APPENDIX B

HYDRAULIC CAPTURE MODELING ANALYSIS

Groundwater Capture and Concentration Trend Analysis, Former Fort Ord Sites 2 and 12 and Operable Unit 2 Technical Memorandum

Prepared for

Contract No. 92CA0144-18
AHTNA Government Services Corporation
1115 Shore Street
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MACTEC Project No. {4088064282}

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Groundwater Capture and Concentration Trend Analysis
Former Fort Ord
Sites 2 and 12 and Operable Unit 2
Technical Memorandum

MACTEC Project No. 4088064282

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DISTRIBUTION

1.0 INTRODUCTION

This technical memorandum describes the methodology followed to analyze groundwater capture and concentration trends at extraction and injection wells associated with Operable Unit (OU) 2 and Sites 2 and 12 at the Former Fort Ord in Monterey County, California. Groundwater cleanup and infiltration systems are operating at this Former U.S. Army Facility, and this analysis is part of the ongoing environmental remedies. MACTEC Engineering and Consulting, Inc. (MACTEC) preformed analysis activities for AHTNA Government Services Corporation (AGSC) under contract number 92CA0144-18.

This memorandum documents the requested particle-tracking methodology, which used the numerical groundwater flow and particle-tracking model for OU 2 and Sites 2 and 12 produced for AGSC as part of its 2005 Annual Report. The model was updated with data provided by AGSC, including average extraction and injection rates (July through December 2005) and December 2005 groundwater elevation data for calibration purposes.

2.0 BACKGROUND

Remedial groundwater monitoring programs are designed to measure the effectiveness of an extraction system in achieving hydraulic containment and cleanup objectives. The success of hydraulic containment and groundwater cleanup depends on groundwater chemicals of concern (COCs) flowing into (i.e. being captured by) the extraction system (*Cohen et al., 1997; Cohen et al., 1994*).

In general, containment (capture zone) monitoring involves the following: (1) measuring hydraulic heads and evaluating them to determine whether the extraction (and injection, if applicable) prevents groundwater flow and dissolved contaminant migration across the capture zone boundary; and (2) monitoring groundwater quality to verify that no contaminant movement or increase in contaminant mass is occurring across the capture zone boundary. Monitoring activities, therefore, typically include some combination of hydraulic head measurement, groundwater sampling and analysis, tracer monitoring (occasionally for verification purposes), and pumping rate measurement (*Cohen et al., 1994*). Capture zone analysis has evolved to use particle-tracking (or groundwater streamline) analysis. In capture zone analysis, theoretical particles are mathematically placed into a groundwater regime, and their migration paths are predicted based on groundwater velocity calculations. Various methodologies are available for particle tracking.

Performance of the Former Fort Ord groundwater cleanup remedies has been implemented. Hydraulic capture performance at this site is being estimated and evaluated by AGSC using three approaches: groundwater elevation contour interpretation; model-simulated groundwater flow interpretation; and, measured groundwater chemistry interpretation. As previously stated, this memorandum focuses on capture evaluation using particle-tracking methods based on numerical flow modeling.

3.0 CAPTURE ANALYSIS USING PARTICLE TRACKING

Numerical groundwater flow modeling was conducted to evaluate hydraulic capture of the A-Aquifer, the Upper 180-Foot Aquifer, and the Sites 2 and 12 COCs. Hydraulic capture was estimated using the updated Former Fort Ord groundwater flow model for OU 2. The model was used to simulate groundwater flow paths; specifically, paths induced by operation of the OU 2 and Sites 2 and 12 extraction and infiltration systems. The following sections summarize the origin, development, and results of the Former Fort Ord OU 2 groundwater flow model.

3.1 Flow Model Development

All of the Former Fort Ord numerical groundwater flow models are based on the finite difference MODFLOW model code (*McDonald and Harbaugh, 1988*) originally completed for the Fort Ord basewide hydrogeological characterization and used in the basewide remedial investigation/feasibility study (RI/FS) (*Harding Lawson Associates [HLA], 1995a*). Particle tracking was originally generated using the PATH3D model code (*Zheng, 1989*) and is currently generated using the MODPATH model code (*Pollock, 1994*) in conjunction with MODFLOW. The current model for OU 2 and sites 2 and 12 use a graphical preprocessor/postprocessor interface called Groundwater Modeling System (*GMS; version 5.0, 5/26/05*) pre/post processor application (*EMRL, 2005*).

Previous versions of the OU 2 and Sites 2 and 12 models used an earlier version of GMS (v.2.1 and v.3.1) to construct, calibrate, and simulate the capture analysis. Both models were combined using GMS v. 5.1 (*GMS, 2004*), which is again the platform used to evaluate groundwater capture under 2005 conditions.

More detailed descriptions of the current models may be found in the Harding ESE (Formerly Harding Lawson Associates) documents: (*Harding ESE, 2001a and 2001b; HLA, 1995b and 1995c*). As stated earlier, the most recent version of the GMS v.5.1 was used to simulate the current model. GMS is a pre-processor and post-processor that facilitates data preparation, manipulation, visualization, and presentation of MODFLOW2000® (*Harbaugh et al., 2000*) input and output files. This program provides a high degree of automation and flexibility in the development of the model and reduces the time required to construct input files and process output files.

3.2 Capture Modeling Results

Groundwater capture is evaluated by comparing the simulated groundwater particle pathlines (streamlines) and associated capture zones to the aquifer areas requiring groundwater capture. The areas requiring groundwater capture were determined from the most recent plume shapes (December 2005). Location-specific capture evaluations are described in the following sections. Table 1 lists the average annual groundwater extraction and infiltration flow rates for all three locations.

3.3 OU 2 and Sites 2 and 12

Figures 1, 2, and 3 illustrate the simulated backward-tracking streamlines under pumping conditions from July 2005 through December 2005, for the OU 2 plumes in the A-Aquifer and Upper 180-Foot Aquifer, and Sites 2 and 12. Groundwater streamlines predict that the A-Aquifer extraction system captures the OU 2 plume (Figure 1); however, a portion of the plume that lies between wells MW-OU2-02-A and MW-OU2-73-A, beneath Cell F, appears to lie in a stagnant or low flow area, and will require a greater period of time to remediate using the current extraction well configuration.

As with the previous capture evaluations, Figure 2 shows that some of the streamlines originating in the Upper 180-Foot Aquifer extraction wells “backtrack” up into the A-Aquifer where the overlying Fort Ord-Salinas Valley Aquitard (FO-SVA) clay pinches out and recharge from the A-Aquifer to the Upper 180-Foot Aquifer occurs. Figure 2 streamlines for the Upper 180-Foot Aquifer predict capture for most of the plume with the exception of the eastern portion of the TCE plume located approximately 1,000 feet downgradient (northeast) of extraction wells EW-OU2-05-180 and EW-OU2-06-180. An additional extraction well (EW-OU2-07-180) has been constructed to remedy this situation; however, is not yet operational. Particles originating at this well location reflect the passive migration pathway.

Figure 3 streamlines for Sites 2 and 12 predict capture of the plume within that portion of the site under the extraction/injection configuration for the period of simulation. Modifications to the treatment system have been made since December 2005 that will require changes to the model for simulations extending beyond this time period.

3.4 Calibration Checks

A brief check of the calibration state was conducted for the model. Using GMS tools, the groundwater flow model was calibrated until a reasonable correlation between the observed water elevation data and the simulated model heads was achieved. The groundwater elevation data collected from a relatively complete data set of monitoring wells during the December 2004 monitoring period, were used as the primary set of calibration targets. Pumping from the extraction wells and recharging (using injection wells) from Fort Ord operations within the model domain were also incorporated during the calibration process.

A qualitative evaluation of the calibration can be measured objectively by the target water level residual statistics. The model convergence statistics are a measure of the quality of the iterative solution of the model. A target water level residual is defined as:

Residual = (Target Value - Model Predicted Value)

For the model, the residuals are in units of feet. The closer the residual is to zero (0), the better the fit at a given target location. The residual statistics were evaluated by the following: 1) by traditional statistics, and 2) by a graphical presentation of the observed target heads *versus* the model predicted heads. During calibration, the calculated errors (residuals) were statistically evaluated using mean error, absolute mean error, and the root mean square error (RMS or standard deviation) (*Anderson and Woessner, 1992*). The goal of the calibration was to obtain a residual mean as close to zero as possible and to minimize the sum of the squared residuals.

A qualitative analysis of the similarity between the interpreted and predicted hydraulic head values indicates a close correlation between the heads at the groundwater monitoring wells. The evaluation of the residual statistics for the simulation indicates an acceptable model calibration since the residual mean value is close to zero (Figures 4 and 5). A summary of calibration statistics follows:

Calibration Statistic	**A-Aquifer**	**Upper 180-Foot Aquifer**
Mean Error (feet)	1.495	-1.838
Mean Abs. Error (feet)	3.638	2.496
Root Mean Squared Error (sq. ft.)	6.181	3.352

From Figures 4 and 5, it is observed that some residuals for all the calibration targets were greater than 5 feet. This discrepancy of residuals can attributed to only a few of the calibration targets which are located primarily near the boundaries or, as in the case of the A-Aquifer, in the carbon tetrachloride (CT) plume area, which was not thoroughly calibrated. In addition, discrepancies in residuals could be attributed to surface control of recharge, localized variations in aquifer characteristics, and the inherent limitations of the model discretization. In addition, the use of average pumping and infiltration rates instead of more specific rates during a shorter time period (i.e., December 2005 pumping and infiltration rates) can lead to larger apparent residuals than might be achieved if the more specific rates were modeled.

Linear plots of computed versus observed needs are illustrated in Figures 4 and 5 for the A-Aquifer and the Upper 180-Foot Aquifer, respectively. For an ideal model calibration, the data should plot on a 45-degree line as shown. As observed in Figures 4 and 5, the sign and magnitude of the residuals were randomly distributed within the model domain, as was desired, and that the calibration is acceptable.

3.5 Limitations of the Analysis

As with all numeric modeling exercises, limitations and uncertainties in model input directly affect the model results. Model predictions (including the predicted particle pathlines used to evaluate capture herein), therefore, have the same uncertainties and limitations as the numeric model. Uncertainties include uncertainties in model input parameters (such as hydraulic conductivities, recharge, model water balance, or model boundary conditions). Uncertainty is also introduced given the steady-state model conditions. Real conditions are more dynamic (transient). For example, actual pumping rates fluctuate with time and season along with aquifer recharge and model water balance. The current models simulate average pumping and infiltration rates for the July through December period, along with a fixed recharge value averaged over all model domains.

4.0 CONCENTRATION STATISTICAL TREND ANALYSIS

The following text summarize detected VOCs of concern and their statistical trends from extraction wells at OU 2 and Sites 2/12 at the Former Fort Ord, California (Table 2). Data from October 2004 through December 2005 were used in this evaluation to encapsulate the 2005 year with sufficient data to perform the Mann Kendall evaluation (minimum of four data points). Trends from these data are then applicable to the most recent year's worth of monitoring.

Sites 2/12 Trends

Results from extraction wells at Sites 2/12 indicate that VOC concentrations are generally decreasing, and significantly so at extraction wells EW-12-01-180M (PCE and TCE), EW-12-03-180U (cis-1,2-DCE), and EW-12-04-180M (cis-1,2-DCE). Only a slight (i.e., not statistically significant) increase in VOCs was calculated at extraction wells EW-12-03-180M (PCE, TCE), EW-12-03-180U (cis-1,2-DCE, PCE, TCE), EW-12-04-180U (cis-1,2-DCE). These results are consistent with those from previous evaluations and indicate that the current Sites 2/12 remedial program is reducing the mass of VOCs in groundwater.

OU 2 Trends

Results from extraction wells at OU 2 indicate that VOC concentrations are generally decreasing or stable. Statistically significant increasing, but still low, concentrations are observed for various at wells downgradient from Cell F, including EW-OU2-08-A (benzene) and EW-OU2-13-A (1,1-DCA), that reflect that Cell F appears to remain a significant source of VOCs to groundwater in the underlying A-Aquifer. Other wells with statistically significant increases in concentration (e.g. EW-OU2-06-A) are doing so with VOC concentrations below cleanup limits and, as such, are of less importance, but should continue to be evaluated. VOC concentration trends within the Upper 180-Foot Aquifer relatively stable. As with Sites 2/12, these results are consistent with previous trend analyses.

5.0 CONCLUSIONS

The current groundwater flow model was used to predict that A-Aquifer extraction system captures the OU 2 plume (Figure 1) with a portion of the plume near Cell F, between wells MW-OU2-02-A and MW-OU2-73-A, lying in a stagnant or low flow area that will require a greater period of time to remediate using current extraction well configurations.

The Upper 180-Foot Aquifer OU 2 plume was predicted by the model to be captured, excepting the eastern portion located approximately 1,000 feet downgradient (northeast) of extraction wells EW-OU2-05-180 and EW-OU2-06-180, is not being captured. Operation of a new extraction well (EW-OU2-07-180) is anticipated to capture this area of the plume.

Figure 3 streamlines for Sites 2/12 predict capture of the plume within that portion of the site under the current extraction/injection configuration.

A statistical trend analysis of VOC's was conducted for 2005 data from extraction wells using the Mann Kendall test for trend. Results indicate that concentrations are generally decreasing or stable at both the OU 2 and Sites 2/12 area, with several A-Aquifer extraction wells downgradient of landfill Cell F illustrating a statistically significant increase in concentration, reflecting the continued source of VOCs represented by Cell F.

6.0 REFERENCES

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TABLES

Table 1. 1 Simulated Average System Pumping Rates

July through December 2005

Groundwater Remedy at OU 2 and Sites 2 and 12

Former Fort Ord, California

WELL NAME	Simulated Flow Rates (gpm)
OU 2 Groundwater Treatment System	
Extraction	
EW-OU2-01-A	1
EW-OU2-02-A	22
EW-OU2-03-A	0
EW-OU2-04-A	47
EW-OU2-05-A	49
EW-OU2-06-A	29
EW-OU2-07-A	0
EW-OU2-08-A	23
EW-OU2-09-A	40
EW-OU2-10-A	34
EW-OU2-11-A	26
EW-OU2-12-A	10
EW-OU2-13-A	64
EW-OU2-14-A	18
EW-OU2-15-A	11
EW-OU2-16-A	8
EW-OU2-01-180	0
EW-OU2-02-180	68
EW-OU2-03-180	46
EW-OU2-04-180	67
EW-OU2-05-180	121
EW-OU2-06-180	125
EW-OU2-07-180	0
Injection	
IW-OU2-01-180	211
IW-OU2-02-180	195
IW-OU2-03-180	0
INF-OU2-01-1	0
INF-OU2-02-1	0
INF-OU2-03-1	0
INF-OU2-04-1	0
INF-OU2-05-1	0
Sites 2 and 12 Groundwater Treatment System	
Extraction	
EW-12-01-180M	12
EW-12-01-180U	12
EW-12-02-180M	55
EW-12-02-180U	30
EW-12-03-180M	9
EW-12-03-180U	29
EW-12-04-180M	39
EW-12-04-180U	58
Injection	
IW-02-01-180	89
IW-02-02-180	40
INF-02-01-180	142
INF-02-02-180	155
INF-02-03-180	88
Water Supply Wells	
FO29	315
F030	487
F031	524

Checked MT

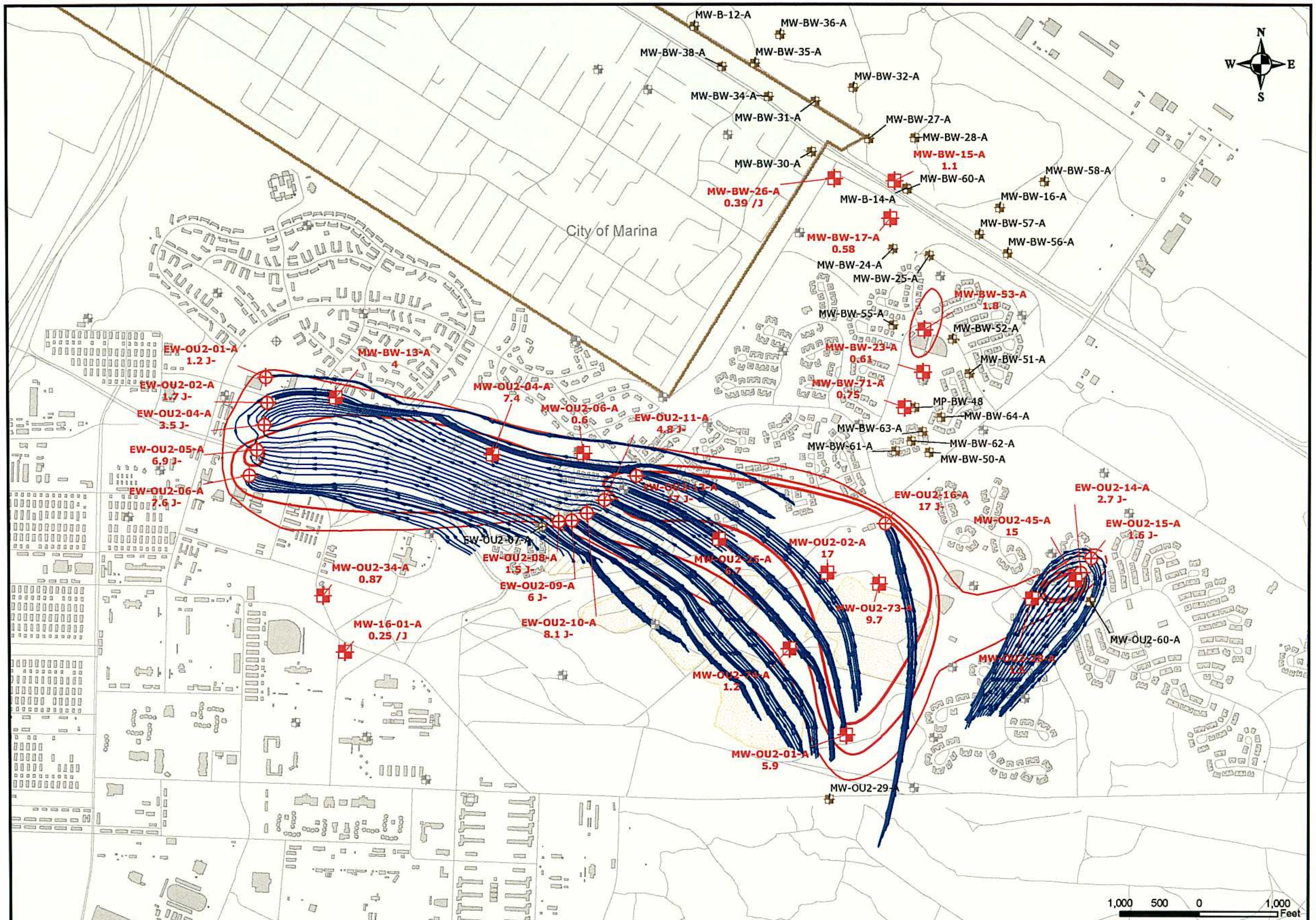
Approved

Table 2. Sites 2/12 Extracted Groundwater COC Trend Evaluation
Annual Evaluation Report
December 2003 through December 2004
Former Fort Ord, California

Extraction Well	Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	1,2-DCP	Benzene	Carbon Tetrachloride	Chloroform	cis-1,2-DCE	Methylene chloride	PCE	TCE	Vinyl chloride
EW-12-01-180M	3/30/2005								0.14	38		4.6	66	0.54
EW-12-01-180M	6/21/2005			0.21	0.17				0.15	41		6.1	84	0.72
EW-12-01-180M	8/30/2005				0.18				0.13	36		4.4	66	0.58
EW-12-01-180M	12/13/2005								0.13	41		4.4	66	0.59
Mann-Kendall Statistics				Too few pts.	50.0% (-)				62.5% (-)	59.2% (-)		73.8% (-)	59.2% (-)	50.0% (.)
EW-12-01-180U	12/14/04											1.8	1	
EW-12-01-180U	3/30/2005											0.29	0.66	
EW-12-01-180U	6/21/2005											1.3	1.2	
EW-12-01-180U	8/30/2005											0.48	0.59	
EW-12-01-180U	12/13/2005											3.2	1.2	
Mann-Kendall Statistics												59.2% (+)	50.0% (+)	
EW-12-02-180M	12/14/04			0.39	0.39					32		6.2	62	0.37
EW-12-02-180M	3/30/2005									25		4.9	47	
EW-12-02-180M	6/21/2005			0.23	0.29				0.19	28		7.1	63	
EW-12-02-180M	8/30/2005			0.26	0.32				0.18	23		6.3	48	0.25
EW-12-02-180M	12/13/2005								0.22	24		6	42	0.3
Mann-Kendall Statistics				50.0% (-)	50.0% (-)				50.0% (+)	88.3% (-)		50.0% (.)	75.8% (-)	50.0% (-)
EW-12-02-180U	12/14/04									1.7		3.3	4	
EW-12-02-180U	3/30/2005								0.096	1.1		2.1	2.5	
EW-12-02-180U	6/21/2005								0.15	1.1		2.3	1.9	
EW-12-02-180U	8/30/2005								0.11	0.79		2.7	1.4	
EW-12-02-180U	12/13/2005								0.13	0.99		2	1.2	
Mann-Kendall Statistics									62.5% (+)	88.3% (-)		75.8% (-)	99.2% (Sig -)	
EW-12-03-180M	12/21/04			0.16	0.2				0.15	19		4.2	36	0.17
EW-12-03-180M	3/30/2005								0.24	4.4		1.7	6	
EW-12-03-180M	9/22/2005				0.28				0.26	7.7		1.8	11	
EW-12-03-180M	12/13/2005				0.2				0.25	4.1		1.3	5.7	0.05
Mann-Kendall Statistics				Too few pts.	50.0% (.)				83.3% (+)	83.3% (-)		83.3% (-)	83.3% (-)	50.0% (-)
EW-12-03-180U	12/14/04				0.13					1		0.4		
EW-12-03-180U	3/30/2005								0.29	1.3			0.12	
EW-12-03-180U	6/21/2005								0.22	1.1		0.56	0.4	
EW-12-03-180U	8/30/2005								0.24	1.3		2.2	1.3	
EW-12-03-180U	12/13/2005				0.14				0.27	1.4		0.77	0.99	
Mann-Kendall Statistics					Too few pts.				50.0% (.)	88.3% (+)		83.3% (+)	50.0% (+)	
EW-12-04-180M	12/14/04				0.14					2.4		0.77	4.3	
EW-12-04-180M	3/30/2005								0.18	1.9		0.57	3.5	
EW-12-04-180M	6/21/2005				0.11				0.18	2		0.77	4	
EW-12-04-180M	8/30/2005								0.22	1.8		0.62	3.6	
Mann-Kendall Statistics					50.0% (-)				66.7% (+)	83.3% (-)		50.0% (-)	62.5% (-)	
EW-12-04-180U	12/14/04				0.088					0.84		0.18		
EW-12-04-180U	3/30/2005								0.18	0.69		0.14	0.17	
EW-12-04-180U	6/21/2005								0.16	0.7		0.22	0.21	
EW-12-04-180U	8/30/2005								0.16	0.51		0.24	0.22	
EW-12-04-180U	12/13/2005								0.24	0.87		0.3	1.2	
Mann-Kendall Statistics					Too few pts.				50.0% (.)	50.0% (.)		95.8% (Sig +)	83.3% (+)	

Checked: MT
Approved:

FIGURES



Explanation

TCE Detections
- Remediation Extraction Well
- Monitoring Well

- Monitoring Well TCE not Detected
- Piezometer TCE not Detected
- Extraction Wells TCE not Detected
- Monitoring Wells not Sampled this Quarter
- Extraction Wells not Sampled this Quarter
- Piezometer not Sampled this Quarter
- Injection Wells

TCE Concentration Contour in ug/L; Dashed where inferred
- Below ACL
- Above ACL

Groundwater Streamline (1 year travel time between arrows)

- Facilities
- Roads

WELL ID

MW-12-04-180
0.50 A/J ug/l

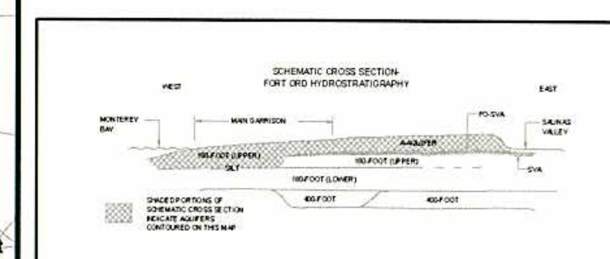
CONCENTRATION IN ug/L WITH MACTEC/LAB QUALIFIER

(1) CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA THAT WERE AVAILABLE AT THE TIME THIS REPORT WAS PREPARED; OTHER INTERPRETATIONS MAY BE POSSIBLE.

(2) CONTOURS BASED ON HIGHEST VALUE OBTAINED FROM MULTIPLE BAGS WHERE APPLICABLE.

(3) SAMPLE RESULTS FLAGGED WITH AN ASTERISK (*) WERE NOT USED FOR CONTOURING.

(4) MODEL RUN: 2005_annual_01.GPR



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					APPROVED	CHECKED MT
					DATE 6/06	DATE 6/2006

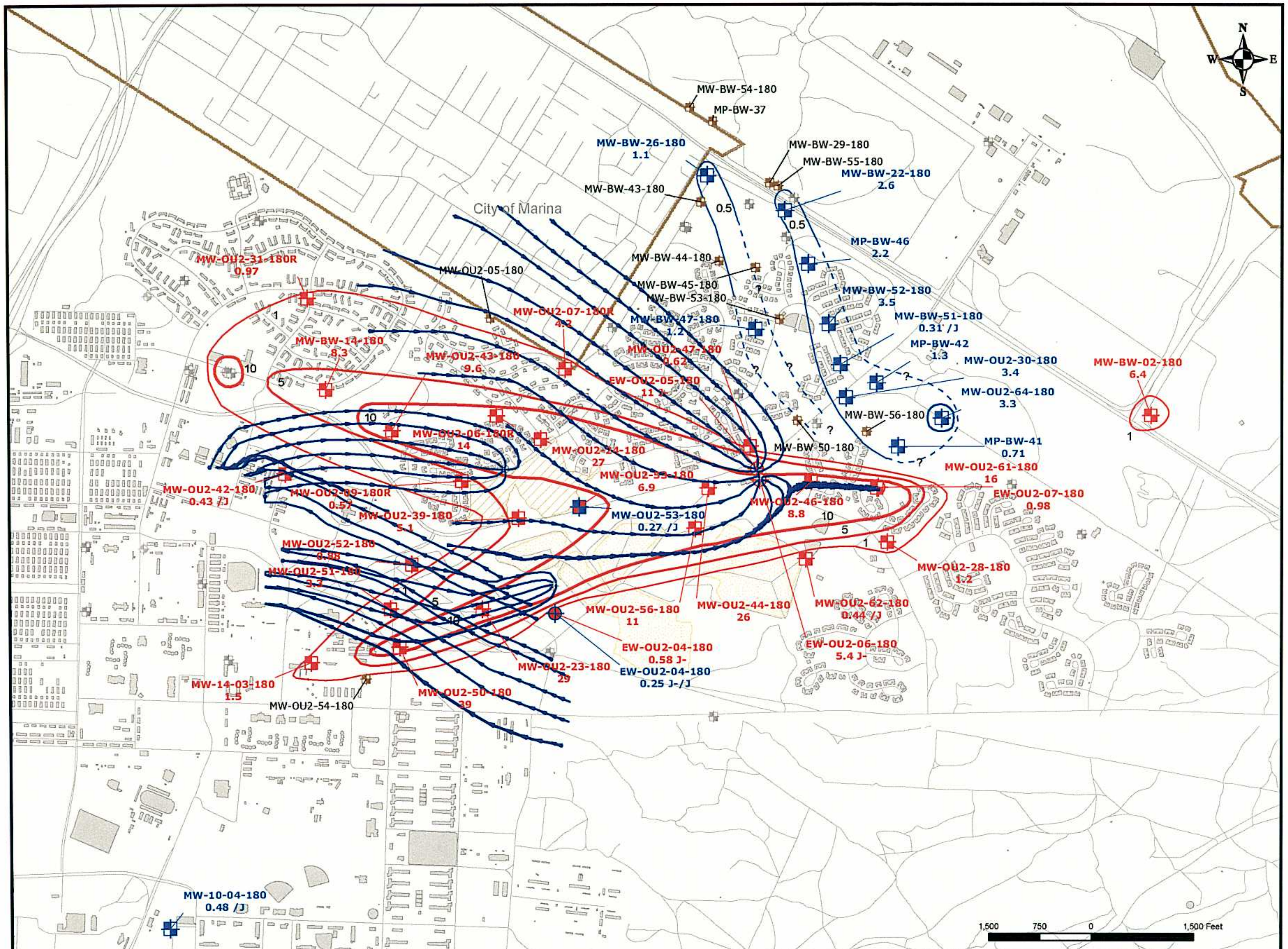
MACTEC

Capture Analysis
Former Fort Ord, California

OU2 Capture, Backtracking Groundwater Streamlines
A-Aquifer - Average July through December 2005

PLATE: 1

Fort Ord GIS - TCE_OU2_A.mxd - 3/13/2006



Explanation

Carbon Tet Detects	TCE Detects	TCE Detects & Carbon Tet Detects
Monitoring Well	Monitoring Well	Monitoring Well
Remediation Extraction Well	Remediation Extraction Well	Remediation Extraction Well

- Monitoring Well TCE not Detected
- Piezometer TCE not Detected
- Extraction Wells TCE not Detected
- Monitoring Wells not Sampled this Quarter
- Extraction Wells not Sampled this Quarter
- Piezometer not Sampled this Quarter
- Injection Wells

Carbon Tetrachloride Concentration Contour in ug/L; Dashed where inferred
- Above ACL

TCE Concentration Contour in ug/L; Dashed where inferred
- Below ACL
- Above ACL

- Groundwater Streamline (1 year travel time between arrows)
- Facilities
- Roads

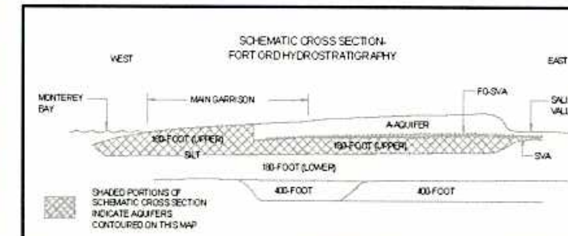
WELL ID
MW-12-04-180
0.50 A/J ug/l
CONCENTRATION IN ug/L WITH MACTEC/LAB QUALIFIER

(1) CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA THAT WERE AVAILABLE AT THE TIME THIS REPORT WAS PREPARED; OTHER INTERPRETATIONS MAY BE POSSIBLE.

(2) CONTOURS BASED ON HIGHEST VALUE OBTAINED FROM MULTIPLE BAGS WHERE APPLICABLE.

(3) SAMPLE RESULTS WITH A * WERE NOT USED FOR CONTOURING.

(4) MODEL RUN: 2005_annual_01.GPR



NO	DATE	REVISIONS	BY	CHK

DESIGNED:
DRAWN: RTT
APPROVED: [signature]
DATE: 6/06
PROJECT NO: 4088064282.01
SCALE: 1" = 1500'
CHECKED: MT
DATE: 6/2006

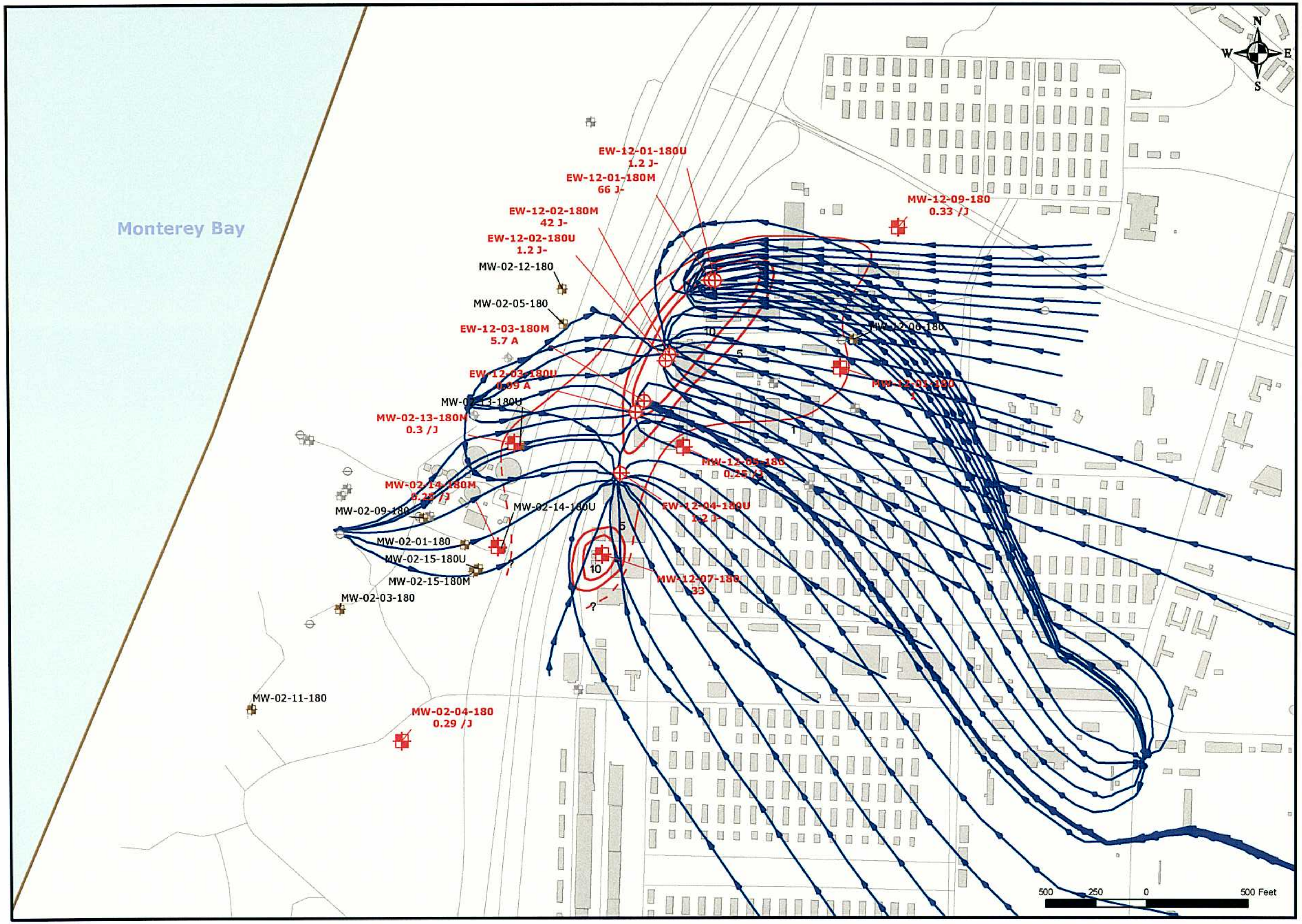
MACTEC

Report of Quarterly Monitoring
Former Fort Ord, California

OU2 Capture, Backtracking Groundwater Streamlines
Upper 180-Foot Aquifer - Average July through December 2005

PLATE: 2

Fort Ord GIS - OU CTP-OU2_U180ft.mxd 03/13/2006



Explanation

TCE Detections

- Remediation Extraction Well
- Monitoring Well
- Monitoring Well TCE not Detected
- Piezometer TCE not Detected
- Extraction Wells TCE not Detected
- Monitoring Wells not Sampled this Quarter
- Extraction Wells not Sampled this Quarter
- Piezometer not Sampled this Quarter
- Injection Wells

TCE Concentration Contour in ug/L; Dashed where inferred
- Below ACL
- Above ACL

- Groundwater Streamline (1 year travel time between arrows)
- Facilities
- Roads

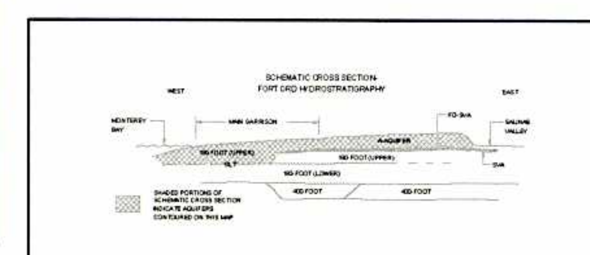
MW-12-04-180 — WELL ID
0.50 A/J ug/l — CONCENTRATION IN ug/L WITH MACTEC/LAB QUALIFIER

(1) CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA THAT WERE AVAILABLE AT THE TIME THIS REPORT WAS PREPARED; OTHER INTERPRETATIONS MAY BE POSSIBLE.

(2) CONTOURS BASED ON HIGHEST VALUE OBTAINED FROM MULTIPLE BAGS WHERE APPLICABLE.

(3) SAMPLE RESULTS FLAGGED WITH AN ASTERISK (*) WERE NOT USED FOR CONTOURING.

(4) MODEL RUN: 2005_annual_01.GPR



NO	DATE	REVISIONS	BY	CHK		
					DESIGNED:	PROJECT NO: 4088064282.01
					DRAWN: RTT	SCALE: 1" = 500'
					APPROVED:	CHECKED:
					DATE: 6/06	DATE: 6/2006

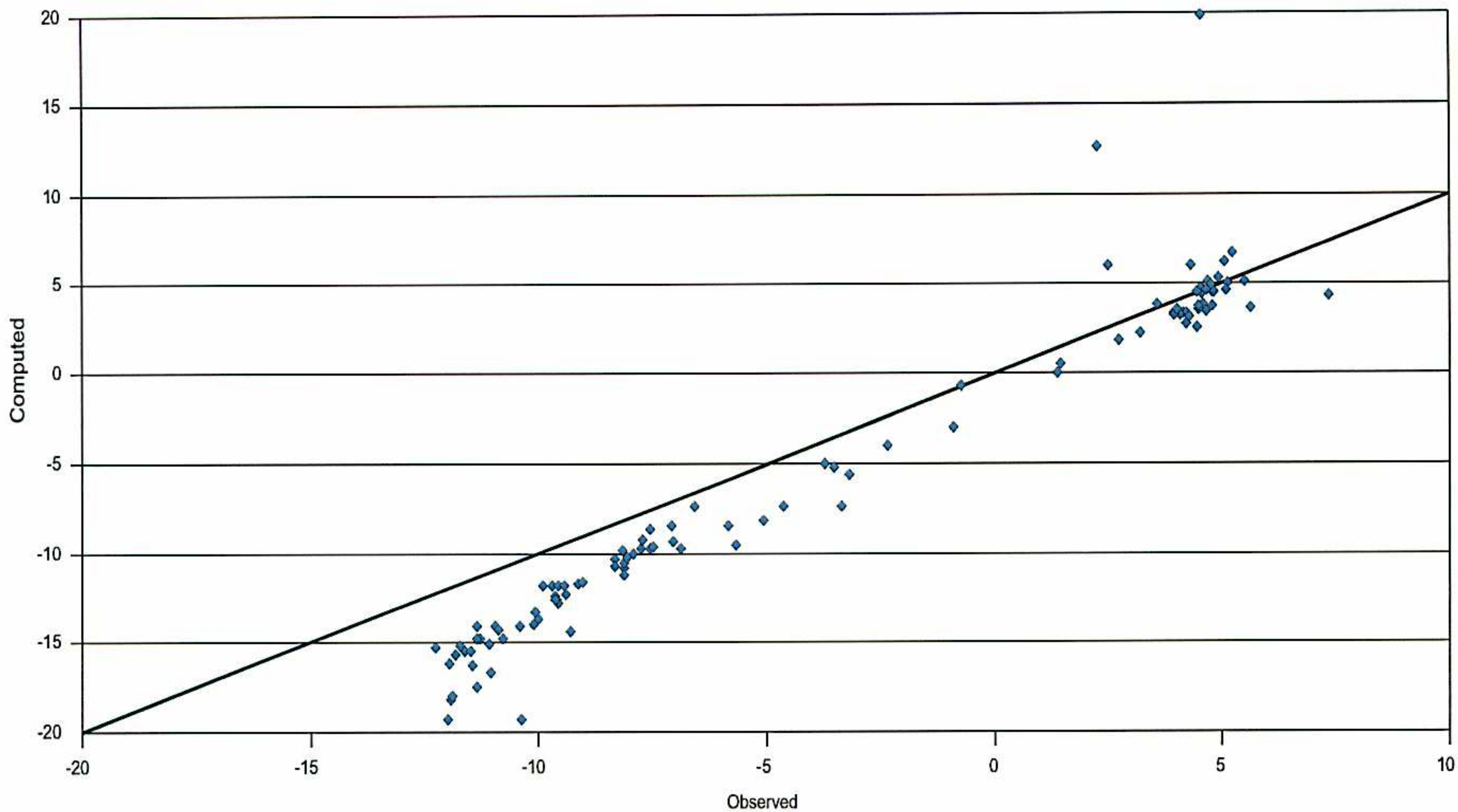
MACTEC

Capture Analysis
Former Fort Ord, California

Sites 2 and 12, Backtracking Groundwater Streamlines
Average July through December 2005

PLATE: 3

Fort Ord GIS - December 2005 - TCE_Site2-12_u180_A.mxd - 03/13/2006



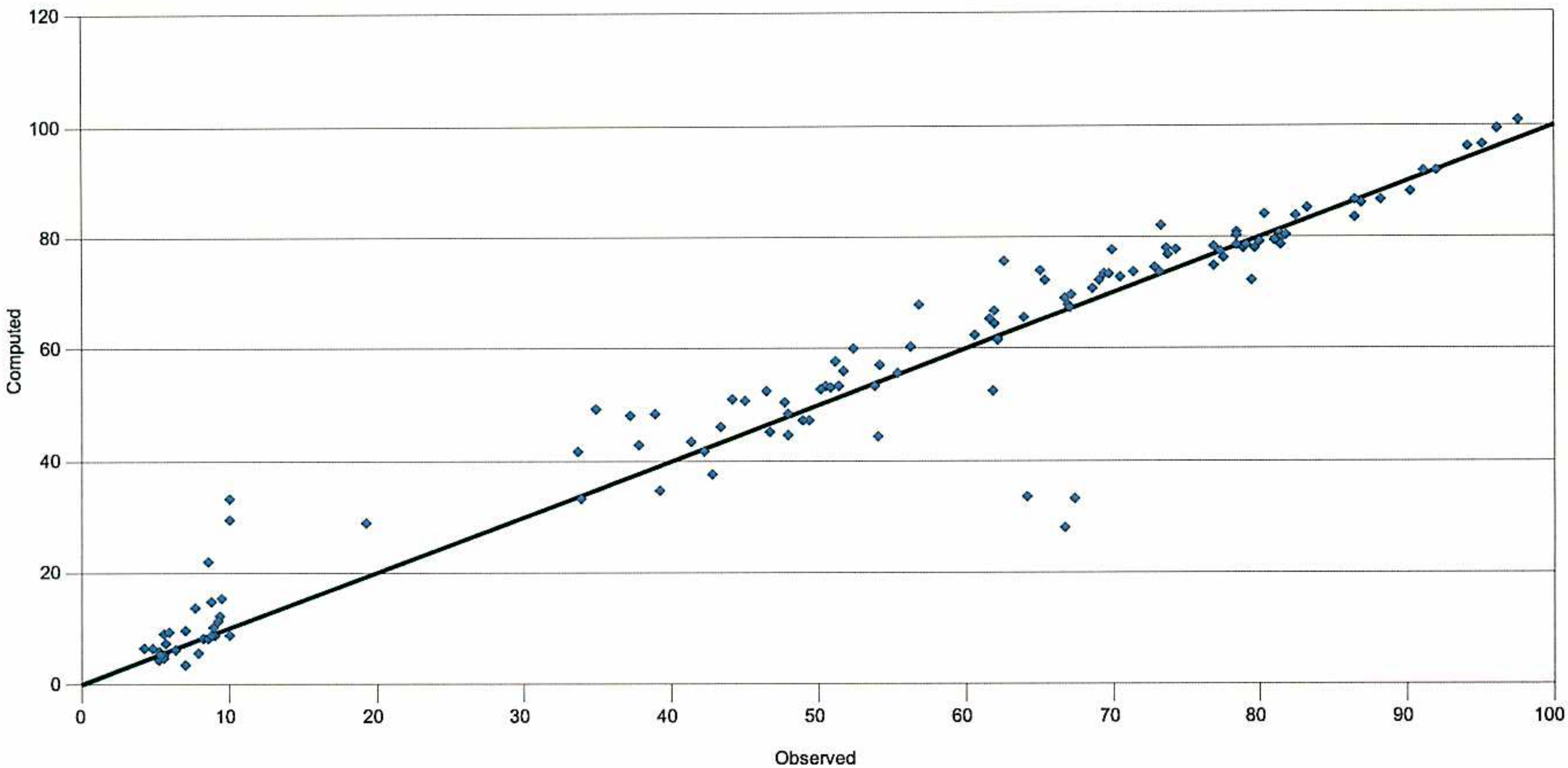
P:\4080\Fort_Ord_GIS\Graphics\AHTNA\4088064282\FIGS-4-n-5_Grafs.FH10

MACTEC

Graph of Computed vs Observed Values and Statistical Calibration Data
A-Aquifer, Average July through December 2005
Former Fort Ord
Monterey, California

FIGURE
4

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
CN	4088064282 01	MT	06/06		6/29/06



P:\4080\Fort_Ord_GIS\Graphics\AHTNA\4088064282\FIGS-4-n-5_Grafs.FH10

MACTEC

Graph of Computed vs Observed Values and Statistical Calibration Data
Upper 180-Foot-Aquifer, Average July through December 2005
Former Fort Ord
Monterey, California

FIGURE
5

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
CN	4088064282 01	MT	06/06	JSB	6/29/06