DEPARTMENT OF THE AIR FORCE
60TH CIVIL ENGINEER SQUADRON (AMC)

June 22, 2011

MEMORANDUM FOR DISTRIBUTION

FROM: 60 CES/CEANR
411 Airmen Dr.
Travis AFB, CA 94535-2001

SUBJECT: Final ST018 Baseline Implementation Report

1. Attached is the Final ST018 Baseline Implementation Report (BIR). This BIR describes the installation and startup of the groundwater extraction and treatment (GET) system at Petroleum Only Contaminated (POCO) Site ST018.

2. If you have any questions or require any further information, please contact my Project Manager for this site, Mr. Lonnie Duke, either at (707) 424-7520, Lonnie.duke@us.af.mil, or at the address above.

MARK H. SMITH
Chief, Environmental Restoration

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Final ST018 BIR
cc:
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TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM

Final

POCO Site ST018 Baseline Implementation Report

USACE Contract No. W91238-06-D-0013

Delivery Order DK01

Prepared for:

U.S. Army Corps of Engineers
Omaha District

60 CES
Travis Air Force Base, California

Prepared by:

CH2MHILL

June 2011

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SECTION 1

Introduction

This Site ST018 Baseline Implementation Report (BIR) describes the installation and startup of the groundwater extraction and treatment (GET) system at Petroleum Only Contaminated (POCO) Site ST018, located at Travis Air Force Base (AFB), Solano County, California. The results of the pre-design investigation, conducted in accordance with the *Final POCO Site ST018 Remedial Design/Remedial Action Work Plan* (RD/RA WP) (CH2M HILL, 2009a), are also described.

Site ST018 was identified as a POCO site based on the results of the *Stage 1 Draft Final Remedial Investigation/Feasibility Study, North and South Gas Stations, Travis Air Force Base, California* (Weston, 1991) and the *Stage 2 Remedial Investigation Report, North and South Gas Stations, Travis Air Force Base, California* (Parsons Engineering Science, Inc. [Parsons], 1995). The California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) has regulatory oversight responsibility for POCO sites at Travis AFB.

Remediation at POCO sites follows a risk-based corrective action (RBCA) approach in accordance with the guidelines established in the *Work Plan, Petroleum Only Contaminated (POCO) Sites, Travis AFB, California* (IT Corporation, 1996). The RBCA approach favors natural attenuation at sites that present no immediate or short-term threat to human health, safety, or environmental receptors.

The Site ST018 BIR is organized into the following sections:

- **Section 1: Introduction.** Provides scope, purpose, and organization of the Site ST018 BIR.
- **Section 2: Background.** Describes Site ST018, the geologic and hydrogeologic setting, and summarizes selection of the final remedy for Site ST018 groundwater contamination.
- **Section 3: Pre-design Investigation.** Summarizes the methods used to execute the pre-design investigation and the results of that investigation, including the nature and extent of methyl tertiary butyl ether (MTBE) contamination in groundwater.
- **Section 4: Implementation.** Describes the construction, permitting, and startup of the final selected remedy at Site ST018.
- **Section 5: Planned Operation.** Describes the operational requirements for the installed remedy, including operation and maintenance (O&M) in accordance with the *Site ST018 Groundwater Treatment Plant Operation and Maintenance Manual* (CH2M HILL, 2010) and compliance sampling and reporting required by the National Pollutant Discharge and Elimination System (NPDES) permit.
- **Appendix A: Acronyms and Abbreviations**
- **Appendix B: References**
- **Appendix C: Pre-design Investigation Field Data**
- **Appendix D: Site ST018 Groundwater Treatment Plant Record Design Drawings**

- **Appendix E: Site ST018 Groundwater Treatment Plant NPDES Permit**
- **Appendix F: Site ST018 Groundwater Treatment Plant Startup Report**
- **Appendix G: Site ST018 Groundwater Treatment Plant Operation and Maintenance Log Sheet**
- **Appendix H: Response to Comments**

SECTION 2

Background

2.1 Site Description

Site ST018 consists of the North and South Base Exchange gasoline service stations, which have operated from the mid-1960s to the present. The source of petroleum hydrocarbon contamination is believed to be leaks or releases from the underground storage tanks (USTs) and product delivery lines at both the North Gas Station (NGS) and the South Gas Station (SGS). Figure 2-1 shows the features of the site. In 1988, leaks were detected in two (2) of the three (3) USTs located at the NGS. As a result, the three (3) USTs at the NGS were removed, and four (4) new double-walled USTs were installed in 1988. During replacement of the NGS tanks, contaminated soil was excavated and removed to approximately 20 feet below ground surface (bgs). There is no estimate of the amount of fuel that may have leaked from the NGS USTs. Also in 1988, product inventory reconciliation indicated approximately 3,800 gallons of unleaded gasoline had leaked from the SGS. The leak occurred from the distribution line between the USTs and the south pump island. The distribution line was subsequently excavated and repaired. In 1994, all six (6) USTs and associated piping at the SGS were removed and replaced with three (3) new 20,000-gallon double-walled USTs. During the tank replacement, approximately 10,000 gallons of contaminated groundwater and 1,700 cubic yards of contaminated soil were removed (Parsons, 1996).

In 1997, MTBE impacts to groundwater at Travis AFB were investigated by Lawrence Livermore National Laboratory (LLNL), but the source could not be determined. MTBE may have been present in releases that occurred prior to tank or pipeline repairs, or it may have been introduced into the subsurface by surface spills or ongoing leakage (LLNL, 1997). However, there is no evidence in available records of ongoing leaks. Floating petroleum product was reported in three (3) wells adjacent to the tank pits between 1991 and 1995, but has not been detected in any Site ST018 wells since that time (Parsons, 1995).

More than 50 monitoring wells and piezometers have been installed at Site ST018 since the site was first investigated in the late 1980s. Four (4) monitoring wells at the NGS were abandoned in 2006 during renovation of the NGS building. In addition, one (1) monitoring well downgradient of the SGS was abandoned in 2008 during construction of a new C-17 maintenance facility. Figure 2-2 shows the locations of monitoring wells associated with Site ST018.

Site ST018 monitoring wells are sampled semiannually, annually, or biennially, as appropriate, based on the Travis AFB groundwater monitoring frequency decision tree. Results are reported in Groundwater Sampling and Analysis Program (GSAP) annual reports. During the most recent annual sampling event (second quarter 2010), 14 site-related wells were sampled and analyzed for fuel constituents.

2.2 Geology/Hydrogeology

The subsurface at Site ST018 consists of Quaternary alluvial deposits underlain by weathered shale bedrock, identified as the Nortonville Shale. The Quaternary alluvial deposits consist of clay to approximately 15 feet bgs and fine to coarse sand and silt from 15 feet bgs to the basal contact with the Nortonville Shale. The basal contact between the alluvial deposits and bedrock occurs at 15 to 30 feet bgs. The contact between the alluvial deposits and the Nortonville Shale is deepest in the central part of the site where it forms a shallow trough. The contact is shallowest in the western part of the site where it occurs at a depth of about 15 feet bgs. The basal contact of the alluvium with the Nortonville Shale influences groundwater flow direction, particularly in the northern and central part of the site.

The aquifer is relatively thin and occurs primarily in the sand and silt alluvial layers between the clay layer and the bedrock, which act as semi-confining or confining layers. The bedrock is thought to act as a lower boundary for the alluvial aquifer that severely restricts the vertical movement of groundwater (Parsons, 1996).

During second quarter 2010, depth to groundwater measurements at Site ST018 ranged from about 7 to 12.5 feet bgs. Figure 2-3 shows groundwater elevations measured during second quarter 2010 and the interpreted groundwater elevation contours based on the elevation data. Groundwater flow direction was variable, but in the northern and central part of the site was generally to the east, away from the western bedrock high, and in the southern part of the site was generally to south-southeast.

Seasonal variations in groundwater elevation are generally less than 5 feet. No long-term trend of increasing or decreasing groundwater elevation has been observed (CH2M HILL, 2011a). Based on aquifer test data from the Stage 2 Remedial Investigation (RI) Report (Parsons, 1995) and assuming an effective porosity of 0.2, the average advective groundwater flow velocity is approximately 80 feet per year in the northern part of the site but increases to about 115 feet per year in the southern part of the site.

2.3 Selected Remedy

The Air Force conducted an investigation at Site ST018 in 2007 and 2008 to determine if monitored natural attenuation (MNA) would be a suitable remedy for dissolved gasoline and MTBE contamination in groundwater. The results of the MNA investigation were documented in the *POCO Evaluation Report and Corrective Action Plan for Site ST018* (CH2M HILL, 2008). The Site ST018 Corrective Action Plan (CAP) concluded that MNA would not be effective, primarily because conditions within the dissolved fuels plume are anaerobic, and anaerobic biodegradation of MTBE has not been conclusively demonstrated at the field scale at this site.

The CAP evaluated the following remedial alternatives to address MTBE in groundwater:

- GET with ultraviolet/oxidation
- GET with liquid-phase granular activated carbon (LGAC)
- Enhanced in situ bioremediation by oxygen injection
- In situ chemical oxidation

The CAP selected GET with LGAC as the final remedy for groundwater contamination at Site ST018. In a letter dated July 24, 2008, the Water Board concurred with the selected remedy (Water Board, 2008).

The RD/RA WP (CH2M HILL, 2009a) described a pre-design investigation intended to provide the basis for refining the remedial design and presented the basic design for the Site ST018 GET system. The remedial action objectives for the Site ST018 GET system are to decrease the time needed to meet cleanup goals and to control potential migration of the dissolved MTBE plume.

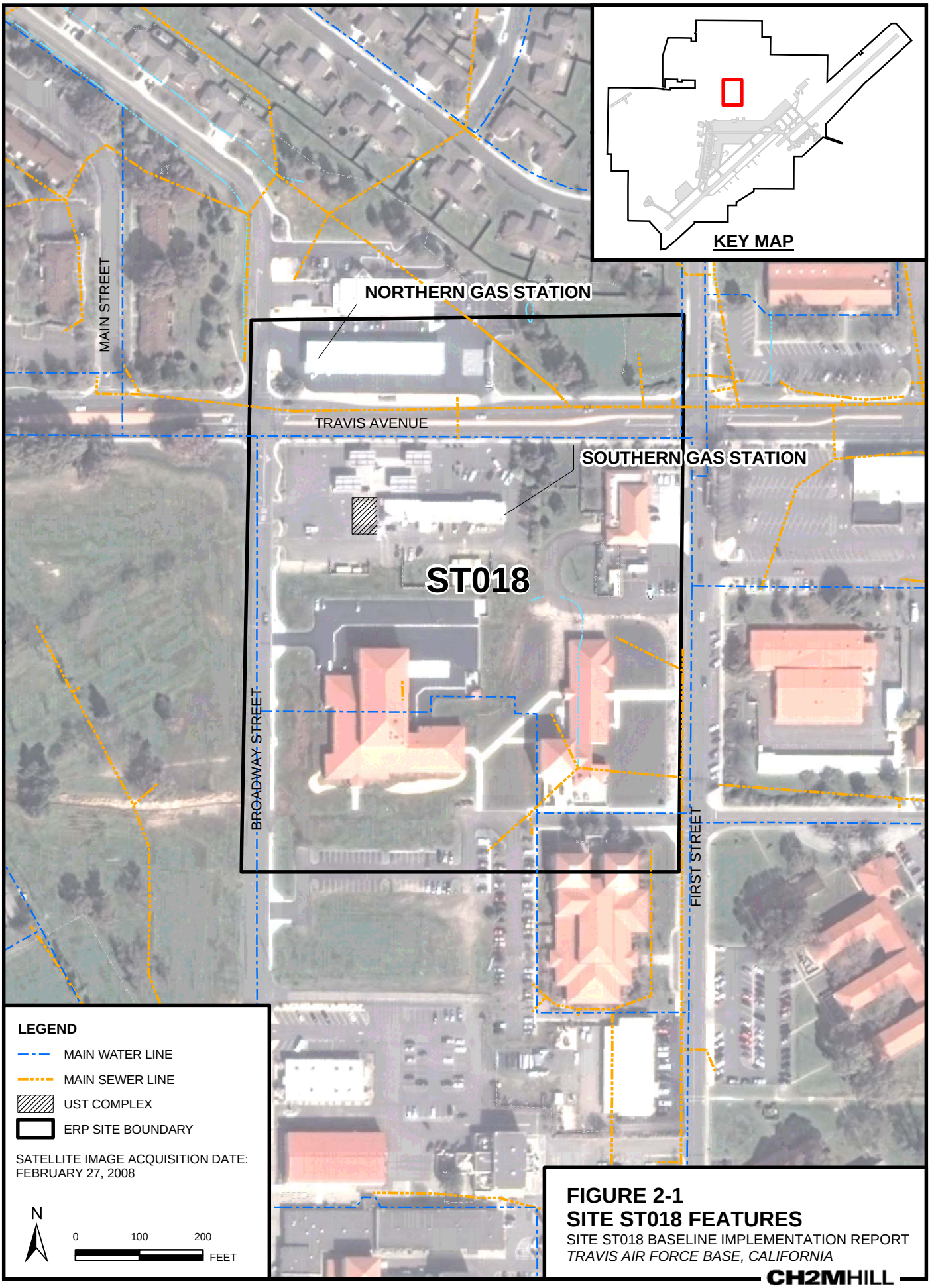

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FIGURE 2-1
SITE ST018 FEATURES
SITE ST018 BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL

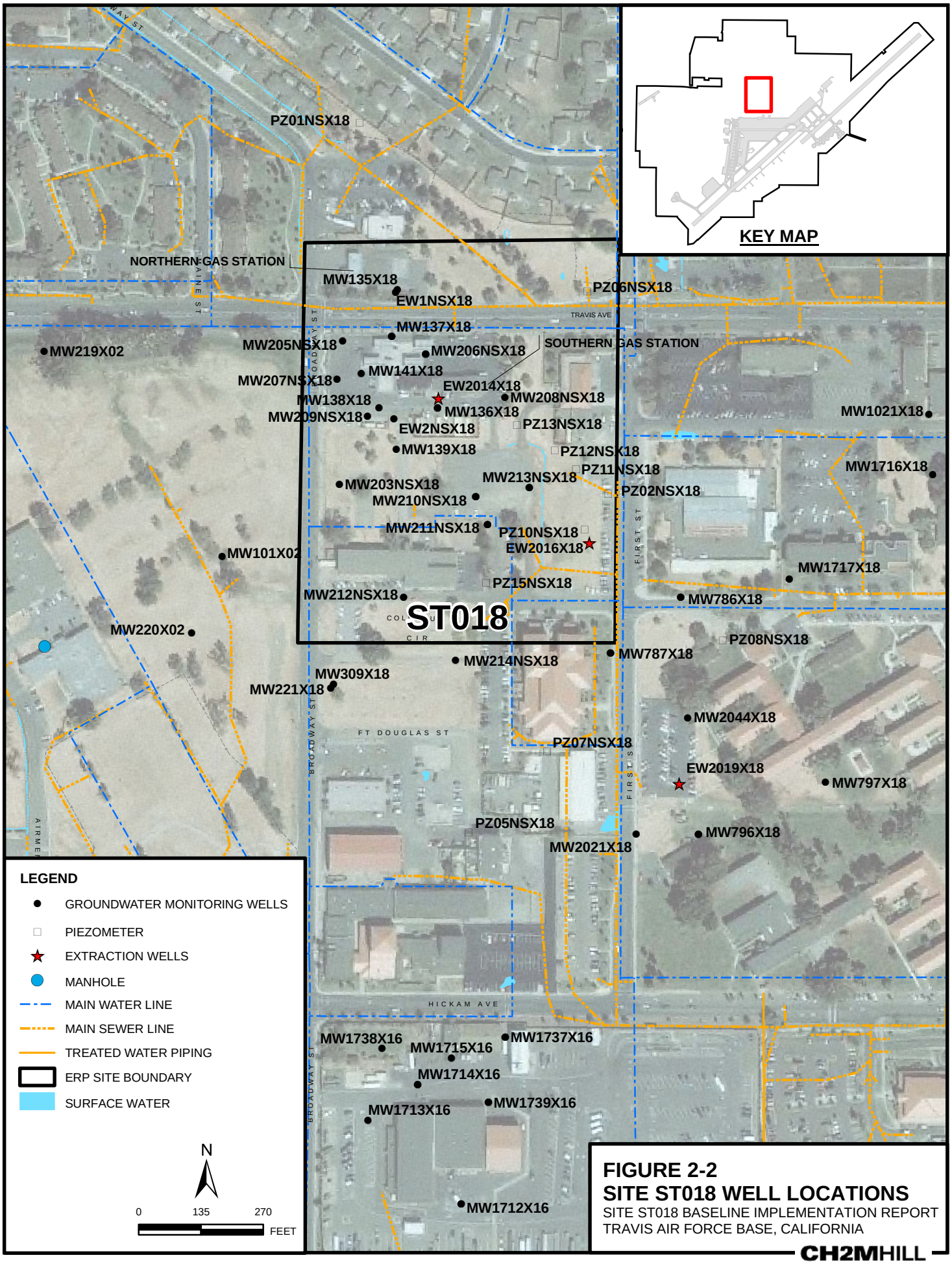

FIGURE 2-2
SITE ST018 WELL LOCATIONS
SITE ST018 BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

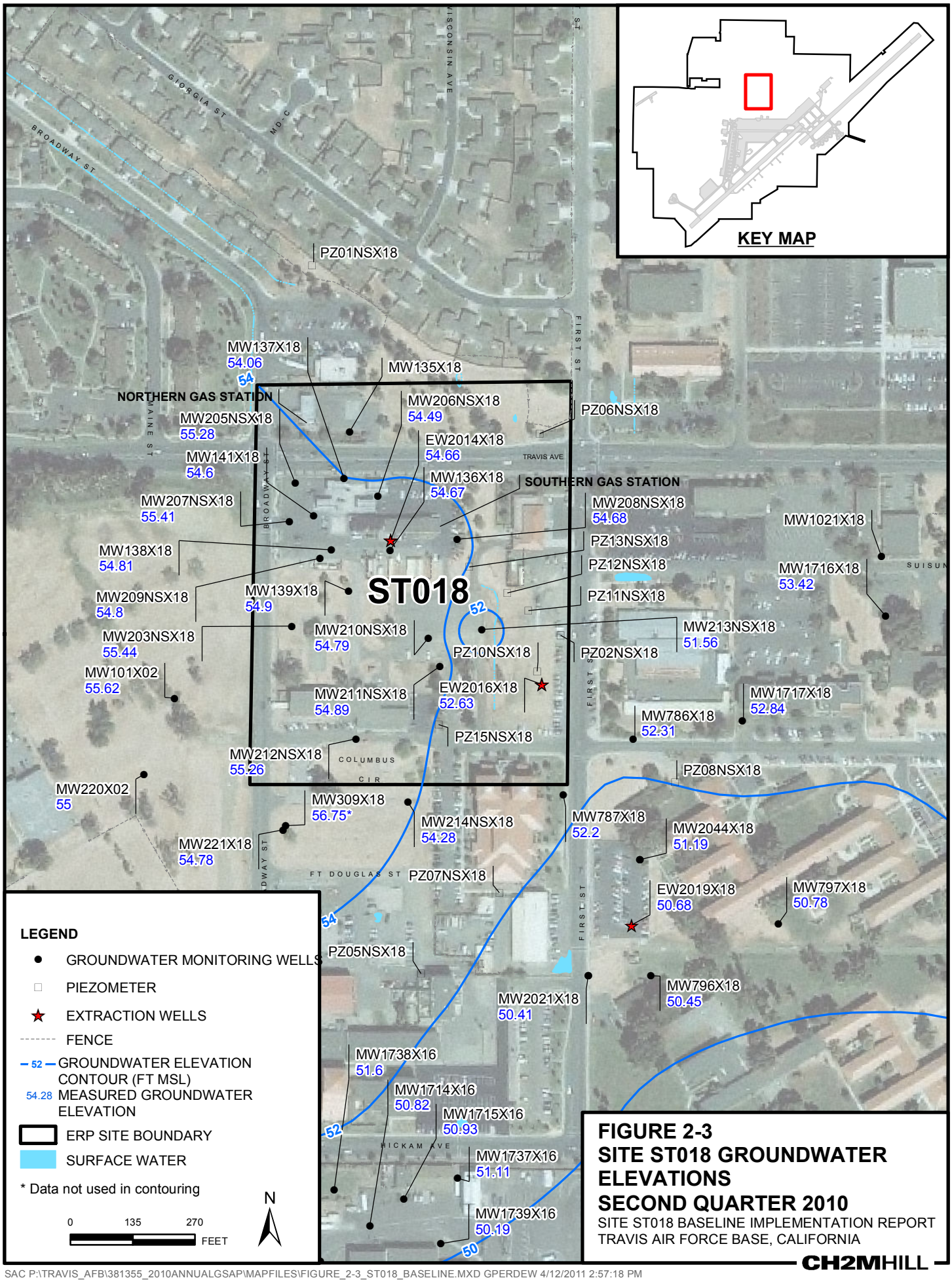

FIGURE 2-3
SITE ST018 GROUNDWATER ELEVATIONS
SECOND QUARTER 2010
SITE ST018 BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

SAC P:\TRAVIS_AFB\381355_2010ANNUALGSAP\MAPFILES\FIGURE_2-3_ST018_BASELINE.MXD GPERDEW 4/12/2011 2:57:18 PM

SECTION 3

Pre-design Investigation

3.1 Methods and Approach

Drilling, sampling, and well installation activities were performed in accordance with the RD/RA WP (CH2M HILL, 2009a) and the Final Field Sampling Plan (CH2M HILL, 2009b).

3.1.1 Plume Delineation

Two (2) borings, HP2021x18 and HP2044x18, were drilled to delineate the downgradient extent of the dissolved MTBE plume. These two (2) locations are shown on Figure 2-2. Location HP2021x18 was drilled on December 15, 2009, using a CME 75 hollow-stem auger (HSA) drill rig equipped with 8-inch-diameter augers. Location HP2044x18 was drilled on September 23, 2009, using a GeoProbe 8040DT direct-push drill rig equipped with 1.5-inch-diameter core barrels. HydroPunch® groundwater samples were collected from both borings and were submitted to Curtis & Tompkins, Ltd. laboratory of Berkeley California, where they were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) (by U.S Environmental Protection Agency [EPA] Method 8015B) and volatile organic compounds (VOCs), including MTBE (by EPA Method 8260B). Both locations were subsequently converted to permanent 2-inch-diameter monitoring wells using the CME 75 HSA drill rig equipped with 8-inch-diameter augers. Installation of new monitoring well MW2021x18 was completed on December 18, 2009, and installation of new monitoring well MW2044x18 was completed on November 10, 2009.

3.1.2 Extraction Well Installation

Four (4) soil borings, HP2014x18, HP2015x18, HP2016x18, and HP2019x18, were drilled and sampled to determine if they were suitable locations for extraction wells. Soil borings HP2014x18, HP2015x18, and HP2016x18 were drilled and sampled between September 23 and 24, 2009. Soil boring HP2019x18 was drilled and sampled on November 2, 2009. HP2014x18 through HP2016x18 were drilled using a GeoProbe 8040DT direct-push drill rig equipped with 1.5-inch-diameter core barrels. Soil boring HP2019x18 was drilled using a CME 75 HSA drill rig equipped with 8-inch-diameter augers. HydroPunch® groundwater samples were collected from all four (4) borings and were submitted to Curtis & Tompkins, Ltd. laboratory of Berkeley, California, where they were analyzed for TPH-G (by EPA Method 8015B) and VOCs, including MTBE (by EPA Method 8260B). Borings HP2014x14, HP2016x18, and HP2019x18 were subsequently converted to 6-inch-diameter extraction wells using a CME 75 drill rig equipped with 12-inch-diameter augers. Boring HP2015x18 was abandoned by filling it from the bottom up with cement grout. Installation of extraction wells EW2014x18 and EW2016x18 was completed on November 5, 2009, and installation of extraction well EW2019x18 was completed on December 18, 2009.

Table 3-1 summarizes drilling, sampling, and well construction information for pre-design investigation locations. Field data, including soil boring logs and as-built well completion diagrams, are provided in Appendix C.

TABLE 3-1
Drilling and Well Construction Summary
POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location Identification	Date Installed	Borehole Diameter (inches)	Borehole Depth (feet bgs)	HydroPunch® Sample Depths (feet bgs)	Casing Diameter (inches)	Screen Interval (feet bgs)	Screen Slot Size (inches)	Filter Pack Interval (feet bgs)	TOC Elevation (feet msl)	Northing	Easting
Borings											
HP2014x18	9/24/2009	1.5	33	18, 28	NA	NA	NA	NA	NA	1860753.013	6578510.516
HP2015x18	9/23/2009	1.5	27	18	NA	NA	NA	NA	NA	1860559.584	6578697.57
HP2016x18	9/24/2011	1.5	28	25	NA	NA	NA	NA	NA	1860440.114	6578837.965
HP2019x18	11/3/2009	8	35	13.5	NA	NA	NA	NA	NA	1859918.822	6579032.333
HP2021x18	12/15/2009	8	30	25	NA	NA	NA	NA	NA	1859810.3	6578938.832
HP2044x18	9/23/2010	1.5	28	13	NA	NA	NA	NA	NA	1860061.148	6579050.536
Wells											
EW2014x18	11/4/2009	12	31.3	NA	6	9.3 to 29.3	0.02	7.8 to 31.3	66.75	1860753.013	6578510.516
EW2016x18	11/5/2009	12	37	NA	6	10 to 30	0.02	8.5 to 32	62.69	1860440.114	6578837.965
EW2019x18	12/18/2009	12	35	NA	6	10 to 30	0.02	8.5 to 32	61.08	1859918.822	6579032.333
MW2021x18	12/15/2009	8	30	NA	2	10 to 25	0.02	8.5 to 25	61.01	1859810.3	6578938.832
MW2044x18	11/10/2009	8	20.5	NA	2	10 to 20	0.02	9 to 20	61.81	1860061.148	6579050.536

Notes:

msl = mean sea level
NA = not applicable
TOC = top of casing

3.1.3 Well Development

All new wells were developed in accordance with the Final Field Sampling Plan (CH2M HILL, 2009b). Wells were alternately bailed and surged to remove fines from the filter pack and induce hydraulic communication with the aquifer and were then pumped until a minimum of five (5) casing volumes were removed and temperature, pH, and conductivity measurements stabilized to within 1 degree Celsius, 0.2 standard units, and 10 percent, respectively, over three (3) consecutive measurements. Well development logs are provided in Appendix C.

3.1.4 Investigation-derived Waste Management

Solid investigation-derived waste (IDW), which consisted of soil cuttings from drilling, was stored onsite in a 20-yard roll-off bin pending waste characterization sampling and profiling. A composite soil sample was collected from the soil cuttings on January 5, 2010, and submitted to Curtis & Tompkins, Ltd. laboratory of Berkeley, California, where it was analyzed for metals, TPH-G, total petroleum hydrocarbons as diesel (TPH-D), and VOCs. Analytical results were received on January 21, 2010. The results indicated that the soil cuttings were suitable for on-base disposal. The soil cuttings were transported to and disposed of at an on-base location identified by Travis AFB on February 19, 2010. Liquid IDW, which consisted of rinsate from equipment decontamination and purge water from well development, was disposed of and treated through the South Base Boundary Groundwater Treatment Plant (GWTP).

3.2 Results

As documented in the RD/RA WP (CH2M HILL, 2009a), data collected during second quarter 2009 (prior to the pre-design investigation) suggested that a discrete mass or "slug" of dissolved MTBE had been migrating through the central and southern part of the site since at least 2003. The purpose of the pre-design investigation was to delineate the downgradient extent of the MTBE plume and confirm the "slug" hypothesis. A secondary goal of the pre-design investigation was to verify suitable locations for groundwater extraction wells.

Analytical results obtained from the pre-design investigation and the GSAP are summarized in Table 3-2. As indicated, the slug of dissolved MTBE contamination, which had been detected in monitoring well MW786x18 between 2007 and 2008, was detected in 2009 in pre-design soil boring HP2044x18, and in 2009 and 2010 in pre-design monitoring well MW2044x18 installed at the same location. MTBE was detected at a concentration of 350 J (estimated value) micrograms per liter (µg/L) in the HydroPunch® sample from HP2044x18 (collected in September 2009). Samples collected from new monitoring well MW2044x18, installed at the same location, confirmed the HydroPunch® sample results. MW2044x18 was sampled three (3) times between November 2009 and October 2010, and MTBE concentrations in these samples ranged from 373 to 790 µg/L. The HydroPunch® sample from soil boring HP2021x18, which was drilled to confirm the crossgradient extent of the MTBE slug, was non-detect for MTBE. Follow-on samples collected from MW2021x18 in October 2010 were also non-detect for MTBE (Table 3-2).

As described in Section 3.1, prior to installing extraction wells, soil borings were drilled and HydroPunch® samples were collected at all potential extraction well locations identified in the RD/RA WP (CH2M HILL, 2009a). Results are summarized in Table 3-2. MTBE concentrations were highest at near-source location HP2014x18, where the HydroPunch® sample contained 1,500 µg/L of MTBE. MTBE concentrations were at least an order of magnitude lower in HydroPunch® samples from HP2015x18, HP2016x18, and HP2019x18. In the plume axis, at locations HP2015x18 and HP2016x18, MTBE concentrations in HydroPunch® samples ranged from 76 to 130 J µg/L. At the furthest downgradient location, HP2019x18, the HydroPunch® sample contained only 4.9 µg/L of MTBE. HP2015x18 was subsequently abandoned, and extraction wells were installed at HP2014x18, HP2016x18, and HP2019x18, based on the following rationale:

- The highest dissolved concentrations are located near the source (the SGS). Therefore, an extraction well is necessary immediately downgradient of the source (at HP2014x18) to remove mass and control migration away from the source.
- Concentrations in the plume axis at HP2015x18 and HP2016x18 are much lower. One (1) extraction well at HP2016x18 is adequate to control migration within the plume axis.
- High concentrations of MTBE remain and continue to migrate within the detached slug in the furthest downgradient part of the plume. An extraction well is necessary at HP2019x18 to control migration at the toe of the plume.

Figure 3-1 shows the estimated MTBE plume during second quarter 2010. As shown, the main mass of the 13-µg/L MTBE plume extends from the SGS approximately 700 feet southeast to the vicinity of new extraction well EW2016x18. The furthest downgradient portion of the MTBE plume consists of a detached slug, which is approximately 330 feet long and is centered on new monitoring well MW2044x18. The downgradient MTBE slug continues to migrate and has begun to impact new extraction well EW2019x18, where the MTBE concentration was above the cleanup goal of 13 µg/L during June 2010 (30 µg/L) and October 2010 (15.2 µg/L) (Table 3-2). The toe of the 13-µg/L MTBE plume is defined by monitoring well MW796x18 and new monitoring well MW2021x18, which was installed during the pre-design investigation.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG
Sample Media: Groundwater									
Site: Site ST018									
EW1NSX18									
EW1NSx18-106		5/18/2010	N	SW8260	1,2-DCA	3.6		µg/L	
		5/18/2010	N	SW8260	Ethylbenzene	0.25	J	µg/L	30
		5/18/2010	N	SW8260	Methyl tert-butyl ether	**26.1**	J+	µg/L	5
		5/18/2010	N	SW8015-P	TPH-G	**800**		µg/L	100
EW2014X18									
EW2014X18-107		5/14/2010	N	SW8260	2-Hexanone	0.7	J	µg/L	
		5/14/2010	N	BNASIM	Acenaphthene	0.06	J	µg/L	
		5/14/2010	N	A2320	Alkalinity	360		mg/L	
		5/14/2010	N	A2320	Alkalinity, Bicarbonate (As CaCO3)	360		mg/L	
		5/14/2010	N	E200.8	Arsenic	0.009		mg/L	
		5/14/2010	N	SW8260	Benzene	**25**		µg/L	1
		5/14/2010	N	BNASIM	Benzo(a)pyrene	0.2		µg/L	
		5/14/2010	N	BNASIM	Benzo(b)fluoranthene	0.1	J	µg/L	
		5/14/2010	N	E200.8	Cadmium	0.00009	J	mg/L	
		5/14/2010	N	E200.8	Calcium	540		mg/L	
		5/14/2010	N	E300	Chloride	1300		mg/L	
		5/14/2010	N	E200.8	Chromium	0.0006		mg/L	
		5/14/2010	N	A4500CE	Cyanide	0.003		mg/L	
		5/14/2010	N	SW8260	Ethylbenzene	**33**		µg/L	30
		5/14/2010	N	BNASIM	Fluoranthene	0.1	J	µg/L	
		5/14/2010	N	BNASIM	Fluorene	0.06	J	µg/L	
		5/14/2010	N	E200.8	Iron	4.2		mg/L	
		5/14/2010	N	E200.8	Lead	0.0039		mg/L	
		5/14/2010	N	SW8260	m,p-Xylene	0.7	J	µg/L	20
		5/14/2010	N	E200.8	Magnesium	370		mg/L	
		5/14/2010	N	E200.8	manganese	29		mg/L	
		5/14/2010	N	E1631	Mercury	0.00001		mg/L	
		5/14/2010	N	SW8260	Methyl ethyl ketone	4.7	J	µg/L	
		5/14/2010	N	SW8260	Methyl isobutyl ketone	3.1	J	µg/L	
		5/14/2010	N	SW8260	Methyl tert-butyl ether	**170**		µg/L	5
		5/14/2010	N	SW8015-E	Motor Oils	480		µg/L	
		5/14/2010	N	BNASIM	Naphthalene	11		µg/L	
		5/14/2010	N	E200.8	Nickel	0.03		mg/L	
		5/14/2010	N	SW7199	No Analytes Detected				

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG
Site: Site ST018									
EW2014X18									
EW2014X18-107		5/14/2010	N	BNASIM	Phenanthrene	0.04	J	µg/L	
		5/14/2010	N	E200.8	Selenium	0.00075	J	mg/L	
		5/14/2010	N	E370.1	Silica	31		mg/L	
		5/14/2010	N	E200.8	Sodium	1200		mg/L	
		5/14/2010	N	E300	Sulfate	3000		mg/L	
		5/14/2010	N	SW8260	Toluene	0.4	J	µg/L	40
		5/14/2010	N	A5310C	Total Organic Carbon	3.7		mg/L	
		5/14/2010	N	SW8015-E	TPH-D	1100		µg/L	
		5/14/2010	N	SW8015-P	TPH-G	**1100**		µg/L	100
		5/14/2010	N	E200.8	Zinc	0.0023	J	mg/L	
EW2016X18									
EW2016X18-107		5/14/2010	N	SW8260	1,2-DCA	0.4	J	µg/L	
		5/14/2010	N	A2320	Alkalinity	450		mg/L	
		5/14/2010	N	A2320	Alkalinity, Bicarbonate (As CaCO3)	450		mg/L	
		5/14/2010	N	E200.8	Aluminum	0.032	J	mg/L	
		5/14/2010	N	E200.8	Calcium	66		mg/L	
		5/14/2010	N	E300	Chloride	170		mg/L	
		5/14/2010	N	SW8260	Chloroform	0.1	J	µg/L	
		5/14/2010	N	E200.8	Chromium	0.00059		mg/L	
		5/14/2010	N	E200.8	copper	0.0024		mg/L	
		5/14/2010	N	A4500CE	Cyanide	0.0011		mg/L	
		5/14/2010	N	E200.8	Iron	0.048	J	mg/L	
		5/14/2010	N	SW8260	m,p-Xylene	0.3	J	µg/L	20
		5/14/2010	N	E200.8	Magnesium	43		mg/L	
		5/14/2010	N	E200.8	manganese	0.73		mg/L	
		5/14/2010	N	E1631	Mercury	0		mg/L	
		5/14/2010	N	SW8260	Methyl tert-butyl ether	**18**		µg/L	5
		5/14/2010	N	E200.8	Nickel	0.0045		mg/L	
		5/14/2010	N	BNASIM	No Analytes Detected				
		5/14/2010	N	SW7199	No Analytes Detected				
		5/14/2010	N	SW8015-E	No Analytes Detected				
		5/14/2010	N	SW8015-P	No Analytes Detected				
		5/14/2010	N	E200.8	Selenium	0.0002	J	mg/L	
		5/14/2010	N	E370.1	Silica	24		mg/L	
		5/14/2010	N	E200.8	Sodium	320		mg/L	

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG
Site: Site ST018									
EW2016X18									
EW2016X18-107		5/14/2010	N	E300	Sulfate	550		mg/L	
		5/14/2010	N	SW8260	Toluene	0.3	J	µg/L	40
		5/14/2010	N	A5310C	Total Organic Carbon	2.8		mg/L	
		5/14/2010	N	E200.8	Zinc	0.0094	J	mg/L	
EW2019X18									
EW2019X18-107		5/14/2010	N	SW8260	1,2-DCA	0.5		µg/L	
		5/14/2010	N	A2320	Alkalinity	380		mg/L	
		5/14/2010	N	A2320	Alkalinity, Bicarbonate (As CaCO3)	380		mg/L	
		5/14/2010	N	E200.8	Calcium	150		mg/L	
		5/14/2010	N	E300	Chloride	200		mg/L	
		5/14/2010	N	SW8260	Chloroform	0.1	J	µg/L	
		5/14/2010	N	E200.8	Chromium	0.0035		mg/L	
		5/14/2010	N	E200.8	copper	0.0029		mg/L	
		5/14/2010	N	A4500CE	Cyanide	0.00097	J	mg/L	
		5/14/2010	N	E200.8	Iron	0.1		mg/L	
		5/14/2010	N	SW8260	m,p-Xylene	0.3	J	µg/L	20
		5/14/2010	N	E200.8	Magnesium	76		mg/L	
		5/14/2010	N	E200.8	manganese	0.62		mg/L	
		5/14/2010	N	E1631	Mercury	0	J	mg/L	
		5/14/2010	N	SW8260	Methyl tert-butyl ether	**30**		µg/L	5
		5/14/2010	N	SW8015-E	Motor Oils	100	J	µg/L	
		5/14/2010	N	E200.8	Nickel	0.055		mg/L	
		5/14/2010	N	BNASIM	No Analytes Detected				
		5/14/2010	N	SW7199	No Analytes Detected				
		5/14/2010	N	SW8015-P	No Analytes Detected				
		5/14/2010	N	SW8260	o-Xylene	0.1	J	µg/L	20
		5/14/2010	N	E200.8	Selenium	0.00017	J	mg/L	
		5/14/2010	N	E370.1	Silica	24		mg/L	
		5/14/2010	N	E200.8	Sodium	240		mg/L	
		5/14/2010	N	E300	Sulfate	640		mg/L	
		5/14/2010	N	SW8260	Toluene	0.3	J	µg/L	40
		5/14/2010	N	A5310C	Total Organic Carbon	2.2		mg/L	
		5/14/2010	N	E200.8	Zinc	0.0016	J	mg/L	
EW2019x18-108		10/7/2010	N	SW8260	Methyl tert-butyl ether	**16.5**		µg/L	5
		10/7/2010	N	SW8015-P	No Analytes Detected				

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG
Site: Site ST018									
EW2019X18									
EW2019x18-108B		10/7/2010	FD	SW8260	Methyl tert-butyl ether	**15.2**		µg/L	5
		10/7/2010	FD	SW8015-P	No Analytes Detected				
HP2014X18									
HP2014X18A		9/24/2009	N	SW8260	Benzene	0.8		µg/L	1
		9/24/2009	N	SW8260	Ethylbenzene	3.2	J+	µg/L	30
		9/24/2009	N	SW8260	m,p-Xylene	2.8	J+	µg/L	20
		9/24/2009	N	SW8260	Methyl tert-butyl ether	**1500**		µg/L	5
		9/24/2009	N	SW8260	o-Xylene	0.5	J+	µg/L	20
		9/24/2009	N	SW8260	tert-Butyl Alcohol	4.3	J	µg/L	
		9/24/2009	N	SW8015-P	TPH-G	**110**		µg/L	100
HP2014X18B		9/24/2009	N	SW8260	Methyl tert-butyl ether	**18**		µg/L	5
		9/24/2009	N	SW8015-P	No Analytes Detected				
HP2015X18									
HP2015X18A		9/23/2009	N	SW8260	1,2-DCA	0.6	J+	µg/L	
		9/23/2009	N	SW8260	Methyl tert-butyl ether	**130**	J+	µg/L	5
		9/23/2009	N	SW8015-P	TPH-G	36	J	µg/L	100
HP2016X18									
HP2016X18A		9/24/2009	N	SW8260	1,2-DCA	3.8		µg/L	
		9/24/2009	N	SW8260	Chloroform	0.1	J	µg/L	
		9/24/2009	N	SW8260	Methyl tert-butyl ether	**96**		µg/L	5
		9/24/2009	N	SW8015-P	No Analytes Detected				
HP2016X18AD		9/24/2009	FD	SW8260	1,2-DCA	4.1		µg/L	
		9/24/2009	FD	SW8260	Methyl tert-butyl ether	**76**		µg/L	5
		9/24/2009	FD	SW8015-P	No Analytes Detected				
HP2019X18									
SB2019X18		11/3/2009	N	SW8260	1,2-DCA	0.2	J	µg/L	
		11/3/2009	N	SW8260	Methyl tert-butyl ether	4.9		µg/L	5
		11/3/2009	N	SW8015-P	No Analytes Detected				
HP2021X18									
SB-3 GRAB SAMPLE		12/15/2009	N	SW8260	1,1-DCE	0.3	J	µg/L	
		12/15/2009	N	SW8260	Cis-1,2-DCE	0.5	J	µg/L	
		12/15/2009	N	SW8260	Methyl tert-butyl ether	0.3	J	µg/L	5
		12/15/2009	N	SW8260	TCE	12		µg/L	
		12/15/2009	N	SW8015-P	TPH-G	20	J	µg/L	100

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG
Site: Site ST018									
HP2044X18									
HP2044X18	A	9/23/2009	N	SW8260	Methyl tert-butyl ether	**350**	J-	µg/L	5
		9/23/2009	N	SW8015-P	TPH-G	37	J-	µg/L	100
MW136X18									
MW136x18-106		4/21/2010	N	SW8260	Chloromethane	13.1		µg/L	
		4/21/2010	N	SW8260	Methyl tert-butyl ether	**1050**		µg/L	5
		4/21/2010	N	SW8260	TCE	1.8	J	µg/L	
		4/21/2010	N	SW8015-P	TPH-G	96		µg/L	100
MW137X18									
MW137x18-106		5/6/2010	N	SW8260	1,2-DCA	7.3		µg/L	
		5/6/2010	N	SW8260	Methyl tert-butyl ether	**664**		µg/L	5
		5/6/2010	N	SW8015-P	TPH-G	48	J	µg/L	100
MW2021X18									
MW2021x18-108		10/7/2010	N	SW8015-P	No Analytes Detected				
		10/7/2010	N	SW8260	No Analytes Detected				
MW2021x18-108_112310		11/23/2010	N	SW8260	Cis-1,2-DCE	0.53	J	µg/L	
		11/23/2010	N	SW8015-P	No Analytes Detected				
		11/23/2010	N	SW8260	TCE	8.8		µg/L	
MW2044X18									
MW2044X18		11/19/2009	N	SW8260	Methyl tert-butyl ether	**790**		µg/L	5
		11/19/2009	N	SW8015-P	No Analytes Detected				
MW2021x18-106		6/2/2010	N	SW8260	Methyl tert-butyl ether	**529**		µg/L	5
		6/2/2010	N	SW8260	TCE	3.1		µg/L	
		6/2/2010	N	SW8015-P	TPH-G	44	J	µg/L	100
MW2044x18-108		10/7/2010	N	SW8260	Methyl tert-butyl ether	**373**		µg/L	5
		10/7/2010	N	SW8015-P	TPH-G	36	J	µg/L	100
MW2044x18-108_112310		11/23/2010	N	SW8260	1,2-DCA	0.35	J	µg/L	
		11/23/2010	N	SW8260	Methyl tert-butyl ether	**553**	J	µg/L	5
		11/23/2010	N	SW8260	TCE	0.45	J	µg/L	
		11/23/2010	N	SW8015-P	TPH-G	81		µg/L	100
MW2044x18-108B		11/23/2010	FD	SW8260	1,2-DCA	0.3	J	µg/L	
		11/23/2010	FD	SW8260	Methyl tert-butyl ether	**537**	J	µg/L	5
		11/23/2010	FD	SW8260	TCE	0.43	J	µg/L	
		11/23/2010	FD	SW8015-P	TPH-G	74		µg/L	100
MW206NSX18									
MW206NSx18-106		5/6/2010	N	SW8260	Benzene	0.61		µg/L	1

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG
Site: Site ST018									
MW206NSX18									
MW206NSx18-106		5/6/2010	N	SW8260	Chloroform	0.29	J	µg/L	
		5/6/2010	N	SW8260	Methyl tert-butyl ether	**25.5**		µg/L	5
		5/6/2010	N	SW8015-P	No Analytes Detected				
MW210NSX18									
MW210NSx18-106		4/21/2010	N	SW8260	Chloromethane	0.36	J	µg/L	
		4/21/2010	N	SW8260	Methyl tert-butyl ether	**19.4**		µg/L	5
		4/21/2010	N	SW8015-P	No Analytes Detected				
MW211NSX18									
MW211NSx18-106		4/21/2010	N	SW8015-P	No Analytes Detected				
		4/21/2010	N	SW8260	No Analytes Detected				
MW213NSX18									
MW213NSx18-106		4/21/2010	N	SW8260	Chloromethane	11.8		µg/L	
		4/21/2010	N	SW8260	Methyl tert-butyl ether	**868**		µg/L	5
		4/21/2010	N	SW8015-P	TPH-G	58		µg/L	100
MW786X18									
MW786x18-106		5/6/2010	N	SW8015-P	No Analytes Detected				
		5/6/2010	N	SW8260	No Analytes Detected				
MW787X18									
MW787x18-106		6/3/2010	N	SW8260	1,4-DCB	0.17	J	µg/L	
		6/3/2010	N	SW8260	Chlorobenzene	0.17	J	µg/L	
		6/3/2010	N	SW8015-P	No Analytes Detected				
MW787x18-106B		6/3/2010	FD	SW8015-P	No Analytes Detected				
		6/3/2010	FD	SW8260	No Analytes Detected				
MW796X18									
MW796X18_100809		10/8/2009	N	SW8260	1,2-DCA	0.3	J	µg/L	
		10/8/2009	N	SW8260	Methyl tert-butyl ether	3.4		µg/L	5
		10/8/2009	N	SW8015-P	No Analytes Detected				
MW796x18-106		5/13/2010	N	SW8260	Methyl tert-butyl ether	0.8	J-	µg/L	5
		5/13/2010	N	SW8015-P	No Analytes Detected				
MW796x18-108		11/22/2010	N	SW8260	Methyl tert-butyl ether	**8.9**		µg/L	5
		11/22/2010	N	SW8015-P	No Analytes Detected				

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

Table 3-2

Analytical Results

POCO Site ST018 Baseline Implementation Report, Travis Air Force Base, California

Location	Field ID	Sample Date	QA/QC Type	Method	Analyte	Result*	Flag	Units	IRG

Notes:
DCA = Dichloroethane
DCE = Dichloroethene
IRG = interim remediation goal
mg/L = milligram(s) per liter
N = normal
QA/QC = quality assurance/quality control
TCE = Trichloroethene
Qualifier Description:
J = The analyte was present but reported value may not be accurate or precise.
J+ = The analyte was present but reported value may not be accurate or precise, and there may be a high bias in the value reported (actual concentration may be lower than the reported result).
J- = The analyte was present but reported value may not be accurate or precise, and there may be a low bias in the value reported (actual concentration may be higher than the reported result).
FD = The field duplicate precision exceeds the expected sampling and analytical provision—analyte reproducability may be due to site-specific variability of contaminant.

Note: Grouped by Site and Location; sorted by Field ID and Analyte.

*Bold values indicate result greater than IRGs.

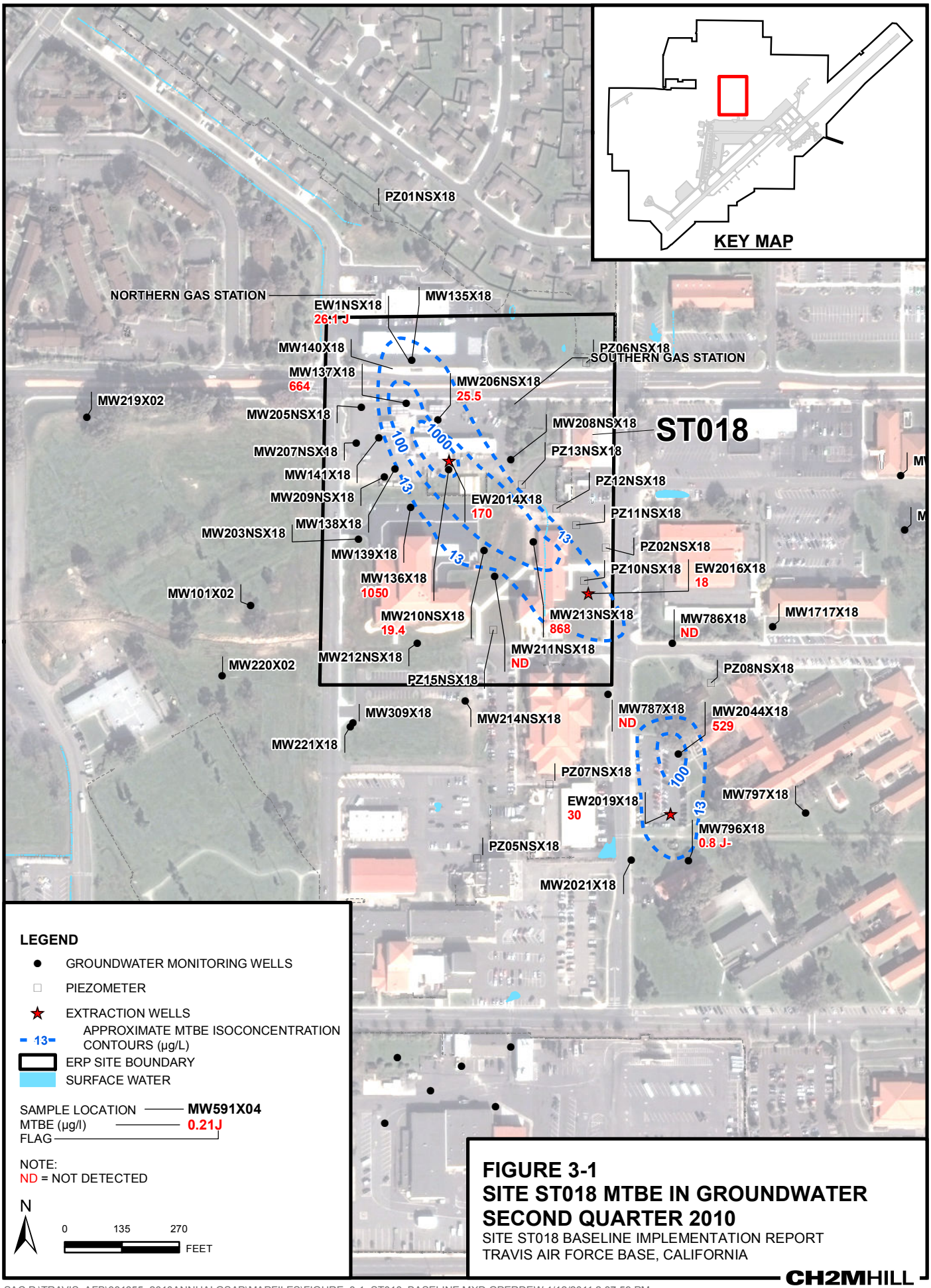

FIGURE 3-1
SITE ST018 MTBE IN GROUNDWATER SECOND QUARTER 2010

SITE ST018 BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

SAC P:\TRAVIS_AFB\381355_2010ANNUALGSAP\MAPFILES\FIGURE_3-1_ST018_BASELINE.MXD GPERDEW 4/12/2011 2:37:59 PM

SECTION 4

Implementation

The following subsections describe how the Site ST018 GWTP was installed, and provide details on the equipment used when building the treatment plant. This section is organized as follows:

- Section 4.1: Project Schedule
- Section 4.2: System Installation
- Section 4.3: Permitting
- Section 4.4: Startup
- Section 4.5: Compliance

4.1 Project Schedule

The original project schedule included a total of 24 calendar days to begin construction, complete installation, and finalize system startup testing (November 15 to December 9, 2010). Because of various schedule changes resulting from holiday breaks and weather delays, total system installation took approximately 43 calendar days to complete. The original project schedule is presented on Figure 4-1. A breakdown of project milestones during the construction phase of the project follows:

- **October 19, 2010 –** The site kickoff meeting was held, attended by Travis AFB Environmental Management personnel, CH2M HILL representatives, and the subcontractor. The job scope, overall plan, and schedule were reviewed. The subcontractor marked out all digging locations for utility location services (Underground Service Alert and a private utility locator).
- **November 1 and 2, 2010 –** Site construction began. The treatment pad location was prepared. Utility locating work was completed by a private utility locator, and directional boring was initiated from the treatment pad location to the electrical service connection.
- **November 3 to 10, 2010 –** All directional boring was completed; conveyance water piping and electrical conduit were completed and welded (high-density polyethylene). All three (3) extraction well vaults were placed around the extraction wells, and equipment was delivered for the treatment compound (e.g., LGAC vessels, bag filter housings, influent tank).
- **November 11 to 22, 2010 –** All piping passed pressure testing. Concrete was poured to form the Site ST018 GWTP equipment pad. Most of the plumbing inside the GWTP was completed.
- **November 23 to December 6, 2010 –** Electrical service to the Site ST018 GWTP was completed. All electrical control wiring was completed, pending testing. Solar panel arrays were installed, with batteries and charge controllers connected to each set of solar panels. All exposed metal (e.g., solar panel array supports, galvanized pipe into and out of LGAC vessels) were primed and painted.

- **December 7 to 13, 2010 –** Electrical wiring was completed. All alarms and solar-powered well pumps were tested for proper operation. LGAC vessels were filled with virgin coconut carbon. The system was tested and deemed to be working correctly.

4.2 System Installation

Many of the details regarding the Site ST018 GWTP are also presented in the *Site ST018 Groundwater Treatment Plant Operation and Maintenance Manual* (CH2M HILL, 2010). The O&M Manual also includes specific equipment specification sheets, instruction and installation manuals, and instructions for system operation.

The Site ST018 GWTP was installed over the course of approximately 43 calendar days as described in Section 4.1. This section provides additional details regarding the type of equipment installed, and the functions of the main components of the treatment plant. Many of these details will reference the record design drawing package, included in this BIR in Appendix D.

4.2.1 Extraction Well Vaults

There are currently three (3) extraction wells associated with the Site ST018 GWTP: EW2014x18, EW2016x18, and EW2019x18. Each wellhead is surrounded by a wellhead vault with traffic-rated lids. Within each extraction wellhead vault is an identical setup of wellhead piping and appurtenances designed to allow for system data collection, sample collection, and operational manipulation.

Drawing (DWG) C-04 in Appendix D presents a record drawing of a wellhead vault. The main components of each vault include an isolation valve, a flow totalizer / flow meter, throttle valve, sample port, well vault flood alarm switch, and the pump power electrical connection.

4.2.2 Extraction Well Pumps

Within each extraction well is a single submersible pump. Each extraction pump is the same make and model: Grundfos SQ-Flex Model 3 SQF 2. The pumps are helical rotor pumps that offer high amounts of head at lower flow rates. Because the design flow rate from each well was 5 gallons per minute (gpm), low-flow pumps were selected for each extraction well.

Each extraction pump is powered by a solar array and battery bank (see Section 4.2.3). The extraction pumps are capable of operating off of a variety of electrical power, including direct current voltage (30 to 300 volts direct current [VDC]) and alternating current voltage (90 to 240 volts, single phase). When operating, each extraction pump consumes approximately 220 watts, or roughly 4.1 amperes (amps) at 54 volts. These values fluctuate throughout each day based on the charge state of the battery bank. The wattage consumed by each extraction pump can vary by up to approximately 20 percent throughout the course of a full day (24 hours) of operation.

4.2.3 Extraction Well Solar Arrays

Each extraction well pump associated with the Site ST018 GWTP is powered by means of individual solar arrays (one [1] for each extraction well pump). The solar arrays consist mainly of five (5) components:

- **Solar panels –** Each solar array is composed of eight (8) individual solar panels connected both in series and in parallel. Each panel provides approximately 185 watts, or 36.4 VDC at 5.09 amps. Four (4) sets of two (2) panels are connected in series to increase voltage, and these four (4) sets of panels are connected in parallel to increase amperage from the array. Each solar array therefore provides approximately 20 amps at approximately 70 VDC. The arrays are pointed toward southern skies at an angle of approximately 30 degrees from horizontal. The amount of solar panels in each array was sufficiently sized to fully charge the battery bank.
- **Battery bank –** Four (4) deep-cycle gel batteries are also included in each solar array. The batteries are used to power the extraction well pump, while the solar panels are used to charge the batteries. Each battery provides 12 VDC at approximately 18 amps, and all are connected in series. The total voltage from the battery bank is approximately 48 VDC, with a total amperage of approximately 18 amps. A battery bank, when fully charged, is designed to operate its extraction well pump for up to 24 hours in the absence of sunlight (or if the solar panel array is disconnected).
- **Charge controller –** Each solar array is equipped with a TriStar-45 solar system controller that acts as the interface between the solar panels and the battery bank. The charge controller feeds incoming power from the solar panels to the battery bank.
- **Pump controller –** Each extraction well solar array has a pump controller that controls operation of the extraction well pump (pump details are provided in Section 4.2.2). When active, the pump controller sends power from the battery bank to the extraction well pump. The controller is sensitive to any well vault alarms (see Section 4.2.5) and will not activate the extraction well pump if any alarms are present.
- **Enclosures –** All equipment associated with the solar arrays is housed in stainless steel enclosures. The battery bank is housed in its own enclosure with passive vents and a temperature monitor. With rechargeable deep-cycle batteries, there is a chance that hydrogen gas can form during the recharging process. The temperature sensor monitors the temperature inside the battery bank enclosure and ceases charging if the temperature gets too high. This minimizes any chance of fire during normal operation. Additionally, the passive vents are installed to prevent accumulation of hydrogen gas, if formed.

Details regarding each solar array are provided in DWG E-04 in Appendix D.

4.2.4 Conveyance System

Conveyance System Piping

All of the conveyance piping for the Site ST018 GWTP was sized to accommodate maximum flow from all extraction wells. Details regarding pipe sizing and selection were presented in the RD/RA WP (CH2M HILL, 2009a).

A combination of two (2) pipe sizes made up the entirety of the piping associated with the conveyance system. Individual piping from each extraction well to the main header consists of single-wall 1.25-inch HDPE. With an expected maximum groundwater flow rate of approximately 5 gpm from each extraction well, 1.25-inch piping is sufficient. Each length of 1.25-inch piping coming from the extraction well vaults ultimately combines into a single-wall 2-inch HDPE conveyance header, which in turn leads back to the GWTP. By using a common conveyance pipeline, flows from each well are combined into a single process stream before entering the GWTP. The maximum expected flow rate from all three (3) extraction wells in the main conveyance header is approximately 15 gpm. A piping size of 2 inches is more than sufficient to accommodate this amount of flow. Additionally, if more extraction wells are added to the current network of three (3) extraction wells, the 2-inch main header conveyance line will be able to accommodate flow from these expansion wells, should they be necessary.

DWG C-01 in Appendix D presents the piping layout of the conveyance system for the GWTP.

Conveyance System Piping Installation

Another aspect of the conveyance system was the way in which it was installed. The original design for installation had specified that all conveyance piping runs be buried in an open trench, and backfilled to surface completion. Instead of creating an open trench for all conveyance piping, trenchless boring technology was used to put the piping in place.

Trenchless boring only requires open pits at the starting and ending locations of a given piping run. The horizontal boring rig begins at one (1) open pit and feeds boring rods into the subsurface through the side wall of the pit. A tracking device that picks up the signal from the boring tip is carried by drilling personnel above ground in order to know how far along the boring has progressed (and how deep the boring shafts are). Once the boring tip reaches the exit pit, piping is attached to the boring rod tip while it is retracted back to the horizontal boring machine. This pulls all necessary piping back through the borehole without having to create an open trench along the way.

This trenchless boring system was used to install all of the conveyance piping for the GWTP. The locations of each bore pit (beginning and ends of trenchless boring runs, identified as "pull boxes") are identified on DWG C-01 in Appendix D.

4.2.5 Site ST018 Groundwater Treatment Plant Main System Components

The Site ST018 GWTP comprises seven (7) main components:

- **Influent actuated ball valve –** This valve serves to allow (open) or prevent (closed) extracted groundwater from entering the GWTP. This valve is electrically actuated and will close when a GWTP alarm is active (see Section 4.2.5).
- **Influent holding tank –** The influent holding tank is a 1,100-gallon black plastic water tank designed to contain all extracted groundwater as it enters the GWTP. The purpose of this influent tank is to provide equalization to the rest of the components downstream of the tank. Flow rates from individual extraction wells can vary widely in short amounts of time (e.g., well drawdown, periods of intense sunlight, periods of weak or no sunlight). The large influent holding tank serves to eliminate those variations by

allowing the tank to fill up before being sent through the system via the transfer pump. In addition, the outlet of the influent tank is positioned approximately 12 inches above the bottom of the tank, which allows large particulate matter to settle on the bottom of the tank instead of being drawn into the transfer pump.

- **Transfer pump –** The transfer pump is a 1.5-horsepower centrifugal pump that takes in water from the influent holding tank and sends it through the rest of the GWTP. The pump activates only when the influent tank is full, and shuts off before the water level in the influent tank drops below the tank outlet. By waiting until the tank is full of water, the transfer pump is assured a steady, even supply of groundwater to pump through the system.

- **Bag filter housings –** The bag filter housing units (two [2] total) serve to eliminate fine particulate matter from the influent process groundwater before being sent through the LGAC vessels. Particulate matter can often foul (block, hinder) the LGAC, reducing its ability to remove contaminants from the groundwater as it passes through each vessel.

- **Granular activated carbon vessels –** There are three (3) total 2,000-pound LGAC vessels at the Site ST018 GWTP. The vessels are connected in series, meaning that the extracted groundwater must pass through each vessel sequentially before being discharged. The inlet and outlet of each LGAC vessel is equipped with connections for flexible 2-inch hose. Each length of hose can reach any connection between these three (3) vessels. This is important because when the LGAC is changed out, it is typically done in two (2) of the three (3) vessels at one (1) time. Following changeout activities, the vessel with the oldest LGAC (in the third vessel) is repositioned as the first LGAC vessel in series, and the vessels with fresh LGAC are placed in the second and third positions in series. Since each carbon vessel is permanently fixed in place, flexible hose will allow any LGAC vessel to be first, second, or third in series.

- **Sump and sump pump –** The GWTP equipment pad was constructed with a 6-inch curb on the edges of the pad, and a sump to collect water (rainwater or system process water). The sump was located at the lowest point within the equipment pad in order to force any surface water within the GWTP compound into the sump. The sump pump sends collected water into the influent holding tank to be processed through the system before ultimately being discharged.

- **Discharge conveyance piping –** The system discharge piping includes a siphon loop and a flow totalizer / flow meter. The siphon loop is a section of raised piping designed to keep the third LGAC vessel full of process water. Additionally, with a vacuum breaker at the top of this loop, all siphoning effects are broken whenever the transfer pump stops pumping. The flow totalizer / flow meter is used to keep track of how much water is processed through the system during normal operation, and to provide an instantaneous flow rate when the transfer pump is active.

An overview of the Site ST018 GWTP system layout, including details on system equipment, is provided on DWGs C-02 and M-01 in Appendix D. Details regarding the GWTP equipment pad are provided on DWG S-01.

4.2.6 Site ST018 Groundwater Treatment Plant System Controls

The Site ST018 GWTP controls consist of devices in the extraction well vaults and in the GWTP that prevent continued system operation in the event of system failure. Details regarding system controls, including placement of float switches, a description of each component, and wiring details are provided in Appendix D (DWG C-04, DWGs E-01 through E-05).

Treatment Plant Controls

There are four (4) conditions associated with the GWTP that will cause an alarm and require a reset before the plant can resume continuous operation:

- **Containment pad high level alarm –** This alarm indicates that the GWTP equipment pad is flooded. A normally open float switch is mounted on the 6-inch berm (curb) that borders the containment pad. When the float rises, the alarm is active and an alarm indicator light on the system control panel illuminates. An active alarm would be the result of flooding inside the containment pad, possibly indicating a fault with the sump pump, a possible leak in one (1) of the main components of the GWTP, or some other fault resulting in accumulation of water within the treatment compound. If this alarm is tripped, power is disconnected to the transfer pump and the influent actuated ball valve would move to a closed position. This alarm remains active until the fault is corrected and manually reset.

- **Influent holding tank high level alarm –** This alarm indicates that there is too much water inside the influent holding tank. A normally open float switch is mounted on the interior of the influent holding tank. When the float rises, the alarm is active and an alarm indicator light on the system control panel illuminates. This alarm might indicate a failure of the transfer pump or a blockage in the system downstream of the transfer pump. An active alarm would disconnect power from the transfer pump and close the influent actuated ball valve. This alarm remains active until the fault is corrected and manually reset.

- **High bag filter pressure alarm –** This alarm indicates that there is too much pressure in the system piping prior to the bag filter housings. An 8.5- to 50-pound-per-square-inch (psi) adjustable pressure switch controls this alarm and is located immediately upstream of the bag filter housings. When active, an alarm indicator light on the system control panel illuminates. A tripped alarm would indicate a blockage in the system downstream of the pressure switch and would likely be the result of fouled bag filters. Although the bag filters would be the likely problem, a pipeline blockage anywhere downstream of the pressure switch could cause this alarm to trip. Pressure gauges installed throughout the GWTP (upstream of the bag filters, downstream of the bag filters, effluent of the first carbon vessel, effluent of the second carbon vessel, effluent of the third carbon vessel) can help locate the point of system blockage. This alarm remains active until the fault is corrected and manually reset.

- **Power failure alarm –** This alarm occurs when power to the GWTP is lost. When this happens, the battery backup inside the GWTP control panel causes the influent actuated ball valve to close. When power is restored, the GWTP returns to normal operation,

although any active extraction wells will likely have been shut down because of the influent actuated ball valve. There is no indicator light for this alarm condition.

In addition to system alarms, the transfer pump is run automatically through use of conductivity sensors mounted within the influent holding tank. There are three (3) conductivity sensors within the tank. The lowest probe is the common probe, the middle probe is the "low" probe, and the highest probe is the "high" probe. The transfer pump turns on or off depending on which of the sensors conduct with one another (which ones are submerged in water). The common probe "listens" to whether the other two (2) probes are submerged in water. When all three (3) probes are submerged in water, the transfer pump turns on. This condition happens when the water level in the tank is high enough to submerge the "high" probe. The pump stays on until the common probe can no longer conduct with the "low" probe. This condition happens when the water is drawn down past the "low" probe so that it is no longer submerged.

Extraction Well Vault Controls

Each extraction well vault contains two (2) controls that affect operation of its extraction well pump:

- **Vault flood alarm –** This alarm is similar to the containment pad high level alarm in that a normally open float switch is mounted on the inside wall of the extraction well vault. When the float rises, the alarm is active, and power is disconnected from the extraction pump. This float switch is tied to the pump controller in its corresponding solar array enclosure (see Section 4.2.2). An alarm indicator light illuminates in the solar array enclosure associated with that extraction well vault when active. Once tripped, the alarm condition must be remedied, and the alarm must be reset manually.
- **High pressure alarm –** This alarm is similar to the high bag filter pressure alarm in that a pressure switch determines the status of this alarm. An 8.5- to 50-psi adjustable pressure switch is located immediately downstream of the throttle valve. When active, an alarm indicator light on the solar array enclosure illuminates. A tripped alarm would indicate a blockage in the system downstream of the pressure switch and would likely be the result of the influent actuated ball valve located in the GWTP. Since there is no electrical communication between each extraction well pump and the GWTP, the only way to stop operation of the solar-powered extraction pump is to physically prevent the pump from pushing water toward the influent holding tank. Any alarm at the GWTP causes the influent actuated ball valve to close, thus causing pressure in the conveyance piping to increase. The pressure switch within each extraction well vault senses this increase in pressure and activates the alarm when reaching a specific set point (approximately 30 psi). This alarm remains active until the fault is corrected and manually reset.

4.3 Permitting

The operation of the Site ST018 GWTP is conducted under an NPDES Fuels General Permit (Order No. R2-2006-0075, NPDES Permit No. CAG912002). This permit governs several aspects of GWTP operation including contaminant effluent (discharge) limits, sampling

frequency, and maximum system flow rate. For reference, a copy of the permit for the Site ST018 GWTP is provided in Appendix E.

4.4 Startup

While the construction phase of the project was completed on December 13, 2010 (see Section 4.1), system startup activities did not begin until February 28, 2011. A brief timeline of events related to system startup follows:

- **February 28, 2011 –** First attempt at system startup. The pump in extraction well EW2014x18 failed, so system startup was postponed until the pump was repaired or replaced.
- **March 2, 2011 –** The pump in extraction well EW2014x18 was repaired and system startup commenced. All process water from the extraction wells was pushed through the system for the first time and discharged into a 21,000-gallon holding tank (Rain for Rent 1 [R4R1]). System samples were collected as part of the startup sampling procedures (see Section 4.3). The system was taken offline immediately following sample collection.
- **March 4, 2011 –** The system was brought back online to maintain compliance with NPDES permit requirements (see Section 4.3). All process water discharge continues to be contained in R4R1.
- **March 9, 2011 –** All three (3) LGAC vessels were backwashed with water from a nearby hydrant. Discharge water from backwash activities was stored in a second 21,000-gallon holding tank (R4R2). Following backwash activities, normal system operation resumed, with all discharge water being stored in R4R1.
- **March 11, 2011 –**Additional samples were collected from the system during normal operation as part of system sampling requirements (see Section 4.3). Began discharging processed effluent water to the storm drain discharge point.

4.5 Compliance

Analytical sample results obtained from both system startup sampling events were recorded and submitted in the *Site ST018 Groundwater Treatment Plant Startup Report* (CH2M HILL, 2011b), which is included in Appendix F. All sample results were within the limits established in the Site ST018 NPDES permit (Appendix E).

CORNERSTONE ENVIRONMENTAL CONTRACTORS

TRAVIS AFB - SITE ST018
Groundwater Treatment Plant Construction

ID	Task Name	Duration	Start	Finish
1	Mobilization, site layout	1 day	Mon 11/1/10	Mon 11/1/10
2	Saw cut pavement, core storm drain tie-in	1 day	Tue 11/2/10	Tue 11/2/10
3	Excavation of vault areas	2 days	Tue 11/2/10	Wed 11/3/10
4	Utility clearance/potholing for boring	1 day	Tue 11/2/10	Tue 11/2/10
5	Horizontal boring and pipe pull	6 days	Wed 11/3/10	Thu 11/11/10
6	Equipment pad layout & over excavation	1 day	Wed 11/3/10	Wed 11/3/10
7	Discharge line tie in	1 day	Wed 11/3/10	Wed 11/3/10
8	Pad construction, base, form rebar & pour	7 days	Thu 11/4/10	Tue 11/16/10
9	Solar panel installation	10 days	Tue 11/9/10	Wed 11/24/10
10	Backfill bore pits	1 day	Thu 11/4/10	Thu 11/4/10
11	Vault installation and well head construction	4 days	Thu 11/18/10	Wed 11/24/10
12	Set, anchor and connect equipment	4 days	Mon 11/22/10	Mon 11/29/10
13	Fence construction	2 days	Mon 11/22/10	Tue 11/23/10
14	Electrical, equipment wiring	4 days	Mon 11/22/10	Mon 11/29/10
15	Power tie-in / power shut down	1 day?	Tue 11/30/10	Tue 11/30/10
16	Start up & testing	1 day	Wed 12/1/10	Wed 12/1/10
17	Demobilization	1 day	Wed 12/1/10	Wed 12/1/10

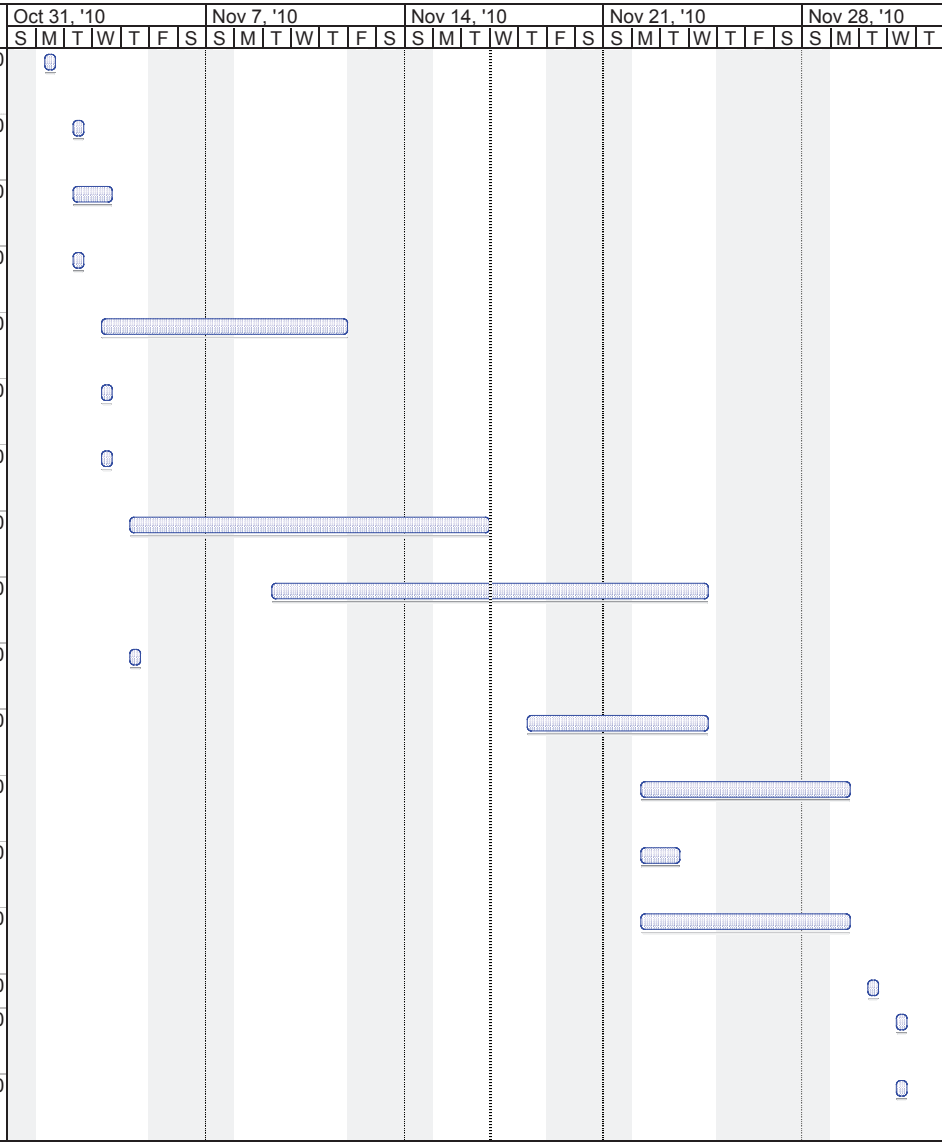

FIGURE 4-1
SITE ST018 CONSTRUCTION SCHEDULE
SITE ST018 BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

ES022211122742SAC Figure_4-1.ai 04.06.2011 tdaus

SECTION 5

Planned Operation

5.1 Standard Operation

Standard operation of the Site ST018 GWTP is expected to be maintained following completion of the startup phase on March 15, 2011. In general, the system is expected to maintain 100 percent uptime, operating 24 hours per day, 7 days per week.

When operating normally, the groundwater flow rates from each extraction well pump are between approximately 2.5 and 3.0 gpm. The total combined flow into the GWTP is approximately 8.0 gpm.

The transfer pump pushes extracted groundwater from the influent tank through the GWTP at a rate of approximately 35 gpm. Because the influent flow rate (into the influent holding tank) is approximately 8.0 gpm, the GWTP transfer pump operates intermittently, or in batch mode. Each batch processes approximately 600 gallons of groundwater from the influent holding tank. At 35 gpm, each batch is processed in approximately 17 minutes. After the transfer pump turns off (drains the influent tank), it remains offline for approximately 75 minutes while the influent holding tank refills with extracted groundwater.

The expected monthly total of groundwater processed by the Site ST018 GWTP is approximately 342,000 gallons, or approximately 11,400 gallons every 24 hours.

A treatment plant's average flow rate over a given period of operation is typically calculated based on the total number of gallons processed and the total minutes of time the system was operating over that same period of time. Because the Site ST018 GWTP is expected to be online 24 hours per day, the expected average flow rate for a 30-day month is approximately 8.0 gpm (same as the influent flow rate). In actuality, the GWTP will operate at a higher flow rate over short periods of time but the calculated average will be a lower overall system flow rate throughout a given time period.

5.2 Compliance Sampling Schedule

Site ST018 GWTP sampling events are typically performed on a monthly basis. The number of analyses, analytical methods, and frequency of sampling are governed by the Site ST018 NPDES permit. Attachment E of the Site ST018 NPDES permit (see Appendix E) presents the Monitoring and Reporting Program (MRP) for the Site ST018 GWTP.

5.3 Reporting

The Site ST018 GWTP reporting requirements are provided in the MRP, which is included as Attachment E of the Site ST018 NPDES permit (see Appendix E).

In general, self monitoring reports (SMRs) are generated on a quarterly basis and submitted to the Water Board electronically via GeoTracker and by regular mail to the address identified in the MRP (Appendix E). These quarterly reports include monthly analytical results from the most recent previous quarter of system operation, system parameters (e.g., flow totals, parameter recordings), and a cover letter signifying the authenticity of the data within. Quarterly SMRs must be submitted no later than 30 days after the last day of the quarter. O&M field logs are completed on a weekly basis and used when generating quarterly SMRs. Appendix G presents a sample O&M field log for the Site ST018 GWTP.

Annual SMRs are also required by the MRP (Appendix E). Annual SMRs will include the fourth quarterly SMR for the year. In addition, annual SMRs must contain a tabular summary of all data obtained during the previous year and a comprehensive discussion of the compliance record and corrective actions taken or planned, which may be needed to bring the system into full compliance. Annual SMRs must be submitted electronically and by regular mail to the address identified in the MRP no later than 30 days after the end of the calendar year.

Occasionally, other reports are necessary for submittal to the Water Board. Such instances include trigger study reports, startup notification reports, startup reports (Appendix F presents the Site ST018 GWTP Startup Report), spill reports, or treatment unit bypass or permit violation reports. Details regarding these reports are presented in the MRP (Appendix E).

Data collected from the Site ST018 GWTP over the course of a given month will be presented at Remedial Program Manager's meetings held at Travis AFB on a monthly basis.

Appendix A
Acronyms and Abbreviations

APPENDIX A

Acronyms and Abbreviations

µg/L	microgram(s) per liter
AFB	Air Force Base
amp	ampere(s)
bgs	below ground surface
BIR	Baseline Implementation Report
CAP	Corrective Action Plan
DCA	dichloroethane
DCE	dichloroethene
DWG	Drawing
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Program
FD	field duplicate
GET	groundwater extraction and treatment
gpm	gallon(s) per minute
GSAP	Groundwater Sampling and Analysis Program
GWTP	groundwater treatment plant
HSA	hollow-stem auger
HDPE	high-density polyethylene
IDW	investigation-derived waste
IRG	interim remediation goal
J	estimated value (data flag)
J+	estimated value, potentially biased high (data flag)
J-	estimated value, potentially biased low (data flag)
LGAC	liquid-phase granular activated carbon
LLNL	Lawrence Livermore National Laboratory
mg/L	milligram(s) per liter

MNA	monitored natural attenuation
MRP	Monitoring and Reporting Program
msl	mean sea level
MTBE	methyl tertiary butyl ether
N	normal
NA	not applicable
NGS	North Gas Station
NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
Parsons	Parsons Engineering Science, Inc.
POCO	Petroleum Only Contaminated
psi	pound(s) per square inch
QA/QC	quality assurance/quality control
R4R1	Rain for Rent 1
R4R2	Rain for Rent 2
RBCA	risk-based corrective action
RD/RA WP	Remedial Design/Remedial Action Work Plan
RI	remedial investigation
SGS	South Gas Station
SMR	self monitoring report
TCE	trichloroethene
TOC	top of casing
TPH-D	total petroleum hydrocarbons as diesel
TPH-G	total petroleum hydrocarbons as gasoline
UST	underground storage tank
VDC	volt(s) direct current
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region

Appendix B
References

APPENDIX B

References

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Appendix C
Pre-design Investigation Field Data

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2014x18/EW2014x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 33.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 67.18 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860753.01	**EASTING (CCS NAD83 Z2):** 6578510.52	**DATE STARTED:** 9/24/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION (USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.)	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
0					0	0	100	**LEAN CLAY (CL)**, black (10YR 2/1), moist, soft, moderate cementation, no odor, green staining, medium plasticity, no dilatancy.			09/24/2009: 2-inches of asphalt, no base. Boring location hand augered to 5 feet.
1											
2											
3											
4											
5		100	CC-1		0	0	100	**LEAN CLAY (CL)**, very dark grayish brown (10YR 3/2), moist, soft, moderate cementation, no odor, green staining, medium plasticity, no dilatancy.			
6											
7											
8		100	CC-2							0.5	
9					0	20	80	**LEAN CLAY WITH SAND (CL)**, brown (10YR 4/3), moist, soft, moderate cementation, no odor, green staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded, subrounded.			
10											
11											
12					0	70	30	**SILTY SAND (SM)**, dark gray (10YR 4/1), loose, wet, weak cementation, slight odor, gray staining, fine sand, poorly graded, subangular. Fines are non plastic, rapid dilatancy.			09/24/2009: Groundwater encountered at 12 feet.
13		100	CC-3		0	20	80	**LEAN CLAY WITH SAND (CL)**, dark grayish brown (10YR 4/2), soft, moderate cementation, slight odor, gray staining, medium plasticity, no dilatancy. Sand is fine, poorly graded, subrounded.		2.9	
14					0	100	0	**POORLY GRADED SAND (SP)**, very dark gray (10YR 3/1), loose, wet, weak cementation, strong gasoline odor, gray staining, medium sand, poorly graded, subrounded.			
15					0	75	25				

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2014x18/EW2014x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 33.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 67.18 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860753.01	**EASTING (CCS NAD83 Z2):** 6578510.52	**DATE STARTED:** 9/24/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION (USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.)	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
16								**SILTY SAND (SM)**, very dark gray (10YR 3/1), loose, wet, moderate cementation, strong odor, gray staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.			
17					0	75	25	**SILTY SAND (SM)**, strong brown (7.5YR 4/6), loose, wet, moderate cementation, slight odor, gray staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.			
18		46									
19			CC-4							16.9	09/24/2009 1510: Groundwater sample HP2014x18A collected at a maximum depth of 18 feet.
20											
21											
22					0	100	0	**POORLY GRADED SAND (SP)**, strong brown (7.5YR 4/6), loose, wet, moderate cementation, medium sand, poorly graded, subrounded.			
23											
24		34	CC-5							2.7	09/24/2009: No recovery from 23 to 26 feet.
25											
26											
27											
28		100								4	
29			CC-6								
30											

SHEET 3 of 3	PROJECT NUMBER: 381355.01.07.18.07	BORING NUMBER: *HP2014x18/EW2014x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 33.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 67.18 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860753.01	**EASTING (CCS NAD83 Z2):** 6578510.52	**DATE STARTED:** 9/24/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
31								**SILTSTONE BEDROCK**, dark gray (10YR 4/1), strongly cemented, fine grained, bedding.			09/24/2009 1615: Groundwater sample HP2014x18B collected at 28 to 31 feet. 09/24/2009: Hard drilling at 30 feet.
32											
33								*Boring Terminated at 33 feet bgs*			09/24/2009: Boring terminated at 33 feet with direct push, redrilled with hollow stem auger to a total depth of 31.3 feet, and completed with a 6-inch extraction well.

CH2MHILL

SHEET 1 of 2

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2015x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 27.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 63.69 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860559.58	**EASTING (CCS NAD83 Z2):** 6578697.57	**DATE STARTED:** 9/23/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION (USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.)	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
1											09/23/2009 1500: Started drilling.
2											
3											
4		100	CC-1		0	0	100	**LEAN CLAY (CL)**, dark brown (10YR 3/3), moist, soft, moderate cementation, no odor, no staining, medium plasticity, no dilatancy.			
5											
6											
7											
8											
9		100	CC-2							0.8	
10					0	70	30	**SILTY SAND (SM)**, strong brown (7.5YR 5/6), loose, wet, moderate cementation, slight odor, no staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.			09/23/2009: Although wet, water was not collecting in the borehole.
11											
12											
13		100	CC-3		0	70	30	**SILTY SAND (SM)**, strong brown (7.5YR 5/6), loose, wet, moderate cementation, no odor, no staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.		6.8	
14											
15					0	40	60	**SANDY LEAN CLAY (CL)**, light yellowish brown (10YR 6/4), soft, wet, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded, subrounded.			
16											
17											
18					0	85	15	**SILTY SAND (SM)**, strong brown (7.5YR 5/6), loose, saturated, weak cementation, no odor, no staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.			
19		100	CC-4		0	60	40	**SILTY SAND (SM)**, strong brown (7.5YR 5/6), loose, saturated, weak cementation, no odor, no staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.		0.2	09/23/2009 1620: Groundwater sample HP2015x18A collected at a maximum depth of 18 feet. 09/23/2009 1630: Drilling stopped. 09/24/2009 0755: Resumed drilling.
20											

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
381355.01.07.18.07	*HP2015x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 27.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 63.69 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860559.58	**EASTING (CCS NAD83 Z2):** 6578697.57	**DATE STARTED:** 9/23/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
21											
22					0	100	0	**POORLY GRADED SAND (SP)**, strong brown (7.5YR 5/6), loose, wet, weak cementation, no odor, no staining, medium grained sand, poorly graded, subrounded.			
23					0	85	15	**SILTY SAND (SM)**, dark yellowish brown (10YR 4/4), loose, wet, weak cementation, no odor, no staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.			
24		83	CC-5							1.5	
25											
26								**SILTSTONE BEDROCK**, dark yellowish brown (10YR 4/4), strongly cemented, fine grained, laminated bedding.			09/24/2009 0805: Hard drilling at 25.5 feet.
27								*Boring Terminated at 27 feet bgs*			09/24/2009 0810: Boring terminated at 27 feet and grouted to ground surface.

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2016x18/EW2016x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 37.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 63.20 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860440.11	**EASTING (CCS NAD83 Z2):** 6578837.97	**DATE STARTED:** 9/24/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION (USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.)	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
0					0	30	70	**SANDY LEAN CLAY (CL)**, reddish yellow (7.5YR 6/8), moist, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded, subrounded.			09/24/2009: Surface is grass and soil. Boring location hand augered to 5 feet.
1											
2											
3											
4		100	CC-1		0	0	100	**LEAN CLAY (CL)**, dark yellowish brown (10YR 3/4), moist, soft, moderate cementation, no odor, no staining, medium plasticity, no dilatancy.			
5											
6					0	0	100	**LEAN CLAY (CL)**, dark yellowish brown (10YR 3/4), moist, soft, moderate cementation, no odor, no staining, medium plasticity, no dilatancy.			09/24/2009 0945: Started drilling.
7											
8											
9		80	CC-2		0	5	95	**LEAN CLAY (CL)**, dark yellowish brown (10YR 3/4), moist, soft, moderate cementation, no odor, no staining, medium plasticity, no dilatancy. Sand is fine, poorly graded, subrounded.		1.3	
10											
11											
12											
13											
14		100	CC-3		0	30	70	**SANDY LEAN CLAY (CL)**, dark yellowish brown (10YR 4/4), wet, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded, subrounded.		0.5	09/24/2009: Groundwater encountered at 13 feet.
15											

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2016x18/EW2016x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 37.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 63.20 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860440.11	**EASTING (CCS NAD83 Z2):** 6578837.97	**DATE STARTED:** 9/24/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
16											
					0	65	35	**CLAYEY SAND (SC)**, dark yellowish brown (10YR 4/4), loose, wet, weak cementation, no odor, no staining, fine to coarse sand, well graded, subrounded. Fines have medium plasticity, slow dilatancy.			
17					0	30	70	**SANDY LEAN CLAY (CL)**, dark yellowish brown (10YR 4/4), wet, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded, subrounded.			
18											
		100			0	85	15	**SILTY SAND (SM)**, dark yellowish brown (10YR 4/4), loose, wet, weak cementation, no odor, no staining, fine to coarse sand, well graded, subrounded. Fines are non plastic, rapid dilatancy.		1.6	
19			CC-4								
20											
21											
22											
23											
		100			10	75	15	**CLAYEY SAND (SC)**, dark yellowish brown (10YR 4/4), loose, saturated, weak cementation, no odor, no staining, fine to coarse sand, well graded. Fines have medium plasticity, slow dilatancy. Gravel is fine, poorly graded, subangular to subrounded.		2.4	
24			CC-5								09/24/2009: Subrounded to subangular gravel consisting of weathered siltstone observed at 23 to 25 feet.
25											09/24/2009 1115: Drilling is paused at 25 feet to allow groundwater to collect in boring.
		100			40	10	50	**GRAVELLY LEAN CLAY (CL)**, dark yellowish brown (10YR 4/4), wet, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Gravel is fine, poorly graded, subangular to subrounded. Sand is fine to coarse, well graded.		0.1	
26			CC-6					**SILTSTONE BEDROCK**, light brownish gray (10YR 6/2), strongly cemented, no odor, no staining, fine grained, laminated bedding.			09/24/2009 1345: Groundwater sample HP2016x18A and field duplicate HP2016x18AD collected at 25 feet.
27											
28								No recovery from 28 to 37 feet.			09/24/2009 1400: Boring terminated at 28 feet with direct push, redrilled with hollow stem auger to a total depth of 37 feet, and completed with a 6-inch extraction well.
29											
30											

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2016x18/EW2016x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 37.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 63.20 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860440.11	**EASTING (CCS NAD83 Z2):** 6578837.97	**DATE STARTED:** 9/24/2009	**DATE COMPLETED:** 9/24/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
31											
32											
33											
34											
35											
36											
37								*Boring Terminated at 37 feet bgs*			

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2019x18/EW2019x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 35.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 61.97 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1859918.82	**EASTING (CCS NAD83 Z2):** 6579032.33	**DATE STARTED:** 11/3/2009	**DATE COMPLETED:** 11/3/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Hollow-stem Auger		**DRILLING EQUIPMENT:** CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** C. Holland	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
1											11/3/2009 1345: Hand augered boring location to 5 feet.
2					15	15	70	**SANDY ELASTIC SILT WITH GRAVEL (CL)**, very dark brown (10YR 2/2), damp, soft, uncemented, no odor, no staining, low plasticity, slow dilatancy. Sand is fine, poorly graded. Gravel is fine.			
3											
4			CC-1		0	10	90	**LEAN CLAY (CL)**, black (10YR 2/1), damp, very soft, weak cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine grained.	0	0	
5											
6											11/3/2009 1427: Started drilling.
7					0	15	85	**LEAN CLAY WITH SAND (CL)**,dark yellowish brown (10YR 3/6), dry, soft, weak cementation, no odor, green staining, medium plasticity, slow dilatancy.			
8											
9								No recovery.	0	3.3	
10			CC-2								
11											11/3/2009: No core recovery from 8.5 to 11 feet.
12					0	60	40	**SILTY SAND (SM)**, dark yellowish brown (10YR 4/6), medium dense, moist, uncemented, no odor, no staining, fine to coarse sand, well graded.			
13											
14					0	90	10	**WELL GRADED SAND WITH CLAY(SW-SC)**, yellowish brown (10YR 5/4), loose, saturated, uncemented, fine to coarse sand, well graded, subangular.	0	2.8	11/3/2009 1444: Groundwater encountered at 13.5 feet. Groundwater sample HP2019x18 collected at 13.5 feet.
15			CC-3								

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2019x18/EW2019x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 35.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 61.97 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1859918.82	**EASTING (CCS NAD83 Z2):** 6579032.33	**DATE STARTED:** 11/3/2009	**DATE COMPLETED:** 11/3/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Hollow-stem Auger		**DRILLING EQUIPMENT:** CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** C. Holland	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
16					0	40	60	**SANDY LEAN CLAY (CL)**, yellowish brown (10YR 5/6), moist to wet, very soft, weak cementation, no odor, iron oxide staining, medium plasticity, slow dilatancy.			
17											
18											
19			CC-4		0	100	0	**WELL GRADED SAND (SW)**, brown (10YR 4/3), loose, wet, uncemented, fine to coarse sand, well graded, subangular.	0	5.1	
20											
21											
22											
23					0	95	5	**POORLY GRADED SAND (SP)**, dark yellowish brown (10YR 4/4), loose, wet, uncemented, medium grained sand, poorly graded, subangular.			
24			CC-5		0	100	0	**WELL GRADED SAND (SW)**, brown (10YR 4/3), very loose, saturated, uncemented, fine to coarse sand, well graded, subangular.	0	6.3	
25											
26											
27											
28											
29			CC-6					**SILTSTONE BEDROCK**, dark gray (10YR 4/1), strongly cemented, hard, bedding.	0	2.2	11/3/2009: Hard drilling at 28.5 feet.
30											

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2019x18/EW2019x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 35.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 61.97 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1859918.82	**EASTING (CCS NAD83 Z2):** 6579032.33	**DATE STARTED:** 11/3/2009	**DATE COMPLETED:** 11/3/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Hollow-stem Auger		**DRILLING EQUIPMENT:** CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** C. Holland	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
31											11/3/2009: No core recovery from 28.5 to 35 feet, but likely siltstone bedrock.
32											
33											
34											
35								*Boring Terminated at 35 feet bgs*			11/3/2009 1536: Boring terminated at 35 feet and completed with a 6-inch extraction well.

USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.

SHEET 1 of 3	PROJECT NUMBER: 381355.01.07.18.07	BORING NUMBER: *HP2021x18/MW2021x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 30.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 61.46 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1859810.30	**EASTING (CCS NAD83 Z2):** 6578938.83	**DATE STARTED:** 12/15/2009	**DATE COMPLETED:** 12/15/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Hollow-stem Auger		**DRILLING EQUIPMENT:** CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** C. Holland	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION (USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.)	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								CONCRETE SIDEWALK SURFACE ,			
								FILL SAND MATERIAL ,		1.2	
1			CC-1		10	0	90	**LEAN CLAY (CL)**, dark yellowish brown (10YR 3/4), moist, soft, weak cementation, no odor, no staining, medium plasticity, slow dilatancy. Gravel is part of fill material.			12/15/2009: 6-inch concrete sidewalk surface.
2											
3											
4					0	0	100	**SILT (ML)**, dark brown (10YR 3/3), damp, soft, weak cementation, no odor, iron oxide staining, low plasticity, rapid dilatancy.			
5											
										1.4	12/15/2009 0900: Hand augered to 5 feet and started drilling.
6			CC-2								
7					0	0	100	**LEAN CLAY (CL)**, yellowish brown (10YR 5/8), damp, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy.			
8											
9											
10					0	0	100	**LEAN CLAY (CL)**, yellowish brown (10YR 5/8), damp, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy.			
										3.6	
11			CC-3								
12											
13											
14					0	0	100	**LEAN CLAY (CL)**, yellowish brown (10YR 5/8), moist to wet, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy.			12/15/2009: Groundwater encountered at 14 feet.
15											

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2021x18/MW2021x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 30.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 61.46 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1859810.30	**EASTING (CCS NAD83 Z2):** 6578938.83	**DATE STARTED:** 12/15/2009	**DATE COMPLETED:** 12/15/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Hollow-stem Auger		**DRILLING EQUIPMENT:** CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** C. Holland	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
16			CC-4							3.3	
17					0	10	90	**LEAN CLAY (CL)**, yellowish brown (10YR 5/8), wet, very soft, no odor, iron oxide staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded.			
18											
19											
20					0	10	90	**LEAN CLAY (CL)**, yellowish brown (10YR 5/8), wet, very soft, no odor, iron oxide staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded.			
21			CC-5							5.1	
22											
23					0	55	45	**CLAYEY SAND (SC)**, dark yellowish brown (10YR 4/6), medium dense, wet, weak cementation, no odor, no staining, fine sand, poorly graded. Fines have medium plasticity.			
24								No recovery.			
25											
26			CC-6							4.7	12/15/2009 1012: Collected groundwater grab sample SB-3 GRAB SAMPLE at 25 feet.
27					0	55	45	**CLAYEY SAND (SC)**, dark yellowish brown (10YR 4/6), medium dense, wet, weak cementation, no odor, no staining, fine sand, poorly graded. Fines have medium plasticity.			
28								**SILTSTONE BEDROCK**, dark gray (10YR 4/1), very strongly cemented, hard, bedding.			12/15/2009: Hard drilling at 28 feet.
29											
30											

SHEET 3 of 3	PROJECT NUMBER: 381355.01.07.18.07	BORING NUMBER: *HP2021x18/MW2021x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 30.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 61.46 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1859810.30	**EASTING (CCS NAD83 Z2):** 6578938.83	**DATE STARTED:** 12/15/2009	**DATE COMPLETED:** 12/15/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Hollow-stem Auger		**DRILLING EQUIPMENT:** CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** C. Holland	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Boring Terminated at 30 feet bgs			12/15/2009 1100: Boring terminated at 30 feet and completed with a 2-inch monitoring well.

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2044x18/MW2044x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 28.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 62.33 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860061.15	**EASTING (CCS NAD83 Z2):** 6579050.54	**DATE STARTED:** 9/23/2009	**DATE COMPLETED:** 9/23/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION (USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.)	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
0											
1					0	20	80	**LEAN CLAY WITH SAND (CL)**, yellowish brown (10YR 5/6), moist, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine, poorly graded, subrounded.			9/23/2009 1030: Asphalt surface with 3-inch base. Boring location hand-augered to 5 feet.
2											
3		72	CC-1		0	0	100	**LEAN CLAY (CL)**, dark brown (10YR 3/3), damp, soft, moderate cementation, no odor, no staining, medium plasticity, no dilatancy.			
4											
5											9/23/2009 1100: Started drilling.
6											
7											
8		100	CC-2							1.5	
9											
10											
11											
12											
13		100	CC-3		0	95	5	**POORLY GRADED SAND (SP)**, dark yellowish brown (10YR 4/6), very loose, wet, weak cementation, no odor, no staining, medium grained sand, subrounded.		1.1	9/23/2009 1125: Groundwater encountered at 13 feet.
14											9/23/2009 1135: Groundwater grab sample HP2044x18A collected at 13 to 15 feet.
15											

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2044x18/MW2044x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 28.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 62.33 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860061.15	**EASTING (CCS NAD83 Z2):** 6579050.54	**DATE STARTED:** 9/23/2009	**DATE COMPLETED:** 9/23/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
16											
17											
18											
19		100	CC-4		0	40	60	**SANDY LEAN CLAY (CL)**, dark yellowish brown (10YR 4/6), wet, soft, moderate cementation, no odor, no staining, medium plasticity, slow dilatancy. Sand is fine to coarse, well graded, subrounded.		1.7	9/23/2009: Hard drilling at 19 feet.
20											
21											
22								**SILTSTONE BEDROCK**, dark yellowish brown (10YR 4/6), strongly cemented, hard, laminated.			
23		100	CC-5							0.6	
24											
25											
26											
27											
28											09/23/2009 1305: Boring terminated at 28 feet with direct push, redrilled with hollow stem auger to a total depth of 20.5 feet, and completed with a 2-inch monitoring well.

PROJECT NUMBER: 381355.01.07.18.07

BORING NUMBER: *HP2044x18/MW2044x18*

SOIL BORING LOG

PROJECT NAME: ST018 Remedy Implementation		**HOLE DEPTH (ft):** 28.00	**DRILLING CONTRACTOR:** WDC Exploration and Wells, Inc.	
SURFACE ELEVATION: 62.33 ft. MSL	**NORTHING (CCS NAD83 Z2):** 1860061.15	**EASTING (CCS NAD83 Z2):** 6579050.54	**DATE STARTED:** 9/23/2009	**DATE COMPLETED:** 9/23/2009
WATER LEVEL: --- ft. bgs	**DRILLING METHOD:** Direct push		**DRILLING EQUIPMENT:** Geoprobe 8040DT/CME 75	
LOCATION: Travis AFB - ST018			**LOGGED BY:** T. Chakurian	

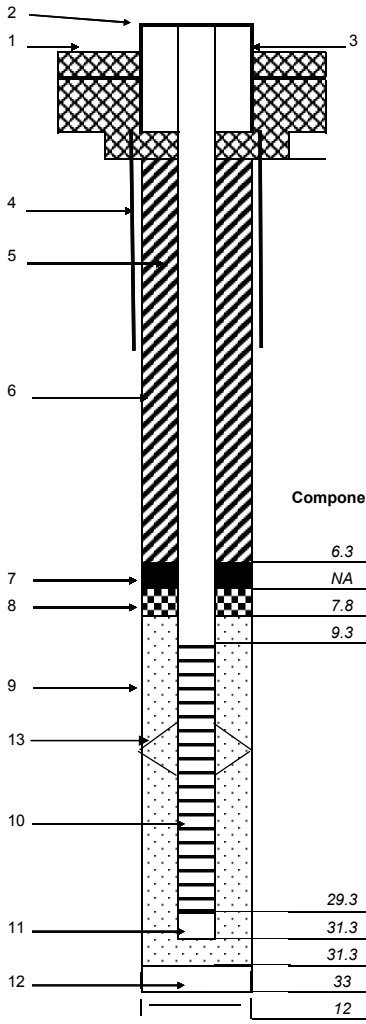
DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	SAMPLE #	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Boring Terminated at 28 feet bgs			

CH2MHILL

PROJECT NUMBER	WELL NUMBER
381355.01.07.18.07	EW2014X18

WELL COMPLETION DIAGRAM

PROJECT NAME :	Site ST018 Remedy Implementation			LOCATION NAME:	Travis AFB - Site ST018
NORTHING:	1860753.013	EASTING:	6578510.516	DRILLING CONTRACTOR:	WDC Exploration and Wells, Inc.
START DATE:	11/3/2009	END DATE:	11/4/2009	DRILLING METHOD:	Hollow-stem auger
BOREHOLE DIAMETER:	12 inches			DRILLING EQUIPMENT:	CME 75
TOTAL BOREHOLE DEPTH:	33 feet bgs			LOGGED BY:	C. Holland



Component Depths BGS

6.3	Top of transition seal (feet bgs)
NA	Top of transition sand (feet bgs)
7.8	Top of filter pack (feet bgs)
9.3	Top of screen (feet bgs)
29.3	Bottom of screen (feet bgs)
31.3	Bottom of sump (feet bgs)
31.3	Bottom of filter pack (feet bgs)
33	Bottom of borehole (feet bgs)
12	Borehole Diameter (inches)

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well	67.18	feet msl
2- Top of casing elevation	66.75	feet msl
3- Surface completion type	Flush mount	
a) Diameter	12	inches
b) Concrete pad dimensions	24	inches
c) Bollards	None	
4- Conductor casing type	None	
a) Diameter		inches
b) Length		feet
5- Well casing type	Schedule 40 PVC	
a) Diameter	6	inches
b) Length	10	feet
6- Sanitary seal type	5% Bentonite cement grout	
a) Method of placement	Free fall	
b) Volume used	17	gallons
c) Calculated volume	2.2 feet^3 16.6	gallons
7- Transition seal type	Medium bentonite chips	
a) Quantity used	1.8	50 lb bags
b) Calculated quantity	0.9 feet^3 1.2	50 lb bags
8- Transition filter pack type	NA	
a) Quantity used		50 lb bags
b) Calculated quantity	feet^3	50 lb bags
9- Filter pack type	#3 Sand	
a) Quantity used	11.7	100 lb bags
b) Calculated quantity	12.7 feet^3 11	100 lb bags
10- Screen type / slot size	Stainless steel wire wrap	
a) Diameter	6	inches
b) Length	20	feet
c) Slot size	0.02	inches
11- Sump / end cap type	Stainless steel	
a) Diameter	6	inches
b) Length	2	feet
12- Backfill type	Formation collapse	
a) Quantity used		
b) Calculated quantity		
13- Centralizer type	None	
a) Depths		feet bgs

Well Development

Start Date/Time:	11/05/2009	14:20
End Date/Time:	11/05/2009	15:05
Measured Depth to Water	NR	feet bgs
Development Method:	Bail, swab, and pump	
Duration:	0.75	hours
Purgevolume:	140	gallons
Volume of water injected:	None	gallons
Calculated well volume:	NR	gallons

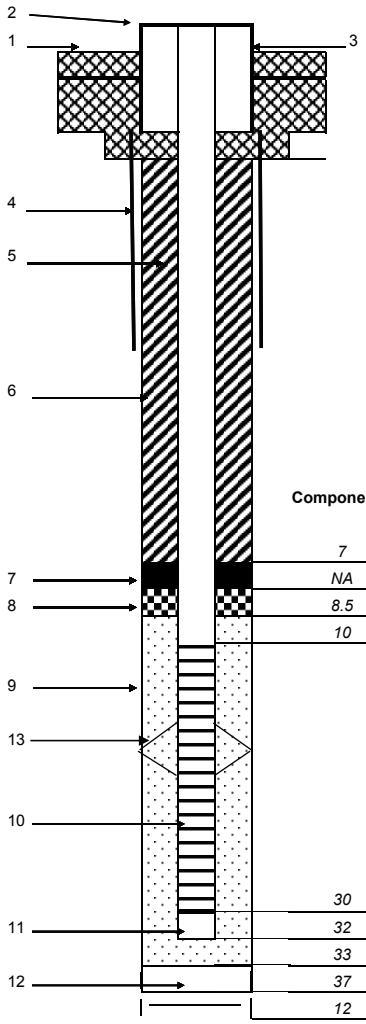
Comments: Bgs = Below ground surface. Lb = pound. Msl = Mean sea level. NA = Not applicable. NR = Not recorded. PVC = Polyvinyl chloride.

CH2MHILL

PROJECT NUMBER	WELL NUMBER
381355.01.07.18.07	EW2016X18

WELL COMPLETION DIAGRAM

PROJECT NAME :	Site ST018 Remedy Implementation			LOCATION NAME:	Travis AFB - Site ST018
NORTHING:	1860440.114	EASTING:	6578837.965	DRILLING CONTRACTOR:	WDC Exploration and Wells, Inc.
START DATE:	11/4/2009	END DATE:	11/5/2009	DRILLING METHOD:	Hollow-stem auger
BOREHOLE DIAMETER:	12 inches			DRILLING EQUIPMENT:	CME 75
TOTAL BOREHOLE DEPTH:	37 feet bgs			LOGGED BY:	C. Holland



Component Depths BGS

7	Top of transition seal (feet bgs)
NA	Top of transition sand (feet bgs)
8.5	Top of filter pack (feet bgs)
10	Top of screen (feet bgs)
30	Bottom of screen (feet bgs)
32	Bottom of sump (feet bgs)
33	Bottom of filter pack (feet bgs)
37	Bottom of borehole (feet bgs)
12	Borehole Diameter (inches)

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well	63.20	feet msl
2- Top of casing elevation	62.69	feet msl
3- Surface completion type	Flush mount	
a) Diameter	12	inches
b) Concrete pad dimensions	24	inches
c) Bollards	None	
4- Conductor casing type	None	
a) Diameter		inches
b) Length		feet
5- Well casing type	Schedule 40 PVC	
a) Diameter	6	inches
b) Length	10	feet
6- Sanitary seal type	5% Bentonite cement grout	
a) Method of placement	Free fall	
b) Volume used	17	gallons
c) Calculated volume	2.2 feet^3 16.6	gallons
7- Transition seal type	Medium bentonite chips	
a) Quantity used	1.5	50 lb bags
b) Calculated quantity	0.9 feet^3 1.2	50 lb bags
8- Transition filter pack type	NA	
a) Quantity used		50 lb bags
b) Calculated quantity	feet^3	50 lb bags
9- Filter pack type	#3 Sand	
a) Quantity used	13.7	100 lb bags
b) Calculated quantity	12.7 feet^3 11	100 lb bags
10- Screen type / slot size	Stainless steel wire wrap	
a) Diameter	6	inches
b) Length	20	feet
c) Slot size	0.02	inches
11- Sump / end cap type	Stainless steel	
a) Diameter	6	inches
b) Length	2	feet
12- Backfill type	Formation collapse	
a) Quantity used		
b) Calculated quantity		
13- Centralizer type	None	
a) Depths		feet bgs

Well Development

Start Date/Time:	11/06/2009	14:20
End Date/Time:	11/06/2009	16:10
Measured Depth to Water	10.78	feet bgs
Development Method:	Bail, swab, and pump	
Duration:	1.8	hours
Purgevolume:	387	gallons
Volume of water injected:	None	gallons
Calculated well volume:	58	gallons

Comments: Bgs = Below ground surface. Lb = pound. Msl = Mean sea level. NA = Not applicable. PVC = Polyvinyl chloride.

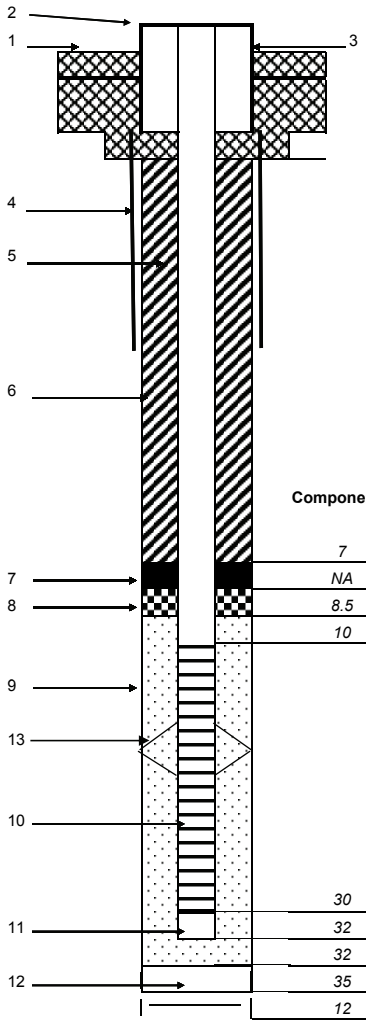
Boring drilled with 8-inch augers to 37 feet and reamed with 12-inch augers to 33 feet.

CH2MHILL

PROJECT NUMBER	WELL NUMBER
381355.01.07.18.07	EW2019X18

WELL COMPLETION DIAGRAM

PROJECT NAME :	Site ST018 Remedy Implementation			LOCATION NAME:	Travis AFB - Site ST018
NORTHING:	1859918.822	EASTING:	6579032.333	DRILLING CONTRACTOR:	WDC Exploration and Wells, Inc.
START DATE:	12/18/2009	END DATE:	12/18/2009	DRILLING METHOD:	Hollow-stem auger
BOREHOLE DIAMETER:	12 inches			DRILLING EQUIPMENT:	CME 75
TOTAL BOREHOLE DEPTH:	35 feet bgs			LOGGED BY:	P. Governor



Component Depths BGS

7	Top of transition seal (feet bgs)
NA	Top of transition sand (feet bgs)
8.5	Top of filter pack (feet bgs)
10	Top of screen (feet bgs)
30	Bottom of screen (feet bgs)
32	Bottom of sump (feet bgs)
32	Bottom of filter pack (feet bgs)
35	Bottom of borehole (feet bgs)
12	Borehole Diameter (inches)

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well	61.97	feet msl
2- Top of casing elevation	61.08	feet msl
3- Surface completion type	Flush mount	
a) Diameter	12	inches
b) Concrete pad dimensions	24	inches
c) Bollards	None	
4- Conductor casing type	None	
a) Diameter		inches
b) Length		feet
5- Well casing type	Schedule 40 PVC	
a) Diameter	6	inches
b) Length	10	feet
6- Sanitary seal type	5% Bentonite cement grout	
a) Method of placement	Free fall	
b) Volume used	18	gallons
c) Calculated volume	2.2 feet^3 16.6	gallons
7- Transition seal type	Medium bentonite chips	
a) Quantity used	2	50 lb bags
b) Calculated quantity	0.9 feet^3 1.2	50 lb bags
8- Transition filter pack type	NA	
a) Quantity used		50 lb bags
b) Calculated quantity	feet^3	50 lb bags
9- Filter pack type	#3 Sand	
a) Quantity used	15	100 lb bags
b) Calculated quantity	12.7 feet^3 11	100 lb bags
10- Screen type / slot size	Stainless steel wire wrap	
a) Diameter	6	inches
b) Length	20	feet
c) Slot size	0.02	inches
11- Sump / end cap type	Stainless steel	
a) Diameter	6	inches
b) Length	2	feet
12- Backfill type	Formation collapse	
a) Quantity used		
b) Calculated quantity		
13- Centralizer type	None	
a) Depths		feet bgs

Well Development

Start Date/Time:	12/22/2009	13:10
End Date/Time:	12/22/2009	11:20
Measured Depth to Water	10.55	feet bgs
Development Method:	Bail, swab, and pump	
Duration:	1.8	hours
Purgevolume:	475	gallons
Volume of water injected:	None	gallons
Calculated well volume:	58	gallons

Comments: Bgs = Below ground surface. Lb = pound. Msl = Mean sea level. NA = Not applicable. PVC = Polyvinyl chloride.

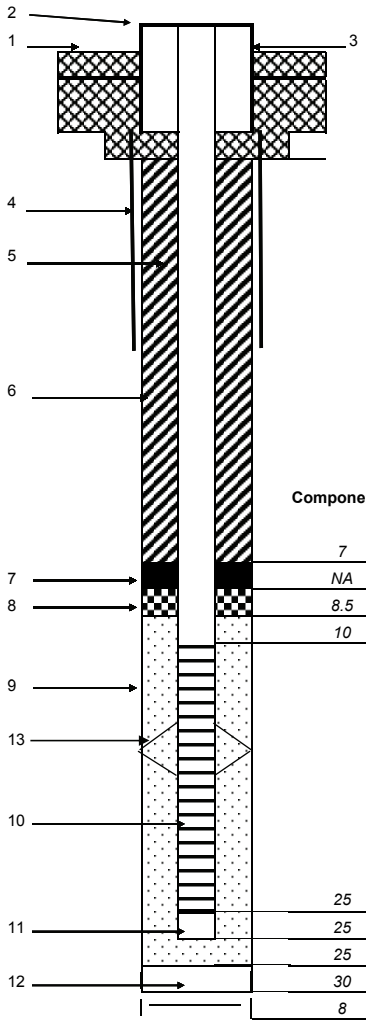
Boring drilled with 8-inch augers to 35 feet and reamed with 12-inch augers to 32 feet.

CH2MHILL

PROJECT NUMBER	WELL NUMBER
381355.01.07.18.07	MW2021X18

WELL COMPLETION DIAGRAM

PROJECT NAME :	Site ST018 Remedy Implementation			LOCATION NAME:	Travis AFB - Site ST018
NORTHING:	1859810.300	EASTING:	6578938.832	DRILLING CONTRACTOR:	WDC Exploration and Wells, Inc.
START DATE:	12/18/2009	END DATE:	12/18/2009	DRILLING METHOD:	Hollow-stem auger
BOREHOLE DIAMETER:	8 inches			DRILLING EQUIPMENT:	CME 75
TOTAL BOREHOLE DEPTH:	30 feet bgs			LOGGED BY:	P. Governor



Component Depths BGS

7	Top of transition seal (feet bgs)
NA	Top of transition sand (feet bgs)
8.5	Top of filter pack (feet bgs)
10	Top of screen (feet bgs)
25	Bottom of screen (feet bgs)
25	Bottom of sump (feet bgs)
25	Bottom of filter pack (feet bgs)
30	Bottom of borehole (feet bgs)
8	Borehole Diameter (inches)

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well	61.46	feet msl
2- Top of casing elevation	61.01	feet msl
3- Surface completion type	Flush mount	
a) Diameter	8	inches
b) Concrete pad dimensions	12	inches
c) Bollards	None	
4- Conductor casing type	None	
a) Diameter		inches
b) Length		feet
5- Well casing type	Schedule 40 PVC	
a) Diameter	2	inches
b) Length	10	feet
6- Sanitary seal type	5% Bentonite cement grout	
a) Method of placement	Free fall	
b) Volume used	13	gallons
c) Calculated volume	1.6 feet^3 12.2	gallons
7- Transition seal type	Medium bentonite chips	
a) Quantity used	1	50 lb bags
b) Calculated quantity	0.5 feet^3 0.7	50 lb bags
8- Transition filter pack type	NA	
a) Quantity used		50 lb bags
b) Calculated quantity	feet^3	50 lb bags
9- Filter pack type	#3 Sand	
a) Quantity used	6	100 lb bags
b) Calculated quantity	5.4 feet^3 4.7	100 lb bags
10- Screen type / slot size	Schedule 40 PVC	
a) Diameter	2	inches
b) Length	15	feet
c) Slot size	0.02	inches
11- Sump / end cap type	Schedule 40 PVC	
a) Diameter	2	inches
b) Length	NA	feet
12- Backfill type	Formation collapse	
a) Quantity used		
b) Calculated quantity		
13- Centralizer type	None	
a) Depths		feet bgs

Well Development

Start Date/Time:	12/22/2009	08:53
End Date/Time:	12/22/2009	12:00
Measured Depth to Water	10.79	feet bgs
Development Method:	Bail, swab, and pump	
Duration:	3.1	hours
Purgevolume:	159	gallons
Volume of water injected:	None	gallons
Calculated well volume:	12	gallons

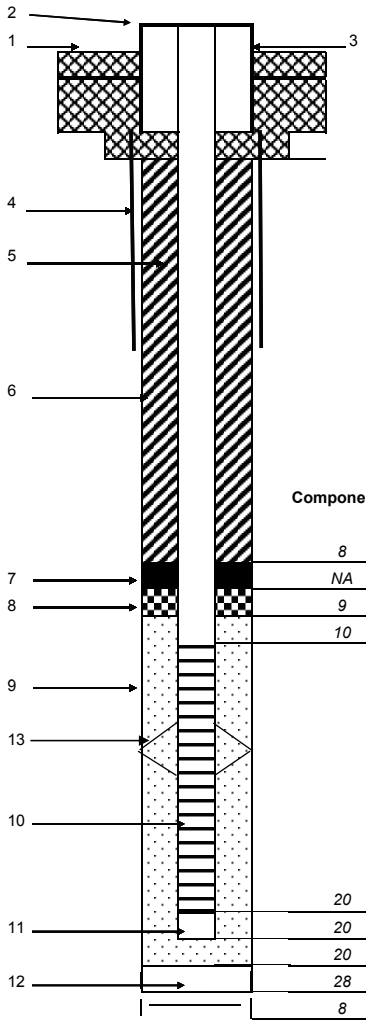
Comments: Bgs = Below ground surface. Lb = pound. Msl = Mean sea level. NA = Not applicable. PVC = Polyvinyl chloride.

CH2MHILL

PROJECT NUMBER	WELL NUMBER
381355.01.07.18.07	MW2044X18

WELL COMPLETION DIAGRAM

PROJECT NAME :	Site ST018 Remedy Implementation			LOCATION NAME:	Travis AFB - Site ST018
NORTHING:	1860061.148	EASTING:	6579050.536	DRILLING CONTRACTOR:	WDC Exploration and Wells, Inc.
START DATE:	11/10/2009	END DATE:	11/10/2009	DRILLING METHOD:	Hollow-stem auger
BOREHOLE DIAMETER:	8 inches			DRILLING EQUIPMENT:	CME 75
TOTAL BOREHOLE DEPTH:	28 feet bgs			LOGGED BY:	C. Holland



Component Depths BGS

8	Top of transition seal (feet bgs)
NA	Top of transition sand (feet bgs)
9	Top of filter pack (feet bgs)
10	Top of screen (feet bgs)
20	Bottom of screen (feet bgs)
20	Bottom of sump (feet bgs)
20	Bottom of filter pack (feet bgs)
28	Bottom of borehole (feet bgs)
8	Borehole Diameter (inches)

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well	62.33	feet msl
2- Top of casing elevation	61.81	feet msl
3- Surface completion type	Flush mount	
a) Diameter	8	inches
b) Concrete pad dimensions	12	inches
c) Bollards	None	
4- Conductor casing type	None	
a) Diameter		inches
b) Length		feet
5- Well casing type	Schedule 40 PVC	
a) Diameter	2	inches
b) Length	10	feet
6- Sanitary seal type	5% Bentonite cement grout	
a) Method of placement	Free fall	
b) Volume used	16	gallons
c) Calculated volume	2 feet^3 15	gallons
7- Transition seal type	Medium bentonite chips	
a) Quantity used	0.5	50 lb bags
b) Calculated quantity	0.3 feet^3 0.4	50 lb bags
8- Transition filter pack type	NA	
a) Quantity used		50 lb bags
b) Calculated quantity	feet^3	50 lb bags
9- Filter pack type	#3 Sand	
a) Quantity used	3.5	100 lb bags
b) Calculated quantity	3.6 feet^3 3.1	100 lb bags
10- Screen type / slot size	Schedule 40 PVC	
a) Diameter	2	inches
b) Length	10	feet
c) Slot size	0.02	inches
11- Sump / end cap type	Schedule 40 PVC	
a) Diameter	2	inches
b) Length	NA	feet
12- Backfill type	Formation collapse	
a) Quantity used		
b) Calculated quantity		
13- Centralizer type	None	
a) Depths		feet bgs

Well Development

Start Date/Time:	11/12/2009	09:36
End Date/Time:	11/12/2009	13:00
Measured Depth to Water	11.47	feet bgs
Development Method:	Bail, swab, and pump	
Duration:	3.4	hours
Purgevolume:	150	gallons
Volume of water injected:	None	gallons
Calculated well volume:	7	gallons

Comments: Bgs = Below ground surface. Lb = pound. Msl = Mean sea level. NA = Not applicable. PVC = Polyvinyl chloride.

CH2MHILL

PROJECT NUMBER

WELL NUMBER EW2014x18 SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT: 5T018 LOCATION: Travis AFB

DEVELOPMENT CONTRACTOR: WDC

DEVELOPMENT METHOD AND EQUIPMENT USED: Bailer, surge block, 1.5 hp pump, U-22 Hor. Pa

START WATER LEVELS: START: END: LOGGER: E. Phelps

MAXIMUM DRAWDOWN DURING PUMPING:

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER: South Treatment Plant

Date	Time	Totalizer Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH (Units)	Conductivity (µmhos/cm)	Remarks (color, odor, sheen, sediment, etc.)
11-5-09	1420	63300	25.68	686.	24.37	6.20	2.82	Light Brn, cloudy, fuel odor
	1425	63320	26.10	>999.	24.22	6.19	2.68	same
	1430	63330	26.1	471.	24.06	6.17	2.61	Almost clear
	1435	63358	26.1	378.	24.04	6.17	2.60	same
	1440	63370	26.1	24.	23.97	6.15	2.63	clear water
	1445	63383	26.1	33.8	23.98	6.14	2.60	same
	1450	63394	26.1	25.0	24.02	6.14	2.59	same
	1455	63405	26.1	0.0	23.95	6.13	2.62	same
	1500	63421	26.1	0.0	23.95	6.13	2.65	
	1505	63440	26.1	0.0	23.97	6.13	2.65	Stop pump. Well development complete
	Well Recovery Test							
	Time		DTW (TOC)					
	1510		19.82					
	1511		17.54					
	1512		16.30					
	1513		14.87					
	1514		14.08					
	1515		14.02					
	1516		13.97					
	1517		13.89					
	1518		13.82					
	1519		13.83					
	1520		13.72					

Start logging well Development log.

CH2MHILL	PROJECT NUMBER 381355.01.07.18.04	WELL NUMBER EW2016x18 SHEET 1 OF 1
	WELL DEVELOPMENT LOG	

PROJECT: ST01B LOCATION: Travis AFB, CA
DEVELOPMENT CONTRACTOR: WDC Exploration & Wells
DEVELOPMENT METHOD AND EQUIPMENT USED: Bailer, surge block, 1.5 hp pump, U-22 Heibei
START WATER LEVELS: START 10.18 END 11.74 LOGGER E. Phelps
MAXIMUM DRAWDOWN DURING PUMPING: 28.18
RANGE AND AVERAGE DISCHARGE RATE: 1.4-2.4 gpm
TOTAL QUANTITY OF WATER DISCHARGED: 387 gallons
DISPOSITION OF DISCHARGE WATER: SBGWTP TANK

Totalizer

Date	Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH (Units)	Conductivity (µmhos/cm)	Remarks (color, odor, sheen, sediment, etc.)
11-6-09	1420	63440 ~~165~~	10.87	"	"	"	"	Flowrate 2.4 gpm. Brn, muddy
	1425	~~179~~.	14.40	"	"	"	"	Same. No odor
	1430	63459	16.08	"	"	"	"	same
	1435	63472	18.17	"	"	"	"	Lt Brn, Sediment/fines.
	1440	63482	19.74	>999.	21.05	6.42	5.58	same
	1445	63494	21.76	>999.	20.93	6.41	5.75	same
	1450	63507	24.08	>999	20.91	6.41	6.01	same
	1455	63525	25.11	>999	20.94	6.41	6.33	Lt Brn, starting to clear
	1500	63536	27.43	>999	20.81	6.43	6.26	Lt Brn, mostly clear water
	1520	63558	27.98	>999	21.28	6.48	5.86	Flowrate = 1.4 gpm
	1530	63571	27.68	20.	21.71	6.46	5.89	Water clear.
	1540	63585	27.78	29.9	21.72	6.45	5.91	same
	1550	63598	27.92	6.1	21.69	6.44	5.97	same
	1600	63610	28.18	6.8	21.64	6.44	5.92	Flowrate = 1.2
	1610	63622	27.99	0	21.59	6.40	5.91	Water clear. Stop purging well. Well development complete. END 6.20

Site: 18 Travis AFB, CA

EW2016x18

Pumping/Recovery Test Data

Test Location _____ Pumped Well _____ Observation Wells _____ Sheet 1 of 1

Source of Data Below _____ Distance from Pumped Well (ft) _____ Measuring Point T.O.C.

Test Started: Date 11·6·09 Time 11:14 Pre-test Static Water Level (ft) 10.78

Test Ended: Date 11·6·09 Time 17:38 Final Water Level (ft) 11.74

Initial Flow Meter Reading (gal) 63440 Final Flow Meter Reading (gal) 63660

Pump Capacity (type/hp) Grundfos 1.5 hp Range of Pumping Rates (gpm) 1.2-2.4

Average Pumping Rate (gpm) 1.4

Test Conducted by Eric Phelps/CH2MHill

(Print name and title, then sign)

Pumping Test				Recovery Test		
Date and Time (date - hour minutes)	Elapsed Time (minutes)	Depth to Water (feet)	Pumping Rate (gpm)	Date and Time (date - hour minutes)	Elapsed Time (minutes)	Depth to Water (feet)
				11·6·09 1658	0	19.53
				1659		19.09
				1700		18.71
				1701		18.27
				1702		17.86
				1703		17.44
				1704		17.10
				1705		16.82
				1706		16.53
				1707		16.24
				1708		16.00
				1709		15.72
				1710		15.39
				1711		15.12
				1712		15.00
				1717		14.01
				1723		13.10
				1728		12.45
				1733		12.12
				1738		11.74

CH2MHILL

PROJECT NUMBER 381355

WELL NUMBER EW2019 X 18 SHEET 1 OF X2

WELL DEVELOPMENT LOG

PROJECT: STO18 LOCATION: TRAVIS AFB,CA

DEVELOPMENT CONTRACTOR: WDC Exploration & Wells

DEVELOPMENT METHOD AND EQUIPMENT USED: Bailer, Surge Block, Grunfos 1.5 hp, Horiba U-22

START WATER LEVELS: 10.55 START: 1310, 12/22 END: 12/23@1120 LOGGER: P. Governor

MAXIMUM DRAWDOWN DURING PUMPING

RANGE AND AVERAGE DISCHARGE RATE: ~~3 gpm~~ 2 gpm to 1 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 475

DISPOSITION OF DISCHARGE WATER: SBBGWTP

Stabalization Criteria				+/- 2	+/- 10%	<10 NTU	+/- 2	
Date	Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	pH (Units)	Conductivity (umhos/cm)	Turbidity (NTU)	Temperature (°C)	Remarks (color, odor, sheen, sediment, etc.)
12/22/09	1320	60	10.55					START Bailing 31.90 TD
	1345	—						Begin inital surge
	1415	120						Second Bail After surge
	1433	—						Begin second surge
	1510	175						Third Bail After surge
12-23-09	~~0745~~ 0755	175	10.91	5.83	2.43	333	20.24	Begin Pump Light Brown no odor Some Sediment
	0800	190	16.50	5.99	2.45	249	20.56	cloudy no odor no sediment
	0805	205	17.60	6.06	2.45	321	20.64	same
	0810	220	19.22	6.11	2.45	-5.0	20.83	Brown no odor Some Sediment
	0815	235	19.70	6.13	2.45	-5.0	20.80	same
	0820	250	20.35	6.11	2.47	-5.0	20.79	same
	0825	265	21.08	6.08	2.48	597	20.91	cloudy no odor Some Sediment
	0830	280	21.58	6.07	2.44	530	20.80	no change
	0835	295	22.25	6.03	2.44	474	20.83	cloudy no odor no sediment
	0840	310	22.75	6.03	2.43	~~425~~ 433	20.91	no change
	0845	325	23.40	6.01	2.45	231	20.83	clear no odor no sediment
	0850	340	23.75	6.04	2.44	271	20.88	no change
	0855	355	24.35	6.00	2.46	244	20.75	no change
	0900	370	24.78	5.98	2.45	180.0	20.87	no change
	0905	385	25.30	5.96	2.48	93.9	20.86	clear, no odor, no Sediment
	0910	395	25.90	5.98	2.47	96.8	20.81	no change
	0915	~~405~~	26.10	5.97	2.52	64.2	20.67	no change
	0920	415	26.31	5.97	2.52	62.6	20.79	no change
	0925	425	26.60	5.97	2.50	79.3	20.84	no change waiting for Turb.
	0930	435	27.00	5.98	2.47	57.6	20.81	same
	0935	445	27.30	5.96	2.52	36.5	20.85	same see Pg2

CH2MHILL

PROJECT NUMBER 381355 | WELL NUMBER EW2019x18 | SHEET 2 OF 2

WELL DEVELOPMENT LOG

PROJECT: ST018 LOCATION: TRAVIS AFB,CA

DEVELOPMENT CONTRACTOR: WDC Exploration & Wells

DEVELOPMENT METHOD AND EQUIPMENT USED: Bailer, Surge Block, Grunfos 1.5 hp, Horiba U-22

START WATER LEVELS: START: END: LOGGER: R. Governor

MAXIMUM DRAWDOWN DURING PUMPING:

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER: SBBGWTP

Stabalization Criteria				+/- .2	+/- 10%	<10 NTU	+/- .2	
Date	Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	pH (Units)	Conductivity (µmhos/cm)	Turbidity (NTU)	Temperature (°C)	Remarks (color, odor, sheen, sediment, etc.)
12/23/09	0940	455	27.30	5.97	2.49	36.0	20.79	clear, no odor, no sediment
	0945	460	26.75	5.97	2.48	24.2	20.79	reduced pump rate to 1 gpm
	0950	465	26.40	5.96	2.45	9.7	20.85	clear no odor no sediment
	0955	470	26.30	5.93	2.48	6.4	20.86	same
	1000	475	26.15	5.94	2.47	2.5	20.84	clear, no odor, no sediment
	1005	—	29.30					recharge ~~rate~~ rate
	1006	—	28.65		Time	W/L		
	1007	—	28.30		1026	20.05		
	1008	—	27.75		1027	19.75		
	1009	—	27.25		1028	19.50		
	1010	—	26.90		1029	19.25		
	1011	—	26.00		1030	18.90		
	1012	—	25.30		1031	18.65		
	1013	—	24.65		1032	18.40		
	1014	—	24.40		1033	18.13		
	1015	—	23.90		1034	17.90		
	1016	—	23.20		1035	17.70		
	1017	—	22.85		1036	17.40		
	1018	—	22.60		1037	17.20		
	1019	—	22.20		1038	16.95		
	1020	—	21.90		1039	16.75		
	1021	—	21.50		1040	16.55		
	1022	—	21.15		1041	16.35		
	1023	—	20.90		1042	16.20		
	1024	—	20.55		1043	16.00	50%	
	1025	—	20.30	→	1044	15.80	→	

Time	WL	Time	WL
1045	15.65	1103	13.25
1046	15.50	1104	13.10
1047	15.30	1105	13.00
1048	15.10	1106	12.95
1049	15.00	1107	12.85
1050	14.90	1108	12.75
1051	14.70	1109	12.70
1052	14.55	1110	12.65
1053	14.45	1111	12.55
1054	14.30	1112	12.45
1055	14.15	1113	12.40
1056	14.00	1114	12.35
1057	13.90	1115	12.30
1058	13.80	1116	12.25
1059	13.70	1117	12.20
1100	13.60	1118	12.15
1101	13.50	1119	12.10
1102	13.35	1120	12.05

CH2MHILL

PROJECT NUMBER 381355 | WELL NUMBER MW2021X18 | SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT: STO 18 | LOCATION: TRAVIS AFB, CA

DEVELOPMENT CONTRACTOR: WDC Exploration & Wells

DEVELOPMENT METHOD AND EQUIPMENT USED: Bailer, Surge Block, Grunfos 1.5 hp, Horiba U-22

START WATER LEVELS: 10.79 | START: 0853 | END: 1200 | LOGGER: P. Goverman

MAXIMUM DRAWDOWN DURING PUMPING: 0

RANGE AND AVERAGE DISCHARGE RATE: 2.0 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 159 gal

DISPOSITION OF DISCHARGE WATER: SBBGWTP

Stabalization Criteria				+/- 2	+/- 10%	<10 NTU	+/- 2	
Date	Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	pH (Units)	Conductivity (µmhos/cm)	Turbidity (NTU)	Temperature (°C)	Remarks (color, odor, sheen, sediment, etc.)
12-22-09	0853	15	10.79					Initial Pkw Begin Bailing TD 25.39
	0936	—	↓					Begin Surging
	0956	30						Bail after surging
	1017	—						second surge
	1025	45	↓					Bail after surge
	1103	—	11.15	6.26	3.13	-50	19.83	~~Third Surge~~ Begin Pump
	1107	53	12.75	no reads	Purge to	clear		Light Brown Cloudy no odor
	1115	69	12.25	6.64	2.95	-5.0	20.86	no odor light brown no sediment
	1120	79	12.25	6.65	2.95	462	20.90	no odor, cloudy, no sediment
	1125	89	12.30	6.64	2.95	189	21.33	no odor, slight cloudy no sediment
	1130	99	12.32	6.63	2.94	55.2	21.11	no odor, clear, no sediment
	1135	109	12.34	6.62	2.94	19.4	21.19	same
	1140	119	12.33	6.61	2.93	14.2	21.14	same
	1145	129	12.35	6.60	2.93	10.4	21.18	same
	1150	139	12.35	6.59	2.93	6.3	21.21	same
	1155	149	12.35	6.59	2.93	5.3	21.30	clear, no odor, no sediment
	1200	159	12.35	6.60	2.93	4.1	21.17	clear, no odor, no sediment

CH2MHILL

PROJECT NUMBER 381355

WELL NUMBER MW2014x18

SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT: STO16

LOCATION: Travis AFB

DEVELOPMENT CONTRACTOR: WDC

DEVELOPMENT METHOD AND EQUIPMENT USED: Pulstar

START WATER LEVELS: 11.47

START: 0936 END: 1300 LOGGER: C. Holland

MAXIMUM DRAWDOWN DURING PUMPING: .87

RANGE AND AVERAGE DISCHARGE RATE: 1.5 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 150 gallons

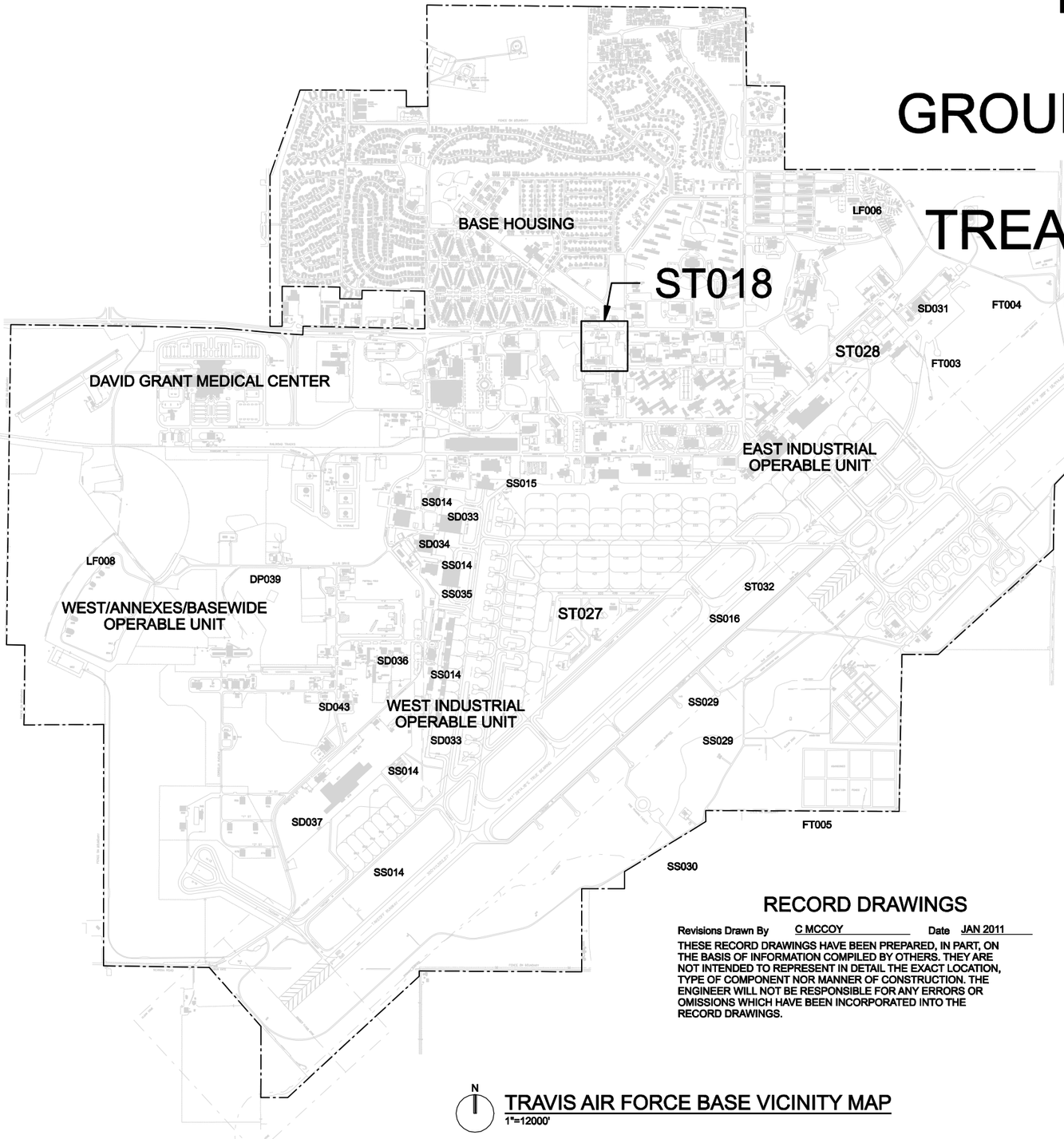
DISPOSITION OF DISCHARGE WATER:

Date	Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU) ±10	Temperature (°C) ±1°	pH (Units) ±.2	Conductivity (µmhos/cm) ±2 or 10%	Remarks (color, odor, sheen, sediment, etc.)
11-12-09	0936	10.0	11.47					Initial DTW. Begin bailing Depth to bottom 20.92
	1003							Begin Surging
	1020	20.0						Bail water after surging
	1031							Begin second Surge
	1040	25.0						Bail water after surging
	1058							Begin third Surge
	1110	30.0						Bail water after surging
	1140	37.5	12.07	-5.0	20.73	6.09	2.07	Begin pump
	1145	45.0	12.11	-5.0	21.00	6.44	2.07	Brown, no odor, few sediments Cloudy
	1150	52.5	12.14	250	21.15	6.49	2.07	much more clear, no odor, no visible sediments
	1155	60.0	12.15	117	21.21	6.52	2.08	clear, no odor, no sediments
	1200	67.5	12.16	65.4	20.98	6.52	2.08	clear, no odor, no sediments
	1205	75.0	12.16	31.0	21.26	6.52	2.08	clear, no odor, no sediments
	1210	82.5	12.16	21.5	21.10	6.50	2.09	clear, no odor, no sediments
	1215	90.0	12.16	16.4	21.16	6.48	2.10	clear, no odor, no sediments
	1220	97.5	12.16	7.2	21.20	6.48	2.10	clear, no odor, no sediments
	1225	105.0	12.16	10.9	21.21	6.47	2.10	clear, no odor, no sediments
	1230	112.5	12.16	5.5	21.07	6.50	2.11	clear, no odor, no sediments
	1235	120.0	12.16	6.9	21.00	6.47	2.11	clear, no odor, no sediments
	1240	127.5	12.16	12.3	20.08	6.47	2.12	clear, no odor, no sediment
	1245	135.0	12.16	8.6	21.24	6.51	2.12	clear, no odor, no sediment
	1250	142.5	12.20	5.2	21.32	6.47	2.12	clear, no odor, no sediment
	1255	150.0	12.16	6.8	21.06	6.46	2.13	clear, no odor, no sediment

Copy of WELLDEV.XLS

Appendix D
Site ST018 Groundwater Treatment Plant
Record Design Drawings

TRAVIS AIR FORCE BASE
SITE ST018
GROUNDWATER EXTRACTION AND TREATMENT PLANT DESIGN
FAIRFIELD, CALIFORNIA
AUGUST 2010



N

TRAVIS AIR FORCE BASE VICINITY MAP
1"=12000'

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

INDEX OF DRAWINGS

REGISTERED PROFESSIONAL ENGINEER
LOREN E KROOK
No. C 53815
Exp: 06-30-11
CIVIL
STATE OF CALIFORNIA
08/18/10

NO.	DATE	REVISION	DR	CHK	APVD	BY	APVD
DSGN		GT MALIN	GT MALIN	L KROOK	L KROOK	L KROOK	

ISSUED FOR CONSTRUCTION

CH2MHILL

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

GENERAL
VICINITY MAP AND INDEX OF DRAWINGS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-01
SHEET	1

FILENAME: dn01G001_381355.dgn PLOT DATE: 3/3/2011 PLOT TIME: 3:11:23 PM

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

N

SITE ST018 LOCATION MAP

1"=1200'

REGISTERED PROFESSIONAL ENGINEER
LOREN E KROOK
No. C 53815
Exp: 06-30-11
CIVIL
STATE OF CALIFORNIA

08/18/10

NO.	DATE	REVISION	BY	APVD
DSGN	DR LEE	DR GT MALIN	CHK L KROOK	APVD L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

ISSUED FOR CONSTRUCTION

CH2MHILL

GENERAL

SITE ST018 LOCATION MAP

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-02
SHEET	2

FILENAME: dn01G002_381355.dgn PLOT DATE: 2/28/2011 PLOT TIME: 5:10:40 PM

GENERAL NOTES

1.1 DEFINITIONS

A. OWNER: TRAVIS AIR FORCE BASE (TRAVIS AFB)/GOVERNMENT.

B. CONTRACTOR: CH2MHILL

1.2 MAPPING AND RECORD DRAWINGS

A. MAPPING AND SURVEY DATA BASED UPON CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 2, NAD 1983. COORDINATES AND ELEVATIONS SHOWN ARE APPROXIMATE.

B. RECORD DRAWINGS: MAINTAIN AS-BUILT DRAWINGS TO BE TURNED OVER TO CONTRACTOR AT COMPLETION OF WORK. THESE SHALL BE A SET OF "RED LINED" 11"X17" DRAWINGS SUBMITTED AT CONSTRUCTION COMPLETION. IDENTIFY PIPELINE AND CONDUIT RUNS, CONNECTION DETAILS, WELL LOCATION COORDINATES, ROUTINGS, ETC.

1.3 EXISTING UTILITIES AND STRUCTURES

A. SUBCONTRACTOR WILL OBTAIN DIGGING PERMITS FROM CONTRACTOR PRIOR TO ALL EXCAVATION.

B. VERIFY LOCATION, SIZE, TYPE, AND ELEVATION OF EXISTING UTILITIES AND STRUCTURES TO BE AFFECTED BY CONSTRUCTION.

C. NOTIFY CONTRACTOR AND TRAVIS AFB COORDINATOR WITHIN 30 MINUTES WHEN ANY UTILITY IS DAMAGED OR PLACED OUT-OF-SERVICE.

1.4 TRAFFIC CONTROL

A. PROVIDE TRAFFIC CONTROL MEASURES IN ACCORDANCE WITH BASE STANDARD OPERATING PROCEDURES. NO WORK SHALL BEGIN WITHOUT CONTRACTOR APPROVAL AND UNTIL CLEARANCES HAVE BEEN OBTAINED.

B. PROVIDE TRAFFIC CONTROL DETOUR AND SAFETY SIGNAGE, BARRICADES, FLASHING CAUTION LIGHTS, AND OTHER TECHNIQUES AND DEVICES DURING EXECUTION OF THE WORK.

1.5 BRAND NAME OR EQUAL

A. THE "BRAND NAME" DESCRIPTIVE TERMS ARE USED TO PORTRAY THE CHARACTERISTICS, LEVEL AND STANDARD OF QUALITY REQUIRED, AND FOR FUNCTION IN THE MANNER INTENDED.

B. TO BE CONSIDERED "OR EQUAL" PRODUCTS (OTHER THAN THE "BRAND NAME" SPECIFIED) ITEM MUST MEET THE SALIENT PHYSICAL, FUNCTIONAL, AND OTHER CHARACTERISTICS SPECIFIED. THE CONTRACTOR WILL DETERMINED IF THE SUBCONTRACTOR'S SUBMITTAL REQUESTING INFORMATION OF EQUIPMENT UNDER THE "OR EQUAL" PROVISION IS ACCEPTABLE, AND THE CONTRACTOR'S DETERMINATION IS FINAL.

1.6 TEMPORARY CONTROLS

A. PROTECTION OF WORK AND PROPERTY:

1. COMPLY WITH BASE SAFETY RULES WHILE ON BASE PROPERTY.
2. BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
3. PROTECT NEW AND EXISTING UTILITIES AND STRUCTURES FROM DAMAGE.
4. KEEP BASE INFORMED OF ACCIDENTS ON THE SITE AND RELATED CLAIMS.
5. MOBILIZE TEMPORARY CONSTRUCTION FACILITIES TO LOCATIONS AS DIRECTED BY CONTRACTOR.

B. UNAUTHORIZED ENTRY: PROVIDE BARRICADES AND LIGHTS TO PREVENT UNAUTHORIZED ENTRY TO CONSTRUCTION AREAS AND AFFECTED ROADS, STREETS, AND ALLEYWAYS TO ENSURE PUBLIC SAFETY AND THE SAFETY OF EMPLOYEES.

C. AIR POLLUTION CONTROL:

1. MINIMIZE AIR POLLUTION FROM CONSTRUCTION OPERATIONS.
2. BURNING: WASTE MATERIALS, RUBBISH, OR OTHER DEBRIS WILL NOT BE PERMITTED ON OR ADJACENT TO THE SITE.
3. PROVIDE WATER TRUCK OR OTHER MEANS FOR DUST CONTROL AT THE SITE.

D. WATER POLLUTION CONTROL: DO NOT DISPOSE OF VOLATILE WASTES SUCH AS MINERAL SPIRITS, OIL, OR CHEMICALS IN STORM OR SANITARY DRAINS. DISPOSAL OF WASTES INTO STREAMS OR WATERWAYS IS PROHIBITED. PROVIDE ACCEPTABLE CONTAINERS FOR COLLECTION AND DISPOSAL OF WASTE MATERIALS, DEBRIS, AND RUBBISH.

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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GENERAL ABBREVIATIONS

@	AT
AC	ASPHALT CONCRETE
ACI	AMERICAN CONCRETE INSTITUTE
AHP	AIR: HIGH PRESSURE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APVD	APPROVED
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AUX	AUXILIARY
AWG	AMERICAN WIRE GAGE
BF	BLIND FLANGE
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BM	BENCH MARK
BV	BALL VALVE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CI	CAST IRON
CL	CENTERLINE
CO	CLEANOUT
CONC	CONCRETE
CR	CREEK, CONTROL RELAY
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
CTR	CENTER
CU FT	CUBIC FOOT
CU IN.	CUBIC INCH
CU YD	CUBIC YARD
CULV	CULVERT
CV	CHECK VALVE
°C	DEGREE CELSIUS
DCA	DICHLOROETHANE
DCE	DICHLOROETHENE
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DWG	DRAWING
E	EAST, EASTING
EA	EACH
EL	ELEVATION
ELB	ELBOW
ELEC	ELECTRIC, ELECTRICAL
ENGR	ENGINEER
EW	EACH WAY, EXTRACTION WELL
EXST	EXISTING
FC	FLEXIBLE COUPLING, FAIL CLOSED
FG	FINISHED GRADE
FI	FLOW INDICATOR
FIG	FIGURE
FLP	FAIL LAST POSITION
FNSH	FINISH
FO	FUEL OIL, FAIL OPEN, FIBER OPTICS
FSL	FLOW SWITCH LOW
FQIT	FLOW TOTALIZER INDICATOR TRANSMITTER
FT	FOOT OR FEET
°F	DEGREE FAHRENHEIT
GAC	GRANULAR ACTIVATED CARBON
GAL	GALLON
GALV	GALVANIZED
GC	GROOVED COUPLING
GPM	GALLONS PER MINUTE
GSP	GALVANIZED STEEL PIPE
GV	GATE VALVE
GWE	GROUNDWATER EXTRACTION
HDPE	HIGH DENSITY POLYETHYLENE
HORIZ	HORIZONTAL
HP	HORSEPOWER, HYDRO PUNCH BORING
ID	INSIDE DIAMETER
IN.	INCH
INV	INVERT
JT	JOINT
L	LEFT, ANGLE, LENGTH
LB/CU FT	POUNDS PER CUBIC FOOT
LF	LINEAR FEET
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MISC	MECHANICAL JOINT
MJ	MECHANICAL JOINT
MW	MONITORING WELL
N	NORTH, NORTHING, NEUTRAL
NO.	NUMBER, NUMBERING
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OG	ORIGINAL GROUND
OPNG	OPENING
PCE	TETRA-CHLOROETHYLENE
PE	PLAIN END
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PLC	PROGRAMMABLE LOGIC CONTROLLER
PPB	PARTS PER BILLION
PREFAB	PREFABRICATED
PRESS.	PRESSURE
PRL	POTENTIAL RELEASE LOCATION
PROP.	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH, GAUGE
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE PIPE
PZ	PIEZOMETER
RD	ROAD
REQD	REQUIRED
R/W	RIGHT-OF-WAY
SCH	SCHEDULE
SECT	SECTION
SH	SHEET
SIM	SIMILAR
SPEC	SPECIFICATIONS
SQ	SQUARE
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL, STEEL PIPE
SYM	SYMMETRICAL
TBD	TO BE DETERMINED
TCE	TRICHLOROETHYLENE
W/	WITH
WP	WEATHERPROOF (NEMA 4X)
WTTP	WEST TREATMENT AND TRANSFER PLANT

EXISTING UTILITY LEGEND

W	WATER
E	ELECTRICAL
F	FUEL
G	GAS
HG	HEATING GAS
SD	STORM DRAIN
SS	SANITARY SEWER
TEL	TELECOMMUNICATIONS

GROUNDWATER SUPPLY LEGEND

EW-233 — EXISTING CONVENTIONAL EXTRACTION WELL

SITE PLAN LEGEND

- FENCE LINE
- WATER COARSE
- X 61.1 — EXISTING SPOT ELEVATION
- RAILROAD
- 612 — BUILDING SHOWING BUILDING NUMBER
- 60 — GROUND SURFACE CONTOUR WITH ELEVATION
- TRAVIS AFB BOUNDARY
- PAVED ROADS/PARKING LOTS
- UNPAVED ROADS/PARKING LOTS
- CURBED ROADS/PARKING LOTS
- SWAMP

MECHANICAL LEGEND

PIPING DESIGNATION

4" TW — 4" TW
PIPE IDENTIFICATION LEGEND
NOMINAL PIPE DIAMETER

EXISTING PIPE (SCREENED)
NEW PIPE (BOLD)

VALVE SYMBOLS

- GATE
- BUTTERFLY
- GLOBE
- PINCH
- BALL
- VEE-BALL
- GAUGE W/COCK
- SWING CHECK
- SAMPLE
- FLEXIBLE PIPE CONNECTION

DETAIL/SECTION LEGEND

A / C-1 — SECTION (LETTER) OR DETAIL (NUMBER) DESIGNATION
DRAWING NUMBER WHERE CORRESPONDING DETAIL OR SECTION IS SHOWN OR CALLED OUT. (REPLACED WITH A LINE IF SHOWN ON SAME SHEET.

1 — STANDARD OR MISCELLANEOUS DETAIL NUMBER

SCREENING

NOTES:

1. THE SCREENED BACKGROUND ON SITE AREAS AND ON PROCESS AND INSTRUMENTATION DRAWINGS REPRESENT EXISTING FACILITIES OR CALLOUTS.
2. BOLD LINE WORK AND CALLOUTS REPRESENT NEW WORK TO BE DONE ON THIS CONTRACT.

REGISTERED PROFESSIONAL ENGINEER — LOREN E KROOK — No. C 53815 — Exp: 06-30-11 — CIVIL — STATE OF CALIFORNIA
08/18/10

NO.	DATE	DR	REVISION	CHK	BY
		D BERWICK	GT MALIN	L KROOK	APVD L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

GENERAL
GENERAL, CIVIL, AND MECHANICAL LEGENDS

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-03
SHEET	3

DESIGN CRITERIA

1. APPLICABLE CODE: 2010 UNITED FACILITIES CRITERIA (UFC) 3-301-01 AND 2007 CALIFORNIA BUILDING CODE (CBC).
2. WIND LOAD: UFC 3-301-01 AND ASCE 7 METHOD 2
   BASIC WIND SPEED = 85 MPH
   EXPOSURE = C
   IMPORTANCE FACTOR = 1.0
3. SEISMIC LOAD: UFC 3-301-01 AND ASCE 7 SECTION 15 NONBUILDING NOT SIMILAR TO BUILDINGS AND SECTION 13 NONSTRUCTURAL COMPONENTS.
   MAPPED SPECTRAL RESPONSE ACCELERATIONS
   S_S= 1.86g
   S_1= 0.60g
   DESIGN SPECTRAL RESPONSE ACCELERATIONS
   S_{DS}= 1.21g
   S_{D1}= 0.6g
   IMPORTANCE FACTOR = 1.0
4. SOIL DESIGN PARAMETERS: NET ALLOWABLE SOIL BEARING PRESSURE = 1200 PSF.

GENERAL INFORMATION

1. CONTRACTOR IS CH2M HILL.
2. DESIGN DETAILS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS OCCURRING THROUGHOUT THE PROJECT, WHETHER OR NOT THEY ARE INDIVIDUALLY CALLED OUT.
3. DETAILING AND DIMENSIONS OF EXISTING STRUCTURES SHOWN ARE BASED ON AS-BUILT DESIGN DRAWINGS, AND DO NOT NECESSARILY REPRESENT THE AS-CONSTRUCTED CONDITIONS. THE SUBCONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND DETAILING OF THE EXISTING STRUCTURES PRIOR TO FABRICATION OF ADJACENT FRAMING OR CONNECTIONS OR SUPPORTS THAT ARE AFFECTED BY THE EXISTING STRUCTURE.
4. VISITS TO THE JOB SITE BY THE ENGINEER TO OBSERVE THE CONSTRUCTION DO NOT IN ANY WAY MEAN THAT CH2MHILL IS GUARANTOR OF SUBCONTRACTOR'S WORK, NOR RESPONSIBLE FOR THE COMPREHENSIVE OR SPECIAL INSPECTIONS, COORDINATION, SUPERVISION, OR SAFETY AT THE JOB SITE.
5. FIELD QUALITY ASSURANCE WILL BE FURNISHED BY CONTRACTOR. FIELD QUAILTY CONTROL WILL BE FURNISHED BY SUBCONTRACTOR.

FORMWORK, SHORING AND BRACING

STRUCTURES SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED FOR STABILITY UNDER FINAL CONDITIONS ONLY. DESIGN SHOWN DOES NOT INCLUDE NECESSARY COMPONENTS OR EQUIPMENT FOR STABILITY OF THE STRUCTURES DURING CONSTRUCTION. SUBCONTRACTOR IS RESPONSIBLE FOR ALL WORK RELATING TO CONSTRUCTION ERECTION METHODS, BRACING, SHORING, RIGGING, GUYS, SCAFFOLDING, FORMWORK, AND OTHER WORK AIDS REQUIRED TO SAFELY PERFORM THE WORK SHOWN.

FOUNDATIONS

1. REFER TO GEOTECHNICAL REPORT, SS 030 SITE AT TRAVIS AFB, CALIFORNIA BY CH2M HILL DATED APRIL 23, 1997.
2. ALL EXCAVATIONS SHALL BE SHORED AS NECESSARY TO PREVENT SUBSIDENCE OR DAMAGE TO ADJACENT EXISITING STRUCTURES, STREETS, UTILITIES, ETC.
3. ALL FOUNDATION SLABS AND SLAB-ON-GRADE SHALL SHEAR ON A MINIMUM OF 9 INCHES OF COMPACTED AGGREGATE BASE.
4. SUBGRADE FOR FOUNDATIONS SLABS AND SLAB-ON-GRADE SHALL BE CLEARED OF ALL TOPSOIL CONTAINING ROOTS AND OTHER ORGANIC MATERIAL. COMPACT THE UPPER 6 INCHES OF EXISTING SUBGRADE TO 90 PERCENT OF ASTM D1557.

REINFORCED CONCRETE

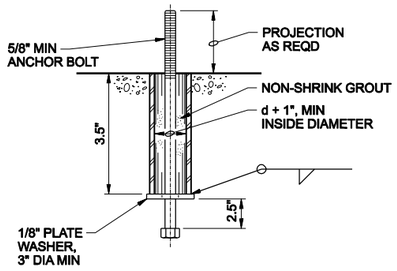
1. REINFORCING STEEL CONFORM TO THE FOLLOWING:

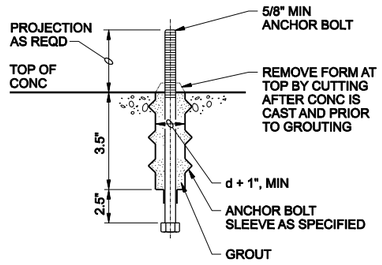
   DEFORMED REINFORCING STEEL ASTM A615, GRADE 60
2. CLEARANCE FOR REINFORCEMENT BARS SHALL BE AS SHOWN.
3. 90 DEGREE BENDS, UNLESS OTHERWISE SHOWN, SHALL BE ACI 318 STANDARD HOOKS.
4. STAGGER BAR SPLICES.
5. 28-DAY CAST-IN-PLACE CONCRETE STRENGTHS:
   TYPICAL: 4000 PSI
6. FABRICATION AND PLACEMENT OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CRSI MSP-1 "MANUAL OF STANDARD PRACTICE" AND ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE".
7. CONSTRUCTION JOINTS INDICATED ARE REQUIRED LOCATIONS. SUBCONTRACTOR MAY ADD JOINTS, SUBJECT TO SPECIFIED REQUIREMENTS. ADDITIONAL CONSTRUCTION JOINT LOCATIONS, INCLUDING ADDITIONAL REQUIRED FOR CONSTRUCTION, SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY CH2MHILL.
8. ROUGHEN AND CLEAN CONSTRUCTION JOINTS IN SLABS AS SPECIFIED PRIOR TO PLACING ADJACENT CONCRETE.
9. REINFORCEMENT BENDS AND LAPS, UNLESS OTHERWISE NOTED, SHALL SATISFY THE FOLLOWING MINIMUM REQUIREMENTS:

CONCRETE DESIGN STRENGTH = 4,000 PSI		GRADE 60 REINFORCING STEEL								
BAR SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11
LAP SPLICE LENGTH										
SPACING<6"	TOP BAR *	1'-4"	2'-0"	3'-0"	4'-0"	5'-10"	6'-8"	7'-7"	8'-6"	9'-5"
	OTHER BAR	1'-4"	1'-7"	2'-4"	3'-1"	4'-6"	5'-2"	5'-10"	6'-7"	7'-3"
SPACING≥6"	TOP BAR *	1'-4"	1'-6"	2'-0"	2'-5"	3'-6"	4'-0"	5'-0"	6'-2"	7'-5"
	OTHER BAR	1'-4"	1'-4"	1'-7"	1'-10"	2'-9"	3'-1"	3'-10"	4'-9"	5'-8"
EMBEDMENT LENGTH										
SPACING<6"	TOP BAR *	1'-0"	1'-7"	2'-4"	3'-1"	4'-6"	5'-2"	5'-10"	6'-7"	7'-3"
	OTHER BAR	1'-0"	1'-3"	1'-9"	2'-5"	3'-6"	4'-0"	4'-6"	5'-1"	5'-7"
SPACING≥6"	TOP BAR *	1'-0"	1'-3"	1'-7"	1'-10"	2'-9"	3'-1"	3'-10"	4'-9"	5'-8"
	OTHER BAR	1'-0"	1'-0"	1'-3"	1'-5"	2'-1"	2'-5"	3'-0"	3'-8"	4'-5"

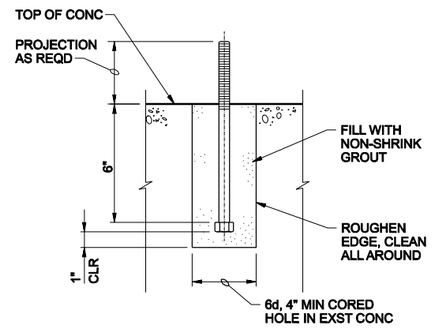
* TOP BARS SHALL BE DEFINED AS ANY HORIZONTAL BARS PLACED SUCH THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR IN ANY SINGLE POUR.

1. HORIZONTAL WALL BARS ARE CONSIDERED TOP BARS.

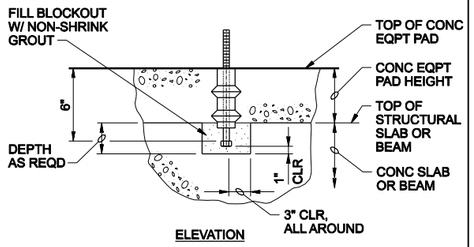




MACHINERY ANCHOR BOLT DETAIL



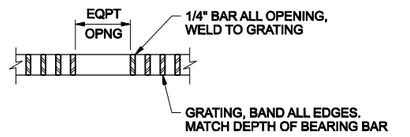
ANCHOR BOLT RETROFIT



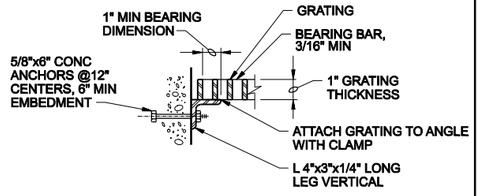
ELEVATION

ANCHOR BOLT BLOCKOUT

ANCHOR BOLT DETAILS



EQUIPMENT OPENINGS



GS-3

NOTE:

1. GALVANIZED STEEL ASTM A1011 OR ASTM A36 WITH BEARING BAR SPACING OF 1 3/16 INCH CENTER TO CENTER AND CROSS BAR SPACING OF 4 INCHES CENTER TO CENTER.

LIGHT DUTY GRATING

METAL FABRICATIONS

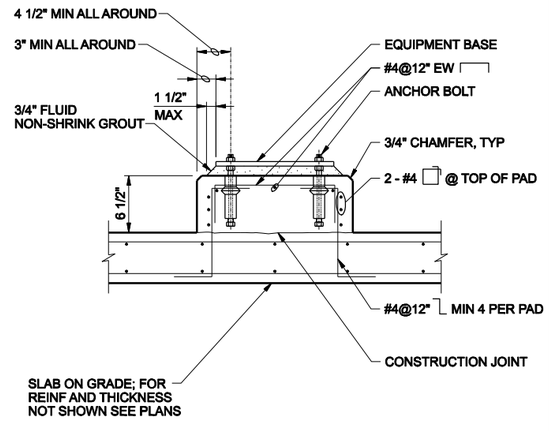
1. STRUCTURAL STEEL PLATES, ANGLES, AND CHANNELS SHALL BE ASTM A36.
2. ANCHOR BOLTS SHALL BE GALVANIZED STEEL ASTM F1554, GR 36 / A153.
3. ITEMS TO BE EMBEDDED IN CONCRETE SHALL BE CLEAN AND FREE OF OIL, DIRT, AND PAINT.
4. GALVANIZE STEEL AFTER FABRICATION.

STRUCTURAL ABBREVIATIONS

AB	ANCHOR BOLT	FDN	FOUNDATION	PJF	PREMOLDED JOINT FILLER
ADH	ADHESIVE	FG	FINISHED GRADE	PRCST	PRECAST
APVD	APPROVED	FO	FACE OF	PL	PLATE
BOT	BOTTOM	FTG	FOOTING	RC	REINFORCED CONCRETE
BF	BOTTOM FACE	GALV	GALVANIZE (HOT DIP)	REINF	REINFORCE
BM	BEAM	GVL	GRAVEL	RST	REINFORCING STEEL
BRG	BEARING	HORIZ	HORIZONTAL	SIM	SIMILAR
C TO C	CENTER TO CENTER	I.F.	INSIDE FACE	SPECS	SPECIFICATIONS
CJ	CONSTRUCTION JOINT	LONG.	LONGITUDINAL	SQ	SQUARE
CL	CENTER LINE	MAX	MAXIMUM	STD	STANDARD
CLR	CLEARANCE	MB	MACHINE BOLTS	STIF	STIFFENER
CMU	CONCRETE MASONRY UNIT	MFR	MANUFACTURER	STL	STEEL
COL	COLUMN	MIN	MINIMUM	STR	STRAIGHT
CONC	CONCRETE	NIC	NOT IN CONTRACT	STRUCT	STRUCTURES
CONN	CONNECTION	NTS	NOT TO SCALE	SYMM	SYMMETRICAL
CONT	CONTINUOUS	OC	ON CENTER	T&B	TOP AND BOTTOM
CTR	CENTER	O.F.	OUTSIDE FACE	TC	TOP OF CONCRETE
DIA	DIAMETER	O TO O	OUT TO OUT	TF	TOP FACE
DWG	DRAWING	OPNG	OPENING	THK	THICK
EA	EACH			TYP	TYPICAL
EF	EACH FACE			VERT	VERTICAL
EL	ELEVATION			WWR	WELDED WIRE REINFORCEMENT
EQL SP	EQUALLY SPACED				
EW	EACH WAY				
EXST	EXISTING				

NOTE:

FOR ABBREVIATIONS NOT LISTED, SEE "ABBREVIATIONS FOR OWN ON DRAWINGS AND TEXT", PUBLISHED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE INC. (ANSI)



CONCRETE EQUIPMENT PAD

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

REGISTERED PROFESSIONAL ENGINEER
CATHERINE A. P. LOW
No. S 5513
Exp: 06-30-12
STRUCTURAL
STATE OF CALIFORNIA

08/18/10

NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
		C LOW	C MCCOY	C BURKE	APVD	L KROOK	

ISSUED FOR CONSTRUCTION

CH2MHILL

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

GENERAL
STRUCTURAL LEGEND AND NOTES

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-04
SHEET	4

FILENAME: dn01G004_381355.dgn PLOT DATE: 2/28/2011 PLOT TIME: 5:09:35 PM

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	NEW EQUIPMENT, WIRING AND TEXT
	EXISTING EQUIPMENT, WIRING AND TEXT IS SHOWN WITH SCREENED LINES
	FUTURE EQUIPMENT NOT IN CONTRACT
	EXISTING EQUIPMENT, CONDUIT AND WIRING TO BE REMOVED
	CONNECTION POINT - FURNISH AND INSTALL UNDER OTHER SECTIONS, RACEWAYS, CONDUCTORS AND CONDUCTOR END TERMINATORS FURNISHED AND INSTALLED UNDER THIS SECTION AS SHOWN. CONDUCTOR FINAL CONNECTIONS PROVIDED UNDER OTHER SECTIONS.
	CONNECTION POINT TO EQUIPMENT SPECIFIED. FURNISH AND INSTALL UNDER OTHER SECTIONS, RACEWAY, CONDUCTOR AND CONNECTION IN THIS SECTION.
MCC-A	MAJOR ELECTRICAL COMPONENT OR DEVICE. NAME OR IDENTIFYING SYMBOL AS SHOWN.
	BRANCH CIRCUIT PANELBOARD
UH1	UNIT HEATER NO.1, SEE SCHEDULE
TEL	TELEPHONE TERMINAL CABINET
	TERMINAL JUNCTION BOX
10	WOUND-ROTOR MOTOR, HORSEPOWER INDICATED
5	MOTOR, SQUIRREL CAGE INDUCTION, HORSEPOWER INDICATED
GEN	GENERATOR
TEL	LUMINAIRE
TEL	LUMINAIRE-FLUORESCENT
TEL	LUMINAIRE AND POLE
	WALL MOUNTED LUMINAIRE
	FLOOD LIGHTS
	EXIT LIGHTS
	LUMINAIRE W/EMERGENCY BATTERY PACK
QS	HID WITH QUARTZ STANDBY LAMP
	EMERGENCY DC LIGHT UNIT

TYPE INDICATED, SEE LUMINAIRE SCHEDULE

LA-2	HOME RUN, DESTINATION SHOWN
or G	EXPOSED CONDUIT AND CONDUCTORS *
or G	CONCEALED CONDUIT AND CONDUCTORS *

NOTE:

RUNS WITH CROSSHATCHES INDICATE NUMBER OF NO. 12 CONDUCTORS MINIMUM. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE. EACH CONDUIT RUN SHALL BE PROVIDED WITH A GREEN GROUND CONDUCTOR, EXCEPT FOR SIGNAL CONDUIT RUNS. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE. MINIMUM SIZE CONDUIT SHALL BE *f"* 3/4".

	CROSSHATCHES WITH BAR INDICATE #10 CONDUCTOR. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE. MINIMUM SIZE CONDUIT SHALL BE *f"* 3/4".
CE	CONCRETE ENCASED DUCT BANK
	CONDUIT DOWN
	CONDUIT UP
T	TELEPHONE DUCT
S_a or 2 a	SMALL LETTER SUBSCRIPT AT SWITCH AND LUMINAIRE INDICATES SWITCHING. SUBSCRIPT NUMBER AT LUMINAIRE INDICATES CIRCUIT IN PANELBOARD.
S	WALL SWITCH: 2- DOUBLE POLE, 3- THREE WAY, 4- FOUR WAY, WP- WEATHER-PROOF, P- PILOT LIGHT, K- KEY OPERATED, D- DIMMER, T- TIMER, CRE- CORROSION RESISTANT
SM	MANUAL MOTOR STARTER SWITCH

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

SYMBOL	DESCRIPTION
	CONVENIENCE RECEPTACLE - DUPLEX UNLESS SPECIFIED OTHERWISE: C- CLOCK HANGER, CRE- CORROSION RESISTANT, WP- WEATHERPROOF, TL- TWIST LOCK, GFI- GROUND FAULT INTERRUPTING
PNL 4-1-1 (2)	CONVENIENCE RECEPTACLE - WITH PANEL NUMBER AND CIRCUIT NUMBER IN PARENTHESIS.
	CONVENIENCE RECEPTACLE, PEDESTAL, DUPLEX SINGLE FACE UNLESS INDICATED OTHERWISE
30	RECEPTACLE - 240V., 10, AMPERAGE INDICATED
30	RECEPTACLE, SPECIAL PURPOSE - AMPERAGE AS INDICATED
	DUPLEX CONVENIENCE RECEPTACLE - FLUSH IN FLOOR
	MULTI OUTLET ASSEMBLY
	RECEPTACLE - 4-PLEX
	TELEPHONE RECEPTACLE (OUTLET BOX ONLY) FLUSH IN FLOOR
	TELEPHONE RECEPTACLE (OUTLET BOX ONLY)
	GENERAL CONTROL OR WIRING DEVICE. NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. (WP = NEMAAX ENCLOSURE, XP = NEMA 7 EXPLOSION PROOF ENCLOSURE.
CS	CONTROL STATION, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. (WP = NEMA 4 ENCLOSURE) SEE CONTROL DIAGRAMS FOR TYPE OF CONTROLS REQUIRED.
30	NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, WP = WEATHERPROOF (NEMA 4X)
60/40 F	FUSED DISCONNECT SWITCH, SIZE INDICATED (60/40, 60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, WP = WEATHERPROOF (NEMA 4X)
2	CONTACTOR, MAGNETIC, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE, UNLESS INDICATED OTHERWISE.
30 L	LIGHTING CONTACTOR, CURRENT RATING INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM FOR NUMBER OF POLES.
2	STARTER MAGNETIC NEMA SIZE INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM.
	COMBINATION DISCONNECT/ MAGNETIC STARTER, NEMA SIZE 1, NEMA 4 ENCLOSURE UNLESS INDICATED OTHERWISE.
	METERING FACILITIES
	MULTI-PARTY DESK TOP COMMUNICATIONS SYSTEM STATION WITH REMOTE AMPLIFIER
W	MULTI-PARTY WALL MOUNTED COMMUNICATIONS SYSTEM STATION WITH INTEGRAL AMPLIFIER
	CONE TYPE PAGING SPEAKER, CEILING MOUNTED
	INTERIOR PAGING TRUMPET SOUND REPRODUCER, 120^ x 60^ WITH REMOTE AMPLIFIER, SURFACE MOUNTED.
	OUTDOOR PAGING TRUMPET SOUND REPRODUCER, 120^ x 60^ WITH REMOTE AMPLIFIER, SURFACE MOUNTED.
	TERMINAL CABINET FOR COMMUNICATIONS SYSTEM
F	FIRE ALARM STATION, MANUAL
FA	FIRE ALARM STATION, AUTOMATIC, HEAT DETECTOR
F	FIRE ALARM BELL
F	FIRE ALARM HORN
FI	FIRE ALARM IONIZATION DETECTOR
I	AIR DUCT IONIZATION DETECTOR
	GROUND ROD BOX AND COVER. AS SHOWN ON THE DRAWINGS
	TERMINAL OR CLAMP GROUND CABLE CONNECTION
	EXOTHERMIC WELD GROUND CABLE CONNECTION
P	PHOTOELECTRIC AND MOTION DETECTOR SWITCH
	SEALING FITTING

SYMBOL	DESCRIPTION
1	CONTACT - NORMALLY OPEN WITH NEMA SIZE INDICATED AS APPLICABLE
1	CONTACT - NORMALLY CLOSED WITH NEMA SIZE INDICATED AS APPLICABLE
TDR TC / or TDR TO	TIME DELAY RELAY CONTACT (TIME ACTION INDICATED)
	REMOTE DEVICE
XX	RELAY COIL: CR= CONTROL RELAY, TDR=TIME DELAY RELAY
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
100/M	CIRCUIT BREAKER, MAGNETIC TRIP ONLY, FRAME SIZE SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
	CIRCUIT BREAKER DRAWOUT, INSULATED CASE, LOW VOLTAGE
300 175	FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
100	SWITCH - CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
LC / UC	LATCHING RELAY
	LIGHTNING ARRESTER
	FUSE
10	CAPACITOR - KVAR INDICATED
SW V 0-600V100	METER WITH SWITCH - SCALE RANGE SHOWN
	GROUND
120V OR 120/240V 15 KVA, 1 PH	TRANSFORMER, SECONDARY VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE
GFR 25A 0.1	PICK-UP SETTING / TIME CURRENT CHARACTERISTIC — GROUND FAULT RELAY WITH C.T.
	PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	PUSH BUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
	3 POSITION SELECTOR SWITCH MAINTAINED CONTACT
	2 POSITION SELECTOR SWITCH MAINTAINED CONTACT
HAND OFF AUTO XOO OOX	SELECTOR SWITCH - MAINTAINED CONTACT X INDICATES CLOSED POSITION
(3)	CURRENT TRANSFORMER, NUMBER INDICATED
A	INDICATING LIGHT, PUSH-TO-TEST, LETTER INDICATES COLOR
A	INDICATING LIGHT - LETTER INDICATES COLOR: A - AMBER, B - BLUE, C - CLEAR, G - GREEN, R - RED, W - WHITE
	LEVEL SWITCH (NORMALLY OPEN)
	PRESSURE SWITCH (NORMALLY OPEN)

ELECTRICAL ABBREVIATIONS

ABBREV.	DESCRIPTION
A	AMMETER, AMPERE
AC	ALTERNATING CURRENT
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AS	RECEPTACLE - 4-PLEX
	AMPERE SENSOR
ASU	AIR SUPPLY UNIT
ATCS	AUTOMATIC TRANSFER CONTROL SYSTEM
ATS	AUTOMATIC TRANSFER SW
AT	AMP TRIP
BO	BOILER
BCU	BARE COPPER
BRKR	BREAKER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CC	CONTROL CABLE
CKT	CIRCUIT
COMM	COMMUNICATIONS
COND	CONDUCTOR
CONT	CONTINUED
CPT	CONTROL POWER XFMR
CR	CONTROL RELAY
CRS	COATED RIGID STEEL CONDUIT
CS	CONTROL STATION
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DCU	DISTRIBUTED CONTROL UNIT
DIV	DIVISION
E	EMPTY
ECP	ENVIRONMENT CONTROL PNL
EF	EXHAUST FAN
EMER	EMERGENCY
EOL	END OF LINE REGISTER
ETM	ELAPSED TIME METER
EXST	EXISTING
FACP	FIRE CONTROL PANEL
FDR	FEEDER
F, FU	FUSE
FLR	FLOOR
FLUOR	FLUORESCENT
G	GREEN GROUND, GROUND
GALV	GALVANIZED
GF	GROUND FAULT
GFI	GROUND FAULT INTERRUPTER
GFR	GROUND FAULT RELAY
GND	GROUND
GRH	GAS RADIANT HEATER
H	HIGH SPEED
HD	HEAT DETECTOR
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HPS	HIGH PRESSURE SODIUM
HV	HIGH VOLTAGE
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IC	INTERRUPTING CAPACITY
I & C	INSTRUMENTATION AND CONTROL
INCAND	INCANDESCENT
INST	INSTANTANEOUS
INSTR	INSTRUMENTATION
ISOL	ISOLATION
J, J-BOX	JUNCTION BOX
K	KEY INTERLOCK
L	LIGHTING CONTACTOR, LOW SPEED
LA	LIGHTNING ARRESTER
LC	LOAD CENTER
LOC	LOCATION
LR	LATCHING RELAY
LS	LIMIT SWITCH
LT	LONG TIME
LT FLEX	LIQUID TIGHT FLEX CONDUIT
LTG	LIGHTING
LV	LOW VOLTAGE

ABBREVIATIONS	DESCRIPTION
M	MAGNETIC CONTACTOR COIL
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
	MDCEPTACLE - 4-PLEX
MERC	MERCURY VAPOR
MFR	MANUFACTURER
MH	MANHOLE
MMP	MECHANICAL MOUNTING PANEL
MO	MOTOR OPERATOR
MS	MOTOR STARTER
MT	MOUNT
MTD	MOUNTED
MTG	MOUNTING
N	NEUTRAL
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
NO	NORMALLY OPEN
NP	NAMEPLATE
OH	OVERHEAD ELECTRIC
OL	OVERLOAD RELAY
PB	PULL BOX
PC	POWER CENTER
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE CONDUIT
R	RED
RECEPT	RECEPTACLE
REQD	REQUIRED
RM	REMOTE MULTIPLEXER
RS	RIGID STEEL CONDUIT
RT	REMOTE TELEMETRY
S	SWITCH
SC	SPEED CONTROL
SECT	SECTION
SH	SPACE HEATER
S/N	SOLID NEUTRAL
SPD	SPEED
SPEC	SPECIFICATIONS
SST	STAINLESS STEEL
ST	SHORT TIME
SV	SOLENOID VALVE
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
T	THERMOSTAT
TB	TERMINAL BOARD
TD	TEMPERATURE DETECTOR
TCU	TERMINAL CONTROL UNIT
TDR	TIME DELAY RELAY
TJB	TERMINAL JUNCTION BOX
TS	TEMPERATURE SWITCH
TSP	TWISTED SHIELDED PAIR
TYP	TYPICAL
UG	UNDERGROUND ELECTRIC
UH	UNIT HEATER
UVR	UNDER VOLTAGE RELAY
V	VOLTMETER, VOLT
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
WC	WATER COIL
WHD	WATTHOUR DEMAND METER
WP	WEATHERPROOF (NEMA 4X)
XFMR	TRANSFORMER
XP	EXPLOSION PROOF CLASS 1 DIV 1
	FOR INSTRUMENT ABBREVIATIONS, SEE I&C LEGENDS

* DENOTES DEVICE REMOTE FROM STARTER OR PANEL.

MISCELLANEOUS SYMBOLS

120V	120 VOLT, 60 HZ POWER
480V	480 VOLT, 60 HZ POWER
	CONTROL INTERLOCK SEE CONTROL DIAGRAMS

NOTE:

THIS IS A STANDARD LEGEND SHEET. THEREFORE SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT ON THE PLANS.

REGISTERED PROFESSIONAL ENGINEER — FRED A. HAHN — No. 84440 — Exp 6-30-2010 — ELECTRICAL — STATE OF CALIFORNIA

08/18/10

NO.	DATE	DR	REVISION	CHK	APVD	BY	APVD
		F HAHN	C MACDONALD	R CONSTANTINESCU			L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

GENERAL

ELECTRICAL LEGEND

ISSUED FOR CONSTRUCTION

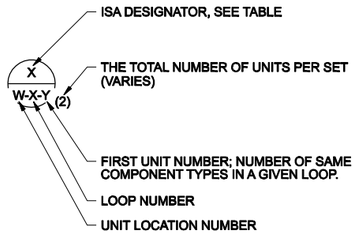
VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-05
SHEET	5

INSTRUMENTATION IDENTIFICATION

EXAMPLE SYMBOLS



FE — FIELD MOUNTED INSTRUMENT

I/I
FY — REAR-OF-PANEL MOUNTED INSTRUMENT

FIC — PANEL MOUNTED INSTRUMENT

00
QL — MOTOR CONTROL CENTER MOUNTED INSTRUMENT

SPECIAL CASES

00
HS — ON-OFF HAND SWITCH. MAINTAINED CONTACT SWITCH (CONTROLLED DEVICE WILL RESTART ON A RETURN OF POWER AFTER POWER FAILURE)

SS
HS — STOP-START HAND SWITCH MOMENTARY CONTACT SWITCHES (CONTROLLED DEVICE WILL NOT RESTART ON RETURN OF POWER AFTER POWER FAILURE)

AO — 4-20mA ANALOG OUTPUT

AI — 4-20mA ANALOG INPUT

DI — DISCRETE INPUT

DO — DISCRETE RELAY OUTPUT

SCADA SYMBOL DEFINITIONS

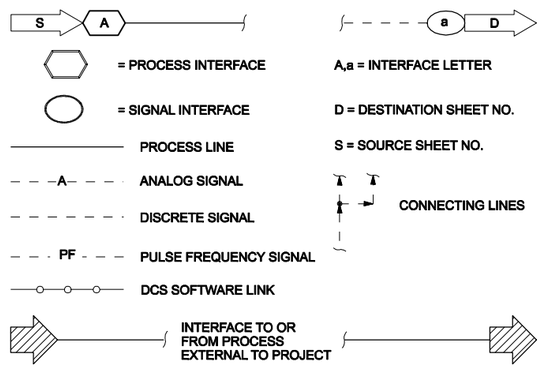
RUN
QA — DENOTES SIGNAL OR CONTROL FOR USE IN DISPLAYING EQUIPMENT STATUS OR IN ANNUNCIATING EQUIPMENT AND PROCESS ALARM CONDITIONS ON ASSOCIATED OPERATOR INTERFACE COMPUTER.

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER (S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (+)		ALARM		
B	BURNER FLAME		USERS CHOICE (+)	USERS CHOICE (+)	USERS CHOICE (+)
C	CONDUCTIVITY			CONTROL	
D	DENSITY (S.G)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION				MIDDLE
N	USERS CHOICE (+)		USERS CHOICE (+)	USERS CHOICE (+)	USERS CHOICE (+)
O	USERS CHOICE (+)		ORIFICE		
P	PRESSURE (OR VACUUM)		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT(+)	INTEGRATE	INTEGRATE		
R			RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (+)		MULTIFUNCTION	MULTIFUNCTION (+)	MULTIFUNCTION (+)
V	VISCOSITY			VALVE OR DAMPER	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED (+)		UNCLASSIFIED(+)	UNCLASSIFIED (+)	UNCLASSIFIED (+)
Y	USERS CHOICE (+)			RELAY OR COMPUTE (+)	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(+) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS.

INTERFACE SYMBOLS AND LINE LEGEND



FLOW STREAM IDENTIFICATION

LEGEND	SERVICE
DR	DRAIN
FA	FOUL AIR
FE	FINAL EFFLUENT
FL	FLUSH
OF	OVERFLOW
SA	SAMPLE
SS	SANITARY SEWER
SWR	SEAL WATER SUPPLY
SWS	SEAL WATER RETURN
SV	SOIL VAPOR

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

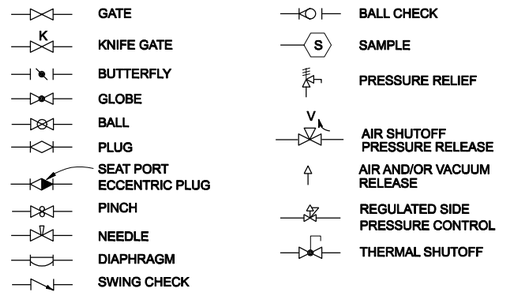
THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

SELF CONTAINED VALVE AND EQUIPMENT TAG NUMBERS

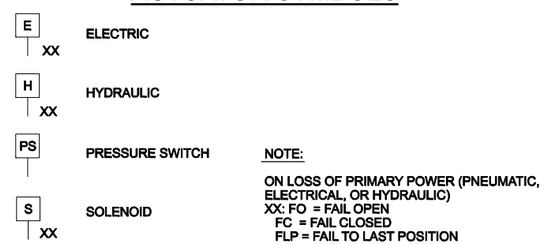
D-W-X-Y

D = ARV = AIR RELEASE VALVE
ASV = ANTI-SYPHON VALVE
AVRV = AIR AND VACUUM RELEASE VALVE
E = INJECTOR
FCV = FLOW CONTROL VALVE
G = GATE
LCV = LEVEL CONTROL VALVE
M = MECHANICAL EQUIPMENT
P = PUMP
PCV = PRESSURE CONTROL VALVE
PSE = RUPTURE DISK
PSV = PRESSURE RELIEF VALVE
T = TANK
TCV = TEMPERATURE CONTROL VALVE
W = FACILITY NUMBER
X = LOOP NUMBER
Y = UNIT NUMBER

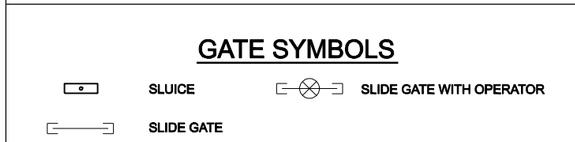
VALVE SYMBOLS



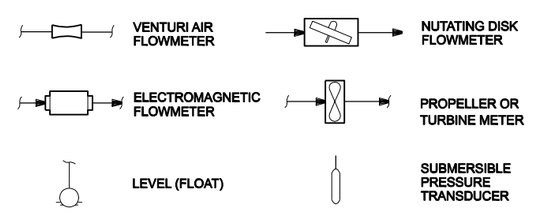
ACTUATOR SYMBOLS



GATE SYMBOLS

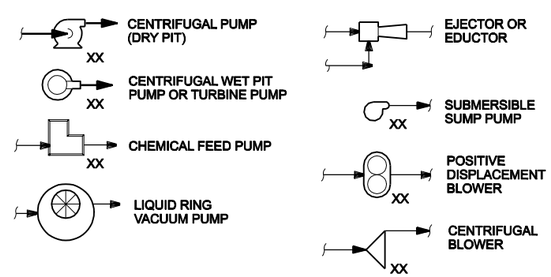


PRIMARY ELEMENT SYMBOLS

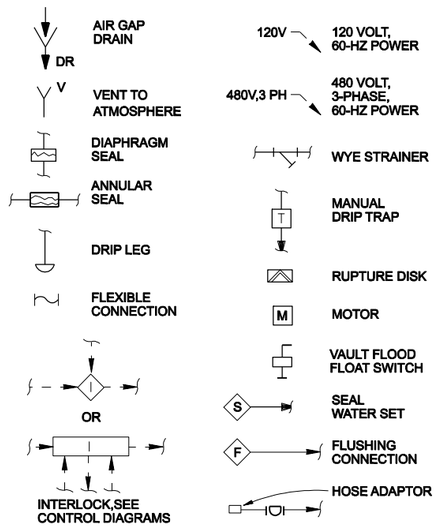


PUMP SYMBOLS

NOTE: XX: AS = ADJUSTABLE SPEED
CS-1 = CONSTANT SPEED (SINGLE SPEED)
CS-2 = CONSTANT SPEED (TWO SPEED)



MISCELLANEOUS SYMBOLS



I&C ABBREVIATIONS

ACK	ACKNOWLEDGE
AFD	ADJUSTABLE FREQUENCY DRIVE
BTD	BEARING TEMPERATURE DETECTOR
CS	CONSTANT SPEED
DCU	DISTRIBUTED CONTROL UNIT
EMERG	EMERGENCY
FAP	FIRE ALARM PANEL
FCP	FACILITY CONTROL PANEL
HOA	HAND-OFF-AUTO
LCP	LOCAL CONTROL PANEL
LOR	LOCAL-OFF-REMOTE
LR	LOCAL-REMOTE
MA	MANUAL-AUTO
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MLD	MOTOR LEAKAGE DETECTOR
MTD	MOTOR TEMPERATURE DETECTOR
OC	OPEN-CLOSE (D)
OCR	OPEN-CLOSE-REMOTE
OCA	OPEN-CLOSE-AUTO
OIC	OPERATOR INTERFACE COMPUTER
OO	ON-OFF
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
OSC	OPEN-STOP-CLOSE
PF	PULSE FREQUENCY
pH	HYDROGEN ION CONCENTRATION
RTU	REMOTE TELEMETRY UNIT
SEQ	SEQUENCE
SS	START-STOP
TC	TERMINATION CABINET
UPS	UNINTERRUPTIBLE POWER SUPPLY
f(x)	OUTPUT IS FUNCTION OF INPUTS
>	SELECT HIGHEST SIGNAL
X	MULTIPLY
Σ	SUM
TYP	TYPICAL

GENERAL NOTES

1. THIS A STANDARD LEGEND, THEREFORE NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.
2. COMPONENTS AND PANELS SHOWN WITH A ( ) ARE SPECIFIED UNDER SECTION "PROCESS INSTRUMENTATION AND CONTROL SYSTEM".
3. COMPONENTS AND PANELS SHOWN WITH A DOUBLE (**) ARE PART OF A PACKAGE SYSTEM, SEE EQUIPMENT SPECIFICATIONS.

REGISTERED PROFESSIONAL ENGINEER
FRED A. HAHN
No. 8440
Exp. 6-30-2010
ELECTRICAL
STATE OF CALIFORNIA
8/18/10

NO.	DATE	DSGN	DR	CHK	APVD
		F HAHN	C MACDONALD	R CONSTANTINESCU	L KROOK

REVISION BY

CH2MHILL

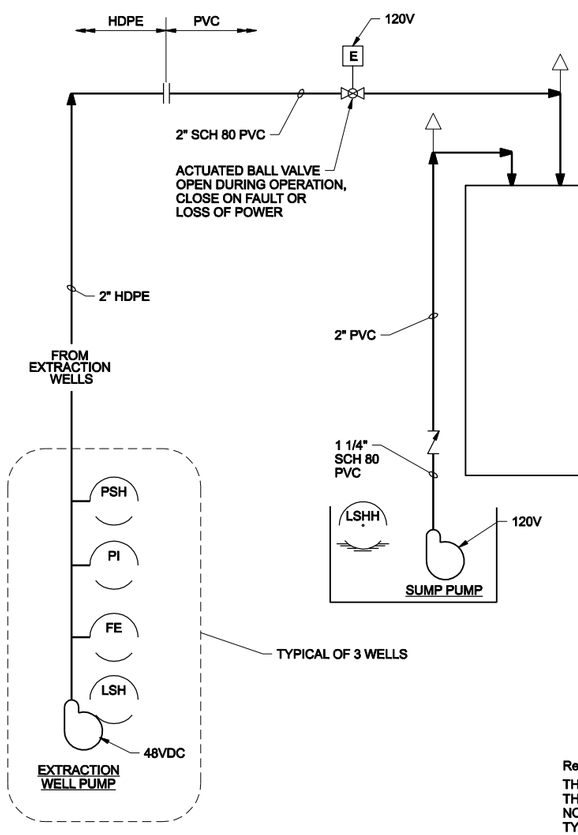
TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

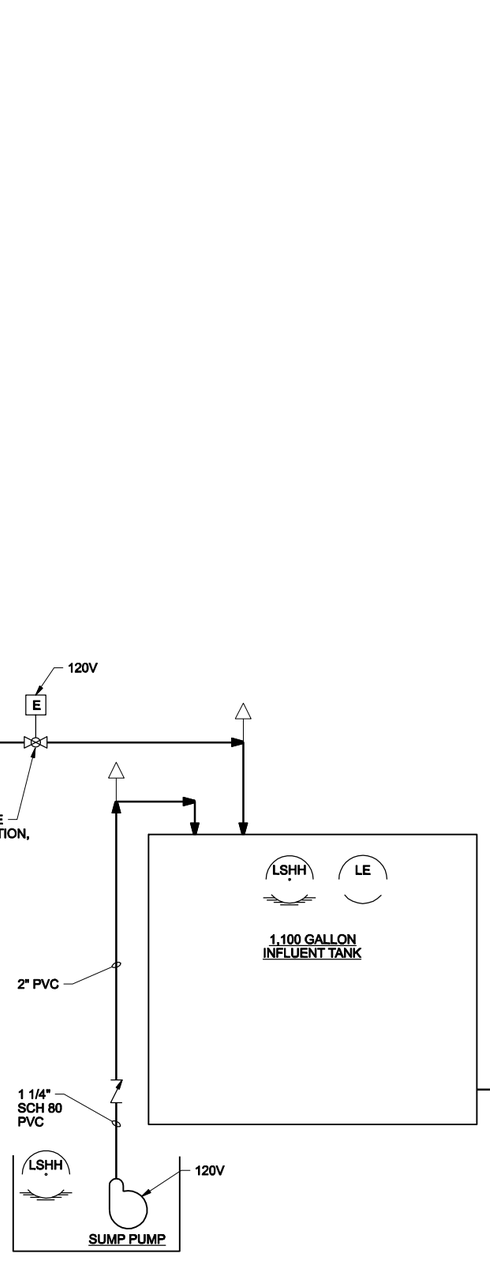
GENERAL
INSTRUMENTATION AND CONTROLS LEGEND

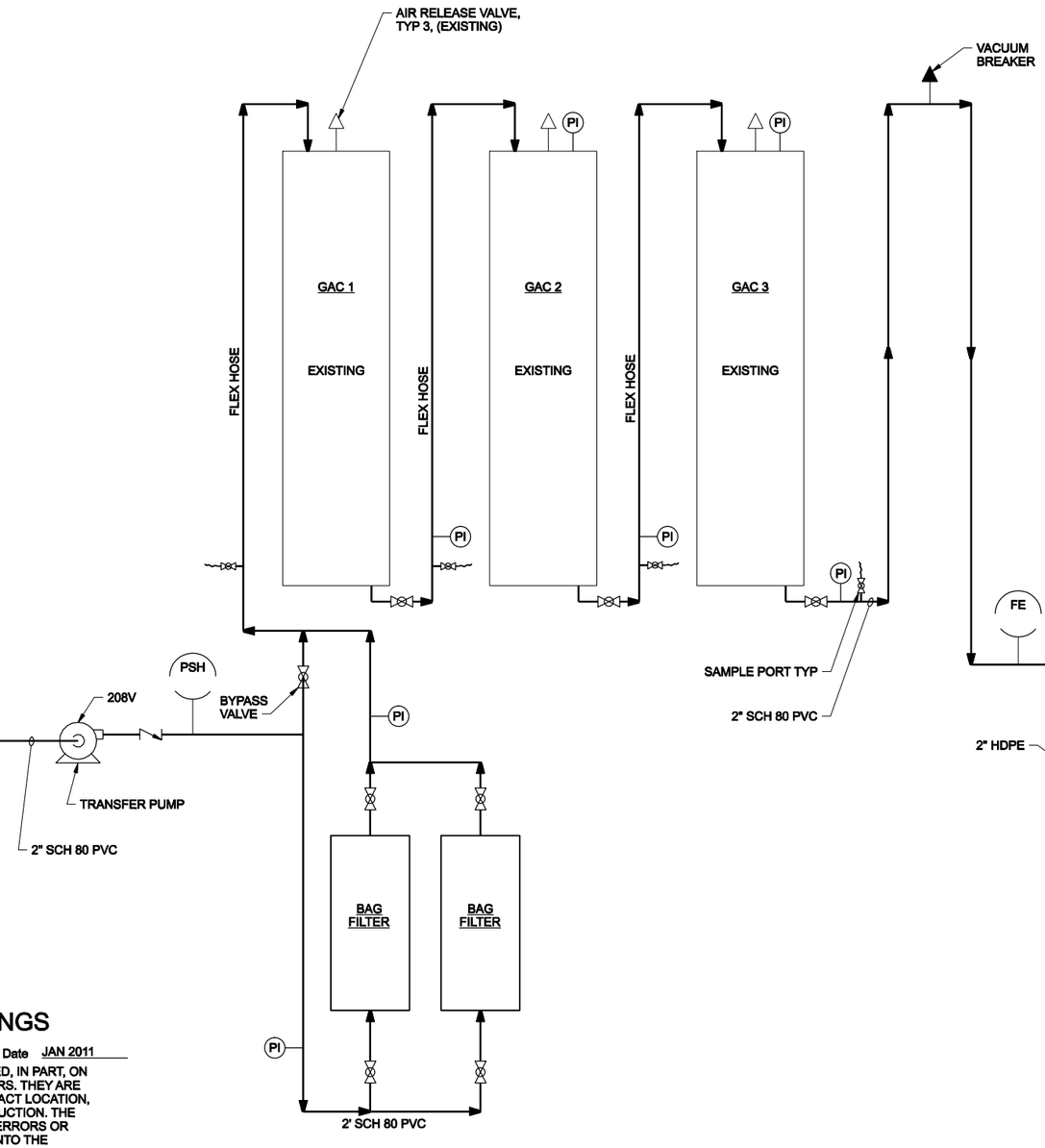
ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-06
SHEET	6







RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

08/18/10

NO.	DATE	REVISION	BY	APVD

DSGN D BERWICK DR C MACDONALD CHK L KROOK APVD L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE
AND TREATMENT SYSTEM DESIGN

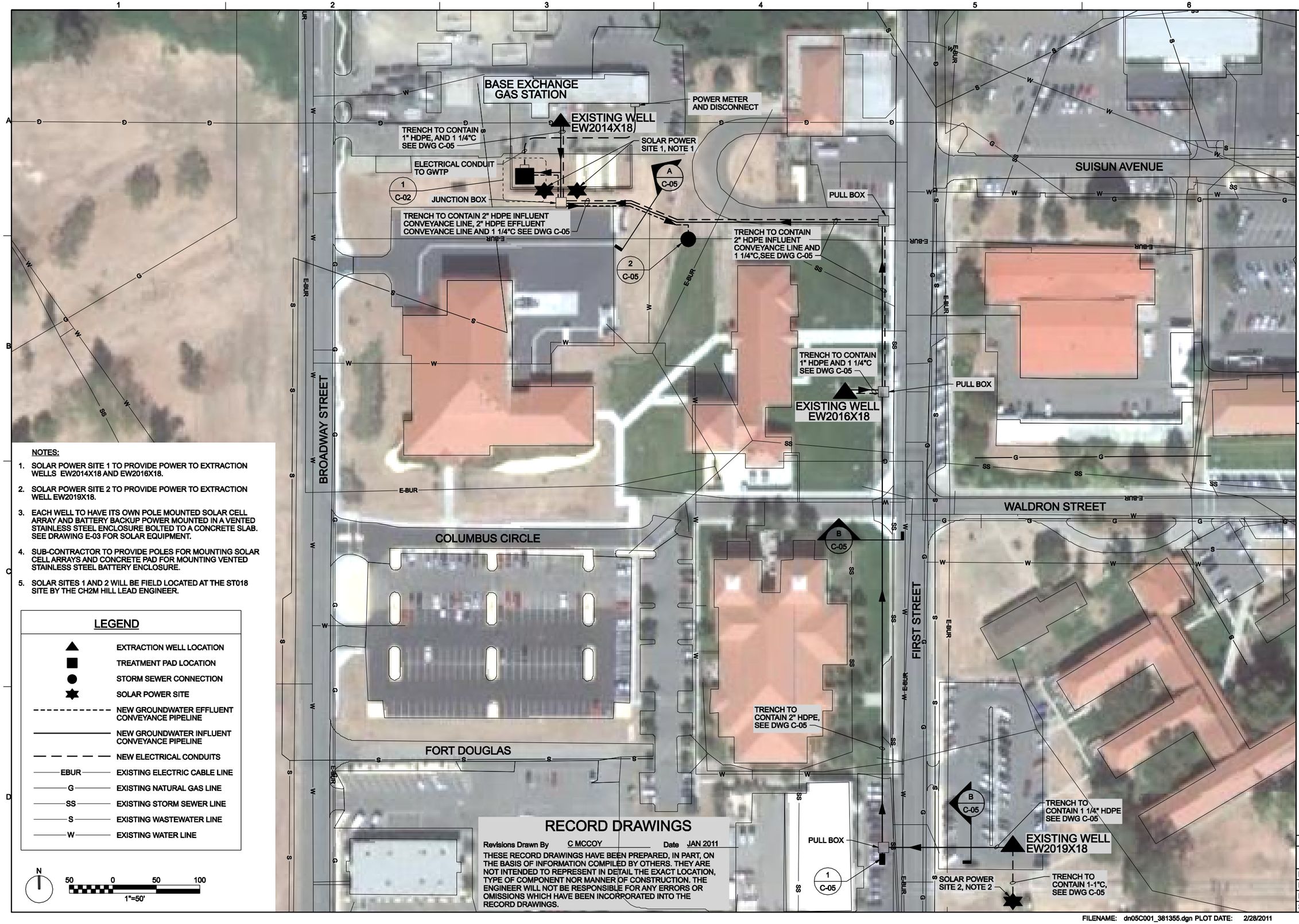
ISSUED FOR CONSTRUCTION

CH2MHILL

GENERAL
OVERALL PROCESS FLOW DIAGRAM

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	G-07
SHEET	7



NOTES:

1. SOLAR POWER SITE 1 TO PROVIDE POWER TO EXTRACTION WELLS EW2014X18 AND EW2016X18.
2. SOLAR POWER SITE 2 TO PROVIDE POWER TO EXTRACTION WELL EW2019X18.
3. EACH WELL TO HAVE ITS OWN POLE MOUNTED SOLAR CELL ARRAY AND BATTERY BACKUP POWER MOUNTED IN A VENTED STAINLESS STEEL ENCLOSURE BOLTED TO A CONCRETE SLAB. SEE DRAWING E-03 FOR SOLAR EQUIPMENT.
4. SUB-CONTRACTOR TO PROVIDE POLES FOR MOUNTING SOLAR CELL ARRAYS AND CONCRETE PAD FOR MOUNTING VENTED STAINLESS STEEL BATTERY ENCLOSURE.
5. SOLAR SITES 1 AND 2 WILL BE FIELD LOCATED AT THE ST018 SITE BY THE CH2M HILL LEAD ENGINEER.

LEGEND

- EXTRACTION WELL LOCATION
- TREATMENT PAD LOCATION
- STORM SEWER CONNECTION
- SOLAR POWER SITE
- NEW GROUNDWATER EFFLUENT CONVEYANCE PIPELINE
- NEW GROUNDWATER INFLUENT CONVEYANCE PIPELINE
- NEW ELECTRICAL CONDUITS
- EBUR — EXISTING ELECTRIC CABLE LINE
- G — EXISTING NATURAL GAS LINE
- SS — EXISTING STORM SEWER LINE
- S — EXISTING WASTEWATER LINE
- W — EXISTING WATER LINE

N

50 0 50 100

1"=50'

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER
LOREN E KROOK
No. C 53815
Exp: 06-30-11
CIVIL
STATE OF CALIFORNIA

08/18/10

NO	DATE	DSGN	DESCRIPTION	DR	CHK	APVD	APVR	N
	D. BERWICK		REVISION	CD MACDONALD	L KROOK	APVD	BY	L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE
AND TREATMENT SYSTEM DESIGN

ISSUED FOR CONSTRUCTION

CH2MHILL

CIVIL

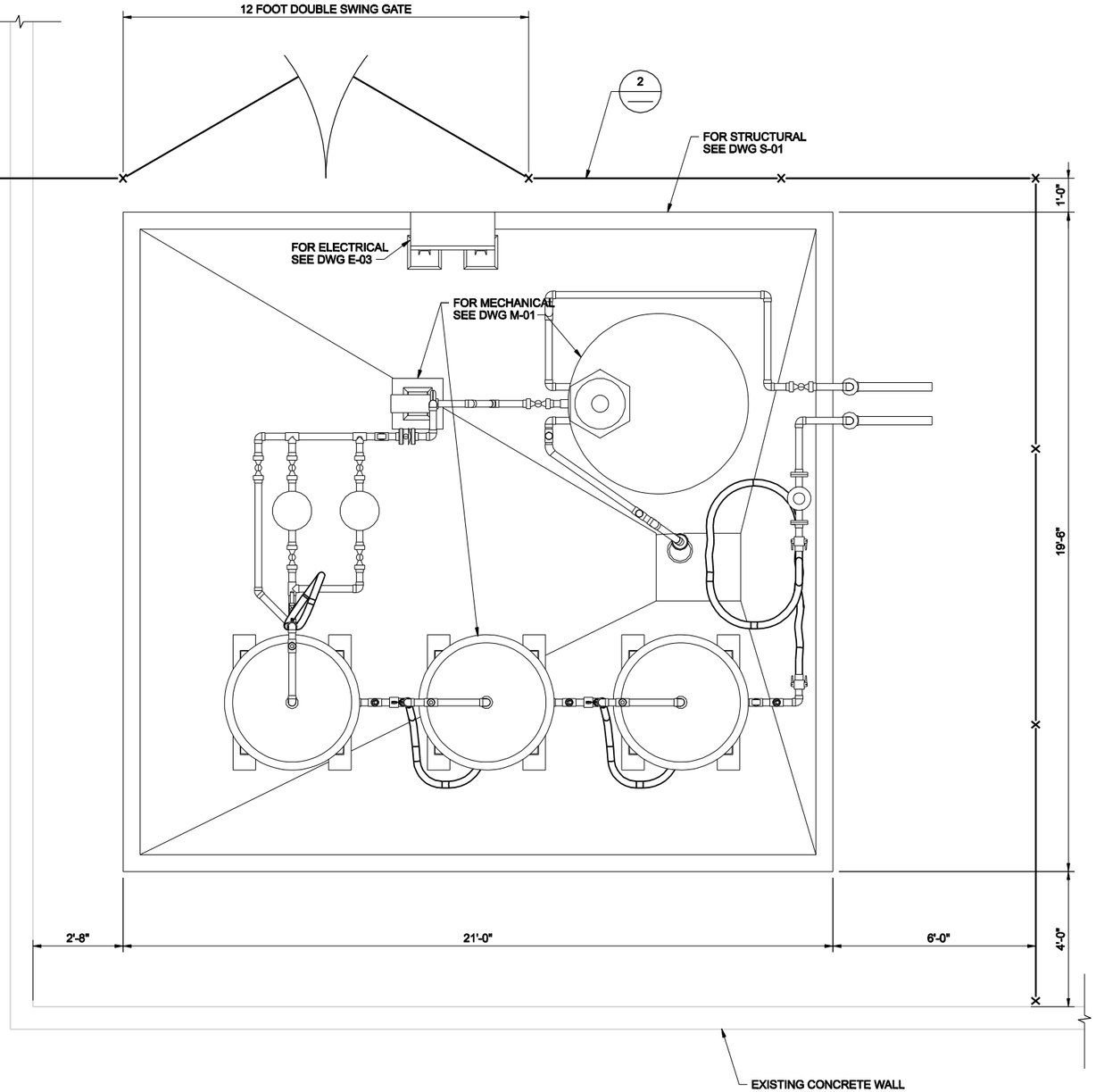
SITE LAYOUT, GROUNDWATER
TREATMENT PLANT
PIPING PLAN AND ELECTRICAL PLAN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	C-01
SHEET	8

FILENAME: dn05C001_381355.dgn PLOT DATE: 2/28/2011 PLOT TIME: 5:15:51 PM



1 SITE PLAN
1/2"=1'-0"
C-1

N

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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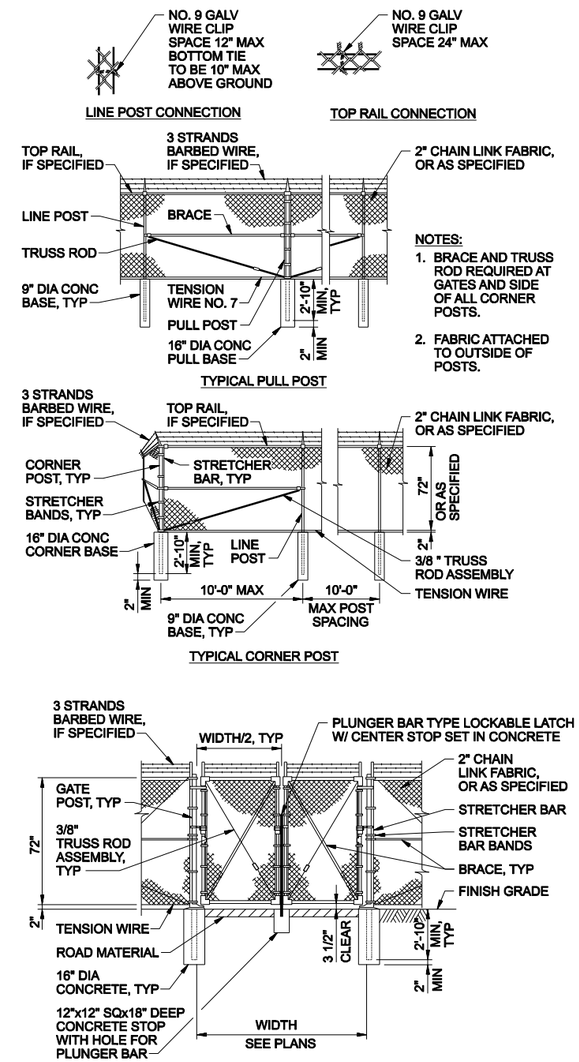


2 CHAIN FENCE DETAIL
NTS

08/18/10

NO.	DATE	REVISION	BY	APVD
DSGN	D BERWICK	DR CD MACDONALD	CHK L KROOK	APVD L KROOK
				BY L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

CIVIL
GROUNDWATER SECONDARY CONTAINMENT PAD AND FENCE PLAN

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	C-02
SHEET	9

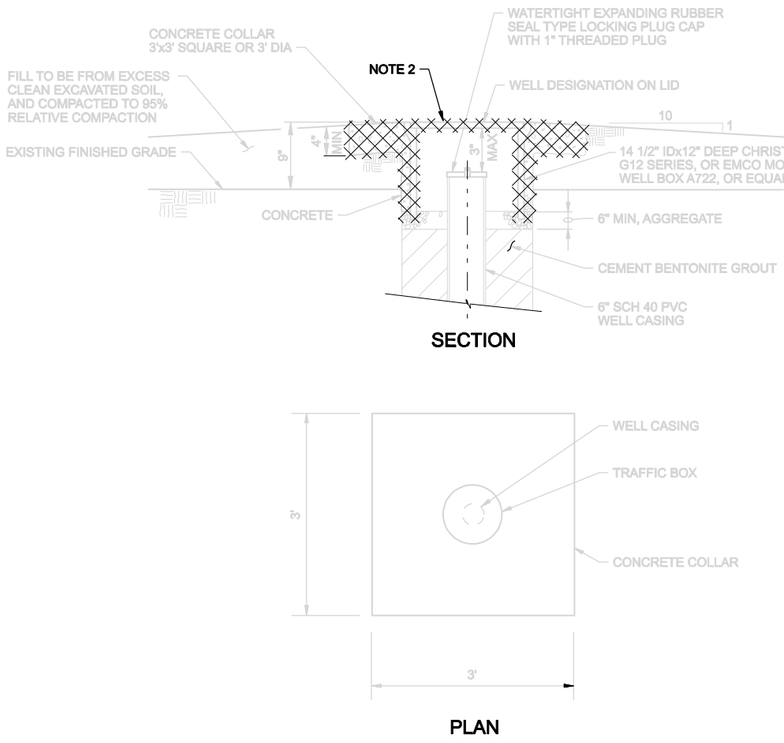
FILENAME: dn05C002_381355.dgn PLOT DATE: 2/28/2011 PLOT TIME: 5:15:58 PM

EXISTING EXTRACTION WELL SCHEDULE

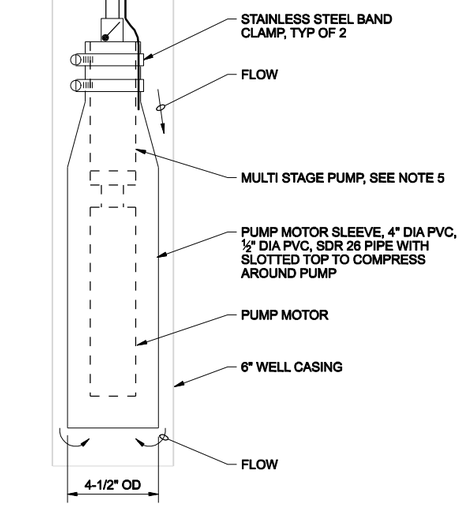
WELL ID	BOREHOLE DIA (INCHES)	CASING DIA (INCHES)	CASING/SCREEN MATERIAL	TOTAL DEPTH "A" (FT)	DEPTH TO PUMP "B" (FT)	DEPTH TO BOTTOM OF SCREEN INTERVAL "C"(FT)	DEPTH TO TOP OF SCREEN INTERVAL "D"(FT)	SCREEN LENGTH (FT)	COORDINATES ±		
									NORTHING	EASTING	ELEVATION
EW2014x18	12	6	SCHEDULE 40 PVC/ TYPE 304 STAINLESS STEEL	33	27	29.3	9.3	20	1860753.013	6578510.516	67.184
EW2016x18	12	6	SCHEDULE 40 PVC/ TYPE 304 STAINLESS STEEL	32	27	30	10	20	1860440.114	6578837.965	63.204
EW2019x18	12	6	SCHEDULE 40 PVC/ TYPE 304 STAINLESS STEEL	32	27	30	10	20	1859918.822	6579032.333	61.968

NOTES:

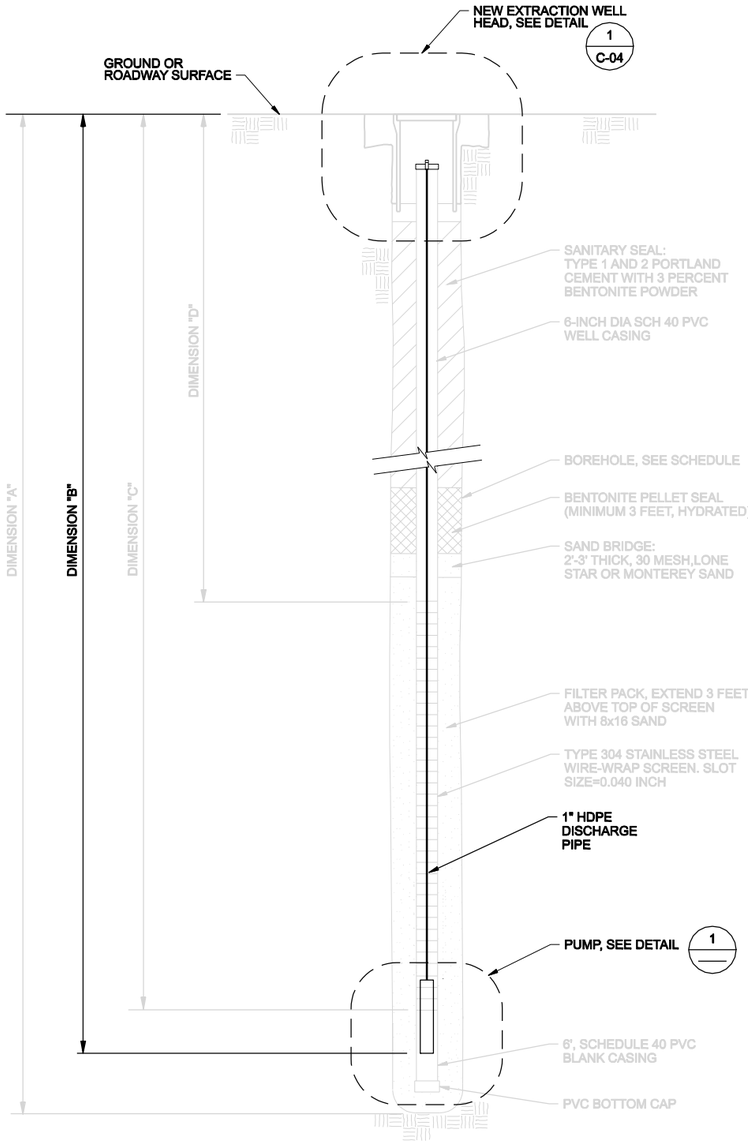
1. ALL EXTRACTION WELLS PREVIOUSLY INSTALLED BY OTHERS.
2. SUBCONTRACTOR SHALL DEMOLISH EXISTING CONCRETE COLLAR AND WELLHEAD BOX, COMPLETE EXTRACTION WELLHEADS, INSTALL NEW WELL PUMPS PER (1) AND INSTALL NEW VAULTS PER DRAWING (1/C-04).



EXISTING BELOW GRADE WELL HEAD DETAIL
NTS



(1) PUMP DETAIL
NTS



EXISTING EXTRACTION WELL DETAIL
NTS

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER — LOREN E KROOK — No. C 53815 — Exp: 06-30-11 — CIVIL — STATE OF CALIFORNIA

08/18/10

NO.	DATE	REVISION	BY	APVD
DSGN	D BERWICK	DR C MACDONALD	CHK L KROOK	APVD L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

ISSUED FOR CONSTRUCTION

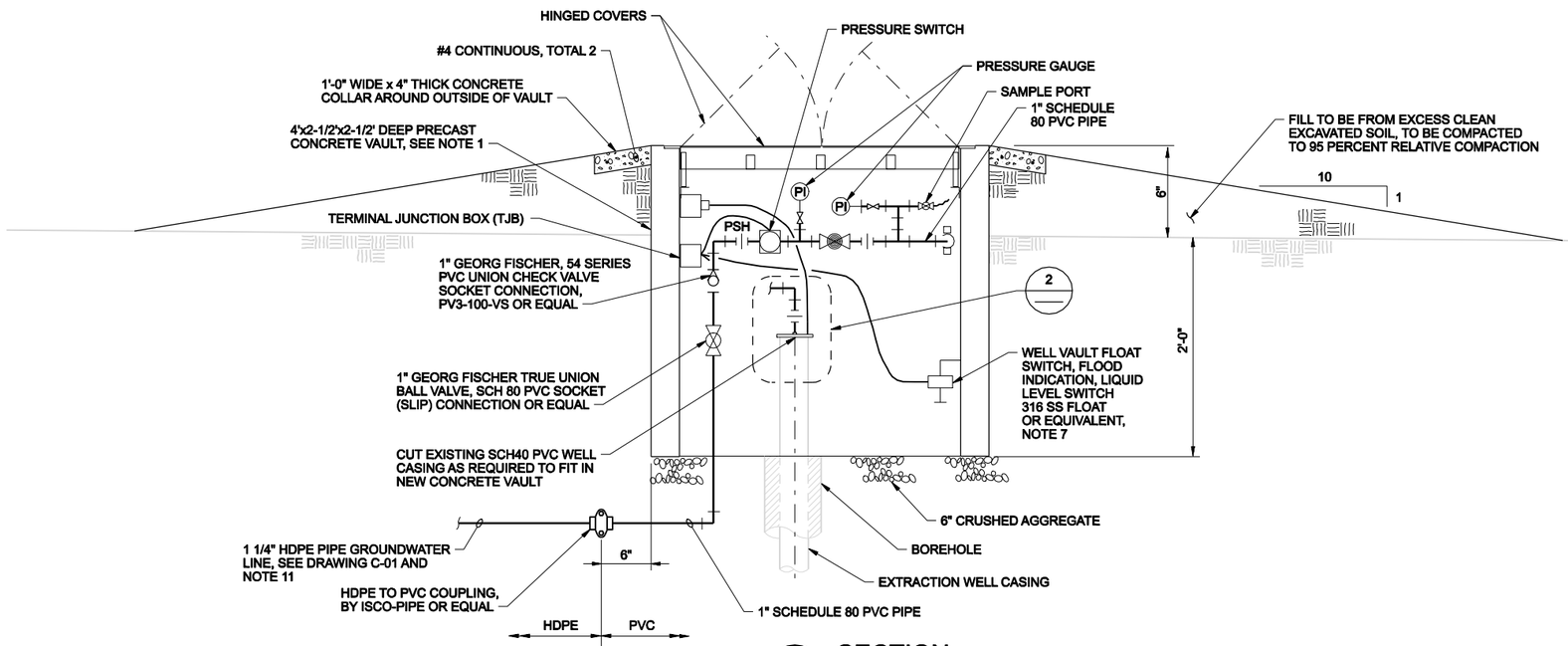
CH2MHILL

CIVIL
GROUNDWATER EXTRACTION WELL PLAN AND DETAILS

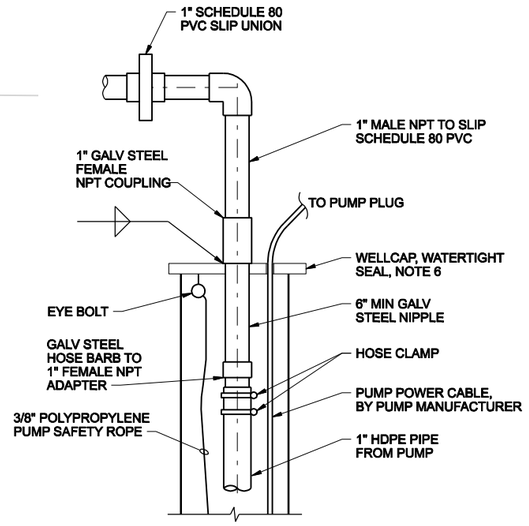
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	C-03
SHEET	10

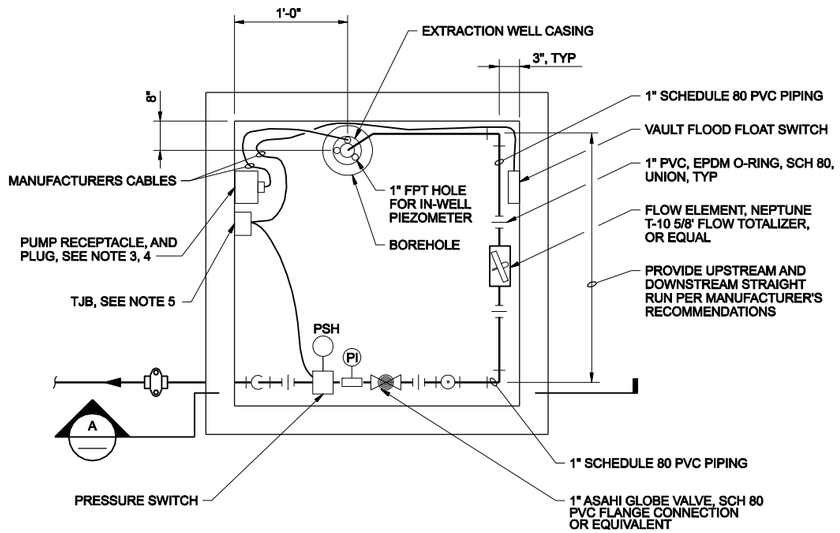
FILENAME: dn05C003_381355.dgn PLOT DATE: 2/28/2011 PLOT TIME: 5:16:00 PM



A SECTION
NTS



2 DETAIL
NTS



PLAN

1 EXTRACTION WELL DETAIL
NTS
C-03

NOTES:

1. UTILITY VAULT SHALL BE 4'x2-1/2'x2-1/2' DEEP JENSEN PRECAST CONCRETE MODEL PB3048i, MODIFIED WITH SOLID CONCRETE WALLS (NO BLOCKOUTS) AND NO CONCRETE BOTTOM. THE VAULT SHALL HAVE A HINGED TWO-DOOR 48"x30" CHECKER-PLATE COVER JENSEN MODEL CA3048ATI ADJUSTABLE TORSION SPRING ASSISTED, AASHTO H-20 TRAFFIC RATED LID, COUNTER BALANCED HATCHES, AND LOCKING DEVICE. THE VAULT SHALL HAVE TWO UNISTRUT PIPE SUPPORTS ALONG EACH WALL.
2. PIPE SUPPORTS NOT SHOWN. PROVIDE MINIMUM TWO GALVANIZED SUPPORTS PER HORIZONTAL RUN.
3. PUMP RECEPTACLE, BRYANT 430R7W, OR EQUAL, MOUNT WITHIN TOP 12" OF VAULT.
4. PUMP PLUG, BRYANT 430P7W, OR EQUAL. INSTALL ON PUMP CABLE.
5. PROVIDE TERMINAL JUNCTION BOXES NEMA 4 CAST METAL WITH 316 STAINLESS STEEL SCREENS.
6. WELLCAP FITTINGS / PENETRATIONS:
   1" THREADED, FOR PUMP POWER CORD
   1" THREADED, FOR IN-WELL PIEZOMETER
   1.660" PUMP DISCHARGE
7. FLOAT TO BE PLACED IN VAULT TO TRIGGER ALARM BEFORE FLOODING CAN COVER WELL CAP.
8. ALL COMPONENTS SHALL BE RATED FOR 150 PSIG OPERATING PRESSURE.
9. LOCATION OF BELOW GRADE WELL VAULTS TO BE MARKED WITH FLEXIBLE DELINEATORS.
10. WELL NAME TO BE MARKED ON VAULT COVER.
11. UPSTREAM PIPE MUST BE SNAKED IN TRENCH TO MINIMIZE MOVEMENT AT COUPLING.

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER
LOREN E KROOK
No. C 53815
Exp: 06-30-11
CIVIL
STATE OF CALIFORNIA
08/18/10

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		D BERWICK	C MACDONALD	L KROOK	L KROOK	L KROOK	

REVISION

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

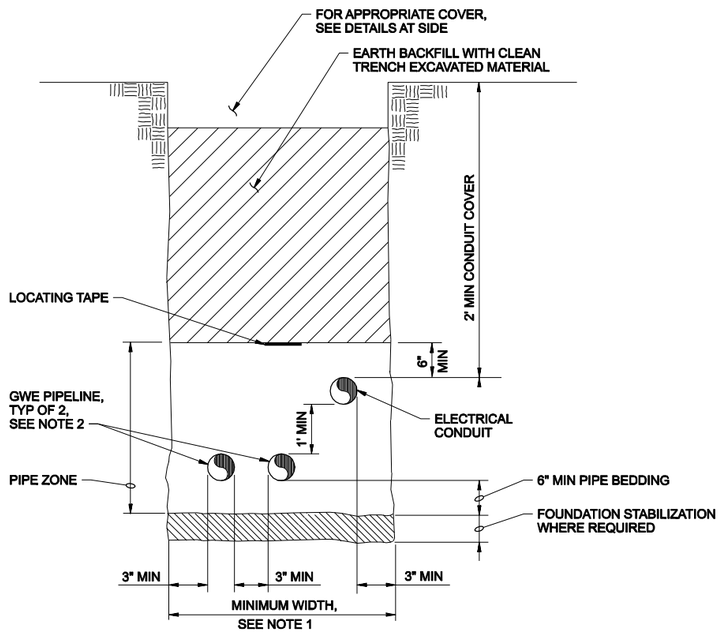
ISSUED FOR CONSTRUCTION

CH2MHILL

CIVIL
GROUNDWATER TREATMENT PLANT
WELLHEAD DETAILS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

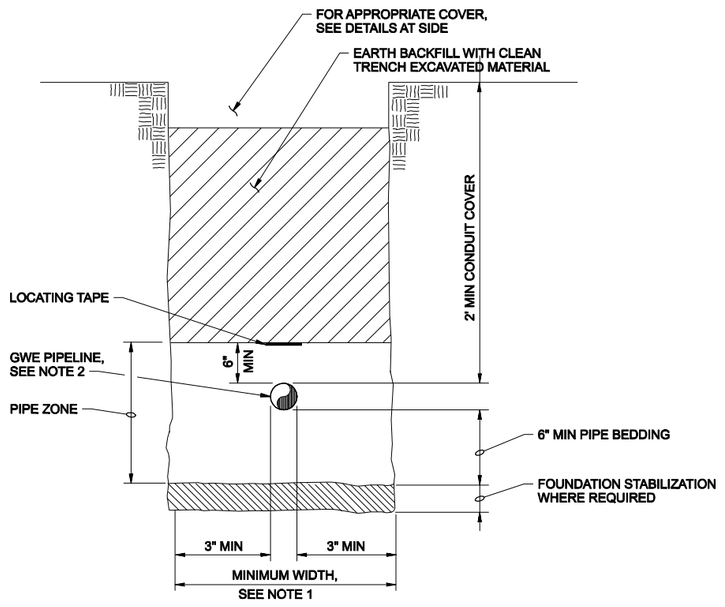
DATE	AUGUST 2010
PROJ	381355
DWG	C-04
SHEET	11



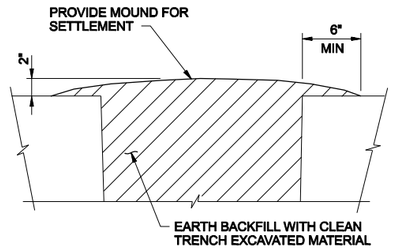
A SECTION
NTS
C-01

NOTES:

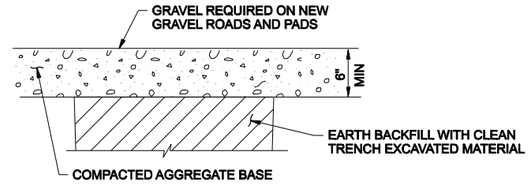
1. THE MINIMUM TRENCH WIDTH MAY BE REDUCED WHEN USING CONTROLLED LOW STRENGTH FILL AS PIPE ZONE, AND/OR FILL ABOVE PIPE ZONE.
2. PIPELINE TO BE WELDED HDPE SDR11.
3. CONTENTS OF TRENCH: IDENTIFIED ON SHEET C-01. HDPE PIPE DIAMETER TO VARY DEPENDING ON SECTION OF TRENCH. SEE SHEET C-01 FOR TRENCH CONTENT INFORMATION.
4. TRENCH BACKFILL MUST ACHIEVE 90% RELATIVE COMPACTION IN ACCORDANCE WITH ASTM 01577.



B SECTION
NTS
C-01



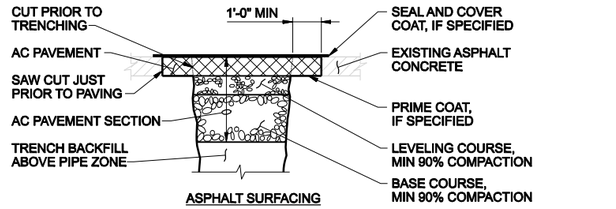
UNIMPROVED AREAS



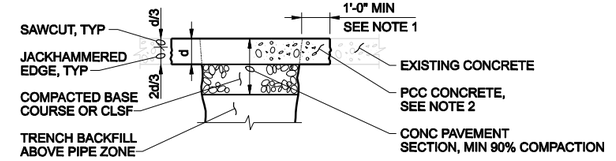
GRAVEL AREAS

NOTES:

1. EXCAVATIONS: GENERAL EXCAVATIONS
2. BACKFILL MATERIALS AND ASPHALTIC CONCRETE
3. DISTURBED GROUND SURFACE ALONG MULTISERVICE TRENCH ALIGNMENT RESTORED TO PREVIOUS CONDITIONS



ASPHALT SURFACING

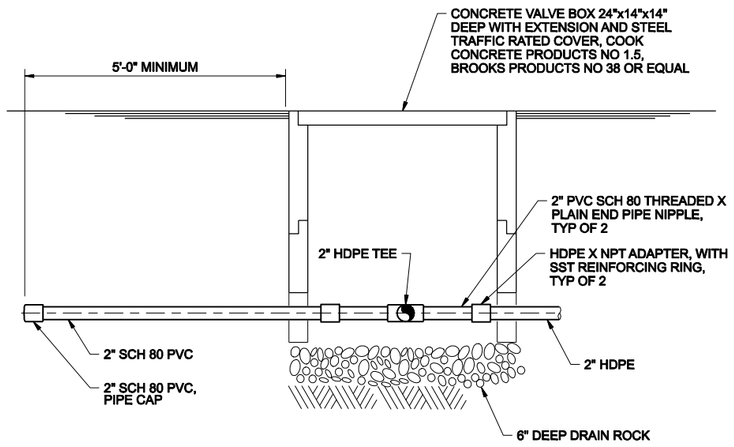


PCC CONCRETE SURFACING

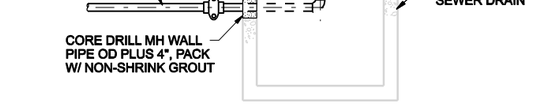
NOTES:

1. IF LOCATION OF TRENCH SAW CUT IS WITHIN 2 FEET OF AN EXISTING JOINT OR EDGE OF CONCRETE, REPLACE ENTIRE CONCRETE TO THE JOINT OR EDGE.
2. CONSTRUCT JOINTS ACROSS NEW CONCRETE TO MATCH EXISTING JOINT TYPES & LOCATIONS.
3. FOR ASPHALT AND CONCRETE FINISHING, BACKFILL MUST ACHIEVE 90% RELATIVE COMPACTION IN ACCORDANCE WITH ASTM D1557.

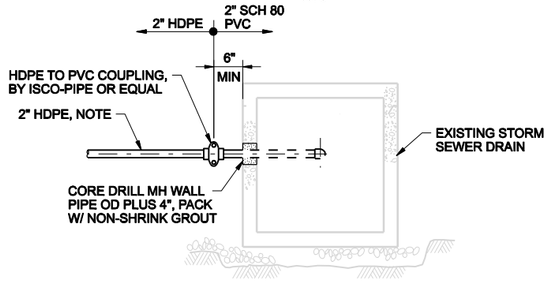
SURFACE RESTORATION
NTS



1 VALVE BOX
NTS
C-01



PLAN
NTS



ELEVATION
NTS

NOTE:
UPSTREAM PIPE MUST BE SNAKED IN TRENCH TO MINIMIZE MOVEMENT AT COUPLING.

2 STORM DRAIN PIPE PENETRATION
NTS
C-01

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER
LOREN E KROOK
No. C 53815
Exp: 06-30-11
CIVIL
STATE OF CALIFORNIA
08/18/10

NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
		D BERWICK	C MACDONALD	L KROOK	APVD	L KROOK	

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

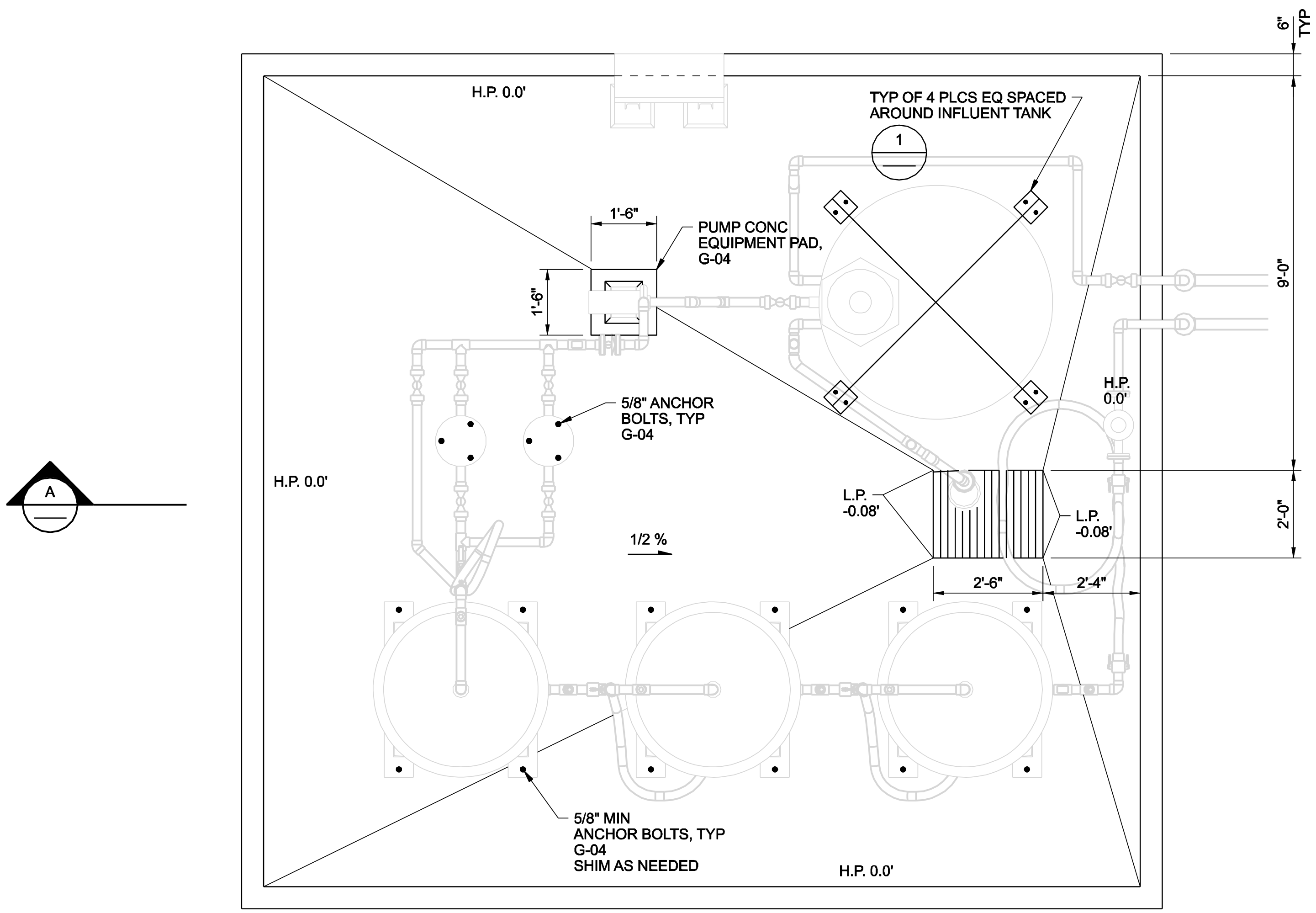
CIVIL
GROUNDWATER TREATMENT PLANT DETAILS

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	C-05
SHEET	12

FILENAME: dn05C005_381355.dgn PLOT DATE: 2/28/2011 PLOT TIME: 5:18:48 PM

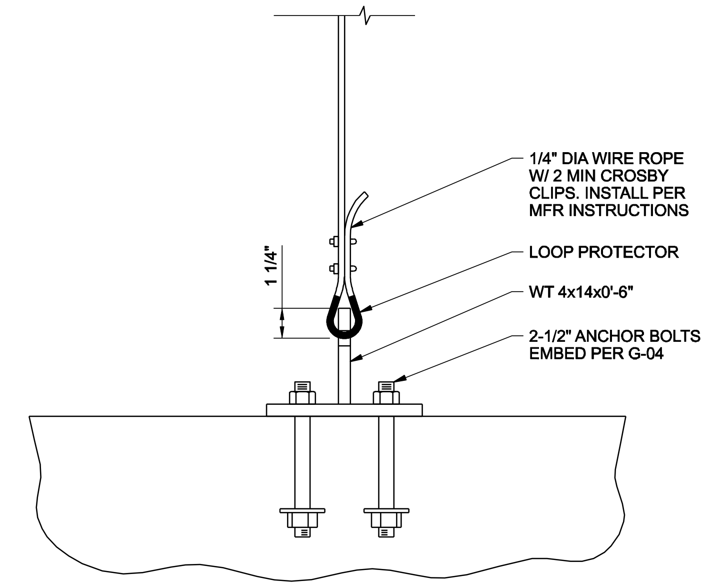


PLAN
1/2"=1'-0"

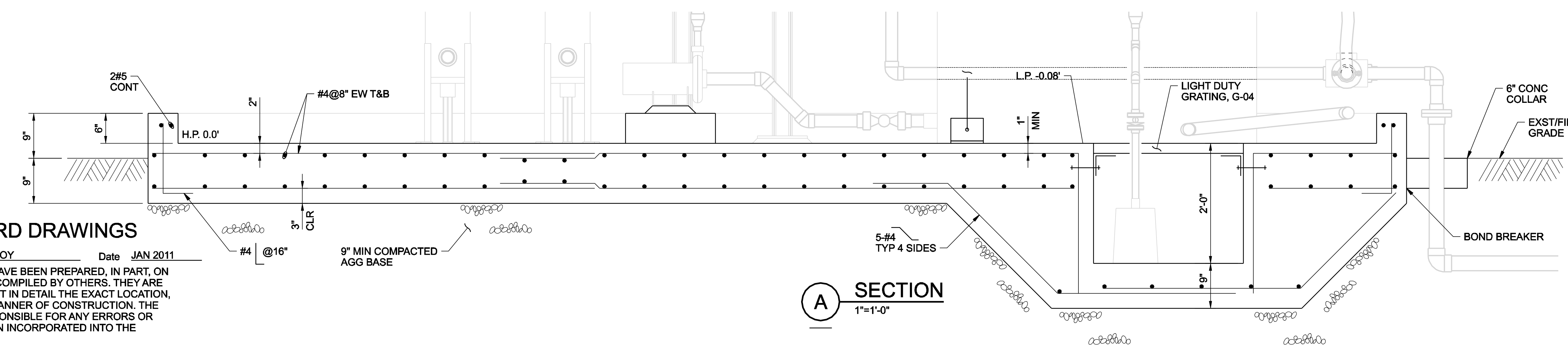
N

NOTES:

1. EXISTING WALL AND NEW FENCE NOT SHOWN, SEE C-02
2. HIGH POINT, H.P. AND LOW POINT, L.P., INDICATE TOP OF CONCRETE SLAB SLOPES TO SUMP.



1 DETAIL
3"=1'-0"



A SECTION
1"=1'-0"

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER CATHERINE A. P. LOW No. S 5513 Exp: 06-30-12 STRUCTURAL STATE OF CALIFORNIA

08/18/10

NO.	DATE	REVISION	BY	APVD

DSGN	DR	CHK	APVD
C LOW	C MCCOY	C BURKE	L KROOK

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

STRUCTURAL
GROUNDWATER TREATMENT PLANT SECONDARY CONTAINMENT PAD PLAN AND SECTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	S-01
SHEET	13

ISSUED FOR CONSTRUCTION

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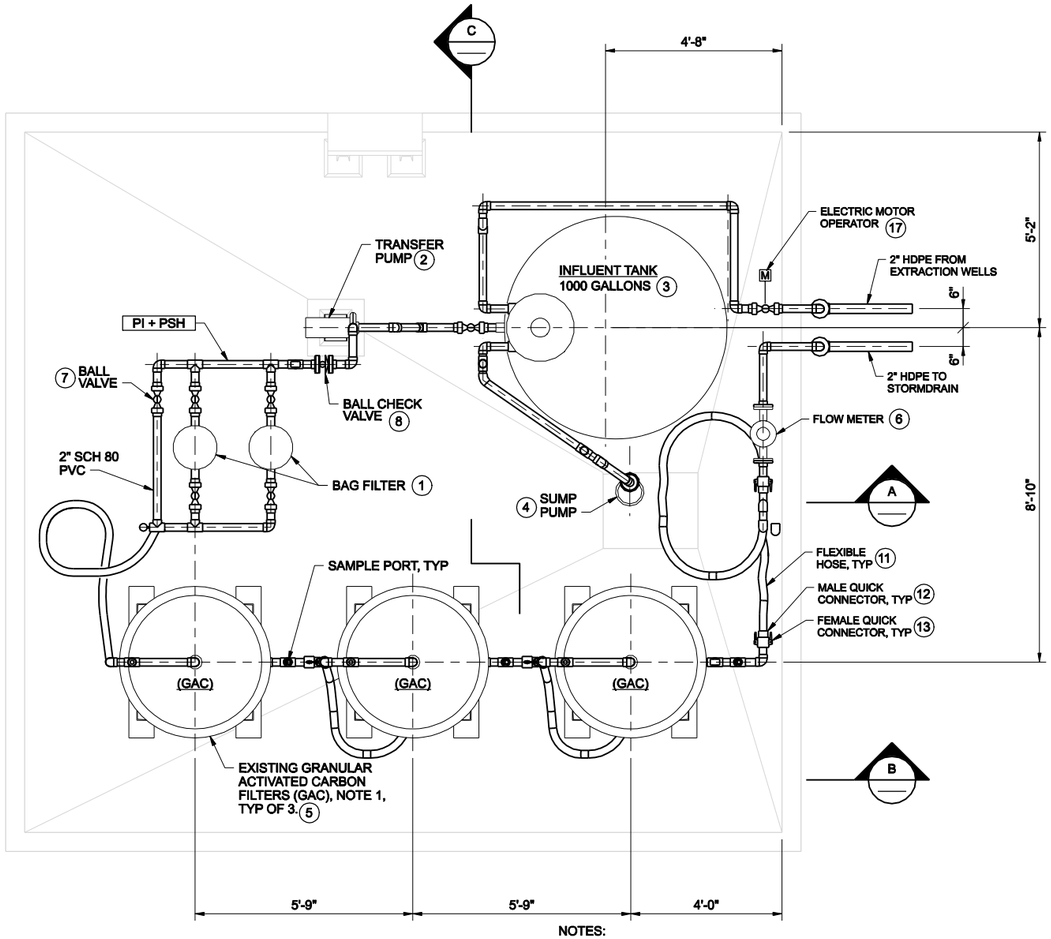
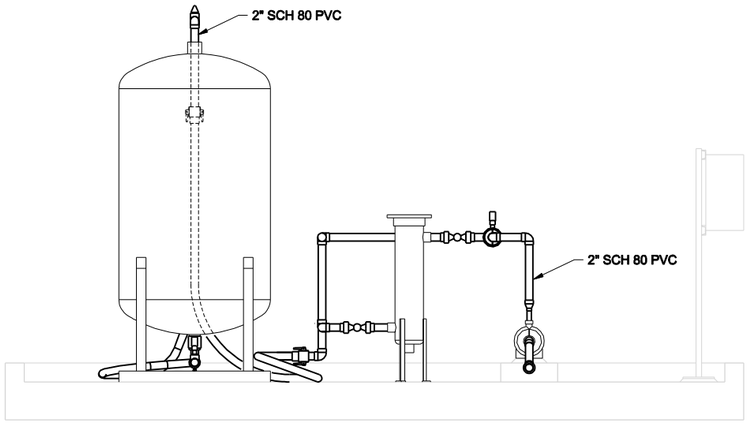


MECHANICAL PLAN

1/2"=1'-0"

1. FILTER ASSEMBLY FILTER SPECIALISTS INC. BFNP-12-6-316-150-2" NPT OR EQUIVALENT.
2. TRANSFER PUMP GOULDS MCC SERIES GENERAL PURPOSE CENTRIFUGAL PUMP, OPEN DRIP PROOF CONTINUOUS DUTY MOTOR 1-1/4" INLET BY 1" NPT OUTLET MODEL IMCIF2B0 OR EQUIVALENT.
3. INFLUENT TANK AMERICAN TANK, 1,000 GALLON AGRICULTURAL POLY TANK HW 64Dx80H, PRODUCT #085-050 OR EQUIVALENT.
4. SUMP PUMP, SUBMERSIBLE DAYTON, HP RATING 1/2, 115 VAC, AUTO SWITCH, OFF 1.65 INCH, ON 5.7 INCH, MODEL 3YU59.
5. GAC, US FILTER, PV2000, 48-INCH DIAMETER, 8'-8" HIGH, OPERATING WEIGHT: 7,700 POUNDS, 3-INCH INLET, 3-INCH OUTLET. UNITS EXISTING WITH ALL VESSEL FITTINGS INTACT, MUST BE SET UP FOR SERIES OPERATION AS NECESSARY.
6. FLOW METER, ELSTER AMCO C-700 DIRECT READ 2" FLANGE CONNECTION TOTALIZING FLOW METER OR EQUIVALENT. FLOW METER TO BE INSTALLED WITH THE CORRECT UPSTREAM AND DOWNSTREAM STRAIGHT PIPE LENGTHS, PER FLOW METER MANUFACTURER.
7. BALL VALVE, GEORG FISHER TRUE UNION SCH 80 PVC OR EQUIVALENT.
8. BALL CHECK VALVE, GEORG FISHER TRUE UNION SCH 80 PVC OR EQUIVALENT.
9. ASHCROFT LPD 0-60 PSI ADJUSTABLE SPOT PRESSURE SWITCH OR EQUIVALENT.
10. LIQUID FILLED PRESSURE GAUGE, 0-60 PSI RANGE.
11. 50 FEET FLEXIBLE HOSE, USA BLUEBOOK NO ME-69284, OR EQUAL.
12. MALE QUICK CONNECT FITTING, USA BLUEBOOK NO ME-44296, OR EQUAL.
13. FEMALE QUICK CONNECT FITTING, USA BLUEBOOK NO ME-44272, OR EQUAL.
14. 1/2" AIR AND VACUUM VALVE, APCO MODEL NO 141 WITH CAST IRON BODY, OR EQUAL.
15. 1/2" AIR RELEASE VALVE, APCO MODEL NO S-50 WITH CAST IRON BODY, OR EQUAL.
16. 1/2" BRASS BALL VALVE, McMASTER-CARR MODEL NO 47865K23, OR EQUAL.
17. ELECTRIC ACTUATOR, QUARTER MASTER SERIES 94, OR EQUAL.



C SECTION

1/2"=1'-0"

NOTES:

1. THE GAC TANKS ARE EXISTING TANKS AT TRAVIS AFB AND WILL BE RELOCATED TO THE ST018 SITE BY SUBCONTRACTOR.
2. PIPE SUPPORTS ARE NOT SHOWN. RE-USE EXISTING GAC TANK PIPE SUPPORTS IF FEASIBLE. ALL PIPING WITHIN TREATMENT COMPOUND TO BE RUN ALONGSIDE THE CONTAINMENT PAD CURB WHERE POSSIBLE AND IN THE SHORTEST RUNS POSSIBLE TO AVOID TRIPPING HAZARDS. ALL PIPING SHALL BE PROPERLY SUPPORTED AND SUPPORTED AT EVERY PIPING CHANGE OF DIRECTION.

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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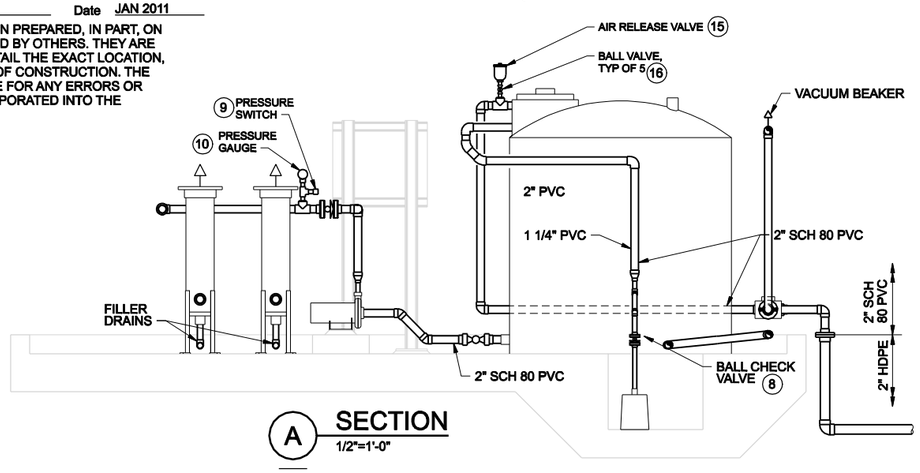
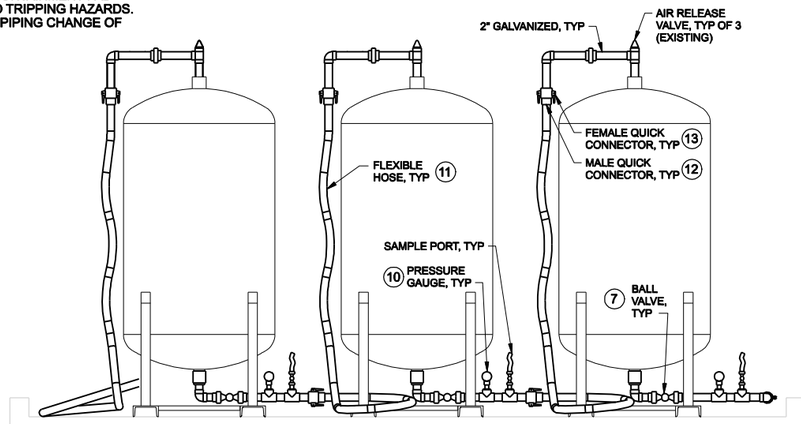


A SECTION

1/2"=1'-0"



B SECTION

1/2"=1'-0"

NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
		D BERWICK	C MACDONALD	J CROWE		L KROOK	

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

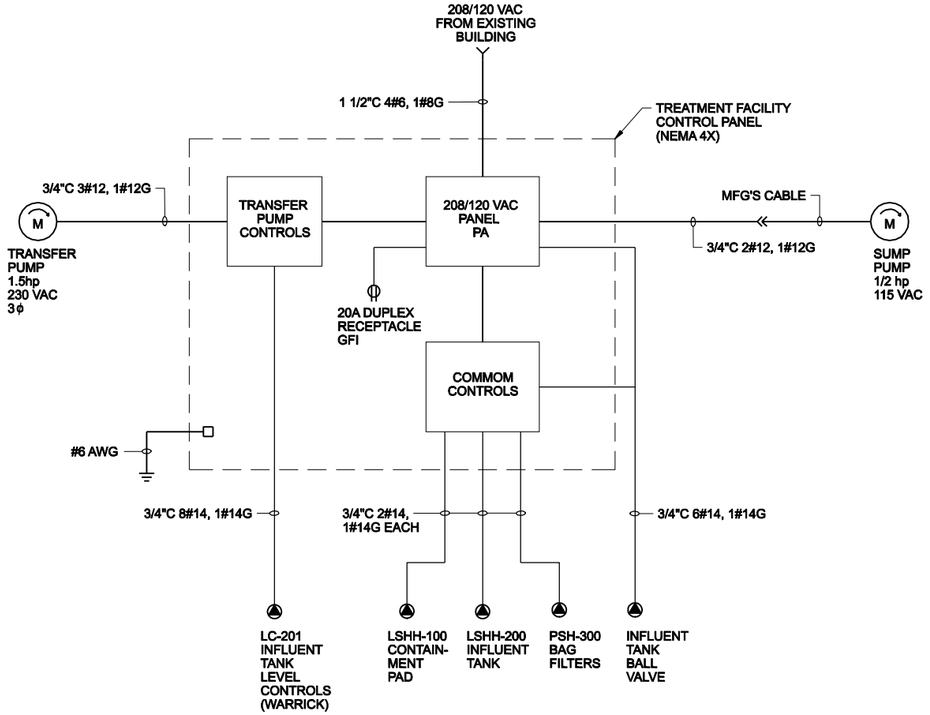
MECHANICAL
GROUNDWATER TREATMENT PLANT
SECONDARY CONTAINMENT PAD
PLAN AND SECTIONS

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	M-01
SHEET	14

FILENAME: dn05M001_381355.dgn PLOT DATE: 3/3/2011 PLOT TIME: 3:41:20 PM

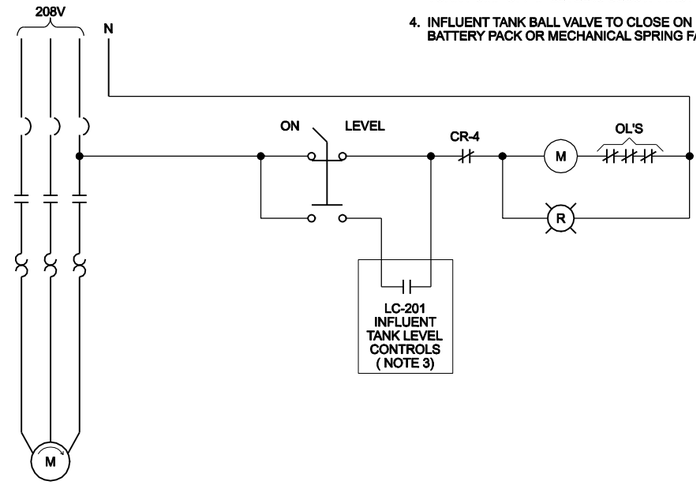


TREATMENT FACILITY ONE LINE / RISER DIAGRAM

PANEL: PA			LOCATION: TREATMENT FACILITY CONTROL PANEL								
SERVICE VOLTAGE:		120/208V	PHASE: 3		WIRE: 4						
TOTAL LOAD KVA:		3.3	BUS SIZE:		MAIN SIZE: 50A			TYPE: BREAKER			
REMARKS:			NEUTRAL:		MOUNTING: SURFACE						

LOAD IN VA				BKR	CKT	CKT	BKR		LOAD IN VA		
A	B	C	CIRCUIT DESCRIPTION	A/P	NO.	NO.	A/P	CIRCUIT DESCRIPTION	A	B	C
500.0			TRANSFER PUMP	20/3	1	2	20/1	SUMP PUMP	500.0		
	500.0		TRANSFER PUMP	20/3	3	4	20/1	BALL VALVE		500.0	
		500.0	TRANSFER PUMP	20/3	5	6	20/1	COMMON CONTROLS			500.0
100.0			LEVEL CONTROLS	20/1	7	8	20/1	SPARE			
	200.0		DUPLEX RECEPT	20/1	9	10	20/1	SPARE			
			SPARE	20/1	11	20	20/1	SPARE			
600.0	700.0	500.0	TOTAL					TOTAL	500.0	500.0	500.0

PANELBOARD SCHEDULE

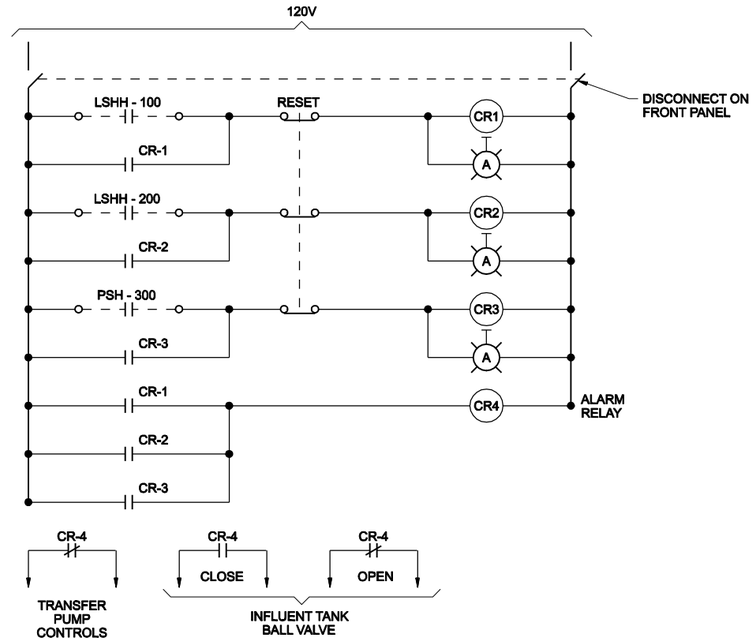


TRANSFER PUMP CONTROLS

NTS

NOTES:

1. SEE DRAWING E-03 FOR SPECIFICATIONS.
2. WIRE INFLUENT TANK BALL VALVE CONTROLS SUCH THAT VALVE CLOSES WHEN ALARM RELAY CR-4 IS ENERGIZED.
3. TURN PUMP ON IF LEVEL IS ABOVE SECOND PROBE (LSM). TURN PUMP OFF IF LEVEL IS BELOW FIRST PROBE (LSL).
4. INFLUENT TANK BALL VALVE TO CLOSE ON POWER FAILURE. BATTERY PACK OR MECHANICAL SPRING FAIL SAFE REQUIRED.



COMMON CONTROLS

NTS

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER
FRED A. HAHN
No. 8440
Exp. 6-30-2010
ELECTRICAL
STATE OF CALIFORNIA

8/18/10

NO.	DATE	DR	REVISION	CHK	APVD	BY	APVD
-						-	L KROOK
-						-	
-		FA HAHN	-	SN LEONG R CONSTANTINESCU			

CH2MHILL

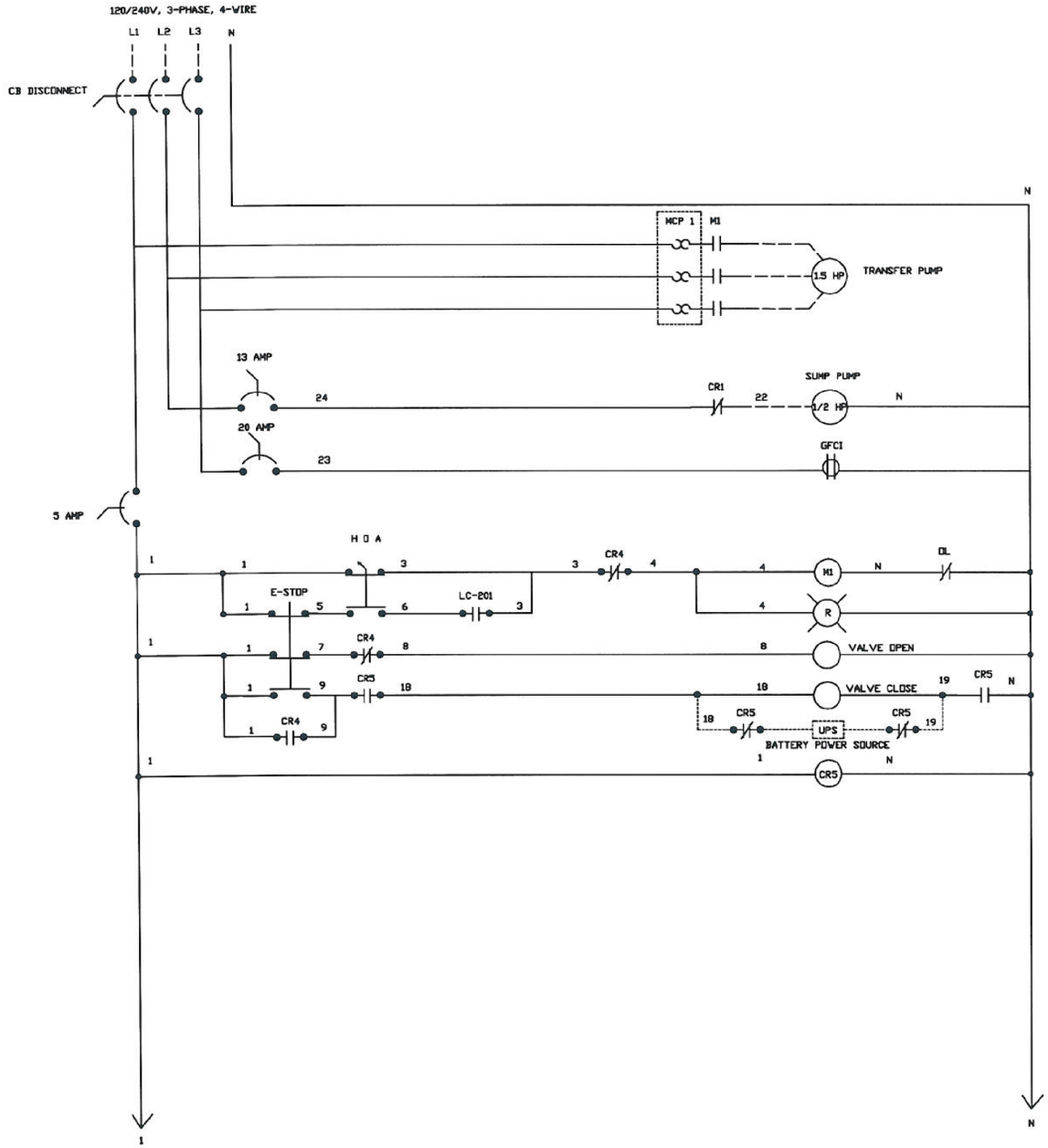
TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

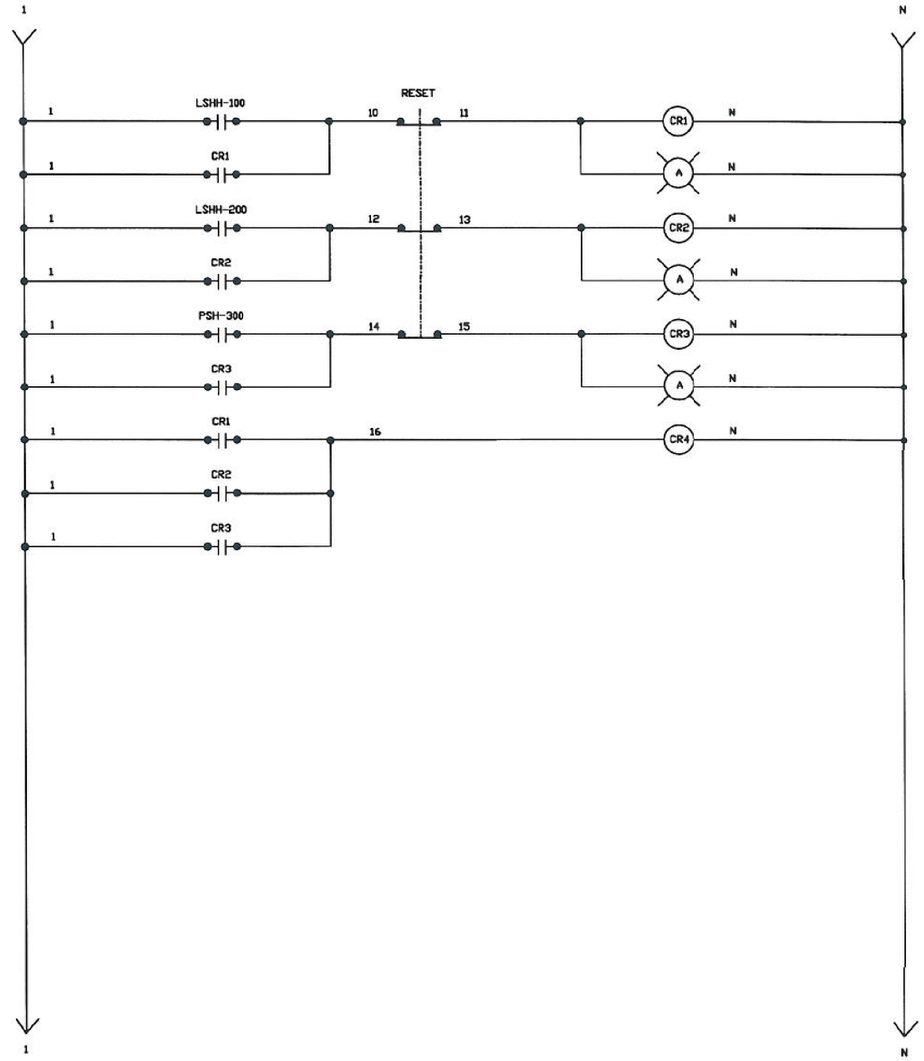
ELECTRICAL
GROUNDWATER TREATMENT PLANT
ONE LINE / RISER DIAGRAM AND DETAILS

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	E-01
SHEET	15





NOTES:

1. THIS DRAWING WAS CREATED BY CORNERSTONE ENVIRONMENTAL CONTRACTORS INCORPERATED 3527 MT DIABLO BLVD, LAFAYETTE CALIFORNIA 94549-3815, ON DECEMBER 30TH 2010.

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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NO.	DATE	REVISION	DR	CHK	APVD	BY	APVD
-	-	-				-	-

CH2MHILL

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

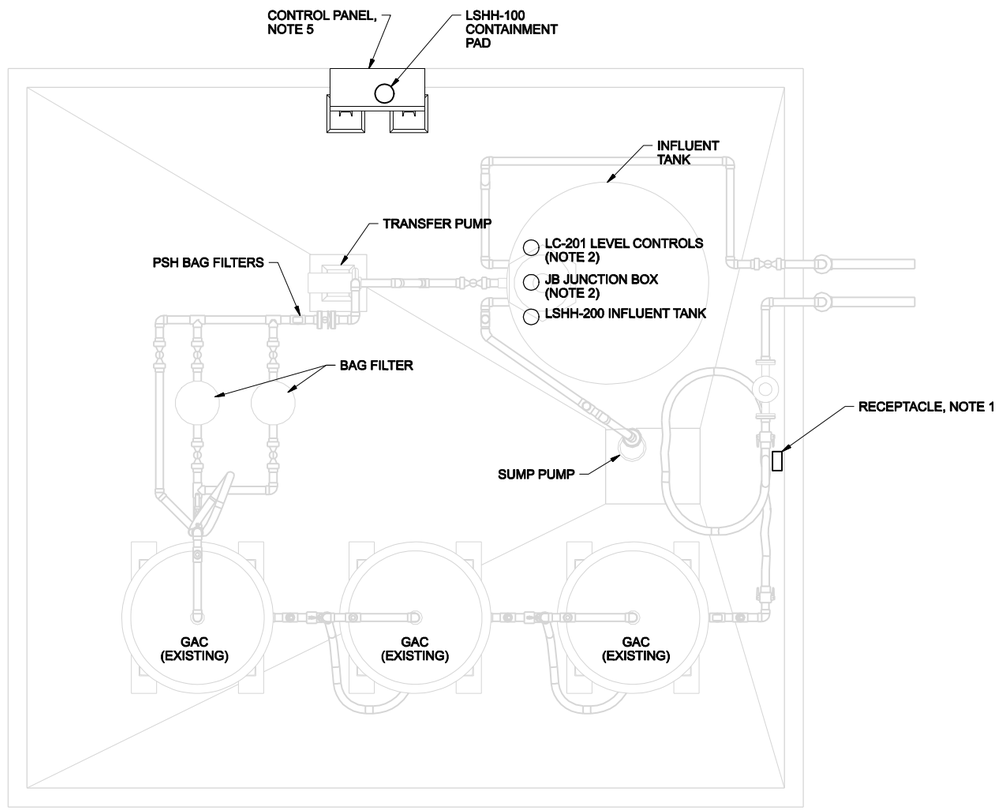
ELECTRICAL
GROUNDWATER TREATMENT PLANT
ONE LINE / RISER DIAGRAM
REFERENCE DRAWING

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

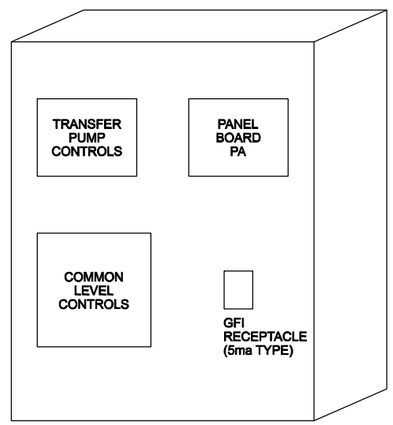
DATE	DECEMBER 2010
PROJ	381355
DWG	E-02
SHEET	16

FILENAME: dn10E002_381355.dgn PLOT DATE: 3/3/2011 PLOT TIME: 2:54:47 PM



TREATMENT FACILITY - PLAN

1/2"=1'-0"



TREATMENT FACILITY - CONTROL PANEL INTERIOR LAYOUT

NTS

SPECIFICATIONS

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), UNDERWRITERS LABORATORIES (UL), AND THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ).
2. ALL WIRING SHALL BE CABLE IN CONDUIT. ALL ABOVE GROUND CONDUIT SHALL BE RIGID GALVANIZED STEEL (RGS). ALL BELOW GROUND CONDUIT EXCEPT 90° BENDS SHALL BE PVC SCHEDULE 40 CONDUIT. ALL BELOW GROUND 90° BEND SHALL BE PVC COATED RGS CONDUIT. CONDUIT TERMINATIONS TO MOTORS, VALVES, AND INSTRUMENTS SHALL BE WITH PVC COATED FLEXIBLE METAL CONDUIT. ALL JUNCTION AND PULL BOXES SHALL BE NEMA 4 CAST METAL TYPE WITH GASKETS AND 316 STAINLESS SCREENS.
3. ALL CABLE SHALL 600 VOLT RATED STRANDED COPPER, WITH THHN/THWN-2 INSULATION EXCEPT FOR SIZES NO. 6 AND LARGER SHALL BE INSULATED WITH XHHW-2 INSULATION.
4. ALL GROUND RODS SHALL BE COPPER CLAD STEEL, 5/8" DIAMETER, AND 10 FEET LONG. ALL GROUND CONNECTIONS ABOVE GRADE SHALL BE MECHANICAL TYPE. ALL BELOW GRADE CONNECTIONS SHALL BE EXOTHERMIC OR COMPRESSION TYPE.
5. ALL CONTROL PANELS SHALL BE NEMA 4X, 304 STAINLESS STEEL WITH DOOR BEHIND DOOR CONSTRUCTION AND LOCKABLE OUTER DOOR FOR SECURITY. CONTROL PANELS SHALL BE MOUNTED ON EQUIPMENT MOUNTING PEDESTALS AS SHOWN ON DETAIL 1/E-04 AND FACED NORTH OR EAST AS MUCH AS POSSIBLE. USE TWO MOUNTING PEDESTALS IF NEEDED FOR LARGER PANELS.
6. ALL CIRCUIT BREAKERS SHALL BE MOLDED CASE TYPE. AC CIRCUIT BREAKERS SHALL BE 250 VDC RATED. STARTERS, RELAYS, TERMINAL BLOCKS AND CONTROL DEVICES SHALL BE ALSO BE 600 VOLT RATED. IN ADDITION, ALL CONTROL DEVICES SHALL BE INDUSTRIAL GRADE TYPE.
7. SOLAR EQUIPMENT SHALL BE AS FOLLOWS: (OR EQUIVALENT AND APPROVED BY CH2MHILL)
   - o PHOTO VOLTAIC PANELS - SHARP NT-175UCI 175 WATT PV MODULES
   - o CHARGE CONTROLLERS - TRI STAR 45 AMP 12/24/48 VOLT TYPE
   - o DIGITAL DISPLAYS - MORNINGSTAR TS-M DIGITAL DISPLAY FOR TRI STAR UNIT
   - o BATTERIES - MK S31 SLDG (8G31) 12V, 98 AH DEEP CYCLE GEL BATTERY WITH STUD TERMINALS
   - o PUMPS - GRUNDFOS SQ FLEX 3 SQF-2 PUMP
8. SUBMIT FOR REVIEW AND APPROVAL, CATALOG CUTS OF ALL ELECTRICAL EQUIPMENT TO BE PROVIDED, PRIOR TO CONSTRUCTION. IN ADDITION, FOR CONTROL PANELS, SUBMIT SHOP DRAWINGS SHOWING ONE LINE DIAGRAMS, CONTROL DIAGRAMS, INTERNAL AND EXTERNAL PANEL ELEVATIONS, AND BILLS OF MATERIAL FOR REVIEW AND APPROVAL, PRIOR TO FABRICATION. PROVIDE SIX COPIES OF O AND M MANUALS CONTAINING ALL SUBMITTED ITEMS, OF ALL ELECTRICAL EQUIPMENT AT END OF PROJECT.

NOTES:

1. INSTALL 30 ma GFI RECEPTACLE FOR SUMP PUMP.
2. INSTALL JUNCTION BOX ON TOP OF TANK FOR COMBINING LEVEL CONTROL CABLES AND LSHH CONDUCTORS. TERMINATE CABLES SUPPLIED WITH LEVEL CONTROLS ON TERMINAL BLOCKS IN JUNCTION BOX.
3. USE EQUIPMENT MOUNTING PEDESTAL DETAIL 1/E-04 FOR MOUNTING THIS PANEL.
4. CONDUIT RUNS ARE NOT SHOWN. ALL CONDUIT RUNS (POWER, SIGNAL, ETC) WITHIN TREATMENT COMPOUND TO BE RUN ALONGSIDE THE CONTAINMENT PAD CURB WHERE POSSIBLE AND IN THE SHORTEST RUNS POSSIBLE TO AVOID TRIPPING HAZARDS. ALL CONDUITS SHALL BE PROPERLY SUPPORTED AND SUPPORTED AT EVERY CHANGE OF DIRECTION.

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

REGISTERED PROFESSIONAL ENGINEER — FRED A. HAHN — No. 8440 — Exp. 6-30-2010 — ELECTRICAL — STATE OF CALIFORNIA

8/18/10

NO.	DATE	DR	REVISION	CHK	BY
-	-	FA HAHN	-	SN LEONG R CONSTANTINESCU	APVD L KROOK

DSGN

CH2MHILL

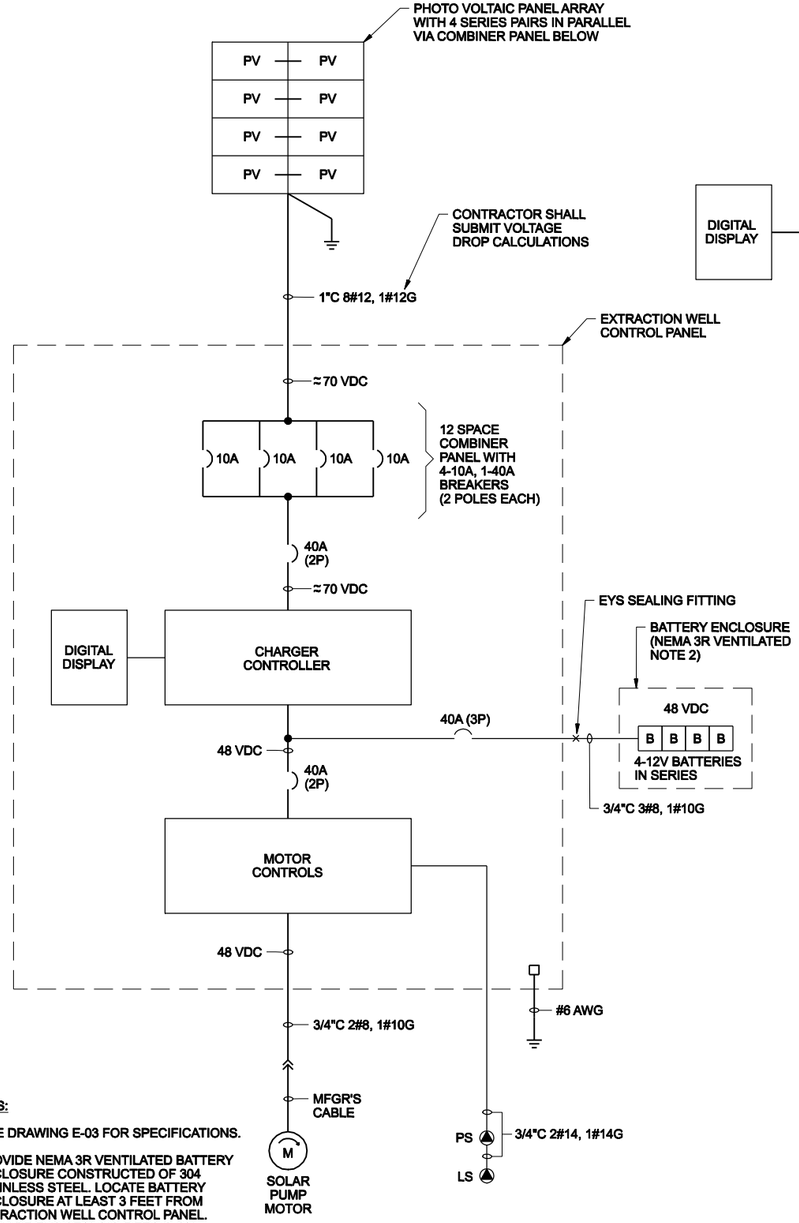
TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

ELECTRICAL
GROUNDWATER TREATMENT PLANT PLAN, SPECIFICATIONS AND DETAILS

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

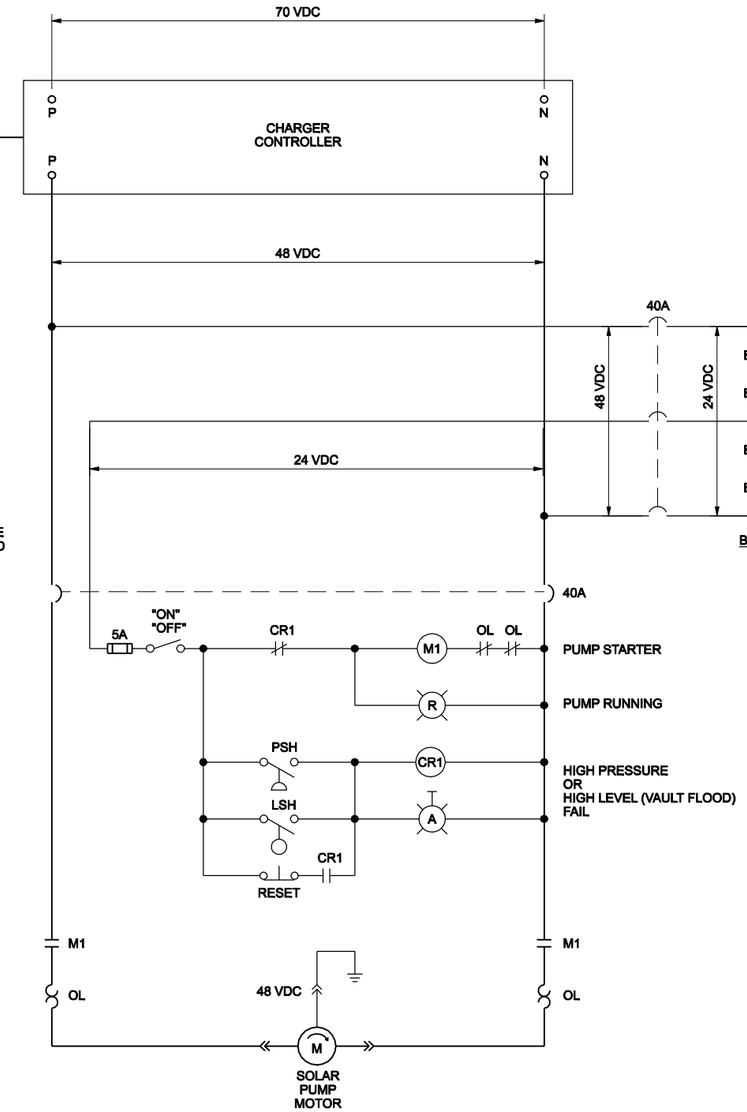
DATE	AUGUST 2010
PROJ	381355
DWG	E-03
SHEET	17



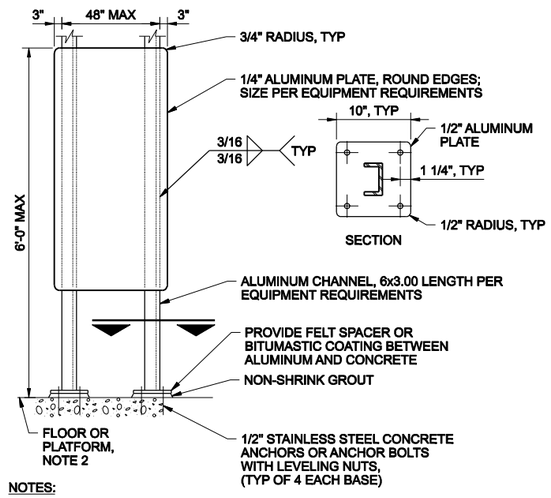
NOTES:

1. SEE DRAWING E-03 FOR SPECIFICATIONS.
2. PROVIDE NEMA 3R VENTILATED BATTERY ENCLOSURE CONSTRUCTED OF 304 STAINLESS STEEL. LOCATE BATTERY ENCLOSURE AT LEAST 3 FEET FROM EXTRACTION WELL CONTROL PANEL. PROVIDE EYS SEALING FITTING ON CONDUIT BETWEEN THE TWO, (WITHIN 18") OF THE CONTROL PANEL.

EXTRACTION WELLS
ONE LINE/RISER DIAGRAM
(TYPICAL 3 WELLS)



EXTRACTION WELLS
CONTROL DIAGRAM
(TYPICAL 3 WELLS)



NOTES:

1. USE STAINLESS STEEL MOUNTING HARDWARE. USE WASHER AND SPLIT LOCK WASHER UNDER ALL NUTS.
2. FOR YARD LOCATIONS PROVIDE A 9 INCH THICK CONCRETE PAD AT GRADE WITH #4 BAR @ 12" OC EACH WAY, CENTERED. THE PAD SHALL BE 12 INCHES LONGER THAN THE MOUNTING PLATE BY ONE HALF THE HEIGHT OF THE MOUNTING PLATE ABOVE FINISHED GRADE. MINIMUM WIDTH 24 INCHES.
3. PREPARE SUBGRADE PER DRAWING G-04.

1 ELECTRICAL EQUIPMENT SUPPORT
NTS
C-03

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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REGISTERED PROFESSIONAL ENGINEER
FRED A. HAHN
No. E440
Exp. 6-30-2010
ELECTRICAL
STATE OF CALIFORNIA
8/18/10

NO.	DATE	DSGN	DR	CHK	APVD
-		FA HAHN	SN LEONG R CONSTANTINESCU		APVD
-			REVISION		BY
-			-		APVD
-					L KROOK

CH2MHILL

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

ELECTRICAL
EXTRACTION WELLS
ONE LINE / RISER DIAGRAM
AND DETAILS

ISSUED FOR CONSTRUCTION

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	E-04
SHEET	18

INSTRUMENT LIST

TAG NAME	DESCRIPTION	LOCATION	MANUFACTURER	MODEL	RANGE/SETTING	CONTROL STRATEGY
EW2014X18-FE-100	TURBINE FLOWMETER	Extraction Well EW2014X18	NEPTUNE TECHNOLOGIES	T-10 5/8"	1-20 GPM	N/A
EW2014X18-PI-200	PRESSURE GAUGE	Extraction Well EW2014X18	ASHCROFT		0-150 PSIG	N/A
EW2014X18-PSH-300	HIGH PRESSURE SWITCH	Extraction Well EW2014X18	ASHCROFT		0-150 PSIG	TURN OFF EXTRACTION WELL PUMP.
EW2014X18-LSH-300	VAULT FLOODED/HIGH LEVEL SWITCH	Extraction Well EW2014X18			0.5 FEET ABOVE VAULT FLOOR	TURN OFF EXTRACTION WELL PUMP.
EW2016X18-FE-100	TURBINE FLOWMETER	Extraction Well EW2016X18	NEPTUNE TECHNOLOGIES	T-10 5/8"	1-20 GPM	N/A
EW2016X18-PI-200	PRESSURE GAUGE	Extraction Well EW2016X18	ASHCROFT		0-150 PSIG	N/A
EW2016X18-PSH-300	HIGH PRESSURE SWITCH	Extraction Well EW2016X18	ASHCROFT		0-150 PSIG	TURN OFF EXTRACTION WELL PUMP.
EW2016X18-LSH-300	VAULT FLOODED/HIGH LEVEL SWITCH	Extraction Well EW2016X18			0.5 FEET ABOVE VAULT FLOOR	TURN OFF EXTRACTION WELL PUMP.
EW2019X18-FE-100	TURBINE FLOWMETER	Extraction Well EW2019X18	NEPTUNE TECHNOLOGIES	T-10 5/8"	1-20 GPM	N/A
EW2019X18-PI-200	PRESSURE GAUGE	Extraction Well EW2019X18	ASHCROFT		0-150 PSIG	N/A
EW2019X18-PSH-300	HIGH PRESSURE SWITCH	Extraction Well EW2019X18	ASHCROFT		0-150 PSIG	TURN OFF EXTRACTION WELL PUMP.
EW2019X18-LSH-300	VAULT FLOODED/HIGH LEVEL SWITCH	Extraction Well EW2019X18			0.5 FEET ABOVE VAULT FLOOR	TURN OFF EXTRACTION WELL PUMP.
ST-018-LSHH-100	SUMP LEVEL HIGH HIGH	TREATMENT FACILITY				TURN OFF TRANSFER PUMP. CLOSE INFLUENT TANK BALL VALVE.
ST-018-LSHH-200	INFLUENT TANK LEVEL HIGH HIGH	TREATMENT FACILITY				TURN OFF TRANSFER PUMP. CLOSE INFLUENT TANK BALL VALVE.
ST-018-LC-201	INFLUENT TANK LEVEL SENSOR AND CONTROLLER	TREATMENT FACILITY	WARRICK			TURN TRANSFER PUMP ON OR OFF BASED ON LEVEL.
ST-018-PSH-300	BAG FILTERS HIGH PRESSURE SWITCH	TREATMENT FACILITY	ASHCROFT			TURN OFF TRANSFER PUMP. CLOSE INFLUENT TANK BALL VALVE.
ST-018-PI-301	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-PI-302	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-PI-303	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-PI-304	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-PI-305	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-PI-306	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-PI-307	BAG FILTERS PRESSURE GAUGE	TREATMENT FACILITY	ASHCROFT			N/A
ST-018-FE-400	EFFLUENT POSITIVE DISPLACEMENT FLOWMETER	TREATMENT FACILITY	ELSTER AMCO	C-700		N/A

SHEDULE OF CONTROL PANELS

Tag Name	DESCRIPTION	Type	Dimensions	Mounting DETAIL
EW2014X18-CP-1	EXTRACTION WELL EW2014X18 CONTROL PANEL	NEMA 4X	36"HX36"WX18"D	See Electrical Equipment Suport Detail
EW2014X18-BAT-1	EXTRACTION WELL EW2014X18 BATTERRY ENCLOSURE	NEMA 3R	36"HX36"WX18"D	ON 6" THICK CONCRETE PAD, GALVANIZED SUPPORTS
EW2016X18-CP-1	EXTRACTION WELL EW2014X18 CONTROL PANEL	NEMA 4X	36"HX36"WX18"D	2605-008B
EW2016X18-BAT-1	EXTRACTION WELL EW2014X18 BATTERRY ENCLOSURE	NEMA 3R	36"HX36"WX18"D	ON 6" THICK CONCRETE PAD, GALVANIZED SUPPORTS
EW2014X18-CP-1	EXTRACTION WELL EW2014X18 CONTROL PANEL	NEMA 4X	36"HX36"WX18"D	2605-008B
EW2014X18-BAT-1	EXTRACTION WELL EW2014X18 BATTERRY ENCLOSURE	NEMA 3R	36"HX36"WX18"D	ON CONCRETE PAD, GALVANIZED SUPPORTS
ST018-CP-1	TREATMENT FACILITY CONTROL PANEL	NEMA 4X	48"HX36"WX18"D	See Electrical Equipment Suport Detail

RECORD DRAWINGS

Revisions Drawn By C MCCOY Date JAN 2011

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NO.	DATE	REVISION	DR	CHK	APVD	BY	APVD
-	-	-	FA HAHN	CD MACDONALD	R CONSTANTINESCU	L KROOK	

TRAVIS AIR FORCE BASE, CALIFORNIA
ST018
GROUNDWATER EXTRACTION, CONVEYANCE AND TREATMENT SYSTEM DESIGN

CH2MHILL

ELECTRICAL
EXTRACTION WELLS
INSTRUMENT LIST AND
SCHEDULE OF CONTROL PANELS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 2010
PROJ	381355
DWG	E-05
SHEET	19

Appendix E
Site ST018 Groundwater Treatment Plant
NPDES Permit

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Acting Secretary for Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Edmund G. Brown, Jr.
Governor

CIW QS Place ID: 761357 (lrg)

Travis Air Force Base
Attn.: James C. Vechery, Colonel, USAF
Commander, 60th Air Mobility Wing
400 Brennan Circle
Travis AFB, CA 94535

Subject: Notice of General Permit Coverage for Discharge from 170 Travis Avenue STO18, Travis Air Force Base, Solano County, CA 94535, under the Requirements of Order No. R2-2006-0075, NPDES Permit No. CAG912002 (Fuels General Permit)

Dear Colonel James C. Vechery:

We reviewed the Notice of Intent (NOI) application package dated January 18, 2011, and supplemental dated January 26, and February 4, 2010, for the above-named facility. We determined that the proposed discharge is eligible for coverage under the requirements of the Fuels General Permit. You are authorized to discharge only as specified in the following table, and you are required to comply with all Fuels General Permit requirements. This discharge authorization is conditional and may be terminated at any time by the Water Board's Executive Officer.

Facility	**Discharge Type**
Travis Air Force Base STO18 170 Travis Avenue Travis AFB, CA 94535	Groundwater Extraction & Treatment System for an active service station
State Receiving Water	**Discharge Location**
Union Creek	Latitude: 38° 15' 28.85 "; Longitude: 121° 55' 36.47"
CIWQS Place Identification	**Allowable Discharge**
761357	Extracted and treated groundwater (Limits under "Other Surface Water Areas" are applicable)

Maximum Discharge Flow Rate	Treatment Systems
60 gallons per minute (gpm)	A treatment system consisting of at least: • three submersible pump-equipped extraction wells, • one 1,100-gallon influent collection tank, • two bag filters, and • three 2,000-pound Granular Activated Carbon vessels in series.

Reminder Notes:

1. Use CIWQS Place identification number and the facility address listed in the table for any future communications.
2. Notify Lou Gonzales within 24 hours at the e-mail address below, of the document titles uploaded on Geotracker.
3. Submit the Self-Monitoring Reports no later than 45 days following the last day of the quarter, and the Annual Reports by February 15th of each year. If there is no discharge during the reporting period, please state this information in the reports. Late reports and effluent violations are subject to mandatory minimum penalties pursuant to California Water Code 13385 (h)&(i).

Any changes to the treatment system require prior approval by Water Board staff. If the information within the table is incorrect, or for questions, please contact Lou Gonzales at (510) 622-2365, or by e-mail at lgonzales@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

Attachment: Clarification letter dated 9/11/2008

cc: Lonnie Duke – Lonnie.Duke@us.af.mil
Doug Berwick – Douglas.Berwick@ch2m.com
Loren Krook – Loren.krook@ch2m.com
Alan Friedman – Afriedman@waterboards.ca.gov

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Secretary for
Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

To: Attached List

Subject: Amendment of Self-Monitoring Program, Clarification on Submittal of Reports, and Termination of Coverage for Fuels General Permit, NPDES No. CAG912002, Order No. R2-2006-0075

Dear Fuels General Permit Dischargers:

We have noticed some problems with specific monitoring requirements and some general confusion (and therefore noncompliance) with some of the reporting requirements. This letter intends to correct those problems and clarify the confusion.

Amendment to Correct a Problem:

- **Effluent Monitoring Requirements**—Modify Section IV at page E-3 of the Self-Monitoring Program as follows (underline indicates new text):

  C. "If the analytical results show violation of any effluent limit (Effluent Limitation, Table 2), the Discharger shall take a confirmation effluent sample, together with receiving water samples (see Table E.2 and VIII.A) within 24 hours of knowledge of violation of effluent limit. The Discharger must have the confirmation sample analyzed by expedited methods and obtain results within 24 hours of sample collection. If the analytical results are also in violation of the effluent limit, the Discharger shall terminate the discharge until it has corrected the cause of violation. In this case, both the initial and confirmed results are violations. However, if the confirmation effluent sampling shows compliance, we will consider only the initial exceedance as a violation."

- **Receiving Water Monitoring Requirements**—Modify Table E.2 at pages E-5 and E-6,

  "Frequency of Sampling

  V. You must perform the receiving water sampling together (on the same calendar day) with the effluent confirmation sample that the permit requires when there is a violation of an effluent limit, and must analyze for that specific exceeded compound and the Dissolve Oxygen level…"

The above modification requires collecting receiving water samples at the same time, or at least within the same day, as the effluent confirmation sample after an effluent violation occurred. This will avoid the situation where a discharger continues discharging into the next day in order to collect receiving water samples that may result in additional effluent violations.

Clarifications

A. **Reporting Requirements** – Sections B.2 and B.3 of the MRP requires timely submittal of Quarterly Self-Monitoring Reports and Annual Reports by the Dischargers. The following points clarifies these requirements.

- **When to submit SMRs and ARs**
  Submit Quarterly Self Monitoring Reports no later than 30 days after the last day of each calendar quarter.

  Submit Annual Reports by January 30th of each year covering the previous calendar year. The annual report shall contain all data required for annual reporting. You may submit the Annual Report in lieu of the 4th quarterly report of a calendar year.

- **Late reports subject to penalties**
  Reports that are late by 30 days or more are subject to mandatory minimum penalties. These are mandatory penalties. The minimum that must be assessed is $3,000 for each 30-day period for which a report is late.

- **Where to send reports**
  Do not combine the NPDES and Groundwater Reports. Submit NPDES reports to the attention of Lou Gonzales, NPDES Wastewater Division. Submit Groundwater Reports to the attention of Toxics Division staff. If you upload your NPDES reports on Geotracker, please notify Lou Gonzales when you have done so via e-mail at lgonzales@waterboards.ca.gov.

- **When facility is neither operating nor discharging**
  Dischargers still need to submit Self Monitoring Reports. If there is no discharge during the reporting period, please state this information on the Self Monitoring Reports.

- **Reports of treatment unit bypass and permit violation**
  Within 1 day of the Discharger becoming aware of a treatment unit bypass or a permit violation at its facility, the Discharger must notify Water Board staff by phone or e-mail (Lou Gonzales, or her designee, at 510-622-2365, lgonzales@waterboards.ca.gov). Within 5 days of becoming aware of the

problem, the Discharger must follow-up with a written report of the bypass or violation. Please see the Self-Monitoring Program for information that must be included in the written report.

- **Reports must include perjury statement**
  There are strict rules for who must sign off on submittals of reports to the Water Board, and in no case shall the consultant sign this certification.

  Standard Provision and Reporting Requirements for NPDES Surface Water Discharge Permits requires that all reports shall be signed by a principal executive officer or ranking elected official of the discharger, or by a duly authorized representative of that person. Section 122.22 (b), CFR 40, further defines who may be a duly authorized person.

  All reports signed by the duly authorized representative shall contain the following certification:

  "I certify under penalty of law that this document and attachments are prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing the violations."

  We will not accept reports signed by a discharger's consultants. Reports that are submitted signed by the wrong person or missing this perjury statement do not count as reports and can lead to fines.

B. **Termination of Coverage** – Please request rescission or termination of your Fuels General Permit coverage if you no longer plan to discharge to surface waters and, therefore, no longer need coverage. Unless we rescind your coverage, you remain active in our system, and are legally required to comply with all of the Fuels General Permit's requirements including report submittal and annual fee payment.

Finally, as a reminder, Dischargers must properly operate their treatment systems to avoid violations and must submit reports by the required due dates. Late reports and effluent violations are subject to mandatory minimum penalties pursuant to California Water Code 13385(h), 13385(i),and 13385.l

If you have other permit-related issues that need clarification, or if you have any questions, please contact Lou Gonzales at (510) 622-2365 or by e-mail at lgonzales@waterboards.ca.gov. Please use the CIWQS Place ID number and the site address listed in the attachment for future communications.

Sincerely,

Lila Tang
Chief, NPDES Wastewater Division

Attachment: Fuels Permittees List

FUELS GENERAL PERMIT DISCHARGERS

Dischargers	Consultants	Facilities	CIWQS Place #
Chevron Environmental	tflora@secor.com	147 East Santa Clara Street, San Jose, Santa Clara County, CA 95113	201629
Management Company	dana.mccarthy@saic.com	395 Bird Avenue, San Jose, Santa Clara County, CA 95126	202559
Attn.: Mr. Ian Robb	dana.mccarthy@saic.com	598 South First Street, San Jose, Santa Clara County, CA 95113	203408
P.O. Box 6004	prashant.m.shah@saic.com	1401 Airport Boulevard, San Jose, Santa Clara County, CA 95110	201602
San Ramon, CA 94583	dana.mccarthy@saic.com	2710 Story Road, San Jose, Santa Clara County, CA 95127	202206
	Des_Garner@URSCorp.com	9000 Carquinez Scenic Drive, Port Costa, Contra Costa County, CA 94569	203794
	prashant.m.shah@saic.com	1151 Tully Road, San Jose, Sta. Clara County, CA 95122	201459
Mr. and Mrs. Randy Lemos	Blackpoint Environmental	684 Liberty Road, Petaluma, Sonoma County, CA 94952	656166
684 Liberty Road	Attn.: Brian West		
Petaluma, CA 94952	930 Shiloh Rd., Bldg. 40, Ste F		
	Windsor, CA 95492		
Atlantic Richfield Company	erik.lawson@stantec.com	666 North Santa Cruz Avenue, Los Gatos, Santa Clara County, CA 95030	203493
Attn.: Mr. John C. Skance	erik.lawson@stantec.com	5755 Camden Avenue, San Jose, Santa Clara County, CA 95124	203396
P.O. Box 1257	Michael.A.Lawson@saic.com	10550 South De Anza Boulevard, Cupertino, Santa Clara County, CA 95014	655538
San Ramon, CA 94581	erik.lawson@stantec.com	545 West Alma Avenue, San Jose, Santa Clara County, CA 95110	655531
John.Skance@bp.com	erik.lawson@stantec.com	3010 Union Avenue, San Jose, Santa Clara County, CA 95124	202335
	erik.lawson@stantec.com	97 South Abbott Avenue, Milpitas, Santa Clara County, CA 95035	203833
200 Saratoga Corrective	RRM, Inc.	200 Saratoga Avenue, Los Gatos, Santa Clara County, CA 95030	655529
Action Acct.; c/o Brian Kelleher	cate@rrmsc.com		
Kelleher & Assoc Env Mgmt.			
812 S. Winchester, Ste 10,#109			
San Jose, CA 95128			
Alken Properties	Geo Restoration, Inc.	333 Phelan Avenue, San Jose, Santa Clara County, CA 95112	202441
Attn.: Mr. Paul Houvet, Presider	dugan@welltest.biz		
1503 Cherrygarden Lane			
San Jose, CA 95125			

Dischargers	Consultants	Facilities	CIWQS Place #
Former Ancewicz Property	Augeas Corporation	1098 So 5th Street, SJ	201401
Attn.: Mr. Walt Ancewicz	john@augeas.com		
1195 Chateau DriveSan Jose, CA 95120			
World Oil Marketing Company	The Source Group, Inc.	3148 Senter Road, San Jose, Santa Clara County, CA 95111	202377
Attn.: Mr. John Hundley	Attn.: Karl Bowers		
9302 South Garfield Avenue	299 West Hillcrest Dr., Ste 220		
South Gate, CA 90280	Thousand Oaks, CA 91360		
Mr. Ihioma Nzeadibe	SOMA Environ & Eng	3363 San Pablo Dam Road, Contra Costa County, CA 94803	202447
3363 San Pablo Dam Road	Attn.: Mansour Sepehr		
San Pablo, CA 94803	6620 Owens Dr., Ste. A		
	Pleasanton, CA 94588		
Mr. Bob Sidhu	SOMA Environ & Eng	3700 Pacheco Boulevard, Martinez, Contra Costa County, CA 94553	202508
3700 Pacheco Boulevard	Attn.: Mansour Sepehr		
Martinez, CA 94553	6620 Owens Dr., Ste. A		
	Pleasanton, CA 94588		
Western States Oil	Alterra Environmental, Inc.	498 South 4th Street, San Jose, Santa Clara County, CA 95112	203254
Attn.: Mr. Thao Le	849 Alamr Ave., Ste. C, # 281		
254 Southside Drive	Santa Cruz, CA 95060		
San Jose, CA 95111	alterraenvironmental@yahoo.com		
Chris' Service Center	reierstad@msn.com	701 North 4th Street, San Jose, Santa Clara County, CA 95112	657697
Attn.: Mr. Chris Yiasemis			
347 Frederick Street			
San Francisco, CA 94117			
ConocoPhillips Company	Environ Strategy	Site: 901 Ashby Avenue, Berkeley, Alameda County, CA 94710	203796
Attn.: Mr. Michael Bryan	Attn.: Dave Nyagaard		
P.O. Box 25376	1 Technology, Ste. B-123		
Santa Ana, CA 92799	Irvine, CA 92618		

Dischargers	Consultants	Facilities	CIWQS Place #
C&M Auto (T&D)	mdougherty@eticeng.com	1098 West San Carlos Street, San Jose, Santa Clara County, CA 95126	201402
Attn.: Mr. Inder Jaisingh			
5968 Porto Alegre Drive			
San Jose, CA 95120			
ExxonMobil Corporation	mdougherty@eticeng.com	3110 Mount Vista Drive, San Jose, Santa Clara County, CA 95127	202368
Attn.: Ms. Jennifer Sedlachek	mdougherty@eticeng.com	2411 Oak Grove Road, Walnut Creek, Contra Costa County, CA 94598	202109
4096 Piedmont Avenue, #194	mdougherty@eticeng.com	3155 El Camino Real, Santa Clara, Santa Clara County, CA 95051	202378
Oakland, CA 94611	mdougherty@eticeng.com	3725 El Camino Real, Santa Clara, Santa Clara County, CA 95051	725868
Kaiser Permanente	msternad@secor.com	3701-3799 Broadway, Oakland, Alameda County, CA 94611	704817
Attn.: Mr. Gary Bankhead			
Senior Project Manager			
Oakland Replacement Team			
1100 San Leandro Blvd., Ste 200			
San Leandro, CA 94577			
Quik Stop Markets, Inc.	Compliance & Closure, Inc.	1100 Lucretia Avenue, San Jose, Santa Clara County, CA 94538	201416
Attn.: Mr. Mike Karvelot	gary@cci-envr.com		
4567 Enterprise Street			
Fremont, CA 94538			
Equilon Enterprises LLC	Cambria	2165 O'Toole Avenue, San Jose, Santa Clara County, CA 95131	201982
dba Shell Oil Products US	mlundberg@craworld.com		
Attn.: Mr. Jeff Whitworth			
20945 South Wilmington Avenue			
Carson, CA 95476			

Dischargers	Consultants	Facilities	CIWQS Place #
City of Oakland	OTG Environmental	7101 Edgewater Drive, Oakland, Alameda County, CA 94621	241881
Attn.: Mr. Raul Godinez II	xtong@otgenv.com		
Director, Public Works Agency			
250 Frank Ogawa Plaza, Suite 4314			
Oakland, CA 94612			
Port of Oakland	Geomatrix	No. 1 Airport Drive, Oakland, Alameda County, CA 94621	
Attn.: David Klettke	Attn.: Susan Gallardo		201295
530 Water Street	2101 Webster St., 12th Flr.		
Oakland, CA 94607	Oakland, CA 94612		
Cal Gas	Frey Environmental	95 South White Road, San Jose, Santa Clara County, CA 95127	709012
(Former Eagle Gas & Mini Mart	jduhl@freyinc.com		
Attn.: Mr. Muhammad S. Chaudhary			
3500 Story Lane			
San Jose, CA 95127			
WicklandCorporation	RAH Environmental	827 South First Street, San Jose, Santa Clara County, CA 95110	203727
Attn.: Mr. Daniel Hall	Attn.: Jerry Huang		
P.O. Box 13648	4645 Raley Blvd.		
Sacramento, CA 95853	Sacto, CA 95838		
Mr. Dan Kataoka	Oliver and Company	920 Heinz Avenue, Berkeley, Alameda County, CA 94710	656166
Vice President	stevenF@oliverandco.net		
Berkeley Bowl Produce, Inc.			
2020 Oregon Street			
Berkeley, CA 94703			
Eugene Rene Leroy Trust	RRM, Inc.	1170 North 4th Street, San Jose, Santa Clara County, CA 95113	655569
c/o Brian Kelleher	julie@rrmsc.com		
Kelleher & Associates			
812 S. Winchester Boulevard, Ste. 130, #109			
San Jose, CA 95128			

Dischargers	Consultants	Facilities	CIWQS Place #
Pacific Gas & Electric Company	bbrelje@secor.com	1301 Mitchell Drive, St. Helena, Napa County, CA 94574	651226
Attn.: Mr. Robert L. Harris, Vice President			
Environmental, Health, Safety and Technical			
77 Beale Street, Mail Code B22A			
San Francisco, CA 94105			
Former Dai-Co-Viet Motors	ATC Associates	1655 McKee Road, San Jose, Santa Clara County, CA 95113	655527
Attn.: Khanh Weinberg	jeff.stivers@atcassociates.com		
1615 Circle Hill Road			
Oakland, CA 94605			
Anello Trucking Company	Frey Environmental	1999 Stone Avenue, San Jose, Santa Clara County, CA 95125	725870
Attn.: Ms. Vi Anello	tkinn@freyinc.com		
9 Spanish Bay Circle			
Peeble Beach, CA 95953			
Robinson Oil Corporation	RM Associates	2305 Story Road, San Jose, Santa Clara County, CA 95122	202063
Attn.: Mr. Thomas L. Robinson	rmichelson@volcano.net		
4250 Williams Road			
San Jose, CA 95129			
World Oil Marketing Company	The Source Group	2310 McKee Road, San Jose, Santa Clara County, CA 95116	202066
Attn.: Mr. John Hundley	sbakshi@thesourcegroup.net		
9302 South Garfield Avenue			
South Gate, CA 90280			
USA Petroleum Corporation	Stellar Environmental	2345 South 7th Street, San Jose, Santa Clara County, CA 95112	
Attn.: Mr. Charles Miller	rmakdisi@stellar-environmental.com		202077
805 Rancho Conejo Boulevard			
Newbury Park, CA 91319			

Dischargers	Consultants	Facilities	CIWQS Place #
Thrifty Oil Company	GeoHydrologic Consultants	3501 Homestead Road, Santa Clara, Santa Clara County, CA 95051	708379
Attn.: Chris Panaitescu, GM	Attn.: Richard Vogl		
13116 Imperial Highway	5912 Bolsa Ave., Ste. 200		
Santa Fe Springs, CA 90670	Huntington Beach, CA 92649		
California Department of Transportation (CALTRANS)		Route 680 from Bayshore Road to 1.5 KM South	716549
District No. 4	r	of Mococo Overhead Structure and on Route 780 from East 5th Street to Route 680	
Attn.: Ms. Cassaundra Lograsso			
2727 Systron Drive, Suite 150			
Concord, CA 94518			
ralph_dodge@dot.ca.gov			
U.S. Department of the Navy		Packaged Groundwater Treatment Plant at	657165
Attn.: Mr. David Clark		Naval Fuel Depot Point Molate, Richmond, Contra Costa County, CA 94801	
BRAC Operations Office			
1230 Columbia Street, Suite 1100			
San Diego, CA 92101-8517			
david.j.clark2@navy.mil			
Mr. Jeff Kwok	TRC	1705 Branham Lane, San Jose, Santa Clara County, CA 95118	201770
965 Arquez Ave., Ste. 100	Attn.: Amy Wilson		
Sunnyvale, CA 94085	5052 Commercial Center		
	Concord, CA 94520-1248		
1950 MLK LLC	Stellar Environmental	1950 Martin Luther King Jr. Way, Berkeley, Alameda County, CA 94704	657697
Attn.: Evan McDonald, Mgr.	rmakdisi@stellar-environmental.com		
Hudson McDonald LLC			
1600 Shattuck Avenue, # 218			
Berkeley, CA 94709			

Dischargers	Consultants	Facilities	CIWQS Place #
SFPUC	Shaw Environmental	3200 Geneva Avenue, Daly City, CA94014	651223
Attn.: Ms. Cheryl Davis	Attn.: Gerhardt Locke		
Water Supply & Treatment	4005 Port Chicago Hwy		
1000 El Camino Real	Concord, CA 94520		
Milbrae, CA 94030			
Mission Trail Oil Co	RM Associates	25 Washington St Santa Clara 95050	202133
Attn: Thomas Robinson	rmichelson@volcano.net		
4250 Williams Rd			
San Jose 95129			

California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
(510) 622-2300 • Fax: (510) 622-2460
http://www.waterboards.ca.gov

ORDER NO. R2-2006-0075
NPDES NO. CAG912002

GENERAL WASTE DISCHARGE REQUIREMENTS FOR: Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Fuel Leaks and Other Related Wastes at Service Stations and Similar Sites

Table 1. Administrative Information

This Order was adopted by the Regional Water Board on:	**November 13, 2006**
This Order shall become effective on:	**January 12, 2007**
This Order shall expire on:	**January 12, 2012**

The U.S. Environmental Protection Agency (USEPA) and the Regional Water Board have classified the discharges under this General National Pollutant Discharge Elimination System (NPDES) Permit as minor discharges.

To obtain coverage under this general permit, Dischargers must submit a Notice of Intent (NOI) Form as described in Attachments B and C and a filing fee equivalent to the first year's annual fee. If the NOI is complete, authorization to initiate discharge will be issued by the Regional Water Board Executive Officer.

The Dischargers who need to discharge treated groundwater after the expiration date of this Order shall file a complete Notice of Intent (NOI), as a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, and as an application for proposed discharge no later than July 15, 2011, which is 180 days in advance of the Order expiration date, as application for issuance of new waste discharge requirements (see Attachments B and C). The terms and conditions of this Order will be automatically continued after the expiration date of this Order for the Dischargers who submitted a complete NOI and will remain in effect until a new Order is adopted by the Regional Water Board. In order to assure no lapse in NPDES permit coverage for authorized discharges, the Dischargers who submitted a complete NOI will then be subject to the new Order pending receipt of a new discharge authorization.

IT IS HEREBY ORDERED, that this Order supercedes Order No. 01-100 except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder, the Dischargers shall comply with the requirements in this Order.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that this Order, Order No. R2-2006-0075, with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on November 13, 2006.

Bruce H. Wolfe, Executive Officer

California Regional Water Quality Control Board
San Francisco Bay Region

ORDER NO. R2-2006-0075
NPDES NO. CAG912002

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I. FACILITY INFORMATION

The regulated facilities under this Order are normally groundwater treatment facilities located at active or closed service stations or construction sites with the need for short or long term dewatering. These groundwater treatment facilities are in operation to extract and treat groundwater polluted mainly by fuel leaks. Facility information for each discharge shall be included in the Notice of Intent (NOI) Form submitted for that discharge (see Attachments B and C).

II. FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter Regional Water Board), finds:

A. Background. There are 55 underground fuel storage tanks operators, current property owners, or previous property owners (hereinafter current Dischargers) currently authorized to discharge pursuant to Order No. 01-100, NPDES Permit No. CAG912002. Of the current Dischargers, 37 submitted a Report of Waste Discharge and applied for a NPDES permit renewal to discharge up to 150 gallons per minute (gpm) of treated wastewater from their groundwater extraction and treatment facilities, hereinafter Facility or Facilities. The Regional Water Board will complete the review of these applications during the period starting after the adoption date of this Order and ending before effective date of this Order.

For the purposes of this Order, references to the "Discharger" or "permittee" in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger(s) herein.

B. Facility Description. Most Dischargers authorized under this general permit use aeration and/or granular activated carbon (GAC) systems to treat their pollutants of concern. Treated wastewaters are normally discharged through storm drain systems, rivers, and/or creeks to the Bay. A complete description of the treatment system installed at each facility is required to be completely documented in the Notice of Intent submitted by each Discharger (Attachments B and C).

C. Legal Authorities. This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code (commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to

article 4, chapter 4, division 7 of the Water Code (commencing with section 13260).

States may request authority to issue general NPDES permits pursuant to 40 CFR Section 122.28. On June 8, 1989, the State Water Resources Control Board (State Water Board) submitted an application to the USEPA requesting revisions to its NPDES Program in accordance with 40 CFR 122.28, 123.62, and 403.10. The application included a request to add general permit authority to its approved NPDES Program. On September 22, 1989, the USEPA, Region 9, approved the State Water Board's request and granted authorization for the State to issue general NPDES permits.

D. **Background and Rationale for Requirements**. The Regional Water Board developed the requirements in this Order based on information submitted as part of the applications, through monitoring and reporting programs, and other available environmental information. The Fact Sheet (Attachment F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through E and G through I are also incorporated into this Order.

E. **California Environmental Quality Act (CEQA).** Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.

F. **Technology-based Effluent Limitations.** Title 40 of the Code of Federal Regulations (Hereinafter 40 CFR) at section 122.44(a) requires that permits include applicable technology-based limitations and standards. This Order includes technology-based effluent limitations based on Best Professional Judgment (BPJ) in accordance with 40 CFR Section 125.3. A detailed discussion of the technology-based effluent limitations development and BPJ is included in the Fact Sheet (Attachment F).

G. **Water Quality-based Effluent Limitations.** 40 CFR Section 122.44(d) requires that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) may be established: (1) using USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) on an indicator parameter for the pollutant of concern; or (3) using a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

H. **Water Quality Control Plans.** The Regional Water Board adopted a Water Quality Control Plan for the San Francisco Bay Basin (hereinafter Basin Plan) on June 21, 1995, and amended this plan on January 2, 2004, and November 16, 2005. This later amendment will be final after approval from the State Water Board and Office of Administrative Law. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. The Basin Plan at Page 2-5 states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. The Basin Plan may not specifically identify beneficial uses for every receiving water regulated under this permit, but may identify present and potential uses for the downstream water body, to which the receiving water, via an intermediate water body, is tributary. These potential and existing beneficial uses are municipal and domestic supply, fish migration and fish spawning, industrial service supply, navigation, industrial process supply, marine habitat, agricultural supply, estuarine habitat, groundwater recharge, shellfish harvesting, water contact and non-contact recreation, ocean, commercial, and sport fishing, wildlife habitat, areas of special biological significance, cold freshwater and warm freshwater habitat, and preservation of rare and endangered species for surface waters and municipal and domestic supply, industrial service supply, industrial process supply, agricultural supply, and freshwater replenishment for groundwaters. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Requirements of this Order implement the Basin Plan.

The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for surface waters. Requirements of this Order implement the Thermal Plan.

I. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, and later amended it on May 4, 1995, and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

J. **State Implementation Policy.** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the

Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria promulgated by the USEPA through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

K. Compliance Schedules and Interim Requirements. (Not applicable)

L. Alaska Rule. On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes. (40 CFR § 131.21; 65 Fed. Reg. 24641 (April 27, 2000).) Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

M. Antidegradation Policy. 40 CFR Section 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the state and federal antidegradation policies. As discussed in detail in the Fact Sheet, the permitted discharge is consistent with the antidegradation provision of section 131.12 and State Water Board Resolution No. 68-16.

N. Anti-Backsliding Requirements. Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at title 40, Code of Federal Regulations section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order.

O. Monitoring and Reporting. 40 CFR Section 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorizes the Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements to implement federal and State requirements. This Monitoring and Reporting Program is provided in Attachment E.

P. **Standard and Special Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR section 122.42 and as modified for this general permit, are provided in Attachment D. The Discharger must comply with all standard provisions and with those additional conditions that are applicable under section 122.42. The Regional Water Board has also included in this Order special provisions applicable to the Dischargers. A rationale for the special provisions contained in this Order is provided in the attached Fact Sheet.

Q. **Provisions and Requirements Implementing State Law.** The provisions/requirements in subsections IV.B, IV.C, V.B, and VI.C of this Order are included to implement state law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.

R. **Notification of Interested Parties.** The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet of this Order.

S. **Consideration of Public Comment.** The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet of this Order.

III. DISCHARGE PROHIBITIONS

A. The discharge of extracted and treated groundwater polluted by fuel leaks and other related wastes at service stations and similar sites and related wastes to surface waters is prohibited unless an NOI application for proposed discharge has been submitted and the Executive Officer has provided the Discharger with an authorization to initiate the discharge.

B. The discharge shall be limited to extracted and treated groundwater and those added treatment chemicals approved by the Executive Officer which do not adversely affect the environment and comply with the requirements of this Order.

C. The discharge of extracted and treated groundwater from a specific site in excess of the flow rate specified in the authorization to discharge by the Executive Officer is prohibited.

D. The discharge shall cause no scouring or erosion at the point where the storm drain discharges into the receiving waters.

E. Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code.

F. Bypass or overflow of untreated or partially treated groundwater polluted by fuel leaks or other wastes to waters of the State either at the treatment system or from any of the collection or transport systems or pump stations tributary to the treatment system is prohibited.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations (Surface water discharges only)

1. **Organic Pollutants:** The discharge of the effluent shall maintain compliance with the following effluent limitations at a discharge point after full treatment but before it joins or is diluted by any other waste stream, body of water, or substance:

Table 2. Effluent Limitations for Toxics Pollutants

No.	Compound	CAS Number	Column A: Discharge to Drinking Water Areas (see Note 2)		Column B: Discharge to Other Surface Water Areas	
			Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)
1	Benzene	71432		1		5
2	Carbon Tetrachloride	56235	0.25 (see Note 1)	0.50	4.4	5
3	Chloroform	67663		5		5
4	1,1-Dichloroethane	75343		5		5
5	1,2-Dichloroethane	107062	0.38 (see Note 1)	0.5		5
6	1,1-Dichloroethylene	75354	0.057 (see Note 1)	0.11 (see Note 1)	3.2	5
7	Ethylbenzene	100414		5		5
8	Methylene Chloride (Dichloromethane)	75092	4.7	5		5
9	Tetrachloroethylene	127184	0.8	1.6		5
10	Toluene	108883		5		5
11	Cis 1,2-Dichloroethylene	156592		5		5
12	Trans 1,2-Dichloroethylene	156605		5		5
13	1,1,1-Trichloroethane	71556		5		5
14	1,1,2-Trichloroethane	79005	0.6	1.2		5

No.	Compound	CAS Number	Column A: Discharge to Drinking Water Areas (see Note 2)		Column B: Discharge to Other Surface Water Areas	
			Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)
15	Trichloroethylene	79016	2.7	5		5
16	Vinyl Chloride	75014		0.5		1
17	Total Xylenes	1330207		5		5
18	Methyl Tertiary Butyl Ether (MTBE)	1634044		5		5
19	Total Petroleum Hydrocarbons (as Gasoline or as Diesel)			50		50
20	Ethylene Dibromide (1,2-Dibromoethane)	106934		0.05 (see Note 1)		5
21	Trichloro-trifluoroethane	76131		5		5

Notes:
1) If reported detection level is greater than effluent limit, then a non-detect result using a 0.5 ug/L detection level will not be deemed to be out of compliance.
2) Drinking water areas are defined as surface waters with the existing or potential beneficial uses of "municipal and domestic supply" and "groundwater recharge" (the latter includes recharge areas to maintain salt balance or to halt salt water intrusion into fresh water aquifers).

2. **pH:** The pH of the discharge shall not exceed 8.5 nor be less than 6.5.

3. **Toxicity:** The survival of rainbow trout test fish in 96-hour static renewal bioassays (EPA-821-R-02-012 Test method 2019.0) of the discharge shall be not less than a three sample moving median of 90% survival and a single test value of not less than 70% survival.

B. Land Discharge Specifications. (Not applicable)

C. Reclamation Specifications – Water Reuse

1. Reuse Policy: The Regional Water Board adopted Resolution No. 88-160 on October 19, 1988. The Resolution urges Dischargers of extracted groundwater from site cleanup projects to reclaim their effluent and that when reclamation is not technically and/or economically feasible, to discharge to a publicly owned treatment works (POTW). If neither reclamation nor discharge to a POTW is technically or economically feasible and if beneficial uses of the receiving water are not adversely affected, it is the intent of the Regional Water Board to authorize the discharge of treated extracted groundwater in accordance with the requirements of this Order.

2. Reuse Allowed: This Order permits reuse or reclamation of extracted treated groundwater in conjunction with the discharge to surface water, except for purposes of recharge or reinjection. Reuse of extracted treated groundwater

can take many forms, such as irrigation of landscaping or agriculture, dust control or soil compaction on construction sites, and industrial water supply.

3. Water Reclamation Specifications (water reuse only)

   a. Water reclaimed for beneficial reuse as applied shall meet the requirements in Section B- Effluent Limitations.
   b. The water reclamation activities shall be described in the Discharger's NOI, including method of any additional treatment and location and type of water reuse.
   c. No reclaimed water shall be allowed to escape from the authorized use area by airborne spray, nor by surface flow except in minor amounts associated with good irrigation practice, nor from conveyance facilities.
   d. Reclamation involving irrigation shall not occur when the ground is saturated.
   e. The use of reclaimed water shall not impair the quality of waters of the State, nor shall it create a nuisance as defined by Section 13050(m) of the California Water Code.
   f. Adequate measures shall be taken to minimize public contact with reclaimed water and to prevent the breeding of flies, mosquitoes, and other vectors of public health significance during the process of reuse.
   g. Appropriate public warnings must be posted to advise the public that the water is not suitable for drinking. Signs must be posted in the area, and all reclaimed water valves and outlets appropriately labeled.
   h. There shall be no cross-connection between the potable water supply and piping containing treated groundwater intended for reuse.
   i. Water reclamation consisting of recharge or reinjection is not authorized under this Order.

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Receiving water limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. The discharge shall not cause the following in surface receiving waters:

1. Narrative Limits: The discharge shall not cause the following conditions to exist in waters of the State at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam;
   b. Bottom deposits or aquatic growths;
   c. Alteration of temperature, turbidity, taste, odor, or apparent color beyond present natural background levels;

d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;

e. Toxic or other deleterious substances to be present in concentrations or quantities that will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

2. Numerical Limits: The discharge shall not cause the following limits to be exceeded in waters of the State in any place within one foot of the water surface:

   a. Dissolved oxygen:

      For all tidal waters:

      In the Bay downstream of Carquinez Bridge - 5.0 mg/l minimum

      Upstream of Carquinez Bridge - 7.0 mg/l minimum

      For nontidal waters:

      Waters designated as cold water habitat - 7.0 mg/l minimum

      Waters designated as warm water habitat - 5.0 mg/l minimum

      For all inland surface waters:

      The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, then the discharge shall not cause further reduction in ambient dissolved oxygen concentrations.

   b. pH: The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH by more than 0.5 pH units.

3. More Stringent Standards May Apply: The discharge shall not cause or contribute to a violation of any applicable water quality standard for receiving waters adopted by the Regional Water Board or the State Water Board as required by the Clean Water Act and regulations adopted there under. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Regional Water Board will revise and modify this Order in accordance with such more stringent standards.

B. Groundwater Limitations

The discharge shall cause no violation of the Basin Plan water quality standards for receiving groundwaters.

VI. PROVISIONS

A. Standard Provisions.

The Dischargers shall comply with all Federal and all Standard Provisions for General Permits Standard Provisions included in Attachment D of this Order.

B. Monitoring and Reporting Program Requirements.

1. The Dischargers shall comply with the Monitoring and Reporting Program (MRP), and future revisions thereto, in Attachment E of this Order.

2. Dischargers authorized under this permit, especially the Dischargers with flow rate exceeding 10 gpm, may be required to comply with additional monitoring requirements. The Executive Officer will specify such additional monitoring requirements in the authorization letter. Examples of additional monitoring that could be required are listed below:

    a. Monitoring Required to Respond to a Complaint received about a Facility authorized to discharge under this permit,
    b. Storm Water Monitoring,
    c. Dioxins and Furans Monitoring,
    d. Regional Monitoring Program Monitoring,
    e. Additional Discharge Observations, and
    f. Additional Effluent and Ambient Priority Pollutant Scans.

C. Special Provisions.

1. Reopener Provisions. The Regional Water Board may modify or reopen this Order prior to its expiration date in any of the following circumstances:

    a. If present or future investigations demonstrate that the discharge(s) governed by this Order will, or cease to, have adverse impacts on water quality and/or beneficial uses of the receiving waters;

    b. As new or revised WQOs come into effect for the San Francisco Bay estuary and contiguous water bodies (whether statewide, regional, or site-specific). In such cases, effluent limitations in this Order will be modified as necessary to reflect updated WQOs;

    c. If translator or other water quality studies provide a basis for determining that a permit condition(s) should be modified;

    d. An administrative or judicial decision on a separate NPDES permit or WDR that addresses requirements similar to this discharge; and

e. as authorized by law.

The Dischargers may request permit modification based on the above. The Dischargers shall include in any such request an antidegradation and antibacksliding analysis.

2. Notice of Intent (NOI) or Modified NOI Application: The NOI or Modified NOI application for each point of proposed discharge to a storm drain system shall contain the information required in the Notice of Intent Form as explained in Attachments B and C of this Order and as may be amended by the Executive Officer.

3. NOI Review: Upon receipt of a complete NOI application package for proposed discharge, the Executive Officer will review the application to determine whether the proposed Discharger is eligible to discharge waste under this general permit. The application package shall document that:

   a. The proposed discharge results from the cleanup of groundwater polluted by fuel leaks and other related wastes at service stations and similar sites with similar wastes;
   b. The proposed Discharger has met the provisions of Resolution No. 88-160; and
   c. The proposed treatment system and associated operation, maintenance, and monitoring plans are capable of ensuring that the discharge will meet the provisions, prohibitions, effluent limitations, and receiving water limitations of this Order.

4. Discharge Authorization: If the Executive Officer determines that the proposed Discharger is eligible to discharge waste under this general permit, the Executive Officer will authorize the proposed discharge. This discharge authorization may be terminated by the Executive Officer at any time.

5. Non-Compliance As A Violation: Upon receipt of the Executive Officer's discharge authorization, the Discharger(s) shall comply with all applicable conditions and limitations of this Order and its Attachments. Any permit noncompliance (violations of requirements in this Order or Monitoring Program) constitutes a violation of the Clean Water Act and the California Water Code and is grounds for enforcement action, permit or authorization termination, revocation and reissuance, modification, the issuance of an individual permit, or denial of a renewal application.

6. Triggers: The following triggers are not effluent limitations, and should not be construed as such. Instead, they are levels at which additional investigation is warranted to determine whether a numeric limit for a particular constituent is necessary. If any constituent in the effluent of a discharge exceeds the

corresponding trigger as listed in the Table 3 below, then the Discharger shall take three additional samples (three influent and three effluent) for each exceeded constituent during the following calendar quarter and conduct activities as explained in the Provisions VI.C.7, VI.C.8, or VI.C.9. If this monitoring activity has already been completed in the past, then summarize the results including the design of any installed treatment unit.

Table 3. Trigger Compounds or Constituents

Compound	CAS Number	Trigger (ug/L)
Antimony	7440360	6
Arsenic	7440382	10
Beryllium	7440417	1
Cadmium	7440439	0.07
Chromium (total)	18540299	11 (See Note 1)
Chromium (VI)	18540299	11
Copper	7440508	3.1
Lead	7439921	2.0
Mercury	7439976	0.025
Nickel	7440020	8.2
Selenium	7782492	5.0
Silver	7440224	1.9
Thallium	7440280	0.1
Zinc	7440666	35
Cyanide	57125	1.0
Asbestos	1332214	7 MFibers/L
2,3,7,8-TCDD (Dioxin)	1746016	0.000000013
Acrylonitrile	107131	2.0
Bromoform	75252	4.3
Chlorodibromomethane	124481	0.401
Dichlorobromomethane	75274	0.56
1,2-Dichloropropane	78875	0.50
1,3-Dichloropropylene	542756	0.2
1,1,2,2-Tetrachloroethane	79345	0.1
Pentachlorophenol	87865	0.28
2,4,6-Trichlorophenol	88062	2.1
Benzidine	92875	0.00012
Benzo(a)Anthracene	56553	0.0044
Benzo(a)Pyrene	50328	0.004
Benzo(b)Fluoranthene	205992	0.0044
Benzo(k)Fluoranthene	207089	0.0044
Bis(2-Chloroethyl)Ether	111444	0.031
Bis(2-Ethylhexyl)Phthalate	117817	1.8
Chrysene	218019	0.0044
Dibenzo(a,h)Anthracene	53703	0.0044
3,3'-Dichlorobenzidine	91941	0.04
2,4-Dinitrotoluene	121142	0.11
1,2-Diphenylhydrazine	122667	0.04

Compound	CAS Number	Trigger (ug/L)
Hexachlorobenzene	118741	0.00075
Hexachlorobutadiene	87683	0.44
Hexachloroethane	67721	1.9
Indeno(1,2,3-cd)Pyrene	193395	0.0044
N-Nitrosodimethylamine	62759	0.00069
N-Nitrosodi-n-Propylamine	621647	0.005
Aldrin	309002	0.00013
alpha-BHC	319846	0.0039
beta-BHC	319857	0.014
gamma-BHC	58899	0.019
Chlordane	57749	0.00057
4,4'-DDT	50293	0.00059
4,4'-DDE	72559	0.00059
4,4'-DDD	72548	0.00083
Dieldrin	60571	0.00014
alpha-Endosulfan	959988	0.0087
beta-Endosulfan	33213659	0.0087
Endrin	72208	0.0023
Endrin Aldehyde	7421934	0.76
Heptachlor	76448	0.00021
Heptachlor Epoxide	1024573	0.0001
Polychlorinated biphenyls (PCBs) total	1336363	0.00017
Toxaphene	8001352	0.0002
1,4-Dioxane	123911	3
Perchlorate	14797730	5
Freon 12 (Dichlorodifluoromethane)	75718	0.19
Other Oxygenates (Other than MTBE)	-	5
Other VOCs	-	5
Other SVOCs	-	5
Turbidity (Units)	-	5
Odor-Threshold (Units)	-	3
Total Petroleum Hydrocarbons other than Gasoline and Diesel	-	50 (See Note 2)
Sulfate	-	250,000
Foaming Agents	-	500
Color (Units)	-	15

Legend:
CAS = Chemical Abstract System or Service
Notes:
1) If total chromium concentration exceeds 11 then Chromium (VI) analysis shall also be done.
2) If a Discharger is reporting monitoring data with a detection level higher than 50 ug/l, the reason for a higher detection level shall be fully explained in the monitoring report.

7. Triggers Case 1: If the results of the three additional samples for the effluent **do not** exceed the triggers, the Discharger shall report the results to the Executive Officer in the next Monitoring Report, and shall return to the schedule of sampling and analysis in the attached MRP (Attachment E).

8. Triggers Case 2: If the results of **any one of the three** additional samples

exceed the triggers, the Discharger has two options. Option one is submitting a rationale for not doing the special studies as described in the last paragraph of VI.C.9. Option two is performing the following three tasks listed below:

a. Calculate the median and maximum concentration values for the exceeded trigger constituent, using the three recent samples **and** all samples collected and analyzed for that constituent in the previous 12-month period.

b. Estimate the mass load discharged in the previous 12-month period for the exceeded trigger constituent. Report the results in grams per day and in kilograms per year, using the average discharge rate for the previous 12-month period.

c. Report the results to the Executive Officer in the next Self-Monitoring Report, and return to the schedule of sampling and analysis in the Self-Monitoring Program.

9. Triggers Case 3: If the results of **two or three** of the additional samples exceed the triggers, the Discharger shall perform the following:

a. Calculate median and maximum concentration values and mass load for the constituent, as described in Case 2 above.

b. Explain or identify source(s) of the trigger constituent. If the trigger constituent is a byproduct of a decomposed compound, list all of the byproduct components and when each of these components will be formed during the decomposition process.

c. Define the properties of the exceeded trigger constituent and, if applicable, the decomposing compound with all of its byproduct components. Attach Material Safety Data Sheets, if available or applicable.

d. Document what standard or customized EPA approved test methods are used to detect this compound.

e. List and evaluate all available technologies for treatment or pre-treatment of this exceeded trigger constituent and, if applicable, the decomposing compound with all of its byproduct components. This evaluation may include the cost of increased treatment to reduce the exceeded trigger constituent and any applicable the decomposing compound with all of its byproduct components and the amount of reduction in terms of concentration.

f. Discuss any proposed plan for pilot bench scale and field tests for treatment of this exceeded trigger constituent and, if applicable, the

decomposing compound with all of its byproduct components and associated timetable.

g. Determine the best available technology economically achievable for treatment of this exceeded trigger constituent and, if applicable, the decomposing compound with all of its byproduct components, or propose the next step after obtaining the results of the pilot tests.

h. If the results of the evaluation indicate that the additional treatment of the discharge does not appear to be a feasible option, then:

1) Perform an evaluation of the potential adverse impacts to the beneficial uses of the receiving water. The evaluation should include, but need not be limited to, description of the beneficial uses specific to the receiving water, physical and chemical characteristics of the water body and sediment, and the physical, chemical, or biological effects from the constituent(s) on the beneficial uses. For inorganic compounds (also known as metals), include discussions regarding effects related to total or dissolved fraction (i.e., metals translators) and hardness with hardness-dependent objectives. If exceedances are only for metals with hardness-dependent objectives, then the Discharger may conduct a hardness study prior to completing this task.

2) If the receiving water study finds that the discharge has potential to cause adverse impacts to beneficial uses of the receiving water, then evaluate control measures other than treatment to reduce the constituent(s) of concern in the discharge, such as re-evaluating options for re-use, discharge to POTW, or alternatives to groundwater extraction.

i. Within 180 days of the Discharger receiving results of the confirmation sampling, report the results of tasks (a) through (h) above to the Executive Officer, including a proposed method to eliminate or minimize future exceedances, or provide a rationale for why no change to the existing treatment program should take place. The Discharger may be required to perform additional evaluations or take additional actions, as deemed necessary by the Executive Officer. The Discharger may apply or may be required to apply for an individual NPDES permit. If the Executive Officer determines that additional numeric limits are necessary for a particular compound or constituent (including but not limited to a VOC), these limits will be calculated using the procedures specified in the SIP, Basin Plan, and applicable USEPA regulations.

As an alternative, the Discharger may submit a specific technical rationale for not conducting the above special studies, subject to the Executive Officer's approval. Examples of acceptable rationales to the Executive Officer could be submitting a copy of a technical report prepared previously or if the

Discharger is contributing funds for a joint special studies addressing the same questions discussed above for this exceeded trigger constituent and, if applicable, the decomposing compound with all of its byproduct components.

10. Exceedance of the same Triggers: If an exceedance of the same trigger in Table 3 occurs less than 60 months after completion of the required tasks in Provisions VI.7, VI.8 or VI.9, then the Executive Officer may waive the evaluation required above. This waiver will not apply if a different constituent or compound exceeds the triggers set in Tables 3. In that case, the Discharger shall perform an evaluation for that constituent or compound. During and after any additional monitoring, the Discharger shall continue the required schedule of sampling and analysis as required in the MRP (Attachment E).

11. Individual NPDES Permit May Be Required: The USEPA Administrator may request the Regional Water Board Executive Officer to require any Discharger authorized to discharge waste by the general permit to subsequently apply for and obtain an individual NPDES permit. The Executive Officer may require any Discharger authorized to discharge waste by a general permit to subsequently apply for and obtain an individual NPDES permit. An interested person may petition the Executive Officer or the Regional Administrator to take action under this provision. Cases where an individual NPDES permit may be required include the following:

    a. The Discharger is not in compliance with the conditions of this Order or as authorized by the Executive Officer;
    b. A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;
    c. Effluent limitation guidelines are promulgated for point sources covered by the general NPDES permit;
    d. A water quality control plan containing requirements applicable to such point sources is approved; or
    e. The requirements of 40 CFR 122.28(a), as explained in Finding No. II.C, are not met.

12. Treatment Reliability: The Dischargers shall, at all times, retain a professional engineer certified in State of California to oversee the design, and operation and maintenance of the treatment system to properly operate and maintain all facilities that are used by the Dischargers to achieve compliance with this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. All of these procedures shall be described in an Operation and Maintenance manual. The Discharger shall keep in a state of readiness all systems necessary to achieve compliance with the conditions of this Order. All systems, both those in service and reserve, shall be inspected and maintained on a regular basis.

Records shall be kept of the tests and made available to the Regional Water Board for at least five years. Additional requirements for compliance with this provision are explained in Attachments B and C of the Order.

13. **No Preemption**. This Order permits the discharge of treated groundwater to waters of the State subject to the prohibitions, effluent limitations, and provisions of this Order. It does not pre-empt or supersede the authority of municipalities, flood control agencies, or other local agencies to prohibit, restrict, or control discharges of waste to storm drain systems or other watercourses subject to their jurisdiction.

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in Section IV of this Order will be determined as specified below:

A. General.

Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined in the MRP and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

B. Multiple Sample Data.

When determining compliance with an AMEL **or** MDEL for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

ATTACHMENT A – DEFINITIONS

Arithmetic Mean (μ), also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL): the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Bioaccumulative pollutants are those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic pollutants are substances that are known to cause cancer in living organisms.

Coefficient of Variation (CV) is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Detected, but Not Quantified (DNQ) are those sample results less than the RL, but greater than or equal to the laboratory's MDL.

Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

Duly Authorized Representative is one whose:

a. Authorization is made in writing by a principal executive officer or ranking elected official;

b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general partner in a partnership, sole proprietor in a sole proprietorship, the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

Effluent Concentration Allowance (ECA) is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-

term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in USEPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

Estimated Chemical Concentration is the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

Field Blank is defined as an individual sample demonstrated to be free from the contaminants of interest and other potentially interfering substances, and treated as a sample in all respects, including exposure to grab-sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the field blank is to determine if the field or sample transporting procedures and environments have contaminated the sample.

Flow Sample is defined as the accurate measurement of the average daily flow volume using a properly calibrated and maintained flow-measuring device.

Grab Sample is defined as an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not be during hydraulic peaks. It is used primarily in determining compliance with maximum daily limits and average monthly limits. Grab samples represent only the condition that exists at the time the wastewater is collected.

Instantaneous Maximum Effluent Limitation: the highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation: the lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Maximum Daily Effluent Limitation (MDEL) means the highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median is the middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (n) is odd, then the median = $X_{(n+1)/2}$. If n is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between the n/2 and n/2+1).

Method Detection Limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in title 40 of the Code of Federal Regulations, Part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample

that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Not Detected (ND) are those sample results less than the laboratory's MDL.

Ocean Waters are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

Persistent pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

Reporting Level (RL) is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Source of Drinking Water is any water designated as municipal or domestic supply (MUN) in a Regional Water Board Basin Plan.

Standard Deviation (σ) is a measure of variability that is calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

where:

x is the observed value;

μ is the arithmetic mean of the observed values; and

n is the number of samples.

Toxicity Reduction Evaluation (TRE) is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

ATTACHMENT B - NOTICE OF INTENT APPLICATION FORM
To Receive
Authorization to Discharge Treated Groundwater under the Requirements of
ORDER NO. R2-2006-XXXX
NPDES PERMIT NO. CAG912002 (FUEL)

For Groundwater Treatment Facility located at:

_____

Type or Print Facility Address above the line
File No: 1210.44

This is an application for discharge or reuse of extracted and treated groundwater resulting from the cleanup of groundwater polluted by fuel leaks and other related wastes at service stations and similar sites. Please mark one of the applicable lines:

Table 1. Mark only one as applicable

1	Notice of Intent for an Existing Discharge (for Permit Reissuance)	
2	Notice of Intent for a previously regulated Discharge (provide the Order and NPDES permit numbers here in this row)	
3	Notice of Intent for a New Discharge	
4	Modified Notice of Intent (if modified, complete all sections in this Form and indicate information on which item(s) below are modified):	
	Discharger's Certification	
	Administrative Information	
	Condition 1	
	Condition 2	
	Condition 3	
	Condition 4	
	Condition 5	
	Condition 6	
	Condition 7	
	Condition 8	
	Condition 9	
	Condition 10	
	Condition 11	
	Condition 12	
	Attachment 1	
	Attachment 2	
	Attachment 3	
	Attachment 4	
	Attachment 5	

Discharger's Certification

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the design engineer whose signature and engineering license number is documented in this notice, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Name (print)	Signature and Date
Title/Organization	Address

Complete Table 2. Facility Information

1	Discharger's Name	
2	Name of Facility	
3	Facility Address	
4	Facility Contact, Title, and Phone	
5	Authorized Person to Sign & Submit Reports	
6	Mailing Address	
7	Billing Address	
8	Type of site or project. For example: Active Service Station, Closed Service Station, Short Term Dewatering Project, Long Term	

	Dewatering Project, or other (please explain if "Other")	
9	Watershed	
10	Receiving Water	
11	Receiving Water Type. For example, eenclosed bay, estuary, inland surface water, or Sacramento-San Joaquin Delta	

I understand that if this discharge is eligible under the requirements of Order No. R2-2006-xxxx (Order), authorization to discharge treated groundwater from the above facility will be granted providing the following conditions are met:

1. I must comply with all applicable requirements of the Order and the associated Self-Monitoring Program (SMP). The effluent shall not contain constituents in excess of the limits listed under:

Complete Table 3. Mark only one as applicable

1	Discharge to Drinking Water Areas (Column A, Table 2, Page 7 of the Order)	
2	Discharge to Other Surface Water Areas (Column B, Table 2, Page 7 of the Order)	

2. A treatment system including the elements described in Table 4 below and the schematic shown in Attachment 1 will treat the extracted groundwater.

Complete Table 4. Treatment System Description

	Unit	Number	Size, or capacity (e.g. pounds of GAC), Further Description (If Applicable)
1	Extraction Well(s)		
2	Extraction Wells with Dedicated Treatment Unit(s)		
3	Dedicated Treatment Unit(s)		
4	Settling Tank(s) in series		
5	Settling Tank(s) in parallel		
6	Oil/Water Separator(s)		
7	Filter(s)		
8	Air Strippers with Air Filters		
9	Air Strippers without Air Filters		
10	Advanced Treatment Unit(s) for Oxygenates such Tertiary Butyl Alcohol, Ethanol, and Methanol		
11	Advanced Treatment Unit(s)		
12	Liquid-phase Granular Activated Carbon (GAC) vessel(s) in series		
13	GAC vessel(s) in parallel		
14	Effluent reuse Infrastructure (If so, provide additional detail)		

3. I understand that I shall, at all times, retain a professional engineer certified in the State of California to oversee the design, and proper operation and maintenance of the treatment system, including all facilities necessary to achieve compliance with the Order. I also understand that proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures and all of these procedures shall be described in an Operation and Maintenance (O&M) Manual. Table 5 includes the names of all professionals who will keep the treatment system - including all facilities necessary to achieve compliance with the conditions of the Order - in a state of readiness. All treatment system components, both those in service and those in reserve, shall be inspected and maintained on a regular basis.

4. Attachment 2 is a report certifying the adequacy of each component of the proposed treatment system, and including the table of contents of the associated O&M manual. This certification report contains an item-by-item analysis, based on accepted engineering practice, of how the process and physical design of the treatment system will ensure compliance with the Order. This report also certifies that:

   i. All treatment facility startup and operation instruction manuals are adequate and available to operating personnel.

   ii. Adequate treatment facility maintenance and testing schedules are included in the treatment facility O&M Manual.

   iii. Influent and effluent sampling locations or ports are located in areas where samples representative of the waste stream to be monitored can be obtained.

   iv. The residual concentration of any chemical additive or additives used in the treatment process is designed to be zero and will never exceed the No Adverse Effect Concentration (NOEC) as documented in the ecological section of the applicable Material Safety Data Sheet (MSDS). A copy of the MSDS for every chemical used is provided as an attachment in the O&M Manual.

   v. If any chemical used in the treatment process may cause pH variances in the effluent, the frequency of pH monitoring in the effluent will be increased as explained in the Legends for Table E.2 of Attachment E – Monitoring and Reporting Program.

   vi. The design engineer has affixed his/her signature and engineering license number to this certification report in Attachment 2.

Complete Table 5. Professional Engineer(s) and Other Information

1	Design Engineer's Name, California License Number, address, and phone number	
2	Operation and Maintenance Responsible Engineer's Name, California License Number, address, and phone number	
3	Name, phone number, and email of the Discharger's assigned staff to investigate the cause(s) of errors and the corrective actions taken, or date when actions will be completed to eliminate or reduce future data error (applicable if any monitoring data for the sample(s) taken on or after January 1, 2006, were claimed to be invalid)	

5. The maximum discharge rate from the groundwater treatment system shall not exceed _____ gallons per minute (gpm). The groundwater treatment system is designed for _____ gpm. I understand this discharge shall not cause pollution, contamination, or nuisance. For example, the discharge shall cause no scouring or erosion at the point where the storm drain or outfall-pipe discharges into the receiving water(s).

6. Treated water will be discharged through a storm drain to the receiving water(s) described in Table 6 below and shown on the aerial map in Attachment 3.

Complete Table 6. Discharge Location

Discharge Point Location	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
Storm-Drain Location:			Storm-Drain
Outfall Location:			

7. A copy of the Order, a complete copy of this Notice of Intent, documentation of the authorization to discharge received from the Regional Water Board, a full copy of the O&M Manual, and any other documents recommended by the engineer or the QA officer shall be stored at or near the treatment facility. These documents shall be made available to Regional Water Board staff during inspections. No O&M Manual shall be submitted to the Regional Water Board office, unless requested.

8. Self-Monitoring Reports shall be submitted by uploading it on Geo-Tracker on a quarterly calendar basis, no later than 45 days following the last day of the quarter. The laboratory results shall be summarized in tabular form, but the laboratory data sheets need not be included in the reports (unless requested). The reports shall summarize the monitoring data and include information such as the sample location (extraction well(s), influent, effluent, or receiving water); the constituents analyzed; the analytical methods used; the laboratory reporting limits in micrograms per liter (ug/l); the sample results (ug/l); the date sampled; and the date samples were analyzed. A summary of quality assurance/quality control data such as field, trip, and laboratory blank results shall be reported for each analyzed constituent or group of constituents. These reports shall also include a description of the operation and maintenance of the groundwater extraction and treatment system. An annual report summarizing system operation and maintenance for the last four quarters shall be prepared and submitted no later than February 15 of the following year. The last calendar quarter monitoring report may be combined with the annual report. The annual report shall document that the annual fee has been paid.

9. I understand that it is the responsibility of any person proposing to discharge to a storm drain system or other watercourses to obtain authorization to discharge from the agency having jurisdiction over the use of the storm drain system or watercourse. I also understand any discharge authorization granted by the Regional Water Board is conditional and may be terminated at any time.

10. A Check for $5,688 is attached.

11. Tables ___ through ____ in Attachment 5 of this NOI list all pollutants of concern in each extraction well, influent or projected influent, and effluent or projected effluent including the data suggested in Table 7. Unless requested, no laboratory reports have been included in this NOI.

Table 7. Suggested format for listing pollutants

	Pollutant 1	Pollutant 2	Pollutant 3	Add Columns and/or tables as needed
Number of Samples				
Maximum Concentration				

	Pollutant 1	Pollutant 2	Pollutant 3	Add Columns and/or tables as needed
Average Concentration				
Median Concentration				
Minimum Concentration				
Number of Non-Detects				
Lowest Reporting Limit				
Highest Reporting Limit				
Number of Samples with Lowest Reporting Limit				
Sample Date 1, Method Number				
Sample Date 2, Method Number				
Sample Date 3, Method Number				
Add rows as needed				

12. Any other relevant information about this project that may be necessary to evaluate the eligibility of this discharge under the Order is included in Attachment 6.

13. Add the following five attachments to this form:

    Attachment 1: Flow Schematics
    Attachment 2: Engineering Certification Report
    Attachment 3: Aerial Map (highlight the discharge path)
    Attachment 4: Check for $5,688
    Attachment 5: Tables listing Pollutants of Concern at this Site
    Attachment 6: Other Information (If applicable)

Note: The Regional Water Board may modify this form at any time to reflect any new fees and other needed improvements as applicable.

ATTACHMENT C - INSTRUCTIONS FOR COMPLETING NOTICE OF INTENT (NOI) FORM

to Receive Authorization to Discharge Treated Groundwater under the Requirements of
ORDER NO. R2-2006-XXXX
NPDES PERMIT NO. CAG912002 (FUEL)

Facility Address: Please include Zip code and County for the Groundwater Treatment Facility Address.

Table 1. Please mark only one as is applicable:

	Table 1.	Explanation
1	Notice of Intent for An Existing Discharge authorized under this Order (For Permit Reissuance)	If you need to discharge after November 13, 2011, you need to submit this NOI no later than May 13, 2011.
2	Notice of Intent for a previously regulated Discharge	Provide the Order and NPDES permit numbers if this Discharge is currently or was previously regulated under this general permit, another general permit, or regulated under an individual NPDES permit.
3	Notice of Intent for a New Discharge	If this Discharge was never authorized under any of the Regional Water Board permits.
4	Modified Notice of Intent (if modified, submit NOI Form all sections completed and indicate which item(s) modified)	If this Discharge is currently regulated under this Order and you need to modify one or more items in the NOI.

Discharger's Certification

This form must be signed by an appropriate corporate officer, general partner, principal executive officer, or ranking elected official. In no case should the consultant sign the forms.

Administrative Information

Complete Table 2. Facility Information

1	Discharger's Name	
2	Name of Facility	Please use the Facility address as the name of the Facility and then add the name that Discharger prefers. For example: 123 Main Street, San Jose Oilco No. 987
3	Facility Address	
4	Facility Contact, Title, and Phone	
5	Authorized Person to Sign & Submit Reports	
6	Mailing Address	
7	Billing Address	
8	Type of site or project.	For example: Active Service Station, Closed Service Station, Short Term Dewatering Project, Long Term Dewatering Project, or other (please explain if "Other")
9	Watershed	If you do not know, you may check web sites such as "San Francisco Bay Area Creek & Watershed Finder", at

		http://www.museumca.org/creeks/resc.html.
10	Receiving Water	
11	Receiving Water Type	<enclosed bay, estuary, inland surface water, or Sacramento-San Joaquin Delta>

Condition 1. Unless you have specific information to select otherwise, select discharge to source of drinking water because most discharges of treated groundwater regulated under this Order are to storm drain systems that discharge to creeks and streams. Many of these creeks and streams are dry during the summer months. Therefore, for many months of the year, these discharges may represent all or nearly all of the flow in some portions of the receiving creeks or streams. These discharges therefore have the potential to recharge groundwaters that are normally protected as drinking waters. There are surface waters in the Region that serve beneficial uses such as groundwater recharge and municipal and domestic, industrial process and service, or agricultural water supplies. A few examples are most creeks in Santa Clara County, Napa River, Alameda Creek, San Mateo Creek, and San Lorenzo Creek.

Condition 2. The treatment system shall be fully described. The reuse of the effluent shall be in compliance with Specification IV.C of the Order.

Complete Table 2. Treatment System Description

	Unit	No.	Size, or capacity (e.g. pounds of GAC), Further Description (If Applicable)
1	Extraction Well(s)		
2	Extraction Wells with Dedicated Treatment Unit(s)		
3	Dedicated Treatment Unit(s)		
4	Settling Tank(s) in series		
5	Settling Tank(s) in parallel		
6	Oil/Water Separator(s)		
7	Filter(s)		
8	Air Strippers with Air Filters		
9	Air Strippers without Air Filters		
10	Advanced Treatment Unit(s) for Oxygenates such Tertiary Butyl Alcohol, Ethanol, and Methanol		
11	Other Advanced Treatment Unit(s)		
12	Liquid-phase Granular Activated Carbon (GAC) vessel(s) in series		
13	GAC vessel(s) in parallel		
14	Effluent reuse Infrastructure (If so, provide additional detail such as producer and user name and address, rate, volume, and frequency of reuse)		

Condition 3. This permit requires a professional engineer (PE) certified in the State of California to oversee the design, and proper operation and maintenance of the treatment system. If you reported any invalid monitoring data for the sample(s) taken on or after

January 1, 2006, the name, phone number, and email of the assigned staff to investigate the cause(s) of errors and the corrective actions taken, or date when actions will be completed to eliminate or reduce future data error shall be documented in this Form.

Condition 4. A PE shall certify the adequacy of each component of the proposed treatment system. Other relevant information such as the reason(s) if any chemical additive or additives are needed to be used in the treatment system, method of application and disposal shall also be fully explained in the PE certification. Please note that the design engineer has the authority to reject usage of any chemical which has an inadequate MSDS or may cause an adverse effect on most sensitive residents of the receiving water.

Condition 5. If you have a batch discharge, provide the frequency, volume, and maximum flow rate.

Condition 6. Some of this information may be obtained from the municipalities. The discharge path shall be highlighted from the facility to the final receiving water.

Condition 7. All documents needed by your technicians to properly operate or maintain the treatment facility shall be at or near the facility.

Condition 8. Late Self-Monitoring Reports are considered in violation of the permit's requirements and are subject to mandatory minimum penalty if more than 30 days late.

Condition 9. Prepare a contact List.

Condition 10. No application will be considered complete without the applicable fee.

Condition 11. No application will be considered complete without complete delineation of pollutants of concern. The NOI shall include analytical results, including the date the samples were taken, for influent (except for mercury, this may be a weighted average of individual extraction wells for non-operating facilities) and effluent (not required for proposed discharges with no prior operating experience). In case of detecting mercury in any well in excess of 0.025 microgram per liter, the Discharger shall install a dedicated treatment unit for that well and check with Regional Water Board staff if an application for an individual NPDES permit shall be submitted. Table below lists the suggested analytical methods.

Follow the instruction in Table 3.

Analyses	Method of Analysis (See Note 1)
MTBE, Benzene, Toluene, Ethylbenzene, and Total Xylenes	USEPA Method 8020

Analyses	Method of Analysis (See Note 1)
Petroleum Hydrocarbons	Modified USEPA Method 8015
Volatile Organic Compounds	USEPA Method 8260
Polynuclear Aromatic Hydrocarbon	USEPA Method 610
Semi-Volatile Organic Compounds(See Note 2)	USEPA Method 8270
Ethylene Dibromide (See Note 2)	USEPA Method 504
Perchlorate (See Note 3)	USEPA Method 314
Mercury	USEPA Method 1631
Cadmium, Silver, Antimony, Beryllium, Chromium, Copper, Lead, Nickel, Selenium, Thallium, Zinc, Arsenic, and Cyanide.	USEPA Methods (various)
Others (if there is evidence of a release or being present)	USEPA Methods (various)
Notes: 1: All chemical analyses shall be performed according to the appropriate USEPA Methods by a certified laboratory and copies of laboratory analytical reports must be submitted (equivalent methods are accepted). 2: Not required if no evidence of this release. 3: Not required if no evidence of solid rocket fuel release or other Perchlorate use.	

Condition 12. Other information such as vicinity to a highly polluted site shall be provided. For example, if this is a dewatering project of a site adjacent to a site with documented groundwater pollution, then the information about how the engineer in charge of this dewatering project will manage the risk of moving the contaminated groundwater plume from that site into the treatment facility.

Condition 13. All attachments are mandatory.

Please upload the completed NOI Form and all attachments on Geo-Tracker and send a confirmation email with a PDF copy of the package attached to the email to the responsible staff member at the Regional Water Board office. At this time, the responsible staff member is Lourdes Gonzales and her email address is lgonzales@waterboards.ca.gov

New Dischargers may obtain access rights to Geo-Tracker from:
http://www.waterboards.ca.gov/ust/cleanup/electronic_reporting/index.html

Note: The Regional Water Board may modify this instruction at any time as needed.

ATTACHMENT D –STANDARD PROVISIONS

Table of Contents

ATTACHMENT D –STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR § 122.41(a).)

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR § 122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 CFR § 122.5(c).)

F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR § 122.41(i); Wat. Code, § 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR § 122.41(i)(1));

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR § 122.41(i)(2));

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR § 122.41(i)(3)); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 CFR § 122.41(i)(4).)

G. Bypass

1. Definitions

   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR § 122.41(m)(1)(i).)

   b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR § 122.41(m)(1)(ii).)

2. Bypass of uncontaminated extracted groundwater. During a dewatering project, the Discharger may allow any bypass of uncontaminated extracted groundwater to occur which originates from uncontaminated extraction well(s). The Discharger shall monitor the water quality of these extractions wells to confirm that the extracted water remains uncontaminated.

3. Prohibition of bypass. Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR § 122.41(m)(4)(i)):

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR § 122.41(m)(4)(i)(A));

b. There were no feasible alternatives to the bypass, such as turning off the extraction wells pump(s), discharge to a POTW, retention of untreated wastes, maintenance during normal periods of equipment downtime, or the use of auxiliary treatment facilities. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR § 122.41(m)(4)(i)(B)); and

c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR § 122.41(m)(4)(i)(C).)

4. The Regional Water Board may not take enforcement action against a Discharger for bypass, if the Regional Water Board determines that the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above have been met. (40 CFR § 122.41(m)(4)(ii).)

5. Notice

a. Anticipated bypass of uncontaminated extracted groundwater. If the Discharger knows in advance of the need for a bypass of uncontaminated extracted groundwater, it shall submit the necessary information in the initial or modified Notice of Intent, if possible at least 45 days before the date of the bypass. The necessary information includes but not limited to the name and number of extraction wells, flow rates for each well, the distance to other contaminated wells, and monitoring data such as turbidity, color, conductivity, pH, temperature, metals, TPH, VOC, SVOC, PAHs, Oxygenates.

b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR § 122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 CFR § 122.41(n)(1).)

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was

caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR § 122.41(n)(2).).

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR § 122.41(n)(3)):

   a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR § 122.41(n)(3)(i));

   b. The permitted facility was, at the time, being properly operated (40 CFR § 122.41(n)(3)(ii));

   c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR § 122.41(n)(3)(iii)); and

   d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR § 122.41(n)(3)(iv).)

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR § 122.41(n)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must submit a completed Notice of Intent form (see Attachment B), 180 days in advance of the Order expiration date, **to** obtain a new permit. (40 CFR § 122.41(b).)

C. Transfers

Any authorization to discharge issued under this Order is not transferable to any person except after filing a modified Notice of Intent with the Regional Water Board. If the new Discharger has a different professional engineer, the modified Notice of Intent shall be revised accordingly.

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR § 122.41(j)(1).)

B. Monitoring results must be conducted according to test procedures under Part 136 or other test procedures specified in this Order. (40 CFR § 122.41(j)(4); § 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time (40 CFR § 122.41(j)(2).)

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 CFR § 122.41(j)(3)(i));

2. The individual(s) who performed the sampling or measurements (40 CFR § 122.41(j)(3)(ii));

3. The date(s) analyses were performed (40 CFR § 122.41(j)(3)(iii));

4. The individual(s) who performed the analyses (40 CFR § 122.41(j)(3)(iv));

5. The analytical techniques or methods used (40 CFR § 122.41(j)(3)(v)); and

6. The results of such analyses. (40 CFR § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 CFR § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 CFR § 122.7(b)(1)); and

2. Permit applications and attachments, permits and effluent data. (40 CFR § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or USEPA within a reasonable time, any information which the Regional Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 CFR § 122.41(h); Wat. Code, § 13267.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR § 122.41(k).)

2. All permit applications shall be signed by a responsible person as explained below:

    a. **For a corporation.** All permit applications shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (40 CFR § 122.22(a)(1).)

    b. **For a partnership or sole proprietorship.** All permit applications shall be signed by a general partner or the proprietor, respectively. (40 CFR § 122.22(a)(2).)

    c. **For a municipality, State, federal, or other public agency.** All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a

principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR § 122.22(a)(3).).

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR § 122.22(b)(1));

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR § 122.22(b)(2)); and

   c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 CFR § 122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR § 122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 CFR § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR § 122.22(l)(4).)

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (40 CFR § 122.41(l)(4)(i).) or paper or electronic forms provided or specified by the Regional Water Board or State Water Board.

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under Part 136 or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or other reporting form specified by the Regional Water Board. (40 CFR § 122.41(l)(4)(ii).)

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 CFR § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be uploaded on GeoTracker within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 CFR § 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR § 122.41(l)(6)(ii)):

   a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR § 122.41(l)(6)(ii)(A).)

   b. Any upset that exceeds any effluent limitation in this Order. (40 CFR § 122.41(l)(6)(ii)(B).)

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR § 122.41(l)(6)(iii).)

F. Planned Changes

The discharger shall file with the Executive Officer an amended Notice of Intent at least 60 days before making any material change in the character, location, or volume of the discharge. In case of proposing any change of treatment system or operation and maintenance procedures, a professional engineer certified in State of California shall certify the adequacy of the design and/or the procedures. A modified Notice of Intent is required under this provision only when (40 CFR § 122.41(l)(1)) the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged (pollutants regulated or not regulated by this Order).

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with the requirements in this Order. (40 CFR § 122.41(l)(2).)

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 CFR § 122.41(l)(7).)

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 CFR § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations section 122.48 requires that all NPDES permits specify monitoring and reporting requirements. Water Code Sections 13267 and 13383 also authorize the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, which implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. Reporting responsibilities of waste Dischargers are specified in Sections 13225(a), 13267(b), 13268, 13383 and 13387(b) of the California Water Code and this Regional Water Board's Resolution No. 73-16 and the Environmental Protection Agency's Discharge Monitoring Report (Form 3320-1).

B. The principal purposes of a monitoring program by a waste Discharger, also referred to as self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by the Regional Water Board, (2) to facilitate self-policing by the waste Discharger in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of effluent or other limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and (4) to prepare water and wastewater quality inventories.

C. Laboratories analyzing monitoring samples shall be certified by the Department of Health Services, in accordance with the provision of Water Code section 13176, and must include quality assurance/quality control data with their reports.

D. Written reports, strip charts, calibration and maintenance records, and other records shall be maintained by the Discharger and accessible and retained for a minimum of five years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board or Regional Administrator of the U.S. Environmental Protection Agency, Region IX. Such records shall show the following for **each** sample:

1. Identity of sampling and observation stations by number.
2. Date and time of sampling and/or observations.
3. Method of sampling.
4. Full report for rainbow trout bioassay test (96-hour static bioassay).
5. Date and time that analyses are started and completed, and name of personnel performing the analyses.
6. Complete procedure used, including method of preserving sample and identity and volumes of reagents used. A reference to a specific section of

Standard Methods (SM) or the standard USEPA method number is satisfactory.

7. Calculations of results.
8. Results of analyses and/or observations.

E. Monthly discharge flow volume shall be recorded, as well as totalized quarterly and annual flow.

F. A tabulation reflecting bypassing and accidental waste spills shall be maintained.

G. A copy of this Order, a complete copy of the Notice of Intent filed, documentation of the authorization to discharge received from the Regional Water Board, a full copy of the O&M Manual, and any other documents relevant to the operation and maintenance of the treatment facility shall be stored at or near the treatment facility. These documents help the Dischargers' staff responsible for compliance assurance activities and shall be made available to Regional Water Board staff during inspections. The Dischargers' staff responsible for compliance assurance activities shall inspect the Facility as frequent as required by the O&M Manual. No O&M Manual shall be submitted to the Regional Water Board office, unless requested.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E.1 - Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description (include Latitude and Longitude when available)
--	INF-001	At a point in the extraction system immediately prior to inflow to the treatment unit.
	EFF-001	At a point in the discharge line immediately following treatment and before it joins or is diluted by any other waste stream, body of water, or substance.
	RSW-001U	At a point 50 feet upstream from the point of discharge into the receiving water, or if access is limited, at the first point upstream which is accessible.
	RSW-001D	At a point 50 feet downstream from the point of discharge into the receiving water, or if access is limited, at the first point downstream which is accessible.
	REU-001	At a point immediately prior to reuse location. Not Applicable if reused reclaimed water is the same as effluent or reclamation is in place.

III. INFLUENT MONITORING REQUIREMENTS

The Discharger shall perform sampling and analyses according to the schedule in Table E-2 and no Influent samples shall include any treatment system recirculation.

IV. EFFLUENT MONITORING REQUIREMENTS

The Discharger shall perform sampling and analyses according to the schedule in Table E-2 in accordance with the following conditions:

A. Samples of effluent shall be collected on days coincident with influent sampling.

B. When any type of bypass occurs, grab samples shall be collected on a daily basis for all constituents at all affected discharge points that have effluent limits for the duration of the bypass.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

The Discharger shall perform sampling and analyses according to the schedule in Table E-2 in accordance with the following conditions:

A. Fish bioassay samples shall be collected on days coincident with effluent sampling.
B. Bioassay tests should be performed on effluent samples after chlorination-dechlorination.
C. Total ammonia nitrogen of the effluent shall be analyzed and un-ionized ammonia calculated whenever fish bioassay test results fail to meet the specified percent survival.
D. If the final or intermediate results of any single bioassay test indicate a threatened violation (i.e. the percentage of surviving test organisms is less than the required survival percentage), a new test will begin and the Discharger shall investigate the cause of the mortalities and report the finding in the next self-monitoring report.

TABLE E.2 - Schedule for Sampling, Measurements, and Analysis

Sampling Station	Minimum Sampling Frequency for Influent INF-001	Minimum Sampling Frequency for Effluent EFF-001 or Effluent for Reuse REU-001	Minimum Sampling Frequency for Receiving Surface Water RSW-001U and RSW-001D	Required Analytical Test Method Number, Technique, SM, USEPA Report Number, 40 CFR Part (or equivalent)
Unit is "µg/L" and Type of Sample is "Grab" unless noted otherwise	**Grab**	**Grab**	**Grab**	
Fish Toxicity, 96-hr (% survival)		Q/Y		EPA-821-R-02-012 Test, Method

Sampling Station	Minimum Sampling Frequency for Influent INF-001	Minimum Sampling Frequency for Effluent EFF-001 or Effluent for Reuse REU-001	Minimum Sampling Frequency for Receiving Surface Water RSW-001U and RSW-001D	Required Analytical Test Method Number, Technique, SM, USEPA Report Number, 40 CFR Part (or equivalent)
Unit is "µg/L" and Type of Sample is "Grab" unless noted otherwise	**Grab**	**Grab**	**Grab**	
				2019.0
All Applicable Standard Observations (No Unit)		M	V	
Benzene	D/Q	D/M	V	8020
Toluene	D/Q	D/M	V	8020
Ethyl benzene	D/Q	D/M	V	8020
Total Xylenes	D/Q	D/M	V	8020
Methyl Tertiary Butyl Ether (MTBE)	D/Q	D/M	V	8020
Total Petroleum Hydrocarbons as Gasoline	D/Q	D/M	V	8015 Modified
Total Petroleum Hydrocarbons as Diesel	D/Q	D/M	V	8015 Modified
Total Petroleum Hydrocarbons other than Gasoline and Diesel (required if Petroleum Hydrocarbons other than Gasoline and Diesel present in the soil and groundwater)	D/Q	D/M	V	8015 Modified
Polynuclear Aromatic Hydrocarbons (PAHs)	Q	Q	V	8310
Ethylene Dibromide (EDB)	Y	Y	V	504
Volatile Organic Compounds	Y	Y	V	8260b
Tertiary Amyl Methyl Ether (TAME)	Y	Q See Note1		8260b
Dilsopropyl Ether (DIPE)	Y	Q See Note1		8260b
Ethyl Tertiary Butyl Ether (ETBE)	Y	Q See Note1		8260b
Tertiary Butyl Alcohol (TBA)	Y	Q See Note1		8260b
Ethanol	Y	Q See Note1		8260b
Methanol	Y	Q See Note1		8260b
Semi Volatile Organic Compounds except PAHs	Y	Y		8270c
Antimony Total (See Note 2)	D/Y	D/Y		204.2
Arsenic Total (See Note 2)	D/Y	D/Y		206.3
Beryllium Total (See Note 2)	D/Y	D/Y		GFAA or ICPMS
Cadmium Total (See Note 2)	D/Y	D/Y		GFAA or ICPMS
Chromium Hexavalent and Total Chromium (See Note 2)	D/Y	D/Y		Standard Method (SM) 3500
Copper Total (See Note 2)	D/Y	D/Y		200.9
Cyanide Total (See Note 2)	D/Y	D/Y		SM 4500-CN⁻ C or

Sampling Station	Minimum Sampling Frequency for Influent INF-001	Minimum Sampling Frequency for Effluent EFF-001 or Effluent for Reuse REU-001	Minimum Sampling Frequency for Receiving Surface Water RSW-001U and RSW-001D	Required Analytical Test Method Number, Technique, SM, USEPA Report Number, 40 CFR Part (or equivalent)
Unit is "µg/L" and Type of Sample is "Grab" unless noted otherwise	**Grab**	**Grab**	**Grab**	
				I
Lead Total (See Note 2)	D/Y	D/Y		200.9
Mercury Total (See Note 2)	D/Y	D/Y		1631
Nickel Total (See Note 2)	D/Y	D/Y		249.2
Selenium Total (See Note 2)	D/Y	D/Y		SM 3114B or C
Silver Total (See Note 2)	D/Y	D/Y		272.2
Thallium Total (See Note 2)	D/Y	D/Y		279.2
Zinc Total (See Note 2)	D/Y	D/Y		200 or 289
Flow Rate (gpm & gpd)		Continuous		
Turbidity		D/Q/Y		
pH	D/M/Q/Y	D/M/Q/Y	V	
Dissolved Oxygen (mg/L)			V	
Total Dissolved Solids (mg/L) (construction and dewatering projects)		D/M		
Temperature (°C)	D	D/M/Q/Y		
Electrical Conductivity	D	D/M/Q/Y		
Hardness (mg/L as $CaCO_3$)			T	SM
Salinity (parts per thousand)			T	SM

Notes for Table E2-

Note 1: If not detected at 5 ug/l, annual sampling is sufficient

Note 2: Inorganic compounds samples shall be analyzed for total (unfiltered) constituents with the reporting levels not exceeding the following: 0.002 ug/l for Mercury; 0.25 ug/l for Cadmium and Silver; 1 ug/l for Nickel, Thallium, and Zinc; 2.0 ug/l for Arsenic and Selenium; 1 ug/l for Cyanide; and 0.5 ug/l for Antimony, Beryllium, Total Chromium, Copper, and Lead (SIP Appendix 4 Minimum Levels http://www.waterboards.ca.gov/iswp/docs/final.pdf). If the Discharger exceeds the trigger for mercury of 0.025, the Discharger may consider re-sampling and re-analyzing another sample using ultra-clean techniques as described in USEPA methods 1669 and 1631 to eliminate the possibility of artifactual contamination of the sample.

Definitions: ug/L = microgram per liter or parts per billion (ppb), g/day = grams per day, gpm = gallons per minute, mg/L = milligram per liter or parts per million (ppm), gpd = gallons per day, MFL = million fibers per liter

GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; Hydride = Gaseous Hydride Atomic Absorption; ICP = Inductively Coupled Plasma; and ICPMS = Inductively Coupled Plasma/Mass Spectrometry.

Legends

D Once during the first and fifth day of start up.
M Once each month.
Y Once during the first week of start up; annually thereafter.
D/M Once during the first and fifth day of start up; monthly thereafter.
D/Q Once during the first and fifth day of start up; quarterly thereafter.
D/Y Once during the first and fifth day of start up; annually thereafter.
Q/Y Quarterly for first year of operation, annually thereafter.
D/Q/Y Once during the first and fifth day of start up; quarterly for first year of operation, annually thereafter.
D/M/Q/Y Once during the first and fifth day of start up; monthly for first year of operation, quarterly for the second year, and annually thereafter. In case of pH analysis, this monitoring requirement is only for facilities with a treatment process that would cause no pH variances in the effluent. If any chemical used in the treatment process may cause pH variances in the effluent, the

frequency of pH monitoring in the effluent shall be increased to twice per week for the first month of operation and weekly thereafter if pH monitoring data for the first month of operation demonstrate compliance with pH effluent limits.
V Sampling should be performed within 24 hours after an effluent limit violation is confirmed in E-001.
T Sampling should be performed when Cadmium, Chromium (total), Copper, Lead, Nickel, Silver, or Zinc triggers are exceeded.

VI. LAND DISCHARGE MONITORING REQUIREMENTS. (NOT APPLICABLE)

VII. RECLAMATION MONITORING REQUIREMENTS

The same as effluent and see section IX-E.

VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER

The Discharger is required to perform sampling and analyses according to the schedule in Table E-2 in accordance with the following conditions:

A. Receiving Waters sampling should be performed within 24 hours after an effluent limit violation is confirmed in the effluent.

B. Receiving water samples shall be collected at each station on each sampling day during the period within 1 hour following low slack water. Where sampling at lower slack water period is not practical, sampling shall be performed during higher slack water period. Samples shall be collected within the discharge plume and 50 feet down current of the discharge point so as to be representative, unless otherwise stipulated.

C. Samples should be collected within one foot below the surface of the receiving water body. Explanation shall be provided in the monitoring report if this specification could not be met.

IX. OTHER MONITORING REQUIREMENTS

A. Start Up Phase Monitoring. During the original start up for the treatment system, sampling of the effluent must occur on the first day and fifth day of operation.

1. On the first day of the original start up, the system shall be allowed to run until at least three to five well volumes are removed and until three consecutive readings for pH, conductivity, and temperature are within five percent of each other; then, the influent and effluent shall be sampled and submitted for analyses. Prior to receipt of the results of the initial samples, all effluent shall be discharged into a holding tank (that is contained, not discharged to the receiving water) or discharged to the sanitary sewer until the results of the analyses show the discharge to be within the effluent limits established in this Order and/or as authorized by the Executive Officer. The treatment system may be shut down after the first day's

sampling to await the analyses results and, thereby, reduce the amount of storage needed. For the stored effluent, if the results of the analyses show the discharge to be in violation, the effluent shall: (1) be retreated until the retreated effluent is in compliance, or (2) be disposed in accord with the provisions of Chapter 15, Title 23, California Code of Regulations.

2. If the first day's sampling shows compliance, the treatment system shall be operated for a total of five days with the discharge to the storm sewer or other conveyance system leading to the receiving water, and be sampled again during the fifth day. While the fifth day's samples are being analyzed, the effluent may be discharged to the receiving water as long as the analyses are received within 72 hours of sampling, and then, continue to be discharged to the receiving water if the analyses show compliance. If the treatment system is shut down more than 72 hours during the original start up (awaiting analyses results, etc.), the original start up procedures and sampling must be repeated.

B. Chemical Additives Monitoring: If applicable, monitoring related to chemical usage shall be conducted by the Discharger as required in its treatment system design specification and Operation and Maintenance Manual.

C. Standard Observations for Receiving Water

1. Floating and suspended materials of waste origin (to include oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.
2. Discoloration and turbidity: description of color, source, and size of affected area.
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
4. Evidence of beneficial water use: presence of waterfowl or wildlife, people fishing, and other recreational activities in the vicinity of the site.
5. Hydrographic condition, if relevant:
    a. Time and height of corrected high and low tides (corrected to nearest National Oceanic and Atmospheric Administration (also known as NOAA) location for the sampling date and time of sample and collection).
    b. Depth of water columns and sampling depths.
6. Weather condition:
    a. Air temperature.
    b. Wind direction and estimated velocity.
    c. Total precipitation during the previous five days and on the day of observation.

E. Standard Observations for Onsite Usage of Reclaimed Water

1. Floating and suspended materials of waste origin (to include oil, grease, algae, and other macroscopic particulate matter): presence or absence,

source, and size of affected area.

2. Discoloration and turbidity: description of color, source, and size of affected area.
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
4. Weather condition:
    a. Air temperature.
    b. Wind direction and estimated velocity.
    c. Total precipitation during the previous five days and on the day of observation.
5. Deposits, discolorations, and/or plugging in the conveyance system that could adversely affect the system reliability and performance.
6. Operation of the valves, outlets, sprinkler heads, and/or pressure shutoff valves in conveyance system.

F. Standard Observations for Groundwater Treatment System

1. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
2. Weather condition: wind direction and estimated velocity.
3. Deposits, discolorations, and/or plugging in the treatment system (stripping tower, carbon filters, etc.) that could adversely affect the system reliability and performance.
4. Operation of the float and/or pressure shutoff valves installed to prevent system overflow or bypass.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with all Standard Provisions in Attachment D and in this document related to monitoring, reporting, and recordkeeping.

B. Self Monitoring Reports (SMRs)

1. At any time during the term of this permit, the State or Regional Water Board may notify the Dischargers to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site, and will also provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, the Dischargers shall upload an electronic copy of the SMR on GeoTracker (http://www.geotracker.swrcb.ca.gov).

2. The Dischargers shall report in the SMR the results for all monitoring specified in this MRP under sections III through IX. The Dischargers shall submit quarterly SMRs, uploaded on GeoTracker, no later than 45 days after end of each calendar quarter, including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.

3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E.3 - Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
Continuous	Effective start up date	All	See Note 1
Daily	Effective start up date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	See Note 1
Weekly	Effective start up date	Effective start up day through one week after Effective start up date	See Note 1
Monthly	First day of calendar month following the last day of the start up date	1st day of calendar month through last day of calendar month	See Note 1

Quarterly	**Closest of January 1, April 1, July 1, or October 1 following (or on) the last day of the start up date**	**January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31**	**See Note 1**
Semiannually	**Closest of January 1 or July 1 following (or on) the last day of the start up date**	**January 1 through June 30 July 1 through December 31**	**See Note 1**
Annually	**January 1 following (or on) the last day of the start up date**	**January 1 through December 31**	**See Note 1**
Note 1: A report on the start up phase shall be submitted to the Regional Water Board by uploading it on GeoTracker no more than fifteen (15) days after the end of the start up phase. Quarterly Self-Monitoring Reports shall also be submitted the Regional Water Board by uploading it on GeoTracker on a quarterly calendar basis, no later than forty five (45) days following the last day of the quarter. Annual Reports shall be uploaded on GeoTracker by February 15 of each year, covering the previous calendar year. The annual report shall contain all data required for the fourth quarter in addition to summary data required for annual reporting. This report may be submitted in lieu of the report for the fourth quarter of a calendar year.			

4. Reporting Protocols. The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current Method Detection Limit (MDL), as determined by the procedure in Part 136. The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

   a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

   b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported. For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (± a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

   c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

   d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical

data derived from *extrapolation* beyond the lowest point of the calibration curve.

5. The Discharger shall upload SMRs on GeoTracker in accordance with the following requirements:

   a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with the effluent limitations.

   b. The Discharger shall attach a cover letter to the monitoring reports. The information contained in the cover letter shall clearly identify violations of the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

   c. Monitoring reports must be submitted to the Regional Water Board signed, and certified as required by the Standard Provisions (Attachment D) to the address listed below:

      California Regional Water Quality Control Board
      San Francisco Bay Region
      1515 Clay Street, Suite 1400
      Attn: NPDES Wastewater Division
      Fuel General NPDES NO. CAG912002

   d. The monitoring reports shall also include a description of operation and maintenance (O&M) of the groundwater extraction and treatment system consistent with the O&M manual, which shall be available to all personnel who are responsible for operation and maintenance activities.

   e. The monitoring reports shall include the results of analyses and observations as follows:
      1. Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.
      2. A table identifying by method number the analytical procedures used for analyses. Any special methods shall be identified and should have prior approval of the Regional Water Board's Executive Officer.
      3. Laboratory results shall be summarized in tabular form but do not need to be included in the report. A summary of quality assurance/quality control activities data such as field,

travel, and laboratory blanks shall be reported for each analyzed constituent or group of constituents.

4. A summary of the monitoring data to include information such as source of the sample (influent, effluent, or receiving water); the constituents; the methods of analysis used; the laboratory reporting limits in ug/l; the sample results (ug/l); the date sampled; and the date sample was analyzed.
5. Flow (in gpm) and mass removal data (in kilograms).
6. Summary of treatment system status during the reporting period (e.g. in operation/on standby) and reason(s) for non-routine treatment system shut down.
7. The annual reports shall contain tabular summary of the monitoring data obtained during the previous year. In addition, the annual reports shall contain a comprehensive discussion of the compliance record and the corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements. The annual report shall document that the annual fee has been paid.
8. If, during any calendar quarter, a Discharger becomes aware that any monitoring data obtained for compliance with this Order are invalid, the Discharger shall submit a claim of invalid monitoring data, as uploaded on GeoTracker with a confirmation email to the Regional Water Board staff in charge of this permit, within 45 days after end of that calendar quarter. The Discharger shall include with this claim, the name, phone number, and email of its assigned staff to investigate the cause(s) of errors and the corrective actions taken, or date when actions will be completed to eliminate or reduce future data errors. The Discharger shall also provide, in this claim, a date that the Operation and Maintenance Manual will be updated to include errors prevention measures. These preventive measures shall include but not be limited to accelerated monitoring (e.g. twice a month monitoring for at least one month) to provide valid monitoring data indicating the effectiveness of the proposed preventive measures.

C. Discharge Monitoring Reports (DMRs) Not Applicable

D. Other Reports

1. Trigger Study Report: The Discharger shall report the results of any trigger study required by Special Provisions – VI.C.6 and the progress in satisfaction of compliance schedule dates specified in Special Provisions VI.C.7, VI.C.8, and VI.C.9 of this Order. The Discharger shall upload

these reports on GeoTracker.

2. Start Up Notification Report: The Discharger shall notify the Executive Officer by uploading on GeoTracker the completed Form provided in Attachment G - Notice of Startup or Re-Startup Form. no later than 14 days before planned start up date.

3. Start-up Report: A report on the start up phase shall be uploaded on GeoTracker no more than fifteen days after the end of the start up phase. This report shall include a certification that a professional engineer certified in the State of California oversees the treatment system operation and maintenance activities including the start up work.

4. Spill Reports: If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the Discharger shall report such a discharge to this Regional Water Board, at (510) 622-2300 on weekdays during office hours from 8 a.m. to 12 p.m. and 1 p.m. to 5 p.m, and to the Office of Emergency Services at (800) 852-7550 during non-office hours. A written report shall be uploaded on GeoTracker, with an confirmation email to staff, within five (5) working days and shall contain information relative to:

    a. Nature of waste or pollutant,
    b. Quantity involved,
    c. Duration of incident,
    d. Cause of spilling,
    e. Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any,
    f. Estimated size of affected area,
    g. Nature of effects (i.e., fish kill, discoloration of receiving water, etc.),
    h. Corrective measures that have been taken or planned, and a schedule of these activities, and
    i. Persons/agencies notified.

5. Reports of Treatment Unit Bypass and Permit Violation: In the event the Discharger violates or threatens to violate the conditions of the waste discharge requirements and prohibitions or intends to permit a treatment unit bypass due to:
    a. Maintenance work, power failures, or breakdown of waste treatment equipment,
    b. Accidents caused by human error or negligence,
    c. The self-monitoring program results exceeding effluent limitations,
    d. Any activity that would result in a frequent or routine discharge of any toxic pollutant not limited by this Order, or
    e. Other causes, such as acts of nature.

The Discharger shall notify the Regional Water Board within 24 hours of when the Discharger or Discharger's agent has knowledge of the incident and confirm this notification in writing and uploaded on GeoTracker with a confirmation email to staff, within 5 working days of the initial notification. The written report shall include time, date, duration and estimated volume of waste bypassed, method used in estimating volume and person notified of the incident. The report shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

If a violation of the effluent limitations should occur, the Discharger shall direct the effluent to a holding tank and contained, or the extraction and treatment system shall be shut down. The confirmation sampling shall be conducted when the discharge is directed to a holding tank and contained or right before the extraction and treatment system is shut down. The content of the holding tank shall be retreated until the retreated effluent is in compliance, or be disposed in accord with the provisions of Chapter 15, Title 23, California Code of Regulations.

If the treatment system is shut down for more than 120 consecutive hours after the start up period (maintenance, repair, violations, etc.) the reason(s) for shut down, proposed corrective action(s) and estimated start up date shall be orally reported to the Regional Water Board within five days of shut down and a written submission through GeoTracker shall also be provided within 15 days of shut down.

If feasible, the corrective action(s) taken and the proposed start up procedures shall be reported to the Regional Water Board at least 15 days before start up.

ATTACHMENT F – FACT SHEET

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List of Tables

ATTACHMENT F – FACT SHEET

This Order is intended to cover discharges of extracted and treated groundwater resulting from the cleanup of groundwater polluted by fuel leaks and other related wastes at service stations and similar sites.

This Fact Sheet includes the legal basis and technical rationale for the requirements of the Order. This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as "not applicable" have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as "not applicable" are fully applicable to the Dischargers.

In 1991, the Regional Water Board issued a National Pollutant Discharge Elimination System (NPDES) General Permit for allowing the discharge of extracted and treated groundwater resulting from the cleanup of groundwater polluted by fuel leaks and other related wastes at service stations and similar sites. The permit was reissued twice in 1996 and 2001.

The 2001 permit expired on September 19, 2006, and needs to be reissued because approximately 9,700 sites with underground fuel storage tanks within the San Francisco Bay Region are known to be leaking or have leaked in the past. Fuel is also discharged to groundwater from other sources (surface spills, pipeline breaks or leakages, etc.). Within the next five years, approximately 300 of these sites will be conducting groundwater cleanups by extracting contaminated groundwater, treating, and discharging treated groundwater, particularly in Santa Clara County. Because some Publicly Owned Treatment Works (POTWs) do not accept new discharges from groundwater cleanups, approximately 75 of these sites will require Waste Discharge Requirements from the Regional Water Board for discharge to surface water. These cleanups will exceed the capacity of available staff to develop and bring individual waste discharge requirements to the Regional Water Board for adoption. These circumstances create the need for an expedited system to process the anticipated numerous requests. The renewal of the fuel general NPDES permit will expedite the processing of requirements, enable the Regional Water Board to better utilize limited staff resources, and permit cleanups to begin promptly.

The following fuel-cleanup discharges are normally not eligible for coverage: discharges from cleanups involving significant contamination by metals, pesticides, or other conservative pollutants; discharges from cleanups involving reinjection of treated groundwater; and discharges from sites with other NPDES discharges (e.g. process waste). A fuel-cleanup discharger that combines extracted groundwater with stormwater before treatment is normally not eligible for coverage under this Order because amount of rainwater varies and may exceed the treatment system capacity.

I. PERMIT INFORMATION

The following Table (Table F-1) and paragraphs summarize administrative information related to the facilities. As applicable, Table F-1 provides cross-references to the specific sections of the Notice of Intent (NOI) Form, in the Attachment B, that each Discharger enrolled under this Order must initially complete and submit as part of the NOI.

Table F-1. Facility Information

WDID	A waste discharge identification number will be assigned to a facility when the Executive Officer issues the authorization to discharge
Discharger	Row 1 of Table 2 of NOI Form in Attachment B
Name of Facility	Row 2 of Table 2 of NOI Form in Attachment B
Facility Address	Row 3 of Table 2 of NOI Form in Attachment B
Facility Contact, Title and Phone	Row 4 of Table 2 of NOI Form in Attachment B
Authorized Person to Sign and Submit Reports	Row 5 of Table 2 of NOI Form in Attachment B
Mailing Address	Row 6 of Table 2 of NOI Form in Attachment B
Billing Address	Row 7 of Table 2 of NOI Form in Attachment B
Type of Facility	Row 8 of Table 2 of NOI Form in Attachment B
Major or Minor Facility	Minor
Threat to Water Quality	Category 2 (based on three categories 1, 2, and 3)
Complexity	Category B (based on three categories A, B, and C)
Pretreatment Program	Not Applicable
Reclamation Requirements	Producer (See Row 14 of Table 4 of NOI in Attachment B)
Facility Permitted Flow	Condition 4 of NOI Form in Attachment B (in gallons per minute (gpm))
Facility Design Flow	Condition 4 of NOI Form in the Attachment B (in gpm)
Watershed	Row 9 of Table 2 of NOI Form in the Attachment B
Receiving Water	Row 10 of Table 2 of NOI Form in the Attachment B
Receiving Water Type	Row 11 of Table 2 of NOI Form in the Attachment B

A. Site Owners or Operators who will apply for an authorization to discharge under this Order and who may be granted such authorization are hereinafter called Discharger(s). The groundwater treatment facility is considered the Facility regulated under this Order (hereinafter Facility). For the purposes of this Order, references to the "Discharger(s)" or "permittee(s)" in applicable federal and state

laws, regulations, plans, or policy are held to be equivalent to references to the Discharger(s) herein.

B. The Facilities currently regulated under the previous general NPDES permit, Order No. 01-100, discharge wastewater to different receiving waters of the United States, mainly in Santa Clara County. Order No. 01-100, which was adopted on September 19, 2001, expired on September 19, 2006. The terms and conditions of the previous Order were automatically continued in effect until new Waste Discharge Requirements and NPDES permit are adopted pursuant to this Order. During the life of the previous Order, 114 facilities were authorized to discharge treated groundwater to the receiving water documented in the NOI submitted for each discharge.

C. As of June 2006, 37 Dischargers filed a report of waste discharge by submitting an NOI application for renewal of their discharge authorization under this General Waste Discharge Requirements (GWDRs), NPDES permit. At least 38 more NOIs may be submitted during the next five years. In the process of reviewing and approving NOIs, supplemental information may be requested from a subset of these facilities. It may also be necessary to visit facilities for which an NOI has been submitted, to observe operations and collect additional data to determine the eligibility of authorizing those discharges under this Order. This Order requires the Dischargers to submit monitoring data per Attachment E. A few Dischargers authorized under this Order may be required to apply for an individual NPDES permit if monitoring data indicate significant contamination by metals, pesticides, or other conservative pollutants.

II. FACILITY DESCRIPTION

The regulated facilities under this Order are normally groundwater treatment facilities located at active or closed service stations or construction sites with the need for short or long term dewatering. These groundwater treatment facilities are in operation to extract and treat groundwater polluted mainly by fuel leaks.

A. Description of Wastewater Treatment

Dischargers authorized under this Order typically use aeration and/or granular activated carbon (GAC) systems to treat their pollutants of concern. The most common pollutants contained in the influent of these treatment systems are benzene, ethylbenzene, toluene, total xylenes, Methyl Tertiary Butyl Ether (MTBE), and other petroleum hydrocarbons collectively named as total petroleum hydrocarbons (TPH). Less commonly inorganic compounds may also be present in the influent and effluent. Other volatile or semi volatile organic compounds may also be present in the influent of a subset of facilities regulated under this permit. Approximately 75% of the 37 facilities that applied for permit re-issuance designed their treatment facilities for a flow rate less than 10 gpm.

Except for some inorganic compounds and oxygenates other than MTBE, the concentrations of organic pollutants in the effluents of the discharges are usually below detectable levels. The reported detection limit for benzene, ethylbenzene, toluene, total xylenes, and most volatile organic compounds (VOCs) is 0.5 microgram per liter (ug/l); for MTBE the reported detection limit ranges from 0.5 to 5.0 ug/l; for TPH the reported detection limit is mostly 50.0 ug/l; and the reported detection limits for semi volatile organic compounds are mostly 5.0 or 10.0 ug/l.

B. Discharge Points and Receiving Waters

Condition No. 6 of the NOI Form (Attachment B) requires the Discharger to provide discharge location data and a map with the discharge path highlighted.

C. Summary of Existing Requirements

With two exceptions, the effluent limitations contained in the previous Order have been continued into this Order as summarized in Table F-4. These exceptions are: MTBE reduced from 13 ug/l to 5 ug/l, and Vinyl Chloride reduced from 5 ug/l to 1 ug/l, for Discharge to Other Surface Water Areas.

D. Compliance Summary

In order to collect compliance history information, the Regional Water Board staff reviewed the 37 permit renewal applications submitted, and the annual reports from those same 37 facilities, from the previous permit period, 2001-2006. Except for Total Petroleum Hydrocarbon as diesel (TPHd), the Dischargers have reported almost a 100% compliance rate with the effluent limitations in the permit. In the case of TPHd, the Dischargers reported 15 TPHd exceedances in the cover letter to the annual reports. These same Dischargers reported 52 TPHd exceedances in the NOI applications submitted in March 2006. The Dischargers reported 46 of those 52 TPHd exceedances (about 90%) were due to false positives - in other words, sampling and reporting errors of various nature. A number of oil companies also reported some of the TPHd exceedances were due to false positive results caused by sampling errors and problems with EPA method 8015 for diesel. These false positive concerns were summarized in an August 18, 2003, report titled "Diesel False Positives and Related Regulatory Policy for NPDES Effluent Dischargers," prepared by Tim Utterback and Richard Weiss for Wetern States Petroleum Association (WSPA). This report summarizes the WSPA members' concerns about the potential for enforcement actions based on invalid monitoring data, and finds it beneficial to the Regional Water Board and Dischargers to have a standardized procedure to prevent, identify, and report diesel false positives. This Order provides the Dischargers with requirements to prevent, identify, and report diesel false positives as explained in the following sections of the Order:

1. Section X.B.5.e.3 of Attachment E requires the reporting of quality assurance/quality control activities data such as field, travel, and laboratory blanks for each analyzed constituent or group of constituents,

2. Table E.2 of Attachment E requires the Dischargers to monitor TPH other than gasoline and diesel separate from TPHd which will minimize TPHd false positives,
3. Section X.B.5.e.8 of Attachment E requires the Dischargers to report every discovered invalid monitoring data, including TPHd false positives,
4. Section X.B.5.e.8 of Attachment E provides the Dischargers with additonal time, 45 days instead of 15 days in the 2001 permit, to identify, verify, and report any monitoring errors, and
5. Table 5 of Attachment B and Section X.B.5.e.8 of Attachment E require the Dischargers to assign a specific person to investigate the cause(s) of errors and implement corrective actions.

E. Planned Changes

As required in Attachment D, a Discharger authorized under this Order shall submit a modified NOI before making any material change in the character, location, or volume of the discharge.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code (commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the Water Code (commencing with section 13260). States may request authority to issue general NPDES permits pursuant to Code of Federal Regulations, Title 40, Chapter 1, Subchapter D, part 122.28 (40 CFR 122.28). 40 CFR 122.28 provides for the issuance of general permits to regulate discharges of waste which result from similar operations, are the same types of waste, require the same effluent limitations, require similar monitoring, and are more appropriately regulated under a general permit rather than individual permits. This general permit meets the requirements of 40 CFR 122.28 because the discharges and proposed discharges:

1. result from similar operations (all involve extraction, treatment, and discharge of groundwater),
2. are the same types of waste (all are groundwater containing petroleum hydrocarbons and other related wastes due to leaks and spills from service stations and similar sites),

3. require similar effluent limitations for the protection of the beneficial uses of surface waters in the San Francisco Bay Region (this general permit does not cover direct discharges to the Pacific Ocean),
4. require similar monitoring, and
5. are more appropriately regulated under a general permit rather than individual permits.

This Order shall become effective about two months after the date of its adoption provided the Regional Administrator, USEPA, has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

B. **California Environmental Quality Act (CEQA).** Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.

C. State and Federal Regulations, Policies, and Plans

a. **Water Quality Control Plans.**
The Regional Water Board adopted a Water Quality Control Plan for the San Francisco Bay Basin (hereinafter Basin Plan) on June 21, 1995, and amended this plan on January 2, 2004, and November 16, 2005. The 2005 amendment will be final after approval from the State Water Board and Office of Administrative Law. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. The Basin Plan (Page 2-5) states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. The Basin Plan may not specifically identify beneficial uses for every Receiving Water regulated under this permit, but identifies present and potential uses for the downstream water body, to which the Receiving Water, via an Intermediate water body, is tributary. These potential and existing beneficial uses are: municipal and domestic supply, fish migration and fish spawning, industrial service supply, navigation, industrial process supply, marine habitat, agricultural supply, estuarine habitat, groundwater recharge, shellfish harvesting, water contact and non-contact recreation, ocean, commercial, and sport fishing, wildlife habitat, areas of special biological significance, cold freshwater and warm freshwater habitat, and preservation of rare and endangered species for surface waters and municipal and domestic supply, industrial service supply, industrial process supply, agricultural supply, and freshwater replenishment for groundwaters. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

All beneficial uses listed in the Order are from Basin Plan, Tables 2-1 through 2-7 (pages 2-11, 2-13, 2-15, 2-17, 2-19, 2-21, and 2-23, respectively). The tributary rule is explained on Page 2-5. The beneficial uses for the groundwater basins are listed in Table 2-9 (page 2-28). Requirements of this Order implement the Basin Plan.

b. **Thermal Plan.**
The Regional Water Board has included this Plan in Page 3-4 of the Basin Plan.

c. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

d. State Implementation Policy.
On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria promulgated by the USEPA through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

e. Alaska Rule.
On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes. (40 C.F.R. § 131.21; 65 Fed. Reg. 24641 (April 27, 2000).) Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

f. **Antidegradation Policy.** Section 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. The permitted discharge is consistent with the antidegradation provision of section 131.12 and State Water Board Resolution No. 68-16. Discharges regulated by this Order should not lower water quality if the terms and conditions of this Order are met. Therefore the permitted discharges are consistent with the antidegradation provision of 40 CFR Section 131.12 and State Water Board Resolution No. 68-16.

g. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at title 40, Code of Federal Regulations section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order.

D. Impaired Water Bodies on CWA 303(d) List

On June 6, 2003, the USEPA approved a revised list of impaired water bodies prepared by the State (hereinafter referred to as the 303(d) list). The SIP requires final effluent limitations for all 303(d)-listed pollutants to be based on total maximum daily loads and associated waste load allocations.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source Dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: section 122.44(a) requires that permits include applicable technology-based limitations and standards; and section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Where reasonable

potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) may be established: (1) using USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) on an indicator parameter for the pollutant of concern; or (3) using a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

The proposed effluent limitations are required to protect Beneficial Uses of the surface waters and ground waters of the San Francisco Bay Region. The Clean Water Act (CWA) requires technology-based effluent limits (Section 301) unless more stringent limits are required in order to achieve water quality objectives. Section 301 of the CWA also requires that technology-based effluent limits include the application of best available technology economically achievable (BAT) for the pollutants being discharged. Technology based effluent limits were developed for the suite of volatile organic compounds (VOCs) to be regulated, and then water quality based effluent limits were developed for those VOCs whose lowest value from the CTR and Basin Plan was less than the respective technology based effluent limit.

A. Discharge Prohibitions

The proposed prohibitions are required to protect beneficial uses of the surface waters and ground waters of the San Francisco Bay Region.
Prohibition III.A, no unauthorized discharge of extracted and treated groundwater, is the same as in the previous permit and is based on CWC Section 13260, which requires filing of a report of waste discharge (ROWD) before discharges can occur. The Dischargers submitted a ROWD for the discharges described in this Order; therefore discharges not described in this Order are prohibited.
Prohibition III.B, no discharge other than the one approved by the Executive Officer which do not adversely affect the environment and comply with the requirements of this Order, is based on the same rationale documented for Prohibition A.1.
Prohibition III.C, no discharge of extracted and treated groundwater in excess of the authorized flow rate, is based on the same rationale documented for Prohibition A.1. The Dischargers submitted a ROWD for the discharges which included a treatment facility designed for a specific maximum flow rate by a professional engineer certified in the State of California, therefore flow rates exceeding the designed/authorized flow rates are prohibited.
Prohibition III.D, no scouring or erosion due to discharge of extracted and treated groundwater, is based on Basin Plan (page 4-40) goal of reducing and preventing (human-caused) erosion.
Prohibition III.E, no pollution, contamination, or nuisance, is based on the Basin Plan (page 2-1).

Prohibition III.F, no bypass or overflow of untreated or partially treated polluted groundwater, is based on 40 CFR 122.41(m)(ii)(4).

B. Technology-Based Effluent Limitations

1. Scope and Authority

The CWA requires that technology-based effluent limitations are established based on several levels of controls:

- Best practicable treatment control technology (BPT) represents the average of the best performance by plants within an industrial category or subcategory. BPT standards apply to toxic, conventional, and non-conventional pollutants.

- Best available technology economically achievable (BAT) represents the best existing performance of treatment technologies that are economically achievable within an industrial point source category. BAT standards apply to toxic and non-conventional pollutants.

- Best conventional pollutant control technology (BCT) represents the control from existing industrial point sources of conventional pollutants including BOD, TSS, fecal coliform, pH, and oil and grease. The BCT standard is established after considering the "cost reasonableness" of the relationship between the cost of attaining a reduction in effluent discharge and the benefits that would result, and also the cost effectiveness of additional industrial treatment beyond BPT.

- New source performance standards (NSPS) represent the best available demonstrated control technology standards. The intent of NSPS guidelines is to set limitations that represent state-of-the-art treatment technology for new sources.

The CWA requires USEPA to develop effluent limitations, guidelines and standards (ELGs) representing application of BPT, BAT, BCT, and NSPS. Section 402(a)(1) of the CWA and section 125.3 of the Code of Federal Regulations authorize the use of BPJ to derive technology-based effluent limitations on a case-by-case basis where ELGs are not available for certain industrial categories and/or pollutants of concern. Where BPJ is used, the permit writer must consider specific factors outlined in section 125.3.

2. Applicable Technology-Based Effluent Limitations

BPJ was used in developing technology-based effluent limits in this Order. BPJ is defined as the highest quality technical opinion developed by a permit writer after consideration of all reasonably available and pertinent data or information that forms the basis for the terms and conditions of a NPDES permit. The authority for BPJ is contained in Section 402(a)(1) of the CWA.

In the treatment systems regulated by this permit, organic compounds are typically removed from groundwater through either aeration processes or through adsorption processes (e.g. granular activated carbon). When properly designed and operated, most aeration and/or granular activated carbon (GAC) systems can lower the concentration of petroleum pollutants and VOCs to below detection limits. Limits established in the tentative order for the petroleum pollutants and VOCs can be met if GAC/air stripper treatment systems are properly operated.

In 1986, U.S. EPA Region 9 in a document titled "NPDES Permit Limitations for Discharge of Contaminated Groundwater: Guidance Document" (USEPA 1986) concluded that the cost of attaining effluent levels to non-detect (5 ug/l detection levels except 1 ug/l for Vinyl Chloride) for all organic compounds that are commonly detected in contaminated groundwater is considered economically achievable. This permit was originally issued in 1991. The suite of pollutants to be regulated with effluent limits in this permit was selected by reviewing USEPA 1986 and the 1989 State of California document titled "Leaking Underground Fuel Tank Field Manual" and using the compounds called out by those documents as most likely to be detected at a fuel or groundwater cleanup site and for which a Maximum Contaminant Level (MCL) has been promulgated. In addition, the Regional Water Board staff, using BPJ, added Trichlorotrifluoroethane (Freon 113) in a previous permit reissuance, and Methyl Tertiary Butyl Ether (MTBE) in the 2001 permit reissuance.

MTBE has a secondary MCL of 5 ug/l. The discharges regulated under this permit have the potential to recharge groundwaters designated as drinking waters. The Basin Plan requires these groundwaters to be protected to both the primary and secondary MCLs. Therefore, it is appropriate to limit discharges that may recharge these groundwaters to secondary MCL levels. In 2001, the previous permit was re-issued with two MTBE effluent limits: one 5 ug/l limit for discharging to drinking water areas and another 13 ug/l limit (based on MTBE primary MCL) for discharging to other surface water areas. Data collected over 18 months, ending in 2001, showed that out of 443 effluent samples analyzed for MTBE during that period, 432 were "non-detect" and one sample detected MTBE above 5 ug/l, suggesting that a limit of 5 ug/L would be reasonably achievable. Additionally, the MTBE monitoring data provided by the Dischargers during the 2001-2006 period, confirm the limit of 5 ug/l for MTBE is

technologically feasible and economically achievable. Most Dischargers authorized under this permit were already required to comply with the 5 ug/l limit and almost all MTBE monitoring data confirm the Dischargers' ability to comply with the 5 ug/l technology-based limit. Therefore, consistent with the USEPA 1986 guidance, the maximum daily effluent limitation for MTBE for discharge to other surface water areas is changed from 13 ug/l to 5 ug/l.

Similarly, consistent with the USEPA 1986 guidance, the maximum daily effluent limitation for Vinyl Chloride for discharge to other surface water areas is corrected from 5 ug/l to 1 ug/l.

Even though information exists to show that the reporting limit and removal technology for many of the effluent constituents is now lower (0.5 ug/l), USEPA Region 9 has not updated its original guidance to adjust limits downward. The Regional Water Board staff's BPJ, at this time, is to remain consistent with EPA's original limits. The technology-based effluent limits in this permit are consistent with, or more stringent than, the USEPA 1986 guidance.

This Order has also effluent limits for Total Petroleum Hydrocarbons (TPH) as gasoline or as diesel. USEPA 1986 guidance has no mention of TPH as gasoline or as diesel. The expired permit had a limit of 50.0 ug/l for TPH and a monitoring requirement for TPH as Gasoline and Diesel. TPH does not have an MCL and typically has a reporting limit of 50 ug/l.

In 1991, the most significant group of pollutants in the groundwater cleanup facilities regulated under this permit were the pollutants associated with gasoline and diesel fuels. However, since 2001, Dischargers have submitted groundwater treatment facilities influent and effluent monitoring data that indicate petroleum hydrocarbons other than gasoline and diesel fuel have contaminated groundwater. For example, the West Base Realignment and Closure Program Management Office of the Department of Navy (Navy) reported detected levels of TPH Bunker-C in the influent and non-detect TPH Bunker-C monitoring data with a reporting level as high as 300 ug/l in the effluent.

In this case, the Regional Water Board staff do not have sufficient information to require a reporting limit of 50 ug/l for TPH Bunker C. In addition, even if a reporting limit of 50 ug/l is achieved, the Navy may need additional time to improve its groundwater treatment system to remove TPH Bunker-C to a non-detect level of 50 ug/l.

In general, the Regional Water Board staff need to gather information regarding the detection and treatment limitations for those TPH components other than Gasoline and Diesel. For this reason, instead of setting a new limit, a trigger (called TPH other than Gasoline and Diesel) and a monitoring requirement has been added in the permit. This trigger and monitoring requirement would allow Dischargers such as the Navy to continue their groundwater cleanup while improving their reporting levels to 50 ug/l and/or upgrading their treatment facility to remove TPH other than Gasoline and Diesel category to a 50 ug/l non-detect level. By the next permit reissuance in 2011, the Regional Water Board staff should have a better understanding of the range of constituents included in this new TPH other than Gasoline and Diesel category and whether a new effluent limit would be appropriate at that time.

Table F-2 shows that the technology based effluent limits for discharge to drinking water areas were derived by picking the lowest limit from the State promulgated MCL, Federal promulgated MCL, and USEPA 1986 guidance for each of the listed compounds. The last column of Table F-2 shows that the technology based effluent limits for discharge to other surface water areas are the same as USEPA 1986 BAT.

Table F-2. Summary of Technology-based Effluent Limitations

No.	Compound	SMCL ug/L	FMCL ug/L	USEPA 1986 BAT ug/L	Technology-based Effluent Limitations for Discharge to Drinking Water Areas ug/L	Technology-based Effluent Limitations For Discharge to Other Surface Water Areas ug/L
1	Benzene	1	5	5	1	5
2	Carbon Tetrachloride	0.5	5	5	0.5	5
3	Chloroform	80	80	5	5	5
4	1,1-Dichloroethane	5	-	5	5	5
5	1,2-Dichloroethane	0.5	5	5	0.5	5
6	1,1-Dichloroethylene	6	7	5	5	5
7	Ethylbenzene	300	700	5	5	5
8	Methylene Chloride (Dichloromethane)	5	5	5	5	5
9	Tetrachloroethylene	5	5	5	5	5
10	Toluene	150	1000	5	5	5
11	Cis 1,2-Dichloroethylene	6	70	5	5	5
12	Trans 1,2-Dichloroethylene	10	100	5	5	5
13	1,1,1-Trichloroethane	200	200	5	5	5
14	1,1,2-Trichloroethane	5	5	5	5	5
15	Trichloroethylene	5	5	5	5	5
16	Vinyl Chloride	0.5	2	1	0.5	1
17	Total Xylenes	1750	10000	5	5	5
18	Methyl Tertiary Butyl Ether (MTBE)	5	-	5	5	5
19	Total Petroleum Hydrocarbons (TPH) as Gasoline or as Diesel	-	-	-	50 (proposed)	50 (proposed)
20	Ethylene Dibromide (1,2-Dibromoethane)	0.05	0.05	5	0.05	5
21	Trichlorotrifluoroethane	1200	-	5	5	5

LEGEND: FMCL - Federal Maximum Contaminant Level and MCL - California Maximum Contaminant Level

Effluent Limitations A.2 for pH is based on Table 4-2 (Page 4-69) of the Basin Plan.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

As specified in section 122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an in-stream excursion above any state water quality standard. The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

If any extracted and treated groundwater receive less than proper treatment, the Benzene, Carbon Tetrachloride, Chloroform, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, Ethylbenzene, Methylene Chloride (Dichloromethane), Tetrachloroethylene, Toluene, Cis 1,2-Dichloroethylene, Trans 1,2-Dichloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, Total Xylenes, Methyl Tertiary Butyl Ether (MtBE), Total Petroleum Hydrocarbons, Ethylene Dibromide (1,2-Dibromoethane), and/or Trichloro-trifluoroethane concentration in the effluent of those discharges do cause, have a reasonable potential to cause, or contribute to an exceedance of any applicable criterion established by the USEPA pursuant to CWA Section 303.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The water quality criteria applicable to the discharge(s) regulated under the Order are based on protecting the beneficial uses described in Section III of the Order. The WQOs/WQC applicable to the receiving water bodies of these discharges are from the Basin Plan, CTR, and NTR.

(1) The Basin Plan specifies numeric WQOs for 10 priority toxic pollutants, as well as narrative WQOs for toxicity and bioaccumulation in order to protect beneficial uses. The pollutants for which the Basin Plan specifies numeric objectives are arsenic, cadmium, chromium (VI), copper in fresh water, and lead, mercury, nickel, silver, zinc, and total polynuclear aromatic hydrocarbons (PAHs) in salt water. The narrative toxicity objective states in part "[a]ll waters shall be maintained free of toxic substances in concentrations that are lethal to

or that produce other detrimental responses in aquatic organisms." The bioaccumulation objective states in part "[c]ontrollable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered." Effluent limitations and provisions contained in this Order are designed to implement these objectives, based on available information.

(2) The CTR specifies numeric aquatic life criteria for 23 priority toxic pollutants and numeric human health criteria for 57 priority toxic pollutants. These criteria apply to inland surface waters and enclosed bays and estuaries such as San Francisco Bay, except where the Basin Plan's Tables 3-3 and 3-4 specify numeric objectives for certain of these priority toxic pollutants. The Basin Plan's numeric objectives apply over the CTR (except in the South Bay south of the Dumbarton Bridge).

(3) The NTR established numeric aquatic life criteria for selenium, numeric aquatic life and human health criteria for cyanide, and numeric human health criteria for 34 toxic organic pollutants for waters of San Francisco Bay upstream to, and including, Suisun Bay and the Sacramento-San Joaquin Delta. This includes the receiving water for this Discharger.

3. Determining the Need for WQBELs

The CWA requires water quality based effluent limits if technology based effluent limits are not sufficiently stringent to meet water quality objectives. In the suite of VOCs regulated by the Order, several VOCs have water quality criteria (WQC) in the CTR that are below the respective technology based effluent limit. The effluent limit for those VOCs is set to be the CTR WQC as shown in Table F-3. A blank cell in Table F-3 denotes that no California Toxics Rule criterion is available for that pollutant.

4. WQBEL Calculations

No dilution credit is given in establishing effluent limits in this permit because all discharges of treated groundwater regulated under this Order are to storm drain systems that discharge to rivers, creeks, and streams. Many of these creeks and streams are dry during the summer months. Therefore, for many months of the year, these discharges may represent all or nearly all of the flow in some portions of the receiving creeks or streams. These discharges therefore also have the potential to recharge groundwaters protected as drinking waters.

In explanation of the procedure for WQBEL calculations: if the detection limit for the VOC is greater than the CTR WQC then the effluent limit is set at the CTR WQC. Pursuant to SIP 2.4.5, the Regional Water Board will deem a discharge out of compliance if a sample result is above the reporting level. There should be no significant adverse impact on water quality from those VOCs whose detection limit is above the CTR WQC because these are low volume discharges and because the treatment used, aeration or GAC, reduces concentrations of VOCs to non-detectable levels.

For the pollutants that have a water quality objective less than the 5 ug/l technology based limit, monthly average effluent limit and maximum daily effluent limits have been included consistent with the SIP. Monthly average effluent limits for discharge to areas of drinking water usage utilize CTR criteria for consumption of water and organisms. Monthly average effluent limits for discharge to other surface water areas utilize CTR criteria for consumption of organisms. For those pollutants that have water quality objectives less than 5 ug/l, the maximum daily effluent limit was computed according to SIP Procedure 1.4B, Step 6, without dilution, utilizing a multiplier of 2.01 times the monthly average effluent limit. In cases where the value of the maximum daily effluent limit is equivalent to the monthly average effluent limit, no monthly average effluent limit is necessary.

For the effluent limits for "Discharge to Other Surface Water Areas," the rationale for these limits is the same as for the effluent limits for "Discharge to Drinking Water Areas".

Table F-3. Summary of Water Quality-based Effluent Limitations

No.	Compound	CTR Criteria Water and Organisms	CTR Criteria Organisms Only	Discharge to Drinking Water Areas (See Note 1)		Discharge to Other Surface Water Areas	
		(ug/L)	(ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)
1	Benzene	1.2	71	1.2	2.4	71	142.7
2	Carbon Tetrachloride	0.25	4.4	0.25	0.5	4.4	8.8
3	Chloroform	-	-	-	-	-	-
4	1,1-Dichloroethane	-	-	-	-	-	-
5	1,2-Dichloroethane	0.38	99	0.38	0.8	99	199
6	1,1-Dichloroethylene	0.057	3.2	0.057	0.1	3.2	6.4
7	Ethylbenzene	3100	29000	3100	6231	29000	58290
8	Methylene Chloride (Dichloromethane)	4.7	1600	4.7	9.4	1600	3216
9	Tetrachloroethylene	0.8	8.85	0.8	1.6	8.85	17.8
10	Toluene	6800	200000	6800	13668	200000	402000
11	Cis 1,2-Dichloroethylene	-	-	-	-	-	-
12	Trans 1,2-Dichloroethylene	700	140000	700	1407	140000	281400
13	1,1,1-Trichloroethane	-	-	-	-	-	-

No.	Compound	CTR Criteria Water and Organisms	CTR Criteria Organisms Only	Discharge to Drinking Water Areas (See Note 1)		Discharge to Other Surface Water Areas	
		(ug/L)	(ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)
14	1,1,2-Trichloroethane	0.6	42	0.6	1.2	42	84.4
15	Trichloroethylene	2.7	81	2.7	5.4	81	162.8
16	Vinyl Chloride	2	525	2	4	525	1055
17	Total Xylenes	-	-	-	-	-	-
18	Methyl Tertiary Butyl Ether (MTBE)	-	-	-	-	-	-
19	Total Petroleum Hydrocarbons (TPH)	-	-	-	-	-	-
20	Ethylene Dibromide (1,2-Dibromoethane)	-	-	-	-	-	-
21	Trichlorotrifluoroethane	-	-	-	-	-	-

Note 1: Drinking water areas are defined as surface waters with the existing or potential beneficial uses of "municipal and domestic supply" and "groundwater recharge" (the latter includes recharge areas to maintain salt balance or to halt salt water intrusion into fresh water aquifers).

5. Whole Effluent Toxicity (WET)

The basis for Effluent Limitations A.3 (toxicity) is Table 4-4 (Chapter 4, Page 70) of the Basin Plan. The basis for using rainbow trout and 96-hour static renewal bioassays is in Chapter 4, Page 9, of the Basin Plan. The basis for repeating the toxicity testing if the percentage of surviving test organisms is less than the required survival percentage, and the requirements to investigate the cause of mortality is based on 40 CFR 122.41(d), which is needed to minimize adverse impacts from discharges in violation of requirements. Non-compliance is also a cause for termination of the authorization to discharge (40 CFR 122.64).

D. Final Effluent Limitations

For both drinking water and non-drinking water areas of discharge, the final effluent limitations were derived by picking the most protective value, between the technology based effluent limits and WQBELs, in situations where both exist. The technology based effluent limits together with the water quality based effluent limits are sufficiently stringent to protect water quality and beneficial uses. The summary of the final effluent limitations is included in the Table F-4 below:

Table F-4. Summary of Final Effluent Limitations

		Technology-based Effluent Limitations		Water Quality-based Effluent Limitations				Final Effluent Limitations			
No.	Compound	Discharge to Drinking Water Areas (See Note 2)	Discharge to Other Surface Water Areas	Discharge to Drinking Water Areas (See Note 2)		Discharge to Other Surface Water Areas		Discharge to Drinking Water Areas (See Note 2)		Discharge to Other Surface Water Areas	
	See Note 1	ug/L	ug/L	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)	Average Monthly Effluent Limitation (ug/L)	Maximum Daily Effluent Limitation (ug/L)
1	Benzene	1	5	1.2	2.4	71	142.7	-	1	-	5
2	Carbon Tetrachloride	0.5	5	0.25	0.5	4.4	8.8	0.25 (See Note 3)	0.50	4.4	5
3	Chloroform	5	5	-	-	-	-	-	5	-	5
4	1,1-Dichloroethane	5	5	-	-	-	-	-	5	-	5
5	1,2-Dichloroethane	0.5	5	0.38	0.8	99	199	0.38 (See Note 3)	0.5	-	5
6	1,1-Dichloroethylene	5	5	0.057	0.1	3.2	6.4	0.057 (See Note 3)	0.11 (See Note 3)	3.2	5
7	Ethylbenzene	5	5	3100	6231	29000	58290	-	5	-	5
8	Methylene Chloride (Dichloromethane)	5	5	4.7	9.4	1600	3216	4.7	5	-	5
9	Tetrachloroethylene	5	5	0.8	1.6	8.85	17.8	0.8	1.6	-	5
10	Toluene	5	5	6800	13668	200000	402000	-	5	-	5
11	Cis 1,2-Dichloroethylene	5	5	-	-	-	-	-	5	-	5
12	Trans 1,2-Dichloroethylene	5	5	700	1407	140000	281400	-	5	-	5
13	1,1,1-Trichloroethane	5	5	-	-	-	-	-	5	-	5
14	1,1,2-Trichloroethane	5	5	0.6	1.2	42	84.4	0.6	1.2	-	5
15	Trichloroethylene	5	5	2.7	5.4	81	162.8	2.7	5	-	5
16	Vinyl Chloride	0.5	1	2	4	525	1055	0.5	0.5	-	1
17	Total Xylenes	5	5	-	-	-	-	-	5	-	5
18	Methyl Tertiary Butyl Ether (MTBE)	5	5	-	-	-	-	-	5	-	5
19	Total Petroleum Hydrocarbons (TPH)	50 (proposed)	50 (proposed)	-	-	-	-	-	50	-	50
20	Ethylene Dibromide (1,2-Dibromoethane)	0.05	5	-	-	-	-	-	0.05 (See Note 3)	-	5
21	Trichlorotrifluoroethane	5	5	-	-	-	-	-	5	-	5

LEGEND: FMCL - Federal Maximum Contaminant Level & SMCL - California Maximum Contaminant Level

Notes for Table F-4:

Note 1: A blank cell in this Table denotes no criterion for that compound.

Note 2: Drinking water areas are defined as surface waters with the existing or potential beneficial uses of "municipal and domestic supply" and "groundwater recharge" (the latter includes recharge areas to maintain salt balance or to halt salt water intrusion into fresh water aquifers).

Note 3: If reported detection level is greater than effluent limit, then a non-detect result using a 0.5 ug/L detection level is deemed to be in compliance.

Some organic and inorganic compounds, other than pollutants with effluent limitations in Table F-4, may also be detected in the effluent of some of the treatment systems. While this permit does not establish effluent limits for these compounds (summarized as "Trigger Pollutants") Dischargers are required to monitor for them, and follow procedures outlined in Provision VI.6.

The following paragraphs provide additional information regarding these pollutants.

Some organic compounds such as Tertiary Butyl Alcohol (TBA), Ethanol, and Methanol have been detected in the effluent of a few facilities exceeding the 5 ug/L expected treatment level. At this time, these pollutants have no water quality objective or criteria below 5 ug/L. Also, many Dischargers are actively involved in pilot testing innovative treatment technologies for removal of these compounds. For example, one Discharger added two bioreactors to its treatment systems that contain the TBA-degrading bacteria. Although this method has been proven to successfully degrade TBA, the Discharger reported these bioreactors are sensitive to various factors and need fine-tuning. The Trigger provisions of this Order allow for data to be collected on the prevalence of these compounds, while allowing Dischargers to develop a body of available technologies for their removal. Since the main objective of this permit is to allow the Dischargers to cleanup petroleum-related pollutants from groundwater, the trigger system allows treatment to move forward while additional information about relatively minor pollutants is being collected.

Some inorganic compounds such as antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc (hereinafter called inorganic compounds) are sometimes present in fuel-cleanup discharges, primarily due to background concentrations in the shallow groundwater being cleaned up. The discharge volume and effluent concentrations of inorganic compounds discharges from facilities regulated by this permit are low. In the Regional Water Board staff's BPJ, the Bay-wide loading of inorganic compounds from fuel cleanup discharges -- representing a very small portion of total inorganic compounds loadings from sources within the Region (including municipal and industrial point-source discharges and stormwater discharges) -- shall cause no impairment of beneficial uses or potential exceedances of inorganic compounds objectives in receiving waters. Facilities where inorganic compounds have adversely impacted groundwater are not eligible for coverage under this Order.

In conclusion, as discussed in detail in section VII.C.6 of this Fact Sheet, the Dischargers with detected pollutants with concentrations exceeding 5 ug/L or the most stringent water quality criteria, shall comply with the Special Study Provisions VI.C.6 through VI.C.10 of the Order.

E. Interim Effluent Limitations. (Not Applicable)

F. Land Discharge Specifications. (Not Applicable)

G. Reclamation Specifications

Basis for Water Reclamation Specifications is the Regional Water Board Resolution No. 88-160.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

The proposed receiving water limitations are intended to protect beneficial uses of the surface waters and ground waters of the San Francisco Bay Region and are based on the Basin Plan.

A. Surface Water: These limitations are based on the narrative/numerical objectives contained in Chapter 3 of the Basin Plan as explained below:

The basis for V.A.1.a is on page 3-3 of the Basin Plan;
The basis for V.A.1.b is on page 3-2 of the Basin Plan;
The basis for V.A.1.c is on pages 3-3 and 3-4 of the Basin Plan
The basis for V.A.1.d is on page 3-3 of the Basin Plan;
The basis for V.A.1.e is on pages 3-2, 3-3, and 3-4 of the Basin Plan;
The basis for V.A.2.a is on page 3-3 of the Basin Plan;
The basis for V.A.2.b is on page 3-3 of the Basin Plan;
The basis for V.A.2.c is on page 3-3 of the Basin Plan;
The basis for V.A.2.d is on pages 3-4 of the Basin Plan; and
The basis for V.A.3 is on pages 3-5 of the Basin Plan.

B. Groundwater: These limitations are on Page 3-6 of the Basin Plan.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Section 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorizes the Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (MRP), Attachment E of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the MRP for this facility.

A. Influent Monitoring

The purpose of influent monitoring is to provide documentation that the pollutants loadings are below the level that the treatment system was designed for and provide warnings should one or more new pollutants being extracted that the as built treatment system was not designed to remove them. Except PAHs, the influent monitoring has been reduced in this permit. PAHs monitoring frequency

has been changed to quarterly because a few PAHs have been detected in the influent of a few facilities.

B. Effluent Monitoring

The purpose of effluent monitoring is to provide documentation that the treatment system adequately removed all pollutants of concern in compliance with the limits in the permit. These effluent monitoring data also provide warnings should one or more pollutants detected, even though below the limits, that may be a sign of poor maintenance or other unexpected problems. Except PAHs, the effluent monitoring has been reduced in this permit. PAHs monitoring frequency has been changed to quarterly because a few PAHs have been detected in the effluent of a few facilities.

C. Whole Effluent Toxicity Testing Requirements

The selected test species and frequency of testing are the same as previous permit and appropriately cost effective for these discharges.

D. Receiving Water Monitoring

The purpose of receiving water monitoring is to provide documentation about the condition of the receiving water should any effluent limit violations occur that may harm the life in the receiving water. The receiving water monitoring frequency is the same as previous permit.

E. Other Monitoring Requirements

The purpose of additional monitoring requirements is to investigate complaints, identify the discharges that should be regulated by individual NPDES permits, coordinate storm water monitoring with municipalities, and quantify potential impacts of extracted and treated groundwater discharge on the receiving water and the ambient conditions of the receiving waters.

F. Additional Quality Assurance/Quality Control Requirements

As explained in section II.D of this Fact Sheet, the purpose of the additional quality assurance/quality control requirements is to prevent generation and reporting of invalid monitoring data, such as TPHd false positives, that the Dischargers reported discovering during the term of the previous permit. Although everyone involved in the compliance assurance activities including the Discharger's staff and PE shall pay close attention to quality assurance/quality control activities, Table 5 of Attachment B and Section IV.C of Attachment E require the Dischargers who claim invalid monitoring data to assign a specific person to investigate the cause(s) of errors, to lead the required corrective

actions development, and to implement the Discharger's proposed measures to prevent future invalid monitoring data.

The Tentative Order before its final revision required a "Quality Assurance Officer" – meaning, a qualified individual who was not otherwise involved in sample collection, transport, or analysis (please refer to the following web site for a more detailed description: http://www.waterboards.ca.gov/swamp/docs/swampqapp_template032404.doc) to investigate the cause of data error. This Order has no Quality Assurance Officer" requirement so that a Discharger's staff person involved in generating monitoring data could also oversee quality assurance/quality control aspects of data generation. If, however, a Discharger were to continue to generate invalid monitoring data, the Regional water Board Executive Officer may require that Discharger to assign an individual independent from those generating the data, to oversee the data generation process.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions.

Standard Provisions provided in Attachment D are in accordance with section 122.41 and additional conditions applicable to the discharges under this permit are in accordance with section 122.42. Section 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with section 123.25, this Order omits federal conditions that address enforcement authority specified in sections 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Monitoring and Reporting Program Requirements.

The basis for "Monitoring and Reporting Program Requirements" Provision is 40CFR 122.41, 122.48, 122.62, 122.63, and 124.5, CWC Sections 13267 and 13383, and BPJ.

C. Special Provisions.

1. **Basis for Reopener Provisions.** The Basis for "Reopener Provisions" is 40CFR122.41(f).

2. **Basis for Notice of Intent (NOI) Application.** Provision VI.C.2, Notice of Intent (NOI) Application, is based on 40 CFR 122.28(b).

3. **Basis for NOI Review.** Provision VI.C.3, NOI Review, is based on 40 CFR 122.28(b).

4. **Basis for Discharge Authorization.** Provision VI.C.4, Discharge Authorization, is based on 40 CFR 122.28(b).

5. **Basis for Non-Compliance as a Violation.** Provision VI.C.5, Non-Compliance as a Violation, is based on 40 CFR 122.41(a).

6. **Basis for Provisions VI.C.6 through VI.C.10.** The Dischargers authorized under this Order are expected to use BAT and treat their volatile organic pollutants to non-detectable levels. However, some compounds, other than pollutants with effluent limitations, may be detected in the effluent of some of the treatment systems. These pollutants include both organic and inorganic compounds. The purpose of these provisions is to require Dischargers to do additional activities should any pollutants exceed the triggers in Table F-3. These triggers are not effluent limitations, and should not be construed as such. Instead, they are levels at which additional investigation is warranted to determine whether a numeric limit for a particular constituent is necessary. The Table F-3 concentration-based triggers are set at the lowest value of the State Maximum Contaminant Level, Federal Maximum Contaminant Level, State Public Health Goal in Drinking Water, California Toxics Rule lowest criterion, or Basin Plan water quality objective but mostly not exceeding 5 ug/l as referenced in Table F-3 below. The reason for this approach is explained in section IV.D of this Fact Sheet, and further explained below.

   a. **Triggers for Inorganic Compounds.** Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc (hereinafter called inorganic compounds) are present in fuel-cleanup discharges, primarily due to background concentrations in the shallow groundwater being remediated. The discharge volume and effluent inorganic compounds concentrations are low before the effluent is discharged into the storm drain system. In staff judgment, Bay-wide inorganic compounds loading from fuel cleanup discharges, represent a very small portion of total inorganic compounds loadings from sources within the Region (including municipal and industrial point-source discharges and stormwater discharges), and therefore, shall cause no impairment of beneficial uses or potential exceedances of inorganic compounds objectives in receiving waters. Facilities where inorganic compounds have adversely impacted groundwater are not eligible for coverage under this Order. Each Discharger shall submit, as part of the application for proposed discharge, analytical results including inorganic compounds concentrations in the influent and effluent, if available, or maximum concentrations in any individual extraction wells, if not operating yet. Based on these data, the Discharger may receive a discharge authorization letter. In some cases after starting up an extraction and treatment system, the effluent concentration of some inorganic compounds may exceed the triggers listed in Table F-3. In this case, the Discharger shall take three additional samples and have them analyzed for the inorganic compound of concern and comply with the Provisions VI.C.7, VI.C.8, or VI.C.9. For example, if the results of two or three of the

additional samples exceed the triggers, then the Discharger shall investigate the toxicity and treatment of the constituent of concern. Dischargers who cannot comply with these provisions will lose their authorization to discharge under this Order. The Table F-3 "concentration-based triggers" are set at the lowest value of the State Maximum Contaminant Level, Federal Maximum Contaminant Level, State Public Health Goal in Drinking Water, California Toxics Rule lowest criterion, or Basin Plan water quality objective, except for Arsenic and Chromium. The median of reported maximum Arsenic levels in the effluent of all authorized discharges is non-detect with a 5 ug/L reporting limit. The total Chromium trigger is to trigger additional testing for Chromium (VI) when the total Chromium concentration exceeds 11 as referenced in the Table F-3. The expired Order had inorganic mass-based triggers. The mass-based triggers are replaced with concentration based triggers to make this Order consistent with the Regional Board Order No. R2-2004-0055, NPDES NO. CAG912003, General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater Resulting From the Cleanup of Groundwater Polluted by Volatile Organic Compounds. A few other parameters were also added to the triggers list to accommodate special cases that may occur during a dewatering project authorized under this Order.

b. **Triggers for Organic Compounds.** Dischargers authorized under this Order are expected to use BAT and treat their volatile organic pollutants to non-detectable levels. Sites where pesticides or other conservative pollutants have adversely impacted groundwater are not eligible for coverage under this Order. Each Discharger shall submit, as part of the application for proposed discharge, analytical results including volatile and semi volatile organic compounds concentrations in the influent and effluent if available or maximum concentrations in any individual extraction wells, if not operating yet. In addition, each Discharger shall submit a report, to the satisfaction of Executive Officer, certifying the adequacy of the proposed treatment system in removal of all organic pollutants of concern. Based on these data and information, the Discharger may receive a discharge authorization letter. However, some organic compounds, other than pollutants with effluent limitations, may be detected in the effluent of some of the treatment systems. This could be due to the movement of the contaminated groundwater from a neighboring site into the capture zone of the treatment facility authorized under this permit. Table F-3 contains concentration-based triggers for conducting additional activities for a list of pollutants reported by Dischargers or listed in the CTR. This provision would allow Dischargers to continue groundwater cleanup while investigating the toxicity and ability to treat any detected volatile or semi volatile organic compounds, in excess of Table F-3 triggers.

Table F-5. Basis for Table 3 Trigger Compounds

Compound	CAS Number	State MCL ug/L	Federal MCL ug/L	State PHG in Drinking Water ug/L	CTR Lowest Criterion unless noted ug/L	Trigger (ug/L)
Antimony	7440360	6	6	20	14	6
Arsenic	7440382	50	10	NA	36	10
Beryllium	7440417	4	4	1	NA	1
Cadmium	7440439	5	5	0.07	2.2	0.07
Chromium (total)	18540299	50	100	-	180	11 (See Note 1)
Chromium (VI)	18540299	-	-	-	11	11
Copper	7440508	1000	1000	170	3.1	3.1
Lead	7439921	15	15	2	2.5	2.0
Mercury	7439976	2	2	1.2	0.025 (See Note 2)	0.025
Nickel	7440020	100	-	12	8.2	8.2
Selenium	7782492	50	50	-	5.0	5.0
Silver	7440224	100	100	-	1.9	1.9
Thallium	7440280	2	2	0.1	1.7	0.1
Zinc	7440666	5000	5000	-	81	81
Cyanide	57125	200/150	200	-	1	1.0
Asbestos	1332214	7 MFL	7 MFL	-	7 MFL	7 MFibers/L
2,3,7,8-TCDD (Dioxin)	1746016	0.00003	0.00003	-	1.3E-08	0.000000013
Acrylonitrile	107131	-	-	-	0.059	2.0
Bromoform	75252	100/80	100/80	-	4.3	4.3
Chlorodibromomethane	124481	100/80	100/80	-	0.401	0.401
Dichlorobromomethane	75274	100/80	100/80	-	0.56	0.56
1,2-Dichloropropane	78875	5	5	0.5	0.52	0.50
1,3-Dichloropropylene	542756	0.5	-	0.2	10	0.2
1,1,2,2-Tetrachloroethane	79345	1	-	0.1	0.17	0.1
Pentachlorophenol	87865	1	1	0.4	0.28	0.28
2,4,6-Trichlorophenol	88062	-	-	-	2.1	2.1
Benzidine	92875	-	-	-	0.00012	0.00012
Benzo(a)Anthracene	56553	-	0.1	-	0.0044	0.0044
Benzo(a)Pyrene	50328	0.2	0.2	0.004	0.0044	0.004
Benzo(b)Fluoranthene	205992	-	-	-	0.0044	0.0044
Benzo(k)Fluoranthene	207089	-	-	-	0.0044	0.0044
Bis(2-Chloroethyl)Ether	111444	-	-	-	0.031	0.031
Bis(2-Ethylhexyl)Phthalate	117817	-	-	-	1.8	1.8
Chrysene	218019	-	-	-	0.0044	0.0044
Dibenzo(a,h)Anthracene	53703	-	-	-	0.0044	0.0044
3,3'-Dichlorobenzidine	91941	-	-	-	0.04	0.04
2,4-Dinitrotoluene	121142	-	-	-	0.11	0.11
1,2-Diphenylhydrazine	122667	-	-	-	0.04	0.04
Hexachlorobenzene	118741	1	1	0.03	0.00075	0.00075
Hexachlorobutadiene	87683	-	-	-	0.44	0.44
Hexachloroethane	67721	-	-	-	1.9	1.9
Indeno(1,2,3-cd)Pyrene	193395	-	-	-	0.0044	0.0044
N-Nitrosodimethylamine	62759	-	-	-	0.00069	0.00069

Compound	CAS Number	State MCL ug/L	Federal MCL ug/L	State PHG in Drinking Water ug/L	CTR Lowest Criterion unless noted ug/L	Trigger (ug/L)
N-Nitrosodi-n-Propylamine	621647	-	-	-	0.005	0.005
Aldrin	309002	-	-	-	0.00013	0.00013
alpha-BHC	319846	-	-	-	0.0039	0.0039
beta-BHC	319857	-	-	-	0.014	0.014
gamma-BHC	58899	0.2	0.2	-	0.019	0.019
delta-BHC	319868	-	-	-	-	5.0
Chlordane	57749	0.1	2	0.03	0.00057	0.00057
4,4'-DDT	50293	-	-	-	0.00059	0.00059
4,4'-DDE	72559	-	-	-	0.00059	0.00059
4,4'-DDD	72548	-	-	-	0.00083	0.00083
Dieldrin	60571	-	-	-	0.00014	0.00014
alpha-Endosulfan	959988	-	-	-	0.0087	0.0087
beta-Endosulfan	33213659	-	-	-	0.0087	0.0087
Endrin	72208	2	2	1.8	0.0023	0.0023
Endrin Aldehyde	7421934	-	-	-	0.76	0.76
Heptachlor	76448	0.01	0.4	0.008	0.00021	0.00021
Heptachlor Epoxide	1024573	0.01	0.2	0.006	0.0001	0.0001
Polychlorinated biphenyls (PCBs) total	1336363	0.5	0.5	-	0.00017	0.00017
Toxaphene	8001352	3	3	0.03	0.0002	0.0002
1,4-dioxane	123911	3 (See Note 4)	-	-	-	3
Perchlorate	14797730	-	-	6	-	5
Freon 12 (Dichlorodifluoromethane)	75718	-	-	-	0.19 (See Note 3)	0.19
Other Oxygenates (Other than MTBE)	-	-	-	-	-	5
Other VOCs	-	-	-	-	-	5
Other SVOCs	-	-	-	-	-	5
Turbidity (Units)	-	5	5	-	-	5
Odor-Threshold (Units)	-	3	3	-	-	3
Total Petroleum Hydrocarbons other than Gasoline and Diesel	-	-	-	-	-	50 (see Note 5)
Sulfate	-	250,000	250,000	-	-	250,000
Foaming Agents	-	500	500	-	-	500
Color (Units)	-	15	15	-	-	15

Legend:
CAS = Chemical Abstract System
PHG = Public Health Goal
CTR = California Toxics Rule
NA = Not Applicable
MCL = Maximum Contaminant Level
BPJ = Best Professional Judgment

Notes:
1 If total chromium concentration exceeds 11 then Chromium (VI) analysis shall also be done
2 Basin Plan
3 USEPA National Recommended Ambient Water Quality Criteria
4 California Department of Health Services Action Level for Drinking Water
5 The 50 ug/l trigger is based on BPJ. If a Discharger is reporting monitoring data with a detection level higher than 50 ug/l, the reason for a higher detection level shall be fully explained in the monitoring report.

7. **Basis for Individual NPDES Permit may be Required.** Provision VI.C.11, Individual NPDES Permit may be Required, is based on 40 CFR 122.28(b)(3).

8. **Basis for Treatment Reliability Requirement.** Provision VI.C.11, Treatment Reliability, is mostly based on 40 CFR 122.41. The basis for the requirement for a certified engineer to oversee the treatment and operation of the treatment system is to ensure that qualified professionals perform this work. Service stations operators are generally not qualified for this technical level of oversight.

VIII. PUBLIC PARTICIPATION

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) is considering the reissuance of general waste discharge requirements (GWDRs) that will serve as a National Pollutant Discharge Elimination System (NPDES) permit. As a step in the GWDR adoption process, the Regional Water Board staff has developed tentative GWDRs. The Regional Water Board encourages public participation in the GWDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Dischargers and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through a legal notice published in the Recorder.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative GWDRs. Comments should be submitted either in person or by mail to the Executive Office at the Regional Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Regional Water Board, written comments should be received at the Regional Water Board offices by 5:00 p.m. on October 2, 2006.

C. Public Hearing

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date:	November 13, 2006
Time:	10:00 AM
Location:	Elihu Harris State Building (1st Floor auditorium) 1515 Clay Street (Walking distance from City Center 12th Street BART station) Oakland, CA 94612

Interested persons are invited to attend. At the public hearing, the Regional Water Board will hear testimony, if any, pertinent to the discharge, GWDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our web address is http://www.waterboards.ca.gov/sanfranciscobay where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final GWDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

The Report of Waste Discharges (RWD), related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above during regular office hours, which are generally weekdays from 8:00 a.m. to 5:00 p.m., excluding 12:00 p.m. to 1:00 p.m. lunch hours and holidays. Copying of documents may be arranged through the Regional Water Board by calling (510) 622-2300.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this order should be directed to **Farhad Azimzadeh at (510) 622-2310 or by e-mail at fazimzadeh@waterboards.ca.gov.**

ATTACHMENT G - NOTICE OF STARTUP OR RE-STARTUP

A PDF electronic copy of this Form shall be uploaded on GeoTracker

A Groundwater Treatment System authorized to Discharge under the Requirements of
ORDER NO. R2-2006-XXXX
NPDES PERMIT NO. CAG912002 (FUEL)

Submitted by:
Name and Title: _____ Phone &Email: _____

For Groundwater Treatment Facility located at:

_____ _____

Type or Print Facility Address above the line
File No: 1210.44

WDID No.
Please refer to Authorization Letter

Please mark one of the applicable lines:

Table 1. Mark only one as applicable

No.	Action	Date
1	Initial Startup. Are you providing at least two weeks notification? If not, change the date to provide at least two weeks notification.	
2	Re-Startup (Shut Down occurred more than 120 Hours before re-start date) and start up phase monitoring requirements in Section IX.A of the Attachment E will be repeated	
3	Re-Startup (Shut Down occurred less than 120 Hours before re-start date)	No need to file this notice

Table 2. Please explain if answer is "No" to any questions listed in the Check List below:

No.	Question	Yes or No	Comments
1	Is a copy of the Order and SMP kept at the facility?		
2	Is a copy of the Authorization kept at the facility?		
3	Is a copy of the Operation and Maintenance (O&M) Manual kept at the facility?		

No.	Question	Yes or No	Comments
4	Is this O & M Manual certified by a California registered engineer?		
5	Does the O&M Manual include names of the operators and those who take sample at this facility?		
6	Are adequate treatment facility maintenance and inspection schedules and procedures included in the O & M Manual?		
7	Are sampling procedures described in the O & M Manual?		
8	Does discharger maintain a log of all sampling events?		
9	Are the operators familiar with the O&M Manual?		
10	Does O&M Manual include procedures for receiving water sampling? Are they followed?		
11	Do O&M Manual sampling procedures include quality assurance activities?		
12	Do the sampling procedures include field and trip blanks?		
13	Can operator explain what will happen in case of a power outage?		
14	Can operator explain what will happen in case of a pump failure?		
15	Is there an automatic shut down system in case of any component's failure?		
16	Are the sampling procedures followed during a sampling event?		
17	Is the influent sample being collected at a point in the extraction system immediately prior to inflow to the treatment unit?		
18	Is the effluent sample being collected at a point immediately following the treatment facility?		
19	Are influent and effluent sampling ports properly marked?		
20	Is the treatment facility adequately fenced and gated?		
21	Is receiving water accessible for inspection? If so, did you conduct standard observations? (see page 5 of the SMP or the other side of this sheet)		

ATTACHMENT H - NOTICE OF TEMPORARY SHUT DOWN

A PDF electronic copy of this Form shall be uploaded on GeoTracker and after GeoTracker upload a confirmation email shall be sent to the responsible staff member at this office, currently Lourdes Gonzales, at lgonzales@waterboards.ca.gov.

This form is for the Groundwater Treatment Facility located at:

Type or Print Facility Address above the line File No: 1210.44	WDID No. Please refer to Authorization Letter

This Groundwater Treatment System is authorized to Discharge under the Requirements of
ORDER NO. R2-2006-XXXX
NPDES PERMIT NO. CAG912002 (FUEL)

Please explain the following:

1) Temporary Shut Down Date?
2) Expected Re-Start Date?
3) Is the difference between 1 and 2 above more than 120 business hours?
   If so, do you understand that start up phase monitoring requirements in Section IX.A of the Attachment E shall be repeated?
4) If the difference between 1 and 2 above is not more than 120 business hours, no need to file this notice.

Note: The Regional Water Board may modify this form at any time to reflect the new requirements and other needed improvements.

ATTACHMENT I - NOTICE OF TERMINATION

A PDF electronic copy of this Form shall be uploaded on GeoTracker and after GeoTracker upload a confirmation email shall be sent to the responsible staff member at this office, currently Lourdes Gonzales, at lgonzales@waterboards.ca.gov.

For Facilities Permitted to Discharge Treated Groundwater under the Requirements of
ORDER NO. R2-2006-XXXX
NPDES PERMIT NO. CAG912002 (FUEL)
For Groundwater Treatment Facility located at:

_____ _____

Type or Print Facility Address above the line
File No: 1210.44

WDID No.
Please refer to Authorization Letter

Table 1. Mark only one as applicable

1	Groundwater cleanup works have been completed	
2	Method of groundwater cleanup has been changed with no need to discharge treated groundwater	
3	Extract and treat method of groundwater cleanup will be stopped for a while and only groundwater will be monitored at this site. In this case, documentation shall be attached to this Notice that the cleanup overseeing agency has no objection to have this authorization rescinded. Otherwise complete Notice Temporary Shut Down (Attachment H)	
4	Dewatering cleanup project has been completed	
5	Other reasons such as discharge to POTW has been granted	

Table 2. If you have marked number one in Table 1, please add the name, address, and phone number of the agency and agency staff finding the clean up work to be complete and you have also provided a copy of this termination notice:

	Name, address, and phone number of the agency and agency staff finding your clean up work to be complete	Have you provided a copy of this termination notice to this staff? (Yes/No. If No, please explain the reason)
1		
2		

I certify under penalty of law that this notice is prepared under my direction or supervision and the effective termination date of this Discharge is _____. I am aware that discharging without a discharge authorization is in violation of California Water Code.

_____ _____

Name (print) Signature and Date

_____ _____

Title/Organization Address

Note: The Regional Water Board may modify this form at any time to reflect the new requirements and other needed improvements.

Appendix F
Site ST018 Groundwater Treatment Plant
Startup Report

DEPARTMENT OF THE AIR FORCE
60TH CIVIL ENGINEER SQUADRON (AMC)

March 29, 2011

MEMORANDUM FOR:
California Regional Region Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attn: NPDES Wastewater Division
Fuels General NPDES No. CAG912002

FROM:
Mark Smith, RPM, Travis AFB, CA

SUBJECT:
Startup Report
Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)
Order No. R2-2006-0075, NPDES No. CAG912002

Following is the Startup Report for the above referenced facility. This report certifies that a Professional Engineer certified in the State of California oversees the treatment system operation and maintenance activities including the startup work at the above referenced facility. Attached are the operations summary (Table 1), standard observations (Table 2), flow data (Table 3), field parameter data (Table 4), and laboratory analytical results summary (Table 5). Should you have any questions or comments, please call me at (707) 424-7520.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Sincerely,

Mark Smith, DAF, 60 CES/CEANR
Restoration Program Manager

Cc: Alan Friedman/San Francisco Bay Regional Water Quality Control Board.

Table 1 - Operations Summary

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Treatment System Operations, Issues, and Corrective Actions		
Date	Time	Description
3/2/2011	12:15	Started system with normal operation. Discharge effluent to portable 20,000-gallon holding tank (R4R1).
3/2/2011	16:30	Shut system off pending reciept of 1st day sample results.
3/4/2011	14:00	Restarted system with normal operation. Discharge effluent to portable holding tank
3/9/2011	10:00	Back-flushed system with 5,000 gallons of hydrant water to to lower pH in effluent. Flush-water discharged to second 20,000-gallon portable holding tank (R4R2).
3/9/2011	16:40	Resumed normal operation. Discharge effluent to portable holding tank (R4R1).
3/11/2011	11:30	Normal operation. Discontinue discharging effluent to portable holding tank (R4R1) and begin discharging effluent to storm sewer.
3/17/2011	11:00	Normal operation. Ellfuent discharging to storm sewer. Begin re-treatment of effluent water stored in portable holding tank (R4R1) for discharge to storm sewer.
3/22/2011	08:00	Normal operation. Ellfuent discharging to storm sewer. Re-treatment of effluent water stored in portable holding tank (R4R1) is complete. 18,000-gallons of stored effluent re-treated and discharged to storm sewer. 5,000-gallons of flush-water remains in second portable holding tank (R4R2) pending reciept of chlorine analysis.

Table 2 - Standard Observations

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Standard Observations for Groundwater Treatment System						
Date	Time	Weather (temperature, cloud cover, wind speed & direction)	Odors (presence, type, source, distance of travel and wind direction)	Deposits, discoloration, plugging/fouling	Overflow/bypass protection	
					Sump float switch	Pressure switch
3/2/2011	12:30	Overcast, some rain, 65 °F	Degraded fuel smell, immediate vicinity of influent tank	None	Ready/Standby	Functional/Standby
3/4/2011	14:30	Overcast, 65 °F	Degraded fuel smell, immediate vicinity of influent tank	None	Ready/Standby	Functional/Standby
3/9/2011	16:45	Rain, 55 °F	None	None	Ready/Standby	Functional/Standby
3/11/2011	12:10	Sunny, 70 °F	Degraded fuel smell, immediate vicinity of influent tank	None	Ready/Standby	Functional/Standby
3/17/2011	11:30	Rain, 60 °F	Degraded fuel smell, immediate vicinity of influent tank	None	Ready/Standby	Functional/Standby
3/22/2011	15:00	Rain, 60 °F	Degraded fuel smell, immediate vicinity of influent tank	None	Ready/Standby	Functional/Standby

Notes:
°F = Degrees Fahrenheit

Table 3 - Flow Data

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Date	**Time**	**Total Flow** [(a)] (gallons)	**Instantaneous Flow** [(b)] (gallons per minute)	**Comments**
3/2/2011	11:30	116	34	Total flow measurement is value read on totalizer before system was started.
3/11/2011	11:30	116	35	System configured to discharge to storm drain for the first time, all previous effluent flow contained in storage tanks.
3/11/2011	16:45	2,113	35	System running normally, discharging to storm drain.
3/14/2011	10:00	24,226	33	System running normally, discharging to storm drain.

Notes:

(a) Total flow is read directly from the effluent flow totalizer.

(b) Instantaneous flow rate is read directly from the effluent flow totalizer.

Table 4 - Field Parameter Data

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

EFF-001[(a)] (Effluent Sample Results)						
Date	Time	Turbidity (NTU)	pH	Dissolved oxygen (mg/L)	Temperature (°C)	Electrical Conductivity (mS/cm)
3/2/2011	12:30	0.0	8.9	1.20	14.32	3.25
3/9/2011	15:30		9.1			
3/10/2011	08:00		8.5			
3/11/2011	09:00		8.3			
3/11/2011	12:20	0.0	8.4	3.29	15.93	2.89
3/17/2011	15:00		8.0			
3/21/2011	10:00		6.8			
INF-001[(b)] (Influent Sample Results)						
Date	Time	Turbidity (NTU)	pH	Dissolved oxygen (mg/L)	Temperature (°C)	Electrical Conductivity (mS/cm)
3/2/2011	12:28	15.9	6.9	7.06	15.07	3.37
3/9/2011	15:30		7.2			
3/10/2011	08:00		7.1			
3/11/2011	09:00		7.1			
3/11/2011	12:25	37.0	6.8	7.52	17.30	2.90
3/21/2011	10:00		7.2			

Notes:

(a) EFF-001 = Effluent sampling point is located at a point in the discharge line immediately following treatment and before it joins or is diluted by any other waste stream, body of water, or substance (MRP for Order No. R2-2006-0075, NPDES No. CAG912002).

(b) INF-001 = Influent sampling point is located at a point in the extraction system immediately prior to inflow to the treatment unit (MRP for Order No. R2-2006-0075, NPDES No. CAG912002).

°C = Degrees Celcius

mg/L = Milligrams per liter

NTU = Nephelometric turbidity units

mS/cm = Millisiemens per centimeter.

Table 5 - Laboratory Analytical Results Summary

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Constituent	Analytical method	Units	Effluent permit limits		Monitoring period:	Startup - First day			Startup - Fifth day	
			Average monthly limitation	Maximum daily limitation	Sample date/time:	03/02/2011 13:55	03/02/2011 13:55	03/02/2011 13:40	03/11/11 09:25	03/11/11 09:35
					Date analyzed:	03/07/11	03/07/11	03/07/11	03/14/11	03/14/11
					Sample identifier:	ST018GWTP_W_EFF-001	ST018GWTP_W_EFF-001B	ST018GWTP_W_INF-001	ST018GWTP_W_EFF-001	ST018GWTP_W_INF-001
					Location:	EFF-001[(a)]	EFF-001[(a)]	INF-001[(b)]	EFF-001[(a)]	INF-001[(b)]
Petroleum Hydrocarbons										
TPH-D	8015B	µg/L		50		**17** DNQ (RL=50:MDL=7.5)	**45** DNQ (RL=50:MDL=7.5)	**480** (RL=50:MDL=7.5)	**13** DNQ (RL=50:MDL=7.5)	**140** (RL=50:MDL=7.5)
TPH-G	8015B	µg/L		50		**21** DNQ (RL=50:MDL=5.5)	**15** DNQ (RL=50:MDL=14)	**2000** (RL=50:MDL=14)	**11** DNQ (RL=50:MDL=5.5)	**780** (RL=50:MDL=5.5)
TPH-MO	8015B	µg/L		50		ND (RL=300:MDL=56)	ND (RL=300:MDL=56)	**120** DNQ (RL=300:MDL=56)	ND (RL=300:MDL=56)	ND (RL=300:MDL=56)
Methanol	8015B	mg/L				ND (RL=1.0:MDL=0.19)	ND (RL=1.0:MDL=0.19)	ND (RL=1.0:MDL=0.19)		
Volatile Organic Compounds										
Methyl tertiary butyl ether	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	**220** (RL=2.0:MDL=0.4)	ND (RL=0.5:MDL=0.1)	**77** (RL=0.5:MDL=0.1)
Tertiary butyl alcohol	8260B	µg/L				ND (RL=10:MDL=1.2)	ND (RL=10:MDL=1.2)	**18** DNQ (RL=40:MDL=4.9)		
Di isopropyl ether	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4		
Ethyl tertiary butyl ether	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4		
Methyl tertiary amyl ether	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4		
Benzene	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	**120** (RL=2.0:MDL=0.4)	ND (RL=0.5:MDL=0.1)	**13** (RL=0.5:MDL=0.1)
Toluene	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	**22** (RL=2.0:MDL=0.4)	ND (RL=0.5:MDL=0.1)	**4.5** (RL=0.5:MDL=0.1)
Ethylbenzene	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	**130** (RL=2.0:MDL=0.4)	ND (RL=0.5:MDL=0.1)	**45** (RL=0.5:MDL=0.1)
Total Xylenes	8260B	µg/L		5		ND (RL=1.0:MDL=0.2)	ND (RL=1.0:MDL=0.2)	**207** (RL=4.0:MDL=0.8)	ND (RL=0.5:MDL=0.1)	**116** (RL=1.0:MDL=0.2)
Carbon tetrachloride	8260B	µg/L	4.4	5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Chloroform	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,1-Dichloroethane	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,2-Dichloroethane	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	**1.3** DNQ (RL=2.0:MDL=0.4)		
1,1-Dichloroethylene	8260B	µg/L	3.2	5		ND (RL=0.5:MDL=0.2)	ND (RL=0.5:MDL=0.2)	ND (RL=2.0:MDL=0.6)		
Methylene Chloride	8260B	µg/L		5		ND (RL=10:MDL=0.1)	ND (RL=10:MDL=0.1)	ND (RL=40:MDL=0.6)		
Tetrachloroethylene	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Cis-1,2-dichloroethene	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.6)		
Trans-1,2-dichloroethene	8260B	µg/L		5		ND (RL=0.5:MDL=0.2)	ND (RL=0.5:MDL=0.2)	ND (RL=2.0:MDL=0.6)		
1,1,1-Trichloroethane	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.5)		
1,1,2-Trichloroethane	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.5)		
Trichloroethylene	8260B	µg/L		5		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Vinyl Chloride	8260B	µg/L		1		ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.5)		
Ethylene Dibromide	EPA 504.1	µg/L		5		ND (RL= 0.01:MDL = 0.0031)	ND (RL= 0.01:MDL = 0.0031)	ND (RL= 0.01:MDL = 0.0031)		
Freon 12	8260B	µg/L				ND (RL=1.0:MDL=0.2)	ND (RL=1.0:MDL=0.2)	ND (RL=4.0:MDL=0.7)		
Chloromethane	8260B	µg/L				ND (RL=1.0:MDL=0.1)	ND (RL=1.0:MDL=0.1)	ND (RL=4.0:MDL=0.5)		
Bromomethane	8260B	µg/L				ND (RL=1.0:MDL=0.1)	**0.2** DNQ (RL=1.0:MDL=0.1)	ND (RL=4.0:MDL=0.5)		
Chloroethane	8260B	µg/L				ND (RL=1.0:MDL=0.1)	ND (RL=1.0:MDL=0.1)	ND (RL=4.0:MDL=0.4)		
Trichlorofluoromethane	8260B	µg/L				ND (RL=1.0:MDL=0.2)	ND (RL=1.0:MDL=0.2)	ND (RL=4.0:MDL=0.6)		
Acetone	8260B	µg/L				**3.4** DNQ (RL=10:MDL=0.6)	**4.0** DNQ (RL=10:MDL=0.6)	**160** (RL=40:MDL=2.3)		
Carbon disulfide	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Vinyl acetate	8260B	µg/L				ND (RL=10:MDL=0.5)	ND (RL=10:MDL=0.5)	ND (RL=40:MDL=2.0)		
2-Butanone	8260B	µg/L				**2.1** DNQ (RL=10:MDL=0.4)	**2.6** DNQ (RL=10:MDL=0.4)	**330** (RL=40:MDL=1.7)		
1,2-Dichloropropane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Bromodichloromethane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Dibromomethane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
4-Methyl-2-pentanone	8260B	µg/L				ND (RL=10:MDL=0.1)	ND (RL=10:MDL=0.1)	ND (RL=40:MDL=0.4)		
Cis-1,2-dichloropropene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Trans-1,2-dichloropropene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
2-Hexanone	8260B	µg/L				ND (RL=10:MDL=0.2)	ND (RL=10:MDL=0.2)	ND (RL=40:MDL=0.8)		
Dibromochloromethane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,2-Dibromoethane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.5)		

Table 5 - Laboratory Analytical Results Summary

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Constituent	Analytical method	Units	Effluent permit limits		Monitoring period:	Startup - First day			Startup - Fifth day	
			Average monthly limitation	Maximum daily limitation	Sample date/time:	03/02/2011 13:55	03/02/2011 13:55	03/02/2011 13:40	03/11/11 09:25	03/11/11 09:35
					Date analyzed:	03/07/11	03/07/11	03/07/11	03/14/11	03/14/11
					Sample identifier:	ST018GWTP_W_EFF-001	ST018GWTP_W_EFF-001B	ST018GWTP_W_INF-001	ST018GWTP_W_EFF-001	ST018GWTP_W_INF-001
					Location:	EFF-001[(a)]	EFF-001[(a)]	INF-001[(b)]	EFF-001[(a)]	INF-001[(b)]
Chlorobenzene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,1,1,2-Tetrachloroethane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Styrene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Bromoform	8260B	µg/L				ND (RL=1.0:MDL=0.1)	ND (RL=1.0:MDL=0.1)	ND (RL=4.0:MDL=0.5)		
1,1,2,2_Tetrachloroethane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,2,3-Trichloropropane	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.6)		
Bromobenzene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,3-Dichlorobenzene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,4-Dichlorobenzene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
1,2-Dichlorobenzene	8260B	µg/L				ND (RL=0.5:MDL=0.1)	ND (RL=0.5:MDL=0.1)	ND (RL=2.0:MDL=0.4)		
Semivolatile organic compounds										
N-nitrosodimethylamine	8270C	µg/L				ND (RL=9.7:MDL=1.4)	ND (RL=9.6:MDL=1.4)	ND (RL=9.4:MDL=1.4)		
phenol	8270C	µg/L				ND (RL=9.7:MDL=0.99)	ND (RL=9.6:MDL=0.98)	ND (RL=9.4:MDL=0.96)		
Aniline	8270C	µg/L				ND (RL=9.7:MDL=1.9)	ND (RL=9.6:MDL=1.9)	ND (RL=9.4:MDL=1.9)		
bis(2-chloroethyl)ether	8270C	µg/L				ND (RL=9.7:MDL=1.2)	ND (RL=9.6:MDL=1.2)	ND (RL=9.4:MDL=1.1)		
2-chlorophenol	8270C	µg/L				ND (RL=9.7:MDL=0.79)	ND (RL=9.6:MDL=0.79)	ND (RL=9.4:MDL=0.77)		
Benzyl alcohol	8270C	µg/L				ND (RL=9.7:MDL=1.1)	ND (RL=9.6:MDL=1.1)	ND (RL=9.4:MDL=1.0)		
2-Methylphenol	8270C	µg/L				ND (RL=9.7:MDL=2.1)	ND (RL=9.6:MDL=2.1)	ND (RL=9.4:MDL=2.0)		
Bis(2-cloroisopropyl)ether	8270C	µg/L				ND (RL=9.7:MDL=1.4)	ND (RL=9.6:MDL=1.4)	ND (RL=9.4:MDL=1.4)		
4-Methylphenol	8270C	µg/L				ND (RL=9.7:MDL=1.7)	ND (RL=9.6:MDL=1.6)	ND (RL=9.4:MDL=1.6)		
N-nitroso-di-n-propylamine	8270C	µg/L				ND (RL=9.7:MDL=1.2)	ND (RL=9.6:MDL=1.2)	ND (RL=9.4:MDL=1.1)		
Hexachloroethane	8270C	µg/L				ND (RL=9.7:MDL=1.1)	ND (RL=9.6:MDL=1.1)	ND (RL=9.4:MDL=1.0)		
Nitrobenzene	8270C	µg/L				ND (RL=9.7:MDL=1.2)	ND (RL=9.6:MDL=1.2)	ND (RL=9.4:MDL=1.2)		
Isophorone	8270C	µg/L				ND (RL=9.7:MDL=1.3)	ND (RL=9.6:MDL=1.3)	ND (RL=9.4:MDL=1.2)		
2-Nitrophenol	8270C	µg/L				ND (RL=19:MDL=2.5)	ND (RL=19:MDL=2.5)	ND (RL=19:MDL=2.5)		
2,4-Dimethylphenol	8270C	µg/L				ND (RL=9.7:MDL=2.4)	ND (RL=9.6:MDL=2.4)	ND (RL=9.4:MDL=2.3)		
Benzoic acid	8270C	µg/L				ND (RL=49:MDL=15)	ND (RL=48:MDL=15)	ND (RL=47:MDL=15)		
Bis(2-chloroethoxy)methane	8270C	µg/L				ND (RL=9.7:MDL=1.1)	ND (RL=9.6:MDL=1.0)	ND (RL=9.4:MDL=1.0)		
2,4-Dichlorophenol	8270C	µg/L				ND (RL=9.7:MDL=2.1)	ND (RL=9.6:MDL=2.0)	ND (RL=9.4:MDL=2.0)		
1,2,4-Trichlorobenzene	8270C	µg/L				ND (RL=9.7:MDL=2.2)	ND (RL=9.6:MDL=2.2)	ND (RL=9.4:MDL=2.1)		
4-chloroaniline	8270C	µg/L				ND (RL=9.7:MDL=2.0)	ND (RL=9.6:MDL=2.0)	ND (RL=9.4:MDL=1.9)		
Hexachlorobutadiene	8270C	µg/L				ND (RL=9.7:MDL=2.3)	ND (RL=9.6:MDL=2.3)	ND (RL=9.4:MDL=2.3)		
4-Chloro-3-methylphenol	8270C	µg/L				ND (RL=9.7:MDL=1.0)	ND (RL=9.6:MDL=1.0)	ND (RL=9.4:MDL=0.99)		
2-Methylnaphthalene	8270C	µg/L				ND (RL=9.7:MDL=1.8)	ND (RL=9.6:MDL=1.8)	**26** (RL=9.4:MDL=1.7)		
Hexachlorocyclopentadiene	8270C	µg/L				ND (RL=19:MDL=0.66)	ND (RL=19:MDL=0.65)	ND (RL=19:MDL=0.64)		
2,4,6-Trichlorophenol	8270C	µg/L				ND (RL=9.7:MDL=0.89)	ND (RL=9.6:MDL=0.88)	ND (RL=9.4:MDL=0.86)		
2,4,5-Trichlorophenol	8270C	µg/L				ND (RL=9.7:MDL=0.82)	ND (RL=9.6:MDL=0.82)	ND (RL=9.4:MDL=0.8)		
2-Chloronaphthalene	8270C	µg/L				ND (RL=9.7:MDL=1.8)	ND (RL=9.6:MDL=1.8)	ND (RL=9.4:MDL=1.7)		
2-Nitroaniline	8270C	µg/L				ND (RL=19:MDL=1.9)	ND (RL=19:MDL=1.1)	ND (RL=19:MDL=1.1)		
Dimethylphthalate	8270C	µg/L				ND (RL=9.7:MDL=1.9)	ND (RL=9.6:MDL=1.9)	ND (RL=9.4:MDL=1.9)		
2,6-Dinitrotoluene	8270C	µg/L				ND (RL=9.7:MDL=1.7)	ND (RL=9.6:MDL=1.7)	ND (RL=9.4:MDL=1.7)		
3-Nitroaniline	8270C	µg/L				ND (RL=19:MDL=1.9)	ND (RL=19:MDL=1.9)	ND (RL=19:MDL=1.8)		
2,4-Dinitrophenol	8270C	µg/L				ND (RL=19:MDL=2.5)	ND (RL=19:MDL=2.5)	ND (RL=19:MDL=2.4)		
4-Nitrophenol	8270C	µg/L				ND (RL=19:MDL=1.7)	ND (RL=19:MDL=1.7)	ND (RL=194:MDL=1.7)		
Dibenzofuran	8270C	µg/L				ND (RL=9.7:MDL=1.8)	ND (RL=9.6:MDL=1.8)	ND (RL=9.4:MDL=1.8)		
2,4-Dinitrotoluene	8270C	µg/L				ND (RL=9.7:MDL=2.0)	ND (RL=9.6:MDL=2.0)	ND (RL=9.4:MDL=2.0)		
Diethylphthalate	8270C	µg/L				ND (RL=9.7:MDL=0.99)	ND (RL=9.6:MDL=0.98)	ND (RL=9.4:MDL=0.96)		

Table 5 - Laboratory Analytical Results Summary

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Constituent	Analytical method	Units	Effluent permit limits		Monitoring period:	Startup - First day			Startup - Fifth day	
			Average monthly limitation	Maximum daily limitation	Sample date/time:	03/02/2011 13:55	03/02/2011 13:55	03/02/2011 13:40	03/11/11 09:25	03/11/11 09:35
					Date analyzed:	03/07/11	03/07/11	03/07/11	03/14/11	03/14/11
					Sample identifier:	ST018GWTP_W_EFF-001	ST018GWTP_W_EFF-001B	ST018GWTP_W_INF-001	ST018GWTP_W_EFF-001	ST018GWTP_W_INF-001
					Location:	EFF-001[(a)]	EFF-001[(a)]	INF-001[(b)]	EFF-001[(a)]	INF-001[(b)]
4-Chlorophenyl-phenylether	8270C	µg/L				ND (RL=9.7:MDL=1.6)	ND (RL=9.6:MDL=1.6)	ND (RL=9.4:MDL=1.5)		
4-Nitroaniline	8270C	µg/L				ND (RL=19:MDL=2.3)	ND (RL=19:MDL=2.3)	ND (RL=19:MDL=2.3)		
4,6-Dinitro-2-methylphenol	8270C	µg/L				ND (RL=19:MDL=1.1)	ND (RL=19:MDL=1.1)	ND (RL=19:MDL=1.1)		
N-Nitrosodiphenylamine	8270C	µg/L				ND (RL=9.7:MDL=1.6)	ND (RL=9.6:MDL=1.6)	ND (RL=9.4:MDL=1.6)		
4-Bromophenyl-phenylether	8270C	µg/L				ND (RL=9.7:MDL=1.9)	ND (RL=9.6:MDL=1.9)	ND (RL=9.4:MDL=1.9)		
Hexachlorobenzene	8270C	µg/L				ND (RL=9.7:MDL=1.9)	ND (RL=9.6:MDL=1.9)	ND (RL=9.4:MDL=1.9)		
Pentachlorophenol	8270C	µg/L				ND (RL=19:MDL=1.9)	ND (RL=19:MDL=1.9)	ND (RL=19:MDL=1.8)		
Di-n-butylphthalate	8270C	µg/L				ND (RL=9.7:MDL=1.2)	ND (RL=9.6:MDL=1.1)	ND (RL=9.4:MDL=1.1)		
Benzidine	8270C	µg/L				ND (RL=49:MDL=0.78)	ND (RL=48:MDL=0.77)	ND (RL=47:MDL=0.75)		
Butylbenzylphthalate	8270C	µg/L				ND (RL=9.7:MDL=0.98)	ND (RL=9.6:MDL=0.97)	ND (RL=9.4:MDL=0.95)		
3,3'-Dichlorobenzidine	8270C	µg/L				ND (RL=19:MDL=1.0)	ND (RL=19:MDL=1.0)	ND (RL=19:MDL=0.99)		
Bis(2-ethylhexyl)phthalate	8270C	µg/L				ND (RL=9.7:MDL=1.8)	**3.9** DNQ (RL=9.6:MDL=1.8)	ND (RL=9.4:MDL=1.7)		
Di-n-octylphthalate	8270C	µg/L				ND (RL=9.7:MDL=1.8)	ND (RL=9.6:MDL=1.8)	ND (RL=9.4:MDL=1.7)		
1,4-Dioxane	8270C-SIM	µg/L				ND (RL=0.99:MDL=0.069)	ND (RL=0.98:MDL=0.068)	ND (RL=0.95:MDL=0.066)		
Polycyclic aromatic hydrocarbons										
Naphthalene	8310	µg/L				ND (RL=0.97:MDL=0.09)	ND (RL=1.0:MDL=0.1)	**65** (RL=0.94:MDL=0.09)		
Acenaphthylene	8310	µg/L				ND (RL=1.9:MDL=0.26)	ND (RL=2.0:MDL=0.27)	**23** (RL=1.9:MDL=0.25)		
Acenaphthene	8310	µg/L				ND (RL=0.97:MDL=0.2)	ND (RL=1.0:MDL=0.21)	**13** (RL=0.94:MDL=0.19)		
Fluorene	8310	µg/L				ND (RL=0.19:MDL=0.03)	ND (RL=0.2:MDL=0.03)	**0.27** (RL=0.19:MDL=0.03)		
Phenanthrene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.09:MDL=0.01)		
Anthracene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.09:MDL=0.01)		
Fluoranthene	8310	µg/L				ND (RL=0.19:MDL=0.02)	ND (RL=0.2:MDL=0.02)	ND (RL=0.19:MDL=0.02)		
Pyrene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.09:MDL=0.01)		
Benzo(a)anthracene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.9:MDL=0.01)		
Chrysene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.09:MDL=0.01)		
Benzo(b)fluoranthene	8310	µg/L				ND (RL=0.19:MDL=0.03)	ND (RL=0.2:MDL=0.03)	ND (RL=0.19:MDL=0.03)		
Benzo(k)fluoranthene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.09:MDL=0.01)		
Benzo(a)pyrene	8310	µg/L				ND (RL=0.1:MDL=0.01)	ND (RL=0.1:MDL=0.01)	ND (RL=0.09:MDL=0.01)		
Dibenz(a,h)anthracene	8310	µg/L				ND (RL=0.19:MDL=0.04)	ND (RL=0.2:MDL=0.04)	ND (RL=0.19:MDL=0.04)		
Benzo(g,i,h)perylene	8310	µg/L				ND (RL=0.19:MDL=0.04)	ND (RL=0.2:MDL=0.04)	ND (RL=0.19:MDL=0.03)		
Indeno(1,2,3-cd)pyrene	8310	µg/L				ND (RL=0.1:MDL=0.03)	ND (RL=0.1:MDL=0.03)	ND (RL=0.09:MDL=0.03)		
Metals										
Total Antimony	E200.8	µg/L				**0.71** (RL=0.5:MDL=0.032)	**0.78** (RL=0.5:MDL=0.032)	**0.69** (RL=0.5:MDL=0.032)	**0.17** DNQ (RL=0.5:MDL=0.032)	**0.2** DNQ (RL=0.5:MDL=0.032)
Total Arsenic	E200.8	µg/L				**13** (RL=1.0:MDL=0.035)	**13** (RL=1.0:MDL=0.035)	**20** (RL=1.0:MDL=0.035)	**4.3** (RL=1.0:MDL=0.035)	**5.8** (RL=1.0:MDL=0.035)
Total Beryllium	E200.8	µg/L				ND (RL=0.5:MDL=0.018)	ND (RL=0.5:MDL=0.018)	ND (RL=0.5:MDL=0.018)	ND (RL=0.5:MDL=0.018)	ND (RL=0.5:MDL=0.018)
Total Cadium	E200.8	µg/L				ND (RL=0.25:MDL=0.032)	ND (RL=0.25:MDL=0.032)	**0.096** DNQ (RL=0.25:MDL=0.032)	ND (RL=0.25:MDL=0.032)	**0.1** DNQ (RL=0.25:MDL=0.032)
Total Chromium	E200.8	µg/L				**0.28** DNQ (RL=0.5:MDL=0.015)	**0.14** DNQ (RL=0.5:MDL=0.015)	**2.4** (RL=0.5:MDL=0.015)	**0.036** DNQ (RL=0.5:MDL=0.015)	**0.52** (RL=0.5:MDL=0.015)
Hexavalent Chromium	7199	µg/L				ND (RL=0.5:MDL=0.13)	ND (RL=0.5:MDL=0.13)	ND (RL=0.5:MDL=0.13)	ND (RL=0.5:MDL=0.13)	ND (RL=0.5:MDL=0.13)
Total Copper	E200.8	µg/L				**0.044** DNQ (RL=0.5:MDL=0.027)	**0.2** DNQ (RL=0.5:MDL=0.027)	**3.6** (RL=0.5:MDL=0.027)	ND (RL=0.5:MDL=0.027)	**2.2** (RL=0.5:MDL=0.027)
Total Cyanide	SM20-4500-CN	µg/L				ND (RL=1.0:MDL=0.5)	ND (RL=1.0:MDL=0.5)	**0.53** DNQ (RL=1.0:MDL=0.5)	ND (RL=1.0:MDL=0.5)	ND (RL=1.0:MDL=0.5)
Total Lead	E200.8	µg/L				**0.093** DNQ (RL=0.5:MDL=0.031)	**0.052** DNQ (RL=0.5:MDL=0.031)	**1.3** (RL=0.5:MDL=0.031)	**0.048** DNQ (RL=0.05:MDL=0.031)	**0.47** DNQ (RL=0.05:MDL=0.031)
Total Mercury	E1631	ng/L				ND (RL=0.5:MDL=0.5)	ND (RL=0.5:MDL=0.5)	**6.0** (RL=0.5:MDL=0.5)	ND (RL=0.5:MDL=0.5)	**3.2** (RL=0.5:MDL=0.5)
Total Nickel	E200.8	µg/L				**0.18** DNQ (RL=1.0:MDL=0.033)	**0.1** DNQ (RL=1.0:MDL=0.033)	**20** (RL=1.0:MDL=0.033)	ND (RL=1.0:MDL=0.033)	**6.5** (RL=1.0:MDL=0.033)
Total Selenium	E200.8	µg/L				**0.23** DNQ (RL=1.0:MDL=0.03)	**0.56** DNQ (RL=1.0:MDL=0.03)	**0.33** DNQ (RL=1.0:MDL=0.03)	**0.15** DNQ (RL=1.0:MDL=0.031)	**0.15** DNQ (RL=1.0:MDL=0.031)
Total Silver	E200.8	µg/L				ND (RL=0.25:MDL=0.018)	ND (RL=0.25:MDL=0.018)	ND (RL=0.25:MDL=0.018)	ND (RL=0.25:MDL=0.018)	ND (RL=0.25:MDL=0.018)
Total Thallium	E200.8	µg/L				ND (RL=1.0:MDL=0.011)	ND (RL=1.0:MDL=0.011)	0.029 DNQ (RL=1.0:MDL=0.011)	**0.071** DNQ (RL=1.0:MDL=0.011)	**0.042** DNQ (RL=1.0:MDL=0.011)
Total Zinc	E200.8	µg/L				**5.2** (RL=1.0:MDL=1.0)	**2.8** (RL=1.0:MDL=1.0)	**140** (RL=1.0:MDL=1.0)	**6.5** (RL=1.0:MDL=1.0)	**84** (RL=1.0:MDL=1.0)

Table 5 - Laboratory Analytical Results Summary

Monitoring and Reporting Program No. R2-2006-0075, NPDES No. CAG912002

Site ST018, 170 Travis Avenue, Travis Air Force Base, California (CIWQS Place ID 761357)

Constituent	Analytical method	Units	Effluent permit limits		Monitoring period:	Startup - First day			Startup - Fifth day	
			Average monthly limitation	Maximum daily limitation	Sample date/time:	03/02/2011 13:55	03/02/2011 13:55	03/02/2011 13:40	03/11/11 09:25	03/11/11 09:35
					Date analyzed:	03/07/11	03/07/11	03/07/11	03/14/11	03/14/11
					Sample identifier:	ST018GWTP_W_EFF-001	ST018GWTP_W_EFF-001B	ST018GWTP_W_INF-001	ST018GWTP_W_EFF-001	ST018GWTP_W_INF-001
					Location:	EFF-001[(a)]	EFF-001[(a)]	INF-001[(b)]	EFF-001[(a)]	INF-001[(b)]
Other										
Fish Toxicity, 96-hour (% survival)	EPA-821-R-02-012	%				30[(c)]				

Notes:

Analytical detections are in **BOLD** font for easier identification.

(a) EFF-001 = Effluent sampling point is located at a point in the discharge line immediately following treatment and before it joins or is diluted by any other waste stream, body of water, or substance (MRP for Order No. R2-2006-0075, NPDES No. CAG912002).

(b) INF-001 = Influent sampling point is located at a point in the extraction system immediately prior to inflow to the treatment unit (MRP for Order No. R2-2006-0075, NPDES No. CAG912002).

(c) Total amonia nitrogen in bioassay sample was ND (<0.03 mg/L), but pH was at upper acceptable limit (pH=9.0). Effluent sample will be collected and analyzed for fish toxicity % survival in April 2011 to verify this result.

% = Percent

µg/L - micrograms per liter

DNQ - Detected but not quantified - estimated concentration. Analytical result is less than the RL but greater than or equal to the laboratory's MDL.

MDL = Method detection limit

ND - Not detected; analytical result is less than the laboratory's reporting limit.

ng/L = nanograms per liter

RL - Reporting limit

TPH-G - Total petroleum hydrocarbons as gasoline

TPH-D - Total petroleum hydrocarbons as diesel

TPH-MO - Total petroleum hydrocarbons as motor oil

Appendix G
Site ST018 Groundwater Treatment Plant Operation and Maintenance Log Sheet

Site ST018 Groundwater Treatment Plant

Operation and Maintenance Log

Name: Date: Time:

Standard Obervations for Treatment Plant:

Weather Conditions (note temperature, precipitation, cloud cover, wind speed and direction):

ODOR (note presence/absence, type, supected source, distance of travel, and wind direction):

Deposits, disoloration, plugging (note discoloration or other fouling that could adversely affect treatment system):

Treatment Plant Currently Running? Yes / No Instantaneous Flow Rate: _____ gpm

Actuated Ball Valve at System Influent Open? Yes / No

Alarms Tripped? Yes / No

Containment Sump / Influent Tank High Level / Bag Filter High Pressure

Operational Parameters - Treatment Plant

Electric Meter (Firestone's wall) _____ kWh

Pressure - Influent Bag Filter _____ psi

Pressure - Effluent Bag Filter _____ psi

Pressure - Carbon Midpoint 1 _____ psi

Pressure - Carbon Midpoint 2 _____ psi

Pressure - Carbon Effluent _____ psi

Totalizer - System Effluent _____ gallons

Sump Pump Running? Yes / No

Process Water Parameters (when sampling)

	pH (su)	Cond (mS/cm)	Turb (NTU)	DO (mg/L)	Temp (^{o}C)
Influent					
Mid 1					
Mid 2					
Effluent					
Outfall Up					
Outfall Down					

Operational Parameters - Extraction Wells

	EW2014x18	EW2016x18	EW2019x18	
Pressure - Before Throttle Valve				psi
Pressure - After Throttle Valve				psi
Ball Valve Percentage Open				%
Totalizer - Wellhead Effluent				gallons

Charge Controller On? Yes / No

Charge Voltage on Batteries _____ volts

Alarms Tripped? Yes / No

Pump Currently Operating? Yes / No

Notes:

Appendix H
Response to Comments

Responses to Comments on the
Draft POCO Site ST018 Baseline Implementation Report
Travis Air Force Base, California

Regional Water Quality Control Board

No.	Comments	Responses
REVIEW COMMENTS – Alan D. Friedman, P.E., Regional Water Quality Control Board dated June 16, 2011		
GENERAL COMMENTS		
1.	RWQCB reviewed this document and had no comments.	No response necessary.