

FINAL
WELL DESTRUCTION REPORT
GROUNDWATER MONITORING WELLS
04_UGMW63, TF6MW-02, AND TFAMW-03

Former JP5 Truck Fueling Area
Former Marine Corps Air Station El Toro
Irvine, California

October 2015

Prepared for:

U.S. Department of the Navy
Base Realignment and Closure
Program Management Office West
33000 Nixie Way, Building 50, Second Floor
San Diego, California 92147

Prepared by:



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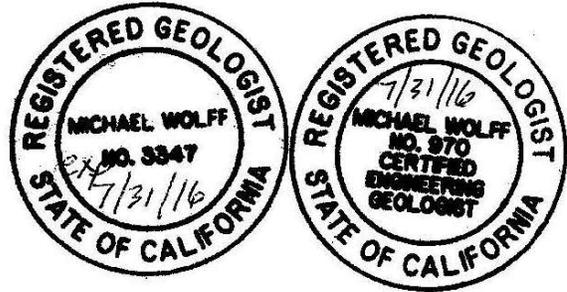
Naval Facilities Engineering Command Southwest
Contract Number N62473-10-C-4405
Contract Task Order No. 0000
DCN: ECS-4405-0000-0104



SIGNATURES

FINAL
WELL DESTRUCTION REPORT
GROUNDWATER MONITORING WELLS 04_UGMW63, TF6MW-02, AND TFAMW-03
FORMER JP5 TRUCK FUELING AREA
FORMER MARINE CORPS AIR STATION EL TORO, IRVINE, CALIFORNIA

This report was reviewed and approved by:





Signature
Michael Wolff, PG No. 3347
Senior Hydrogeologist

October 7, 2015

Date



Signature
Dhananjay Rawal
Program Quality Assurance Manager

October 7, 2015

Date

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional principles and practices for environmental consulting firms. Except as set forth herein, no other warranty, expressed or implied, is made. Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the purposes, locations, time frames, and project parameters indicated. Professional opinions are based, in part, on interpretation of data from discrete monitoring or sampling locations that may not represent actual conditions at other locations that were not monitored or sampled. In some cases, interpretations may have been based on information supplied by others. This information may not have been independently reviewed.

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ACRONYMS AND ABBREVIATIONS

DoN	United States Department of the Navy
ECS	Enviro Compliance Solutions, Inc.
JP5	jet propellant fuel, grade 5
MCAS	Marine Corps Air Station
MNA	monitored natural attenuation
OCHCA	Orange County Health Care Agency
RWQCB	California Regional Water Quality Control Board, Santa Ana Region
TFA	Truck Fueling Area

1.0 INTRODUCTION

Enviro Compliance Solutions, Inc. (ECS) has prepared this *Well Destruction Report, Groundwater Monitoring Wells 04_UGMW63, TF6MW-02, and TFAMW-03, Former JP5 Truck Fueling Area, Former Marine Corps Air Station El Toro, Irvine, California* on behalf of the U.S. Department of the Navy (DoN) Base Realignment and Closure Program Management Office West under Naval Facilities Engineering Command Contract No. N62473-10-C-4405, Modification No. 5. The former jet propellant fuel, grade 5 (JP5) Truck Fueling Area (TFA) is located within Former Marine Corps Air Station (MCAS) El Toro in Irvine, California (Figure 1).

On behalf of the DoN, ECS prepared and issued the *Final Work Plan, Destruction of Groundwater Monitoring Wells 04_UGMW63, TF6MW-02, and TFAMW-03, Former JP5 Truck Fueling Area, Former Marine Corps Air Station El Toro, Irvine, California* (ECS 2015b) to govern the proper destruction of the subject groundwater monitoring wells as requested by the California Regional Water Quality Control Board, Santa Ana Region (RWQCB 2015a; Appendix A). Ms. Patricia Hannon, Engineering Geologist with the RWQCB, approved the final work plan in an electronic mail dated September 25, 2015 (RWQCB 2015b; Appendix A).

Nine wells (18_BGMW01E, 04_DBMW40, 04_UGMW63, 04_DGMW66A, TF6MW-01, TF6MW-02, TFAMW-01, TFAMW-02, and TFAMW-03) were historically included in the former JP5 TFA groundwater monitoring program. With the exception of groundwater monitoring well 04_DGMW66A, all nine wells in the former JP5 TFA monitoring program are now properly destroyed. Trevet (2013) previously destroyed groundwater monitoring wells 18_BGMW01E and 04_DBMW40 on behalf of the DoN, and ECS (2015a) previously destroyed groundwater monitoring wells TF6MW-01, TFAMW-01, and TFAMW-02 on behalf of FivePoint Communities, the current landowner. As documented in this report, ECS has completed destruction of groundwater monitoring wells 04_UGMW63, TF6MW-02, and TFAMW-03. Groundwater monitoring well 04_DGMW66A was not destroyed as it is part of the monitoring network for Installation Restoration Program Site 3.

2.0 SITE LOCATION AND BACKGROUND

2.1 Setting

Former Marine Corps Air Station (MCAS) El Toro is located approximately 45 miles southeast of Los Angeles and 1 mile north of the intersection of Interstates 5 and 405 in the City of Irvine, California. As shown on Figure 1, the former JP5 TFA is located in the east-central portion of Former MCAS El Toro. The State Water Resources Control Board has assigned GeoTracker No. T0605902152 for the former JP5 TFA.

2.2 Environmental Site History

The history of environmental activities for the former JP5 TFA is summarized below:

Date	Activity
1943–mid-1950s	Jet fuel storage tanks were installed at former Tank Farms 5 and 6, and JP5 pipelines, TFAs, and associated features were constructed.
1990s–2008	Various soil investigations were conducted at JP5 features and tank sites located within the TFA, petroleum-impacted soil was removed from the TFA, and underground storage tanks were removed from former Tank Farms 5 and 6, TFAs, and Building 658.
1992–2007	Periodic groundwater monitoring was conducted at selected wells within and near the former plume.
June 2007	The <i>Monitored Natural Attenuation Evaluation and Long-Term Monitoring Plan</i> was issued (Wiedemeier & Associates 2007).
Aug. 2007	RWQCB (2007) approved monitored natural attenuation (MNA) as the groundwater remedy.
Sept. 2007–July 2008	Four quarters of baseline sampling for MNA were completed. Soil samples were collected from a 210-foot-deep vertical boring through the Building 363 dry well in November 2007, and a release of petroleum to groundwater at the Building 363 dry well was identified.
Oct. 2008	Monitoring well TFAMW-01 was constructed near the former Building 363 dry well. Monitoring well TFAMW-02 was constructed southeast of the original TFA and former Building 363 dry well.
Dec. 2008	The first annual groundwater monitoring event was completed.
Nov. 2009	The second annual groundwater monitoring event was completed.
March 2010	Monitoring well TFAMW-03 was installed downgradient of monitoring well TFAMW-01.
Nov. 2010	The third annual groundwater monitoring event was completed.
Oct. 2011	The fourth annual groundwater monitoring event was completed.
Oct. 2012	The fifth annual groundwater monitoring event was completed, ending the five-year MNA demonstration period.
Sep. 2013	Groundwater monitoring wells 04_DBMW40 and 18_BGMW01E were properly destroyed (Trevet 2013).
Oct. 2013	A sixth and final annual groundwater monitoring event was completed at the request of RWQCB.
Oct. 2014	The DoN requested no further action for the groundwater medium (ECS 2014).
May 2015	RWQCB (2015) agreed to site closure and stated that it would issue a no further action letter when the project wells are properly destroyed (Appendix A).
Aug. 2015	Groundwater monitoring wells TF6MW-01, TFAMW-01, and TFAMW-02 were properly destroyed (ECS 2015a).
Sep. 2015	Groundwater monitoring wells 04_UGMW63, TF6MW-02, and TFAMW-03 were properly destroyed.

3.0 WELL DESTRUCTION ACTIVITIES

3.1 Permitting and Approvals

On September 23, 2015, prior to the initiation of fieldwork, ECS obtained signed Well Destruction Permit No. 15-09-14 (Appendix B) from Orange County Health Care Agency (OCHCA). In addition, ECS provided advance notifications (minimum of 48 hours) to the DoN, FivePoint Communities, and OCHCA prior to the start of field activities.

3.2 Well Destruction

JDK Drilling, Inc. (C-57 License No. 887038) was contracted by ECS to perform the well destruction activities per the approved OCHCA permit and final work plan (ECS 2015b). Three groundwater monitoring wells (04_UGMW63, TF6MW-02, and TFAMW-03) were destroyed on September 28, 2015. Construction details and the locations of the former wells are provided in Table 1 and on Figure 2, respectively. Well destruction records are provided in Appendix C.

Monitoring wells 04_UGMW63, TF6MW-02, and TFAMW-03 were decommissioned by pressure grouting in accordance with the standards set by the California Department of Water Resources (1991) Bulletin 74-90, under the supervision of a California-licensed Professional Geologist. Decommissioning activities also followed the guidelines specified by OCHCA for well destruction using the pressure-grouting method described briefly below. Fieldwork activities were completed under the *Final Accident Prevention Plan, Health and Safety Plan, Soil Excavation, Sampling, and Well Installation Procedures for Various Petroleum Sites, Former MCAS El Toro, California* (ECS 2008).

Initially, each well was opened and gauged with a sounding probe to measure depth to water and to check for debris or obstructions that might interfere with the grouting procedure. The total depth of each well was also measured and recorded to confirm the minimum volume of grout needed to seal each well (Table 2). A 30% contingency factor was applied to the casing volume calculations to ensure that sufficient grout was injected to completely seal the well casing and penetrate the filter pack. The total volume of grout used during each well's destruction (Table 2) exceeded the calculated volume needed to seal the well, indicating that the sealing material was penetrating the filter pack and other voids.

For each well, the decommissioning process was continued by using a rig-mounted wireline hammer to punch a hole through the bottom of the well. A sealant material consisting of a high-plasticity bentonite grout was then mixed at the surface and prepared for use. The grout was well mixed to ensure that it had a size and consistency to pass through the 0.01- or 0.02-inch screen slots. The grout was pumped into each well at 120 pounds per square inch to reduce the possibility of bridging and force some of the sealant through the screen and into the surrounding pore spaces of the filter pack.

Destruction procedures included demolition and removal of surface completions, traffic posts, bollards, concrete pads, and well monuments. The top 5 feet of casing of each well was drilled out using a hollow-stem auger. Each resulting borehole was filled to within 1 foot of ground surface with native materials and compacted to minimize subsidence. The top foot of the borehole was filled with concrete. The surface around each former well was then restored to match pre-existing conditions. Photographic documentation of fieldwork is provided in Appendix D.

3.3 Waste Management

Well monuments, bollards, and other uncontaminated materials (concrete debris) generated during the destruction process was disposed off-site at a Class III landfill. As the waste was not hazardous, no manifest was required or completed.

4.0 REFERENCES

- California Department of Water Resources. 1991. *California Well Standards*. Bulletin 74-90. June.
- California Regional Water Quality Control Board, Santa Ana Region (RWQCB). 2007. Letter from Mr. John Broderick, Site Cleanup Program/DoD Section, to Mr. Richard C. Weissenborn, PE, BRAC Environmental Coordinator, re: Remedial Action Plan, Monitored Natural Attenuation, Former JP5 Truck Fueling Area, Former Marine Corps Air Station El Toro, GeoTracker No. T0605902152. August 31.
- . 2015a. Letter from Xinyu Li, PhD, Chief, Land Disposal and DoD Program Section, to James Sullivan, BRAC Environmental Coordinator, re: Closure Notification Letter and Requirements for JP5 Truck Fueling Area Plume in Groundwater at Former Marine Corps Air Station El Toro, Orange County, California, GeoTracker ID: T0605901129. May 26. (Copy provided in Appendix A of this report.)
- . 2015b. Electronic mail from Patricia Hannon, PG, Engineering Geologist, to Guy Chammas, PG, Project Manager, U.S. Department of the Navy, Base Realignment and Closure Program Management Office West, re: El Toro MCAS, JP5 Truck Fueling Area, Work Plan for Destruction of Groundwater Monitoring Wells. September 25. (Copy provided in Appendix A of this report.)
- Enviro Compliance Solutions, Inc. (ECS). 2008. *Final Accident Prevention Plan, Health and Safety Plan, Soil Excavation, Sampling, and Well Installation Procedures for Various Petroleum Sites, Former Marine Corps Air Station El Toro, California*. August.
- . 2014. *Draft Site Closure Report for Groundwater, Former JP5 Truck Fueling Area, Former Marine Corps Air Station El Toro, Irvine, California*. October.
- . 2015a. *Well Destruction Report, Groundwater Monitoring Wells, Former JP5 Truck Fueling Area, Former MCAS El Toro, Irvine, California*. Prepared for FivePoint Communities. August.
- . 2015b. *Final Work Plan, Destruction of Groundwater Monitoring Wells 04_UGMW63, TF6MW-02, and TFAMW-03, Former JP5 Truck Fueling Area, Former Marine Corps Air Station El Toro, Irvine, California*. September.
- Trevet. 2013. *Monitoring Well Destruction Report, Various Locations throughout Former Marine Corps Air Station El Toro, California*. November 22.
- Wiedemeier & Associates. 2007. *Monitored Natural Attenuation Evaluation and Long-Term Monitoring Plan, Former JP-5 Truck Fueling Area, Former MCAS El Toro, California*. June.

TABLES

TABLE 1
WELL COMPLETION DATA
Former JP5 Truck Fueling Area
Former MCAS El Toro, Irvine, California

WELL INSTALLATION						COMPLETION DATA														STATUS		
Well Number	Date Completed	Location*		Elevation*		Hole Diam (in)	Casing Diam (in)	Screen		Depth (ft)				Elevation (ft msl)								
		Northing	Easting	Grd	TOC			Slot (in)	Length (ft)	Sand Pack		Slotted		Total Depth		Sand Pack		Slotted			Total Depth	
										Top	Bottom	Top	Bottom	Casing	Hole	Top	Bottom	Top	Bottom		Casing	Hole
04_UGMW63	10/13/1992	2,192,443.43	6,115,456.16	405.04	405.71	11	5	0.020	40	-	-	235	275	275	281	-	-	170	130	131	124	Destroyed
TF6MW-02	9/5/1996	2,192,142.78	6,114,464.27	386.78	386.49	11	4	0.020	40	184	230	190	230	230	230	203	157	197	157	156	157	Destroyed
TFAMW-03	3/3/2010	2,192,498.91	6,114,856.66	396.71	399.29	12	4	0.010	35	192	232	195	230	230	232	204	167	202	167	169	165	Destroyed

Abbreviations

bgs = below ground surface
Diam. = diameter
JP5 = jet propellant fuel, grade 5
ft = feet
Grd = ground
in = inches
MCAS = Marine Corps Air Station
msl = mean sea level
TOC = top of casing

Symbols

- = Not applicable or data not available
* = Surveyed to: Horizontal: North American Datum of 1983, (NAD '83), CCS83, Zone VI, (1991.35 epoch), Vertical: North American Vertical Datum of 1988, (NAVD '88).
The elevations shown hereon are based upon the NGS GPS Monument No. A14508. Elevation = 495.21 (NAVD '88).

TABLE 2
Grout Calculations for Well Destruction
Former JP5 Truck Fueling Area, Former MCAS El Toro, California

Well ID.	Casing Radius (ft.)	Casing Depth (ft.)	Casing Volume (Cubic Ft.)	Casing Volume (gal)	Casing Volume +30% (gal)	Injected Volume (gal)
04_UGMW63	0.208	275	37.38	279.64	363.53	400
TF6MW-02	0.166	230	19.91	148.96	193.65	250
TFAMW-03	0.166	230	19.91	148.96	193.65	250

NOTES:

$$G = \pi r^2 \times d \times 1.3$$

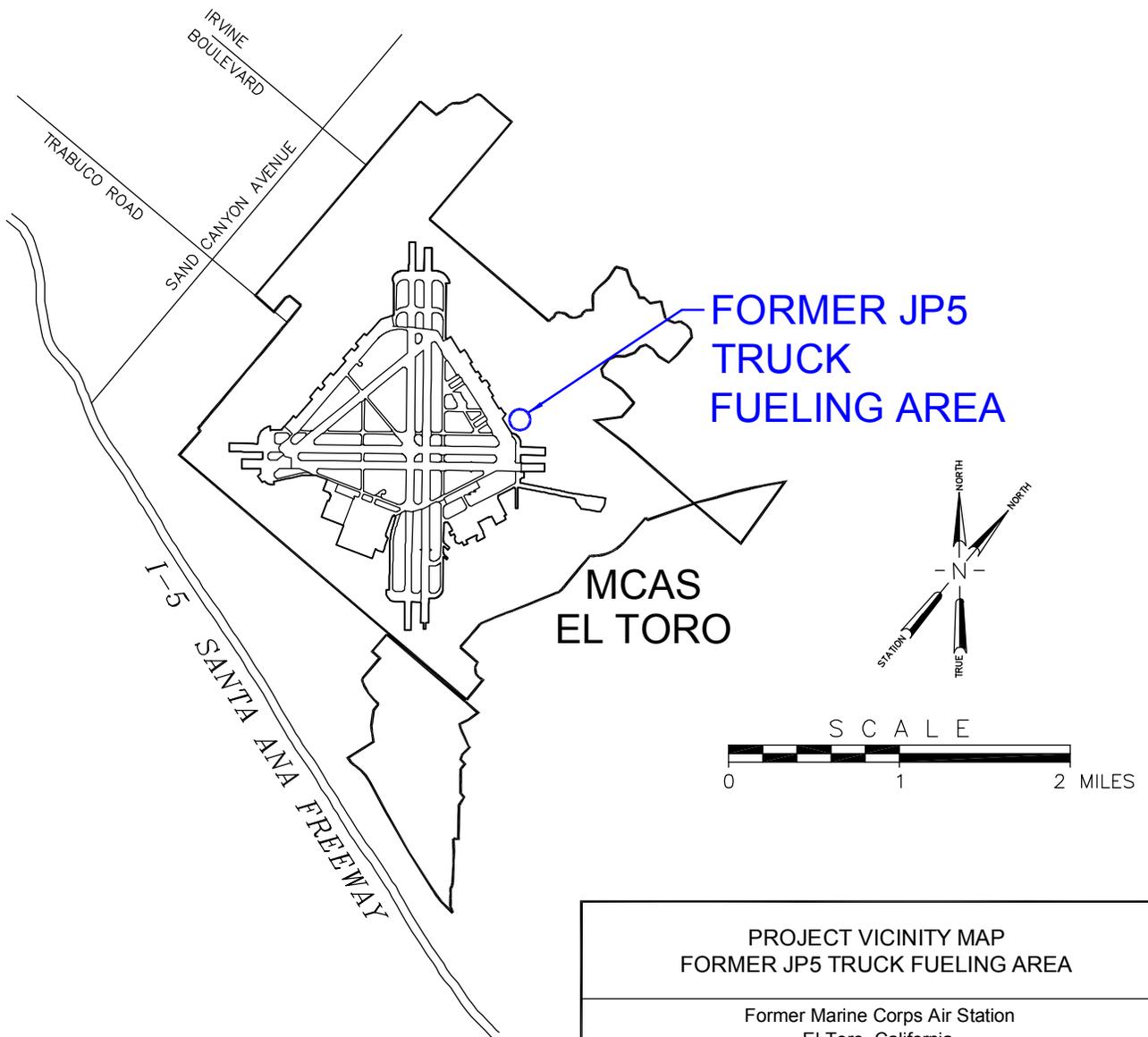
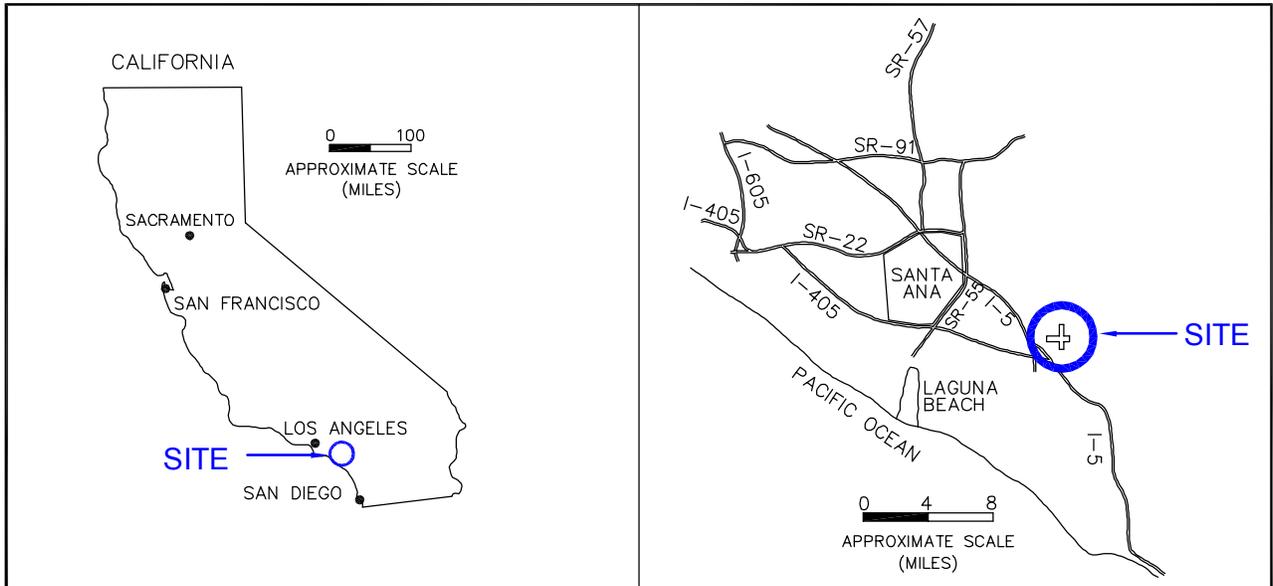
G = minimum amount of grout to be pumped

d = total depth of the well

r = radius of well casing

A 1.3 multiplier was applied to the casing volume equation to ensure that there was sufficient grout to completely seal the well casing and penetrate the filter pack.

FIGURES



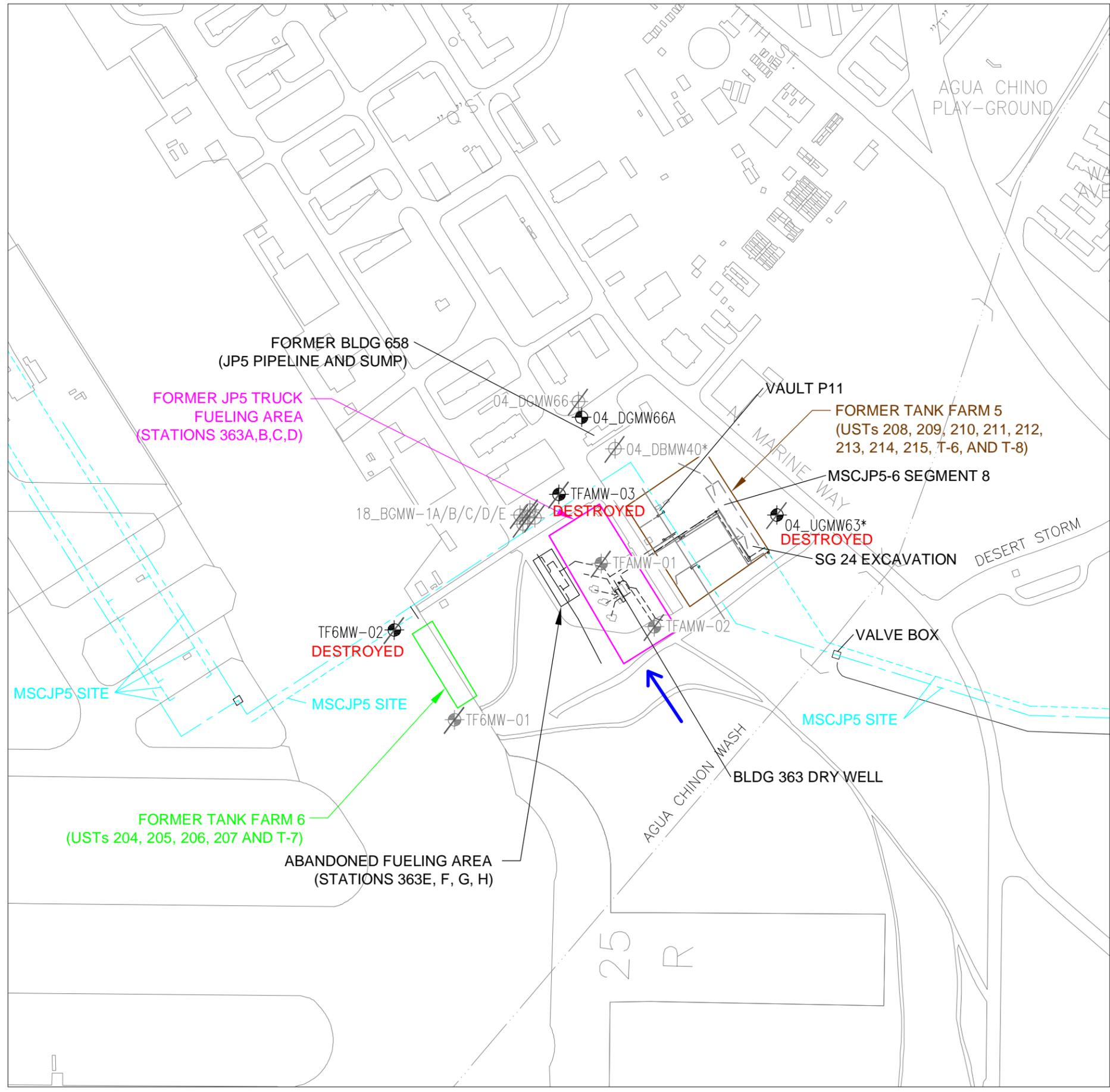
**PROJECT VICINITY MAP
FORMER JP5 TRUCK FUELING AREA**

Former Marine Corps Air Station
El Toro, California

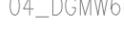
	Enviro Compliance Solutions, Inc. 1571 Parkway Loop, Suite A Tustin, CA 92780	Date: OCTOBER 2013 Contract No.: N62473-08-C-0601
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FIGURE 1

10/6/2015 5:57PM
 FIGURE 2 _2015-10-06_Well Location Map.dwg



LEGEND:

-  WELL IN LONG-TERM MONITORING PLAN
-  WELL NO LONGER SAMPLED.
-  FORMER PRIMARY UNDERGROUND PIPELINE
-  FORMER SECONDARY UNDERGROUND PIPELINE
-  WELL SCREEN IS SUBMERGED
-  GENERALIZED GROUNDWATER FLOW DIRECTION
-  BLDG BUILDING
-  JP5 JET PROPULSION FUEL, GRADE 5
-  MSC MISCELLANEOUS
-  SG SOIL GAS
-  UST UNDERGROUND STORAGE TANK
- DESTROYED TF6MW-02, TFAMW-03, AND 04_UGMW63 WELLS WERE DESTROYED ON 9/28/15

NOTES:

1. MSCJP5 SITE INCLUDES ALL FORMER PIPELINE SEGMENTS, VALVE BOXES, SUMPS, DRY WELL, ETC.
2. FORMER TANK FARM 5 - ALL THE USTS WITHIN FORMER TANK FARM 5 WERE CLOSED BY ORANGE COUNTY HEALTH CARE AGENCY (OCHCA) AS NO RELEASE WAS IDENTIFIED DURING UST REMOVAL SAMPLING ACTIVITIES AND BASED ON THE TANK REMOVAL SOIL SAMPLING RESULTS.
3. FORMER TANK FARM 6 - USTS 205, 207, AND T-7 WITHIN FORMER TANK FARM 6 WERE CLOSED BY OCHCA AS NO RELEASE WAS IDENTIFIED DURING UST REMOVAL SAMPLING ACTIVITIES AND BASED ON THE TANK REMOVAL SOIL SAMPLING RESULTS. HOWEVER, UST 204 AND 206 WERE CLOSED BY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB) AFTER ADDITIONAL SITE ASSESSMENT AND EXCAVATION ACTIVITIES WERE COMPLETED.

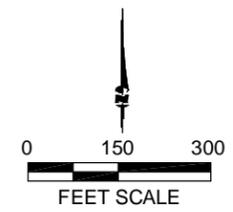


	FIGURE 2 SOUTHWEST DIVISION NAVAL FACILITIES ENGINEERING COMMAND Contract No.: N62473-08-C-0601
	WELL LOCATION MAP SEPTEMBER 2015 FORMER JP5 TRUCK FUELING AREA FORMER MARINE CORPS AIR STATION, ELTORO IRVINE, CALIFORNIA

APPENDIX A

RWQCB Closure Notification Letter and
Requirements and Approval of Work Plan

Santa Ana Regional Water Quality Control Board

May 26, 2015

Base Realignment and Closure
Attn: Mr. James Sullivan
BRAC Environmental Coordinator
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310
James.b.sullivan2@navy.mil

CLOSURE NOTIFICATION LETTER AND REQUIREMENTS FOR JP5 TRUCK FUELING AREA PLUME IN GROUNDWATER AT FORMER MARINE CORPS AIR STATION EL TORO, ORANGE COUNTY, CALIFORNIA, GEOTRACKER ID: T0605901129

Dear Mr. Sullivan:

We have reviewed the Draft Site Closure Report for Groundwater at former JP5 Truck Fueling Area dated October 2014.

Based on our review of the report, we are in agreement that this case should be closed as we stated in our email dated May 1, 2015. We have prepared a *Draft Case Closure Summary* pursuant to California Health and Safety Code, Section 25296.20. This is to notify you and all current record owners of fee title and other interested parties of our proposal to close the subject case. If you or any other interested parties have any information that would suggest that this case should not be closed, please contact us prior to **July 26, 2015**.

If no objections to the proposed case closure are received within the comment period, you will be notified and a final *Case Closure Summary* will be issued upon the completion of the following actions:

1. Removal and/or abandonment of all wells and other site improvements related to the underground storage tank cleanup.
2. Disposal of all waste materials in accordance with State and local guidelines.
3. Submittal of a brief well destruction and waste disposal report (including waste manifests, monitoring well destruction permits, etc.).

The above actions should be completed by **August 24, 2015**. Otherwise, this case may be reactivated and closure re-evaluated under new guidelines and requirements.

Thank you for your cooperation in this matter.

Should have any questions, please contact me at (951)-782-4906 or Patricia Hannon of my staff at (951) 782-4498. You may also email us at cindy.li@waterboards.ca.gov or patricia.hannon@waterboards.ca.gov, respectively.

Sincerely,



Xinyu Li, Ph.D., Chief
Land Disposal and DoD Program Section

Enclosure: 1) Draft Case Closure Summary, 2) Location Map, 3) Site Map

cc w/enclosures:

Mr. Guy Chammas - Navy/MARRS, guy.chammas.ctr@navy.mil

Ms. Content Arnold, Navy BRAC PMO, content.arnold@navy.mil

Mr. James P. Werkmeister, Five Point Communities,

jim.werkmeister@fivepointcommunities.com

Mr. Patrick Sheilds, Irvine Ranch Water District, sheilds@irwd.com

Mr. Roy Herndon, Orange County Water District, RHerndon@ocwd.com

Mr. Eric Tolles, City of Irvine, etolles@ci.irvine.ca.us

Mr. Cliff Wallace, Orange County Great Park Corporation, cwallace@ocgp.org

CASE CLOSURE SUMMARY

Leaking Underground Fuel Tank Program

I. Agency Information

DATE: May 26, 2015

AGENCY NAME	California Regional Water Quality Control Board - Santa Ana Region	STAFF	Patricia Hannon
ADDRESS	3737 Main St. Suite 500	TITLE	Engineering Geologist
CITY/STATE/ ZIP	Riverside CA 92501-3348	PHONE	(951) 782-4498, main # 782-4130

II. Case Information

SITE NAME	JP5 Truck Fueling Area Plume, Groundwater		
LOCATION	El Toro Marine Corps Air Station, former		
REGIONAL BOARD CASE #	T0605902152		
RESPONSIBLE PARTY	ADDRESS	PHONE NUMBER	
Department of Navy Base Realignment and Closure Attn: Mr. James Sullivan BRAC Environmental Coordinator James.b.sullivan2@navy.mil	1455 Frazee Road, Suite 900 San Diego, CA 92108-4310	(619) 532-0966	

III. Release and Site Characterization Information

CAUSE AND TYPE OF RELEASE:	unknown		
MONITORING WELLS INSTALLED?	yes	NUMBER	9
DEEPEST GW DEPTH	215 feet	SHALLOWEST GW DEPTH	181 feet
GROUNDWATER, MOST SENSITIVE CURRENT USE:	Municipal	GW FLOW DIRECTION	northwest
DRINKING WATER WELL(S) AFFECTED?	No	AQUIFER NAME	Irvine Groundwater Management Zone
		NEAREST MUNICIPAL WELL	3 miles
IS SURFACE WATER AFFECTED?	No	NEAREST SURFACE WATER :	Aqua Chinon Wash
OFF-SITE BENEFICIAL USE IMPACTS (ADDRESSES/LOCATIONS):	None		
REPORT(S) ON FILE?	Yes	WHERE IS/ARE REPORT(S) FILED?	RWQCB – Santa Ana Region https://geotracker.waterboards.ca.gov/

TREATMENT AND DISPOSAL OF AFFECTED MATERIAL

MATERIAL	AMOUNT	ACTION (TREATMENT, DISPOSAL)/ DESTINATION	DATE
TANK/PIPING			
FREE PRODUCT	none		
SOIL		See page 2, COMMENTS REGARDING INVESTIGATION AND REMEDIATION	
GROUNDWATER		Monitored natural attenuation	2007- 2013

III. Release and Site Characterization Information (Continued)

Maximum Document Contaminant Concentration – Before and After Cleanup				
CONTAMINANT	SOIL milligrams /kilograms (mg/kg)		WATER micrograms/Liter (µg/L)	
	INITIAL	CURRENT	INITIAL	CURRENT
BENZENE			380	37
TOLUENE			2	<0.2
ETHYLBENZENE			9.9	5.1
Total XYLENE			160	0.24
MTBE			<5	<0.2
TPH-jet fuel (JP5)			3300	330
TPH-diesel			3000	<100
TPH- gasoline			4300	87

COMMENTS REGARDING INVESTIGATION AND REMEDIATION

The former Truck Fueling Area (TFA) site consists of former Tank Farms 5, Tank Farm 6, and former truck fueling areas located between the former tank farms. Tank Farm 5 consisted of ten underground storage tanks (USTs). No releases were found under the USTs. However, petroleum hydrocarbons were detected in the soil in two areas: Vault P11 and SG 24. Petroleum impacted soil was excavated and determinations of no further action for the soil was issued by the Executive Officer of the Regional Board for Vault P11 on January 5, 2009 and for SG24 on October 15, 2009. Tank Farm 6 contained five USTs and petroleum impacted soil was detected near UST 206. The impacted soil was excavated and a determination of no further action was issued by the Executive Officer of the Regional Board on September 10, 2008. At the former JP5 Truck Fueling Area petroleum impacted soil was excavated near Building 363 and a determination of no further action for the soil was issued by the Executive Officer of the Regional Board on August 5, 2009.

Groundwater

Periodic groundwater monitoring from selected wells have been performed at this Site from 1992 through 2007. The constituents detected in the groundwater were benzene, toluene, ethylbenzene, xylene, total petroleum hydrocarbons as gasoline, diesel and jet fuel.

In June 2007 monitored natural attenuation was selected as the remedy for the groundwater plume. The remedy involved a five year demonstration period of monitoring the groundwater for natural attenuation parameters (methane, nitrate, sulfate, dissolved oxygen, iron II, oxidation-reduction potential (ORP), pH, temperature and conductivity) and chemicals of concern: volatile organic compounds (VOCs) and total petroleum hydrocarbons (gasoline, diesel, and jet fuel [JP-4 and JP-5]). Groundwater data were collected semiannual or annual from 2007 through 2012. An additional round of groundwater samples was collected in 2013 at the request of Regional Board staff.

Between November 2008 and April 2010 three additional groundwater monitoring wells were installed at the TFA. Benzene concentration as high as 380 µg/L was detected in the well installed near Building 363.

In 2013, groundwater samples were collected from eight monitoring wells and analyzed for (VOCs), total petroleum hydrocarbons. Benzene was detected in two wells at concentration less than 40 µg/L and ethylbenzene was detected in one well at 5.1 µg/L. Toluene and xylene were not detected in any of the water samples. Concentrations of gasoline and JP5 were less than 350 µg/L and diesel was not detected above laboratory reporting limits.

The plume in the groundwater is stable and concentrations of contaminants are decreasing. Analytical data showing that geochemical conditions are suitable for biodegradation, and that consumption of electron acceptors and/or the production of metabolic byproducts indicates that active biodegradation has occurred. In addition, the nearest municipal drinking water wells is greater than ½ mile from the Site. This Site meets all the criteria for Low Threat Closure Policy for groundwater, and is no longer considered a threat to the beneficial uses of the Irvine Groundwater Management Zone, therefore no further action is recommended.

IV. Closure

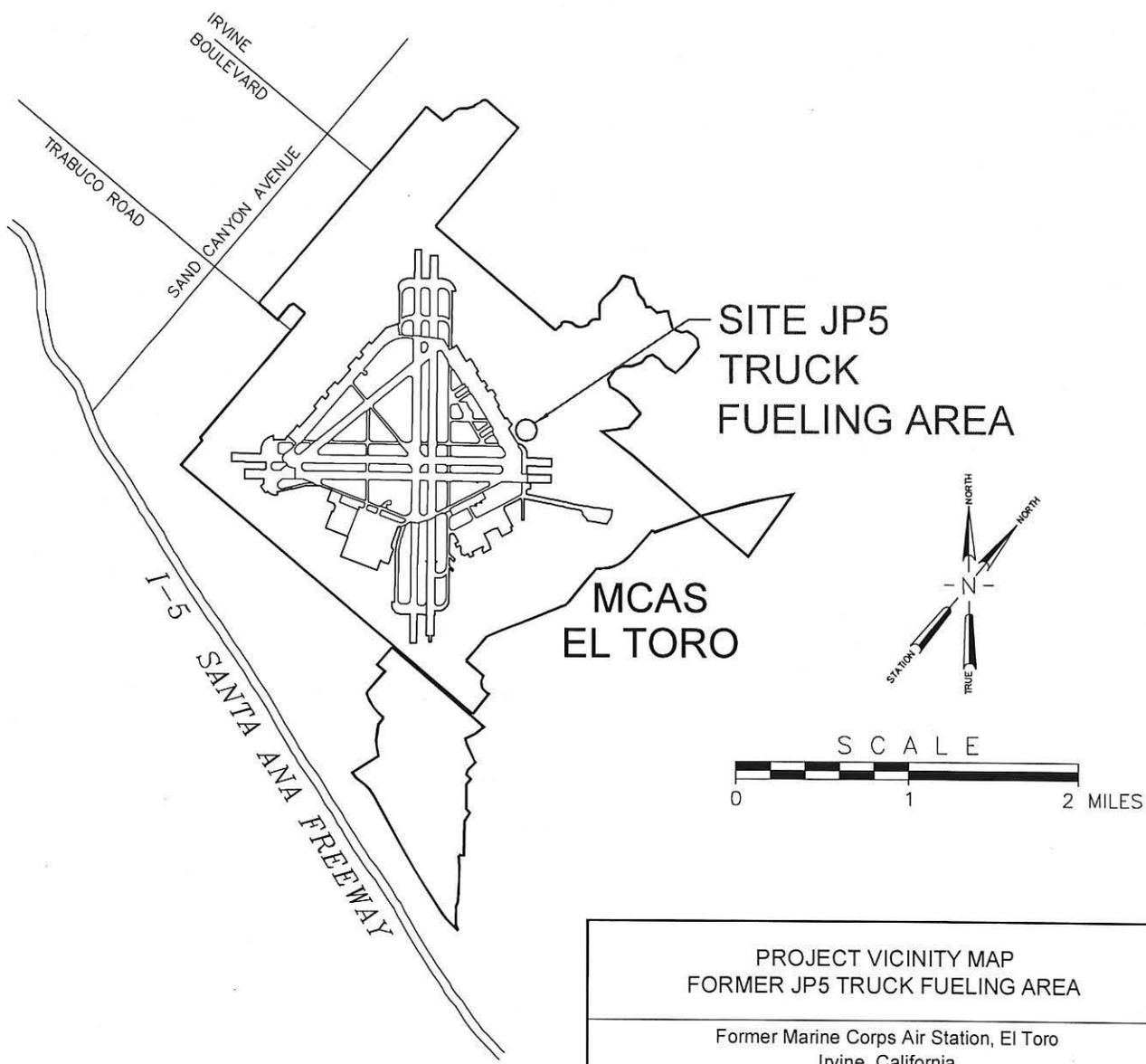
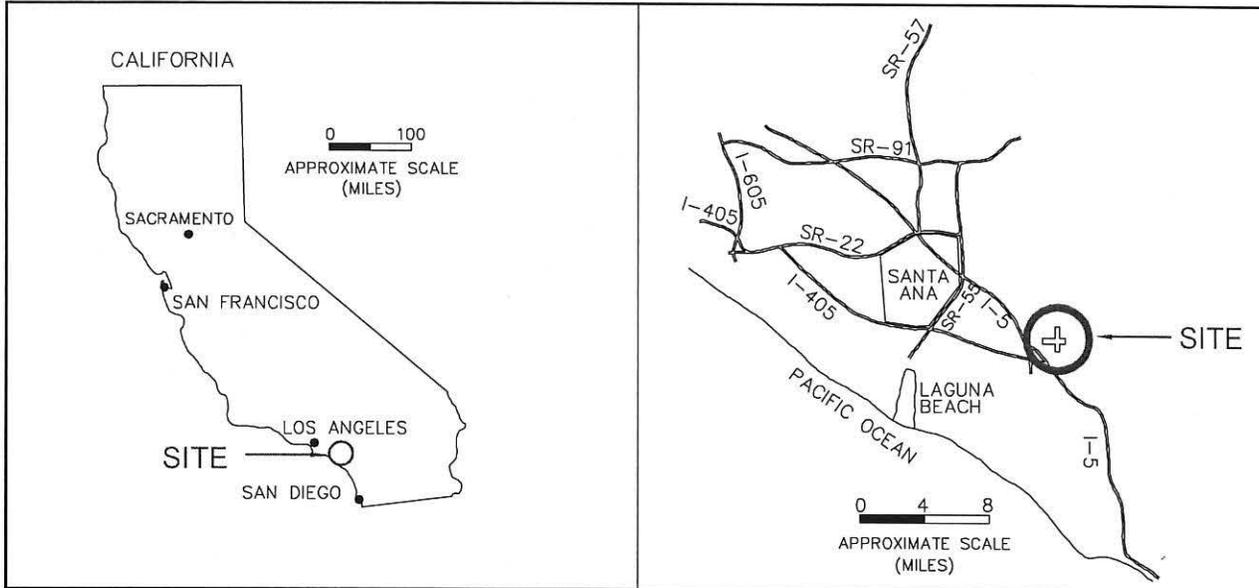
DOES COMPLETED CORRECTIVE ACTION PROTECT <i>EXISTING</i> BENEFICIAL USES PER REGIONAL BOARD BASIN PLAN?		yes	
DOES COMPLETED CORRECTIVE ACTION PROTECT <i>POTENTIAL</i> BENEFICIAL USES PER THE REGIONAL BOARD BASIN PLAN?		yes	
MONITORING WELLS	8	NUMBER DECOMMISSIONED	
LIST ENFORCEMENT ACTIONS TAKEN		none	
LIST ENFORCEMENT ACTIONS RESCINDED		none	

V. Regional Board Representative Data

STAFF	Patricia Hannon	TITLE	Engineering Geologist
SIGNATURE		DATE	
SUPERVISOR	Dr. Xinyu Li, Ph.D, P.G.	TITLE	Senior Engineering Geologist
SIGNATURE		DATE	

VI. Additional Comments, Data etc.

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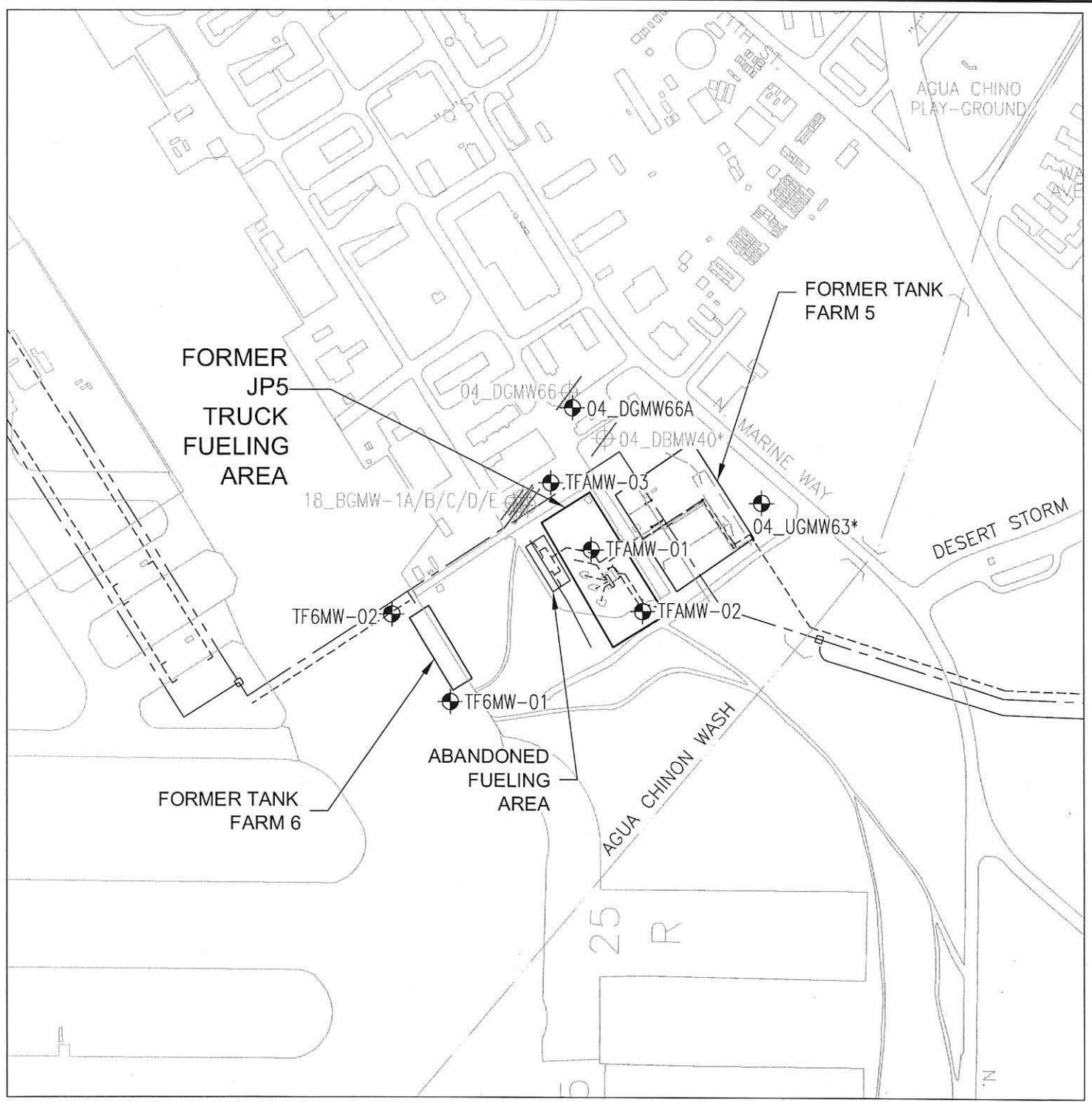
PROJECT VICINITY MAP
FORMER JP5 TRUCK FUELING AREA

Former Marine Corps Air Station, El Toro
Irvine, California

ECS Enviro Compliance Solutions, Inc.
1871 Parkway Loop, Suite A
Tustin, CA 92780

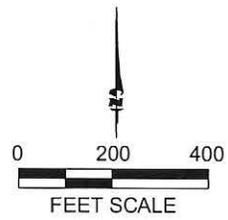
Contract No.: N62473-08-C-0601

FIGURE 1



LEGEND:

-  WELL IN LONG-TERM MONITORING PLAN
-  WELL NO LONGER SAMPLED.
-  04_DGMW65
-  FORMER PRIMARY UNDERGROUND PIPELINE
-  FORMER SECONDARY UNDERGROUND PIPELINE
-  WELL SCREEN IS SUBMERGED
-  SLASH THROUGH WELL SYMBOL INDICATES PROPERLY DESTROYED WELL OR PLANNED FOR DESTRUCTION



	<p>FIGURE 2</p>
	<p>SOUTHWEST DIVISION NAVAL FACILITIES ENGINEERING COMMAND Contract No.: N62473-08-C-0601</p>
<p>WELL LOCATION MAP OCTOBER 2013</p>	
<p>FORMER JP5 TRUCK FUELING AREA FORMER MARINE CORPS AIR STATION, ELTORO IRVINE, CALIFORNIA</p>	

From: "Hannon, Patricia@Waterboards"
<Patricia.Hannon@waterboards.ca.gov>
Date: September 14, 2015 at 4:50:09 PM PDT
To: "Chammas, Guy CTR NAVFAC HQ, BRAC PMO"
<guy.chammas.ctr@navy.mil>
Cc: Dhananjay Rawal <[drawal@ecs-i.com](mailto:drawing@ecs-i.com)>, "Arnold, Content P CIV NAVFAC SW" <content.arnold@navy.mil>
Subject: RE: Request for Extension: Monitoring Well Destruction at Former JP5 TFA, Former MCAS El Toro

Guy,
Okay. Your new due date for submittal of a well destruction report is October 30, 2015.

Patricia Hannon, PG
Engineering Geologist
Land Disposal and DoD Section
California Water Quality Control Board, Santa Ana Region
3737 Main Street, Suite 500
Riverside CA 92501-3348
Direct: (951) 782-4498
Reception desk: (951) 782-4130
patricia.hannon@waterboards.ca.gov
Website: www.waterboards.ca.gov/santaana

-----Original Message-----

From: Chammas, Guy CTR NAVFAC HQ, BRAC PMO
[<mailto:guy.chammas.ctr@navy.mil>]
Sent: Monday, September 14, 2015 2:48 PM
To: Hannon, Patricia@Waterboards
Cc: Dhananjay Rawal; Arnold, Content P CIV NAVFAC SW
Subject: RE: Request for Extension: Monitoring Well Destruction at Former JP5 TFA, Former MCAS El Toro

Hi Patricia,
With the Navy's fiscal year coming to a close, the contracting of the well destruction work for this project has encountered additional delays. Currently, funds have been requested and it is highly likely

that the Navy will have a contract in place by the previously extended deadline of 23 September. Would you please consider providing another extension of at least 2 weeks, but preferably 4 weeks? This would change the deadline to either 8 or 22 October. Thanks for your understanding.

-----Original Message-----

From: Hannon, Patricia@Waterboards
[<mailto:Patricia.Hannon@waterboards.ca.gov>]
Sent: Monday, August 17, 2015 9:20 AM
To: Chammas, Guy CTR NAVFAC HQ, BRAC PMO
Subject: RE: Request for Extension: Monitoring Well Destruction at Former JP5 TFA, Former MCAS El Toro

Hi Guy,

Okay we will grant you a 30-day extension. Your new due date for submittal of a well destruction report for the JP5 Truck Fueling Area is September 23, 2015.

Patricia Hannon, PG
Engineering Geologist
Land Disposal and DoD Section
California Water Quality Control Board, Santa Ana Region
3737 Main Street, Suite 500
Riverside CA 92501-3348
Direct: (951) 782-4498
Reception desk: (951) 782-4130
patricia.hannon@waterboards.ca.gov
Website: www.waterboards.ca.gov/santaana

-----Original Message-----

From: Chammas, Guy CTR NAVFAC HQ, BRAC PMO
[<mailto:guy.chammas.ctr@navy.mil>]
Sent: Monday, August 17, 2015 9:16 AM
To: Hannon, Patricia@Waterboards
Cc: Arnold, Content P CIV NAVFAC SW; Sullivan, James B CIV NAVFACHQ, BRAC PMO; Dhananjay Rawal
Subject: Request for Extension: Monitoring Well Destruction at Former JP5 TFA, Former MCAS El Toro

Good morning Patricia,
I believe Content mentioned that the Navy is finishing up the contracting for the monitoring well destructions at the former JP5

Truck Fueling Area at Former MCAS El Toro as part of the groundwater closure. You had previously requested that the well destructions and accompanying report be completed by 24 August. The Navy will not be able to meet that deadline and would like to request a 30-day extension, making the deadline 23 September. Please let us know if you are amenable to the new deadline to allow for the completion of contracting, mobilization, well destruction, and reporting. Thank you.

Guy Chammas, MS, PG, CPSS, QSD
Contracted Technical Support to Navy BRAC PMO West
33000 Nixie Way, Building 50
San Diego, CA 92147-5101
619.524.5270
guy.chammas.ctr@navy.mil

Dhananjay Rawal

From: Chammas, Guy CTR NAVFAC HQ, BRAC PMO <guy.chammas.ctr@navy.mil>
Sent: Friday, September 25, 2015 3:07 PM
To: Hannon, Patricia@Waterboards
Cc: 'vsalcedo@ecs-i.com'; Dhananjay Rawal
Subject: RE: El Toro MCAS, JP5 Truck Fueling Area, Work Plan for Destruction of GW Monitoring Wells
Signed By: guy.chammas.ctr@navy.mil

Excellent, thanks for the quick turnaround!

-----Original Message-----

From: Hannon, Patricia@Waterboards [<mailto:Patricia.Hannon@waterboards.ca.gov>]
Sent: Friday, September 25, 2015 3:06 PM
To: Chammas, Guy CTR NAVFAC HQ, BRAC PMO
Cc: 'vsalcedo@ecs-i.com'
Subject: El Toro MCAS, JP5 Truck Fueling Area, Work Plan for Destruction of GW Monitoring Wells

Guy,

We have completed our review of the Work Plan for Destruction of Groundwater Monitoring Wells 04_UGMW63, TF6MW-02 and TFAMW-03 at former JP5 Truck Fueling Area, former Marine Corps Air Station El Toro, dated September 2015. We concur with the work plan.

Patricia Hannon, PG

Engineering Geologist

Land Disposal and DoD Section

California Water Quality Control Board, Santa Ana Region

3737 Main Street, Suite 500

Riverside CA 92501-3348

Direct: (951) 782-4498

Reception desk: (951) 782-4130

patricia.hannon@waterboards.ca.gov

Website: www.waterboards.ca.gov/santaana

APPENDIX B

Orange County Health Care Agency
Well Destruction Permit No. 15-09-14

APPLICATION FOR WELL DESTRUCTION PERMIT

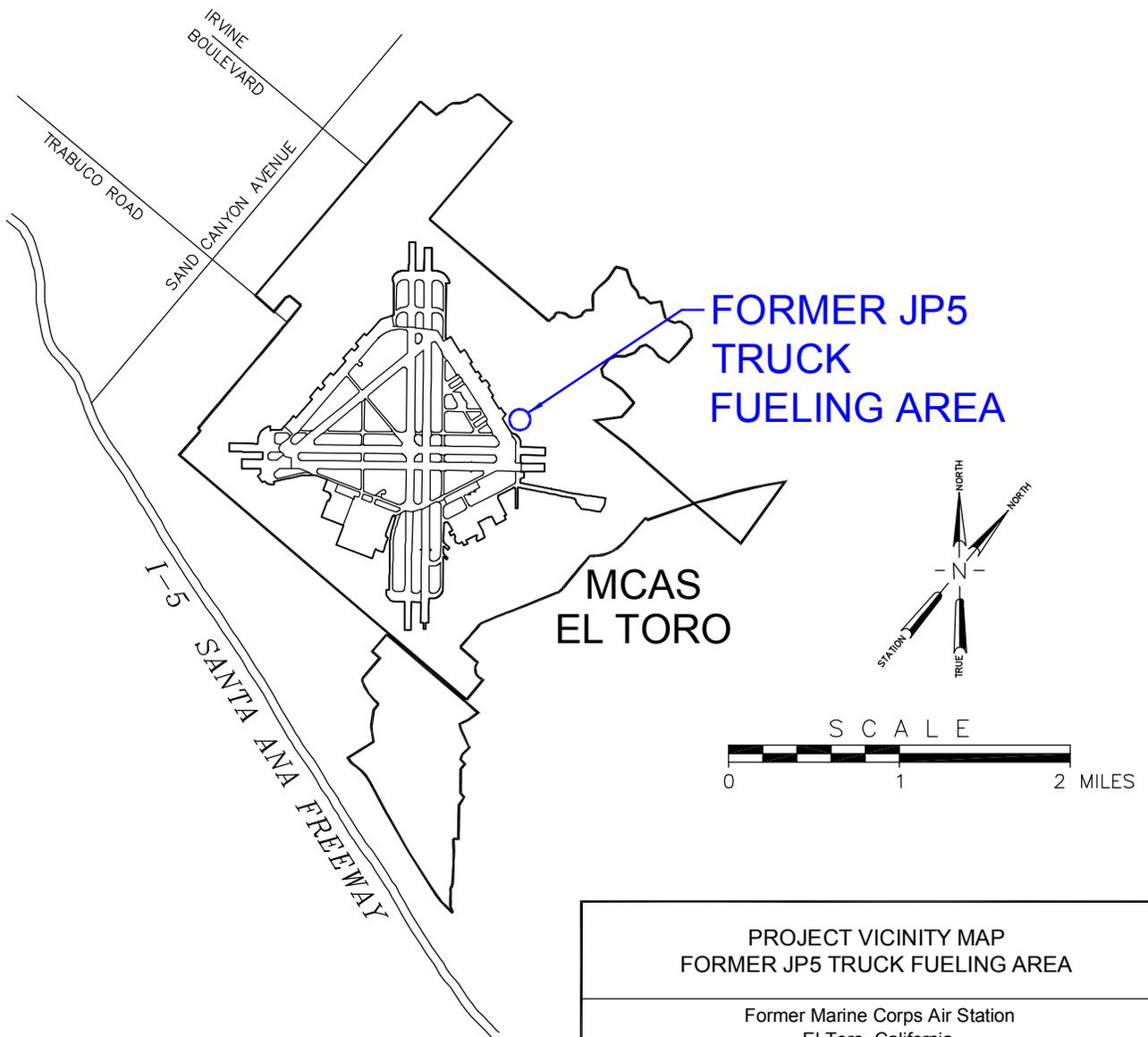
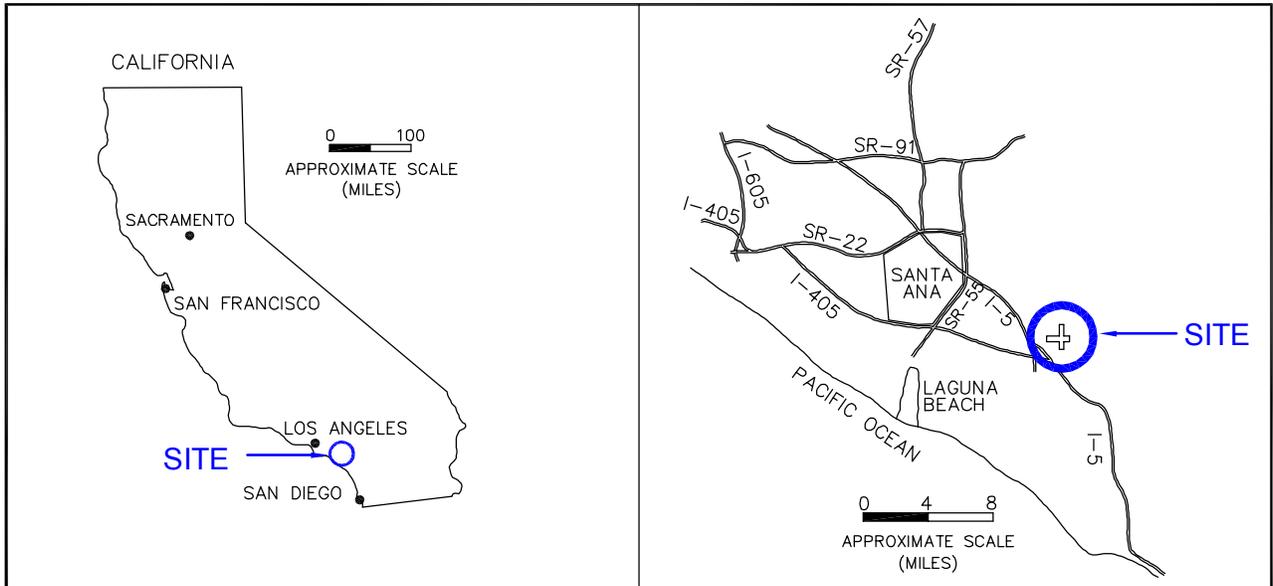
ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION

1241 E. DYER ROAD, SUITE 120
SANTA ANA, CA 92705-5611

(714) 433-6000
FAX: (714) 433-6481

CITY Former MCAS El Toro, Irvine, CA		DATE September 17, 2015	15-09-14
WELL LOCATION (ADDRESS IF AVAILABLE) Former JP-5 Truck Fueling Area			
NAME OF WELL OWNER Dept. of the Navy - NAVFAC SWDIV BRAC		NAME OF CONSULTING FIRM ECS, Inc.	
ADDRESS 33000 Nixie Way, Building 50, Second Floor		BUSINESS ADDRESS 4795 Blue Mountain Drive	
CITY San Diego	ZIP 92147	TELEPHONE (619) 524-4048	
CITY Yorba Linda	ZIP 92887	TELEPHONE (949) 331-4508	
NAME OF DRILLING CO. JDK Drilling, Inc.	C-57 LICENSE NUMBER 887038		
CITY Orange	ZIP 92865	TELEPHONE (714) 279-0131	
SEALING MATERIAL / ESTIMATE AMOUNT OF SEALING MATERIAL NEEDED Cement / bentonite grout		PROPOSED START DATE September 28, 2015 @ 7:00 a.m.	
METHOD OF DESTRUCTION Pressure grout and overdrill upper 5-feet. Cap with cement <i>Remove the well boxes.</i>			
DIAGRAM OF WELL SITE (Use additional sheets and/or attachments) See attached figure Wells proposed to be destroyed: - 04_UGMW63 (TD = 275' bgs) - TF6MW-02 (TD = 230' bgs) - TFAMW-03 (TD = 230' bgs)		I HEREBY AGREE TO COMPLY IN EVERY RESPECT WITH ALL REQUIREMENTS OF THE HEALTH CARE AGENCY AND WITH ALL ORDINANCES AND LAWS OF THE COUNTY OF ORANGE AND OF THE STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, RECONSTRUCTION AND DESTRUCTION. <i>[Signature]</i> 9/21/2015 APPLICANT'S SIGNATURE DATE James B. Sullivan PRINT NAME 619-524-4048 PHONE NUMBER FAX NUMBER	
<input checked="" type="checkbox"/> SITE PLAN ATTACHED			
FOR ACCOUNTING USE ONLY: HSONO. _____ CHECK NO. _____ DATE 09.23.2015 AMOUNT EXEMPT INTL. ETA		DISPOSITION OF PERMIT (DO NOT FILL IN): <input checked="" type="checkbox"/> APPROVED SUBJECT TO THE FOLLOWING CONDITIONS: A. <input checked="" type="checkbox"/> NOTIFY THIS AGENCY AT LEAST 48 HOURS PRIOR TO START. B. <input type="checkbox"/> SUBMIT TO THE AGENCY A WELL DESTRUCTION REPORT. PLEASE REFERENCE PERMIT NUMBER. C. <input checked="" type="checkbox"/> OTHER Notify of any changes. <input type="checkbox"/> DENIED Notify when all work has been completed.	
APPROVAL BY OTHER AGENCIES: JURISDICTION SARWQCB P. Hannon REMARKS Completed case closed (GeoTracker) 0830028701 10605901968		PERMIT ISSUED BY <i>[Signature]</i> 09.23.2015 DATE <i>[Signature]</i> 7144336287 PHONE NUMBER	
AUTHORIZED SIGNATURE _____ DATE _____		PRINT NAME _____ PHONE NUMBER _____	

WHEN SIGNED BY ORANGE COUNTY HEALTH CARE AGENCY REPRESENTATIVE, THIS APPLICATION IS A PERMIT.



**PROJECT VICINITY MAP
FORMER JP5 TRUCK FUELING AREA**

Former Marine Corps Air Station
El Toro, California

	<small>Enviro Compliance Solutions, Inc. 1571 Parkway Loop, Suite A Tustin, CA 92780</small>	<small>Date: OCTOBER 2013 Contract No.: N62473-08-C-0601</small>
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FIGURE 1

APPENDIX C

Groundwater Well Destruction Records



BOREHOLE/WELL DESTRUCTION RECORD							
Borehole/Well Identification No. <u>TF6 MW-02</u>							
Facility: <u>FORMER MCAS ELIORO</u>	Site: <u>FORMER TFA Site</u>	Job No: <u>4405</u>					
Recorded By: <u>Dharamjy Rawal</u>	Date: <u>9/28/15</u>	Checked By:					
Borehole/Well Destruction Permit No: <u>15-09-14</u>		DWR Form 188 Submittal Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>					
Permitting Agency: <u>OCHCA</u>	Contact: <u>Juan Anzola</u>	Phone #: <u>714-433-6287</u>					
Condition of Borehole/Well at Ground Surface Prior to Destruction: <u>Excellent, well lid was secured with bolts.</u>							
Maximum Depth Sounded in Borehole/Well: <u>230</u>		Datum: <u>TOL</u>					
Original Borehole/Wellbore Depth: <u>230</u>							
Downhole Obstruction Indicated? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>							
If yes, describe the method(s) used to assess the nature of the obstruction and/or methods to remove it:							
Depth (ft) to Water Prior to Borehole/Well Destruction: <u>219</u>		Datum: <u>TOL</u>					
Date of water-level measurement: <u>9/28/15</u>							
Any Indications of Borehole/Well Contamination? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>							
If yes, describe field evidence suggesting borehole/well contamination:							
Sealing Material Used for Destruction and Corresponding Depth Intervals:							
	From	To	# Sacks Cement	# Sacks Sand	# Sacks Bentonite	# Sacks Aggregate	# Gal. Water
Neat cement grout			<u>50 lbs</u>		<u>50 lbs</u>	<u>50 lbs</u>	
Sand-cement grout							
Cement/bentonite	<u>5</u>	<u>230</u>	<u>30</u>		<u>2.5</u>		<u>200</u>
Bentonite							
Concrete	<u>0</u>	<u>5</u>	<u>2.5</u>				<u>25</u>
Other (describe):							
Backfill Materials (describe): <u>Cement/bentonite grout</u> From: <u>230</u> To: <u>0</u>							
Comments: <u># OF DRUMS = 111 = 250 gallons.</u>							



BOREHOLE/WELL DESTRUCTION RECORD							
Borehole/Well Identification No. <u>TFAMW-03</u>							
Facility: <u>FORMER MCAS ELTORO</u>	Site: <u>FORMER TPA SITE</u>	Job No: <u>4405</u>					
Recorded By: <u>Dhananjay Rawal</u>	Date: <u>9/28/15</u>	Checked By:					
Borehole/Well Destruction Permit No: <u>15-09-14</u>		DWR Form 188 Submittal Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>					
Permitting Agency: <u>OCHCA</u>	Contact: <u>Juan Arzola</u>	Phone #: <u>714-433-6287</u>					
Condition of Borehole/Well at Ground Surface Prior to Destruction: <u>Good Condition. 3 foot monument and casing in good shape</u>							
Maximum Depth Sounded in Borehole/Well: <u>230</u>		Datum: <u>TOC</u>					
Original Borehole/Wellbore Depth: <u>230</u>							
Downhole Obstruction Indicated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
If yes, describe the method(s) used to assess the nature of the obstruction and/or methods to remove it:							
Depth (ft) to Water Prior to Borehole/Well Destruction: <u>219.90</u>		Datum: <u>TOC</u>					
Date of water-level measurement: <u>9/28/15</u>							
Any Indications of Borehole/Well Contamination? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
If yes, describe field evidence suggesting borehole/well contamination:							
Sealing Material Used for Destruction and Corresponding Depth Intervals:							
	From	To	# Sacks Cement 50lbs	# Sacks Sand	# Sacks Bentonite 50lbs	# Sacks Aggregate	# Gal. Water
Neat cement grout							
Sand-cement grout							
Cement/bentonite	<u>2</u>	<u>230</u>	<u>30</u>		<u>2:5</u>		<u>200</u>
Bentonite	<u>0</u>	<u>2</u>	<u>2</u>				<u>10</u>
Concrete							
Other (describe):							
Backfill Materials (describe): <u>Cement/Bentonite grout</u> From: <u>230</u> To: <u>0</u>							
Comments: <u># OF DRUMS HL = 5 DRUMS = 250 gallons</u>							



BOREHOLE/WELL DESTRUCTION RECORD

Borehole/Well Identification No. 04-UGMW63

Facility: <u>FORMER MCAS EL TORO</u>	Site: <u>FORMER TFA Site</u>	Job No: <u>4405</u>
Recorded By: <u>Dhananjay Rawal</u>	Date: <u>9/28/15</u>	Checked By:
Borehole/Well Destruction Permit No: <u>15-09-14</u>		DWR Form 188 Submittal Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Permitting Agency: <u>OCHCA</u>	Contact: <u>JUAN Anzola</u>	Phone #: <u>714-433-6287</u>

Condition of Borehole/Well at Ground Surface Prior to Destruction:
Good Condition, well Secured Box, 3 Bot Movement and casing good shape

Maximum Depth Sounded in Borehole/Well: 275 Datum: T8C
 Original Borehole/Wellbore Depth: 275
 Downhole Obstruction Indicated? Yes No

If yes, describe the method(s) used to assess the nature of the obstruction and/or methods to remove it:

Depth (ft) to Water Prior to Borehole/Well Destruction: 247.8 Datum: T8C
 Date of water-level measurement: 9/28/15
 Any Indications of Borehole/Well Contamination? Yes No

If yes, describe field evidence suggesting borehole/well contamination:

Sealing Material Used for Destruction and Corresponding Depth Intervals:

	From	To	# Sacks Cement Solbs	# Sacks Sand	# Sacks Bentonite Solbs	# Sacks Aggregate	# Gal. Water
Neat cement grout							
Sand-cement grout							
Cement/bentonite	<u>2</u>	<u>275</u>	<u>36</u>		<u>3.5</u>		<u>300</u>
Bentonite							
Concrete	<u>0</u>	<u>2</u>	<u>2.5</u>				<u>15</u>
Other (describe):							

Backfill Materials (describe): Cement/Bentonite grout From: 275 To: 0

Comments: # OF DRUMS III III = 8 drums = 400 gallons.

APPENDIX D

Photographs



PHOTO 1: Well TF6MW-02 Prior to Well Destruction on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA



PHOTO 2: Well TF6MW-02 Pressure Grouting on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA

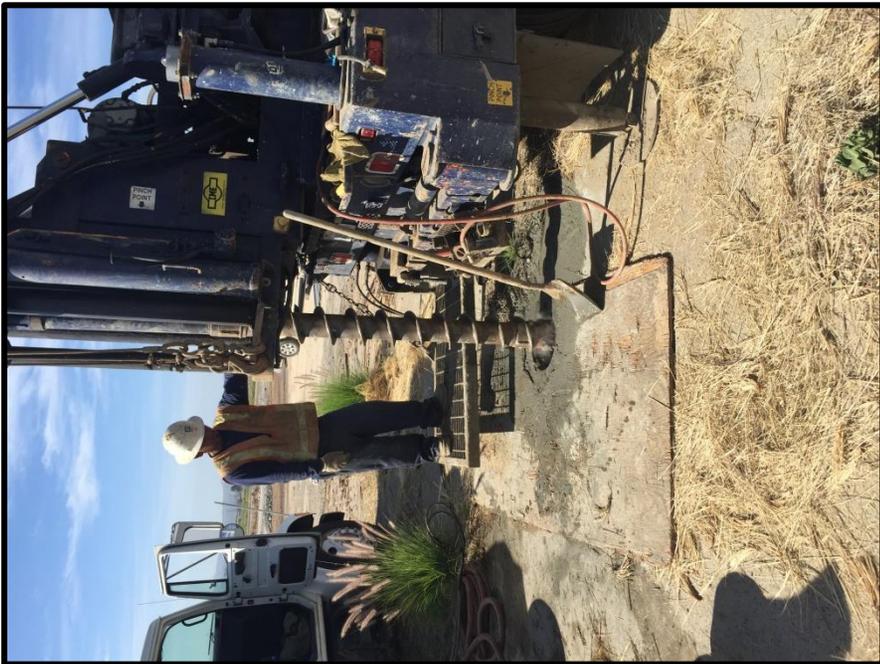


PHOTO 3: Well TF6MW-02 Over drilling Upper 5 feet on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA



PHOTO 4: Well TF6MW-02 After Well Destruction on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA



PHOTO 9: Well 04_UGMW63 Prior to Well Destruction on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA

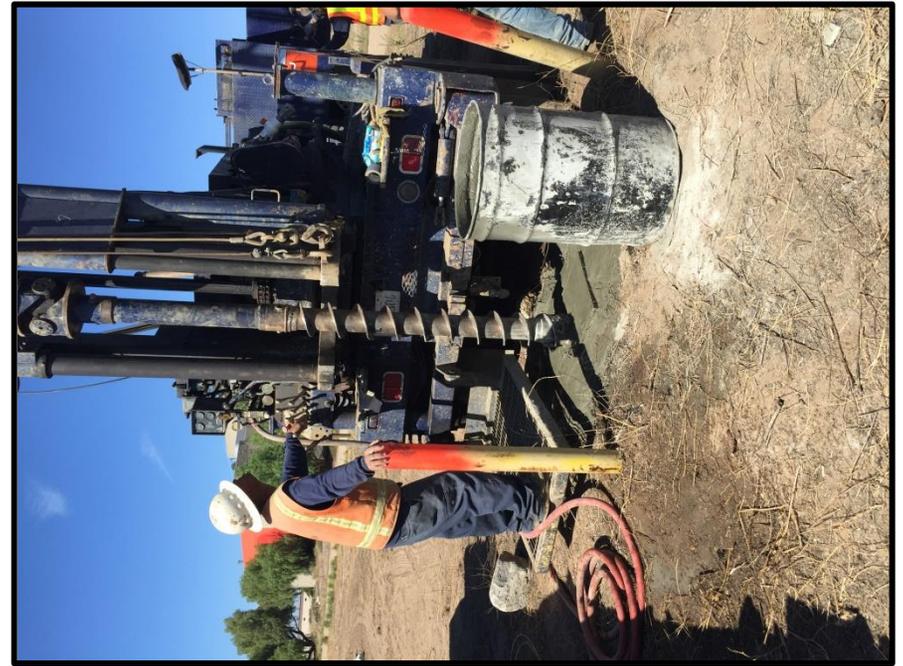


PHOTO 10: Well 04_UGMW63 Pressure Grouting on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA



PHOTO 11: Well 04_UGMW63 After Well Destruction on 9/28/2015
Former JP5 Truck Fueling Area, Former MCAS El Toro, CA