FINAL
GROUNDWATER PERIODIC MONITORING REPORT
FOR
APRIL 2012

(VERSION 1)

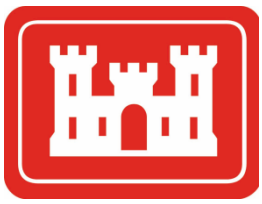
FORT WINGATE DEPOT ACTIVITY
McKinley County, New Mexico

January 2013

Customer Order No. W45XMA20300591

Prepared by:

U.S. Army Corps of Engineers
Albuquerque District



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This report summarizes groundwater sampling and monitoring field activities, chemical analytical results of groundwater samples,

14. ABSTRACT

In April 2008, the U.S. Army Corps of Engineers (USACE) began monitoring groundwater at Fort Wingate Depot Activity as result of the issuance of Resource Conservation and Recovery Act (RCRA) Permit (NM 6213820974). Groundwater samples are collected semi-annually, and groundwater elevation measurements are made quarterly. On a semi-annual basis, activities are reported to the New Mexico Environment Department (NMED) – Hazardous Waste Bureau (HWB). This Groundwater Periodic Monitoring Report was prepared for submission to NMED–HWB and describes January 2012 through April 2012 groundwater monitoring activities and results.

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BIA = Bureau of Indian Affairs
BIA-NR = Bureau of Indian Affairs – Navajo Regional Office
BIA-Zuni = Bureau of Indian Affairs – Zuni Agency
BRACD = U.S. Army Base Realignment and Closure Division
FWDA = Fort Wingate Depot Activity
FWDA-AR = Fort Wingate Depot Activity - Administrative Record
FWDA-BEC = Fort Wingate Depot Activity Base Realignment and Closure – Environmental Coordinator
NMED-HWB = New Mexico Environment Department – Hazardous Waste Bureau
NN = Navajo Nation
POZ = Pueblo of Zuni
USACE SPA = U.S. Army Corps of Engineers – Albuquerque District
USACE SWF = U.S. Army Corps of Engineers – Fort Worth District
USAEC = U.S. Army Environmental Command
USEPA = U.S. Environmental Protection Agency

E.S.1.0 EXECUTIVE SUMMARY

In April 2008, the U.S. Army Corps of Engineers (USACE) began monitoring groundwater at Fort Wingate Depot Activity (FWDA) at the request of the U.S. Department of Defense, U.S. Army Base Realignment and Closure (BRAC) Division. This ongoing project is being conducted under Resource Conservation and Recovery Act (RCRA) Permit (EPA ID No. NM 6213820974) (NMED 2005). Groundwater samples are collected semi-annually, and groundwater elevation measurements are made quarterly. On a semi-annual basis, activities are reported to the New Mexico Environment Department (NMED) – Hazardous Waste Bureau (HWB). This Groundwater Periodic Monitoring Report (GPMR) was prepared for submission to NMED–HWB and describes the April 2012 groundwater monitoring activities and results at FWDA.

E.S.1.1 Purpose

The purpose of this GPMR is to describe the results of groundwater monitoring program executed by the USACE, on behalf of BRAC for the reporting period of April 2012. This report summarizes groundwater sampling and monitoring field activities, chemical analytical results of groundwater samples, and the evaluation of groundwater elevation measurements.

E.S.1.2 Investigation

The depth to water (DTW) in monitoring wells was measured during the month of January and April 2012. Groundwater samples were collected from 82 monitoring wells during the month of April 2012. Groundwater samples were analyzed for constituent groups shown in Table 2-1 of this report. The monitoring wells are located in two major areas of FWDA (Figure 1-1): the Northern Area, and the Open Burn and Open Detonation (OB/OD) Area. Monitoring wells are discussed throughout the report relative to the area in which they are located. Eight new monitoring wells installed in the Northern Area during February 2012 were sampled and water levels were measured.

E.S.1.2.1 Groundwater Measurements

USACE evaluated DTW measurements from monitoring wells located in the Northern Area of the installation to determine the gradient of groundwater in alluvium and bedrock. Additionally, DTW measurements from U.S. Geological Survey (USGS) piezometers along the South Fork of the Rio Puerco were incorporated into the evaluation of the groundwater gradient and flow in the Northern Area. Likewise, OB/OD Area monitoring well DTW measurements were evaluated to determine the gradient of groundwater in the OB/OD Area.

E.S.1.2.2 Groundwater Sampling

Samples were collected from 66 groundwater monitoring wells located in the Northern Area (Figure 2-1). These monitoring wells were installed primarily to characterize releases from the 2,4,6-trinitrotoluene (TNT) Leaching Beds Area, Administration Area [multiple Solid Waste Management Units (SWMUs) and areas of concern (AOCs)]

located in Parcels 6, 7, 11, 21 and 22, Eastern Landfill Area, and the Buildings 542 and 600 Area (TPMC 2008). Groundwater samples collected from these monitoring wells were analyzed for constituents/constituent groups identified in Table 2-1 of this report.

Samples were also collected from 16 existing groundwater monitoring wells located in the OB/OD Area (Figure 2-1). As noted in the 2011 Interim Facility-Wide Groundwater Monitoring Plan (GWMP) (HGS 2011), existing monitoring wells were installed to characterize releases from the Hazardous Waste Management Unit (HWMU) and SWMUs located in Parcel 3 (TPMC 2008). Groundwater samples collected from monitoring wells located in the OB/OD Area were analyzed for constituents/constituent groups identified in Table 2-1 of this report.

E.S.1.3 Results

Northern Area groundwater flow in the alluvium is generally from potentiometric highs in the east, north, and south to a potentiometric low in the Administration Area. From the Administration Area, groundwater locally flows to the west (Alluvial Figures 4-1 and 4-2). This trend is consistent with previous reporting periods. In addition to the alluvial groundwater flow, groundwater is also present in fine grained sandstone beneath the Workshop Area (Bedrock Figures 4-3 and 4-4). Bedrock monitoring well measurements indicate bedrock groundwater flow is generally in a westerly direction in this sandstone**.** Groundwater elevation measurements for the OB/OD Area indicate a general northern gradient that roughly follows the topography.

Figures 4-1 through 4-4 of this report are groundwater elevation contour maps for the Northern Area, and Figure 4-5 is the groundwater elevation contour map for the OB/OD Area. Tables 4-1, 4-2 and 4-4 tabulate DTW measurements and groundwater elevations of monitoring wells and piezometers in the Northern Area, and Table 4-3 tabulates DTW measurements and groundwater elevations of monitoring wells in the OB/OD Area.

Groundwater samples were collected from all monitoring wells that yielded sufficient groundwater volume and/or discharge. Groundwater samples were not collected from those wells that were dry or nearly dry. Nitrate, nitrite, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), 1,3-dinitrobenzene, 2,4-dinitrotoluene, perchlorate, and metals were detected above regulatory health standards in the Northern Area alluvium and bedrock groundwater systems. Other constituents were detected but at concentrations below regulatory health standards. Groundwater samples collected from monitoring wells located in the OB/OD Area contained SVOCs, RDX, 1,3-dinitrobenzene, 2,4,6-trinitrotoluene, and metals above regulatory health standards. Other constituents were detected in OB/OD Area groundwater samples, but these concentrations were below established regulatory health standards.

Chemical results for this reporting period are tabulated in Tables 5-1 through 5-14. Figures 5-1 through 5-4 illustrate constituent concentrations for Northern Area monitoring wells, and Figure 5-5 illustrates constituent concentrations for OB/OD Area

monitoring wells. Appendix E contains the laboratory analytical results, Data Validation Reports (DVR), and Quality Control Summary Reports (QCSR) for all groundwater samples analyzed. A ~~C~~omparison of October 2010, April 2011, October 2011, and April 2012 chemical analytical results is presented in Tables 5-8 through 5-14. This comparison did not indicate significant changes in groundwater chemical concentrations from previous sampling events in either the Northern Area or OB/OD Area.

E.S.1.4 New Findings

Five new monitoring wells and three new background monitoring wells were installed in the Northern Area during February 2012. Chemical analytical results of groundwater samples collected from new monitoring wells provided more information as to the extent of nitrate and RDX in the alluvial groundwater system. The new wells further delineated the nitrate plume on the west side of the TNT leaching beds and contributed to slight changes in the model of the nitrate plume's shape. RDX results contributed to changes in the east and west boundaries, delineating the extent of the explosives plume.

Background monitoring wells were sampled for the first time in April 2012. Nitrate, perchlorate and other chemicals were detected. These wells will be included in an upcoming study to determine background chemical concentrations.

The two sentinel wells were sampled. Nitrate, VOCs, SVOCs, metals, and a pesticide were detected. Toluene, dissolved iron, and dissolved manganese were the only chemicals whose concentrations exceeded regulatory health standards. As of April 2012, there is no evidence of off-site contaminant migration.

Additional information related to chemical results of groundwater samples collected from new monitoring wells is presented in Section 5.0. A discussion of these new findings is presented in Section 5.5, New Findings and Comparative Trends. Figures 5-1 and 5-3 contain concentration contours that were developed based on chemical analytical results from new and existing monitoring wells for Northern Area nitrate and explosives concentrations, respectively. Table 5-1 tabulates the nitrate results and Table 5-2 tabulates the explosives results.

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LIST ACRONYMS

AOC	Areas Of Concern
APPL	Agriculture & Priority Pollutant Laboratories
BIA	Bureau of Indian Affairs
BRAC	Base Realignment and Closure
^{o}C	Degrees Celsius
CFR	Code of Federal Regulations
1,2-DCA	1,2- Dichloroethane
DO	Dissolved Oxygen
DRO	Diesel Range Organics
DTW	Depth To Water
DVR	Data Validation Report
EPA	U.S. Environmental Protection Agency
ft	Foot/Feet
ft-btoc	Feet Below Top Of Casing
ft-msl	Feet Above Mean Sea Level
FWDA	Fort Wingate Depot Activity
GMS	Groundwater Modeling System
GPMR	Groundwater Periodic Monitoring Report
GRO	Gasoline Range Organics
GWMP	Groundwater Monitoring Plan
HWB	Hazardous Waste Bureau
HWMR	New Mexico Hazardous Waste Management Regulations
HWMU	New Mexico Hazardous Waste Management Unit
ID	Identification
IDW	Investigation Derived Waste
LDPE	Low Density Polyethylene
MCL	Maximum Contaminant Level
mg/L	Milligrams Per Liter
MSL	Mean Sea Level
MSSL	Medium Specific Screening Level
N	Nitrogen
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMHWA	New Mexico Hazardous Waste Act
NMOSE	New Mexico Office of the State Engineer
NMSA	New Mexico State Rules Act
NTU	Nephelometric Turbidity Unit
OB/OD	Open Burn/Open Detonation
PCB	Polychlorinated Biphenyls
pg/L	Picograms Per Liter
pH	Scale Used To Measure The Concentration Of Hydrogen Atoms (Acidity) Of A Sample.
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control

QCSR	Quality Control Summary Report
RCRA	Resource Conservation and Recovery Act
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RSL	Regional Screening Level
SU	Standard Unit
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TNT	2,4,6-trinitrotoluene
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
µg/L	Micrograms Per Liter
USACE	United States Army Corps of Engineers
µS/cm	Micro-Siemens Per Centimeter
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WQCC	New Mexico Water Quality Control Commission
ZIST	Zone Isolation Sampling Technology

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1.0 INTRODUCTION

This Groundwater Periodic Monitoring Report (GPMR) for Fort Wingate Depot Activity (FWDA) describes groundwater monitoring activities conducted as part of the FWDA Environmental Restoration Program. The GPMR was prepared by the U.S. Army Corps of Engineers (USACE), Albuquerque District, and reviewed by USACE, Fort Worth District. The GPMR was prepared on behalf of the U.S. Army Base Realignment and Closure (BRAC) Division for submission to the New Mexico Environment Department (NMED) – Hazardous Waste Bureau (HWB) as required by Section V.A of the Resource, Conservation, and Recovery Act (RCRA) Permit (hereinafter referred to as "the Permit") for FWDA. The Permit (EPA ID No. NM 6213820974) was finalized in December 2005 and issued December 1, 2005 (NMED 2005).

FWDA currently occupies approximately 24 square miles (approximately 15,277 acres) of land in McKinley County in northwestern New Mexico. The installation is located approximately seven miles east of Gallup on U.S. Highway 66 and approximately 130 miles west of Albuquerque on Interstate 40 (Figure 1-1) (TPMC 2007). FWDA is almost entirely surrounded by Federally owned or administered lands, including both National Forest System lands and Tribal lands. North and west of FWDA are Navajo Nation Tribal Trust and Allotment lands. East of FWDA is land administered by the Bureau of Indian Affairs (BIA). City of Gallup Red Rock Park, an El Paso Natural Gas fractioning plant and housing area, the Navajo Nation community of Church Rock, and transportation corridors for Interstate 40, U.S. Highway 66 and the Burlington Northern Santa Fe Railway, are located north of the installation (TPMC 2006). The town of Fort Wingate is located to the east of FWDA on BIA administered land and was the original Fort Wingate headquarters site (TPMC 2006). Cibola National Forest borders the south and southeast of the installation and is mostly undeveloped forestlands (TPMC 2006).

FWDA is now an inactive U.S. Army depot whose former mission was to receive, store, ship and dispose of obsolete/deteriorated explosives and military munitions (TPMC 2007). Facilities at FWDA were used to operate a reserve storage activity providing for the care, preservation, and minor maintenance of assigned commodities, primarily conventional military munitions (TPMC 2006). The active mission of FWDA ceased and the installation closed in January 1993 as a result of the Defense Authorization Amendments and BRAC Act of 1988.

2.0 SCOPE OF SERVICES

This section summarizes the scope of activities conducted for the April 2012 sampling event. USACE measured and recorded groundwater elevations and collected groundwater samples from monitoring wells in accordance with the Interim Facility-Wide Groundwater Monitoring Plan (GWMP), as revised in 2011 (TPMC 2008; NMED 2010; HGS 2011).

2.1 GROUNDWATER ELEVATIONS

Depth to water (DTW) measurements were taken in January and April of 2012. DTW was measured in 61 monitoring wells and 10 piezometers in January 2012 and 85 monitoring wells and 10 piezometers in April 2012. Monitoring well and piezometer locations are shown in Figure 2-1. The DTW was measured from the top of casing (TOC) of each monitoring well and piezometer by lowering the tape measure of a Solinst™ water level meter into the monitoring well or piezometer casing down to the top of groundwater. Refer to Appendix A for water level measuring equipment specifications. Measurements from the TOC surveyed reference mark were then recorded to the nearest 0.01 feet (ft) in field books. Appendix B contains copies of field books. To calculate the elevation of groundwater from mean sea level (MSL), static water level measurements were subtracted from the TOC surveyed reference mark elevation. Section 4 of this GPMR contains groundwater measurement details and the interpretation of groundwater flow and gradient.

2.2 GROUNDWATER SAMPLING

Groundwater samples were collected from 82 monitoring wells in April 2012. Table 2-1 summarizes sampling plan requirements based on the 2011 revised GWMP. Section 5 contains a description of sampling activities, chemical analytical results, and interpretation of chemical data. Variances or deviations from the revised GWMP requirements are discussed in Section 5.6.

Samples were collected from monitoring wells using several sampling techniques. Groundwater was sampled by low-flow sampling technique, low-flow sampling with zone isolation sampling technology (ZIST), pumping or bailing monitoring wells dry, or by removing three times the volume of water in the casing and annular space with pumps or bailers. Appendix A4 through A8 contain specifications and information related to dedicated pumps, reusable 12-volt pumps and disposable hand bailers. Monitoring wells having low-flow pumps, and low-flow pumps with ZIST assemblies were low-flow purged in accordance with the GWMP and in accordance with the NMED position paper *Use of Low-Flow and Other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring*. The NMED position paper, *Use of Low-Flow and Other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring (NMED 2001)*, is presented in Appendix C.

During the low-flow purge cycle, samplers monitored purge water quality parameters and recorded: dissolved oxygen (DO) in milligrams per liter (mg/L), turbidity in nephelometric turbidity units (NTU), conductivity in micro-Siemens per centimeter

(µS/cm), pH in standard units (SU), and temperature in degrees Celsius (°C). Purge water was monitored until parameters stabilized within the following specifications over three recording intervals: turbidity (±10%), DO (±10%), conductance (±10%), temperature (±10%), and pH (±0.5 unit). These parameters are in accordance with the GWMP (HSG 2011). Groundwater parameters, except for turbidity, were measured using a transparent flow-through cell attached to the water-quality meter. Refer to Appendix A for equipment specifications, and operating procedures. Turbidity was measured using a separate, hand-held meter. Parameter measurements were recorded on well sampling data forms. Table 2-2 tabulates April 2012 water quality parameter measurements recorded during the purging process. Appendix D contains copies of well sampling data forms.

Several wells could not be sampled using low-flow purging techniques due to extremely limited formation discharge rates. These monitoring wells were purged and sampled with dedicated Bennett pumps, a 12-volt-battery pump, or disposable bailers. Samplers collected groundwater samples from these wells after three volumes of water standing in the well casing and annular space were removed, or, if the monitoring well emptied before three volumes were removed, samples were collected the following day, or later, when a volume of formation water adequate for sampling had refilled the well casing.

At least three sets of groundwater quality parameters were recorded for each monitoring well that was pumped or hand-bailed. For hand-bailed monitoring wells, groundwater was poured from the bailer directly into a graduated beaker, and parameters were measured with hand-held meters and recorded on well sampling data forms. When pumps were used, the graduated beaker was filled via the discharge tube of the pump and parameters were measured in the graduated beaker.

After the purging process, primary groundwater samples were collected for all wells. Groundwater samples were collected in their respective bottles, preserved as specified in the GWMP, placed in a cooler, and shipped overnight to RTI Laboratories at the end of each day. When laboratory groundwater sample chemical results were received, USACE submitted the results to Laboratory Data Consultants, Inc. for independent validation. Validated data were then compared to applicable regulatory requirements or health standards.

USACE collected QA and QC groundwater samples from approximately 10% of the total samples collected. QC samples were submitted to the primary laboratory as blind duplicates with fictitious monitoring well identifications. Blind duplicate groundwater samples were collected from eight on-site monitoring wells. An additional ninth duplicate sample was also collected, but from an off-site well. The results of the off-site well sample were reported in a separate report *Off-Site Wells Groundwater Periodic Monitoring Report for April 2012 (Version 1)*, but are included in the overall QA/QC program. The eight on-site QA/QC samples were collected from the following wells:

- TMW11 with QC identification FW01

- MW22D with QC identification FW02
- CMW18 with QC identification FW03
- TMW13 with QC identification FW04
- TMW15 with QC identification FW05
- TMW48 with QC identification FW07
- TMW30 with QC identification FW08
- TMW36 with QC identification FW09

QA triplicate groundwater samples were collected from the same monitoring wells as the QC blind duplicate samples and shipped to third party Laboratory. The field sample identification for QA triplicate samples has the same corresponding field sample identification number used to identify primary samples submitted to RTI Laboratories. Appendix E contains additional information on the QA/QC program.

Primary and QC blind duplicate samples were sent to RTI Laboratories in Livonia, Michigan, for analysis. QA triplicate samples were shipped to Agriculture & Priority Pollutants Laboratories (APPL) in Clovis, California. Primary, QC, and QA samples were shipped to the appropriate laboratory via Federal Express overnight delivery.

Investigative Derived Waste (IDW), such as purge water and decontamination fluids were handled in accordance with the GWMP (HGS 2011). USACE placed purge water in an evaporation tank. During monitoring well purging, water discharged from each monitoring well was temporarily placed in five-gallon buckets and sealed. At the end of each day, purge water was transported in these five-gallon buckets and poured into the evaporation tank. All decontamination fluid was poured into the evaporation tank. All solid waste, such as used non-decontaminated disposable sampling equipment and personal protective equipment (PPE), general refuse, and decontaminated sampling equipment/PPE, was placed in FWDA refuse containers. No hazardous waste was generated during the sampling event. All waste was disposed of in accordance with FWDA and/or State rules and regulations.

3.0 REGULATORY CRITERIA

On December 1, 2005, NMED issued a RCRA Permit (EPA ID No. NM 6213820974) to the United States Department of the Army (Permittee), the owner and operator of FWDA located in McKinley County, New Mexico. The Permit established the general and specific standards and requirements for these activities pursuant to the New Mexico Hazardous Waste Act (NMHWA), as amended; New Mexico State Rules Act (NMSA) 1978, §§ 74 -4-1 *et seq.*; and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 New Mexico Administrative Code (NMAC) (NMED 2005).

As required by Section V.A of the Permit, the Army developed and implemented the groundwater monitoring program. A GWMP was prepared in consultation with the Pueblo of Zuni and the Navajo Nation according to provisions of the Permit, Section VIII.B.1 [(20.4.1.500 NMAC, incorporating 40 Code of Federal Regulations (CFR) 264.101)] (TPMC 2008). NMED approved the initial GWMP in March 2008, which has been revised three times. Revisions were submitted to NMED in 2009, 2010, and 2011. Therefore, all groundwater monitoring, sampling, and reporting activities are conducted in compliance with the Permit, applicable Permit attachments, and the approved GWMP.

Attachment 7 of the Permit provides cleanup levels applicable to the FWDA groundwater monitoring program. Groundwater chemical results are evaluated and compared to these cleanup levels (referred to as regulatory health standards). Therefore, the following documents and regulations are used to determine if the concentration of a particular hazardous constituent exceeds the Permit cleanup level (NMED 2005).

- New Mexico Water Quality Control Commission (WQCC) standards of 20.6.2.4103.A and B NMAC.

- U.S. Environmental Protection Agency (EPA) drinking water maximum contaminant level (MCL) under 40 CFR Parts 141 and 142.

- If both a WQCC standard and an EPA MCL have been established for a contaminant, the lower of the two was used as a criterion.

- If no WQCC standard or EPA MCL has been established for a particular carcinogenic hazardous constituent, the April 2012 version of the EPA regional screening level (RSL) for residential tapwater was used.

- If no WQCC standard or EPA MCL has been established for a particular noncarcinogenic hazardous constituent, the April 2012 version of the EPA RSL for residential tapwater was used.

- Currently, there is no WQCC groundwater standard or MCL for perchlorate; however, perchlorate concentrations were compared to the value noted in the Permit, 6 micrograms per liter (µg/L).

The Permit, Section V.A.2, requires the Army to submit periodic monitoring reports within 60 days of receipt of groundwater chemical analytical results in a format consistent with the NMED *General Reporting Requirements for Routine Groundwater Monitoring at RCRA Sites* (NMED 2003). Therefore, results and activities conducted are presented in the format recommended by this guidance document.

4.0 GROUNDWATER ELEVATION

This section summarizes static water level measurements and the evaluation of groundwater flow and gradient. Static water levels were measured at monitoring wells and USGS piezometers. These measurements were used to determine the gradient and flow of groundwater in the Northern Area alluvium, Northern Area bedrock, and the OB/OD Area.

4.1 NORTHERN AREA GROUNDWATER ELEVATIONS

Two groundwater systems are monitored in the Northern Area, one in alluvium and the other in bedrock. Table 4-1 contains tabulated elevation data for wells screened in the alluvial system and Table 4-2 contains tabulated elevation data for wells screened in the bedrock system. Additionally, U.S. Geological Survey (USGS) piezometer elevation measurements are tabulated in Table 4-4. Figures 4-1 through 4-4 present Northern Area groundwater elevation contour maps. Groundwater elevation contours presented in these figures were developed with the Groundwater Modeling System (GMS) software, Version 6.5.

4.1.1 Northern Area Alluvial Groundwater System

Groundwater elevation data from monitoring wells screened in the alluvium and the USGS piezometers, also screened in alluvium, were used to construct groundwater elevation contour maps (Figures 4-1 and 4-2). Groundwater in the alluvial system locally flows from potentiometric highs in the north and south to a potentiometric low in the Administration Area. A groundwater mound was observed in the center of the Administration Area, which may be caused by a leaking water storage cistern. This mounding effect has been documented previous reports and does not appear to influence the general flow of groundwater. From the Administration Area, groundwater locally flows to the west. This trend is consistent with previous reporting periods. The general groundwater gradient in the alluvium is 0.01 ft/ft, although, it is steeper to the south.

In February 2012, background monitoring wells BGMW01, BGMW02, and BGMW03 were installed in the Northern Area alluvial groundwater system along with wells TMW43, TMW44, TMW45, TMW46, and TMW47, see Appendix F for drilling logs and completion diagrams. A borehole for BGMW04 was drilled. However, BGMW04 was dry, thus the borehole was abandoned and the well was not installed. The groundwater elevations measured at the eight newly installed wells had no significant effect on the shape of the groundwater elevation contours in the Northern Area alluvial groundwater system.

4.1.2 Northern Area Bedrock Groundwater System

Groundwater connectivity in the sandstone-bedrock is not completely understood in the Northern Area, but connectivity is assumed given the relatively smooth potentiometric surface and observed migration of perchlorate found in bedrock monitoring wells. However, the static water levels measured in TMW02 do not correspond with other measured static water levels found in the alluvial or sandstone-bedrock monitoring wells in this area of FWDA. Static water levels measured in TMW02 are 8 to 25 feet different

than that of other nearby sandstone-bedrock monitoring wells. It is because of this difference in static water level measurements that TMW02 was not included in the contour interpolations for Figures 4-3 through 4-4. TMW02 is thought to be constructed in a locally discontinuous sandstone that is stratigraphically higher than the sandstone containing the perchlorate plume.

Figures 4-3 and 4-4 are sandstone-bedrock groundwater elevation contour maps for January and April of 2012. Bedrock groundwater generally flows west. This is a common trend noted in previous reporting periods. The general groundwater elevation gradient in the bedrock is 0.006 ft/ft.

4.2 OB/OD AREA GROUNDWATER ELEVATIONS

Table 4-3 tabulates OB/OD Area groundwater elevation data. Figure 4-5 is a groundwater elevation contour map for April of 2012. Groundwater elevations in the OB/OD area were not measured in January, since snow cover in the area prevented safe entry due to unexploded ordnance. USACE also developed groundwater elevation contours for the OB/OD Area using GMS software, Version 6.5. Groundwater flows in a northerly direction, approximately following the surface topography. This is a general trend noted in previous reporting periods. The general groundwater gradient in the OB/OD area is 0.03 ft/ft.

Monitoring wells KMW09, KMW10, KMW11, KMW12, and KMW13 are screened in the Cretaceous or Jurassic formations associated with the Hogback (PMC 1999). Bedding planes of these formations dip steeply, between 42° and 64°, to the west and contain mudstone and claystone beds (the Mancos Shale), which potentially prevents the horizontal flow of groundwater (NMT 2003). USACE did not include static water level measurements from KMW09, KMW10, KMW11, or KMW12 in the evaluation of groundwater movement in the OB/OD Area. KMW13 is a dry well.

Groundwater contours in Figure 4-5 are based only on the static water levels measured in monitoring wells CMW02, CMW04, CMW07, CMW10, CMW14, CMW17, CMW19, CMW22, CMW23, CMW24, and CMW25. USACE assumes that these monitoring wells are screened in one of two units, either the Painted Desert or the Sonsela Members of the Triassic Petrified Forest Formation (PMC 1999). Geologic descriptions provided in well logs for these monitoring wells supports this assumption.

5.0 GROUNDWATER CHEMICAL ANALYTICAL DATA RESULTS

Sampling crews mobilized in April 2012 to the FWDA facility to collect groundwater samples in accordance with the 2011 GWMP. Groundwater samples were collected from 82 monitoring wells, which included collecting samples from eight new monitoring wells installed during February of 2012 in the Northern Area. New monitoring wells sampled were BGMW01, BGMW02, BGMW03, TMW43, TMW44, TMW45, TMW46, and TMW47. Tables 5-1 through 5-7 present chemical analytical results of groundwater samples for April 2012. Tables 5-8 through 5-14 compare the results of the four most recent sampling events, providing a 2-year comparative summary. Primary samples from October 2010 were analyzed by ANA-Lab Corp. Refer to Appendix E for the Quality Control Summary Report (QCSR). The following is a summary of the findings related to chemical analytical results for this reporting period.

5.1 NORTHERN AREA CHEMICAL ANALYTICAL RESULTS

The following paragraphs summarize chemical constituents detected in Northern Area groundwater samples collected in April 2012. Wells beginning with EMW, FW, MW, SMW, and TMW are located in the Northern Area of FWDA. Sampling results from the sentinel wells (MW23 and MW24) and the background monitoring wells (BGMW01, BGMW02, and BGMW03) are discussed in Section 5.3 and 5.4 respectively.

Because TMW02 is thought to be screened in a discontinuous sandstone, constituent concentrations detected in groundwater samples from this location were not used in the interpolation of concentration contours. As with groundwater elevation measurements, TMW02 sample results do not correlate with chemical analytical results reported in groundwater samples from nearby monitoring wells.

5.1.1 Nitrate and Nitrite

Tables 5-1 and 5-8 tabulate nitrate and nitrite results. Figure 5-1 is the isoconcentration map for nitrate in alluvium. Figure 5-2 shows nitrate and nitrite results for each bedrock monitoring well. For both nitrate and nitrite, the MCL is the applicable regulatory health standard. MCLs for nitrate and nitrite are 10.0 mg/L and 1.0 mg/L, respectively.

Nitrate concentrations above the MCL were detected in groundwater samples collected from monitoring wells MW20, MW22D, MW22S, TMW02, TMW03, TMW06, TMW22, TMW23, TMW30, TMW31D, TMW34, TMW35, TMW40S, TMW44, TMW46, TMW47, TMW48. The highest nitrate concentration detected was 150 mg/L from the groundwater sample collected from monitoring well TMW03.

Nitrite was detected above the MCL of 1.0 mg/L in samples collected from monitoring wells MW20 and TMW40S. The concentrations of MW20 and TMW40S were 4.3 mg/L and 1.6 mg/L respectively.

5.1.2 Total Explosives

Tables 5-2 and 5-9 tabulate total explosives results from April 2012. Of the explosive compounds that were analyzed for, hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), 2,4-dinitrotoluene, and 1,3-dinitrobenzene were the only compounds detected above a

regulatory health standard in the Northern Area. Because there are no MCL or WQCC standards for these explosives, RSL values were used for comparison.

Northern Area groundwater samples collected from TMW03, TMW21, TMW23, and TMW43 contained RDX at concentrations of 250 µg/L, 1.0 µg/L, 36 µg/L, and 2.5 µg/L, respectively. The RSL for RDX is 0.61 µg/L. 1,3-dinitrobenzene was detected above the RSL of 1.5 µg/L in the Northern Area groundwater samples collected from MW18D and TMW38 at concentrations of 4.5 µg/L and 1.9 µg/L, respectively. 2,4-dinitrotoluene was also detected above the RSL of 0.2 µg/L in groundwater samples collected from TMW03 at concentrations of 0.40 µg/L.

RDX was the most spatially prevalent explosive compound detected in groundwater samples for this sampling event; therefore, RDX results were used to construct the concentration contours shown in Figure 5-3 to represent the explosives plume in the alluvium groundwater. Other explosive compounds were detected in Northern Area groundwater samples, but at concentrations below applicable regulatory health standards.

5.1.3 Perchlorate

Tables 5-3 and 5-10 tabulate perchlorate results for April 2012. Figure 5-3 shows perchlorate and explosives concentrations in the alluvium with concentration contours for RDX and perchlorate. Figure 5-4 shows concentration contours for perchlorate in bedrock groundwater.

USACE compared perchlorate results to the value noted in the Permit, 6 µg/L. Groundwater samples collected in April from TMW01, TMW02, TMW30, TMW31D&S, TMW32, TMW39D&S, TMW40D&S, TMW48, and TMW49 contained perchlorate above 6 µg/L. The groundwater samples collected from TMW30 and TMW49 contained the highest concentrations at 2570 µg/L each.

5.1.4 Volatile Organic Compounds

Tables 5-4 and 5-11 tabulate volatile organic compounds (VOC) results for April 2012. 1,2-dichloroethane (1,2-DCA) was detected above the regulatory health standards in three wells in the Northern Area. Groundwater samples collected from MW18D, MW20, and TMW33 contained 1,2–DCA above the MCL of 5.0 µg/L with concentrations of 110 µg/L, 9.0 µg/L, and 42 µg/L, respectively.

Other VOCs were detected in Northern Area groundwater samples, but at concentrations below applicable regulatory health standards. No isoconcentration map was developed for VOCs; however, Figure 5-5 shows all VOCs detected at each monitoring well sampled.

5.1.5 Semi-Volatile Organic Compounds

Tables 5-5 and 5-12 tabulate semi-volatile organic compounds (SVOCs) results. In the

Northern Area, 2,4-dinitrotoluene and bis(2-ethylhexyl)phthalate were detected above applicable regulatory health standards in April 2012. 2,4-dinitrotoluene was detected above the RSL of 0.2 µg/L in TMW03 and TMW04 at concentrations of 0.32 µg/L and 0.62 µg/L, respectively. Bis(2-ethylhexyl)phthalate was detected above the MCL of 6 µg/L in TMW19 at a concentration of 13 µg/L.

Other SVOCs were detected in Northern Area groundwater samples but at concentrations below applicable regulatory health standards. An isoconcentration map could not be constructed for SVOCs because there was no pattern associated with constituent concentrations; however, Figure 5-5 shows the concentrations of the SVOC detected at each sampled monitoring well.

5.1.6 Diesel and Gasoline Range Organics

No diesel range organics (DRO) or gasoline range organics (GRO) constituents were detected in groundwater samples collected in April 2012.

5.1.7 Total and Dissolved Metals, Including Mercury

Because metals and mercury are naturally occurring, it is difficult to determine if laboratory results represent natural conditions or anthropogenic impacts; therefore, the results presented in Table 5-6 are values only for those metals that exceed applicable regulatory health standards. Table 5-6 shows both dissolved and total metals, including mercury. Appendix E presents results for all metals and mercury with detectable concentrations. In the future, metals results will be compared to a background value after completion of an upcoming background study.

5.1.8 Pesticides

Tables 5-7 and 5-14 tabulate pesticide compounds results, and Figure 5-5 shows results of pesticide compounds at each monitoring well in April 2012. No pesticide compound was detected above a regulatory health standard. Methoxychlor and p, p'-DDE were detected in Northern Area groundwater samples, but at concentrations below their regulatory health standards. Endrin aldehyde was detected at TMW37 but this compound does not have an applicable regulatory health standard.

5.2 OB/OD AREA SAMPLING RESULTS

OB/OD Area monitoring wells have prefixes KMW and CMW. Groundwater samples collected from these monitoring wells were analyzed for constituents and constituent groups presented in Table 2-1. No isoconcentration maps could be constructed for the OB/OD Area because constituents detected in groundwater samples do not have a pattern that can be interpreted. However, Figure 5-6 shows the results for all detections, except for metals and mercury.

5.2.1 Nitrate and Nitrite

Tables 5-1 and 5-8 tabulate nitrate and nitrite results. While there were detections, no OB/OD Area groundwater sample results exceeded the nitrate or the nitrite MCLs in April 2012.

5.2.2 Total Explosives

Tables 5-2 and 5-9 tabulate groundwater sample results of all detected total explosives compounds. 2,4,6-trinitrotoluene, 1,3-dinitrobenzene, and RDX explosive compounds were detected at concentrations above a regulatory health standard in the OB/OD Area.

1,3-dinitrobenzene was detected above the RSL of 1.5 µg/L in the OB/OD groundwater samples collected from CMW04, CMW19, CMW24, and KMW09 at concentrations of 4.6 µg/L, 6.3 µg/L, 32 µg/L, and 8.8 µg/L, respectively. 2,4,6-trinitrotoluene was detected in KMW09 at a concentration of 2.5 µg/L. The RSL for 2,4,6-trinitrotoluene is 2.2 µg/L. RDX was detected above the RSL of 0.61 µg/L in CMW18 at a concentration of 58 µg/L.

Other explosive compounds were detected in groundwater samples collected from the OB/OD area but at concentrations below applicable regulatory health standards.

5.2.3 Perchlorate

Tables 5-3 and 5-10 tabulate perchlorate results. Perchlorate was detected in several OB/OD area wells, but no OB/OD Area groundwater samples exceeded the regulatory health standard of 6 µg/L.

5.2.4 Volatile Organic Compounds

Tables 5-4 and 5-11 tabulate VOC results. VOCs were detected in OB/OD area wells. However, no OB/OD Area groundwater samples exceeded a VOC applicable regulatory health standard.

5.2.5 Semi-Volatile Organic Compounds

Tables 5-5 and 5-12 tabulate the SVOCs results. In the OB/OD Area, 2,4-dinitrotoluene and bis(2-ethylhexyl)phthalate were detected above applicable regulatory health standards in April 2012. 2,4-dinitrotoluene was detected above the RSL of 0.2 µg/L in CMW24 with a concentration of 0.28 µg/L. Bis(2-ethylhexyl)phthalate was detected above the MCL of 6 µg/L in CMW10 at a concentration of 8.5 µg/L.

5.2.6 Total and Dissolved Metals, Including Mercury

Refer to Subsection 5.1.7 for total and dissolved metals/mercury discussions.

5.2.7 Pesticides

Tables 5-7 and 5-14 tabulate pesticide results. No OB/OD Area groundwater samples exceeded applicable pesticide compound regulatory health standards. Alpha-chlordane was detected in CMW24, but this compound does not have a regulatory health standard.

5.3 SENTINEL WELL SAMPLING RESULTS

The following paragraphs summarize chemical constituents detected in groundwater

samples collected from Sentinel Wells, MW23 and MW24.

5.3.1 Nitrate and Nitrite

Tables 5-1 and 5-8 tabulate nitrate and nitrite results. Figure 5-1 is the isoconcentration map for nitrate in alluvium and also shows nitrite results. Nitrate was detected in MW23 at a concentration of 0.42 mg/L, well below the MCL of 10 mg/L. Nitrite was not detected in either sentinel well.

5.3.2 Total Explosives

Tables 5-2 and 5-9 and Figure 5-3 show total explosives results from April 2012. No explosive compounds were detected in either sentinel well.

5.3.3 Perchlorate

Tables 5-3 and 5-10 and Figure 5-3 show perchlorate results from April 2012. No perchlorate was detected in either sentinel well.

5.3.4 Volatile Organic Compounds

Tables 5-4 and 5-11 and Figure 5-5 show VOCs results from April 2012. The groundwater samples from MW23 and MW24 were found to have a toluene concentration of 920 µg/L and 75 µg/L, respectively. The applicable regulatory health standard for toluene is the WQCC which is set at 750 µg/L. See Section 5.6.3 for a discussion of the toluene results.

5.3.5 Semi-Volatile Organic Compounds

Tables 5-5 and 5-12 and Figure 5-5 show SVOC results from April 2012. M,p-cresol was detected in MW23 at a concentration of 2.5 µg/L. There is no applicable regulatory health standard for m,p-cresol. Phenol was detected in MW23 at a concentration of 23 µg/L, which is above the WQCC of 5 µg/L.

5.3.6 Total and Dissolved Metals, Including Mercury

Table 5-6 shows total and dissolved metals results from April 2012. A variety of metals were detected in both MW23 and MW24, however, iron, manganese, and thallium were the only metals detected at concentrations above their regulatory health standards. Dissolved iron and dissolved manganese both exceeded the WQCCs of 1.0 mg/L and 0.2 mg/L, respectively in MW24. In the sample from MW24, the concentration of dissolved iron was 1.8 mg/L and the concentration of dissolved manganese was 0.5 mg/L. Total manganese and iron also exceeded the WQCCs in MW23 and MW24. Total thallium exceeded the MCL of 0.002 mg/L in MW24. These results will be compared to background concentrations after a study of background chemical concentrations in the alluvial aquifer has been performed.

5.3.7 Pesticides

Tables 5-7 and 5-14 and Figure 5-5 show pesticides results from April 2012. The

pesticide p,p'-DDE was detected in the sample collect from MW23 at a concentration of 0.0073 µg/L, which is below the regulatory health standard (the RSL of 0.2 µg/L).

5.4 BACKGROUND WELL SAMPLING RESULTS

The following paragraphs summarize chemical constituents detected in groundwater samples collected from BGMW01, BGMW02, and BGMW03 in April 2012.

5.4.1 Nitrate and Nitrite

Tables 5-1 and 5-8 and Figure 5-1 show nitrate and nitrite results from April 2012. Nitrate was the only analyte found in concentrations above the applicable regulatory health standard in any of the background monitoring wells. Nitrate was detected in BGMW02 at concentrations of 18 mg/L, which is above the MCL of 10 mg/L. BGMW01 and BGMW03 also had nitrate detected in them, but below the MCL. Nitrite was also detected in BGMW03, but below the MCL.

5.4.2 Total Explosives

No explosives compounds were detected in any of the background monitoring wells.

5.4.3 Perchlorate

Tables 5-3 and 5-10 and Figure 5-3 show perchlorate results from April 2012. Perchlorate was detected in BGMW02 and BGMW03 at concentrations of 0.510 µg/L and 0.579 µg/L respectively. These concentrations are below the value of 6 µg/L dictated by the Permit for comparison.

5.4.4 Volatile Organic Compounds

No VOCs were detected in any of the background monitoring wells.

5.4.5 Semi-Volatile Organic Compounds

Tables 5-5 and 5-12 and Figure 5-5 show SVOCs results from April 2012. SVOCs detected were all below applicable regulatory health standards. Butyl benzyl phthalate was detected in BGMW02 and bis(2-chloroisopropyl)ether and bis(2-ethylhexyl)phthalate were detected in BGMW03, but below regulatory health standards.

5.4.6 Total and Dissolved Metals, Including Mercury

Table 5-6 shows total and dissolved metals results from April 2012. Many dissolved and total metals were detected in each background monitoring well. The only metals to exceed the regulatory health standards were total selenium, dissolved selenium, and dissolved inorganic arsenic, all in BGMW02.

5.4.7 Pesticides

No pesticides were detected in any of the background monitoring wells.

5.5 NEW FINDINGS AND COMPARATIVE TRENDS

Eight new monitoring wells were installed in the Northern Area during February of 2012. Specific information related to each of these monitoring wells is located in Appendix F. The new wells provide new insight into background concentrations and the alluvial nitrate and RDX plumes.

5.5.1 Background Monitoring Well Results

BGMW01, BGMW02, and BGMW03 were sampled for the first time in April 2012. The concentration of nitrate, perchlorate, and other chemicals in the background wells are not yet conclusive as only one sampling has been performed. The Environmental Protection Agency (EPA) guidance, "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities," (EPA 2009) recommends at least four observations on a set of background wells be conducted before determining background chemical concentrations. These wells will be included in an upcoming study to determine background chemical concentrations.

5.5.2 Alterations to Model of Alluvial Nitrate Plume

Results from the new wells TMW43, TMW44, TMW45, TMW46, and TMW47 provided new information on alluvial nitrate concentration gradients in the Northern Area, leading to significant alterations to the nitrate plume shown in Figure 5-1.

The elevated nitrate concentration found in TMW46 of 97 mg/L indicates that the nitrate plume is larger than previous data indicated. TMW43 further delineated the nitrate plume on the west side of the TNT leaching beds. TMW44, TMW45, and TMW47 also contributed to slight changes in the geometry of the nitrate plume.

5.5.3 Alterations to Model of Alluvial RDX Plume

Due to RDX results of newly installed monitoring wells TMW43 and TMW44, the RDX plume's east and west boundaries have been modified in Figure 5-3. These two wells were installed to define these areas. The results indicate that the RDX plume is about 650 ft wide and 2000 ft long. Previous reports depicted this plume wider, perpendicular to the center line of the plume.

5.6 FIELD VARIANCES FROM WORK PLAN

The purpose of this section is to describe any variances from the established monitoring plan or sampling program. The following subsections describe variances and discrepancies for this reporting period.

5.6.1 Variation between Sampling Plan and Sample Collection

Eight new monitoring wells were sampled in April 2012: BGMW01, BGMW02, BGMW03, TMW43, TMW44, TMW45, TMW46, and TMW47. The 2011 GWMP does not specifically address collecting samples from these new monitoring wells. The 2011 GWMP also does not specifically address collecting samples from the sentinel wells. USACE collected a standard suite of groundwater samples from each new monitoring

well and from MW23 and MW24 consisting of: nitrate/nitrite, total explosives, perchlorate, VOCs, SVOCS, pesticides, and metals (totals and dissolved).

Due to limited groundwater availability, USACE was only able to collect nitrate/nitrite, VOCs and perchlorate samples from TMW40S.

5.6.2 Laboratory Anomalies: CMW18

Historically, CMW18 has had elevated concentrations of RDX and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX). However, the analytical results from CMW18 in April showed a non-detect for RDX and HMX. The QC blind duplicate for CMW18, identified as FW03, and the QA triplicate for CMW18 both had elevated concentrations for RDX and HMX consistent with historical results. Suspecting a laboratory error, USACE requested the extra sample volume for CMW18 (held by the laboratory) be analyzed. The results from the subsequent analysis had elevated RDX and HMX concentrations that were consistent with previous sampling events and the QA/QC results. However, the extra sample volume was analyzed after the holding time specified in EPA Method 8330B, and thus results are qualified as estimated. USACE concludes that the original results from CMW18's analysis for RDX and HMX are incorrect, most likely due to a labeling error in laboratory preparation or possibly an instrument loading error.

Explosives results from the blind duplicate (FW03) are reported for CMW18 in Tables 5-2 and 5-9 and Figures 5-3 and 5-4. Refer to Appendix G1 for a narrative from the laboratory of the re-test of CMW18 for explosives and for the results of the re-test.

5.6.3 Laboratory Anomalies: MW23 and MW24

The results of samples from MW23 and MW24 showed elevated concentrations of toluene. USACE suspects that the concentration of toluene found in the sentinel wells is abnormally high. USACE will continue to monitor toluene in MW23 and MW24 in future sampling events to determine if the April 2012 toluene detections were accurate.

5.6.4 Laboratory Anomalies: TMW33 Equipment Blank

The results for the equipment blank rinsate for TMW33 (TMW33EB) showed an elevated concentration of nitrate, 12 mg/L. However, the primary sample for TMW33 had no nitrate detected in it.

5.6.5 Laboratory Anomalies: TMW03 and CMW24

The sample bottles for the explosives and SVOCs analyses of TMW03 and CMW24 were accidentally swapped in the laboratory. The results were initially reported under the wrong well identifications (due to the in-laboratory swap). However, the mistake was discovered when USACE compared the results to historical data, and the correct results are given in this report.

The results reported for CMW24 contained RDX at high concentrations similar to those historically seen at TMW03. The results for CMW24 also reported detections of 2,4-dinitrotoluene, 2-amino-4,6-dinitrotoluene, HMX, and 1,3,5-trinitrobenzene, which are

non-detect result for RDX, which CMW24 has historically had. The samples for TMW03 and CMW24 were prepped for explosives analysis at the same time. Suspecting that the samples were swapped in the laboratory, USACE requested that the additional collected sample volume, unused and held by the laboratory, for TMW03 and CMW24 be re-analyzed for explosives.

For SVOCs, the laboratory originally reported that CMW24's sample contained 19 µg/L of 2,4-dinitrophenol and TMW03's sample was non-detect for 2,4-dinitrophenol. Historically, CMW24 has not had detections of 2,4-dinitrophenol while TMW03 has consistently had high concentrations of it. The samples for TMW03 and CMW24 were prepped for SVOCs analysis at the same time. Suspecting that the samples were swapped in the laboratory, USACE requested that the additional collected sample volume, unused and held by the laboratory, for TMW03 and CMW24 be re-analyzed for SVOCs.

The re-analyses were conducted after the allowable hold times and thus the results are qualified. However, the results from these re-analyses more closely matched historical results, confirming USACE suspicions that the bottles were misidentified. USACE concludes that results were inadvertently assigned to the wrong sample ID. See Appendices G2 and G3 for the re-analysis results for CMW24 and TMW03, respectively.

6.0 ANCILLARY ACTIVITIES

Additional activities related to the groundwater monitoring program were executed during this reporting period. They are described in the paragraphs below.

In February 2012, background monitoring wells BGMW01, BGMW02, and BGMW03 were installed in the Northern Area alluvial groundwater system along with wells TMW43, TMW44, TMW45, TMW46, and TMW47, refer to the *2011 and 2012 Monitoring Well Installation and Abandonment Report* (USACE 2012). These efforts were conducted under the *FWDA Monitoring Well Installation and Abandonment Work Plan* (USGS 2011) submitted and approved by NMED in the spring of 2011. A summary of well installation and abandonment work completed in 2011 and 2012 was provided to NMED in December of 2012. The eight new wells and TMW40D were surveyed on April 18, 2012. Appendix F contains information on the installation of these new wells including the control survey (Appendix F1), the geologist logs (Appendix F2), and the construction diagrams (Appendix F3).

The leaking cistern located in the Administration Area was shut off by USACE in August, with the purpose of reducing potential migration and dilution of contaminants. Surrounding monitoring wells will be used to evaluate the effects of shutting off the cistern, to include nitrate concentration and static water levels. There is a possibility that monitoring wells, MW01 and MW02 will become dry due to the drop in the water table.

7.0 GROUNDWATER MONITORING AND SAMPLING ACTIVITY SUMMARY

Monitoring well static water levels measured in January and April 2012 were evaluated to determine groundwater flow and gradient. In the Northern Area of the installation, groundwater in the alluvial system locally flows from potentiometric highs in the north and south to a potentiometric low under the Administration Area. A groundwater mound was observed in the center of the Administration Area, which may be caused by a leaking water storage cistern. This mounding effect has been documented previous reports and does not appear to influence the general flow of groundwater. From the Administration Area, groundwater locally flows to the west. This general flow has been documented in previously submitted groundwater periodic monitoring reports.

In addition to the alluvial groundwater, groundwater is also present in bedrock beneath the Workshop Area, in a fine grained sandstone. Bedrock monitoring well measurements indicates bedrock groundwater flows in a westerly direction**.** Groundwater elevation measurements for the OB/OD Area indicate a general northern flow that roughly follows the topography.

Groundwater samples were collected during April 2012 from 82 monitoring wells. Groundwater samples collected from Northern Area monitoring wells contained nitrate, nitrite, VOCs, SVOCs, explosives, perchlorate, and metals in concentrations above regulatory health standards. Pesticides were also detected but at concentrations below applicable regulatory health standards.

Five new monitoring wells (TMW43, TMW44, TMW45, TMW46, and TMW47) were installed to define the extent of the nitrate and RDX plume in the Northern Area alluvial groundwater system. Chemical analytical results of groundwater samples from these new alluvial monitoring wells contribute to changes in the geometry of the nitrate plume and indicate that the plume is larger than previous data indicated. Additionally, Chemical analytical results also indicate that the RDX plume is narrower than previously assumed.

Three new monitoring wells (BGMW01, BGMW02, and BGMW03) were installed to define background chemical concentrations in alluvial Northern Area groundwater system. A borehole for BGMW04 was drilled. However, BGMW04 was dry, thus the borehole was abandoned and the well was not installed. Samples from background monitoring wells that were installed contained nitrate, dissolved selenium, and dissolved inorganic arsenic in levels above regulatory health standards. They also contained nitrite, perchlorate, SVOCs, and other metals, but at levels below regulatory health standards. Results from these wells will be used in an upcoming study of background chemical concentrations.

In all, there are five distinct plumes in groundwater located in the Northern Area, a nitrate plume in the alluvial groundwater, an RDX plume in the alluvial groundwater, a perchlorate plume in the sandstone-bedrock groundwater, a low concentration 1,2-DCA

plume in the alluvial groundwater in the Administration Area, and a perchlorate plume in the alluvial groundwater. In addition to these plumes, nitrate concentrations above the MCL are found in samples collected from bedrock monitoring wells. This bedrock nitrate appears to be comingled with the perchlorate plume but is not especially definable. USACE has attempted to correlate bedrock nitrate concentrations, but no definitive pattern has been found.

Groundwater samples collected from monitoring wells located in the OB/OD Area contained SVOCs, explosives, and metals above applicable regulatory health standards. Additional chemical constituents were detected in OB/OD Area groundwater samples, but these concentrations were below established regulatory health standards. Because no apparent pattern exists in OB/OD groundwater sample results, no isoconcentration maps were created. However, results are shown in Figure 5-6.

Samples collected from the two Sentinel Wells contained nitrate, VOCs, SVOCs, metals, and a pesticide in April 2012. Toluene, dissolved iron, and dissolved manganese were the only chemicals whose concentrations exceeded regulatory health standards. As of April 2012, there is no evidence of off-site contaminant migration.

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TABLES

SECTION 2 TABLES

Table 2-1: 2011 Revised Monitoring Plan Sampling Requirement

Well ID	Total Explosives Method 8330A	TCL VOC Method 8260C	TCL SVOC Method 8270D	TCL Pesticides Method 8081A	TALTotal Metals Methods 6020B/7470	TAL Diss Metals Methods 6020B/7470	Total Nitrate/Nitrite Method 300.0	Perchlorate Method 6850	TPH DRO Method 8015B	TPH GRO Method 8015B
OB/OD Area Monitoring Wells										
CMW02		X		X	X	X	X	X		
CMW04	X	X			X	X				
CMW07	X	X			X	X		X		
CMW10	X	X	X		X	X	X	X		
CMW14	X	X	X		X	X	X	X		
CMW17	X	X			X	X	X	X		
CMW18	X	X	X		X	X	X	X		
CMW19	X	X	X	X	X	X	X	X		
CMW22		X			X	X	X			
CMW23	X	X			X	X		X		
CMW24	X	X	X	X	X	X	X			
CMW25		X		X	X	X	X			
KMW09	X	X			X	X	X	X		
KMW10		X	X		X	X	X	X		
KMW11	X	X			X	X	X	X		
KMW12	X	X			X	X	X			
Northern Area Monitoring Wells Alluvial Monitoring Wells										
$BGMW01_1$	X	X	X	X	X	X	X	X		
$BGMW02_1$	X	X	X	X	X	X	X	X		
$BGMW03_1$	X	X	X	X	X	X	X	X		
FW31	X		X		X	X	X			
FW35	X	X	X		X	X	X			
MW01	X	X		X	X	X	X	X	X	X
MW02	X	X		X	X	X	X	X	X	X
MW03	X	X			X	X	X	X	X	X
MW18D	X	X			X	X	X	X	X	X
MW20	X	X	X	X	X	X	X	X	X	X
MW22D	X	X	X	X	X	X	X	X	X	X
MW22S	X	X	X	X	X	X	X	X	X	X
$MW23_2$	X	X	X	X	X	X	X	X		
$MW24_2$	X	X	X	X	X	X	X	X		
SMW01	X	X	X		X	X	X	X		
TMW01	X	X			X	X	X	X		
TMW03	X	X	X		X	X	X	X		
TMW04	X	X	X		X	X	X	X		
TMW06	X	X	X		X	X	X			
TMW07	X	X	X		X	X	X			
TMW08		X		X	X	X	X	X		
TMW10	X	X			X	X	X	X		
TMW11	X	X			X	X	X	X		
TMW13		X			X	X	X	X		
TMW15	X	X	X		X	X	X	X		
TMW21	X	X			X	X	X	X		
TMW22	X	X	X		X	X	X	X		
TMW23	X	X		X	X	X	X	X		
TMW24	X	X		X	X	X	X	X		
TMW25	X	X			X	X	X			
TMW26	X	X			X	X	X	X		
TMW27		X			X	X		X		
TMW28		X			X	X				
TMW29	X	X			X	X	X	X		
TMW31S	X	X	X	X	X	X	X	X	X	

Table 2-1: 2011 Revised Monitoring Plan Sampling Requirement

Well ID	Total Explosives Method 8330A	TCL VOC Method 8260C	TCL SVOC Method 8270D	TCL Pesticides Method 8081A	TALTotal Metals Methods 6020B/7470	TAL Diss Metals Methods 6020B/7470	Total Nitrate/Nitrite Method 300.0	Perchlorate Method 6850	TPH DRO Method 8015B	TPH GRO Method 8015B
TMW33		X	X		X	x	x		X	X
TMW34		X			X	X	X	X	X	X
TMW35		X	X		X	X	X		X	X
TMW39S	X	X	X	X	X	X	X	X		
TMW40S	X	X	X	X	X	X	X	X		
TMW41	X	X	X	X	X	X	X	X		
TMW43[1]	X	X	X	X	X	X	X	X		
TMW44[1]	X	X	X	X	X	X	X	X		
TMW45[1]	X	X	X	X	X	X	X	X		
TMW46[1]	X	X	X	X	X	X	X	X		
TMW47[1]	X	X	X	X	X	X		X		
Northern Area Monitoring Wells Monitoring Bedrock Wells										
EMW01	X	X	X	X	X	X		X		
EMW02	X	X	X	X	X	X	X			
EMW03	X	X	X	X	X	X	X			
EMW04		X	X		X	X	X			
TMW02	X	X			X	X	X	X		
TMW14A	X	X	X		X	X	X	X		
TMW16	X	X	X		X	X		X		
TMW17		X			X	X	X	X		
TMW18	X	X	X		X	X	X	X		
TMW19	X	X	X		X	X				
TMW30	X	X	X	X	X	X	X	X	X	
TMW31D	X	X	X	X	X	X	X	X	X	
TMW32	X	X	X	X	X	X	X	X	X	
TMW36	X	X	X	X	X	X	X	X	X	
TMW37	X	X	X	X	X	X	X	X	X	
TMW38	X	X	X	X	X	X	X	X		
TMW39D	X	X	X	X	X	X	X	X		
TMW40D	X	X	X	X	X	X	X	X		
TMW48	X	X	X	X	X	X	X	X		
TMW49	X	X	X	X	X	X	X	X		

VOC: Volatile Organic Compounds
SVOC: Semi-Volatile Organic Compounds
TAL: Target Analyte List
TCL: Target Compound List
TPH: Total Petroleum Hydrocarbons
GRO/DRO: Gasoline Range Organics/Diesel Range Organics
X: Sample To Be Collected

1. New monitoring well installed February 2012
2. New monitoring wells installed Fall 2011

Table 2-2: April 2012 Groundwater Purge Records

Well ID	Casing Dia. (in)	Well TD (ft-btoc)	Screen Length (ft)	Date	Purge Method	Start DTW (ft-btoc)	End DTW (ft-btoc)	Purge Time (min)	Flow Rate (mL/min)	Purge Volume (gals)	pH	Cond. (uS/cm)	Temp. (C)	Turbidity (NTU)	DO (mg/L)
BGMW01*	2.5	34	20	04/25/12	Low flow	18.38	18.71	30	180	1.57	7.57	3560	12.71	0.93	0.48
BGMW02*	2.5	34.2	20	04/25/12	Low flow	20.46	20.56	30	200	1.61	7.55	5440	14.1	2.38	0.12
BGMW03*	2.5	30.9	20	04/21/12	Baiter	15.60	30.23	35	N/A	7	8.15	3140	11.99	1100	4.38
CMW02	2	37.9	10	04/16/12	Low flow	14.41	14.41	45	200	2.67	8.29	730	10.68	2.68	0.94
CMW04	2	137.91	20	04/17/12	Low flow	46.31	46.32	20	200	1.03	8.3	521	12.93	0.00	0.31
CMW07	2	66.6	20	04/19/12	Low flow	42.34	42.07	67	100	1.73	8.21	1520	14.32	0.00	1.04
CMW10	2	73.1	20	04/17/12	Bailed dry	65.27	70	85	N/A	5	11.72	5600	11.86	4.4	4.98
CMW14	2	96.75	10	04/19/12	ZIST, low flow	65.84	67.89	47	30	1	11.87	5840	15.31	8.61	0.04
CMW17	2	54.24	20	04/16/12	12-volt pump	23.68	51	27	N/A	16	8.8	1130	11.80	600.00	1.69
CMW18	2	54.1	20	04/17/12	Low flow	41.9	42.12	22	150	1	7.41	867	13.72	0.00	4.95
CMW19	2	51.3	15	04/19/12	ZIST low flow	26.04	N/A	215	200	3	9.89	1530	12.50	53.35	1.14
CMW22	2	120.23	20	04/17/12	Bailed dry	114.59	120.1	20	N/A	1.75	7.30	N/A	N/A	413.10	N/A
CMW23	2	106.6	20	04/17/12	Bailed dry	97.50	104.25	17	N/A	3	8.34	5450	12.13	161.8	2.89
CMW24	2	262.34	30	04/24/12	Low flow	45.63	50.75	150	75	2.96	8.76	2810	19.00	76.96	0.06
CMW25	2	98.78	25	04/20/12	Low flow ZIST	37.59	37.59	15	100	1.5	8.69	1064	14.99	27.64	0.13
EMW01	2	120.7	15	04/23/12	Low flow	104.09	106.48	12	50	0.3	8.55	8090	19.41	1.09	1.73
EMW02	2	108.4	15	04/23/12	Low flow	46.73	44.57	14	75	0.4	8.18	6790	19.97	0.30	0.92
EMW03	2	92.9	15	04/23/12	Low flow	46.73	37.86	12	40	0.2	11.03	6410	22.41	0.30	1.18
EMW04	2	115	15	04/13/12	Bennett pump	101.4	Dry	10	N/A	8	7.45	1093	13.3	8.34	1.40
FW31	4	52	40	04/17/12	12-volt pump	41.91	43	14	N/A	13	8.27	2285	12.6	74.6	4.05
FW35	4	32.15	20	04/17/12	12-volt pump	22.56	23.23	11	NA	11	7.35	4120	12	54	1.2
KMW09	2	72.9	10	04/18/12	Low flow ZIST	40.72	42.48	65	75	1.29	7.46	352	15.95	0.00	1.37
KMW10	2	171.02	10	04/18/12	Bailed dry	166.81	169.04	35	N/A	4.00	7.09	900	12.86	304.00	4.00
KMW11	2	57.44	20	04/18/12	Low flow	32.71	33.64	40	80	0.85	8.62	1014	12.81	0.1	1.26
KMW12	2	75.49	20	04/17/12	Bennett pump	54.53	72.00	17	N/A	19.00	7.37	4090	11.50	33.60	4.34
MW01	4	54.8	20	04/17/12	Bailed dry	42.11	53.75	21	N/A	4	7.78	3630	14.89	759.3	2.99
MW02	2	49.45	10	04/16/12	Bailed dry	39.01	49.02	35	N/A	2.5	7.05	2430	14.81	638.8	6.72
MW03	2	56.2	10	04/20/12	Low flow	46.1	46.52	25	90	0.57	7.37	5070	14.54	0	2.3
MW18D	2	59.9	10	04/19/12	Low flow	42.93	44.19	30	90	0.71	6.96	8010	17.34	0.97	1.93
MW20	2	59.4	10	04/24/12	Low flow	44.95	45.48	45	100	1.19	6.92	18400	1570	0	1.17
MW22D	2	58.7	10	04/19/12	Low flow	41.68	42.03	35	210	1.94	6.76	5015	15.15	0.65	1.72
MW22S	2	43.54	10	04/16/12	Bailed dry	41.74	43.28	18	N/A	1	7.23	4220	15.91	1100	3.22
MW23**	2.5	134	70	04/25/12	Bennett Pump	14.4	>80	42	N/A	55.6	8.01	1930	13.55	109.3	4.31
MW24**	2.5	68.5	50	04/26/12	Bennett Pump	19	30.8	16	1.25	150	8.41	1307	11.8	119.9	0.76
SMW01	2	52.15	20	04/20/12	Low flow	28.82	30.78	35	150	1.39	7.87	1970	12.58	0.38	2.3
TMW01	2	61.23	15	04/23/12	Low flow	36.96	37.47	50	250	3.31	7.48	2880	13.62	0.94	1.09
TMW02	2	84.09	14	04/24/12	Low flow	55.44	55.97	30	140	1.1	7.95	4420	16.49	0	0.42
TMW03	2	72.06	20	04/25/12	Low flow	56.95	57.13	45	150	1.78	7.73	4320	15.79	0.71	1.2

Table 2-2: April 2012 Groundwater Purge Records

Well ID	Casing Dia. (in)	Well TD (ft-btoc)	Screen Length (ft)	Date	Purge Method	Start DTW (ft-btoc)	End DTW (ft-btoc)	Purge Time (min)	Flow Rate (mL/min)	Purge Volume (gals)	pH	Cond. (uS/cm)	Temp. (C)	Turbidity (NTU)	DO (mg/L)
TMW04	2	72.36	20	04/25/12	Low flow	56.37	57.01	53	130	2.4	7.93	3960	15.44	0.51	0.65
TMW06	2	57.24	10	04/18/12	Low flow	46.98	47.18	45	140	1.66	7.61	3740	17.53	0.01	0.71
TMW07	2	67.37	10	04/18/12	Bailed dry	47.03	64.65	20	N/A	5	7.55	5110	13.13	491.9	3.68
TMW08	2	62.41	30	04/19/12	Low flow	36.58	36.79	40	140	1.48	6.87	1670	13.9	66.08	2.1
TMW10	2	61.8	30	04/24/12	Low flow	37.28	38.9	27	200	2.49	7.42	8880	15.04	0	1.3
TMW11	2	82.68	25	04/20/12	Low flow	66.32	67.23	48	200	2.53	7.68	2160	13.96	1.02	3.67
TMW13	2	73.78	10	04/23/12	Low flow	59.82	59.98	42	100	1.11	7.49	2270	17.24	1.88	1.61
TMW14A	2	112.1	15	04/21/12	ZIST low flow	63.56	63.56	47	60	0.74	8.72	1880	14.95	0.00	1.48
TMW15	2	76.65	15	04/23/12	Low flow	64.00	64.29	33	200	1.74	7.72	2240	15.22	0.77	2.57
TMW16	2	142.2	15	04/19/12	Bennett pump	69.70	138.00	30	N/A	40	8.51	1875	13.2	392.0	3.25
TMW17	2	130.45	15	04/24/12	Low flow	62.18	63.7	25	80	0.55	9.26	1860	14.08	0	0.3
TMW18	2	160.7	10	04/17/12	Bennett pump	136.93	157.00	9	N/A	22	9.55	2890	13.9	58.0	4.85
TMW19	2	187.97	15	04/17/12	Bennet pump	42.30	42.30	48	N/A	55	8.16	2880	15.1	102	0.88
TMW21	2	61.43	10	04/17/12	Low flow	50.63	52.62	21	100	2	7.82	2670	14.67	1.6	0.24
TMW22	2	65.23	10	04/16/12	Bailed dry	48.85	60.42	47	NA	8	8.20	3620	13.42	1100.0	3.81
TMW23	2	59.57	10	04/21/12	Bailed dry	45.65	55.52	16	N/A	5	7.94	3280	12.8	433.20	6.59
TMW24	2	55.41	10	04/23/12	Low flow	38.82	42.15	35	155	1.5	7.77	3860	15	0.49	0.65
TMW25	2	55	10	04/17/12	Low flow	39.04	42.06	27	140	2	7.67	3910	12.87	5.36	0.14
TMW26	2	58.24	10	04/20/12	Low flow	26.36	29.10	34	200	3	7.96	3530	12.92	1.20	0.07
TMW27	2	73.26	10	04/25/12	Low flow	27.71	28.69	37	125	1.22	7.86	1530	14.93	0.00	1.08
TMW28	2	50.3	10	04/21/12	Low flow	19.04	19.08	55	120	1.8	7.24	1520	13.06	0.00	1.23
TMW29	2	61.65	10	04/21/12	Bailed dry	57.12	59.98	10	N/A	0.2	8.24	2500	13.21	257.40	4.93
TMW30	2	46.65	10	04/18/12	12-volt pump	39.71	Dry	17	N/A	15	7.78	2347	13.3	7.99	5.56
TMW31D	2	107.03	30	04/23/12	Low flow	36.34	36.74	40	280	2.96	7.58	2520	13.71	0.00	1.88
TMW31S	2	62.85	10	04/18/12	12-volt pump	36.12	61.00	17	N/A	14	7.46	2960	13.3	763.00	2.90
TMW32	2	139.1	20	04/24/12	Low flow	38.80	39.10	30	154	1.26	8.34	3370	16	0.00	0.42
TMW33	2	60.65	20	04/18/12	12-volt pump	43.46	43.61	14	NA	14	7.48	1100	15.7	150.00	0.34
TMW34	2	60.01	20	04/24/12	Low flow	45.50	38.79	21	180	2	7.08	6110	16.44	6.46	1.17
TMW35	2	57.31	20	04/23/12	Low flow	43.60	43.69	70	120	2.22	7.24	5200	17.88	0.00	0.16
TMW36	2	154.35	20	04/19/12	Bennett pump	26.18	152.00	38	N/A	30	7.80	2970	13.2	12.01	0.55
TMW37	2	110.7	20	04/20/12	Bennett pump	61.25	107.00	15	N/A	33	8.69	2410	13.4	28.50	3.28
TMW38	2	115.02	40	04/20/12	Bennett pump	46.25	51.14	25	170	1.13	8.64	2500	13.69	2.04	1.35
TMW39D	2	102.77	30	04/23/12	Low flow	34.31	34.55	52	250	3.44	7.73	2890	13.42	0.00	0.11
TMW39S	2	55.5	10	04/19/12	12 volt pump	34.90	38.94	12	N/A	8.5	7.70	4210	13.7	869.00	1.94
TMW40D	2	158.13	20	04/23/12	Low flow	31.30	31.38	35	270	2.6	8.17	3180	14.13	0.17	0.31
TMW40S	2	62	10	04/23/12	Bailed	60.35	61.65	20	N/A	2	8.14	3430	13.05	1100.00	4.73
TMW41	2	67.8	10	04/19/12	12-volt pump	40.05	Dry	17	N/A	18	7.98	4280	12.9	62.50	0.83
TMW43*	2.5	79.6	20	04/24/12	Low flow	53.26	53.40	77	130	4.23	7.49	2450	16.12	5.74	0.91

Table 2-2: April 2012 Groundwater Purge Records

Well ID	Casing Dia. (in)	Well TD (ft-btoc)	Screen Length (ft)	Date	Purge Method	Start DTW (ft-btoc)	End DTW (ft-btoc)	Purge Time (min)	Flow Rate (mL/min)	Purge Volume (gals)	pH	Cond. (uS/cm)	Temp. (C)	Turbidity (NTU)	DO (mg/L)
TMW44*	2.5	66.2	20	04/25/12	12 volt pump	52.60	52.72	11	N/A	10.5	7.97	3330	13.4	946.00	2.65
TMW45*	2.5	61.8	20	04/23/12	12 volt pump	47.90	47.90	28	N/A	18	7.72	3890	13.1	793.00	2.72
TMW46*	2.5	60.7	20	04/23/12	12 volt pump	44.40	44.40	14	N/A	14	7.60	5390	13.9	332.00	1.63
TMW47*	2.5	105.6	20	04/25/12	Low flow	46.38	47.93	50	35	0.52	8.48	2320	19.13	3.89	1.26
TMW48	2	93.55	20	04/25/12	Low flow	34.78	34.80	60	450	7.14	7.38	2450	12.74	0.00	3.56
TMW49	2	62.17	20	04/25/12	Low flow	42.94	43.82	31	130	2.4	7.73	2700	13.41	0.11	3.69

Dia.: Diameter
in: Inches
TD: Total Depth
ft: Feet
btoc: Below Top of Casing
DTW: Depth to Water
min: Minutes
mL/min: Milliliters per Minute
gals: Gallons
Cond.: Conductivty
uS/cm: MicroSiemens per Centimeter
Temp. (C): Temperature in Celsius
NTU: Nephelometric Turbidity Units
DO: Dissolved Oxygen
mg/L: Milligrams per Liter
ZIST: Zone Isolation System Technology
N/A: Not Applicable
**: New monitoring well installed February 2012*
***: New monitoring well installed Fall 2011*

SECTION 4 TABLES

Table 4-1: July 2010-April 2012 Northern Area Alluvial Groundwater Elevations

Well ID	TOC ft-msl	22 & 23-Jul-10		5 to 13-Oct-10		19-Jan-11		1-Apr-11		11-Jul-11		10-Oct-11		24-Jan-12		12-Apr-12	
		DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl
BGMW01	6692.68															18.32	6674.36
BGMW02	6691.99															20.42	6671.57
BGMW03	6680.57															15.54	6665.03
FW31	6832.49	41.49	6791.00	41.57	6790.92	41.51	6790.98	41.6	6790.89	41.73	6790.76	41.84	6790.65	41.91	6790.58	41.88	6790.61
FW35	6711.11	20.78	6690.33	*21.29	6689.82	20.58	6690.53	20.75	6690.36	22.3	6688.81	23.15	6687.96	21.45	6689.66	22.39	6688.72
MW01	6685.94	41.99	6643.95	41.97	6643.97	41.79	6644.15	42.16	6643.78	41.76	6644.18	41.89	6644.05	41.98	6643.96	41.91	6644.03
MW02	6685.22	38.38	6646.84	38.48	6646.74	38.52	6646.70	38.62	6646.60	38.63	6646.59	38.75	6646.47	38.94	6646.28	38.98	6646.24
MW03	6689.53	45.98	6643.55	45.93	6643.60	45.71	6643.82	46.12	6643.41	45.88	6643.65	45.88	6643.65	45.89	6643.64	45.86	6643.67
MW18D	6686.32	42.92	6643.40	42.96	6643.36	43.02	6643.30	43.03	6643.29	42.8	6643.52	42.91	6643.41	42.82	6643.50	42.82	6643.50
MW20	6687.67	44.89	6642.78	44.91	6642.76	44.72	6642.95	44.94	6642.73	44.91	6642.76	44.99	6642.68	44.91	6642.76	44.81	6642.86
MW22D	6684.55	41.67	6642.88	41.88	6642.67	41.49	6643.06	41.75	6642.80	41.71	6642.84	41.80	6642.75	41.70	6642.85	41.63	6642.92
MW22S	6684.69	41.58	6643.11	41.66	6643.03	41.42	6643.27	41.64	6643.05	41.57	6643.12	41.65	6643.04	41.55	6643.14	41.55	6643.14
MW23	6654.50											14.45	6640.05	14.42	6640.08	14.39	6640.11
MW24	6657.08											19.41	6637.67	18.83	6638.25	18.58	6638.50
SMW01	6669.94	28.77	6641.17	*28.13	6641.81	27.46	6642.48	27.8	6642.14	28.41	6641.53	28.79	6641.15	28.59	6641.35	28.60	6641.34
TMW01	6711.84	36.23	6675.61	35.96	6675.88	35.77	6676.07	36.21	6675.63	36.36	6675.48	36.59	6675.25	36.68	6675.16	36.83	6675.01
TMW03	6702.43	56.89	6645.54	*56.94	6645.49	56.75	6645.68	56.91	6645.52	56.81	6645.62	56.89	6645.54	56.88	6645.55	56.85	6645.58
TMW04	6700.86	56.37	6644.49	*56.32	6644.54	56.24	6644.62	56.42	6644.44	56.31	6644.55	56.35	6644.51	56.34	6644.52	56.32	6644.54
TMW06	6690.63	47.01	6643.62	46.95	6643.68	46.74	6643.89	47.11	6643.52	46.95	6643.68	46.96	6643.67	46.90	6643.73	46.87	6643.76
TMW07	6690.47	47.93	6642.54	47.42	6643.05	47.54	6642.93	47.27	6643.20	47.8	6642.67	47.27	6643.20	47.34	6643.13	46.99	6643.48
TMW08	6680.31	36.57	6643.74	*36.68	6643.63	36.33	6643.98	36.68	6643.63	36.58	6643.73	36.45	6643.86	36.45	6643.86	36.45	6643.86
TMW10	6680.04	37.16	6642.88	37.23	6642.81	36.96	6643.08	37.24	6642.80	37.23	6642.81	37.31	6642.73	37.18	6642.86	37.13	6642.91
TMW11	6718.28	65.62	6652.66	*65.62	6652.66	65.55	6652.73	65.64	6652.64	65.87	6652.41	66.04	6652.24	66.21	6652.07	66.31	6651.97
TMW13	6707.49	59.77	6647.72	*59.69	6647.80	59.54	6647.95	59.59	6647.90	59.72	6647.77	59.75	6647.74	59.78	6647.71	59.81	6647.68
TMW15	6713.89	63.80	6650.09	63.67	6650.22	63.57	6650.32	63.57	6650.32	63.82	6650.07	63.88	6650.01	63.98	6649.91	64.01	6649.88
TMW21	6695.14	50.56	6644.58	50.68	6644.46	50.45	6644.69	50.62	6644.52	50.61	6644.53	50.60	6644.54	50.60	6644.54	50.51	6644.63
TMW22	6691.74	48.92	6642.82	48.88	6642.86	48.61	6643.13	48.94	6642.80	45.82	6645.92	49.12	6642.62	48.58	6643.16	48.65	6643.09
TMW23	6687.66	45.73	6641.93	45.68	6641.98	45.39	6642.27	45.74	6641.92	45.57	6642.09	45.50	6642.16	45.36	6642.30	45.39	6642.27
TMW24	6680.42	39.30	6641.12	39.21	6641.21	38.82	6641.60	39.11	6641.31	38.37	6642.05	38.86	6641.56	38.64	6641.78	38.61	6641.81
TMW25	6672.88	39.29	6633.59	**	**	38.86	6634.02	39.12	6633.76	39.06	6633.82	39.05	6633.83	38.84	6634.04	38.76	6634.12
TMW26	6677.71	26.64	6651.07	*26.71	6651.00	26.14	6651.57	26.3	6651.41	26.27	6651.44	26.47	6651.24	26.26	6651.45	26.17	6651.54
TMW27	6668.13	28.17	6639.96	*28.12	6640.01	27.75	6640.38	27.69	6640.44	27.79	6640.34	28.02	6640.11	27.75	6640.38	27.66	6640.47
TMW28	6689.17	18.01	6671.16	*17.5	6671.67	17.55	6671.62	17.68	6671.49	18.31	6670.86	18.41	6670.76	18.24	6670.93	18.13	6671.04
TMW29	6702.88	57.15	6645.73	57.07	6645.81	56.99	6645.89	57.07	6645.81	57.08	6645.80	57.14	6645.74	57.15	6645.73	57.11	6645.77
TMW31S	6710.20	35.48	6674.72	35.25	6674.95	34.98	6675.22	35.46	6674.74	35.58	6674.62	35.80	6674.40	36.85	6673.35	35.98	6674.22
TMW33	6686.60	43.72	6642.88	43.46	6643.14	43.14	6643.46	43.45	6643.15	43.29	6643.31	43.39	6643.21	43.28	6643.32	43.32	6643.28
TMW34	6687.29	45.32	6641.97	45.28	6642.01	45.42	6641.87	45.61	6641.68	45.57	6641.72	45.65	6641.64	45.55	6641.74	45.47	6641.82
TMW35	6686.52	43.42	6643.10	43.49	6643.03	43.28	6643.24	43.53	6642.99	43.38	6643.14	43.51	6643.01	43.42	6643.10	43.42	6643.10
TMW39S	6708.61											37.53	6671.08	34.85	6673.76	34.88	6673.73
TMW40S	6706.40											59.65	6646.75	59.97	6646.43	60.12	6646.28
TMW41	6705.21											41.77	6663.44	40.01	6665.20	40.02	6665.19
TMW43	6698.63															53.21	6645.42
TMW44	6697.31															52.60	6644.71

Table 4-1: July 2010-April 2012 Northern Area Alluvial Groundwater Elevations

Well ID	TOC ft-msl	22 & 23-Jul-10		5 to 13-Oct-10		19-Jan-11		1-Apr-11		11-Jul-11		10-Oct-11		24-Jan-12		12-Apr-12	
		DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl
TMW45	6689.00															47.82	6641.18
TMW46	6680.98															44.41	6636.57
TMW47	6701.88															46.24	6655.64
Wingate89	6663.69	15.15	6648.54	***	***	15.10	6648.59	14.92	6648.77	15.09	6648.60	15.27	6648.42	14.98	6648.71	14.98	6648.71
Wingate90	6656.49	13.67	6642.82	***	***	13.09	6643.40	13.01	6643.48	13.2	6643.29	13.25	6643.24	13.12	6643.37	13.12	6643.37
Wingate91	6659.74	14.35	6645.39	***	***	13.77	6645.97	13.66	6646.08	13.89	6645.85	14.09	6645.65	13.80	6645.94	13.80	6645.94

NM: Not Measured
btoc: Below Top of Casing
msl: Mean Sea Level
DTW: Depth to Water
TOC: Top of Casing

ft: Feet
NOTES: * DTW measurement data from Sampling Data Form. The field book containing these DTW measurements was lost during the October 2010 field work
***: This value was transcribed incorrectly and was not used to model groundwater elevations for Oct 2011*
**** The field book containing these DTW measurements was lost during the October 2010 field work.*
Indicates that these wells were not installed at that time

Table 4-2: July 2010-April 2012 Northern Area Bedrock Groundwater Elevations

Well ID	TOC ft-msl	22 & 23-Jul-10		5 to 13-Oct-10		19-Jan-11		1-Apr-11		11-Jul-11		10-Oct-11		24-Jan-12		12-Apr-12	
		DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl
East Landfill Monitoring Wells (assumed completed in the Painted Desert Member in silt/claystone with extremely low hydraulic conductivity)																	
EMW01	6718.38	81.75	6636.63	80.40	6637.98	80.88	6637.50	80.02	6638.36	81.04	6637.34	79.94	6638.44	80.83	6637.55	80.08	6638.30
EMW02	6702.49	31.80	6670.69	31.73	6670.76	31.79	6670.70	31.31	6671.18	32.03	6670.46	31.72	6670.77	31.93	6670.56	31.51	6670.98
EMW03	6701.09	29.11	6671.98	28.95	6672.14	28.84	6672.25	28.92	6672.17	29.35	6671.74	29.10	6671.99	29.10	6671.99	29.13	6671.96
EMW04	6708.30	106.81	6601.49	102.56	6605.74	107.09	6601.21	102.73	6605.57	105.49	6602.81	100.15	6608.15	105.94	6602.36	101.14	6607.16
Northern Area Bedrock Monitoring Wells (assumed completed in the Painted Desert Member in a discontinuous sandstone lens)																	
TMW02	6705.35	55.22	6650.13	55.20	6650.15	55.06	6650.29	55.33	6650.02	55.27	6650.08	55.38	6649.97	55.34	6650.01	55.37	6649.98
Northern Area Bedrock Monitoring Wells (assumed screened in the Painted Desert Member in a sandstone unit)																	
TMW14A	6723.54	62.24	6661.30	62.22	6661.32	62.24	6661.30	62.70	6660.84	62.88	6660.66	62.95	6660.59	63.16	6660.38	63.36	6660.18
TMW16	6714.15	55.02	6659.13	54.94	6659.21	54.86	6659.29	55.01	6659.14	55.18	6658.97	55.28	6658.87	55.38	6658.77	55.47	6658.68
TMW17	6719.89	61.25	6658.64	61.22	6658.67	63.75	6656.14	61.45	6658.44	61.60	6658.29	61.75	6658.14	61.91	6657.98	62.02	6657.87
TMW18	6713.49	54.30	6659.19	54.15	6659.34	54.07	6659.42	54.11	6659.38	54.33**	**	51.25	6662.24	53.45	6660.04	54.48	6659.01
TMW19	6700.52	42.22	6658.30	41.99	6658.53	41.80	6658.72	42.00	6658.52	42.11	6658.41	42.11	6658.41	42.15	6658.37	42.21	6658.31
TMW30	6714.59	38.85	6675.74	38.10	6676.49	38.43	6676.16	38.80	6675.79	39.14	6675.45	39.17	6675.42	39.41	6675.18	39.66	6674.93
TMW31D	6710.44	35.35	6675.09	35.09	6675.35	35.21	6675.23	35.61	6674.83	35.78	6674.66	36.00	6674.44	35.79	6674.65	36.24	6674.20
TMW32	6709.31	38.46	6670.85	38.27	6671.04	38.47	6670.84	38.70	6670.61	38.90	6670.41	38.51	6670.80	38.42	6670.89	38.58	6670.73
TMW36	6699.04	25.36	6673.68	*25.36	6673.68	25.21	6673.83	25.43	6673.61	25.70	6673.34	26.01	6673.03	25.95	6673.09	26.13	6672.91
TMW37	6713.09	44.54	6668.55	44.44	6668.65	44.61	6668.48	44.79	6668.30	45.00	6668.09	44.78	6668.31	44.80	6668.29	44.85	6668.24
TMW38	6706.79											47.35	6659.44	46.43	6660.36	46.20	6660.59
TMW39D	6708.61											33.22	6675.39	33.32	6675.29	33.50	6675.11
TMW40D	6706.15											30.91	6675.24	30.99	6675.16	31.17	6674.98
TMW48	6709.84											34.40	6675.44	34.54	6675.30	34.69	6675.15
TMW49	6714.71											42.68	6672.03	42.61	6672.10	42.84	6671.87

NM: Not Measured
btoc: Below Top of Casing
msl: Mean Sea Level
DTW: Depth to Water
TOC: Top of Casing

ft: Feet

NOTES: * DTW measurement data from Sampling Data Form. The field book containing these DTW measurements was lost during the October 2010 field work.

*** This value was transcribed incorrectly and was not used to model groundwater elevations for Oct 2011*

Indicates that these wells were not installed at that time

Table 4-3: July 2010-April 2012 OB/OD Area Groundwater Elevations

Well ID	TOC ft-msl	22 & 23-Jul-10		4-Oct-10		19-Jan-11		1-Apr-11		11-Jul-11		10-Oct-11		24-Jan-12		12-Apr-12	
		DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl	DTW ft-btoc	Water Level ft-msl
CMW02	7258.00	10.90	7247.10	13.50	7244.50	NM	NM	12.81	7245.19	15.78	7242.22	15.68	7242.32	NM	NM	14.02	7243.98
CMW04	7251.15	45.10	7206.05	45.08	7206.07	NM	NM	45.56	7205.59	45.95	7205.20	46.13	7205.02	NM	NM	46.28	7204.87
CMW07	7235.16	38.74	7196.42	39.08	7196.08	NM	NM	39.78	7195.38	40.26	7194.90	41.13	7194.03	NM	NM	42.29	7192.87
CMW10	7179.31	66.87	7112.44	63.70	7115.61	NM	NM	64.04	7115.27	67.92	7111.39	64.88	7114.43	NM	NM	65.27	7114.04
CMW14	7153.06	27.77	7125.29	27.43	7125.63	NM	NM	29.93	7123.13	30.52	7122.54	30.59	7122.47	NM	NM	32.2	7120.86
CMW17	7145.18	17.00	7128.18	17.51	7127.67	NM	NM	20.77	7124.41	22.11	7123.07	19.54	7125.64	NM	NM	23.5	7121.68
CMW18	7158.24	38.28	7119.96	39.42	7118.82	NM	NM	40.31	7117.93	40.94	7117.30	41.41	7116.83	NM	NM	41.85	7116.39
CMW19	7129.85	22.39	7107.46	23.29	7106.56	NM	NM	23.30	7106.55	25.19	7104.66	25.88	7103.97	NM	NM	25.97	7103.88
CMW20	7194.68	3.00	7191.68	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CMW21	7088.19	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried	Buried
CMW22	7081.94	114.65	6967.29	114.63	6967.31	NM	NM	115.56	6966.38	114.62	6967.32	114.51	6967.43	NM	NM	114.55	6967.39
CMW23	7035.58	97.38	6938.20	97.32	6938.26	NM	NM	97.31	6938.27	97.38	6938.20	97.21	6938.37	NM	NM	97.35	6938.23
CMW24	7099.68	45.75	7053.93	45.65	7054.03	NM	NM	47.47	7052.21	45.63	7054.05	45.32	7054.36	NM	NM	45.42	7054.26
CMW25	7007.52	36.28	6971.24	36.31	6971.21	NM	NM	37.18	6970.34	**	**	37.35	6970.17	NM	NM	37.58	6969.94
FW24	6999.19	24.05	6975.14	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
FW38	7172.02	Dry	Dry	Dry	Dry	NM	NM	Dry	Dry	Dry	Dry	Dry	Dry	NM	NM	Dry	Dry
KMW09	7187.93	39.29	7148.64	39.50	7148.43	NM	NM	39.91	7148.02	40.35	7147.58	40.39	7147.54	NM	NM	40.69	7147.24
KMW10	7131.38	166.73	6964.65	166.71	6964.67	NM	NM	166.90	6964.48	166.75	6964.63	166.72	6964.66	NM	NM	166.67	6964.71
KMW11	7108.78	36.83	7071.95	31.27	7077.51	NM	NM	31.51	7077.27	32.06	7076.72	32.42	7076.36	NM	NM	32.7	7076.08
KMW12	7193.08	48.66	7144.42	47.59	7145.49	NM	NM	48.71	7144.37	49.30	7143.78	49.07	7144.01	NM	NM	49.12	7143.96

NM: Not Measured
btoc: Below Top of Casing
ft-msl: Mean Sea Level
DTW: Depth to Water
TOC: Top of Casing

ft: Feet
NOTES: * DTW measurement data from Sampling Data Form. The field book containing these DTW measurements was lost during the October 2010 field work
*** This value was transcribed incorrectly and was not used to model groundwater elevations for Oct 2011*

Table 4-4: July 2010-April 2012 USGS Piezometer Groundwater Elevations

USGS South Fork Rio Puerco Piezometer Measurements						22-Jul-10		4-Oct-10		19-Jan-11		4-Apr-11		11-Jul-11		10-Oct-11		26-Jan-12		12-Apr-12	
ID	Easting	Northing	Ground Elevation (msl)	Stick-Up (ft)	TOC Elevation (msl)	DTW (bgs)	Water Level (msl)	DTW (bgs)	Water Level (msl)	DTW (bgs)	Water Level (msl)	DTW (ft-btoc)	Water Level (msl)	DTW (ft-btoc)	Water Level (msl)	DTW (ft-btoc)	Water Level (msl)	DTW (ft-btoc)	Water Level (msl)	DTW (ft-btoc)	Water Level (msl)
PZ01	2499236.22	1645310.72	6674.71	2.581	6677.29	24.16	6650.55	24.00	6650.71	23.58	6651.13	26.45	6650.84	26.39	6650.90	26.36	6650.93	26.15	6651.14	26.22	6651.07
PZ02	2499258.64	1645426.78	6672.50	2.454	6674.95	21.25	6651.25	20.43	6652.07	20.16	6652.34	22.52	6652.43	22.52	6652.43	22.70	6652.25	22.39	6652.56	22.34	6652.61
PZ03	2499288.54	1645502.88	6676.86	2.581	6679.44	24.27	6652.59	24.18	6652.68	23.49	6653.37	26.02	6653.42	26.07	6653.37	26.22	6653.22	25.99	6653.45	25.81	6653.63
PZ04	2498592.56	1645288.26	6674.17	2.506	6676.68	25.63	6648.54	25.44	6648.73	25.06	6649.11	27.51	6649.17	27.58	6649.10	27.78	6648.90	27.48	6649.20	27.47	6649.21
PZ05	2498263.13	1646574.66	6671.53	2.623	6674.15	17.95	6653.58	17.64	6653.89	16.86	6654.67	19.37	6654.78	19.57	6654.58	20.12	6654.03	19.40	6654.75	19.30	6654.85
PZ06	2498718.95	1646327.75	6673.29	2.751	6676.04	17.38	6655.91	16.44	6656.85	15.26	6658.03	17.86	6658.18	19.51	6656.53	19.04	6657.00	17.88	6658.16	17.66	6658.38
PZ07	2500958.18	1645600.75	6682.38	2.150	6684.53	9.66	6672.72	8.26	6674.12	9.89	6672.49	12.85	6671.68	13.66	6670.87	13.09	6671.44	13.72	6670.81	13.98	6670.55
PZ08	2500744.34	1645511.30	6684.11	2.697	6686.81	13.48	6670.63	11.95	6672.16	13.22	6670.89	16.41	6670.40	17.49	6669.32	16.04	6670.77	17.03	6669.78	17.35	6669.46
PZ09	2495520.51	1648138.17	6651.12	2.495	6653.61	13.76	6637.36	12.96	6638.16	12.11	6639.01	14.34	6639.27	15.30	6638.31	15.36	6638.25	14.53	6639.08	14.21	6639.40
PZ10	2495406.66	1648008.28	6654.83	2.436	6657.27	17.59	6637.24	16.83	6638.00	15.93	6638.90	19.18	6638.09	19.17	6638.10	19.21	6638.06	18.36	6638.91	18.06	6639.21

ft-BTOC: Feet Below Top of Casing
BGS: Below Ground Surface
MSL: Mean Sea Level
DTW: Depth to Water
TOC: Top of Casing
ft: Feet
Note: *In previous reports, groundwater measurements were obtained from the USGS. Groundwater elevation measurements were calculated from the ground elevation. As of April 2011, measurements were made in the field with water level sounders, and groundwater elevations were calculated from the top of the casing.*

SECTION 5 TABLES

Table 5-1: April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells												
CMW02	Nitrate	14797-55-8	0.30	0.048	1.1	mg/L				10	MCL	No
CMW10	Nitrate	14797-55-8	0.30	0.048	3.7	mg/L				10	MCL	No
CMW14	Nitrate	14797-55-8	0.30	0.048	0.30	mg/L	J			10	MCL	No
CMW17	Nitrate	14797-55-8	0.30	0.048	2.5	mg/L				10	MCL	No
CMW18	Nitrate	14797-55-8	0.30	0.048	3.8	mg/L				10	MCL	No
CMW22	Nitrate	14797-55-8	0.30	0.048	0.26	mg/L	J	J	J	10	MCL	No
KMW10	Nitrate	14797-55-8	0.30	0.048	9.0	mg/L				10	MCL	No
KMW11	Nitrate	14797-55-8	0.30	0.048	0.24	mg/L	J	J	J	10	MCL	No
KMW12	Nitrate	14797-55-8	0.30	0.048	0.34	mg/L				10	MCL	No
Northern Area Alluvial Monitoring Wells												
BGMW01	Nitrate	14797-55-8	0.30	0.048	1.9	mg/L				10	MCL	No
BGMW02	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**18**	**mg/L**				**10**	**MCL**	**Yes**
BGMW03	Nitrate	14797-55-8	0.30	0.048	8.3	mg/L				10	MCL	No
	Nitrite	14797-65-0	0.30	0.054	0.35	mg/L				1	MCL	No
FW31	Nitrate	14797-55-8	0.30	0.048	0.29	mg/L	J	J	J	10	MCL	No
FW35	Nitrate	14797-55-8	0.30	0.048	0.99	mg/L				10	MCL	No
KMW09	Nitrate	14797-55-8	0.30	0.048	0.61	mg/L				10	MCL	No
MW01	Nitrate	14797-55-8	0.30	0.048	6.4	mg/L				10	MCL	No
MW02	Nitrate	14797-55-8	0.30	0.048	1.4	mg/L				10	MCL	No
MW03	Nitrate	14797-55-8	0.30	0.048	10	mg/L				10	MCL	No
MW20	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**23**	**mg/L**				**10**	**MCL**	**Yes**
	Nitrite	**14797-65-0**	**0.30**	**0.054**	**4.3**	**mg/L**				**1**	**MCL**	**Yes**
MW22D	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**23**	**mg/L**				**10**	**MCL**	**Yes**
MW22S	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**22**	**mg/L**				**10**	**MCL**	**Yes**
MW23	Nitrate	14797-55-8	0.30	0.048	0.42	mg/L				10	MCL	No
TMW01	Nitrate	14797-55-8	0.30	0.048	8.8	mg/L				10	MCL	No
TMW03	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**150**	**mg/L**				**10**	**MCL**	**Yes**
	Nitrite	14797-65-0	0.30	0.054	0.58	mg/L				1	MCL	No
TMW04	Nitrate	14797-55-8	0.30	0.048	8.1	mg/L				10	MCL	No

Table 5-1: April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
TMW06	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**15**	**mg/L**				**10**	**MCL**	**Yes**
TMW07	Nitrate	14797-55-8	0.30	0.048	0.21	mg/L	J	J	J	10	MCL	No
TMW08	Nitrate	14797-55-8	0.30	0.048	4.6	mg/L				10	MCL	No
TMW10	Nitrate	14797-55-8	0.30	0.048	0.21	mg/L	J	J	J	10	MCL	No
TMW11	Nitrate	14797-55-8	0.30	0.048	5.2	mg/L				10	MCL	No
TMW13	Nitrate	14797-55-8	0.30	0.048	1.7	mg/L				10	MCL	No
TMW15	Nitrate	14797-55-8	0.30	0.048	5.0	mg/L				10	MCL	No
TMW21	Nitrate	14797-55-8	0.30	0.048	7.8	mg/L				10	MCL	No
TMW22	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**11**	**mg/L**				**10**	**MCL**	**Yes**
TMW23	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**32**	**mg/L**				**10**	**MCL**	**Yes**
TMW25	Nitrate	14797-55-8	0.30	0.048	0.67	mg/L				10	MCL	No
TMW29	Nitrate	14797-55-8	0.30	0.048	3.7	mg/L				10	MCL	No
TMW31S	Nitrate	14797-55-8	0.30	0.048	7.7	mg/L				10	MCL	No
TMW34	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**50**	**mg/L**				**10**	**MCL**	**Yes**
TMW35	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**20**	**mg/L**				**10**	**MCL**	**Yes**
TMW39S	Nitrate	14797-55-8	0.30	0.048	8.6	mg/L				10	MCL	No
TMW40S*	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**100***	**mg/L**				**10**	**MCL**	**Yes**
	Nitrite	**14797-65-0**	**0.30**	**0.054**	**1.6***	**mg/L**				**1**	**MCL**	**Yes**
TMW41	Nitrate	14797-55-8	0.30	0.048	6.2	mg/L				10	MCL	No
TMW43	Nitrate	14797-55-8	0.30	0.048	10	mg/L				10	MCL	No
	Nitrite	14797-65-0	0.30	0.054	0.19	mg/L	J	J	J	1	MCL	No
TMW44	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**46**	**mg/L**				**10**	**MCL**	**Yes**
TMW45	Nitrate	14797-55-8	0.30	0.048	5.5	mg/L				10	MCL	No
TMW46	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**97**	**mg/L**				**10**	**MCL**	**Yes**
TMW47	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**18**	**mg/L**				**10**	**MCL**	**Yes**
Northern Area Bedrock Monitoring Wells												
EMW02	Nitrate	14797-55-8	0.30	0.048	0.55	mg/L				10	MCL	No
TMW02	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**99**	**mg/L**				**10**	**MCL**	**Yes**
TMW30	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**15**	**mg/L**				**10**	**MCL**	**Yes**
TMW31D	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**16**	**mg/L**				**10**	**MCL**	**Yes**

Table 5-1: April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
TMW39D	Nitrate	14797-55-8	0.30	0.048	7.6	mg/L				10	MCL	No
TMW40D	Nitrate	14797-55-8	0.30	0.048	2.1	mg/L				10	MCL	No
	Nitrite	14797-65-0	0.30	0.054	0.34	mg/L				1	MCL	No
TMW48	**Nitrate**	**14797-55-8**	**0.30**	**0.048**	**50**	**mg/L**				**10**	**MCL**	**Yes**
TMW49	Nitrate	14797-55-8	0.30	0.048	1.3	mg/L				10	MCL	No

Notes: *TMW40S was likely contaminated during drilling. These results may not accurately represent chemical concentrations in the alluvial aquifer. See Section 5.6.6.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, RL = Reporting Limit, DL= Detection Limit, MCL = Maximum Contaminant Limit, mg/L = milligrams per liter

Flags and Qualifiers: J = Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts.

Table 5-2: April 2012 Total Explosives Detected

ANALYTICAL METHOD 8330A												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells												
CMW04	**Dinitrobenzene, 1,3-**	**99-65-0**	**0.20**	**0.025**	**4.6**	**ug/L**				**1.5**	**NC**	**Yes**
CMW14	Dinitrobenzene, 1,3-	99-65-0	0.20	0.025	1.2	ug/L				1.5	NC	No
	Nitrobenzene	98-95-3	0.20	0.049	0.098	ug/L	J	J	J	11	NC	No
CMW19	**Dinitrobenzene, 1,3-**	**99-65-0**	**0.20**	**0.025**	**6.3**	**ug/L**				**1.5**	**NC**	**Yes**
	Tetryl (Trinitrophenylmethylnitramine)	479-45-8	0.30	0.088	0.52	ug/L				63	NC	No
CMW24**	HMX	2691-41-0	0.50	0.026	3.5	ug/L		J	J	780	NC	No
	Trinitrobenzene, 1,3,5-	99-35-4	0.20	0.019	1.8	ug/L				460	NC	No
	Dinitrobenzene, 1,3-	**99-65-0**	**2.0**	**0.25**	**32**	**ug/L**	**m**			**1.5**	**NC**	**Yes**
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	0.20	0.023	0.36	ug/L	m			30	NC	No
CMW18*	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	0.20	0.023	2.4	ug/L		J	J	30	NC	No
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	0.20	0.023	2.7	ug/L		J	J	30	NC	No
	RDX	**121-82-4**	**5.1**	**0.28**	**58**	**ug/L**				**0.61**	**CA**	**Yes**
	HMX	2691-41-0	5.1	0.26	15	ug/L				780	NC	No
	Trinitrotoluene, 2,4,6-	118-96-7	0.20	0.018	0.049	ug/L	J	J	J	2.2	CA	No
KMW09	**Dinitrobenzene, 1,3-**	**99-65-0**	**0.20**	**0.025**	**8.8**	**ug/L**				**1.5**	**NC**	**Yes**
	Trinitrotoluene, 2,4,6-	**118-96-7**	**0.20**	**0.018**	**2.5**	**ug/L**				**2.2**	**CA**	**Yes**
KMW11	Dinitrobenzene, 1,3-	99-65-0	0.20	0.025	0.30	ug/L				1.5	NC	No
Northern Area Alluvial Monitoring Wells												
MW03	Dinitrobenzene, 1,3-	99-65-0	0.20	0.025	0.46	ug/L				1.5	NC	No
MW18D	**Dinitrobenzene, 1,3-**	**99-65-0**	**0.21**	**0.026**	**4.5**	**ug/L**	**m**			**1.5**	**NC**	**Yes**
TMW03***	**Dinitrotoluene, 2,4-**	**121-14-2**	**0.10**	**0.030**	**0.4**	**ug/L**				**0.2**	**CA**	**Yes**
	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	0.20	0.023	0.72	ug/L				30	NC	No
	RDX	**121-82-4**	**50**	**2.8**	**250**	**ug/L**				**0.61**	**CA**	**Yes**
TMW04	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	0.20	0.023	1.5	ug/L		J	J	30	NC	No
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	0.20	0.023	1.6	ug/L		J	J	30	NC	No
	Trinitrobenzene, 1,3,5-	99-35-4	0.20	0.019	2.8	ug/L		J	J	460	NC	No
TMW06	Dinitrobenzene, 1,3-	99-65-0	0.20	0.025	0.29	ug/L				1.5	NC	No
TMW21	**RDX**	**121-82-4**	**0.51**	**0.028**	**1.0**	**ug/L**				**0.61**	**CA**	**Yes**
	Trinitrobenzene, 1,3,5-	99-35-4	0.20	0.019	0.12	ug/L	J	J	J	460	NC	No

Table 5-2: April 2012 Total Explosives Detected

ANALYTICAL METHOD 8330A												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
TMW23	**RDX**	**121-82-4**	**5.0**	**0.28**	**36**	**ug/L**				**0.61**	**CA**	**Yes**
TMW43	**RDX**	**121-82-4**	**0.50**	**0.028**	**2.5**	**ug/L**				**0.61**	**CA**	**Yes**
	HMX	2691-41-0	0.50	0.026	0.12	ug/L	J	J	J	780	NC	No
TMW44	Trinitrobenzene, 1,3,5-	99-35-4	0.20	0.019	0.26	ug/L		J	J	460	NC	No
Northern Area Bedrock Monitoring Wells												
EMW01	Dinitrobenzene, 1,3-	99-65-0	0.20	0.025	0.20	ug/L	J			1.5	NC	No
	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	0.20	0.023	0.048	ug/L	J	J	J	30	NC	No
TMW02	Trinitrobenzene, 1,3,5-	99-35-4	0.20	0.019	0.059	ug/L	J	J	J	460	NC	No
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	0.20	0.023	0.075	ug/L	Jm	J	J	30	NC	No
TMW14A	Dinitrobenzene, 1,3-	99-65-0	0.20	0.025	0.65	ug/L				1.5	NC	No
TMW30	Dinitrobenzene, 1,3-	99-65-0	0.20	0.026	0.10	ug/L	J	J	J	1.5	NC	No
TMW32	RDX	121-82-4	0.50	0.028	0.11	ug/L	J	J	J	0.61	CA	No
TMW38	**Dinitrobenzene, 1,3-**	**99-65-0**	**0.20**	**0.025**	**1.9**	**ug/L**		**J**	**J**	**1.5**	**NC**	**Yes**

Notes: *A laboratory error was made in the original analysis of the CMW18 sample. However, both the blind duplicate sample and triplicate sample were analyzed correctly and results closely match historical data. The blind duplicate (FW03) sample results are given here.
**The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, CMW24's results were reported by the laboratory under the wrong well identification (TMW03). The results shown in the table above are the correct results for CMW24. See Section 5.6.2.
***The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, TMW03's results were reported by the laboratory under the wrong well identification (CMW24). The results shown in the table above are the correct results for TMW03. See Section 5.6.2.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, RL = Reporting Limit, DL= Detection Limit, RSL = Regional Screening Levels, CA = RSL Carcinogenic Sreening, NC = RSL Non- Carcinogenic Screening, RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine, HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra, ug/L = micrograms per liter

Flags and Qualifiers: J = Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts. m = Manual Integration used to determine area response.

Table 5-3: April 2012 Perchlorate Detected

ANALYTICAL METHOD 6850												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells												
CMW02	Perchlorate	14797-73-0	0.200	0.100	0.796	ug/L				6	Permit	No
CMW10	Perchlorate	14797-73-0	0.200	0.100	0.845	ug/L				6	Permit	No
CMW17	Perchlorate	14797-73-0	0.800	0.400	1.87	ug/L	J			6	Permit	No
CMW18	Perchlorate	14797-73-0	2.00	1.00	5.23	ug/L				6	Permit	No
KMW10	Perchlorate	14797-73-0	1.00	0.500	2.42	ug/L				6	Permit	No
KMW11	Perchlorate	14797-73-0	0.200	0.100	0.368	ug/L				6	Permit	No
Northern Area Alluvial Monitoring Wells												
BGMW02	Perchlorate	14797-73-0	0.200	0.100	0.510	ug/L				6	Permit	No
BGMW03	Perchlorate	14797-73-0	0.200	0.100	0.579	ug/L				6	Permit	No
MW18D	Perchlorate	14797-73-0	0.200	0.100	0.500	ug/L				6	Permit	No
MW20	Perchlorate	14797-73-0	0.200	0.100	0.684	ug/L				6	Permit	No
MW22D	Perchlorate	14797-73-0	0.200	0.100	0.219	ug/L				6	Permit	No
MW22S	Perchlorate	14797-73-0	0.200	0.100	0.133	ug/L	J	J	J	6	Permit	No
TMW01	**Perchlorate**	**14797-73-0**	**100**	**50.0**	**296**	**ug/L**				**6**	**Permit**	**Yes**
TMW03	Perchlorate	14797-73-0	0.200	0.100	0.962	ug/L				6	Permit	No
TMW04	Perchlorate	14797-73-0	0.200	0.100	0.371	ug/L				6	Permit	No
TMW11	Perchlorate	14797-73-0	0.200	0.100	0.176	ug/L	J	J	J	6	Permit	No
TMW13	Perchlorate	14797-73-0	0.200	0.100	0.0838	ug/L	J	J	J	6	Permit	No
TMW15	Perchlorate	14797-73-0	0.200	0.100	0.166	ug/L	J	J	J	6	Permit	No
TMW23	Perchlorate	14797-73-0	0.200	0.100	0.113	ug/L	J	J	J	6	Permit	No
TMW29	Perchlorate	14797-73-0	0.200	0.100	0.112	ug/L	J	J	J	6	Permit	No
TMW31S	**Perchlorate**	**14797-73-0**	**200**	**100**	**507**	**ug/L**				**6**	**Permit**	**Yes**
TMW34	Perchlorate	14797-73-0	0.200	0.100	0.288	ug/L				6	Permit	No
TMW35	Perchlorate	14797-73-0	0.200	0.100	0.214	ug/L				6	Permit	No
TMW39S	**Perchlorate**	**14797-73-0**	**200**	**100**	**702**	**ug/L**				**6**	**Permit**	**Yes**
TMW40S*	**Perchlorate**	**14797-73-0**	**20.0**	**10.0**	**76.8***	**ug/L**				**6**	**Permit**	**Yes**
TMW41	Perchlorate	14797-73-0	0.800	0.400	1.68	ug/L				6	Permit	No
TMW45	Perchlorate	14797-73-0	0.200	0.100	0.368	ug/L				6	Permit	No
TMW46	Perchlorate	14797-73-0	0.200	0.100	0.712	ug/L				6	Permit	No
Northern Area Bedrock Monitoring Wells												

Table 5-3: April 2012 Perchlorate Detected

ANALYTICAL METHOD 6850												
Well ID	Analyte	CASRN	RL	DL	Result	Units	Lab Flag	V Flag	Final Flag	Value Used (ug/L)	Standard Used	Standard Exceeded
TMW02	Perchlorate	14797-73-0	4.00	2.00	17.5	ug/L				6	Permit	Yes
TMW30	Perchlorate	14797-73-0	1000	500	2570	ug/L				6	Permit	Yes
TMW31D	Perchlorate	14797-73-0	500	250	1480	ug/L	J			6	Permit	Yes
TMW32	Perchlorate	14797-73-0	40.0	20.0	114	ug/L				6	Permit	Yes
TMW39D	Perchlorate	14797-73-0	200	100	765	ug/L				6	Permit	Yes
TMW40D	Perchlorate	14797-73-0	100	50.0	283	ug/L				6	Permit	Yes
TMW48	Perchlorate	14797-73-0	400	200	1640	ug/L	J			6	Permit	Yes
TMW49	Perchlorate	14797-73-0	1000	500	2570	ug/L				6	Permit	Yes

Notes: *TMW40S was likely contaminated during drilling. This result may not accurately represent perchlorate concentration in the aquifer. See Section 5.6.6. aquifer. See Section 5.6.6.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, RL = Reporting Limit, DL= Detection Limit, MCL = Maximum Contaminant Level, ug/L = micrograms per liter

Flags and Qualifiers: J = Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory

Table 5-4: April 2012 Volatile Organic Compounds Detected

ANALYTICAL METHOD 8260C												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells												
CMW14	Benzene	71-43-2	1.0	0.20	0.36	ug/L	J	J	J	5	MCL	No
	Chloromethane	74-87-3	1.0	0.22	2.0	ug/L				190	NC	No
CMW22	Dichloroethylene, 1,2-trans-	156-60-5	1.0	0.18	0.20	ug/L	J	J	J	100	MCL	No
	Toluene	108-88-3	1.0	0.20	0.21	ug/L	J	J	J	750	WQCC	No
CMW23	Toluene	108-88-3	1.0	0.20	0.35	ug/L	J	J	J	750	WQCC	No
CMW24	Carbon Disulfide	75-15-0	1.0	0.15	51	ug/L				720	NC	No
CMW25	Carbon Disulfide	75-15-0	1.0	0.15	0.71	ug/L	J	J	J	720	NC	No
KMW10	Toluene	108-88-3	1.0	0.20	0.55	ug/L	J	J	J	750	WQCC	No
KMW11	Tetrachloroethylene	127-18-4	1.0	0.26	1.7	ug/L				5	MCL	No
KMW12	Toluene	108-88-3	1.0	0.20	5.4	ug/L				750	WQCC	No
Northern Area Alluvial Monitoring Wells												
MW01	Dichloroethane, 1,2-	107-06-2	1.0	0.19	1.5	ug/L				5	MCL	No
MW18D	Acetone	67-64-1	5.0	0.44	3.8	ug/L	J	J	J	12000	NC	No
	Dichloroethane, 1,2-	**107-06-2**	**1.0**	**0.19**	**110**	**ug/L**				**5**	**MCL**	**Yes**
MW20	**Dichloroethane, 1,2-**	**107-06-2**	**1.0**	**0.19**	**9.0**	**ug/L**				**5**	**MCL**	**Yes**
	Acetone	67-64-1	5.0	0.44	5.7	ug/L				12000	NC	No
MW22D	Dichloroethane, 1,2-	107-06-2	1.0	0.19	1.2	ug/L				5	MCL	No
MW22S	Dichloroethane, 1,1-	75-34-3	1.0	0.25	0.92	ug/L	Jm	J	J	25	WQCC	No
	Dichloroethane, 1,2-	107-06-2	1.0	0.19	0.61	ug/L	J	J	J	5	MCL	No
	Trichloroethane, 1,1,1-	71-55-6	1.0	0.16	2.3	ug/L				60	WQCC	No
MW23	**Toluene**	**108-88-3**	**10**	**2.0**	**920**	**ug/L**				**750**	**WQCC**	**Yes**
MW24	Toluene	108-88-3	1.0	0.20	75	ug/L				750	WQCC	No
TMW06	Dichloroethane, 1,2-	107-06-2	1.0	0.19	0.20	ug/L	J	J	J	5	MCL	No
TMW08	Acetone	67-64-1	5.0	0.44	2.7	ug/L	J	J	J	12000	NC	No
TMW29	Methyl tert-Butyl Ether (MTBE)	1634-04-4	1.0	0.17	0.32	ug/L	J	J	J	12	CA	No
TMW33	**Dichloroethane, 1,2-**	**107-06-2**	**1.0**	**0.19**	**42**	**ug/L**				**5**	**MCL**	**Yes**
TMW34	Bromochloromethane	74-97-5	1.0	0.20	0.44	ug/L	J	J	J	N/A	N/A	N/A
TMW35	Dichloroethane, 1,2-	107-06-2	1.0	0.19	1.9	ug/L				5	MCL	No
Northern Area Bedrock Monitoring Wells												
TMW14A	Carbon Disulfide	75-15-0	1.0	0.15	1.4	ug/L				720	NC	No

Table 5-4: April 2012 Volatile Organic Compounds Detected

ANALYTICAL METHOD 8260C												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
TMW16	Toluene	108-88-3	1.0	0.20	0.54	ug/L	J	J	J	750	WQCC	No
TMW17	Carbon Disulfide	75-15-0	1.0	0.15	7.8	ug/L				720	NC	No
	Chloromethane	74-87-3	1.0	0.22	0.43	ug/L	J	J	J	190	NC	No
	Dichloroethylene, 1,2-trans-	156-60-5	1.0	0.18	0.24	ug/L	J	J	J	100	MCL	No
TMW18	Toluene	108-88-3	1.0	0.20	58	ug/L				750	WQCC	No
TMW31D	Acetone	67-64-1	5.0	0.44	2.2	ug/L	J	J	J	12000	NC	No
TMW36	Toluene	108-88-3	1.0	0.20	89	ug/L				750	WQCC	No
TMW37	Carbon Disulfide	75-15-0	1.0	0.15	6.2	ug/L				720	NC	No
	Toluene	108-88-3	1.0	0.20	19	ug/L				750	WQCC	No

Abbreviations: CASRN = Chemical Abstract Services Registry Number, RL = Reporting Limit, DL= Detection Limit, MCL = Maximum Contaminant Limit, N/A = Not Applicable, WQCC = New Mexico Water Quality Control Commission, CA = Carcinogenic Regional Screening Level, NC = Non- Carcinogenic Regional Screening Level, ug/L = micrograms per liter.

Flags and Qualifiers: J = Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts. m: Manual Integration used to determine area response.

Table 5-5: April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270D												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells												
CMW10	**Bis(2-ethylhexyl) phthalate**	**117-81-7**	**5.1**	**0.27**	**8.5**	**ug/L**				**6**	**MCL**	**Yes**
CMW18	Bis(2-ethylhexyl) phthalate	117-81-7	5.1	0.27	0.35	ug/L	J	J	J	6	MCL	No
CMW19	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.28	ug/L	J	J	J	6	MCL	No
CMW24*	**Dinitrotoluene, 2,4-**	**121-14-2**	**5.1**	**0.25**	**0.28**	**ug/L**	**J**	**J**	**J**	**0.2**	**CA**	**Yes**
KMW10	Diethyl Phthalate	84-66-2	5.0	0.16	0.36	ug/L	J	J	J	11000	NC	No
Northern Area Bedrock Monitoring Wells												
EMW01	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.45	ug/L	J	J	J	6	MCL	No
EMW02	Bis(2-ethylhexyl) phthalate	117-81-7	4.6	0.33	0.33	ug/L	J	J	J	6	MCL	No
TMW16	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.40	ug/L	J	J	J	6	MCL	No
TMW18	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	3.9	ug/L	J	J	J	6	MCL	No
TMW19	**Bis(2-ethylhexyl) phthalate**	**117-81-7**	**5.0**	**0.27**	**13**	**ug/L**		**J**	**J**	**6**	**MCL**	**Yes**
TMW31D	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.27	ug/L	J	J	J	6	MCL	No
TMW38	Diethyl Phthalate	84-66-2	5.1	0.17	0.41	ug/L	J	J	J	11000	NC	No
	Dinitrotoluene, 2,6-	606-20-2	5.1	0.28	1.7	ug/L	J	J	J	15	NC	No
TMW39D	Diethyl Phthalate	84-66-2	5.0	0.16	0.31	ug/L	J	J	J	11000	NC	No
Northern Area Alluvial Monitoring Wells												
BGMW02	Butyl Benzyl Phthlate	85-68-7	5.1	0.25	0.88	ug/L	J	J	J	14	CA	No
BGMW03	Bis(2-chloroisopropyl) ether	108-60-1	5.0	0.24	0.25	ug/L	J	J	J	0.31	CA	No
	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.91	ug/L	J	J	J	6	MCL	No
MW22S	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	1.2	ug/L	J	J	J	6	MCL	No
	Dibutyl Phthalate	84-74-2	5.0	0.20	0.26	ug/L	J	J	J	670	NC	No
MW23	m,p-Cresol	MEPH34	10	0.38	2.5	ug/L	J	J	J	N/A	N/A	N/A
	Phenol	**108-95-2**	**5.0**	**0.14**	**23**	**ug/L**				**5**	**WQCC**	**Yes**
SMW01	Diethyl Phthalate	84-66-2	5.1	0.17	0.20	ug/L	J	J	J	11000	NC	No
TMW03**	Dinitrophenol, 2,4-	51-28-5	10	5.7	19	ug/L				30	NC	No
	Dinitrotoluene, 2,4-	**121-14-2**	**5.1**	**0.25**	**0.32**	**ug/L**	**J**	**J**	**J**	**0.2**	**CA**	**Yes**
	Nitrosodiphenylamine, N-	86-30-6	5.1	0.16	0.67	ug/L	J	J	J	10	CA	No
TMW04	2-Nitroaniline	88-74-4	5.0	0.24	0.29	ug/L	J	J	J	N/A	N/A	N/A
	Dinitrotoluene, 2,4-	**121-14-2**	**5.0**	**0.25**	**0.62**	**ug/L**	**J**	**J**	**J**	**0.2**	**CA**	**Yes**

Table 5-5: April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270D												
Well ID	**Analyte**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (ug/L)**	**Standard Used**	**Standard Exceeded**
TMW07	Diethyl Phthalate	84-66-2	4.9	0.16	0.17	ug/L	J	J	J	11000	NC	No
	Nitrosodiphenylamine, N-	86-30-6	4.9	0.15	0.18	ug/L	J	J	J	10	CA	No
TMW15	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.30	ug/L	J	J	J	6	MCL	No
TMW22	Bis(2-ethylhexyl) phthalate	117-81-7	5.2	0.27	1.3	ug/L	J	J	J	6	MCL	No
TMW31S	Diethyl Phthalate	84-66-2	5.0	0.16	0.31	ug/L	J	J	J	11000	NC	No
TMW33	Bis(2-ethylhexyl) phthalate	117-81-7	5.1	0.27	3.6	ug/L	J	J	J	6	MCL	No
TMW39S	Diethyl Phthalate	84-66-2	5.0	0.16	0.40	ug/L	J	J	J	11000	NC	No
TMW41	Cresol, o-	95-48-7	5.0	0.18	2.3	ug/L	J	J	J	720	NC	No
	m,p-Cresol	MEPH34	10	0.38	0.52	ug/L	J	J	J	N/A	N/A	N/A
TMW43	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	0.53	ug/L	J	J	J	6	MCL	No
TMW44	Bis(2-ethylhexyl) phthalate	117-81-7	5.1	0.27	3.2	ug/L	J	J	J	6	MCL	No
TMW45	Bis(2-ethylhexyl) phthalate	117-81-7	5.0	0.27	1.5	ug/L	J	J	J	6	MCL	No

Abbreviations: CASRN = Chemical Abstract Services Registry Number, RL = Reporting Limit, DL= Detection Limit, MCL = Maximum Contaminant Limit, N/A = Not Applicable, WQCC = New Mexico Water Quality Control Commission, CA = Carcinogenic Regional Screening Level, NC = Non- Carcinogenic Regional Screening Level, ug/L = micrograms per liter.

Notes: *The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, CMW24's results were reported by the laboratory under the wrong well identification (TMW03). The results shown in the table above are the correct results for CMW24. See Section 5.6.2.

**The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, TMW03's results were reported by the laboratory under the wrong well identification (CMW24). The results shown in the table above are the correct results for TMW03. See Section 5.6.2.

Table 5-6: April 2012 Mercury and Metals Detected Above Regulatory Health Standards

ANALYTICAL METHOD 6020													
Well ID	**Analyte**	**Analytical Method**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
Northern Area Alluvial Monitoring Wells													
BGMW02	Arsenic	6020B (DISSOLVED)	7440-38-2	0.0015	0.00061	0.011	mg/L				0.01	MCL	Yes
	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.095	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.11	mg/L				0.05	MCL	Yes
FW31	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.22	mg/L				0.2	WQCC	Yes
MW01	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.40	mg/L				0.2	WQCC	Yes
MW02	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	2.9	mg/L				1	WQCC	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	1.7	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.39	mg/L				0.2	WQCC	Yes
MW18D	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.7	mg/L				1	WQCC	Yes
MW20	Arsenic	6020B (TOTAL)	7440-38-2	0.0015	0.00061	0.021	mg/L				0.01	MCL	Yes
	Arsenic	6020B (DISSOLVED)	7440-38-2	0.0015	0.00061	0.021	mg/L				0.01	MCL	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	2.1	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.10	0.0053	2.2	mg/L				0.2	WQCC	Yes
	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.21	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.23	mg/L				0.05	MCL	Yes
MW22D	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.052	mg/L				0.05	MCL	Yes
MW22S	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.9	mg/L				1	WQCC	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.38	mg/L				0.2	WQCC	Yes
MW23	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.8	mg/L				1	WQCC	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.46	mg/L				0.2	WQCC	Yes
MW24	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	2.3	mg/L				1	WQCC	Yes
	Iron	6020B (DISSOLVED)	7439-89-6	0.10	0.048	1.8	mg/L				1	WQCC	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.49	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.50	mg/L				0.2	WQCC	Yes
	Thallium	6020B (TOTAL)	7440-28-0	0.0020	0.00016	0.014	mg/L				0.002	MCL	Yes
TMW03	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.070	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.072	mg/L				0.05	MCL	Yes
TMW04	Arsenic	6020B (DISSOLVED)	7440-38-2	0.0015	0.00061	0.011	mg/L				0.01	MCL	Yes
	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.096	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.11	mg/L				0.05	MCL	Yes
TMW07	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.32	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.31	mg/L				0.2	WQCC	Yes
TMW08	Arsenic	6020B (DISSOLVED)	7440-38-2	0.0015	0.00061	0.012	mg/L				0.01	MCL	Yes
	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	2.6	mg/L				1	WQCC	Yes

Table 5-6: April 2012 Mercury and Metals Detected Above Regulatory Health Standards

ANALYTICAL METHOD 6020													
Well ID	**Analyte**	**Analytical Method**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
TMW08	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.23	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.21	mg/L				0.2	WQCC	Yes
	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.059	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.066	mg/L				0.05	MCL	Yes
TMW10	Thallium	6020B (TOTAL)	7440-28-0	0.0020	0.00016	0.037	mg/L				0.002	MCL	Yes
TMW24	Thallium	6020B (DISSOLVED)	7440-28-0	0.0050	0.00016	0.010	mg/L				0.002	MCL	Yes
TMW25	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.28	mg/L				0.2	WQCC	Yes
TMW27	Arsenic	6020B (TOTAL)	7440-38-2	0.0015	0.00061	0.019	mg/L				0.01	MCL	Yes
	Arsenic	6020B (DISSOLVED)	7440-38-2	0.0015	0.00061	0.021	mg/L				0.01	MCL	Yes
	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.5	mg/L				1	WQCC	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.65	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.59	mg/L				0.2	WQCC	Yes
TMW28	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.30	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.29	mg/L				0.2	WQCC	Yes
TMW29	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.6	mg/L				1	WQCC	Yes
	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.43	mg/L				0.2	WQCC	Yes
	Thallium	6020B (TOTAL)	7440-28-0	0.0020	0.00016	0.0063	mg/L				0.002	MCL	Yes
TMW33	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.70	mg/L				0.2	WQCC	Yes
	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.56	mg/L				0.2	WQCC	Yes
	Thallium	6020B (TOTAL)	7440-28-0	0.0020	0.00016	0.0041	mg/L				0.002	MCL	Yes
TMW34	Arsenic	6020B (TOTAL)	7440-38-2	0.0015	0.00061	0.011	mg/L				0.01	MCL	Yes
	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.11	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.12	mg/L				0.05	MCL	Yes
TMW39S	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.9	mg/L				1	WQCC	Yes
TMW44	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.54	mg/L				0.2	WQCC	Yes
TMW45	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.3	mg/L				1	WQCC	Yes
	Thallium	6020B (DISSOLVED)	7440-28-0	0.0050	0.00016	0.0038	mg/L	J	J	J	0.002	MCL	Yes
TMW46	Arsenic	6020B (TOTAL)	7440-38-2	0.0015	0.00061	0.011	mg/L				0.01	MCL	Yes
	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.11	mg/L				0.05	MCL	Yes
	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.11	mg/L				0.05	MCL	Yes
OB/OD Area Monitoring Wells													
CMW14	Chromium	6020B (TOTAL)	7440-47-3	0.010	0.00030	0.078	mg/L				0.05	WQCC	Yes
	Chromium	6020B (DISSOLVED)	7440-47-3	0.010	0.00030	0.060	mg/L				0.05	WQCC	Yes
CMW17	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.9	mg/L				1	WQCC	Yes
KMW11	Arsenic	6020B (TOTAL)	7440-38-2	0.0015	0.00061	0.028	mg/L				0.01	MCL	Yes

Table 5-6: April 2012 Mercury and Metals Detected Above Regulatory Health Standards

ANALYTICAL METHOD 6020													
Well ID	**Analyte**	**Analytical Method**	**CASRN**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
KMW11	Arsenic	6020B (DISSOLVED)	7440-38-2	0.0015	0.00061	0.026	mg/L				0.01	MCL	Yes
KMW11	Thallium	6020B (DISSOLVED)	7440-28-0	0.0050	0.00016	0.0021	mg/L	J	J	J	0.002	MCL	Yes
KMW12	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	1.2	mg/L				1	WQCC	Yes
KMW12	Manganese	6020B (TOTAL)	7439-96-5	0.0050	0.00027	0.68	mg/L				0.2	WQCC	Yes
KMW12	Manganese	6020B (DISSOLVED)	7439-96-5	0.0050	0.00027	0.72	mg/L				0.2	WQCC	Yes
Northern Area Bedrock Monitoring Wells													
EMW04	Chromium	6020B (TOTAL)	7440-47-3	0.010	0.00030	0.19	mg/L				0.05	WQCC	Yes
EMW04	Iron	6020B (TOTAL)	7439-89-6	0.10	0.048	2.2	mg/L				1	WQCC	Yes
TMW02	Selenium	6020B (TOTAL)	7782-49-2	0.0050	0.0015	0.080	mg/L				0.05	MCL	Yes
TMW02	Selenium	6020B (DISSOLVED)	7782-49-2	0.0050	0.0015	0.082	mg/L				0.05	MCL	Yes
TMW16	Thallium	6020B (DISSOLVED)	7440-28-0	0.0050	0.00016	0.0081	mg/L				0.002	MCL	Yes
TMW40D	Thallium	6020B (DISSOLVED)	7440-28-0	0.0050	0.00016	0.0040	mg/L	J	J	J	0.002	MCL	Yes

ANALYTICAL METHOD 7470													
Well ID	**Analyte**	**Analytical Method**	**CASNR**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used (mg/L)**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells													
CMW02	Mercury	7470 (DISSOLVED)	7439-97-6	0.00020	0.00005	0.00018	mg/L	J	J	J	0.002	MCL	No
Northern Area Alluvial Monitoring Wells													
TMW10	Mercury	7470 (TOTAL)	7439-97-6	0.00020	0.00002	0.00027	mg/L				0.002	MCL	No
Northern Area Bedrock Monitoring Wells													
TMW25	Mercury	7470 (DISSOLVED)	7439-97-6	0.00020	0.00005	0.00005	mg/L	J	J	J	0.002	MCL	No
TMW39D	Mercury	7470 (TOTAL)	7439-97-6	0.00020	0.00002	0.00010	mg/L	J	J	J	0.002	MCL	No

Abbreviations: CASRN = Chemical Abstract Services Registry Number, RL = Reporting Limit, DL= Detection Limit, MCL = Maximum Contaminant Limit, WQCC = New Mexico Water Quality Control Commission, V Flag = Validation Flag, mg/L = milligrams per liter

Flags and Qualifiers: J = Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts

Table 5-7: April 2012 Pesticide Compounds Detected

ANALYTICAL METHOD 8081A												
Well ID	**Analyte**	**CASNR**	**RL**	**DL**	**Result**	**Units**	**Lab Flag**	**V Flag**	**Final Flag**	**Value Used**	**Standard Used**	**Standard Exceeded**
OB/OD Area Monitoring Wells												
CMW24	alpha-Chlordane	5103-71-9	0.010	0.0031	0.025	ug/L	m			N/A	N/A	N/A
Northern Area Alluvial Monitoring Wells												
MW22D	Methoxychlor	72-43-5	0.010	0.0030	0.0072	ug/L	Jm	J	J	40	MCL	No
MW23	DDE, p,p'-	72-55-9	0.016	0.0043	0.0073	ug/L	J	J	J	0.2	CA	No
TMW47	DDE, p,p'-	72-55-9	0.010	0.0026	0.032	ug/L				0.2	CA	No
Northern Area Bedrock Monitoring Wells												
TMW37	Endrin aldehyde	7421-93-4	0.010	0.0035	0.016	ug/L				N/A	N/A	N/A

Abbreviations: CASRN = Chemical Abstract Services Registry Number, RL = Reporting Limit, DL= Detection Limit, MCL = Maximum Contaminant Limit, N/A = Not Applicable, CA = Carcinogenic Regional Screening Level, ug/L = micrograms per liter

Flags and Qualifiers: J = Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts. m = Manual Integration used to determine area response.

Table 5-8: October 2010 - April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag
OB/OD Area Wells										
CMW02	Nitrate	14797-55-8	1.34	J	3.0		3.1		1.1	
CMW10	Nitrate	14797-55-8	4.02		3.7		4.1	J	3.7	
	Nitrite	14797-65-0	ND		0.21	J	ND		ND	
CMW14	Nitrate	14797-55-8	ND		2.0		ND		0.30	
CMW17	Nitrate	14797-55-8	0.0323		2.0		2.4		2.5	
CMW18	Nitrate	14797-55-8	6.19	J	0.098	J	4.5		3.8	
CMW19	Nitrate	14797-55-8	ND		0.095	J	ND		ND	
	Nitrite	14797-65-0	0.059	J	ND		ND		ND	
CMW22	Nitrate	14797-55-8	ND		0.089	J	ND		0.26	J
CMW25	Nitrite	14797-65-0	ND		ND		0.27	J	ND	
KMW09	Nitrate	14797-55-8	ND		0.36	J	ND		0.61	
	Nitrite	14797-65-0	ND		0.26	J	ND		ND	
KMW10	Nitrate	14797-55-8	8.6	J	9.2		10	J	9.0	
KMW11	Nitrate	14797-55-8	0.262		0.26	J	0.21	J	0.24	J
KMW12	Nitrate	14797-55-8	0.223	J	ND		0.51		0.34	
	Nitrite	14797-65-0	0.056	J	ND		0.39		ND	
Northern Area Alluvial Wells										
BGMW01	Nitrate	14797-55-8	NA		NA		NA		1.9	
BGMW02	Nitrate	14797-55-8	NA		NA		NA		18	
BGMW03	Nitrate	14797-55-8	NA		NA		NA		8.3	
	Nitrite	14797-65-0	NA		NA		NA		0.35	
FW31	Nitrate	14797-55-8	0.0039		0.091	J	0.19	J	0.29	J
	Nitrite	14797-65-0	ND		ND		0.22	J	ND	
FW35	Nitrate	14797-55-8	0.951		0.98		0.88	J	0.99	
MW01	Nitrate	14797-55-8	7.16	J	7.1		7.5		6.4	
MW02	Nitrate	14797-55-8	0.98		0.75		1.4		1.4	
MW03	Nitrate	14797-55-8	11.5	J	12		10		10	
MW18D	Nitrate	14797-55-8	ND		ND		0.18	J	ND	
MW20	Nitrate	14797-55-8	28.9	J	29	J	21		23	

Table 5-8: October 2010 - April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag
MW20	Nitrite	14797-65-0	6.48	J	4.9	J	7.0		4.3	
MW22D	Nitrate	14797-55-8	18.4	J	24		28		23	
	Nitrite	14797-65-0	ND		ND		0.16	J	ND	
MW22S	Nitrate	14797-55-8	26.2	J	26	J	25		22	
MW23	Nitrate	14797-55-8	NA		NA		ND		0.42	
TMW01	Nitrate	14797-55-8	7.66	J	8.9		9.3		8.8	
	Nitrite	14797-65-0	ND		0.19	J	ND		ND	
TMW03	Nitrate	14797-55-8	142	J	ND		160		150	
	Nitrite	14797-65-0	0.056	J	3.1		0.49		0.58	
TMW04	Nitrate	14797-55-8	42.5	J	46	J	49		8.1	
TMW06	Nitrate	14797-55-8	26.2	J	21		25		15	
TMW07	Nitrate	14797-55-8	0.309		0.98		9.2	J	0.21	J
	Nitrite	14797-65-0	ND		ND		0.56	J	ND	
TMW08	Nitrate	14797-55-8	2.37	J	5.0		4.0		4.6	
TMW10	Nitrate	14797-55-8	0.488		0.21	J	0.25	J	0.21	J
TMW11	Nitrate	14797-55-8	1.36		3.5	J	4.8	J	5.2	
TMW13	Nitrate	14797-55-8	1.58		2.0	J	1.9		1.7	
TMW15	Nitrate	14797-55-8	0.985		1.6		3.3	J	5.0	
TMW21	Nitrate	14797-55-8	7.39	J	50		8.2		7.8	
	Nitrite	14797-65-0	ND		0.83		ND		ND	
TMW22	Nitrate	14797-55-8	9.15	J	9.5		11		11	
TMW23	Nitrate	14797-55-8	33	J	33	J	35		32	
	Nitrite	14797-65-0	ND		0.20	J	ND		ND	
TMW24	Nitrate	14797-55-8	ND		ND		0.16	J	ND	
TMW25	Nitrate	14797-55-8	0.621		0.80		1.2		0.67	
TMW29	Nitrate	14797-55-8	4.26		3.5		4.0		3.7	
TMW29	Nitrite	14797-65-0	ND		0.53		ND		ND	
TMW31S	Nitrate	14797-55-8	7.59	J	4.8	J	8.4		7.7	
	Nitrite	14797-65-0	ND		ND		0.13	J	ND	
TMW34	Nitrate	14797-55-8	40.2	J	47		51	J	50	

Table 5-8: October 2010 - April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag
TMW35	Nitrate	14797-55-8	18.7	J	22		23	J	20	
TMW39S	Nitrate	14797-55-8	NA		NA		9.8	J	8.6	
TMW40S*	Nitrate	14797-55-8	NA		NA		28*		100*	
	Nitrite	14797-65-0	NA		NA		6.9*		1.6*	
TMW41	Nitrate	14797-55-8	NA		NA		5.7	J	6.2	
TMW43	Nitrate	14797-55-8	NA		NA		NA		10	
	Nitrite	14797-65-0	NA		NA		NA		0.19	
TMW44	Nitrate	14797-55-8	NA		NA		NA		46	
TMW45	Nitrate	14797-55-8	NA		NA		NA		5.5	
TMW46	Nitrate	14797-55-8	NA		NA		NA		97	
TMW47	Nitrate	14797-55-8	NA		NA		NA		18	
Northern Area Bedrock Wells										
EMW02	Nitrate	14797-55-8	0.407	J	0.20	J	0.87		0.55	
EMW03	Nitrate	14797-55-8	ND		0.16	J	ND		ND	
EMW04	Nitrate	14797-55-8	3.39	J	3.1		2.2	J	ND	
TMW02	Nitrate	14797-55-8	90.6	J	100		110	J	99	
TMW14A	Nitrate	14797-55-8	ND		0.077	J	17		ND	
	Nitrite	14797-65-0	ND		0.19	J	ND		ND	
TMW17	Nitrate	14797-55-8	ND		ND		0.23	J	ND	
TMW30	Nitrate	14797-55-8	18.9	J	19		18		15	
TMW31D	Nitrate	14797-55-8	14.5	J	16		ND		16	
TMW32	Nitrate	14797-55-8	1.26		1.4		1.2		ND	
	Nitrite	14797-65-0	0.0176	J	0.22	J	0.27	J	ND	
TMW36	Nitrate	14797-55-8	ND		0.093	J	ND		ND	
TMW37	Nitrate	14797-55-8	ND		ND		0.14	J	ND	
TMW39D	Nitrate	14797-55-8	NA		NA		9.4	J	7.6	
	Nitrite	14797-65-0	NA		NA		0.62	J	ND	
TMW40D	Nitrate	14797-55-8	NA		NA		2.8		2.1	
	Nitrite	14797-65-0	NA		NA		0.38		0.34	
TMW48	Nitrate	14797-55-8	NA		NA		20	J	50	

Table 5-8: October 2010 - April 2012 Nitrate and Nitrite Detected

ANALYTICAL METHOD 300.0										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag	Result (mg/L)	Flag
TMW48	Nitrite	14797-65-0	NA		NA		0.20	J	ND	
TMW49	Nitrate	14797-55-8	NA		NA		8.4		1.3	

Notes: *TMW40S was likely contaminated during drilling. These results may not accurately represent chemical concentrations in the alluvial aquifer. See Section 5.6.6.
October 2010 primary samples were analyzed by ANA-Lab Corp.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, NA = Not Applicable, ND = Not Detected

Table 5-9: October 2010 - April 2012 Total Explosives Detected

ANALYTICAL METHOD 8330 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
OB/OD Area Wells										
CMW04	Dinitrobenzene, 1,3-	99-65-0	ND		3.3		ND		4.6	
CMW14	Dinitrobenzene, 1,3-	99-65-0	ND		2.2		ND		1.2	
	Methyl-2,4,6-trinitrophenylnitramine	479-45-8	ND		14		ND		ND	
	Nitrobenzene	98-95-3	ND		ND		ND		0.098	J
	Trinitrotoluene, 2,4,6-	118-96-7	ND		1.7		ND		ND	
CMW17	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	1.48		1.1		1.8		ND	
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0	ND		ND		0.20	J	ND	
CMW18	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	1.95		1.7	J	2.3		2.4*	J
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	2.48		1.8	J	2.7		2.7*	J
	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	59.6		48		70.1		58*	
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0	15.8		14		20.9		15*	
	Trinitrotoluene, 2,4,6-	118-96-7	ND		0.17	J	ND		0.049*	J
CMW19	Dinitrobenzene, 1,3-	99-65-0	ND		11	J	ND		6.3	
	Tetryl (Trinitrophenylmethylnitramine)	479-45-8	ND		ND		ND		0.52	
CMW23	Nitrotoluene, o-	88-72-2	0.205	J	ND		ND		ND	
	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.24		ND	
CMW24	Dinitrobenzene, 1,3-	99-65-0	ND		12		ND		32**	
	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	ND		ND		0.064	J	0.36**	
KMW09	Dinitrobenzene, 1,3-	99-65-0	ND		12		ND		8.8	
	Tetryl (Trinitrophenylmethylnitramine)	479-45-8	ND		ND		0.47	J	ND	
	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		ND		2.5	
KMW11	Dinitrobenzene, 1,3-	99-65-0	ND		ND		ND		0.30	
Northern Area Alluvial Wells										
FW35	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.14		ND	
MW01	Dinitrobenzene, 1,3-	99-65-0	ND		0.26	J	ND		ND	
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	ND		0.13	J	ND		ND	
	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.097	J	ND	
MW02	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.30		ND	
MW03	Dinitrobenzene, 1,3-	99-65-0	ND		ND		ND		0.46	

Table 5-9: October 2010 - April 2012 Total Explosives Detected

ANALYTICAL METHOD 8330 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
MW18D	Dinitrobenzene, 1,3-	99-65-0	ND		40		ND		4.5	
MW22S	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	ND		0.072	J	ND		ND	
	Nitrotoluene, p-	99-99-0	ND		0.32	J	ND		ND	
	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.34		ND	
SMW01	Dinitrobenzene, 1,3-	99-65-0	ND		0.096	J	ND		ND	
TMW03	Dinitrobenzene, 1,3-	99-65-0	ND		0.036	J	0.20		ND***	
	Dinitrotoluene, 2,4-	121-14-2	ND		0.35	J	0.36		0.40***	
	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	0.777		0.68	J	0.74		0.72***	
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	1.38		1.0	J	1.2		ND***	
	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	497		360		466		250***	
	Nitrobenzene	98-95-3	ND		7.4		ND		ND***	
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0	126		5.0		5.9	J	3.5***	J
	Trinitrobenzene, 1,3,5-	99-35-4	2.00		1.5	J	0.51		ND***	
TMW04	Dinitrotoluene, 2,4-	121-14-2	ND		0.091	J	0.14		ND	
	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	1.85		1.8		1.5		1.5	J
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	2.61		2.2		2.2		1.6	J
	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	2.17		17		2.3		ND	
	Trinitrobenzene, 1,3,5-	99-35-4	6.55		6.4		1.4		2.8	J
TMW06	Dinitrobenzene, 1,3-	99-65-0	ND		ND		ND		0.29	
TMW11	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	ND		0.12	J	0.14		ND	
TMW21	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	ND		ND		ND		1.0	
	Trinitrobenzene, 1,3,5-	99-35-4	ND		ND		ND		0.12	J
TMW23	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	50.2	J	50		93.3		36	
TMW26	Dinitrobenzene, 1,3-	99-65-0	ND		1.3		ND		ND	
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	ND		0.043	J	ND		ND	
TMW31S	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.15		ND	
TMW41	Trinitrotoluene, 2,4,6-	118-96-7	NA		NA		0.11		ND	
TMW43	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	NA		NA		ND		2.5	
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0	NA		NA		ND		0.12	J
TMW44	Trinitrobenzene, 1,3,5-	99-35-4	NA		NA		ND		0.26	J

Table 5-9: October 2010 - April 2012 Total Explosives Detected

ANALYTICAL METHOD 8330 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Northern Area Bedrock Wells										
EMW01	Dinitrobenzene, 1,3-	99-65-0	ND		ND		ND		0.20	
	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	ND		ND		ND		0.048	J
EMW03	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	ND		0.030	J	ND		ND	
	Nitrobenzene	98-95-3	ND		0.089	J	ND		ND	
TMW02	Trinitrobenzene, 1,3,5-	99-35-4	ND		ND		ND		0.059	J
	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	ND		ND		ND		0.075	J
TMW14A	Dinitrobenzene, 1,3-	99-65-0	ND		1.3		ND		0.65	
TMW16	Trinitrotoluene, 2,4,6-	118-96-7	ND		ND		0.18		ND	
TMW18	Methyl-2,4,6-trinitrophenylnitramine	479-45-8	ND		0.23	J	ND		ND	
TMW19	Dinitrobenzene, 1,3-	99-65-0	ND		0.48		ND		ND	
	Trinitrobenzene, 1,3,5-	99-35-4	ND		0.23		ND		ND	
TMW30	Dinitrobenzene, 1,3-	99-65-0	ND		ND		ND		0.10	J
TMW32	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	ND		ND		ND		0.11	J
TMW36	Dinitrobenzene, 1,3-	99-65-0	ND		0.40	J	ND		ND	
	Trinitrobenzene, 1,3,5-	99-35-4	ND		0.072	J	ND		ND	
TMW37	Dinitrobenzene, 1,3-	99-65-0	ND		0.76		ND		ND	
TMW38	Dinitrobenzene, 1,3-	99-65-0	NA		NA		ND		1.9	J

Notes: *A laboratory error was made in the original analysis of the CMW18 sample. However, both the blind duplicate sample and triplicate sample were analyzed correctly and results closely match historical data. The blind duplicate (FW03) sample results are given here. See Section 5.6.2.

**The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, CMW24's results were reported by the laboratory under the wrong well identification (TMW03). The results shown in the table above are the correct results for CMW24. See Section 5.6.5.

***The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, TMW03's results were reported by the laboratory under the wrong well identification (CMW24). The results shown in the table above are the correct results for TMW03. See Section 5.6.5.

October 2010 primary samples were analyzed by ANA-Lab Corp.

Table 5-10: October 2010 - April 2012 Perchlorate Detected

ANALYTICAL METHOD 6850 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
OB/OD Area Wells										
CMW02	Perchlorate	14797-73-0	0.689		0.815		ND		0.796	
CMW10	Perchlorate	14797-73-0	0.920		0.942		ND		0.845	
CMW14	Perchlorate	14797-73-0	ND		0.0676	J	ND		ND	
CMW17	Perchlorate	14797-73-0	ND		1.88		1.8	J	1.87	
CMW18	Perchlorate	14797-73-0	4.10		4.19		4.5		5.23	
CMW23	Perchlorate	14797-73-0	ND		0.144	J	ND		ND	
KMW10	Perchlorate	14797-73-0	2.26		2.50		2.3		2.42	
KMW11	Perchlorate	14797-73-0	0.555		0.546		ND		0.368	
Nothern Area Alluvial Wells										
BGMW03	Perchlorate	14797-73-0	NA		NA		NA		0.579	
MW18D	Perchlorate	14797-73-0	ND		ND		ND		0.500	
MW20	Perchlorate	14797-73-0	0.825		0.746		ND		0.684	
MW22D	Perchlorate	14797-73-0	0.237		0.434		ND		0.219	
MW22S	Perchlorate	14797-73-0	0.352		0.143	J	ND		0.133	J
SMW01	Perchlorate	14797-73-0	1.66		ND		ND		ND	
TMW01	Perchlorate	14797-73-0	288		ND		270		296	
TMW03	Perchlorate	14797-73-0	0.869		1.00		ND		0.962	
TMW04	Perchlorate	14797-73-0	0.398		0.360		ND		0.371	
TMW11	Perchlorate	14797-73-0	ND		0.143	J	ND		0.176	J
TMW13	Perchlorate	14797-73-0	ND		0.0743	J	ND		0.0838	J
TMW15	Perchlorate	14797-73-0	ND		0.117	J	ND		0.166	J
TMW23	Perchlorate	14797-73-0	ND		0.053	J	ND		0.113	J
TMW27	Perchlorate	14797-73-0	0.312		ND		ND		ND	
TMW29	Perchlorate	14797-73-0	ND		0.123	J	ND		0.112	J
TMW31S	Perchlorate	14797-73-0	554		495		500		507	
TMW34	Perchlorate	14797-73-0	0.282		0.280		ND		0.288	
TMW35	Perchlorate	14797-73-0	ND		ND		ND		0.214	
TMW39S	Perchlorate	14797-73-0	NA		NA		640		702	
TMW40S*	Perchlorate	14797-73-0	NA		NA		140*		76.8*	

Table 5-10: October 2010 - April 2012 Perchlorate Detected

ANALYTICAL METHOD 6850 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
TMW41	Perchlorate	14797-73-0	NA		NA		1.5	J	1.68	
TMW45	Perchlorate	14797-73-0	NA		NA		ND		0.368	
TMW46	Perchlorate	14797-73-0	NA		NA		ND		0.712	
Nothern Area Bedrock Wells										
EMW01	Perchlorate	14797-73-0	ND		0.0796	J	ND		ND	
TMW02	Perchlorate	14797-73-0	1.51		1.44		1.5	J	17.5	
TMW30	Perchlorate	14797-73-0	5010		3280		2700		2570	
TMW31D	Perchlorate	14797-73-0	1660		1450		1400		1480	
TMW32	Perchlorate	14797-73-0	2680		254		190		114	
TMW39D	Perchlorate	14797-73-0	NA		NA		810		765	
TMW40D	Perchlorate	14797-73-0	NA		NA		320		283	
TMW48	Perchlorate	14797-73-0	NA		NA		1600		1640	
TMW49	Perchlorate	14797-73-0	NA		NA		2100		2570	

Notes: *TMW40S was likely contaminated during drilling. These results may not accurately represent chemical concentrations in the alluvial aquifer. See Section 5.6.6.
October 2010 primary samples were analyzed by ANA-Lab Corp.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, NA = Not Applicable, ND = Not Detected

Table 5-11: October 2010 - April 2012 Volatile Organic Compounds Detected

ANALYTICAL METHOD 8260 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
OB/OD Area Wells										
CMW04	Carbon Disulfide	75-15-0	0.660	J	ND		1.5		ND	
CMW07	Carbon Disulfide	75-15-0	ND		ND		0.88	J	ND	
CMW10	Acetone	67-64-1	8.16	J	ND		ND		ND	
CMW14	Acetone	67-64-1	12.3		15	J	5.0	J	ND	
	Benzene	71-43-2	1.18		1.2		0.58	J	0.36	J
	Chloromethane	74-87-3	1.75		2.0		1.4		2.0	
CMW17	Acetone	67-64-1	5.49	J	ND		ND		ND	
CMW19	Carbon Disulfide	75-15-0	0.770		ND		0.93	J	ND	
CMW22	Dichloroethylene, 1,2-cis-	156-59-2	ND		ND		0.68	J	ND	
	Dichloroethylene, 1,2-trans-	156-60-5	ND		ND		ND		0.20	J
	Toluene	108-88-3	ND		ND		ND		0.21	J
CMW23	Acetone	67-64-1	5.57	J	ND		ND		ND	
	Toluene	108-88-3	ND		ND		ND		0.35	J
CMW24	Carbon Disulfide	75-15-0	18.9		7.1		6.4		51	
CMW25	Carbon Disulfide	75-15-0	1.91		ND		ND		0.71	J
KMW10	Toluene	108-88-3	ND		ND		ND		0.55	J
KMW11	Tetrachloroethylene	127-18-4	1.73		2.5		1.4		1.7	
KMW12	Carbon Disulfide	75-15-0	0.520	J	ND		ND		ND	
	Toluene	108-88-3	1.17	J	ND		ND		5.4	
Northern Area Alluvial Wells										
MW01	Dichloroethane, 1,2-	107-06-2	1.61	J	0.46	J	1.6		1.5	
MW18D	Acetone	67-64-1	ND		ND		ND		3.8	J
	Benzene	71-43-2	ND		ND		0.71	J	ND	
	Carbon Disulfide	75-15-0	ND		ND		3.2		ND	
	Dichloroethane, 1,2-	107-06-2	97.1	J	110		87		110	
MW20	Dichloroethane, 1,2-	107-06-2	11.6	J	8.9		9.6		9.0	
	Acetone	67-64-1	ND		ND		ND		5.7	
MW22D	Dichloroethane, 1,2-	107-06-2	ND		ND		ND		1.2	

Table 5-11: October 2010 - April 2012 Volatile Organic Compounds Detected

ANALYTICAL METHOD 8260 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
MW22S	Dichloroethane, 1,1-	75-34-3	0.560		ND		0.83	J	0.92	J
	Dichloroethane, 1,2-	107-06-2	0.690	J	ND		0.61	J	0.61	J
	Trichloroethane, 1,1,1-	71-55-6	4.14		4.3		4.0		2.3	
MW23	Toluene	108-88-3	NA		NA		ND		920	
MW24	Toluene	108-88-3	NA		NA		ND		75	
TMW06	Dichloroethane, 1,2-	107-06-2	ND		ND		ND		0.20	J
TMW08	Acetone	67-64-1	ND		ND		ND		2.7	J
TMW23	Chloroform	67-66-3	ND		ND		0.48	J	ND	
	Toluene	108-88-3	ND		ND		0.22	J	ND	
TMW24	Carbon Disulfide	75-15-0	ND		ND		0.40	J	ND	
TMW26	Ethylbenzene	100-41-4	ND		0.30	J	ND		ND	
TMW27	Carbon Disulfide	75-15-0	0.630		ND		0.55	J	ND	
TMW28	Carbon Disulfide	75-15-0	0.550		ND		ND		ND	
TMW29	Methyl tert-Butyl Ether (MTBE)	1634-04-4	ND		ND		ND		0.32	J
TMW33	Dichloroethane, 1,2-	107-06-2	30.8	J	40		33		42	
	Toluene	108-88-3	ND		1.3		ND		ND	
TMW34	Bromochloromethane	74-97-5	ND		ND		ND		0.44	J
TMW35	Dichloroethane, 1,2-	107-06-2	1.44	J	ND		1.4		1.9	
TMW39S	Dichloroethylene, 1,2-cis-	156-59-2	NA		NA		5.1		ND	
	m,p-Xylene	179601-23-1	NA		NA		1.1	J	ND	
	Toluene	108-88-3	NA		NA		0.57	J	ND	
	Vinyl chloride	75-01-4	NA		NA		3.8		ND	
Northern Area Bedrock Wells										
EMW03	Acetone	67-64-1	5.48	J	ND		ND		ND	
EMW04	Toluene	108-88-3	1.07		0.46	J	ND		ND	
TMW14A	2-Hexanone	591-78-6	ND		ND		3.4	J	ND	
	Carbon Disulfide	75-15-0	ND		ND		1.3		1.4	
TMW16	Toluene	108-88-3	63.9		ND		ND		0.54	J
TMW17	Carbon Disulfide	75-15-0	23.5		1.5		ND		7.8	

Table 5-11: October 2010 - April 2012 Volatile Organic Compounds Detected

ANALYTICAL METHOD 8260 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
TMW17	Chloromethane	74-87-3	1.91		ND		ND		0.43	J
	Dichloroethylene, 1,2-trans-	156-60-5	ND		ND		ND		0.24	J
	Toluene	108-88-3	ND		ND		0.83	J	ND	
TMW18	Chloroform	67-66-3	ND		ND		1.2	J	ND	
	Tetrachloroethylene	127-18-4	ND		ND		0.38	J	ND	
	Toluene	108-88-3	520		120		47	J	58	
TMW19	Toluene	108-88-3	14.7		ND		ND		ND	
TMW31D	Acetone	67-64-1	ND		ND		ND		2.2	J
TMW32	Toluene	108-88-3	1.00	J	ND		ND		ND	
TMW36	Methyl Isobutyl Ketone	108-10-1	1.60	J	ND		ND		ND	
	Toluene	108-88-3	1180	J	490		210	J	89	
TMW37	Carbon Disulfide	75-15-0	5.94		2.2		3.5	J	6.2	
	Methyl Isobutyl Ketone	108-10-1	2.24	J	ND		ND		ND	
	Toluene	108-88-3	1120	J	120		47	J	19	

Notes: October 2010 primary samples were analyzed by ANA-Lab Corp.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, NA = Not Applicable, ND = Not Detected

Table 5-12: October 2010 - April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
OB/OD Area Wells										
CMW10	Bis(2-ethylhexyl)phthalate	117-81-7	1.68	J	ND		0.29	J	8.5	
	Caprolactam	105-60-2	ND		140		ND		ND	
	Dibutyl Phthalate	84-74-2	2.66	J	ND		ND		ND	
CMW14	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.32	J	ND	
	Caprolactam	105-60-2	8.86	J	ND		5.6		ND	
	Dinitrotoluene, 2,4-	121-14-2	ND		ND		0.38	J	ND	
	Nitroso-di-N-propylamine, N-	621-64-7	ND		ND		0.33	J	ND	
	Phenol	108-95-2	ND		0.20	J	ND		ND	
CMW18	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		ND		0.35	J
CMW19	Bis(2-ethylhexyl)phthalate	117-81-7	3.07		ND		0.53	J	0.28	J
	Dibutyl Phthalate	84-74-2	2.17	J	ND		ND		ND	
CMW24	Bis(2-ethylhexyl)phthalate	117-81-7	1.69	J	ND		0.42	J	ND	
	Dinitrotoluene, 2,4-	121-14-2	ND		ND		ND		0.28*	J
	Nitrosodiphenylamine, N-	86-30-6	ND		0.44	J	0.49	J	ND*	
KMW10	Bis(2-ethylhexyl)phthalate	117-81-7	ND		0.53	J	0.48	J	ND	
	Dibutyl phthalate	84-74-2	ND		0.24	J	ND		ND	
	Diethyl Phthalate	84-66-2	ND		ND		ND		0.36	J
Northern Area Alluvial Wells										
BGMW02	Butyl Benzyl Phthlate	85-68-7	NA		NA		NA		0.88	J
BGMW03	Bis(2-chloroisopropyl) ether	108-60-1	NA		NA		NA		0.25	J
	Bis(2-ethylhexyl) phthalate	117-81-7	NA		NA		NA		0.91	J
FW31	Bis(2-ethylhexyl)phthalate	117-81-7	ND		0.41	J	1.9	J	ND	
FW35	Bis(2-ethylhexyl)phthalate	117-81-7	ND		0.64	J	0.42	J	ND	
	Dibutyl Phthalate	84-74-2	ND		ND		0.22	J	ND	
	Diethyl Phthalate	84-66-2	ND		ND		0.62	J	ND	
MW20	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.39	J	ND	
	Dibutyl Phthalate	84-74-2	ND		ND		0.23	J	ND	

Table 5-12: October 2010 - April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
MW22D	Bis(2-chloro-1-methylethyl) ether	108-60-1	ND		ND		0.28	J	ND	
	Bis(2-ethylhexyl)phthalate	117-81-7	2.25	J	ND		ND		ND	
	Nitroso-di-N-propylamine, N-	621-64-7	ND		ND		0.31	J	ND	
MW22S	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.29	J	1.2	J
	Dibutyl Phthalate	84-74-2	ND		ND		0.24	J	0.26	J
MW23	m,p-Cresol	MEPH34	NA		NA		ND		2.5	J
	Phenol	108-95-2	NA		NA		ND		23	
SMW01	Diethyl Phthalate	84-66-2	ND		ND		ND		0.20	J
TMW03	Dinitrophenol, 2,4-	51-28-5	45.2		9.6	J	37		19**	
	Dinitrotoluene, 2,4-	121-14-2	ND		0.41	J	0.96	J	0.32**	J
	Phenol	108-95-2	1.26	J	ND		ND		ND**	
	Nitrosodiphenylamine, N-	86-30-6	ND		ND		ND		0.67**	J
TMW04	2-Nitroaniline	88-74-4	ND		0.30	J	0.32	J	0.29	J
	Dinitrotoluene, 2,4-	121-14-2	ND		1.8	J	ND		0.62	J
	Dinitrotoluene, 2,6-	606-20-2	ND		ND		0.29	J	ND	
	Phenol	108-95-2	1.14	J	ND		ND		ND	
TMW06	Cresol, o-	95-48-7	3.01	J	ND		ND		ND	
	Dinitrotoluene, 2,4-	121-14-2	ND		ND		0.28	J	ND	
TMW07	Bis(2-ethylhexyl)phthalate	117-81-7	ND		6.2	J	0.64	J	ND	
	Dibutyl Phthalate	84-74-2	ND		ND		0.24	J	ND	
	Diethyl Phthalate	84-66-2	ND		ND		ND		0.17	J
	Di-n-octyl phthalate	117-84-0	ND		0.82	J	ND		ND	
	Nitrosodiphenylamine, N-	86-30-6	ND		ND		ND		0.18	J
TMW15	Bis(2-ethylhexyl)phthalate	117-81-7	1.51	J	ND		ND		0.30	J
	Dibutyl Phthalate	84-74-2	2.42	J	ND		ND		ND	
	Diethyl Phthalate	84-66-2	ND		ND		0.23	J	ND	
TMW22	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.85	J	1.3	J
TMW31S	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.066	J	ND	
	Diethyl Phthalate	84-66-2	ND		ND		0.026	J	0.31	J

Table 5-12: October 2010 - April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
TMW33	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		1.4	J	3.6	J
	Dibutyl Phthalate	84-74-2	ND		ND		0.22	J	ND	
	Diethyl phthalate	84-66-2	ND		0.41	J	ND		ND	
TMW35	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.31	J	ND	
	Dimethyl phthalate	131-11-3	ND		0.27	J	ND		ND	
	Phenol	108-95-2	ND		ND		0.31	J	ND	
TMW39S	Bis(2-ethylhexyl)phthalate	117-81-7	NA		NA		6.5		ND	
	Caprolactam	105-60-2	NA		NA		46		ND	
	Diethyl Phthalate	84-66-2	NA		NA		ND		0.40	J
	Phenol	108-95-2	NA		NA		0.21	J	ND	
TMW41	Bis(2-ethylhexyl)phthalate	117-81-7	NA		NA		0.65	J	ND	
	Cresol, o-	95-48-7	NA		NA		ND		2.3	J
	m,p-Cresol	MEPH34	NA		NA		ND		0.52	J
TMW43	Bis(2-ethylhexyl) phthalate	117-81-7	NA		NA		ND		0.53	J
TMW44	Bis(2-ethylhexyl)phthalate	117-81-7	NA		NA		ND		3.2	J
TMW45	Bis(2-ethylhexyl) phthalate	117-81-7	NA		NA		ND		1.5	J
Northern Area Bedrock Wells										
EMW01	Bis(2-ethylhexyl)phthalate	117-81-7	2.26	J	ND		0.28	J	0.45	J
	Diethyl Phthalate	84-66-2	ND		ND		0.28	J	ND	
EMW02	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		ND		0.33	J
	Dimethyl phthalate	131-11-3	ND		0.22	J	ND		ND	
EMW03	Phenol	108-95-2	1.18	J	ND		ND		ND	
EMW04	Bis(2-chloro-1-methylethyl) ether	108-60-1	ND		ND		9.3		ND	
	Bis(2-ethylhexyl)phthalate	117-81-7	2.18	J	ND		0.48	J	ND	
	Cresol, o-	95-48-7	ND		ND		1.2	J	ND	
TMW14A	Bis(2-ethylhexyl)phthalate	117-81-7	2.38	J	ND		8.5		ND	
TMW16	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		0.74	J	0.40	J
	Dibutyl Phthalate	84-74-2	ND		ND		0.26	J	ND	

Table 5-12: October 2010 - April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
TMW18	Acetophenone	98-86-2	10.5		ND		5.1		ND	
	Bis(2-ethylhexyl)phthalate	117-81-7	3.10	J	ND		1.7	J	3.9	J
	Diethyl Phthalate	84-66-2	ND		ND		0.30	J	ND	
	Nitroso-di-N-propylamine, N-	621-64-7	ND		ND		1.1	J	ND	
TMW19	2,6-Dinitrotoluene	606-20-2	ND		0.39	J	ND		ND	
	Bis(2-ethylhexyl)phthalate	117-81-7	ND		21	J	1.8	J	13	J
	Dibutyl Phthalate	84-74-2	ND		ND		0.32	J	ND	
	Diethyl Phthalate	84-66-2	ND		ND		0.30	J	ND	
TMW30	Bis(2-ethylhexyl)phthalate	117-81-7	3.96	J	ND		0.32	J	ND	
TMW31D	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		ND		0.27	J
	Dimethyl phthalate	131-11-3	ND		0.23	J	ND		ND	
TMW32	Bis(2-ethylhexyl)phthalate	117-81-7	1.58	J	ND		ND		ND	
	Dibutyl Phthalate	84-74-2	3.16	J	ND		ND		ND	
	Dimethyl phthalate	131-11-3	ND		0.25	J	ND		ND	
	Phenol	108-95-2	2.85	J	ND		ND		ND	
TMW36	Bis(2-ethylhexyl)phthalate	117-81-7	1.57	J	ND		0.64	J	ND	
	Cresol, o-	95-48-7	1.84	J	0.58	J	1.3	J	ND	
	Dibutyl Phthalate	84-74-2	3.62	J	ND		ND		ND	
	Diethyl Phthalate	84-66-2	ND		ND		0.27	J	ND	
	Isophorone	78-59-1	1.20	J	ND		ND		ND	
	M,P-CRESOL	MEPH34	1.69	J	ND		ND		ND	
	Phenol	108-95-2	11.8		ND		ND		ND	
TMW37	2-Methylphenol	95-48-7	ND		5.6		3.7	J	ND	
	Bis(2-ethylhexyl)phthalate	117-81-7	ND		ND		3.6	J	ND	
	Cresol, o-	95-48-7	ND		5.6		3.7	J	ND	
	m,p-Cresol	MEPH34	ND		9.6	J	ND		ND	
	Phenol	108-95-2	1.16	J	0.29	J	ND		ND	
TMW38	Bis(2-ethylhexyl)phthalate	117-81-7	NA		NA		1.3	J	ND	
	Cresol, o-	95-48-7	NA		NA		0.52	J	ND	
	Diethyl Phthalate	84-66-2	NA		NA		ND		0.41	J

Table 5-12: October 2010 - April 2012 Semi-Volatile Organic Compounds Detected

ANALYTICAL METHOD 8270 (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
TMW38	Dinitrotoluene, 2,6-	606-20-2	NA		NA		ND		1.7	J
TMW39D	Diethyl Phthalate	84-66-2	NA		NA		ND		0.31	J
TMW48	Bis(2-ethylhexyl)phthalate	117-81-7	NA		NA		0.32	J	ND	
TMW49	Bis(2-ethylhexyl)phthalate	117-81-7	NA		NA		3.0	J	ND	
	Cresol, o-	95-48-7	NA		NA		0.69	J	ND	
	Diethyl Phthalate	84-66-2	NA		NA		0.76	J	ND	

Notes: *The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, CMW24's results were reported by the laboratory under the wrong well identification (TMW03). The results shown in the table above are the correct results for CMW24. See Section 5.6.5.
**The sample bottles for CMW24 and TMW03 were accidentally switched in the laboratory. Thus, TMW03's results were reported by the laboratory under the wrong well identification (CMW24). The results shown in the table above are the correct results for TMW03. See Section 5.6.5.
October 2010 primary samples were analyzed by ANA-Lab Corp.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, NA = Not Applicable, ND = Not Detected

Table 5-13: October 2010 - April 2012 Diesel and Gasoline Range Organic Compounds Detected

ANALYTICAL METHOD 8015 DRO (Results in ug/L)										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Northern Area Alluvial Well										
TMW36	DIESEL RANGE ORGANICS	DRO	117	J	ND		ND		ND	

Notes: October 2010 primary samples were analyzed by ANA-Lab Corp.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, NA = Not Applicable, ND = Not Detected

Table 5-14: October 2010 - April 2012 Pesticides Detected

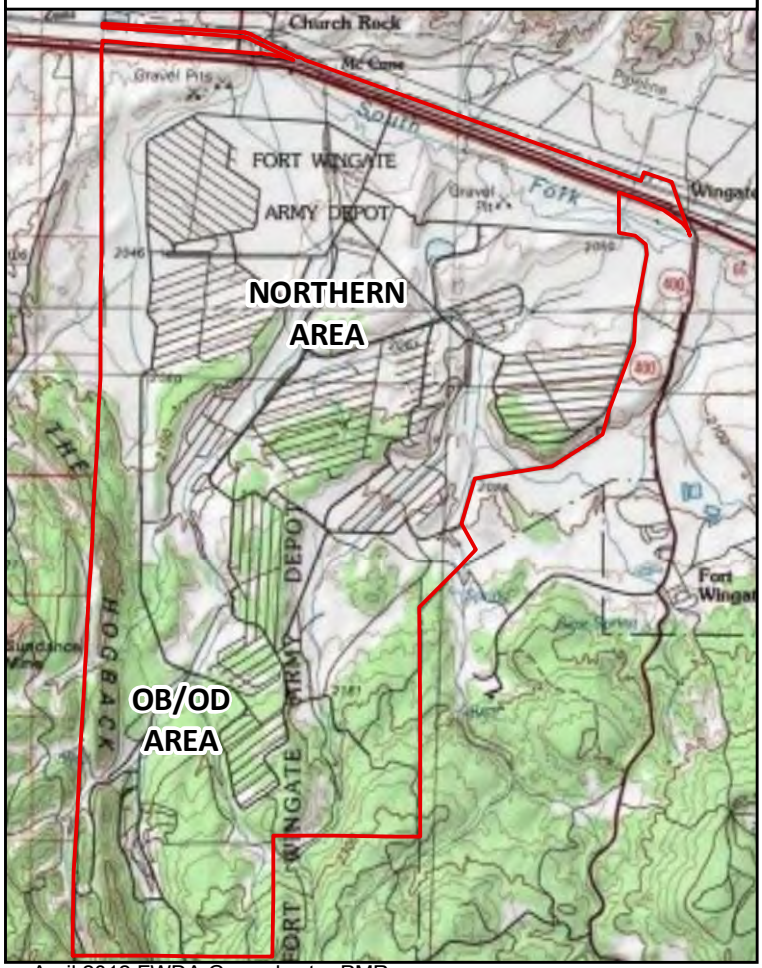
ANALYTICAL METHOD 8081										
			October 2010		April 2011		October 2011		April 2012	
Well ID	Analyte	CASNR	Result	Flag	Result	Flag	Result	Flag	Result	Flag
OB/OD Area Wells										
CMW02	Heptachlor	76-44-8	ND		0.038		ND		ND	
CMW24	alpha-Chlordane	5103-71-9	ND		ND		ND		0.025	
	DDD	72-54-8	ND		ND		0.0096	J	ND	
CMW25	Methoxychlor	72-43-5	ND		0.011		ND		ND	
Northern Area Alluvial Wells										
MW01	Heptachlor	76-44-8	ND		0.028	J	ND		ND	
MW22D	Methoxychlor	72-43-5	ND		0.0037	J	ND		0.0072	J
MW22S	Aldrin	309-00-2	ND		0.0064	J	ND		ND	
	gamma-Chlordane	5103-74-2	ND		0.0041	J	ND		ND	
	Methoxychlor	72-43-5	ND		0.040	J	ND		ND	
MW23	DDE, p,p'-	72-55-9	NA		NA		ND		0.0073	J
TMW23	Methoxychlor	72-43-5	ND		0.028	J	ND		ND	
TMW39S	delta-BHC	319-86-8	NA		NA		0.021		ND	
TMW41	delta-BHC	319-86-8	NA		NA		0.010		ND	
TMW47	DDE, p,p'-	72-55-9	NA		NA		ND		0.032	
Northern Area Bedrock Wells										
TMW30	delta-BHC	319-86-8	ND		ND		0.0064	J	ND	
TMW36	Heptachlor	76-44-8	ND		0.0038	J	ND		ND	
TMW37	Endrin aldehyde	7421-93-4	ND		ND		ND		0.016	
TMW49	delta-BHC	319-86-8	NA		NA		0.024		ND	

Notes: October 2010 primary samples were analyzed by ANA-Lab Corp.

Abbreviations: CASRN = Chemical Abstracts Service Registry Number, NA = Not Applicable, ND = Not Detected

FIGURES

SECTION 1
FIGURES



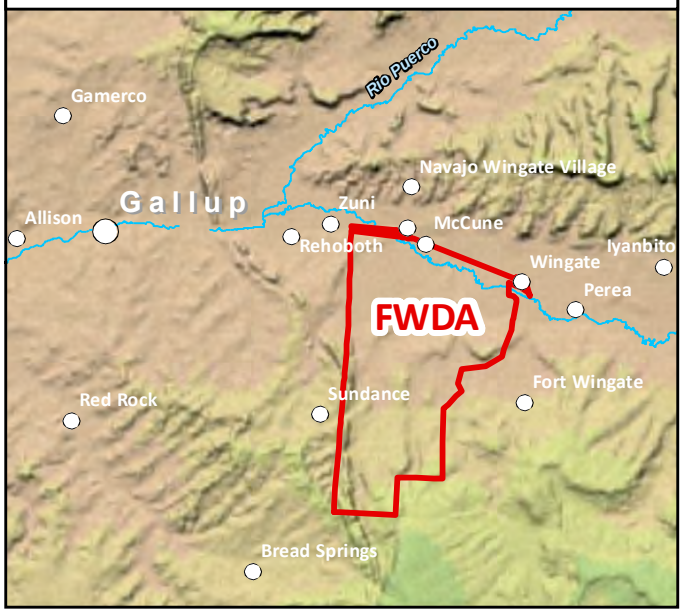


FIGURE 1-1
Ft. Wingate Depot Activity
Installation Boundary in Red

N

Map Date: March 2012

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Thomas McTighe
Reviewed by: David Brown

US Army Corps of Engineers
Albuquerque District

SECTION 2
FIGURES

NORTHERN AREA WELLS

OB/OD AREA WELLS

MW24
MW23
Wingate90
Wingate89
Wingate91
PZ09
PZ10
TMW27
PZ06
PZ05
BGMW03
PZ03
PZ02
PZ01
BGMW02
TWM28
BGMW01
PZ07
PZ08
SMW01
TMW26
TMW10
MW22S
MW22D
TMW33
TMW34
FW26
TMW25
MW20
MW18S
MW18D
TMW21
TMW19
TMW18
TMW13
TMW16
TMW11
TMW17
TMW14A
TMW15
TMW35
TMW08
TMW24
MW02
MW01
MW03
TMW23
TMW06
TMW22
TMW07
TMW29
TMW38
TMW03
TMW04
TMW36
TMW40S
TMW40D
TMW41
TMW39S
TMW39D
TMW02
TMW48
TMW31S
TMW31D
TMW01
TMW30
TMW32
TMW49
TMW37
EMW01
EMW04
EMW03
EMW02
FW35
FW31
CMW25
FW24
CMW23
CMW22
CMW24
KMW11
CMW21
KMW10
CMW16
KMW13
KMW09
KMW12
CMW19
CMW17
CMW18
CMW14
FW38
CMW10
CMW20
CMW07
CMW06
CMW04
CMW02

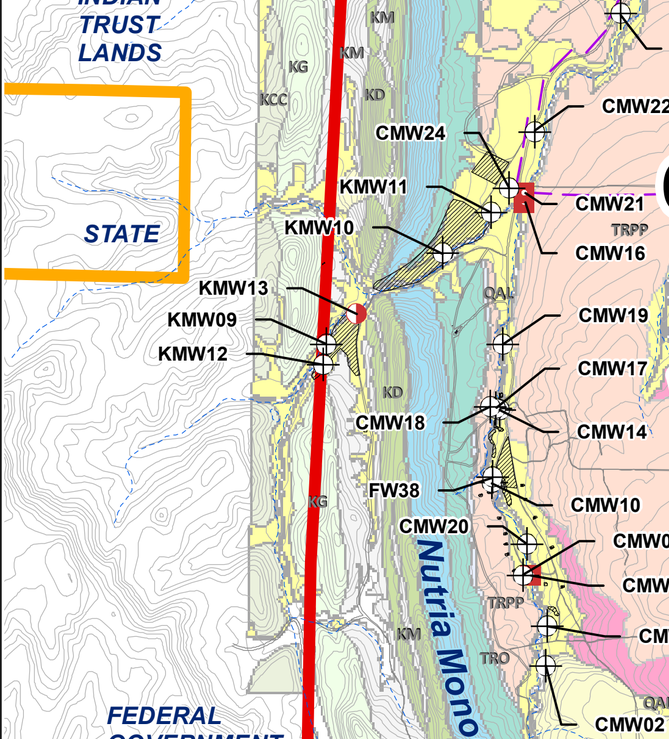
PATENTED (PRIVATE)
PATENTED (PRIVATE)
PATENTED (PRIVATE)
PATENTED (PRIVATE)
FEDERAL GOVERNMENT BLM MANAGED
FEDERAL GOVERNMENT BLM MANAGED
FEDERAL GOVERNMENT INDIAN TRUST LANDS
STATE
FEDERAL GOVERNMENT BLM MANAGED

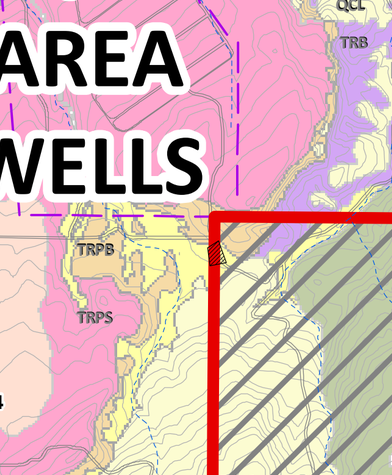
Nutria Monocline
Nutria Monocline
South Fork Rio Puerco
Atchison Topeka Santa Fe

FWDA SURFACE GEOLOGY

- QAL, QUATERNARY ALLUVIAL DEPOSITS
- QCL, QUATERNARY COLLUVIAL AND GRAVEL DEPOSITS
- KCC, CREVASSE CANYON FORMATION
- KG, GALLUP SANDSTONE
- KM, MANCOS SHALE
- KD, DAKOTA SANDSTONE
- JM, MORRISON FORMATION
- JZ, ZUNI SANDSTONE
- JE, ENTRADA SANDSTONE
- TRO, OWL ROCK FORMATION
- TRPP, PETRIFIED FOREST FORMATION - PAINTED DESERT MEMBER
- TRPS, PETRIFIED FOREST FORMATION - SONSELA SANDSTONE MEMBER
- TRPB, PETRIFIED FOREST FORMATION - BLUE MESA MEMBER
- TRB, BLUEWATER CREEK FORMATION
- TRM, SHINARUMP FORMATION AND MOENKOPI FORMATION

Ft. Wingate Army Depot Property Boundary Indicated in Red





- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL DRY MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- BURIED MONITORING WELLS
- OB/OD AREA MONITORING WELLS
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- SOLID AND HAZARDOUS WASTE MANAGEMENT UNITS
- ADJOINING PROPERTY BOUNDARY
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- TRANSFERRED FWDA PROPERTY
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 2-1
Ft. Wingate Army Depot Monitoring Well Locations

1 Miles

1 Kilometers

N

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:20,000 (1" = 1,667')
Map Date: September 26,2012

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

US Army Corps of Engineers ®
Albuquerque District

SECTION 4
FIGURES

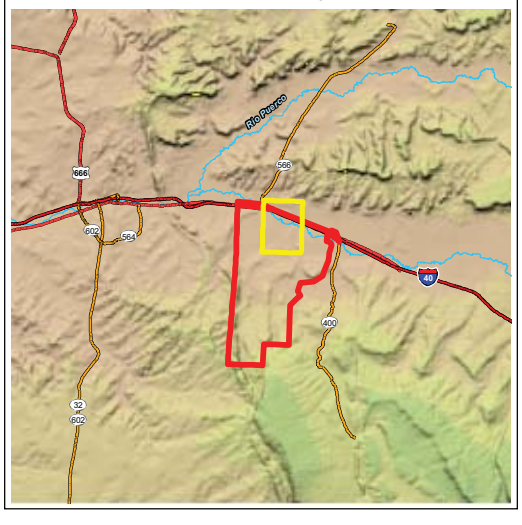
MW23 6640.08
MW24 6638.25
Wingate91 6645.94
Wingate90 6643.37
PZ10 6638.91
PZ09 6639.08
Wingate89 6648.71
PZ05 6654.75
PZ06 6658.16
TMW27 6640.38
SMW01 6641.35
PZ04 6649.20
TMW26 6651.45
PZ03 6653.45
PZ02 6652.56
TMW28 6670.93
PZ07 6670.81
PZ08 6669.78
PZ01 6651.14
TMW10 6642.86
MW22D 6642.85
MW22S 6643.14
TMW08 6643.86
TMW35 6643.10
MW02 6646.28
TMW34 6641.74
MW01 6643.96
TMW33 6643.32
MW03 6643.64
TMW25 6634.04
MW20 6642.76
TMW24 6641.78
TMW07 6643.13
TMW23 6642.30
MW18D 6643.50
TMW06 6643.73
TMW21 6644.54
TMW22 6643.16
TMW29 6645.73
TMW03 6645.55
FW35 6689.66
TMW13 6647.71
TMW04 6644.52
TMW41 6665.20
TMW11 6652.07
TMW40S 6646.43
TMW39S 6673.76
TMW15 6649.91
TMW01 6675.16
TMW31S 6673.35

South Fork Rio Puerco
Navajo Blvd
ADMINISTRATION AREA
WORK SHOP AREA
QAL
QCL
TRPP

FWDA SURFACE GEOLOGY

- QAL, QUATERNARY ALLUVIAL DEPOSITS
- QCL, QUATERNARY COLLUVIAL AND GRAVEL DEPOSITS
- TRPP, PETRIFIED FOREST FORMATION - PAINTED DESERT MEMBER

Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- GROUNDWATER ELEVATION CONTOUR (5 FT INTERVAL)
- GROUNDWATER ELEVATION CONTOUR ESTIMATE (5 FT INTERVAL)
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- 7 PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 4-1
January 2012 Northern Area Alluvial Groundwater Elevation Contour Map

0.25 Miles
0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:6,000 (1" = 500')
Map Date: September 26, 2012

Ground water measurements in US feet;
Dry, no water in wells; N.M., not measured.

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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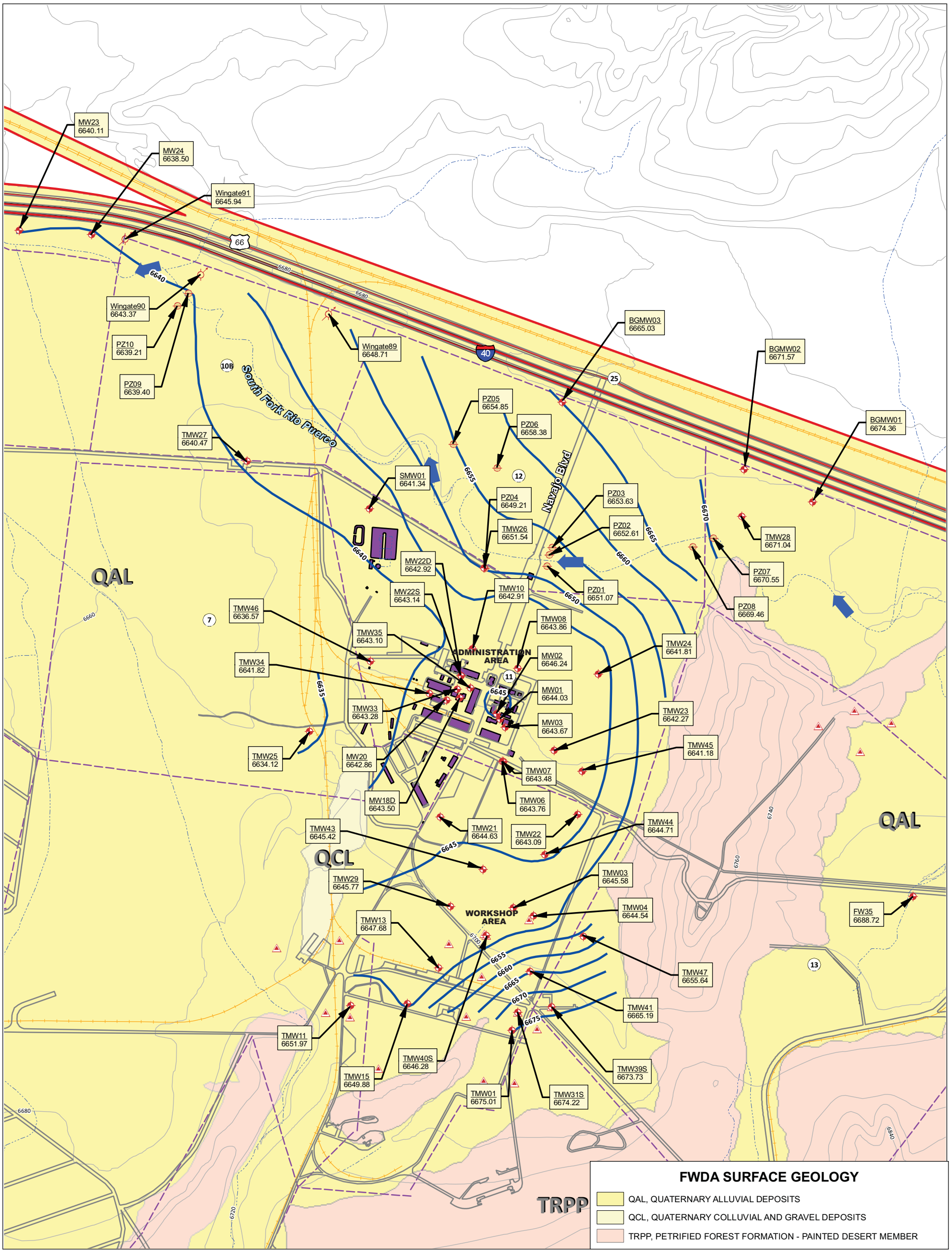
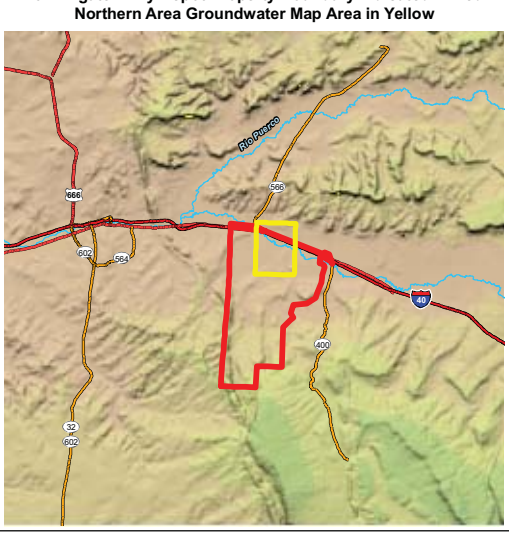
Albuquerque District



Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- GROUNDWATER ELEVATION CONTOUR (5 FT INTERVAL)
- GROUNDWATER ELEVATION CONTOUR ESTIMATE (5 FT INTERVAL)
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 4-2
April 2012 Northern Area Alluvial Groundwater Elevation Contour Map

0.25 Miles

0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:6,000 (1" = 500')
Map Date: September 26, 2012

Ground water measurements in US feet;
Dry, no water in wells; N.M., not measured.

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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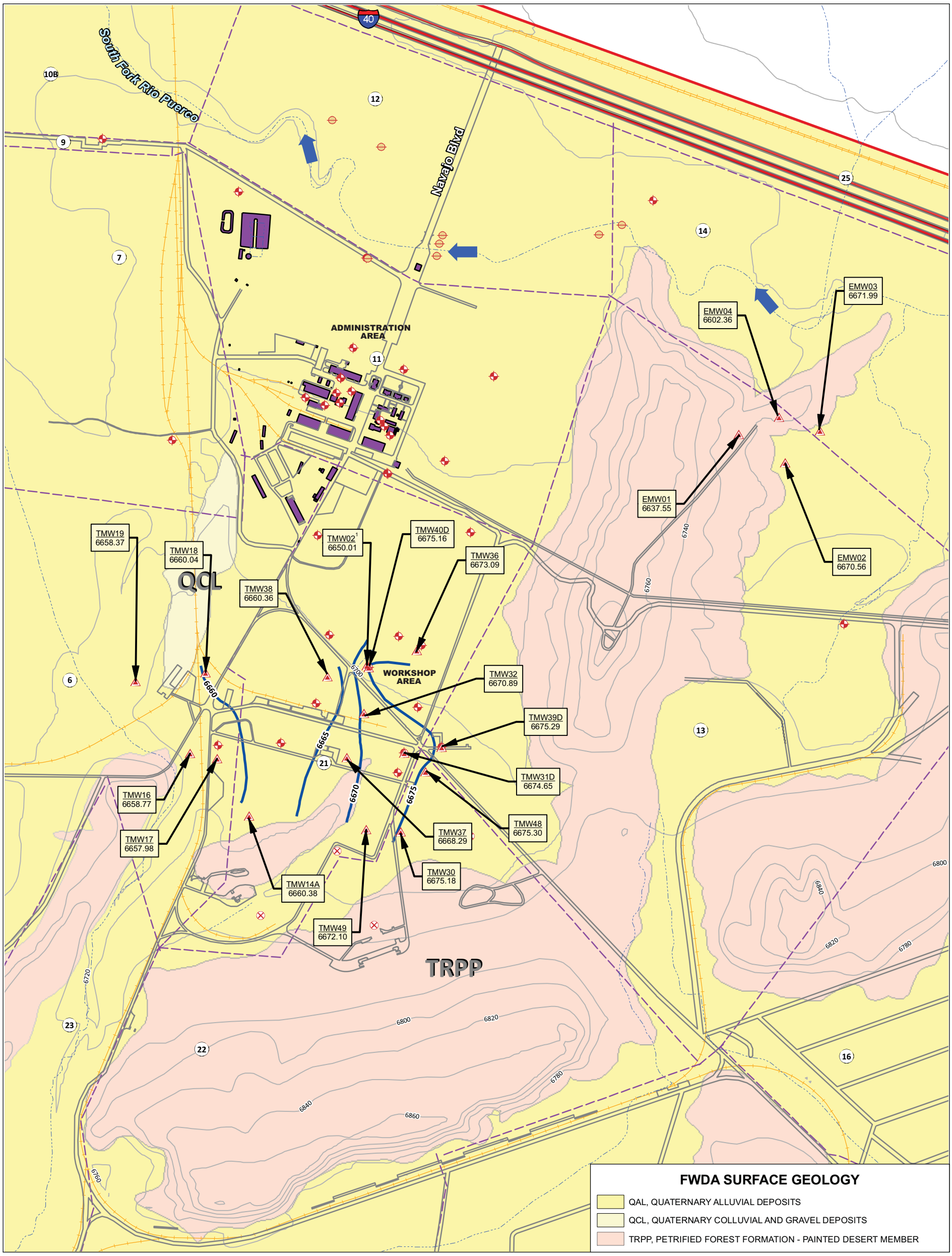
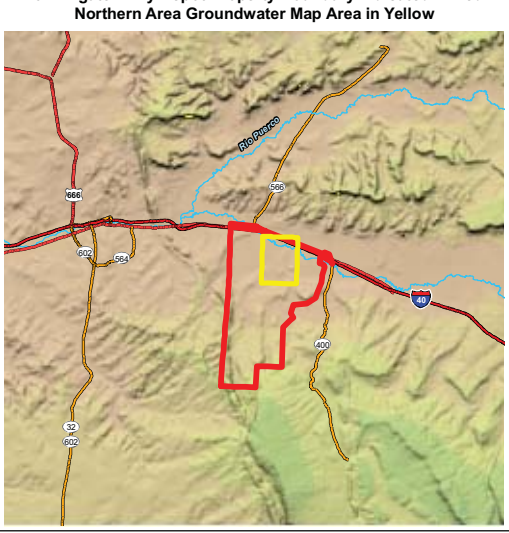
US Army Corps of Engineers
Albuquerque District



Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- DRY BOREHOLES
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- GROUNDWATER ELEVATION CONTOUR (5 FT INTERVAL)
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)
- [1] MONITOR WELL SCREENED IN POSSIBLE LOCALLY DISCONTINUOUS HYDROGEOLOGICAL UNIT.

FIGURE 4-3
January 2012 Northern Area Bedrock Groundwater Elevation Contour Map

0.25 Miles

0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

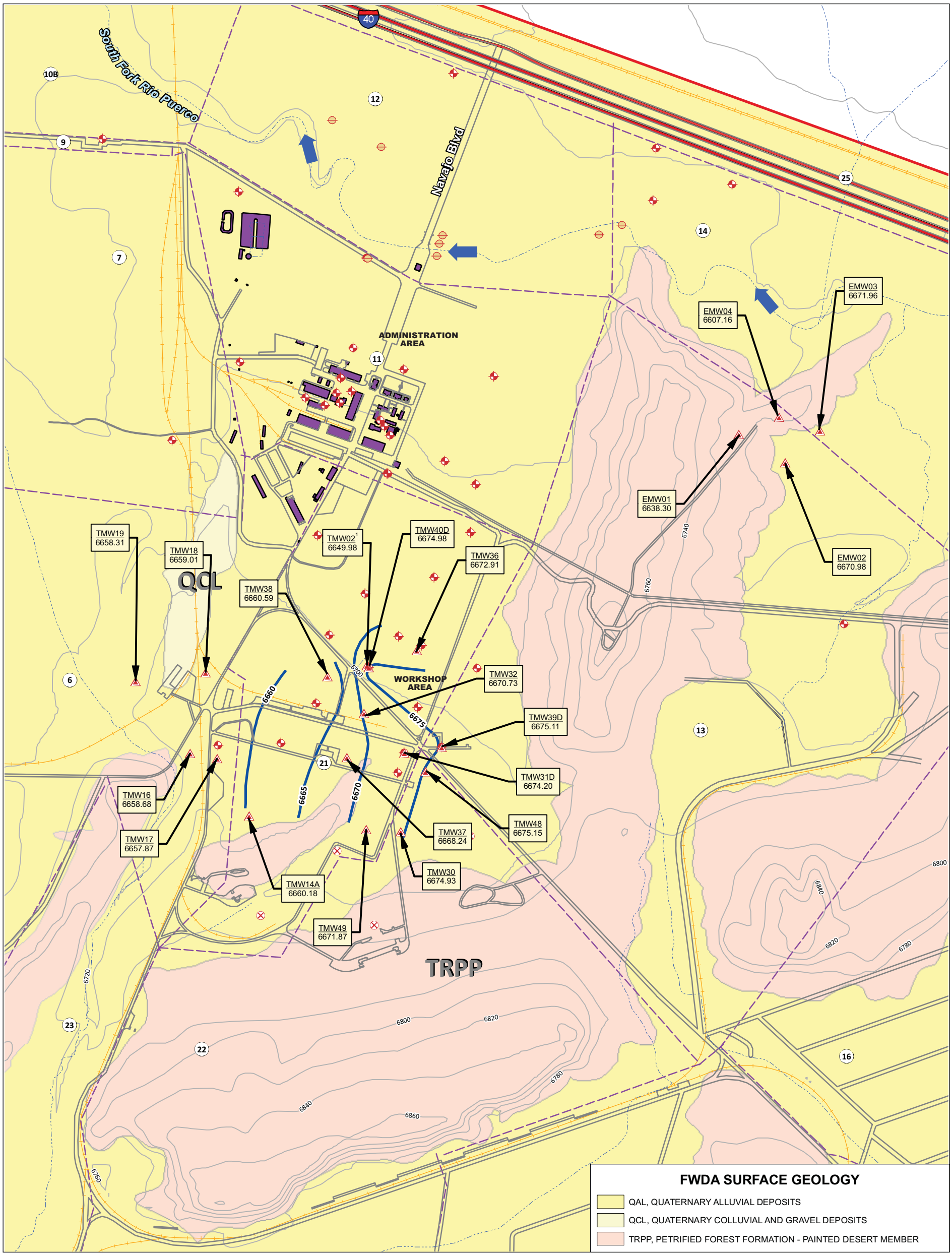
Map Scale: 1:5,400 (1" = 450')
Map Date: September 26, 2012

Ground water measurements in US feet;
Dry, no water in wells; N.M., not measured.

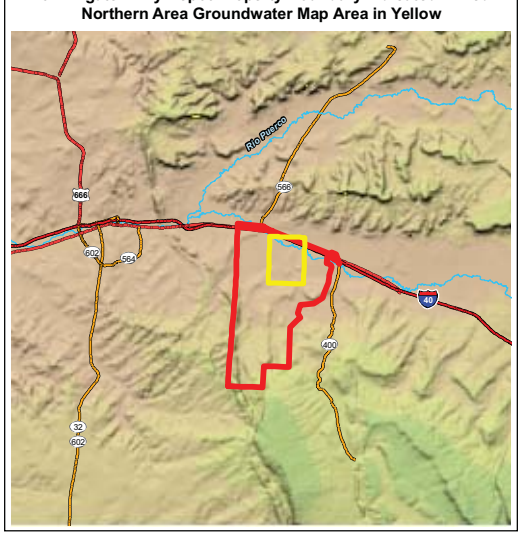
Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

US Army Corps of Engineers
Albuquerque District



Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- DRY BOREHOLES
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- GROUNDWATER ELEVATION CONTOUR (5 FT INTERVAL)
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)
- [1] MONITOR WELL SCREENED IN POSSIBLE LOCALLY DISCONTINUOUS HYDROGEOLOGICAL UNIT.

FIGURE 4-4
April 2012 Northern Area Bedrock Groundwater Elevation Contour Map

0.25 Miles

0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:5,400 (1" = 450')
Map Date: September 26, 2012

Ground water measurements in US feet;
Dry, no water in wells; N.M., not measured.

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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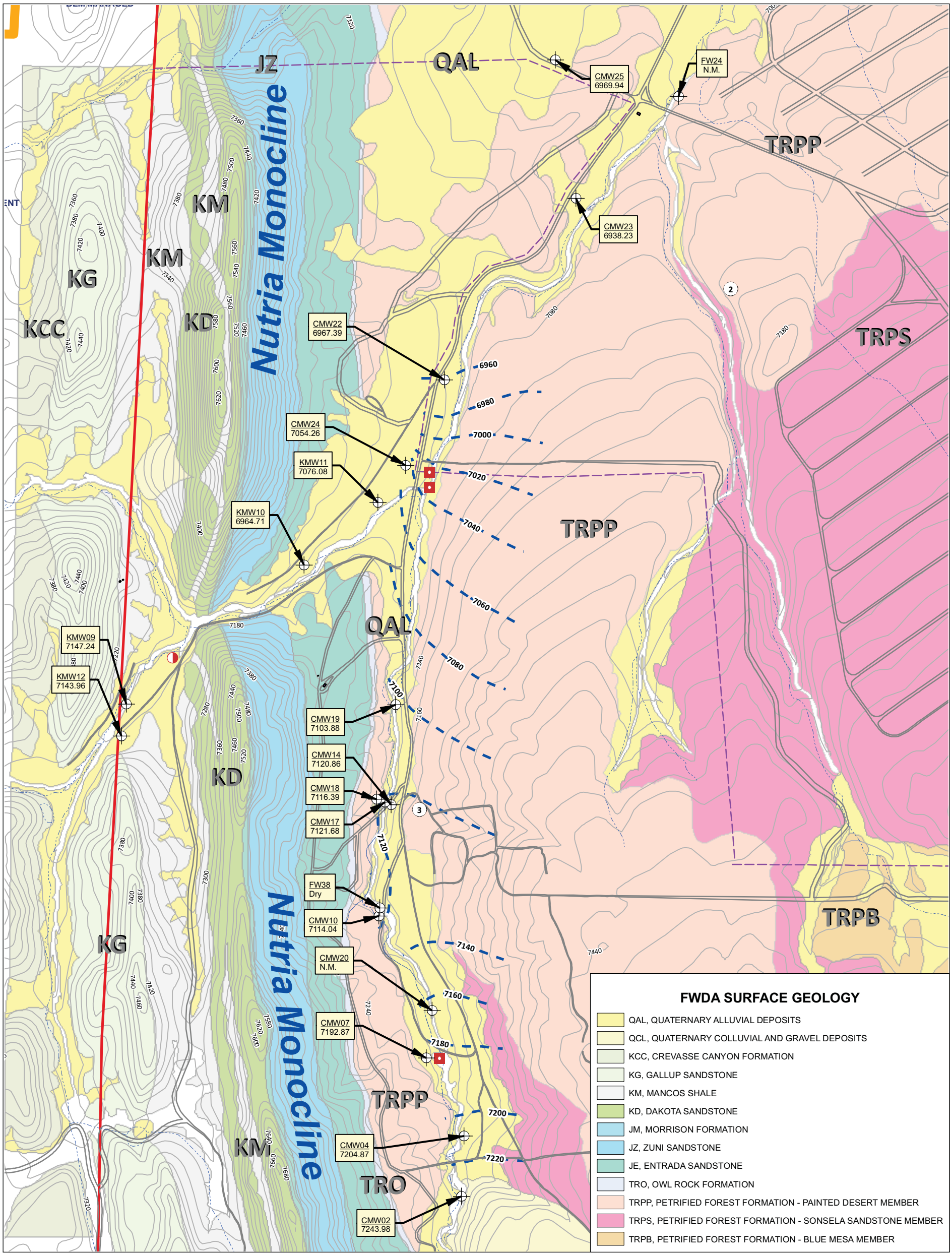
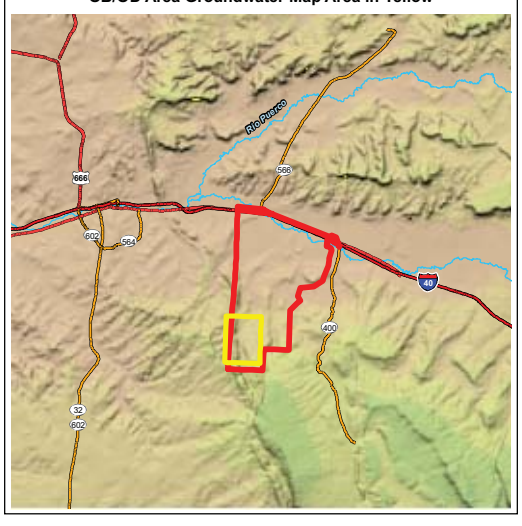
Albuquerque District



Ft. Wingate Army Depot Property Boundary Indicated in Red
OB/OD Area Groundwater Map Area in Yellow



- DRY MONITORING WELLS
- BURIED MONITORING WELLS
- OB/OD AREA MONITORING WELLS
- GROUNDWATER ELEVATION CONTOUR (ESTIMATED) (20 FT INTERVAL)
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 4-5
April 2012 OB/OD Area Groundwater Elevation Contour Map

0.25 Miles

0.25 Kilometers

State Plane Coordinate System, New Mexico West,
North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:5,400 (1" = 450')
Map Date: September 26, 2012

Ground water measurements in US feet;
Dry, no water in wells; N.M., not measured.

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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Albuquerque District

SECTION 5
FIGURES

MW23
Nitrate 0.42 mg/L
Nitrite N.D.

MW24
Nitrate N.D.
Nitrite N.D.

BGMW03
Nitrate 8.3 mg/L
Nitrite 0.35 mg/L

BGMW02
Nitrate 18 mg/L
Nitrite N.D.

BGMW01
Nitrate 1.9 mg/L
Nitrite N.D.

TMW27
Nitrate N.S.
Nitrite N.S.

TMW10
Nitrate 0.21 mg/L
Nitrite N.D.

SMW01
Nitrate N.D.
Nitrite N.D.

TMW26
Nitrate N.D.
Nitrite N.D.

TMW28
Nitrate N.S.
Nitrite N.S.

MW22D
Nitrate 23 mg/L
Nitrite N.D.

MW22S
Nitrate 22 mg/L
Nitrite N.D.

TMW35
Nitrate 20 mg/L
Nitrite N.D.

TMW33
Nitrate N.D.
Nitrite N.D.

TMW08
Nitrate 4.6 mg/L
Nitrite N.D.

TMW24
Nitrate N.D.
Nitrite N.D.

TMW46
Nitrate 97 mg/L
Nitrite N.D.

TMW34
Nitrate 50 mg/L
Nitrite N.D.

MW02
Nitrate 1.4 mg/L
Nitrite N.D.

MW03
Nitrate 10 mg/L
Nitrite N.D.

MW20
Nitrate 23 mg/L
Nitrate 4.3 mg/L

TMW23
Nitrate 32 mg/L
Nitrite N.D.

TMW25
Nitrate 0.67 mg/L
Nitrite N.D.

MW18D
Nitrate N.D.
Nitrite N.D.

TMW45
Nitrate 5.5 mg/L
Nitrite N.D.

MW01
Nitrate 6.4 mg/L
Nitrite N.D.

TMW07
Nitrate 0.21 mg/L
Nitrite N.D.

TMW21
Nitrate 7.8 mg/L
Nitrite N.D.

TMW06
Nitrate 15 mg/L
Nitrite N.D.

TMW43
Nitrate 10 mg/L
Nitrite 0.19 mg/L

TMW22
Nitrate 11 mg/L
Nitrite N.D.

FW35
Nitrate 0.99 mg/L
Nitrite N.D.

TMW29
Nitrate 3.7 mg/L
Nitrite N.D.

TMW03
Nitrate 150 mg/L
Nitrite 0.58 mg/L

TMW44
Nitrate 46 mg/L
Nitrite N.D.

TMW40S
Nitrate 100 mg/L
Nitrite 1.6 mg/L

TMW47
Nitrate 18 mg/L
Nitrite N.D.

TMW04
Nitrate 8.1 mg/L
Nitrite N.D.

TMW41
Nitrate 6.2 mg/L
Nitrite N.D.

TMW11
Nitrate 5.2 mg/L
Nitrite N.D.

TMW39S
Nitrate 8.6 mg/L
Nitrite N.D.

TMW13
Nitrate 1.7 mg/L
Nitrite N.D.

TMW31S
Nitrate 7.7 mg/L
Nitrite N.D.

TMW15
Nitrate 5.0 mg/L
Nitrite N.D.

TMW01
Nitrate 8.8 mg/L
Nitrite N.D.

QAL

QCL

TRPP

ADMINISRTATION AREA

WORKSHOP AREA

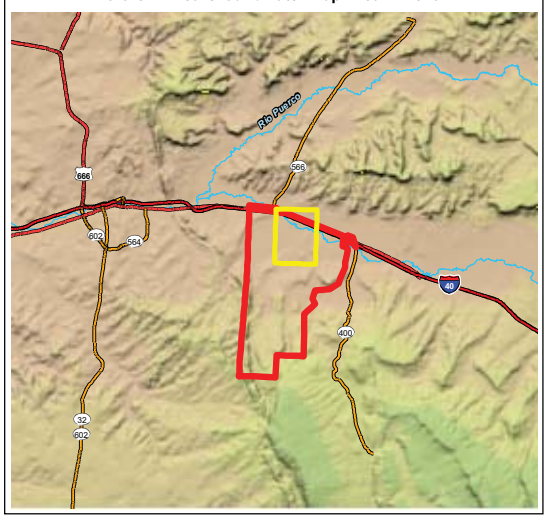
South Fork Rio Puerco

Navajo Blvd

FWDA SURFACE GEOLOGY

- QAL, QUATERNARY ALLUVIAL DEPOSITS
- QCL, QUATERNARY COLLUVIAL AND GRAVEL DEPOSITS
- TRPP, PETRIFIED FOREST FORMATION - PAINTED DESERT MEMBER

Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- NITRATE CONCENTRATION (40 mg/L INTERVAL)
- REGULATORY LIMIT FOR NITRATE (10 mg/L)
- SOLID AND HAZARDOUS WASTE MANAGEMENT UNITS
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 5-1
April 2012 Northern Area Nitrite and Nitrate Concentrations in Alluvial Groundwater

0.2 Miles

0.2 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:6,000 (1" = 500')
Map Date: September 27, 2012

Units: mg/L, milligrams per liter.
N.S., Not Sampled.
N.D., Not Detected.
Bold = Above Regulatory Limit
Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

N

US Army Corps of Engineers
Albuquerque District

South Fork Rio Puerco

Navajo Blvd

ADMINISTRATION AREA

WORKSHOP AREA

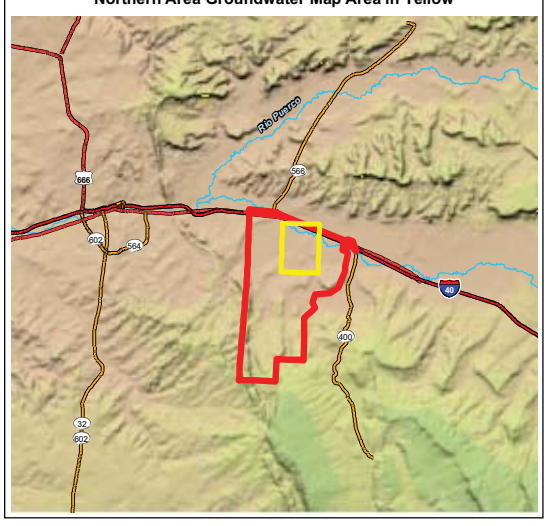
TRPP

EMW01	
Nitrate	N.S.
Nitrite	N.S.
EMW02	
Nitrate	0.55 mg/L
Nitrite	N.D.
EMW03	
Nitrate	N.D.
Nitrite	N.D.
EMW04	
Nitrate	N.D.
Nitrite	N.D.
TMW02[1]	
Nitrate	**99 mg/L**
Nitrite	N.D.
TMW16	
Nitrate	N.S.
Nitrite	N.S.
TMW17	
Nitrate	N.D.
Nitrite	N.D.
TMW18	
Nitrate	N.D.
Nitrite	N.D.
TMW19	
Nitrate	N.S.
Nitrite	N.S.
TMW30	
Nitrate	N.D.
Nitrite	0.009 mg/L
TMW31D	
Nitrate	**16 mg/L**
Nitrite	N.D.
TMW32	
Nitrate	N.D.
Nitrite	N.D.
TMW36	
Nitrate	N.D.
Nitrite	N.D.
TMW37	
Nitrate	N.D.
Nitrite	N.D.
TMW38	
Nitrate	N.D.
Nitrite	N.D.
TMW39D	
Nitrate	7.6 mg/L
Nitrite	N.D.
TMW40D	
Nitrate	2.1 mg/L
Nitrite	0.34 mg/L
TMW48	
Nitrate	**50 mg/L**
Nitrite	N.D.
TMW49	
Nitrate	1.3 mg/L
Nitrite	N.D.
TMW14A	
Nitrate	N.D.
Nitrite	N.D.

FWDA SURFACE GEOLOGY

- QAL, QUATERNARY ALLUVIAL DEPOSITS
- QCL, QUATERNARY COLLUVIAL AND GRAVEL DEPOSITS
- TRPP, PETRIFIED FOREST FORMATION - PAINTED DESERT MEMBER

Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- DRY BOREHOLES
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- NITRATE CONCENTRATION (10 mg/L INTERVAL)
- REGULATORY LIMIT FOR NITRATE (10 mg/L)
- SOLID AND HAZARDOUS WASTE MANAGEMENT UNITS
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

[1] MONITOR WELL SCREENED POSSIBLE LOCALLY DISCONTINOUS HYDROLOGICAL UNIT

FIGURE 5-2
April 2012 Northern Area Nitrite and Nitrate Concentrations in Bedrock Groundwater

0.25 Miles

0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:5,400 (1" = 450')
Map Date: September 27, 2012

Units: mg/L, milligrams per liter.
N.D., not detected.
N.S., not sampled.
Bold= Above Regulatory Limit

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

US Army Corps of Engineers
Albuquerque District

MW23
Explosives N.D.
Perchlorate N.D.

MW24
Explosives N.D.
Perchlorate N.D.

TMW27
Explosives N.S.
Perchlorate N.D.

TMW35
Explosives N.D.
Perchlorate 0.214 ug/L

TMW10
Explosives N.D.
Perchlorate N.D.

BGMW03
Explosives N.D.
Perchlorate 0.579 ug/L

BGMW02
Explosives N.D.
Perchlorate 0.510 ug/L

BGMW01
Explosives N.D.
Perchlorate N.D.

TMW26
Explosives N.D.
Perchlorate N.D.

MW02
Explosives N.D.
Perchlorate N.D.

TMW08
Explosives N.S.
Perchlorate N.D.

MW22S
Explosives N.D.
Perchlorate 0.133 ug/L

MW01
Explosives N.D.
Perchlorate N.D.

TMW28
Explosives N.S.
Perchlorate N.S.

MW22D
Explosives N.D.
Perchlorate 0.219 ug/L

MW03
Dinitrobenzene 0.46 ug/L
Perchlorate N.D.

TMW24
Explosives N.D.
Perchlorate N.D.

TMW46
Explosives N.D.
Perchlorate 0.712 ug/L

TMW33
Explosives N.D.
Perchlorate N.S.

TMW06
Dinitrobenzene, 1,3 0.29 ug/L
Perchlorate N.S.

TMW34
Explosives N.S.
Perchlorate 0.288 ug/L

TMW23
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) 36 ug/L
Perchlorate 0.113 ug/L

TMW25
Explosives N.D.
Perchlorate N.S.

TMW45
Explosives N.D.
Perchlorate 0.368 ug/L

MW20
Explosives N.D.
Perchlorate 0.684 ug/L

TMW22
Explosives N.D.
Perchlorate N.D.

MW18D
Dinitrobenzene, 1,3- 4.5 ug/L
Perchlorate 0.5 ug/L

TMW07
Explosives N.D.
Perchlorate N.S.

TMW44
Trinitrobenzene, 1,3,5- 0.26 ug/L
Perchlorate N.D.

FW35
Explosives N.D.
Perchlorate N.S.

TMW21
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) 1.0 ug/L
Trinitrobenzene, 1,3,5 0.12 ug/L
Perchlorate N.D.

TMW03
Dinitro-benzene,1,3 32 ug/L
Dinitro-toluene,2-Amino-4,6 0.72 ug/L
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) 250 ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX) 3.5 ug/L
Trinitro-benzene,1,3,5 1.8 ug/L
Perchlorate 0.962 ug/L

TMW43
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) 2.5 ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX) 0.12 ug/L
Perchlorate N.D.

TMW29
Explosives N.D.
Perchlorate 0.112 ug/L

TMW47
Explosives N.D.
Perchlorate N.D.

TMW11
Explosives N.D.
Perchlorate 0.176 ug/L

TMW04
Dinitrotoluene, 2-Amino-4,6- 1.5 ug/L
Dinitrotoluene, 4-Amino-2,6- 1.6 ug/L
Trinitrobenzene, 1,3,5- 2.8 ug/L
Perchlorate 0.37 ug/L

TMW41
Explosives N.S.
Perchlorate 1.68 ug/L

TMW02
Explosives N.S.
Perchlorate 17.5 ug/L

TMW15
Explosives N.D.
Perchlorate 0.166 ug/L

TMW40S
Explosives N.S.
Perchlorate 76.8 ug/L

TMW39S
Explosives N.D.
Perchlorate 702 ug/L

TMW13
Explosives N.S.
Perchlorate 0.0838 ug/L

TMW31S
Explosives N.D.
Perchlorate 507 ug/L

TMW01
Explosives N.D.
Perchlorate 296 ug/L

QAL
QCL
ADMINISTRATION AREA
WORKSHOP AREA
South Fork Rio Puerco
Navajo Blvd

FWDA SURFACE GEOLOGY

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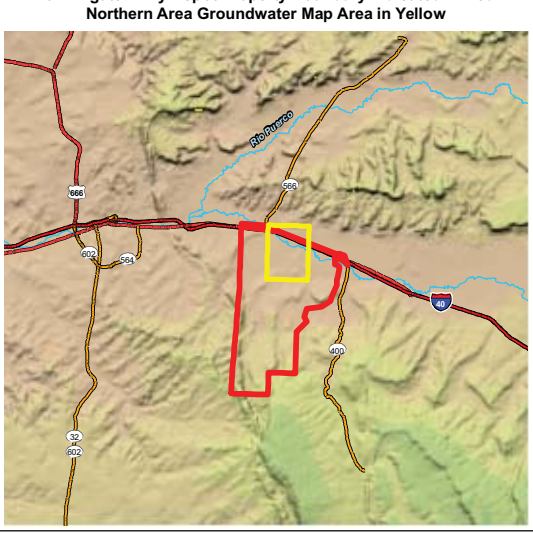
Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- RDX CONCENTRATION (40 UG/L INTERVAL)
- REGULATORY LIMIT FOR RDX (0.61 UG/L)
- SOLID AND HAZARDOUS WASTE MANAGEMENT UNITS
- ADJOINING PROPERTY BOUNDARY
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 5-3
April 2012 Northern Area Explosives and Perchlorate Concentrations in Alluvial Groundwater

0.25 Miles
0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:6,000 (1" = 500')
Map Date: September 27, 2012

Units: ug/L, micrograms per liter.
Bold= Above Regulatory Limit
N.D., Not Detected.
N.S., Not Sampled.
Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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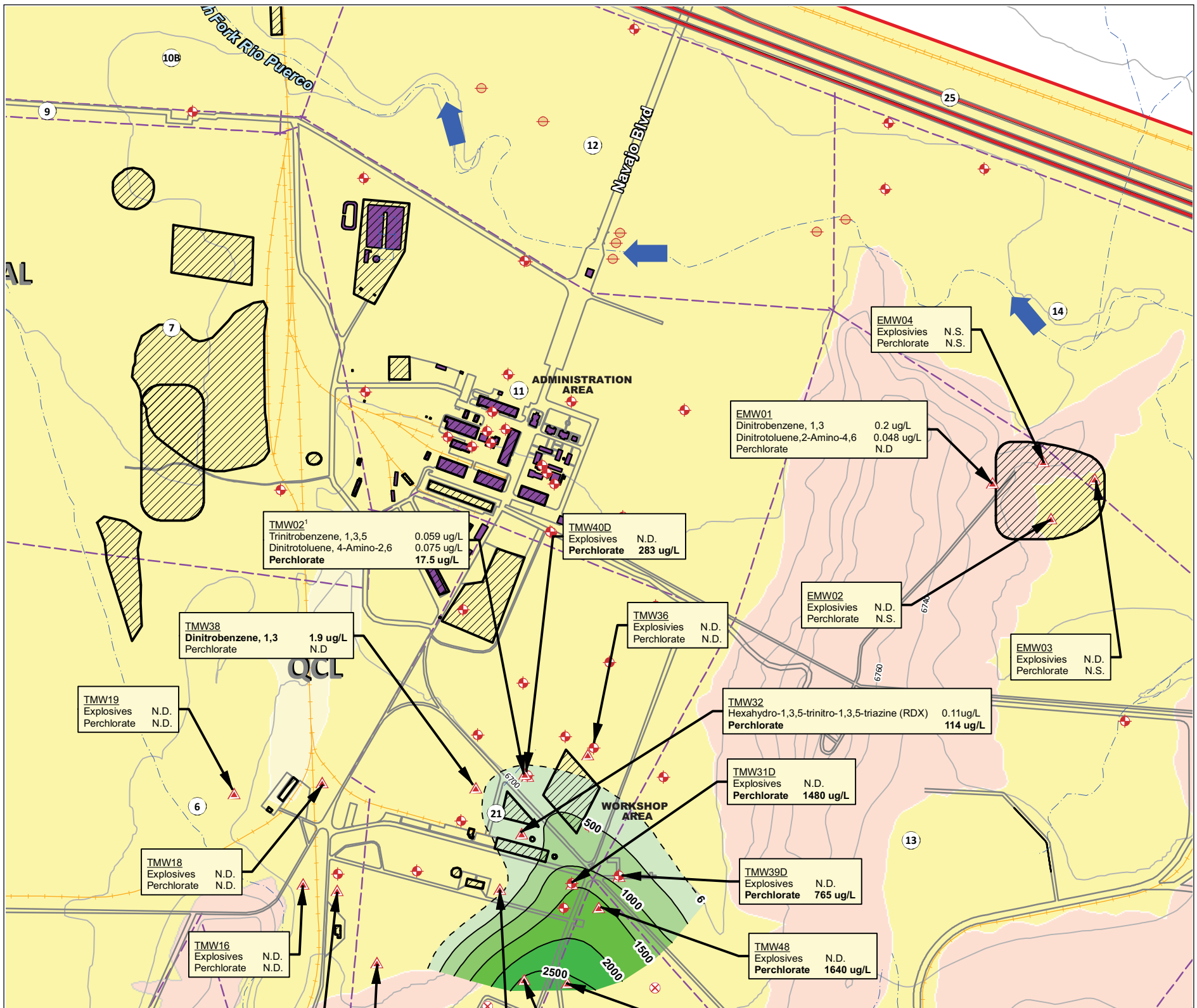
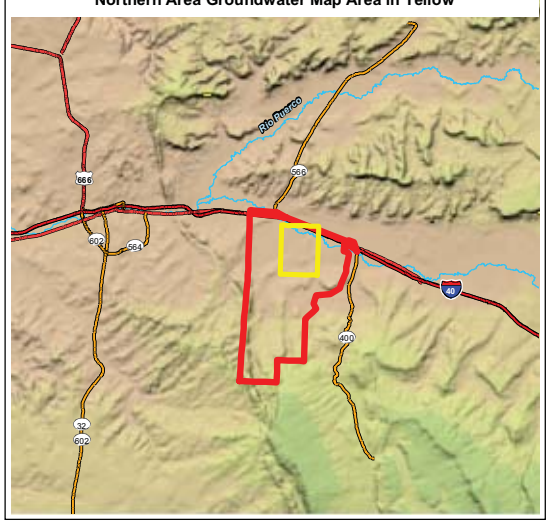
US Army Corps of Engineers
Albuquerque District



Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- DRY BOREHOLES
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- PERCHLORATE CONTOUR (500 ug/L INTERVAL)
- REGULATORY LIMIT FOR PERCHLORATE (6 ug/L)
- SOLID AND HAZARDOUS WASTE MANAGEMENT UNITS
- ADJOINING PROPERTY BOUNDARY
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- 7 PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)
- [1] MONITOR WELL SCREEND IN POSSIBLE LOCALLY DISCONTINOUS HYDROEOLOGICAL UNIT

FIGURE 5-4
April 2012 Northern Area Perchlorate Concentrations in Bedrock Groundwater

0.25 Miles
0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:5,400 (1" = 450')
Map Date: September 27, 2012

Units: ug/L, micrograms per liter.
N.D., not detected
N.S., not sampled
Bold = Above Regulatory Limit

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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US Army Corps of Engineers
Albuquerque District

MW23
Toluene 920 ug/L
m,p-Cresol 2.5 ug/L
Phenol 23 ug/L
DDE 0.0073 ug/L
GRO/DRO N.S.

MW24
Toluene 75 ug/L
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

SMW01
VOCs N.D.
Diethyl Phthalate 0.2 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW27
VOCs N.D.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

MW22S
Dichloroethane, 1,1- 0.92 ug/L
Dichloroethane, 1,2- 0.61 ug/L
Trichloroethane, 1,1,1- 2.3 ug/L
Bis(2-ethylhexyl)phthalate 1.2 ug/L
Dibutyl Phthalate 0.26 ug/L
Pesticides N.S.
GRO/DRO N.D.

MW22D
Dichloroethane, 1,2- 1.2 ug/L
SVOCS N.D.
Methoxychlor 0.0072 ug/L
GRO/DRO N.D.

TMW46
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

TMW33
Dichloroethane, 1,2- 42 ug/L
Bis(2-ethylhexyl)phthalate 3.6 ug/L
Pesticides N.S.
GRO/DRO N.D.

TMW34
Bromochloromethane 0.44 ug/L
SVOCS N.S.
Pesticides N.S.
GRO/DRO N.D.

MW20
Acetone 5.7 ug/L
Dichloroethane, 1,2- 9 ug/L
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.D.

TMW25
VOCs N.D.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

MW18D
Acetone 3.8 ug/L
Dichloroethane, 1,2- 110 ug/L
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.D.

TMW29
Methyl tert-Butyl Ether (MTBE) 0.32 ug/L
SVOCS N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW38
VOCs N.D.
Diethyl Phthalate 0.41 ug/L
Dinitrotoluene, 2,6- 1.7 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW19
VOCs N.D.
Bis(2-ethylhexyl)phthalate 13 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW18
Toluene 58 ug/L
Bis(2-ethylhexyl)phthalate 3.9 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW16
Toluene 0.54 ug/L
Bis(2-ethylhexyl)phthalate 0.4 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW11
VOCs N.S.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW17
Carbon Disulfide 7.8 ug/L
Chloromethane 0.43 ug/L
Dichloroethylene, 1,2-trans- 0.24 ug/al
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW15
VOCs N.D.
Bis(2-ethylhexyl)phthalate 0.3 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW14A
Carbon Disulfide 1.4 ug/L
SVOCS N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW35
Dichloroethane, 1,2- 1.9 ug/L
SVOCS N.D.
Pesticides N.D.
GRO/DRO N.D.

TMW26
VOCs N.D.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW40D/S
VOCs N.D./N.D.
SVOCs N.D./N.S.
Pesticides N.D./N.S.
GRO/DRO N.S./N.S.

TMW13
VOCs N.S.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW02
VOCs N.S.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW32
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

TMW37
Carbon Disulfide 6.2 ug/L
Toluene 19 ug/L
SVOCs N.D.
Endrin Aldehyde 0.016
GRO/DRO N.S.

TMW49
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

TMW21
VOCs N.S.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW43
VOCs N.D.
Bis(2-ethylhexyl)phthalate 0.53 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW22
VOCs N.D.
Bis(2-ethylhexyl)phthalate 1.3 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW30
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

BGMW03
VOCs N.D.
Bis(2-chloroisopropyl)ether 0.25 ug/L
Bis(2-ethylhexyl)phthalate 0.91 ug/L
Pesticides N.D.
GRO/DRO N.S.

BGMW02
VOCs N.D.
Butyl Benzyl Phthlate 0.88 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW10
VOCs N.S.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW28
VOCs N.D.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

BGMW01
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

TMW08
Acetone 2.7 ug/L
SVOCS N.D.
Pesticides N.S.
GRO/DRO N.S.

EMW01
VOCs N.D.
Bis(2-ethylhexyl)phthalate 0.45 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW02
VOCs N.D.
SVOCs N.S.
Pesticides N.D.
GRO/DRO N.D.

MW01
Dichloroethane, 1,2- 1.5 ug/L
SVOCS N.D.
Pesticides N.D.
GRO/DRO N.D.

TMW24
VOCs N.D.
SVOCs N.S.
Pesticides N.D.
GRO/DRO N.S.

EMW04
VOCs N.D.
SVOCs N.D.
Pesticides N.S.
GRO/DRO N.S.

MW03
VOCs N.D.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.D.

TMW07
VOCs N.D.
Diethyl Phthalate 0.17 ug/L
Nitrosodiphenylamine, N- 0.18 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW23
VOCs N.D.
SVOCs N.S.
Pesticides N.D.
GRO/DRO N.S.

EMW03
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

TMW45
VOCs N.D.
Bis(2-ethylhexyl)phthalate 1.5 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW06
Dichloroethane, 1,2- 0.2 ug/L
SVOCS N.D.
Pesticides N.S.
GRO/DRO N.S.

EMW02
VOCs N.D.
Bis(2-ethylhexyl)phthalate 0.33 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW44
VOCs N.D.
Bis(2-ethylhexyl)phthalate 3.2 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW03
VOCs N.D.
Dinitrotoluene, 2,4- 0.32 ug/L
Dinitrophenol, 2,4- 19 ug/L
Nitrosodiphenylamine, N- 0.67 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW04
VOCs N.D.
Dinitrotoluene, 2,4- 0.62 ug/L
2-Nitroaniline 0.29 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW47
VOCs N.D.
SVOCs N.D.
DDE, p,p'- 0.032 ug/L
GRO/DRO N.S.

TMW36
Toluene 89 ug/L
SVOCS N.D.
Pesticides N.D.
GRO/DRO N.S.

FW35
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

TMW41
VOCs N.D.
Cresol, o- 2.3 ug/L
m,p-Cresol 0.52 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW39D/S
VOCs N.D./N.D.
Diethyl Phthalate 0.31 ug/L / 0.4 ug/L
Pesticides N.D./N.D.
GRO/DRO N.S./N.S.

TMW31D
Acetone 2.2 ug/L
Bis(2-ethylhexyl)phthalate 0.27 ug/L
Pesticides N.S.
GRO/DRO N.S.

TMW31S
VOCs N.D.
Diethyl Phthalate 0.31 ug/L
Pesticides N.D.
GRO/DRO N.S.

TMW01
VOCs N.S.
SVOCs N.S.
Pesticides N.S.
GRO/DRO N.S.

TMW48
VOCs N.D.
SVOCs N.D.
Pesticides N.D.
GRO/DRO N.S.

QCL

TRPP

QAL

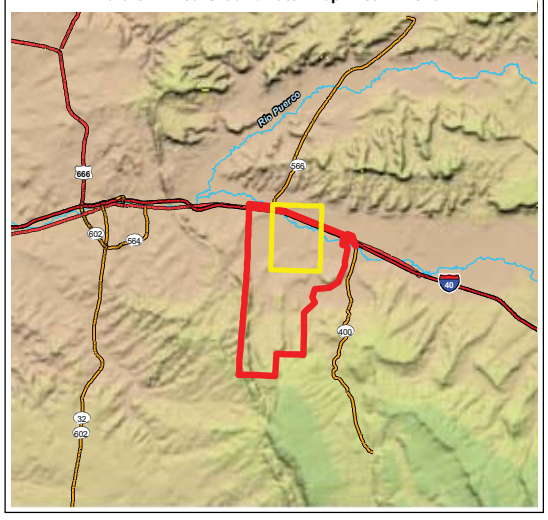
South Fork Rio Puerco

Navajo Blvd

FWDA SURFACE GEOLOGY

- QAL, QUATERNARY ALLUVIAL DEPOSITS
- QCL, QUATERNARY COLLUVIAL AND GRAVEL DEPOSITS
- TRPP, PETRIFIED FOREST FORMATION - PAINTED DESERT MEMBER

**Ft. Wingate Army Depot Property Boundary Indicated in Red
Northern Area Groundwater Map Area in Yellow**



- NORTHERN AREA ALLUVIAL MONITORING WELLS
- NORTHERN AREA ALLUVIAL NON-MONITORING WELLS
- NORTHERN AREA ALLUVIAL PIEZOMETERS
- NORTHERN AREA BEDROCK MONITORING WELLS
- FLOW DIRECTION OF THE SOUTH FORK RIO PUERCO
- ADJOINING PROPERTY BOUNDARY
- SOLID AND HAZARDOUS WASTE MANAGEMENT UNITS
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- RAILROAD
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 5-5
April 2012 Northern Area VOCs, SVOCs, and Pesticides in Alluvial and Bedrock Groundwater

0.25 Miles
0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

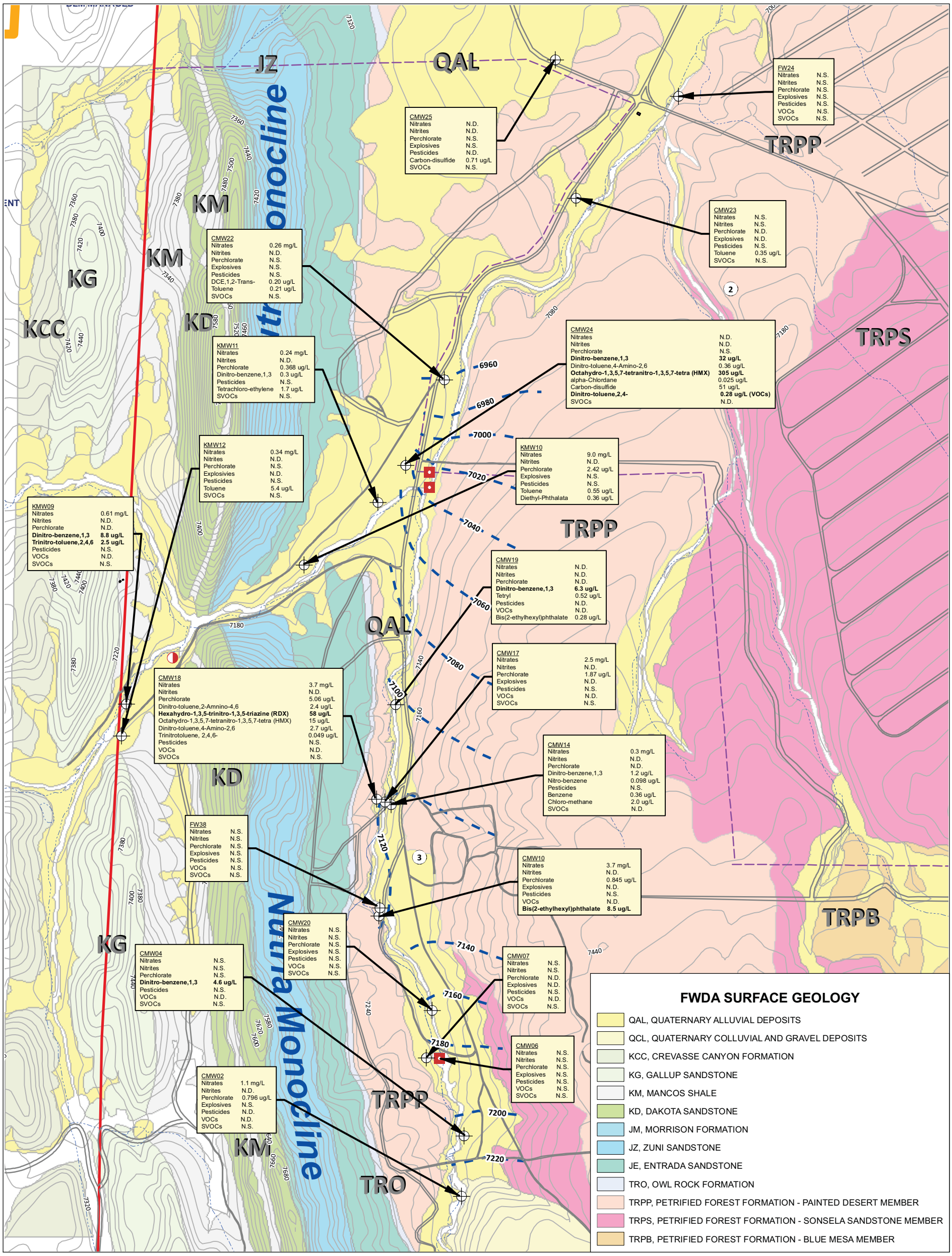
Map Scale: 1:7,200 (1" = 600')
Map Date: October 10, 2012

N.D., not detected
N.S., not sampled
Bold = Above Regulatory Limit
Units: pg/L, picograms per liter;
ug/L, micrograms per liter; mg/L, milligrams per liter.

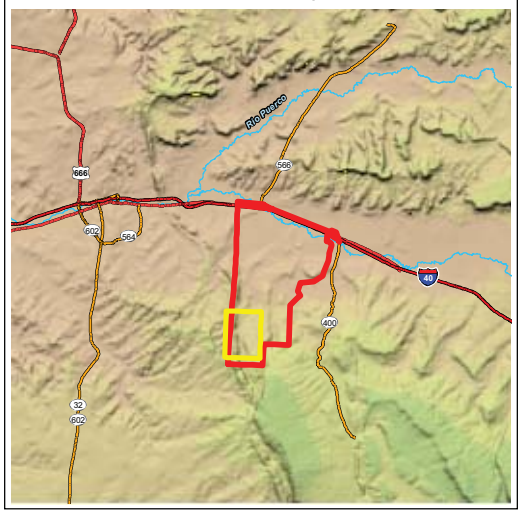
Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

US Army Corps of Engineers
Albuquerque District



Ft. Wingate Army Depot Property Boundary Indicated in Red
OB/OD Area Groundwater Map Area in Yellow



- DRY MONITORING WELLS
- BURIED MONITORING WELLS
- OB/OD AREA MONITORING WELLS
- GROUNDWATER ELEVATION CONTOUR (ESTIMATED) (20 FT INTERVAL)
- BUILDINGS
- FWDA PROPERTY BOUNDARY, FEB 2002
- (7) PROPERTY TRANSFER PARCEL IDENTIFICATION NUMBER
- PROPERTY TRANSFER PARCEL BOUNDARY
- ROAD
- ARROYO
- USGS TOPOGRAPHIC CONTOUR (20 FT INTERVAL)

FIGURE 5-6
April 2012 OB/OD Area Groundwater Constituents Concentrations Map

0.25 Miles

0.25 Kilometers

State Plane Coordinate System, New Mexico West, North American Datum 1983.
Units in US Survey Feet North America Vertical Datum (NAVD) 88.

Map Scale: 1:5,400 (1" = 450')
Map Date: September 26, 2012

Ground water measurements in US feet;
Dry, no water in wells; N.M., not measured.

Data sources: drainages, railroad, roads: Tele Atlas GDT-Dynamap, 2008; populated places: USGS, ESRI, 2005; orthophotography: USGS, 2005; Ft. Wingate Environmental Restoration detail: USACE.

Prepared by: Jonathan Hall - LRL
Reviewed by: David Henry

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US Army Corps of Engineers
Albuquerque District

APPENDICES
(ON DISK)