium (Mg)	EPA 200.7	2.6	1.0		mg/L	01/23/19	01/24/19	1904075	
Manganese (Mn)	EPA 200.7	ND	20	50	ug/L	01/23/19	01/23/19	1904077	
Mercury (Hg)	EPA 200.8	ND	1.0	2	ug/L	01/25/19	01/25/19	1904131	
Nickel (Ni)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Potassium (K)	EPA 200.7	1.6	1.0		mg/L	01/23/19	01/24/19	1904075	
Selenium (Se)	EPA 200.8	ND	5.0	50	ug/L	01/23/19	01/23/19	1904080	
Silver (Ag)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Sodium (Na)	EPA 200.7	54	1.0		mg/L	01/23/19	01/24/19	1904075	
Thallium (Tl)	EPA 200.8	ND	1.0	2	ug/L	01/23/19	01/23/19	1904080	
Vanadium (V)	EPA 200.8	4.2	3.0		ug/L	01/23/19	01/23/19	1904080	
Zinc (Zn)	EPA 200.7	ND	50	5000	ug/L	01/23/19	01/23/19	1904077	

Anion / Cation Balance

Hardness, Total (as CaCO3)	Calculated	67			mg/L	01/23/19	01/24/19	[CALC]	
Total Anions	Calculated	3.58			meq/L	01/23/19	01/23/19	[CALC]	
Total Cations	Calculated	3.75			meq/L	01/23/19	01/24/19	[CALC]	
% difference	Calculated	4.6				01/23/19	01/23/19	[CALC]	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 14 19A1527-02 (Water) Sample Date: 01/17/19 8:00 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
---------	--------	--------	------------	-----	-------	----------	----------	-------	-----------

Field Analyses

Temperature (Field)	Field	69.4			°F	01/17/19	01/17/19	1903135	
Temperature (Field)	Field	20.8			°C	01/17/19	01/23/19	1903127	

General Physical Analyses

Apparent Color	SM 2120BM	ND	3.0	15	Color Units	01/17/19	01/17/19	1903152	
Odor Threshold	EPA 140.1-M	1	1	3	TON	01/17/19	01/17/19	1903152	
Turbidity	EPA 180.1	ND	0.1	5	NTU	01/17/19	01/17/19	1903152	

General Chemical Analyses

Alkalinity, Total (as CaCO ₃)	SM 2320 B	80	5.0		mg/L	01/23/19	01/23/19	1903127	
Bicarbonate (HCO ₃)	SM 2320 B	98	5.0		mg/L	01/23/19	01/23/19	1903127	
Carbonate (CO ₃)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
Chloride (Cl)	EPA 300.0	17	1.0	500	mg/L	01/17/19	01/17/19	1903104	
Langelier Index at Source Temp	SM 203	-0.03				01/17/19	01/23/19	1903127	
Langelier Index at 60 C	SM 203	0.56				01/17/19	01/23/19	1903127	
Aggressive Index	SM 203	11.77				01/17/19	01/23/19	1903127	
Cyanide (CN)	SM4500CNF	ND	100	150	ug/L	01/18/19	01/18/19	1903142	
Specific Conductance (E.C.)	SM 2510B	420	2.0	1600	umhos/cm	01/23/19	01/23/19	1903127	
Fluoride (F)	EPA 300.0	0.89	0.10	2	mg/L	01/17/19	01/17/19	1903104	
Hydroxide (OH)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
MBAS (LAS Mole. Wt 340.0)	SM 5540C	ND	0.10	0.5	mg/L	01/18/19	01/18/19	1903134	
Nitrate as N (NO ₃ -N)	EPA 300.0	1.9	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrate + Nitrite (as N)	EPA 300.0	1.9	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrite as N (NO ₂ -N)	EPA 300.0	ND	0.40	1	mg/L	01/17/19	01/17/19	1903104	
Perchlorate (ClO ₄)	EPA 314.0	ND	4.0	6	ug/L	01/24/19	01/24/19	1904107	
pH (Lab)	SM 4500HB	8.0			pH Units	01/17/19	01/23/19	1903127	
Sulfate (SO ₄)	EPA 300.0	86	0.50	500	mg/L	01/17/19	01/17/19	1903104	
Total Filterable Residue/TDS	SM 2540C	290	5.0	1000	mg/L	01/23/19	01/24/19	1904078	

Metals

Aluminum (Al)	EPA 200.7	ND	50	200	ug/L	01/23/19	01/23/19	1904077	
Antimony (Sb)	EPA 200.8	ND	6.0	6	ug/L	01/23/19	01/23/19	1904080	
Arsenic (As)	EPA 200.8	ND	2.0	10	ug/L	01/23/19	01/23/19	1904080	
Barium (Ba)	EPA 200.7	ND	100	1000	ug/L	01/23/19	01/23/19	1904077	
Beryllium (Be)	EPA 200.8	ND	1.0	4	ug/L	01/23/19	01/23/19	1904080	
Boron (B)	EPA 200.7	180	100		ug/L	01/23/19	01/23/19	1904077	
Cadmium (Cd)	EPA 200.8	ND	1.0	5	ug/L	01/23/19	01/23/19	1904080	

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Client Services Manager

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Twentynine Palms Water District

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Received: 01/17/19 11:45

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Well 14 19A1527-02 (Water) Sample Date: 01/17/19 8:00 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
---------	--------	--------	------------	-----	-------	----------	----------	-------	-----------

Metals

Calcium (Ca)	EPA 200.7	30	1.0		mg/L	01/23/19	01/24/19	1904075	
Chromium (+6)	EPA 218.6	5.2	1.0		ug/L	01/17/19	01/25/19	1903078	
Chromium (Total Cr)	EPA 200.8	ND	10	50	ug/L	01/23/19	01/23/19	1904080	
Copper (Cu)	EPA 200.7	ND	50	1000	ug/L	01/23/19	01/23/19	1904077	
Iron (Fe)	EPA 200.7	ND	100	300	ug/L	01/23/19	01/23/19	1904077	
Lead (Pb)	EPA 200.8	ND	5.0		ug/L	01/23/19	01/23/19	1904080	
Magnesium (Mg)	EPA 200.7	4.9	1.0		mg/L	01/23/19	01/24/19	1904075	
Manganese (Mn)	EPA 200.7	ND	20	50	ug/L	01/23/19	01/23/19	1904077	
Mercury (Hg)	EPA 200.8	ND	1.0	2	ug/L	01/25/19	01/25/19	1904131	
Nickel (Ni)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Potassium (K)	EPA 200.7	1.8	1.0		mg/L	01/23/19	01/24/19	1904075	
Selenium (Se)	EPA 200.8	ND	5.0	50	ug/L	01/23/19	01/23/19	1904080	
Silver (Ag)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Sodium (Na)	EPA 200.7	52	1.0		mg/L	01/23/19	01/24/19	1904075	
Thallium (Tl)	EPA 200.8	ND	1.0	2	ug/L	01/23/19	01/23/19	1904080	
Vanadium (V)	EPA 200.8	6.3	3.0		ug/L	01/23/19	01/23/19	1904080	
Zinc (Zn)	EPA 200.7	ND	50	5000	ug/L	01/23/19	01/23/19	1904077	

Anion / Cation Balance

Hardness, Total (as CaCO3)	Calculated	94			mg/L	01/23/19	01/24/19	[CALC]	
Total Anions	Calculated	3.92			meq/L	01/23/19	01/23/19	[CALC]	
Total Cations	Calculated	4.21			meq/L	01/23/19	01/24/19	[CALC]	
% difference	Calculated	7.1				01/23/19	01/23/19	[CALC]	

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Twentynine Palms Water District

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Received: 01/17/19 11:45

Reported: 01/30/19

Well 15 19A1527-03 (Water) Sample Date: 01/17/19 8:31 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Field Analyses

Temperature (Field)	Field	68			°F	01/17/19	01/17/19	1903135	
Temperature (Field)	Field	20.0			°C	01/17/19	01/23/19	1903127	

General Physical Analyses

Apparent Color	SM 2120BM	ND	3.0	15	Color Units	01/17/19	01/17/19	1903152	
Odor Threshold	EPA 140.1-M	1	1	3	TON	01/17/19	01/17/19	1903152	
Turbidity	EPA 180.1	ND	0.1	5	NTU	01/17/19	01/17/19	1903152	

General Chemical Analyses

Alkalinity, Total (as CaCO ₃)	SM 2320 B	77	5.0		mg/L	01/23/19	01/23/19	1903127	
Bicarbonate (HCO ₃)	SM 2320 B	94	5.0		mg/L	01/23/19	01/23/19	1903127	
Carbonate (CO ₃)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
Chloride (Cl)	EPA 300.0	5.8	1.0	500	mg/L	01/17/19	01/17/19	1903104	
Langelier Index at Source Temp	SM 203	-0.53				01/17/19	01/23/19	1903127	
Langelier Index at 60 C	SM 203	0.08				01/17/19	01/23/19	1903127	
Aggressive Index	SM 203	11.24				01/17/19	01/23/19	1903127	
Cyanide (CN)	SM4500CNF	ND	100	150	ug/L	01/18/19	01/18/19	1903142	
Specific Conductance (E.C.)	SM 2510B	200	2.0	1600	umhos/cm	01/23/19	01/23/19	1903127	
Fluoride (F)	EPA 300.0	0.31	0.10	2	mg/L	01/17/19	01/17/19	1903104	
Hydroxide (OH)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
MBAS (LAS Mole. Wt 340.0)	SM 5540C	ND	0.10	0.5	mg/L	01/18/19	01/18/19	1903134	
Nitrate as N (NO ₃ -N)	EPA 300.0	2.8	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrate + Nitrite (as N)	EPA 300.0	2.8	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrite as N (NO ₂ -N)	EPA 300.0	ND	0.40	1	mg/L	01/17/19	01/17/19	1903104	
Perchlorate (ClO ₄)	EPA 314.0	ND	4.0	6	ug/L	01/24/19	01/24/19	1904107	
pH (Lab)	SM 4500HB	7.6			pH Units	01/17/19	01/23/19	1903127	
Sulfate (SO ₄)	EPA 300.0	8.1	0.50	500	mg/L	01/17/19	01/17/19	1903104	
Total Filterable Residue/TDS	SM 2540C	110	5.0	1000	mg/L	01/23/19	01/24/19	1904078	

Metals

Aluminum (Al)	EPA 200.7	ND	50	200	ug/L	01/23/19	01/23/19	1904077	
Antimony (Sb)	EPA 200.8	ND	6.0	6	ug/L	01/23/19	01/23/19	1904080	
Arsenic (As)	EPA 200.8	ND	2.0	10	ug/L	01/23/19	01/23/19	1904080	
Barium (Ba)	EPA 200.7	ND	100	1000	ug/L	01/23/19	01/23/19	1904077	
Beryllium (Be)	EPA 200.8	ND	1.0	4	ug/L	01/23/19	01/23/19	1904080	
Boron (B)	EPA 200.7	110	100		ug/L	01/23/19	01/23/19	1904077	
Cadmium (Cd)	EPA 200.8	ND	1.0	5	ug/L	01/23/19	01/23/19	1904080	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 15

19A1527-03 (Water)

Sample Date: 01/17/19 8:31

Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Metals

Calcium (Ca)	EPA 200.7	23	1.0		mg/L	01/23/19	01/24/19	1904075	
Chromium (+6)	EPA 218.6	ND	1.0		ug/L	01/17/19	01/25/19	1903078	
Chromium (Total Cr)	EPA 200.8	ND	10	50	ug/L	01/23/19	01/23/19	1904080	
Copper (Cu)	EPA 200.7	ND	50	1000	ug/L	01/23/19	01/23/19	1904077	
Iron (Fe)	EPA 200.7	ND	100	300	ug/L	01/23/19	01/23/19	1904077	
Lead (Pb)	EPA 200.8	ND	5.0		ug/L	01/23/19	01/23/19	1904080	
Magnesium (Mg)	EPA 200.7	4.3	1.0		mg/L	01/23/19	01/24/19	1904075	
Manganese (Mn)	EPA 200.7	ND	20	50	ug/L	01/23/19	01/23/19	1904077	
Mercury (Hg)	EPA 200.8	ND	1.0	2	ug/L	01/25/19	01/25/19	1904131	
Nickel (Ni)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Potassium (K)	EPA 200.7	1.0	1.0		mg/L	01/23/19	01/24/19	1904075	
Selenium (Se)	EPA 200.8	ND	5.0	50	ug/L	01/23/19	01/23/19	1904080	
Silver (Ag)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Sodium (Na)	EPA 200.7	12	1.0		mg/L	01/23/19	01/24/19	1904075	
Thallium (Tl)	EPA 200.8	ND	1.0	2	ug/L	01/23/19	01/23/19	1904080	
Vanadium (V)	EPA 200.8	5.3	3.0		ug/L	01/23/19	01/23/19	1904080	
Zinc (Zn)	EPA 200.7	ND	50	5000	ug/L	01/23/19	01/23/19	1904077	

Anion / Cation Balance

Hardness, Total (as CaCO3)	Calculated	75			mg/L	01/23/19	01/24/19	[CALC]	
Total Anions	Calculated	1.89			meq/L	01/23/19	01/23/19	[CALC]	
Total Cations	Calculated	2.05			meq/L	01/23/19	01/24/19	[CALC]	
% difference	Calculated	8.2				01/23/19	01/23/19	[CALC]	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 16 19A1527-04 (Water) Sample Date: 01/17/19 7:30 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Field Analyses

Temperature (Field)	Field	69.8			°F	01/17/19	01/17/19	1903135	
Temperature (Field)	Field	21.0			°C	01/17/19	01/23/19	1903127	

General Physical Analyses

Apparent Color	SM 2120BM	ND	3.0	15	Color Units	01/17/19	01/17/19	1903152	
Odor Threshold	EPA 140.1-M	1	1	3	TON	01/17/19	01/17/19	1903152	
Turbidity	EPA 180.1	ND	0.1	5	NTU	01/17/19	01/17/19	1903152	

General Chemical Analyses

Alkalinity, Total (as CaCO ₃)	SM 2320 B	87	5.0		mg/L	01/23/19	01/23/19	1903127	
Bicarbonate (HCO ₃)	SM 2320 B	110	5.0		mg/L	01/23/19	01/23/19	1903127	
Carbonate (CO ₃)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
Chloride (Cl)	EPA 300.0	17	1.0	500	mg/L	01/17/19	01/17/19	1903104	
Langelier Index at Source Temp	SM 203	0.18				01/17/19	01/23/19	1903127	
Langelier Index at 60 C	SM 203	0.77				01/17/19	01/23/19	1903127	
Aggressive Index	SM 203	11.97				01/17/19	01/23/19	1903127	
Cyanide (CN)	SM4500CNF	ND	100	150	ug/L	01/18/19	01/18/19	1903142	
Specific Conductance (E.C.)	SM 2510B	430	2.0	1600	umhos/cm	01/23/19	01/23/19	1903127	
Fluoride (F)	EPA 300.0	1.5	0.10	2	mg/L	01/17/19	01/17/19	1903104	
Hydroxide (OH)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
MBAS (LAS Mole. Wt 340.0)	SM 5540C	ND	0.10	0.5	mg/L	01/18/19	01/18/19	1903134	
Nitrate as N (NO ₃ -N)	EPA 300.0	1.5	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrate + Nitrite (as N)	EPA 300.0	1.5	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrite as N (NO ₂ -N)	EPA 300.0	ND	0.40	1	mg/L	01/17/19	01/17/19	1903104	
Perchlorate (ClO ₄)	EPA 314.0	ND	4.0	6	ug/L	01/24/19	01/24/19	1904107	
pH (Lab)	SM 4500HB	8.1			pH Units	01/17/19	01/23/19	1903127	
Sulfate (SO ₄)	EPA 300.0	87	0.50	500	mg/L	01/17/19	01/17/19	1903104	
Total Filterable Residue/TDS	SM 2540C	280	5.0	1000	mg/L	01/23/19	01/24/19	1904078	

Metals

Aluminum (Al)	EPA 200.7	ND	50	200	ug/L	01/23/19	01/23/19	1904077	
Antimony (Sb)	EPA 200.8	ND	6.0	6	ug/L	01/23/19	01/23/19	1904080	
Arsenic (As)	EPA 200.8	ND	2.0	10	ug/L	01/23/19	01/23/19	1904080	
Barium (Ba)	EPA 200.7	ND	100	1000	ug/L	01/23/19	01/23/19	1904077	
Beryllium (Be)	EPA 200.8	ND	1.0	4	ug/L	01/23/19	01/23/19	1904080	
Boron (B)	EPA 200.7	200	100		ug/L	01/23/19	01/23/19	1904077	
Cadmium (Cd)	EPA 200.8	ND	1.0	5	ug/L	01/23/19	01/23/19	1904080	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 16 19A1527-04 (Water) Sample Date: 01/17/19 7:30 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Metals

Calcium (Ca)	EPA 200.7	36	1.0		mg/L	01/23/19	01/24/19	1904075	
Chromium (+6)	EPA 218.6	6.1	1.0		ug/L	01/17/19	01/25/19	1903078	
Chromium (Total Cr)	EPA 200.8	ND	10	50	ug/L	01/23/19	01/23/19	1904080	
Copper (Cu)	EPA 200.7	ND	50	1000	ug/L	01/23/19	01/23/19	1904077	
Iron (Fe)	EPA 200.7	ND	100	300	ug/L	01/23/19	01/23/19	1904077	
Lead (Pb)	EPA 200.8	ND	5.0		ug/L	01/23/19	01/23/19	1904080	
Magnesium (Mg)	EPA 200.7	5.9	1.0		mg/L	01/23/19	01/24/19	1904075	
Manganese (Mn)	EPA 200.7	ND	20	50	ug/L	01/23/19	01/23/19	1904077	
Mercury (Hg)	EPA 200.8	ND	1.0	2	ug/L	01/25/19	01/25/19	1904131	
Nickel (Ni)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Potassium (K)	EPA 200.7	2.0	1.0		mg/L	01/23/19	01/24/19	1904075	
Selenium (Se)	EPA 200.8	ND	5.0	50	ug/L	01/23/19	01/23/19	1904080	
Silver (Ag)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Sodium (Na)	EPA 200.7	49	1.0		mg/L	01/23/19	01/24/19	1904075	
Thallium (Tl)	EPA 200.8	ND	1.0	2	ug/L	01/23/19	01/23/19	1904080	
Vanadium (V)	EPA 200.8	8.2	3.0		ug/L	01/23/19	01/23/19	1904080	
Zinc (Zn)	EPA 200.7	ND	50	5000	ug/L	01/23/19	01/23/19	1904077	

Anion / Cation Balance

Hardness, Total (as CaCO3)	Calculated	110			mg/L	01/23/19	01/24/19	[CALC]	
Total Anions	Calculated	4.17			meq/L	01/23/19	01/23/19	[CALC]	
Total Cations	Calculated	4.47			meq/L	01/23/19	01/24/19	[CALC]	
% difference	Calculated	6.9				01/23/19	01/23/19	[CALC]	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 17 19A1527-05 (Water) Sample Date: 01/17/19 8:10 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Field Analyses

Temperature (Field)	Field	69.3			°F	01/17/19	01/17/19	1903135	
Temperature (Field)	Field	20.7			°C	01/17/19	01/23/19	1903127	

General Physical Analyses

Apparent Color	SM 2120BM	ND	3.0	15	Color Units	01/17/19	01/17/19	1903152	
Odor Threshold	EPA 140.1-M	1	1	3	TON	01/17/19	01/17/19	1903152	
Turbidity	EPA 180.1	ND	0.1	5	NTU	01/17/19	01/17/19	1903152	

General Chemical Analyses

Alkalinity, Total (as CaCO ₃)	SM 2320 B	72	5.0		mg/L	01/23/19	01/23/19	1903127	
Bicarbonate (HCO ₃)	SM 2320 B	88	5.0		mg/L	01/23/19	01/23/19	1903127	
Carbonate (CO ₃)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
Chloride (Cl)	EPA 300.0	20	1.0	500	mg/L	01/17/19	01/17/19	1903104	
Langelier Index at Source Temp	SM 203	-0.06				01/17/19	01/23/19	1903127	
Langelier Index at 60 C	SM 203	0.54				01/17/19	01/23/19	1903127	
Aggressive Index	SM 203	11.75				01/17/19	01/23/19	1903127	
Cyanide (CN)	SM4500CNF	ND	100	150	ug/L	01/18/19	01/18/19	1903142	
Specific Conductance (E.C.)	SM 2510B	480	2.0	1600	umhos/cm	01/23/19	01/23/19	1903127	
Fluoride (F)	EPA 300.0	0.97	0.10	2	mg/L	01/17/19	01/17/19	1903104	
Hydroxide (OH)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
MBAS (LAS Mole. Wt 340.0)	SM 5540C	ND	0.10	0.5	mg/L	01/18/19	01/18/19	1903134	
Nitrate as N (NO ₃ -N)	EPA 300.0	1.4	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrate + Nitrite (as N)	EPA 300.0	1.4	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrite as N (NO ₂ -N)	EPA 300.0	ND	0.40	1	mg/L	01/17/19	01/17/19	1903104	
Perchlorate (ClO ₄)	EPA 314.0	ND	4.0	6	ug/L	01/24/19	01/24/19	1904107	
pH (Lab)	SM 4500HB	8.1			pH Units	01/17/19	01/23/19	1903127	
Sulfate (SO ₄)	EPA 300.0	130	0.50	500	mg/L	01/17/19	01/17/19	1903104	
Total Filterable Residue/TDS	SM 2540C	330	5.0	1000	mg/L	01/23/19	01/24/19	1904078	

Metals

Aluminum (Al)	EPA 200.7	ND	50	200	ug/L	01/23/19	01/23/19	1904077	
Antimony (Sb)	EPA 200.8	ND	6.0	6	ug/L	01/23/19	01/23/19	1904080	
Arsenic (As)	EPA 200.8	2.1	2.0	10	ug/L	01/23/19	01/23/19	1904080	
Barium (Ba)	EPA 200.7	ND	100	1000	ug/L	01/23/19	01/23/19	1904077	
Beryllium (Be)	EPA 200.8	ND	1.0	4	ug/L	01/23/19	01/23/19	1904080	
Boron (B)	EPA 200.7	230	100		ug/L	01/23/19	01/23/19	1904077	
Cadmium (Cd)	EPA 200.8	ND	1.0	5	ug/L	01/23/19	01/23/19	1904080	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well 17

19A1527-05 (Water)

Sample Date: 01/17/19 8:10

Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Metals

Calcium (Ca)	EPA 200.7	26	1.0		mg/L	01/23/19	01/24/19	1904075	
Chromium (+6)	EPA 218.6	5.2	1.0		ug/L	01/17/19	01/25/19	1903078	
Chromium (Total Cr)	EPA 200.8	ND	10	50	ug/L	01/23/19	01/23/19	1904080	
Copper (Cu)	EPA 200.7	ND	50	1000	ug/L	01/23/19	01/23/19	1904077	
Iron (Fe)	EPA 200.7	ND	100	300	ug/L	01/23/19	01/23/19	1904077	
Lead (Pb)	EPA 200.8	ND	5.0		ug/L	01/23/19	01/23/19	1904080	
Magnesium (Mg)	EPA 200.7	4.1	1.0		mg/L	01/23/19	01/24/19	1904075	
Manganese (Mn)	EPA 200.7	ND	20	50	ug/L	01/23/19	01/23/19	1904077	
Mercury (Hg)	EPA 200.8	ND	1.0	2	ug/L	01/25/19	01/25/19	1904131	
Nickel (Ni)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Potassium (K)	EPA 200.7	1.9	1.0		mg/L	01/23/19	01/24/19	1904075	
Selenium (Se)	EPA 200.8	ND	5.0	50	ug/L	01/23/19	01/23/19	1904080	
Silver (Ag)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Sodium (Na)	EPA 200.7	69	1.0		mg/L	01/23/19	01/24/19	1904075	
Thallium (Tl)	EPA 200.8	ND	1.0	2	ug/L	01/23/19	01/23/19	1904080	
Vanadium (V)	EPA 200.8	7.0	3.0		ug/L	01/23/19	01/23/19	1904080	
Zinc (Zn)	EPA 200.7	ND	50	5000	ug/L	01/23/19	01/23/19	1904077	

Anion / Cation Balance

Hardness, Total (as CaCO3)	Calculated	81			mg/L	01/23/19	01/24/19	[CALC]	
Total Anions	Calculated	4.76			meq/L	01/23/19	01/23/19	[CALC]	
Total Cations	Calculated	4.69			meq/L	01/23/19	01/24/19	[CALC]	
% difference	Calculated	1.6				01/23/19	01/23/19	[CALC]	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well TP1 19A1527-06 (Water) Sample Date: 01/17/19 0:00 Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
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Field Analyses

Temperature (Field)	Field	71.2			°F	01/17/19	01/17/19	1903135	
Temperature (Field)	Field	21.8			°C	01/17/19	01/23/19	1903127	

General Physical Analyses

Apparent Color	SM 2120BM	ND	3.0	15	Color Units	01/17/19	01/17/19	1903152	
Odor Threshold	EPA 140.1-M	1	1	3	TON	01/17/19	01/17/19	1903152	
Turbidity	EPA 180.1	ND	0.1	5	NTU	01/17/19	01/17/19	1903152	

General Chemical Analyses

Alkalinity, Total (as CaCO ₃)	SM 2320 B	160	5.0		mg/L	01/23/19	01/23/19	1903127	
Bicarbonate (HCO ₃)	SM 2320 B	200	5.0		mg/L	01/23/19	01/23/19	1903127	
Carbonate (CO ₃)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
Chloride (Cl)	EPA 300.0	28	1.0	500	mg/L	01/17/19	01/17/19	1903104	
Langelier Index at Source Temp	SM 203	0.42				01/17/19	01/23/19	1903127	
Langelier Index at 60 C	SM 203	1.00				01/17/19	01/23/19	1903127	
Aggressive Index	SM 203	12.23				01/17/19	01/23/19	1903127	
Cyanide (CN)	SM4500CNF	ND	100	150	ug/L	01/18/19	01/18/19	1903142	
Specific Conductance (E.C.)	SM 2510B	610	2.0	1600	umhos/cm	01/23/19	01/23/19	1903127	
Fluoride (F)	EPA 300.0	5.9	0.20	2	mg/L	01/23/19	01/23/19	1904071	
Hydroxide (OH)	SM 2320B	ND	5.0		mg/L	01/23/19	01/23/19	1903127	
MBAS (LAS Mole. Wt 340.0)	SM 5540C	ND	0.10	0.5	mg/L	01/18/19	01/18/19	1903134	
Nitrate as N (NO ₃ -N)	EPA 300.0	1.2	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrate + Nitrite (as N)	EPA 300.0	1.2	0.40	10	mg/L	01/17/19	01/17/19	1903104	
Nitrite as N (NO ₂ -N)	EPA 300.0	ND	0.40	1	mg/L	01/17/19	01/17/19	1903104	
Perchlorate (ClO ₄)	EPA 314.0	ND	4.0	6	ug/L	01/25/19	01/25/19	1904134	
pH (Lab)	SM 4500HB	8.3			pH Units	01/17/19	01/23/19	1903127	
Sulfate (SO ₄)	EPA 300.0	86	0.50	500	mg/L	01/17/19	01/17/19	1903104	
Total Filterable Residue/TDS	SM 2540C	380	5.0	1000	mg/L	01/23/19	01/24/19	1904078	

Metals

Aluminum (Al)	EPA 200.7	ND	50	200	ug/L	01/23/19	01/23/19	1904077	
Antimony (Sb)	EPA 200.8	ND	6.0	6	ug/L	01/23/19	01/23/19	1904080	
Arsenic (As)	EPA 200.8	4.8	2.0	10	ug/L	01/23/19	01/23/19	1904080	
Barium (Ba)	EPA 200.7	ND	100	1000	ug/L	01/23/19	01/23/19	1904077	
Beryllium (Be)	EPA 200.8	ND	1.0	4	ug/L	01/23/19	01/23/19	1904080	
Boron (B)	EPA 200.7	400	100		ug/L	01/23/19	01/23/19	1904077	
Cadmium (Cd)	EPA 200.8	ND	1.0	5	ug/L	01/23/19	01/23/19	1904080	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Celebrating 50 Years of Analytical Service 1967-2017



Twentynine Palms Water District

P.O Box 1735

Twentynine Palms CA, 92277

Project: Standard Analysis

Sub Project: Inorganic / Compliance Sampling

Project Manager: Ray Kolisz

Work Order: 19A1527

Received: 01/17/19 11:45

Reported: 01/30/19

Well TP1

19A1527-06 (Water)

Sample Date: 01/17/19 0:00

Sampler: Neal Stephenson

Analyte	Method	Result	Rep. Limit	MCL	Units	Prepared	Analyzed	Batch	Qualifier
Metals									
Calcium (Ca)	EPA 200.7	21	1.0		mg/L	01/23/19	01/24/19	1904075	
Chromium (+6)	EPA 218.6	6.1	1.0		ug/L	01/17/19	01/25/19	1903078	
Chromium (Total Cr)	EPA 200.8	ND	10	50	ug/L	01/23/19	01/23/19	1904080	
Copper (Cu)	EPA 200.7	ND	50	1000	ug/L	01/23/19	01/23/19	1904077	
Iron (Fe)	EPA 200.7	ND	100	300	ug/L	01/23/19	01/23/19	1904077	
Lead (Pb)	EPA 200.8	ND	5.0		ug/L	01/23/19	01/23/19	1904080	
Magnesium (Mg)	EPA 200.7	4.2	1.0		mg/L	01/23/19	01/24/19	1904075	
Manganese (Mn)	EPA 200.7	ND	20	50	ug/L	01/23/19	01/23/19	1904077	
Mercury (Hg)	EPA 200.8	ND	1.0	2	ug/L	01/25/19	01/25/19	1904131	
Nickel (Ni)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Potassium (K)	EPA 200.7	2.8	1.0		mg/L	01/23/19	01/24/19	1904075	
Selenium (Se)	EPA 200.8	ND	5.0	50	ug/L	01/23/19	01/23/19	1904080	
Silver (Ag)	EPA 200.8	ND	10	100	ug/L	01/23/19	01/23/19	1904080	
Sodium (Na)	EPA 200.7	100	2.0		mg/L	01/28/19	01/29/19	1905021	
Thallium (Tl)	EPA 200.8	ND	1.0	2	ug/L	01/23/19	01/23/19	1904080	
Vanadium (V)	EPA 200.8	22	3.0		ug/L	01/23/19	01/23/19	1904080	
Zinc (Zn)	EPA 200.7	ND	50	5000	ug/L	01/23/19	01/23/19	1904077	

Anion / Cation Balance

Hardness, Total (as CaCO3)	Calculated	69		mg/L	01/28/19	01/24/19	[CALC]
Total Anions	Calculated	6.17		meq/L	01/28/19	01/23/19	[CALC]
Total Cations	Calculated	5.82		meq/L	01/28/19	01/29/19	[CALC]
% difference	Calculated	5.9			01/28/19	01/23/19	[CALC]

pH (Lab) was analyzed ASAP but received and analyzed past the 15 minute hold time.

ND Analyte NOT DETECTED at or above the reporting limit

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

EDT Transfer Confirmation 1



Work Order: 19A1527

Report Date: 01/30/2019

Analyzing Lab: Clinical Laboratory of San Bernardino, Inc. ELAP 1088

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TWENTYNINE PALMS WATER DISTRICT

User ID: TAN

System: 3610049

WELL 12	Station No.: 3610049-012			Sampled: 190117 08:53	
COLOR	Result: ND	Units: UNITS	Entry No.: 00081	Analyzed: 190117	
ODOR THRESHOLD @ 60 C	Result: 1	Units: TON	Entry No.: 00086	Analyzed: 190117	
SPECIFIC CONDUCTANCE	Result: 380	Units: UMO/CM	Entry No.: 00095	Analyzed: 190123	
PH (LABORATORY)	Result: 8.2	Units:	Entry No.: 00403	Analyzed: 190123	
TOTAL ALKALINITY (AS CaCO3)	Result: 82	Units: MG/L	Entry No.: 00410	Analyzed: 190123	
BICARBONATE ALKALINITY	Result: 99	Units: MG/L	Entry No.: 00440	Analyzed: 190123	
CARBONATE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 00445	Analyzed: 190123	
NITRATE (AS N)	Result: 1.7	Units: MG/L	Entry No.: 00618	Analyzed: 190117	
NITRITE (N)	Result: ND	Units: MG/L	Entry No.: 00620	Analyzed: 190117	
TOTAL HARDNESS (AS CaCO3)	Result: 67	Units: MG/L	Entry No.: 00900	Analyzed: 190124	
CALCIUM	Result: 23	Units: MG/L	Entry No.: 00916	Analyzed: 190124	
MAGNESIUM	Result: 2.6	Units: MG/L	Entry No.: 00927	Analyzed: 190124	
SODIUM	Result: 54	Units: MG/L	Entry No.: 00929	Analyzed: 190124	
POTASSIUM	Result: 1.6	Units: MG/L	Entry No.: 00937	Analyzed: 190124	
CHLORIDE	Result: 14	Units: MG/L	Entry No.: 00940	Analyzed: 190117	
SULFATE	Result: 72	Units: MG/L	Entry No.: 00945	Analyzed: 190117	
FLUORIDE (F) NATURAL - SOURCE	Result: 1.3	Units: MG/L	Entry No.: 00951	Analyzed: 190117	
ARSENIC	Result: 4.7	Units: UG/L	Entry No.: 01002	Analyzed: 190123	
BARIUM	Result: ND	Units: UG/L	Entry No.: 01007	Analyzed: 190123	
BERYLLIUM	Result: ND	Units: UG/L	Entry No.: 01012	Analyzed: 190123	
BORON	Result: 210	Units: UG/L	Entry No.: 01020	Analyzed: 190123	
CADMIUM	Result: ND	Units: UG/L	Entry No.: 01027	Analyzed: 190123	
CHROMIUM (HEXAVALENT)	Result: 5.5	Units: UG/L	Entry No.: 01032	Analyzed: 190125	
CHROMIUM (TOTAL)	Result: ND	Units: UG/L	Entry No.: 01034	Analyzed: 190123	
COPPER	Result: ND	Units: UG/L	Entry No.: 01042	Analyzed: 190123	
IRON	Result: ND	Units: UG/L	Entry No.: 01045	Analyzed: 190123	
LEAD	Result: ND	Units: UG/L	Entry No.: 01051	Analyzed: 190123	
MANGANESE	Result: ND	Units: UG/L	Entry No.: 01055	Analyzed: 190123	
THALLIUM	Result: ND	Units: UG/L	Entry No.: 01059	Analyzed: 190123	
NICKEL	Result: ND	Units: UG/L	Entry No.: 01067	Analyzed: 190123	
SILVER	Result: ND	Units: UG/L	Entry No.: 01077	Analyzed: 190123	
VANADIUM	Result: 4.2	Units: UG/L	Entry No.: 01087	Analyzed: 190123	
ZINC	Result: ND	Units: UG/L	Entry No.: 01092	Analyzed: 190123	
ANTIMONY	Result: ND	Units: UG/L	Entry No.: 01097	Analyzed: 190123	
ALUMINUM	Result: ND	Units: UG/L	Entry No.: 01105	Analyzed: 190123	
SELENIUM	Result: ND	Units: UG/L	Entry No.: 01147	Analyzed: 190123	
CYANIDE	Result: ND	Units: UG/L	Entry No.: 01291	Analyzed: 190118	
FOAMING AGENTS (MBAS)	Result: ND	Units: MG/L	Entry No.: 38260	Analyzed: 190118	
TOTAL DISSOLVED SOLIDS	Result: 260	Units: MG/L	Entry No.: 70300	Analyzed: 190124	
LANGELIER INDEX @ 60 C	Result: 0.63	Units:	Entry No.: 71813	Analyzed: 190123	
LANGELIER INDEX @ SOURCE TEMP.	Result: - 0.00	Units:	Entry No.: 71814	Analyzed: 190123	
HYDROXIDE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 71830	Analyzed: 190123	
MERCURY	Result: ND	Units: UG/L	Entry No.: 71900	Analyzed: 190125	
TURBIDITY (LAB)	Result: ND	Units: NTU	Entry No.: 82079	Analyzed: 190117	
AGRESSIVENESS INDEX	Result: 11.83	Units:	Entry No.: 82383	Analyzed: 190123	
NITRATE + NITRITE AS N	Result: 1.7	Units: MG/L	Entry No.: A-029	Analyzed: 190117	
PERCHLORATE	Result: ND	Units: UG/L	Entry No.: A-031	Analyzed: 190124	

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Clinical Laboratory of San Bernardino, Inc.

EDT Transfer Confirmation 1



Work Order: 19A1527

Report Date: 01/30/2019

Analyzing Lab: Clinical Laboratory of San Bernardino, Inc. ELAP 1088

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WELL 15		Station No.: 3610049-014		Sampled: 190117 08:31	
COLOR	Result: ND	Units: UNITS	Entry No.: 00081	Analyzed: 190117	
ODOR THRESHOLD @ 60 C	Result: 1	Units: TON	Entry No.: 00086	Analyzed: 190117	
SPECIFIC CONDUCTANCE	Result: 200	Units: UMO/CM	Entry No.: 00095	Analyzed: 190123	
PH (LABORATORY)	Result: 7.6	Units:	Entry No.: 00403	Analyzed: 190123	
TOTAL ALKALINITY (AS CaCO3)	Result: 77	Units: MG/L	Entry No.: 00410	Analyzed: 190123	
BICARBONATE ALKALINITY	Result: 94	Units: MG/L	Entry No.: 00440	Analyzed: 190123	
CARBONATE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 00445	Analyzed: 190123	
NITRATE (AS N)	Result: 2.8	Units: MG/L	Entry No.: 00618	Analyzed: 190117	
NITRITE (N)	Result: ND	Units: MG/L	Entry No.: 00620	Analyzed: 190117	
TOTAL HARDNESS (AS CaCO3)	Result: 75	Units: MG/L	Entry No.: 00900	Analyzed: 190124	
CALCIUM	Result: 23	Units: MG/L	Entry No.: 00916	Analyzed: 190124	
MAGNESIUM	Result: 4.3	Units: MG/L	Entry No.: 00927	Analyzed: 190124	
SODIUM	Result: 12	Units: MG/L	Entry No.: 00929	Analyzed: 190124	
POTASSIUM	Result: 1.0	Units: MG/L	Entry No.: 00937	Analyzed: 190124	
CHLORIDE	Result: 5.8	Units: MG/L	Entry No.: 00940	Analyzed: 190117	
SULFATE	Result: 8.1	Units: MG/L	Entry No.: 00945	Analyzed: 190117	
FLUORIDE (F) NATURAL - SOURCE	Result: 0.31	Units: MG/L	Entry No.: 00951	Analyzed: 190117	
ARSENIC	Result: ND	Units: UG/L	Entry No.: 01002	Analyzed: 190123	
BARIUM	Result: ND	Units: UG/L	Entry No.: 01007	Analyzed: 190123	
BERYLLIUM	Result: ND	Units: UG/L	Entry No.: 01012	Analyzed: 190123	
BORON	Result: 110	Units: UG/L	Entry No.: 01020	Analyzed: 190123	
CADMIUM	Result: ND	Units: UG/L	Entry No.: 01027	Analyzed: 190123	
CHROMIUM (HEXAVALENT)	Result: ND	Units: UG/L	Entry No.: 01032	Analyzed: 190125	
CHROMIUM (TOTAL)	Result: ND	Units: UG/L	Entry No.: 01034	Analyzed: 190123	
COPPER	Result: ND	Units: UG/L	Entry No.: 01042	Analyzed: 190123	
IRON	Result: ND	Units: UG/L	Entry No.: 01045	Analyzed: 190123	
LEAD	Result: ND	Units: UG/L	Entry No.: 01051	Analyzed: 190123	
MANGANESE	Result: ND	Units: UG/L	Entry No.: 01055	Analyzed: 190123	
THALLIUM	Result: ND	Units: UG/L	Entry No.: 01059	Analyzed: 190123	
NICKEL	Result: ND	Units: UG/L	Entry No.: 01067	Analyzed: 190123	
SILVER	Result: ND	Units: UG/L	Entry No.: 01077	Analyzed: 190123	
VANADIUM	Result: 5.3	Units: UG/L	Entry No.: 01087	Analyzed: 190123	
ZINC	Result: ND	Units: UG/L	Entry No.: 01092	Analyzed: 190123	
ANTIMONY	Result: ND	Units: UG/L	Entry No.: 01097	Analyzed: 190123	
ALUMINUM	Result: ND	Units: UG/L	Entry No.: 01105	Analyzed: 190123	
SELENIUM	Result: ND	Units: UG/L	Entry No.: 01147	Analyzed: 190123	
CYANIDE	Result: ND	Units: UG/L	Entry No.: 01291	Analyzed: 190118	
FOAMING AGENTS (MBAS)	Result: ND	Units: MG/L	Entry No.: 38260	Analyzed: 190118	
TOTAL DISSOLVED SOLIDS	Result: 110	Units: MG/L	Entry No.: 70300	Analyzed: 190124	
LANGELIER INDEX @ 60 C	Result: 0.08	Units:	Entry No.: 71813	Analyzed: 190123	
LANGELIER INDEX @ SOURCE TEMP.	Result: - 0.53	Units:	Entry No.: 71814	Analyzed: 190123	
HYDROXIDE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 71830	Analyzed: 190123	
MERCURY	Result: ND	Units: UG/L	Entry No.: 71900	Analyzed: 190125	
TURBIDITY (LAB)	Result: ND	Units: NTU	Entry No.: 82079	Analyzed: 190117	
AGRESSIVENESS INDEX	Result: 11.24	Units:	Entry No.: 82383	Analyzed: 190123	
NITRATE + NITRITE AS N	Result: 2.8	Units: MG/L	Entry No.: A-029	Analyzed: 190117	
PERCHLORATE	Result: ND	Units: UG/L	Entry No.: A-031	Analyzed: 190124	
WELL 16		Station No.: 3610049-015		Sampled: 190117 07:30	
COLOR	Result: ND	Units: UNITS	Entry No.: 00081	Analyzed: 190117	

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Clinical Laboratory of San Bernardino, Inc.

EDT Transfer Confirmation 1



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Analyzing Lab: Clinical Laboratory of San Bernardino, Inc. ELAP 1088

ODOR THRESHOLD @ 60 C	Result: 1	Units: TON	Entry No.: 00086	Analyzed: 190117
SPECIFIC CONDUCTANCE	Result: 430	Units: UMO/CM	Entry No.: 00095	Analyzed: 190123
PH (LABORATORY)	Result: 8.1	Units:	Entry No.: 00403	Analyzed: 190123
TOTAL ALKALINITY (AS CaCO3)	Result: 87	Units: MG/L	Entry No.: 00410	Analyzed: 190123
BICARBONATE ALKALINITY	Result: 110	Units: MG/L	Entry No.: 00440	Analyzed: 190123
CARBONATE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 00445	Analyzed: 190123
NITRATE (AS N)	Result: 1.5	Units: MG/L	Entry No.: 00618	Analyzed: 190117
NITRITE (N)	Result: ND	Units: MG/L	Entry No.: 00620	Analyzed: 190117
TOTAL HARDNESS (AS CaCO3)	Result: 110	Units: MG/L	Entry No.: 00900	Analyzed: 190124
CALCIUM	Result: 36	Units: MG/L	Entry No.: 00916	Analyzed: 190124
MAGNESIUM	Result: 5.9	Units: MG/L	Entry No.: 00927	Analyzed: 190124
SODIUM	Result: 49	Units: MG/L	Entry No.: 00929	Analyzed: 190124
POTASSIUM	Result: 2.0	Units: MG/L	Entry No.: 00937	Analyzed: 190124
CHLORIDE	Result: 17	Units: MG/L	Entry No.: 00940	Analyzed: 190117
SULFATE	Result: 87	Units: MG/L	Entry No.: 00945	Analyzed: 190117
FLUORIDE (F) NATURAL - SOURCE	Result: 1.5	Units: MG/L	Entry No.: 00951	Analyzed: 190117
ARSENIC	Result: ND	Units: UG/L	Entry No.: 01002	Analyzed: 190123
BARIUM	Result: ND	Units: UG/L	Entry No.: 01007	Analyzed: 190123
BERYLLIUM	Result: ND	Units: UG/L	Entry No.: 01012	Analyzed: 190123
BORON	Result: 200	Units: UG/L	Entry No.: 01020	Analyzed: 190123
CADMIUM	Result: ND	Units: UG/L	Entry No.: 01027	Analyzed: 190123
CHROMIUM (HEXAVALENT)	Result: 6.1	Units: UG/L	Entry No.: 01032	Analyzed: 190125
CHROMIUM (TOTAL)	Result: ND	Units: UG/L	Entry No.: 01034	Analyzed: 190123
COPPER	Result: ND	Units: UG/L	Entry No.: 01042	Analyzed: 190123
IRON	Result: ND	Units: UG/L	Entry No.: 01045	Analyzed: 190123
LEAD	Result: ND	Units: UG/L	Entry No.: 01051	Analyzed: 190123
MANGANESE	Result: ND	Units: UG/L	Entry No.: 01055	Analyzed: 190123
THALLIUM	Result: ND	Units: UG/L	Entry No.: 01059	Analyzed: 190123
NICKEL	Result: ND	Units: UG/L	Entry No.: 01067	Analyzed: 190123
SILVER	Result: ND	Units: UG/L	Entry No.: 01077	Analyzed: 190123
VANADIUM	Result: 8.2	Units: UG/L	Entry No.: 01087	Analyzed: 190123
ZINC	Result: ND	Units: UG/L	Entry No.: 01092	Analyzed: 190123
ANTIMONY	Result: ND	Units: UG/L	Entry No.: 01097	Analyzed: 190123
ALUMINUM	Result: ND	Units: UG/L	Entry No.: 01105	Analyzed: 190123
SELENIUM	Result: ND	Units: UG/L	Entry No.: 01147	Analyzed: 190123
CYANIDE	Result: ND	Units: UG/L	Entry No.: 01291	Analyzed: 190118
FOAMING AGENTS (MBAS)	Result: ND	Units: MG/L	Entry No.: 38260	Analyzed: 190118
TOTAL DISSOLVED SOLIDS	Result: 280	Units: MG/L	Entry No.: 70300	Analyzed: 190124
LANGELIER INDEX @ 60 C	Result: 0.77	Units:	Entry No.: 71813	Analyzed: 190123
LANGELIER INDEX @ SOURCE TEMP.	Result: 0.18	Units:	Entry No.: 71814	Analyzed: 190123
HYDROXIDE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 71830	Analyzed: 190123
MERCURY	Result: ND	Units: UG/L	Entry No.: 71900	Analyzed: 190125
TURBIDITY (LAB)	Result: ND	Units: NTU	Entry No.: 82079	Analyzed: 190117
AGRESSIVENESS INDEX	Result: 11.97	Units:	Entry No.: 82383	Analyzed: 190123
NITRATE + NITRITE AS N	Result: 1.5	Units: MG/L	Entry No.: A-029	Analyzed: 190117
PERCHLORATE	Result: ND	Units: UG/L	Entry No.: A-031	Analyzed: 190124

WELL 14

Station No.: 3610049-016

Sampled: 190117 08:00

COLOR	Result: ND	Units: UNITS	Entry No.: 00081	Analyzed: 190117
ODOR THRESHOLD @ 60 C	Result: 1	Units: TON	Entry No.: 00086	Analyzed: 190117
SPECIFIC CONDUCTANCE	Result: 420	Units: UMO/CM	Entry No.: 00095	Analyzed: 190123

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Clinical Laboratory of San Bernardino, Inc.

EDT Transfer Confirmation 1



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Analyzing Lab: Clinical Laboratory of San Bernardino, Inc. ELAP 1088

PH (LABORATORY)	Result: 8.0	Units:	Entry No.: 00403	Analyzed: 190123
TOTAL ALKALINITY (AS CaCO ₃)	Result: 80	Units: MG/L	Entry No.: 00410	Analyzed: 190123
BICARBONATE ALKALINITY	Result: 98	Units: MG/L	Entry No.: 00440	Analyzed: 190123
CARBONATE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 00445	Analyzed: 190123
NITRATE (AS N)	Result: 1.9	Units: MG/L	Entry No.: 00618	Analyzed: 190117
NITRITE (N)	Result: ND	Units: MG/L	Entry No.: 00620	Analyzed: 190117
TOTAL HARDNESS (AS CaCO ₃)	Result: 94	Units: MG/L	Entry No.: 00900	Analyzed: 190124
CALCIUM	Result: 30	Units: MG/L	Entry No.: 00916	Analyzed: 190124
MAGNESIUM	Result: 4.9	Units: MG/L	Entry No.: 00927	Analyzed: 190124
SODIUM	Result: 52	Units: MG/L	Entry No.: 00929	Analyzed: 190124
POTASSIUM	Result: 1.8	Units: MG/L	Entry No.: 00937	Analyzed: 190124
CHLORIDE	Result: 17	Units: MG/L	Entry No.: 00940	Analyzed: 190117
SULFATE	Result: 86	Units: MG/L	Entry No.: 00945	Analyzed: 190117
FLUORIDE (F) NATURAL - SOURCE	Result: 0.89	Units: MG/L	Entry No.: 00951	Analyzed: 190117
ARSENIC	Result: ND	Units: UG/L	Entry No.: 01002	Analyzed: 190123
BARIUM	Result: ND	Units: UG/L	Entry No.: 01007	Analyzed: 190123
BERYLLIUM	Result: ND	Units: UG/L	Entry No.: 01012	Analyzed: 190123
BORON	Result: 180	Units: UG/L	Entry No.: 01020	Analyzed: 190123
CADMIUM	Result: ND	Units: UG/L	Entry No.: 01027	Analyzed: 190123
CHROMIUM (HEXAVALENT)	Result: 5.2	Units: UG/L	Entry No.: 01032	Analyzed: 190125
CHROMIUM (TOTAL)	Result: ND	Units: UG/L	Entry No.: 01034	Analyzed: 190123
COPPER	Result: ND	Units: UG/L	Entry No.: 01042	Analyzed: 190123
IRON	Result: ND	Units: UG/L	Entry No.: 01045	Analyzed: 190123
LEAD	Result: ND	Units: UG/L	Entry No.: 01051	Analyzed: 190123
MANGANESE	Result: ND	Units: UG/L	Entry No.: 01055	Analyzed: 190123
THALLIUM	Result: ND	Units: UG/L	Entry No.: 01059	Analyzed: 190123
NICKEL	Result: ND	Units: UG/L	Entry No.: 01067	Analyzed: 190123
SILVER	Result: ND	Units: UG/L	Entry No.: 01077	Analyzed: 190123
VANADIUM	Result: 6.3	Units: UG/L	Entry No.: 01087	Analyzed: 190123
ZINC	Result: ND	Units: UG/L	Entry No.: 01092	Analyzed: 190123
ANTIMONY	Result: ND	Units: UG/L	Entry No.: 01097	Analyzed: 190123
ALUMINUM	Result: ND	Units: UG/L	Entry No.: 01105	Analyzed: 190123
SELENIUM	Result: ND	Units: UG/L	Entry No.: 01147	Analyzed: 190123
CYANIDE	Result: ND	Units: UG/L	Entry No.: 01291	Analyzed: 190118
FOAMING AGENTS (MBAS)	Result: ND	Units: MG/L	Entry No.: 38260	Analyzed: 190118
TOTAL DISSOLVED SOLIDS	Result: 290	Units: MG/L	Entry No.: 70300	Analyzed: 190124
LANGELIER INDEX @ 60 C	Result: 0.56	Units:	Entry No.: 71813	Analyzed: 190123
LANGELIER INDEX @ SOURCE TEMP.	Result: - 0.03	Units:	Entry No.: 71814	Analyzed: 190123
HYDROXIDE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 71830	Analyzed: 190123
MERCURY	Result: ND	Units: UG/L	Entry No.: 71900	Analyzed: 190125
TURBIDITY (LAB)	Result: ND	Units: NTU	Entry No.: 82079	Analyzed: 190117
AGRESSIVENESS INDEX	Result: 11.77	Units:	Entry No.: 82383	Analyzed: 190123
NITRATE + NITRITE AS N	Result: 1.9	Units: MG/L	Entry No.: A-029	Analyzed: 190117
PERCHLORATE	Result: ND	Units: UG/L	Entry No.: A-031	Analyzed: 190124
WELL WTP-1	Station No.: 3610049-018		Sampled: 190117 00:00	
COLOR	Result: ND	Units: UNITS	Entry No.: 00081	Analyzed: 190117
ODOR THRESHOLD @ 60 C	Result: 1	Units: TON	Entry No.: 00086	Analyzed: 190117
SPECIFIC CONDUCTANCE	Result: 610	Units: UMO/CM	Entry No.: 00095	Analyzed: 190123
PH (LABORATORY)	Result: 8.3	Units:	Entry No.: 00403	Analyzed: 190123
TOTAL ALKALINITY (AS CaCO ₃)	Result: 160	Units: MG/L	Entry No.: 00410	Analyzed: 190123

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BICARBONATE ALKALINITY	Result: 200	Units: MG/L	Entry No.: 00440	Analyzed: 190123
CARBONATE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 00445	Analyzed: 190123
NITRATE (AS N)	Result: 1.2	Units: MG/L	Entry No.: 00618	Analyzed: 190117
NITRITE (N)	Result: ND	Units: MG/L	Entry No.: 00620	Analyzed: 190117
TOTAL HARDNESS (AS CaCO3)	Result: 69	Units: MG/L	Entry No.: 00900	Analyzed: 190124
CALCIUM	Result: 21	Units: MG/L	Entry No.: 00916	Analyzed: 190124
MAGNESIUM	Result: 4.2	Units: MG/L	Entry No.: 00927	Analyzed: 190124
SODIUM	Result: 100	Units: MG/L	Entry No.: 00929	Analyzed: 190129
POTASSIUM	Result: 2.8	Units: MG/L	Entry No.: 00937	Analyzed: 190124
CHLORIDE	Result: 28	Units: MG/L	Entry No.: 00940	Analyzed: 190117
SULFATE	Result: 86	Units: MG/L	Entry No.: 00945	Analyzed: 190117
FLUORIDE (F) NATURAL - SOURCE	Result: 5.9	Units: MG/L	Entry No.: 00951	Analyzed: 190123
ARSENIC	Result: 4.8	Units: UG/L	Entry No.: 01002	Analyzed: 190123
BARIUM	Result: ND	Units: UG/L	Entry No.: 01007	Analyzed: 190123
BERYLLIUM	Result: ND	Units: UG/L	Entry No.: 01012	Analyzed: 190123
BORON	Result: 400	Units: UG/L	Entry No.: 01020	Analyzed: 190123
CADMIUM	Result: ND	Units: UG/L	Entry No.: 01027	Analyzed: 190123
CHROMIUM (HEXAVALENT)	Result: 6.1	Units: UG/L	Entry No.: 01032	Analyzed: 190125
CHROMIUM (TOTAL)	Result: ND	Units: UG/L	Entry No.: 01034	Analyzed: 190123
COPPER	Result: ND	Units: UG/L	Entry No.: 01042	Analyzed: 190123
IRON	Result: ND	Units: UG/L	Entry No.: 01045	Analyzed: 190123
LEAD	Result: ND	Units: UG/L	Entry No.: 01051	Analyzed: 190123
MANGANESE	Result: ND	Units: UG/L	Entry No.: 01055	Analyzed: 190123
THALLIUM	Result: ND	Units: UG/L	Entry No.: 01059	Analyzed: 190123
NICKEL	Result: ND	Units: UG/L	Entry No.: 01067	Analyzed: 190123
SILVER	Result: ND	Units: UG/L	Entry No.: 01077	Analyzed: 190123
VANADIUM	Result: 22	Units: UG/L	Entry No.: 01087	Analyzed: 190123
ZINC	Result: ND	Units: UG/L	Entry No.: 01092	Analyzed: 190123
ANTIMONY	Result: ND	Units: UG/L	Entry No.: 01097	Analyzed: 190123
ALUMINUM	Result: ND	Units: UG/L	Entry No.: 01105	Analyzed: 190123
SELENIUM	Result: ND	Units: UG/L	Entry No.: 01147	Analyzed: 190123
CYANIDE	Result: ND	Units: UG/L	Entry No.: 01291	Analyzed: 190118
FOAMING AGENTS (MBAS)	Result: ND	Units: MG/L	Entry No.: 38260	Analyzed: 190118
TOTAL DISSOLVED SOLIDS	Result: 380	Units: MG/L	Entry No.: 70300	Analyzed: 190124
LANGELIER INDEX @ 60 C	Result: 1.00	Units:	Entry No.: 71813	Analyzed: 190123
LANGELIER INDEX @ SOURCE TEMP.	Result: 0.42	Units:	Entry No.: 71814	Analyzed: 190123
HYDROXIDE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 71830	Analyzed: 190123
MERCURY	Result: ND	Units: UG/L	Entry No.: 71900	Analyzed: 190125
TURBIDITY (LAB)	Result: ND	Units: NTU	Entry No.: 82079	Analyzed: 190117
AGRESSIVENESS INDEX	Result: 12.23	Units:	Entry No.: 82383	Analyzed: 190123
NITRATE + NITRITE AS N	Result: 1.2	Units: MG/L	Entry No.: A-029	Analyzed: 190117
PERCHLORATE	Result: ND	Units: UG/L	Entry No.: A-031	Analyzed: 190125

WELL 17	Station No.: 3610049-021		Sampled: 190117 08:10	
COLOR	Result: ND	Units: UNITS	Entry No.: 00081	Analyzed: 190117
ODOR THRESHOLD @ 60 C	Result: 1	Units: TON	Entry No.: 00086	Analyzed: 190117
SPECIFIC CONDUCTANCE	Result: 480	Units: UMO/CM	Entry No.: 00095	Analyzed: 190123
PH (LABORATORY)	Result: 8.1	Units:	Entry No.: 00403	Analyzed: 190123
TOTAL ALKALINITY (AS CaCO3)	Result: 72	Units: MG/L	Entry No.: 00410	Analyzed: 190123
BICARBONATE ALKALINITY	Result: 88	Units: MG/L	Entry No.: 00440	Analyzed: 190123
CARBONATE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 00445	Analyzed: 190123

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NITRATE (AS N)	Result: 1.4	Units: MG/L	Entry No.: 00618	Analyzed: 190117
NITRITE (N)	Result: ND	Units: MG/L	Entry No.: 00620	Analyzed: 190117
TOTAL HARDNESS (AS CaCO3)	Result: 81	Units: MG/L	Entry No.: 00900	Analyzed: 190124
CALCIUM	Result: 26	Units: MG/L	Entry No.: 00916	Analyzed: 190124
MAGNESIUM	Result: 4.1	Units: MG/L	Entry No.: 00927	Analyzed: 190124
SODIUM	Result: 69	Units: MG/L	Entry No.: 00929	Analyzed: 190124
POTASSIUM	Result: 1.9	Units: MG/L	Entry No.: 00937	Analyzed: 190124
CHLORIDE	Result: 20	Units: MG/L	Entry No.: 00940	Analyzed: 190117
SULFATE	Result: 130	Units: MG/L	Entry No.: 00945	Analyzed: 190117
FLUORIDE (F) NATURAL - SOURCE	Result: 0.97	Units: MG/L	Entry No.: 00951	Analyzed: 190117
ARSENIC	Result: 2.1	Units: UG/L	Entry No.: 01002	Analyzed: 190123
BARIUM	Result: ND	Units: UG/L	Entry No.: 01007	Analyzed: 190123
BERYLLIUM	Result: ND	Units: UG/L	Entry No.: 01012	Analyzed: 190123
BORON	Result: 230	Units: UG/L	Entry No.: 01020	Analyzed: 190123
CADMIUM	Result: ND	Units: UG/L	Entry No.: 01027	Analyzed: 190123
CHROMIUM (HEXAVALENT)	Result: 5.2	Units: UG/L	Entry No.: 01032	Analyzed: 190125
CHROMIUM (TOTAL)	Result: ND	Units: UG/L	Entry No.: 01034	Analyzed: 190123
COPPER	Result: ND	Units: UG/L	Entry No.: 01042	Analyzed: 190123
IRON	Result: ND	Units: UG/L	Entry No.: 01045	Analyzed: 190123
LEAD	Result: ND	Units: UG/L	Entry No.: 01051	Analyzed: 190123
MANGANESE	Result: ND	Units: UG/L	Entry No.: 01055	Analyzed: 190123
THALLIUM	Result: ND	Units: UG/L	Entry No.: 01059	Analyzed: 190123
NICKEL	Result: ND	Units: UG/L	Entry No.: 01067	Analyzed: 190123
SILVER	Result: ND	Units: UG/L	Entry No.: 01077	Analyzed: 190123
VANADIUM	Result: 7.0	Units: UG/L	Entry No.: 01087	Analyzed: 190123
ZINC	Result: ND	Units: UG/L	Entry No.: 01092	Analyzed: 190123
ANTIMONY	Result: ND	Units: UG/L	Entry No.: 01097	Analyzed: 190123
ALUMINUM	Result: ND	Units: UG/L	Entry No.: 01105	Analyzed: 190123
SELENIUM	Result: ND	Units: UG/L	Entry No.: 01147	Analyzed: 190123
CYANIDE	Result: ND	Units: UG/L	Entry No.: 01291	Analyzed: 190118
FOAMING AGENTS (MBAS)	Result: ND	Units: MG/L	Entry No.: 38260	Analyzed: 190118
TOTAL DISSOLVED SOLIDS	Result: 330	Units: MG/L	Entry No.: 70300	Analyzed: 190124
LANGELIER INDEX @ 60 C	Result: 0.54	Units:	Entry No.: 71813	Analyzed: 190123
LANGELIER INDEX @ SOURCE TEMP.	Result: - 0.06	Units:	Entry No.: 71814	Analyzed: 190123
HYDROXIDE ALKALINITY	Result: ND	Units: MG/L	Entry No.: 71830	Analyzed: 190123
MERCURY	Result: ND	Units: UG/L	Entry No.: 71900	Analyzed: 190125
TURBIDITY (LAB)	Result: ND	Units: NTU	Entry No.: 82079	Analyzed: 190117
AGRESSIVENESS INDEX	Result: 11.75	Units:	Entry No.: 82383	Analyzed: 190123
NITRATE + NITRITE AS N	Result: 1.4	Units: MG/L	Entry No.: A-029	Analyzed: 190117
PERCHLORATE	Result: ND	Units: UG/L	Entry No.: A-031	Analyzed: 190124

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Chain of Custody

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