Edward C. Ralston
Program Manager
Remediation Management
Phillips 66 Company
76 Broadway
Sacramento, CA 95818
Phone 916.558.7633
ed.c.ralston@P66.com

March 17, 2014

Ms. Dilan Roe
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Site Conceptual Model

76 (Former BP) Station No. 11117
7210 Bancroft Avenue
Oakland, California
Fuel Leak Case No. RO0000356

Dear Ms. Roe:

I declare under penalty of perjury that to the best of my knowledge the information and/or recommendations contained in the attached report is/are true and correct.

If you have any questions or need additional information, please contact Mr. Dennis Dettloff at (916) 503-1261.

Sincerely,

Edward C. Ralston
Program Manager
Remediation Management

Site Conceptual Model

76 (Former BP) Station No. 11117
7210 Bancroft Avenue
Oakland, CA

Alameda County Environmental Health
Case No. RO0000356

Regional Water Quality Control Board, San Francisco Bay Region, Case No. 01-0215

GeoTracker Global ID No.T0600100201

Antea Group Project No. I42611117

March 14, 2014

Prepared for:
Dilan Roe, P.E.
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Prepared by:
Antea™Group
11050 White Rock Road
Suite 110
Rancho Cordova, CA 95670
+1 800 477 7411

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1.0 INTRODUCTION

Antea Group has prepared this site conceptual model for the site located at 7210 Bancroft Avenue in Oakland, California for the Alameda County Health Care Services Agency's (ACHCSA) consideration. The purpose of the site conceptual model is to give a detailed overview of the site, identify data gaps, and propose resolutions to address those data gaps.

1.1 Site Description

The site is currently an operating 76 gas station located at 7210 Bancroft Avenue in Oakland, California (**Figure 1**). The site contains three 12,000-gallon gasoline underground storage tanks (USTs), one 10,000-gallon diesel UST, and the associated product piping and dispensers (**Figure 2**). See **Appendix A** for additional site information and for a history of environmental investigations and remedial actions.

2.0 SITE CONCEPTUAL MODEL

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Regional	According to the *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (California Regional Water Quality Control Board – San Francisco Bay Region/SFRWQCB, June 1999), the site is located within the Oakland Sub-Area of the East Bay Plain of the San Francisco Basin. The Oakland Sub-Area contains a sequence of alluvial fans. The alluvial fill thickness ranges from 300 to 700 feet deep. There are no well-defined aquitards such as estuarine muds. The largest and deepest wells in this sub-area historically pumped one to two million gallons per day at depths greater than 200 feet. Overall, sustainable yields are low due in part to low recharge potential. The Merrit sand in West Oakland was an important part of the early water supply for the City of Oakland. It is shallow (up to 60 feet), and before the turn of the century, septic systems contaminated the water supply wells. Throughout most of the Alameda County portion of the East Bay Plain, from Hayward north to Albany, water level contours show that the general direction of ground water flow is from east to west or from the Hayward Fault to the San Francisco Bay. Ground-water flow direction generally correlates to topography. Flow direction and velocity are also influenced by buried stream channels that typically are oriented in an east-west direction. In the southern end of the study area however, near the San Lorenzo Sub-Area, the direction of flow may not be this simple. According to information presented in the	None	NA

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, the small set of water level measurements available seemed to show that the ground water in the upper aquifers may be flowing south, with the deeper aquifers, the Alameda Formation, moving north. The nearest natural drainage is the Arroyo Viejo, located approximately 1,300 feet south-southeast of the site. The Arroyo Viejo channel flows generally east to west, but flows north-northwestward before turning southwest again in the vicinity of the site.		
Geology and Hydrogeology	Site	The site is typically underlain by clays interbedded with 1 to 4 foot thick intervals of sands and gravels to the total explored depth of approximately 45 feet below ground surface (ft bgs). Boring logs for monitoring wells MW-1, MW-2, MW-6 and MW-7 indicate less than 5 feet of sand and/or gravel encountered, while those for wells MW-3, MW-4, MW-8, MW-9, MW-10, EX-1 and EX-2 indicate more than 10 feet of sand and/or gravel encountered. The lithology observed in the most recent soil borings A-1 through A-5 and A-7 through A-10 was predominately a clay/gravel layer in the first foot. Silty clays and clayey silts were then encountered to a depth of approximately 14 to 20 ft bgs. Clayey sands and sandy and clayey gravels were then encountered to a depth of approximately 25 to 30 ft bgs. Gravels and sands were then encountered to a depth of approximately 45 ft bgs. Silty clay was encountered below 45 ft bgs, specifically in boring A-1, where the total depth explored was	1. Groundwater Flow direction and gradient unclear due to submerged screens in several on-site monitoring wells.	Destroy and replace wells with submerged screens.

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		46 ft bgs. Off-site borings to the east were similar with the exception that clayey silt was encountered at a depth of approximately 35 ft bgs. Off-site boring A-10 varied greatly from all other borings. An angular gravel fill was encountered beneath a mulch layer to three ft bgs. Predominately silt or silty sand underlies the fill to approximately 35 feet bgs. Silty gravel was encountered from 35 to the total depth sampled of 39 ft bgs. Ground water was first encountered during drilling at depths ranging from 19 ft to 25 ft bgs. The Site elevation is approximately 50 feet above mean sea level. The water table fluctuates seasonally and has risen about 10 feet since 1992. The static depth-to-water in monitoring wells at the site has ranged between an historic minimum of 9.49 ft bgs (MW-3 on 5/22/2000) and maximum of 34.07 feet bgs (MW-2 on 12/27/1993). However, it is possible that the minimum measurement was an anomaly, as the next minimum depth to water measurement was 12.04 ft bgs (MW-8 on 1/18/2005). Historically, depth-to-water measurements have more typically ranged around 15 to 20 ft bgs. Ground-water flow direction during the third quarter monitoring event on 14 August 2013 was variable across the site. Based on historical quarterly ground-water monitoring data, potentiometric contours would indicate that local ground-water generally flows towards the north-northeast. The third quarter 2013 groundwater elevation contour map is included		

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		as **Figure 3**.		
Surface Water Bodies		The closest surface water body is the San Leandro Bay, which is approximately 2 miles west of the site. Lake Merrit is located approximately 4.5 miles northwest of the site.		
Nearby Wells		In 2010, Antea Group, then Delta Environmental, completed a sensitive receptor survey. They survey included a review of well completion reports from the Department of Water Resources (DWR). The DWR well search identified 3 wells within ½ mile of the site and two additional wells within 1 mile of the site. The closest well is an industrial well located approximately 1,450 feet northeast of the site.	2. Distance from plume boundary to receptors not defined.	Conduct a new sensitive receptor survey
Release Source and Volume		In 1984, the pre-existing underground storage tanks (USTs) at the site were removed and three single-walled fiberglass gasoline USTs (6,000-gallon, 10,000-gallon, and 12,000-gallon) and one 6,000-gallon diesel UST were installed in a cavity immediately to the northeast of the former USTs. A UST removal/installation report is not on file, and it is unknown if one was ever prepared. No documentation was reportedly found referencing the conditions of the removed USTs or reporting evidence of the hydrocarbon impacts in the soil and groundwater, if any, at the time of the UST removal. In August 1998, Environmental Resolutions, Inc. (ERI) removed the three gasoline USTs (6,000-gallon, 10,000-gallon, and 12,000-gallon), one 6,000-gallon diesel UST, and associated dispensers and piping from the site. There was no visible evidence of leakage		

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		from the USTs removed. A total of eight native soil samples were collected from beneath each end of the removed USTs at depths of 14 to 16 feet bgs, and a total of 18 soil samples were collected from the former dispenser locations and from beneath the associated product lines at three ft bgs (ERI, 1998).		
LNAPL		Free product was observed in groundwater monitoring well MW-2 between the 1993 and 1998, at thicknesses ranging from 2.60 feet (3/30/1994) to less than 0.01 feet (10/2/1997 to 7/21/1998). When free product was observed in the well, it was removed by bailing. Between 1993 and 1998, a cumulative total of 24.90 gallons of free product had been removed from the well (Alisto, 1998). Free product was also observed in monitoring well MW-4 during the third quarter 2001 (0.03 inches), fourth quarter 2006 (0.11 inches), first quarter 2008 (0.01 inches), and third quarter 2008 (0.05 inches); and in well EX-2 during the second quarter 2007 (0.01 inch). With the exception of 1.5 gallons of a free product/water mixture recovered from monitoring well MW-4 during the third quarter 2008 (BAI, 2008b), free product was not recovered from these wells when observed.	3. Free Product not removed to the maximum extent practicable	Destroy and replace wells with submerged screens and re-evaluate for the presence of free product.
Source Removal Activities		During the 1998 UST replacement activities, approximately 389 tons of soil and backfill were transported off-site disposal. Between March 16 and April 30, 2000, Cambria conducted interim remedial activities at the site to evaluate the effectiveness of	4. Secondary Source not removed 5. Nuisance	Prepare a feasibility study/corrective action plan (FS/CAP) to

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		hydrocarbon and methyl tertiary-butyl either (MTBE) reduction using short-term groundwater extraction. During eight extraction events, approximately 10,900 gallons of groundwater was extracted from wells EX-1, EX-2 and MW-2. From October 29, through November 2, 2001, Cambia performed a dual phase soil vapor and groundwater extraction (DPE) pilot test on the monitoring wells with the highest historical hydrocarbon concentrations (i.e., MW-2 and MW-4) and the extraction wells (EX-1 and EX-2) at the site. The DPE test results indicated that the vacuum influence was limited to within 18 to 28 feet of the extraction well. Water levels typically decreased several feet in the extraction wells and had a varied response in the observation wells. Estimated vapor-phase removal rates were approximately 200-pounds of hydrocarbon per day in wells MW-4 and EX-1, and less than 5-pounds of hydrocarbon per day in wells MW-2 and EX-2 (Cambria 2002). Soil vapor concentrations showed a decreasing trend in wells MW-4 and EX-1 during the short-term pilot tests. Hydrocarbon concentrations in grab groundwater samples collected before and after the pilot tests remained the same order of magnitude. A total of 6,500 gallons of water was extracted during the DPE pilot test and appropriately disposed off-site.	Condition may be present	evaluate potential remediation solutions for removing the secondary source and any nuisance conditions.
Contaminants of Concern		Based on the historical investigations conducted at the site, total petroleum hydrocarbons as gasoline (TPHg), diesel range organics (DRO), benzene, toluene, ethylbenzene, and total xylenes (BTEX),		

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		MTBE, and tertiary-butyl alcohol (TBA) are present in groundwater above their respective maximum contaminant levels (MCLs) and/or environmental screening levels (ESLs). These constituents of concern (COCs) are present above the screening levels primarily on the southeast side of the site and in the vicinity of the former USTs.		
Petroleum Hydrocarbons in Soil		26 soil samples were collected during dispenser and UST replacement (sample points A through Z). Dispenser sample points X and I contained TPHg at concentrations of 7,200 milligrams per kilogram (mg/kg) and 240 mg/kg, respectively. The UST pit sampling points contained a maximum TPHg at a concentration of 5,300 mg/kg at point B. The highest concentrations of COCs in soil borings occurred in MW-4 (1992), at the southeastern edge of the site. TPHg and BTEX compounds were reported in soil samples in this boring between 15 and 25 fbg. Maximum concentrations of TPHg (6,000 mg/kg) and benzene (34 mg/kg) occurred in the sample collected from 20 ft bgs. TPHg and benzene concentrations decreased to 1,100 mg/kg and 1.6 mg/kg in the sample collected from 25 ft bgs. In October 2013, Antea Group conducted a site investigation consisting of advancing CPT soil borings around MW-4 in order to assess the lateral and vertical extent of soil contamination. Antea Group used the data collected from the investigation to create 3-D models showing contamination in the subsurface. Cross sections	6. Lateral and vertical delineation of COCs in soil not defined.	Additional site investigation associated with the FS/CAP will be needed to laterally and vertically delineate COCs in soil before remedial efforts are conducted.

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		created from the 3-D models are presented as **Appendix B**. Based on the 3-D models and the analytical results, the highest impact of TPHg appears to be centered around boring CPT-12 at a depth of 11 feet bgs (11,000 mg/kg). Benzene impact was the highest in boring CPT-7 at 30 ft bgs (14 mg/kg). MTBE impact was highest in boring CPT-7 at 35 feet bgs (1.1 mg/kg).		
Petroleum Hydrocarbons in Groundwater		The majority of the contaminant region originated near the product dispensers where high groundwater concentrations (TPHg-7,400,000 micrograms per liter (ug/L) in the Fourth Quarter 2004, 60,000 ug/L benzene in the First Quarter 2006) were reported in monitoring well MW-4. During the most recent sampling event (3rd quarter 2013) the highest concentrations of TPHg (86,000 ug/L), benzene (3,700 ug/L), and MTBE (810 ug/L) were reported in monitoring well MW-4. TPHg was also reported in monitoring well MW-11 and well EX-1. Benzene was also reported in well EX-1. MTBE was reported in wells MW-7, MW-10, MW-11 and wells EX-1 and EX-2. COC isoconcentration maps are included as **Figures 4** through **7**.	7. Lateral and vertical extent of COCs in groundwater not defined.	Additional site investigation associated with the FS/CAP will be needed to laterally and vertically delineate COCs in groundwater before remedial efforts are conducted.
Risk Evaluation		The site is an active gasoline station that includes a station building, three 12,000-gallon gasoline USTs, one 10,000-gallon diesel UST, and associated piping and dispensers. Asphalt or concrete surfacing covers the site except for planters along the southeastern and southwestern property boundaries and at the north corner of the property.	8. Petroleum vapor intrusion to indoor air has not been assessed.	Complete a soil vapor survey to assess any risk associated with petroleum vapor intrusion to off-site

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
				indoor air.
		The risk evaluation for this site is based on the criteria found in the Low Threat Closure Policy (LTCP). A site may be eligible for closure if it meets all the criteria in the LTCP. The four sections of the LTCP include general, groundwater, petroleum vapor intrusion to indoor air, and direct contact and outdoor air exposure criteria. To date the evaluation of general criteria is incomplete due to secondary source removal not being completed, free product not being removed to the maximum extent practicable, an incomplete conceptual site model, and a possible nuisance condition at the site. The groundwater specific criteria are incomplete due to the lack of lateral and vertical delineation, elevated concentration of COCs, and the possible presence of free product. Petroleum vapor intrusion to indoor air has not been assessed at this site and direct contact and outdoor air exposure is incomplete due to elevated COC concentrations in shallow soils.		

Data Gaps Summary and Proposed Investigation

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
1	Groundwater flow direction and gradient data may be skewed due to several on-site monitoring wells having submerged screens.	Destroy and replace any monitoring wells with submerged screens at the site. The replacement wells will be constructed with appropriate screen intervals. Exact well construction details will be presented in a work plan or the FS/CAP.	Collecting depth to water data from submerged well screens does provide representative data to adequately calculate groundwater elevation, groundwater flow directions, and groundwater gradient.	Soil samples will not be collected during the replacement of the wells.
2	Distance from the plume boundary to nearby sensitive receptors has not been adequately defined.	Conduct an up to date sensitive receptor survey to identify potential receptors near the site.	Knowing where sensitive receptors are located will provide guidance on how to proceed in defining the groundwater plume laterally.	None
3	Free Product not removed to the maximum extent practicable	Destroy and replace any monitoring wells with submerged screens at the site. The replacement wells will be constructed with appropriate screen intervals. Exact well construction details will be presented in a work plan or the FS/CAP.	Free product may still be present at the site; however, submerged screens in the on-site monitoring wells may be impairing Antea Group's ability to measure and remove any remaining free product. Replacing the wells with submerged screens can assist in evaluating for the presence of any remaining free product.	None
4	Secondary Source not removed	Complete a FS/CAP to evaluate potential remediation solutions to remove any secondary source material still remaining at the site.	Removing the secondary source at the site is an important step in reducing residual contamination at the site and reducing the risk to human health and the environment. Choosing the correct remediation method is also important to ensure the maximum amount of contamination is removed in a timely and cost efficient manner.	Soil samples will be analyzed for TPHg, DRO, BTEX, MTBE, TBA, naphthalene, and any constituents necessary for the application of a chosen remediation solution.

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
5	Nuisance Condition may be present	Item 4	Removal of the secondary source and any remaining free product will remove any nuisance conditions at the site.	Item 4
6	Lateral and vertical delineation of COCs in soil not defined.	Item 4	Before implementing a remediation solution, the lateral and vertical extent of COCs in soil will need to be defined. This is important to ensure that the remediation solution is implemented in the correct location to maximize the effectiveness of the remediation efforts.	Item 4
7	Lateral and vertical delineation of COCs in groundwater not defined.	Item 4	Before implementing a remediation solution, the lateral and vertical extent of COCs in groundwater will need to be defined. This is important to ensure that the remediation solution is implemented in the correct location to maximize the effectiveness of the remediation efforts.	Groundwater samples will be analyzed for TPHg, DRO, BTEX, MTBE, TBA, and any constituents necessary for the application of a chosen remediation solution.
8	Petroleum vapor intrusion to indoor air has not been assessed.	Conduct a soil vapor survey on the neighboring parcel to assess any risks due to petroleum vapor intrusion to indoor air.	As part of the LTCP, petroleum vapor intrusion to indoor air must be assessed at an active fueling facility if the contaminant plume has migrated off-site.	Soil vapor samples will be analyzed for benzene, ethylbenzene, and naphthalene

3.0 REMARKS

The recommendations contained in this report represent Antea USA, Inc.'s professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This report is based upon a specific scope of work requested by the client. The contract between Antea USA, Inc. and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Antea USA, Inc.'s client and anyone else specifically identified in writing by Antea USA, Inc. as a user of this report. Antea USA, Inc. will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Antea USA, Inc. makes no express or implied warranty as to the contents of this report.

Prepared by:

Date: 3/14/14

Edward T. Weyrens, G.I.T.
Project Professional

Information, conclusions, and recommendations provided by Antea Group in this document regarding the site have been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.

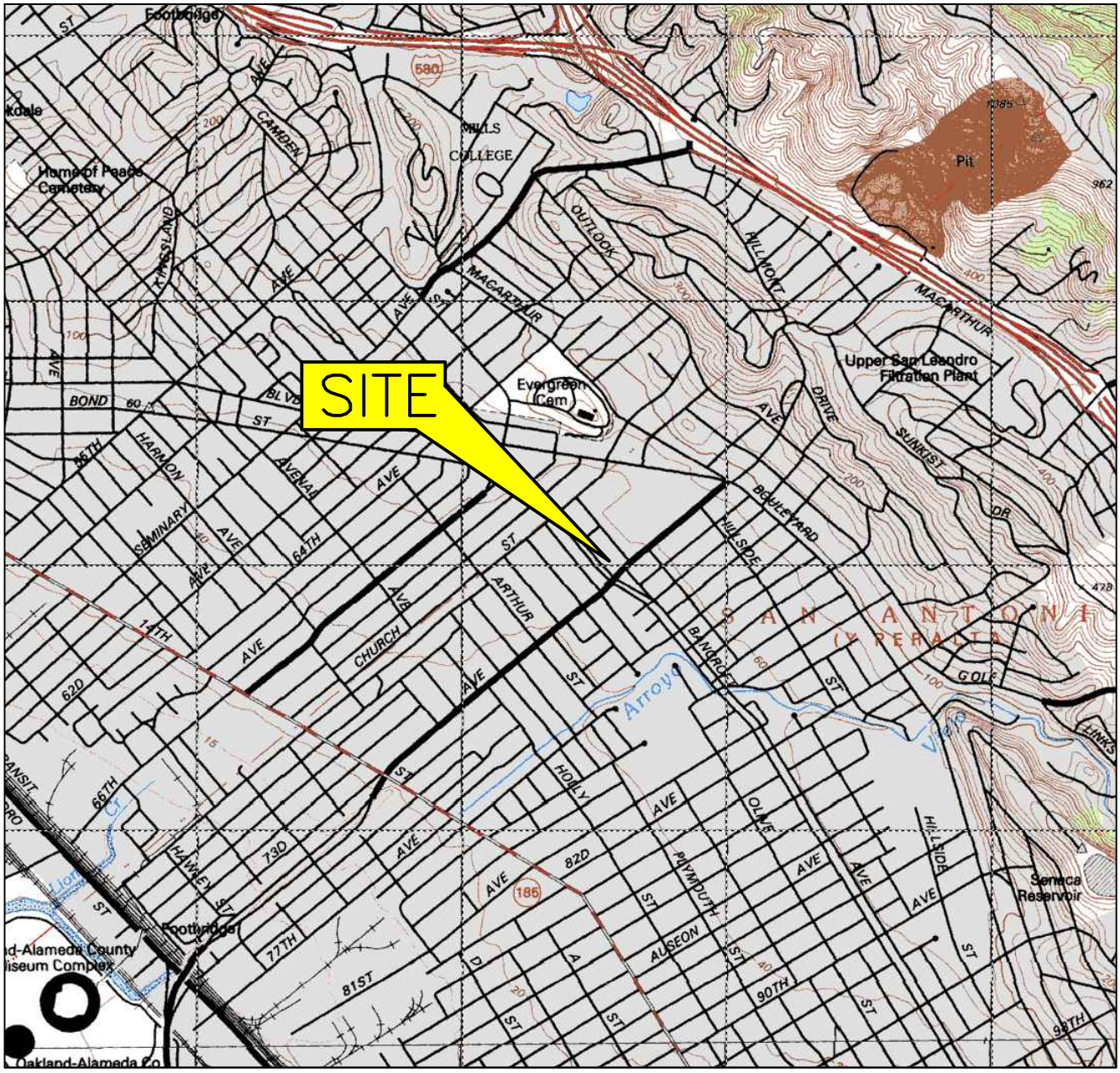
Licensed Approver:

PROFESSIONAL GEOLOGIST
DENNIS SHANNON DETTLOFF
No. 7480
STATE OF CALIFORNIA

Date: 3/14/14

Dennis S. Dettloff, P.G.
Senior Project Manager
California Registered Professional Geologist No. 7480

Figures



QUADRANGLE LOCATION

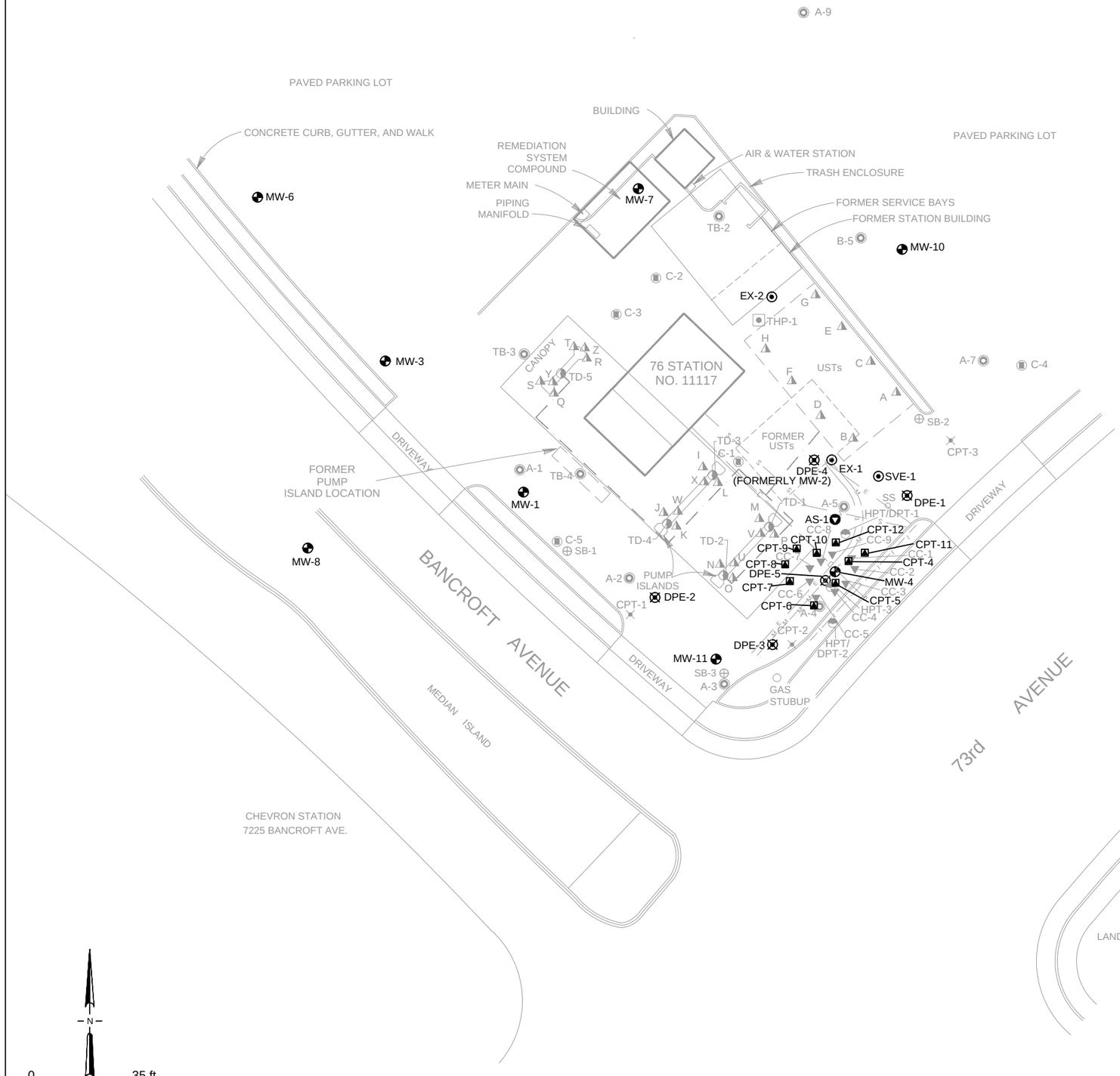
GENERAL NOTES:
BASE MAP FROM USGS, 7.5 MINUTE
TOPOGRAPHIC OAKLAND, CA. PHOTO REVISED 1980

FIGURE 1
SITE LOCATION MAP

76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
I42611117	DD	JH
DATE	REVIEWED BY	FILE NAME
3/14/14	DU	11117-TOPO

antea group



EXPLANATION

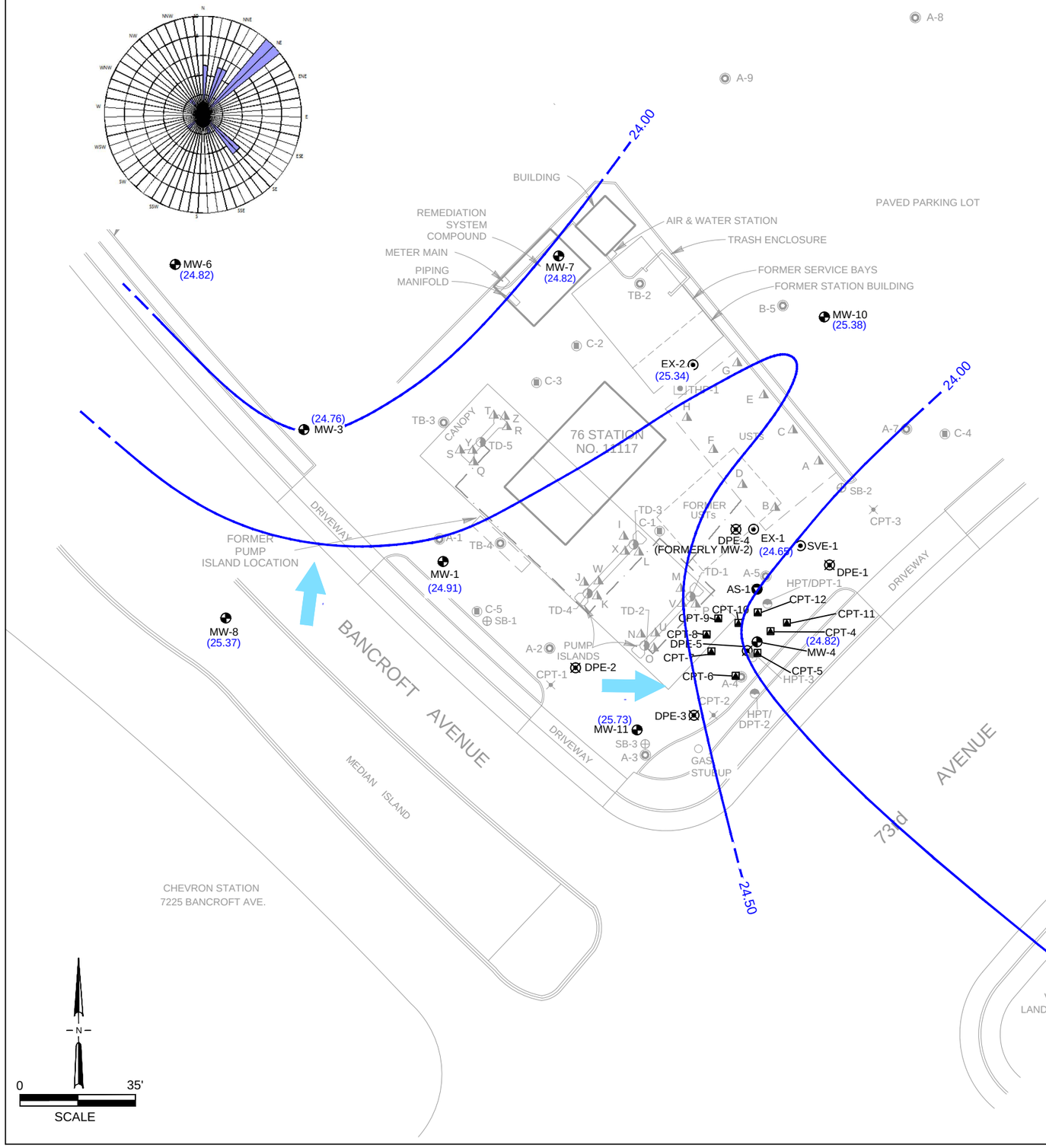
- MW-7 — GROUNDWATER MONITORING WELL LOCATION
- EX-1 — SOIL VAPOR EXTRACTION WELL LOCATION
- DPE-2 — GROUNDWATER EXTRACTION WELL LOCATION
- AS-1 — AIR SPARGE WELL LOCATION
- HPT-3 — HPT BORING LOCATION
- CC-1 — INJECTION LOCATION
- SS — SEWER CLEANOUT LOCATION
- SB-2 — FUTURE USE STUB-OUT LOCATION
- CPT-12 — CPT / UVOST BORING (ANTEA GROUP 2013)
- C-1 — SOIL BORING LOCATION (ANTEA GROUP, 2011)
- CPT-1 — CONE PENETROMETER TEST BORINGS BROADBENT & ASSOCIATES, INC. (JUNE, 2007)
- A-1/TB-2 — SOIL BORING LOCATION
  - A BORINGS (URS, NOVEMBER 2005)
  - B BORING (HEDI, 1992)
  - T BORINGS (EMCON, 1994)
- TD-1 — DISPENSER GRAB SAMPLE LOCATION (EMCON, SEPTEMBER 1994)
- THP-1 — HYDROPUNCH BORING LOCATION (EMCON, SEPTEMBER 1994)
- A — SOIL SAMPLES COLLECTED DURING ERI UST, PRODUCT LINE, AND DISPENSER REMOVAL (NOVEMBER, 1998)

- PRODUCT LINES
- C — UNDERGROUND COMMUNICATIONS LINE
- E — UNDERGROUND ELECTRIC LINE
- I — UNDERGROUND IRRIGATION LINE
- M — UNDERGROUND METAL PIPE LINE
- S — UNDERGROUND SEWER LINE

FIGURE 2
SITE PLAN

76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY	
142611117	DD	JH	
DATE	REVIEWED BY	FILE NAME	
3/14/14	DU	11117-SMS	antea group



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HPT-3	HPT BORING LOCATION
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	SEWER CLEANOUT LOCATION
C-1	SOIL BORING LOCATION (ANTEA GROUP, 2011)
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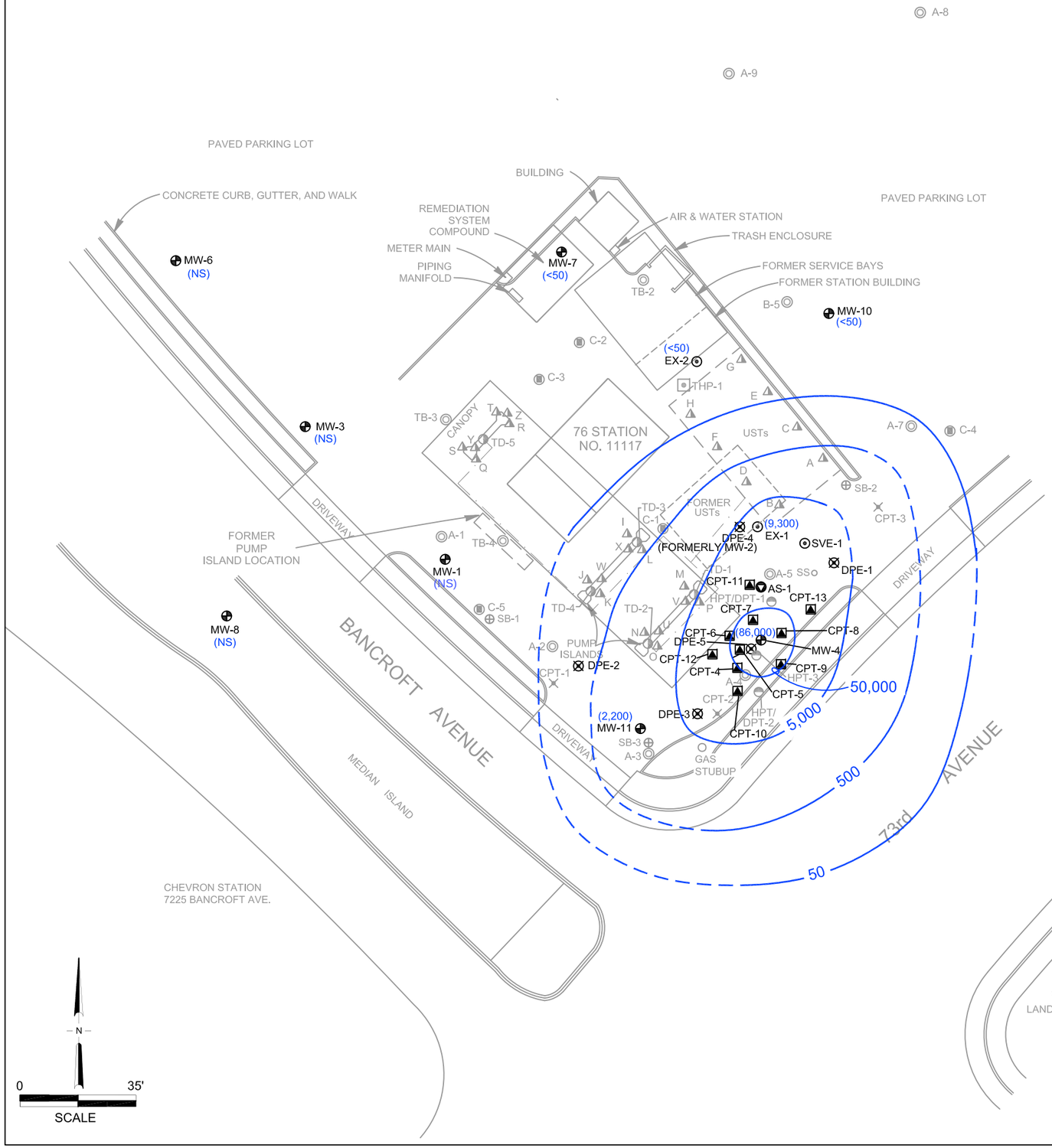
TD-1	DISPENSER GRAB SAMPLE LOCATION (EMCON, SEPTEMBER 1994)
THP-1	HYDROPUNCH BORING LOCATION (EMCON, SEPTEMBER 1994)
A	SOIL SAMPLES COLLECTED DURING ERI UST, PRODUCT LINE, AND DISPENSER REMOVAL (NOVEMBER, 1998)
CPT-1	CONE PENETROMETER TEST BORINGS BROADBENT & ASSOCIATES, INC. (JUNE, 2007)
	PRODUCT LINES
(25.38)	GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (ft/msl)
	GROUNDWATER FLOW DIRECTION AND GRADIENT ARE INDETERMINANT.

FIGURE 3
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 31, 2012

76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
I42611117	NP	JH
DATE	REVIEWED BY	FILE NAME
3/11/13	RB	11117-SMS

antea group



EXPLANATION

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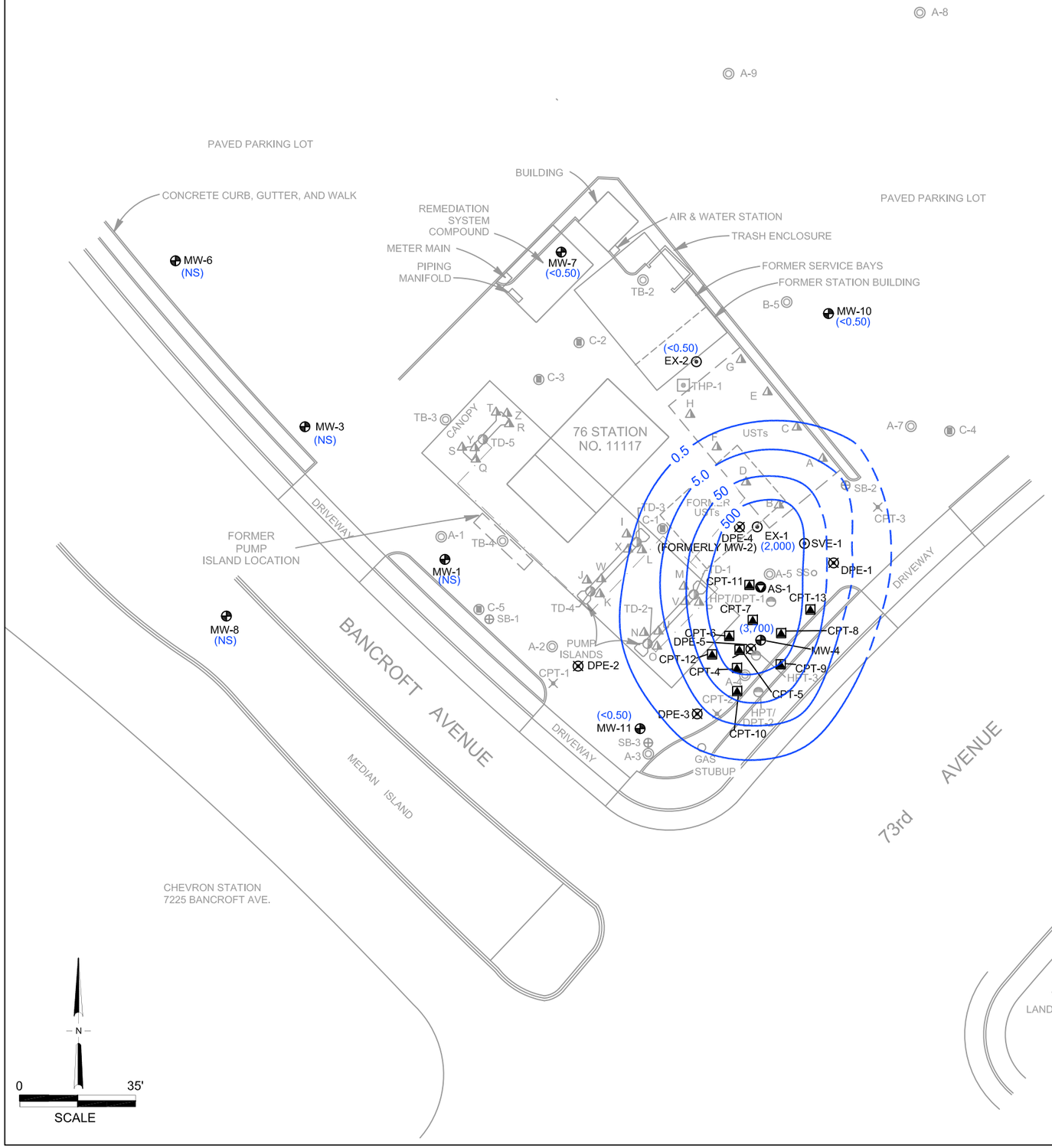
CPT-1	CONE PENETROMETER TEST BORINGS BROADBENT & ASSOCIATES, INC. (JUNE, 2007)
	PRODUCT LINES
TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
µg/L	MICROGRAMS PER LITER
5000	DISSOLVED PHASE TPHg CONCENTRATION CONTOUR (µg/L); DASHED WHERE INFERRED
(86,000)	DISSOLVED PHASE TPHg CONCENTRATION (µg/L)
<50	CONSTITUENT NOT DETECTED ABOVE INDICATED REPORTING LIMIT
NS	NOT SAMPLED

FIGURE 4
DISSOLVED PHASE TPHg ISOCONCENTRATION MAP
AUGUST 14, 2013
76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
I42611117	EW	KM
DATE	**REVIEWED BY**	**FILE NAME**
10/31/13	RB	11117-SMs-07

anteagroup



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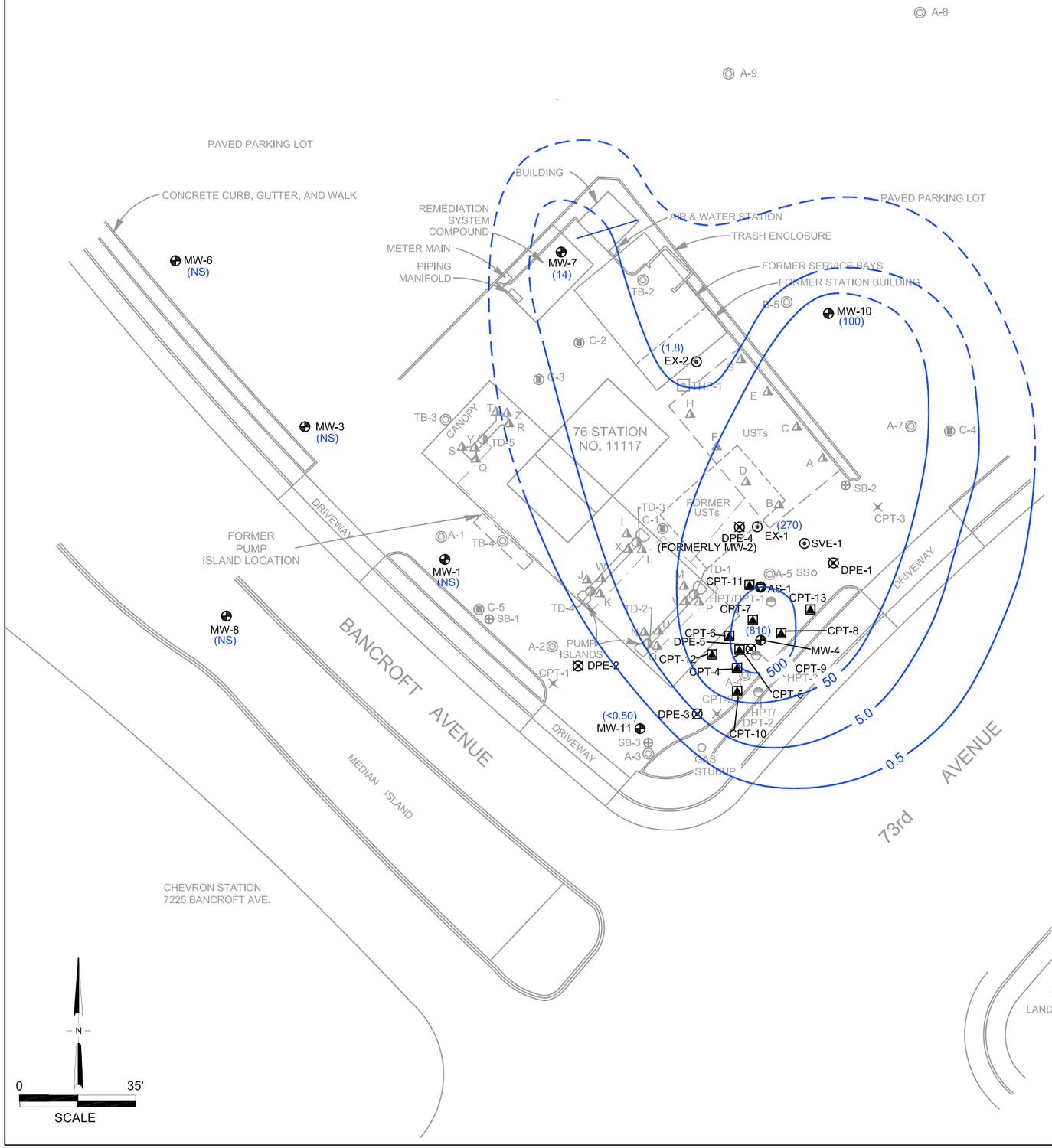
A	SOIL SAMPLES COLLECTED DURING ERI UST, PRODUCT LINE, AND DISPENSER REMOVAL (NOVEMBER, 1998)
CPT-1	CONE PENETROMETER TEST BORINGS BROADBENT & ASSOCIATES, INC. (JUNE, 2007)
	PRODUCT LINES
µg/L	MICROGRAMS PER LITER
100	DISSOLVED PHASE BENZENE CONCENTRATION CONTOUR (µg/L); DASHED WHERE INFERRED
(3,700)	DISSOLVED PHASE BENZENE CONCENTRATION (µg/L)
<0.50	CONSTITUENT NOT DETECTED ABOVE INDICATED REPORTING LIMIT
NS	NOT SAMPLED

FIGURE 5
DISSOLVED PHASE BENZENE ISOCONCENTRATION MAP - AUGUST 14, 2013
76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
I42611117	EW	KM
DATE	REVIEWED BY	FILE NAME
10/30/13	RB	11117-SMs-07

antea group



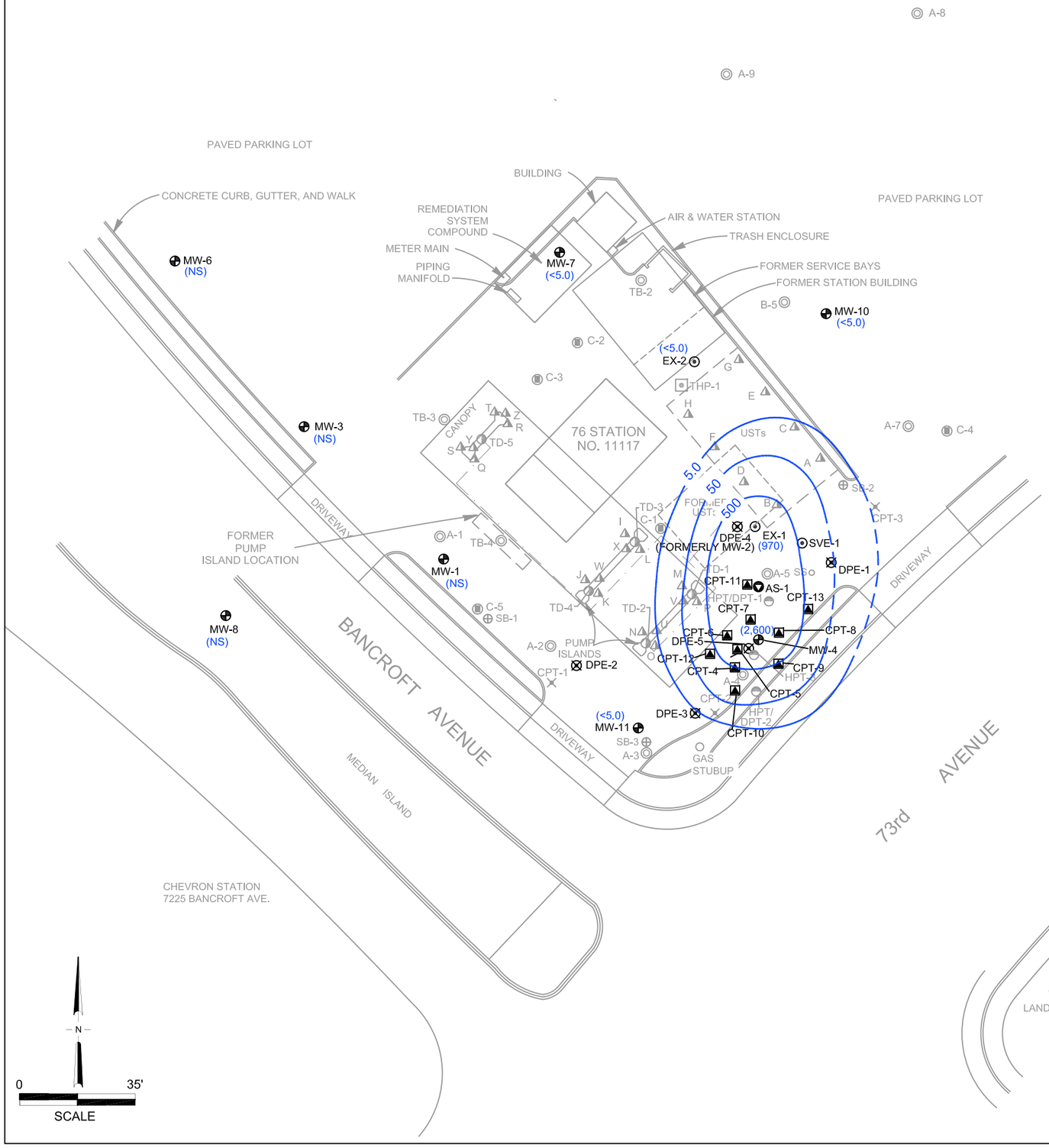
EXPLANATION

MW-7	GROUNDWATER MONITORING WELL LOCATION
EX-1	SOIL VAPOR EXTRACTION WELL LOCATION
DPE-2	GROUNDWATER EXTRACTION WELL LOCATION
AS-1	AIR SPARGE WELL LOCATION
HPT-3	HPT BORING LOCATION
SB-2	FUTURE USE STUB-OUT LOCATION
	SEWER CLEANOUT LOCATION
C-1	SOIL BORING LOCATION (ANTEA GROUP, 2011)
A-1/TB-2	SOIL BORING LOCATION A BORINGS (URS, NOVEMBER 2005) B BORING (HEDI, 1992) T BORINGS (EMCON, 1994)
TD-1	DISPENSER GRAB SAMPLE LOCATION (EMCON, SEPTEMBER 1994)
THP-1	HYDROPUNCH BORING LOCATION (EMCON, SEPTEMBER 1994)
A	SOIL SAMPLES COLLECTED DURING ERI UST, PRODUCT LINE, AND DISPENSER REMOVAL (NOVEMBER, 1998)
CPT-1	CONE PENETROMETER TEST BORINGS BROADBENT & ASSOCIATES, INC. (JUNE, 2007)
	PRODUCT LINES
MTBE	METHYL TERTIARY BUTYL ETHER
µg/L	MICROGRAMS PER LITER
500	DISSOLVED-PHASE MTBE CONCENTRATION CONTOUR (µg/L); DASHED WHERE INFERRED
(810)	DISSOLVED-PHASE MTBE CONCENTRATION (µg/L)
<0.50	CONSTITUENT NOT DETECTED ABOVE INDICATED REPORTING LIMIT
NS	NOT SAMPLED

FIGURE 6
DISSOLVED-PHASE MTBE ISOCONCENTRATION MAP - AUGUST 14, 2013
76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
I42611117	EW	KM
DATE	REVIEWED BY	FILE NAME
10/30/13	RB	11117-SMs-07

antea group



EXPLANATION

MW-7	GROUNDWATER MONITORING WELL LOCATION
EX-1	SOIL VAPOR EXTRACTION WELL LOCATION
DPE-2	GROUNDWATER EXTRACTION WELL LOCATION
AS-1	AIR SPARGE WELL LOCATION
HPT-3	HPT BORING LOCATION
SB-2	FUTURE USE STUB-OUT LOCATION
	SEWER CLEANOUT LOCATION
C-1	SOIL BORING LOCATION (ANTEA GROUP, 2011)
A-1/TB-2	SOIL BORING LOCATION A BORINGS (URS, NOVEMBER 2005) B BORING (HEDI, 1992) T BORINGS (EMCON, 1994)
TD-1	DISPENSER GRAB SAMPLE LOCATION (EMCON, SEPTEMBER 1994)
THP-1	HYDROPUNCH BORING LOCATION (EMCON, SEPTEMBER 1994)
A	SOIL SAMPLES COLLECTED DURING ERI UST, PRODUCT LINE, AND DISPENSER REMOVAL (NOVEMBER, 1998)
CPT-1	CONE PENETROMETER TEST BORINGS BROADBENT & ASSOCIATES, INC. (JUNE, 2007)
	PRODUCT LINES
TBA	TERTIARY BUTYL ALCOHOL
µg/L	MICROGRAMS PER LITER
500	DISSOLVED PHASE TBA CONCENTRATION CONTOUR (µg/L); DASHED WHERE INFERRED
(2,600)	DISSOLVED PHASE TBA CONCENTRATION (µg/L)
<5.0	CONSTITUENT NOT DETECTED ABOVE INDICATED REPORTING LIMIT
NS	NOT SAMPLED

FIGURE 7
DISSOLVED PHASE TBA ISOCONCENTRATION MAP
AUGUST 14, 2013
76 (FORMER BP) STATION NO 11117
7210 BANCROFT AVENUE
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY	
I42611117	EW	KM	
DATE	REVIEWED BY	FILE NAME	
10/30/13	RB	11117-SMs-07	antea group

Appendix A

Site Details and Summary of Previous Environmental Investigations

SITE LOCATION AND BACKGROUND

The Site is an active 76-brand gasoline retail outlet located on the northern corner of Bancroft Avenue and 73rd Avenue at 7210 Bancroft Avenue in Oakland, Alameda County, California (**Figure 1**). The site consists of a service station building, three 12,000-gallon gasoline underground storage tanks (USTs), and one 10,000-gallon diesel UST with associated piping and dispensers. The site is covered with asphalt or concrete surfacing except for planters along the southeastern and southwestern property boundaries and at the north corner of the property.

Land use in the immediate vicinity of the site is mixed commercial and residential. BP acquired the facility from Mobil Oil Corporation in 1989. In January 1994, BP transferred the property to TOSCO Marketing Company (TOSCO) and has not operated the facility since that time.

SUMMARY OF PREVIOUS ENVIRONMENTAL INVESTIGATIONS

1984 UST Replacement: In 1984, the pre-existing USTs at the site were removed and three single-walled fiberglass gasoline underground storage tanks (USTs) (6,000-gallon, 10,000-gallon, and 12,000-gallon) and one 6,000-gallon diesel UST were installed in a cavity immediately to the northeast of the former USTs. A UST removal/installation report is not on file, and it is unknown if one was ever prepared. No documentation was reportedly found referencing the conditions of the removed USTs or reporting evidence of the hydrocarbon impacts in the soil and groundwater, if any, at the time of the UST removal.

1989 Phase II Environmental Audit: In December 1989, Hunter Environmental Services, Inc. (Hunter) performed a Phase II Environmental Audit on the adjacent Eastmont Town Center site located to the north and northwest of the former BP Site. Part of the Phase II study included the installation monitoring well MW-3 near the western boundary of the former BP Site. Soil samples collected from 10 and 20 feet below ground surface (bgs) from MW-3 were analyzed for total petroleum hydrocarbons (TPH), benzene, toluene, ethyl benzene, and total xylenes (BTEX), and oil and grease. No analytes were reported above their respective laboratory reporting limits (LRLs). A groundwater sample collected from MW-3 was reported to contain TPH and benzene at concentrations of 2,700 micrograms per liter (µg/L) and 530 µg/L, respectively (Hunter, 1989).

1991 Phase I Subsurface Investigation: In December 1991, Hydro Environmental Technologies, Inc. (Hydro) drilled two on-site soil borings (MW-1 and MW-2) to total depths of 40 feet bgs, and soil samples were collected at 10-foot intervals between 5 and 25 feet bgs. First groundwater was encountered at approximately 30 feet bgs. The analytical results of the soil samples from MW-1 and MW-2 reported total petroleum hydrocarbons as gasoline (TPH-g) and BTEX at concentrations below their respective LRLs (Hydro, 1991).

1992 Phase I Subsurface Investigation: In July 1992, Hydro advanced boring MW-4 and MW-6 to total depths of 40 feet bgs, and boring B-5 was advanced to 50 feet bgs, First groundwater was encountered at approximately 30 feet bgs in borings MW-4 and MW-6, and no free water was encountered in boring B-5. The analytical results of soil samples collected at 30 feet bgs from B-5 and MW-6 reported TPH-g and BTEX at concentrations below their respective LRLs. The maximum TPH-g and BTEX concentrations in soil reported in MW-4 were 6,000 milligrams per kilogram (mg/kg) and 34 mg/kg, respectively, from a depth of 20 feet bgs. Borings MW-4 and MW-6 were subsequently converted into monitoring wells (Hydro, 1992).

1994 Baseline Assessment Report: In September 1994, EMCON performed a Supplemental Site Assessment at the site. Four exploratory soil borings (THP-1, TB-2, TB-3, TB-4) were advanced to a maximum depth of 45 feet bgs north of the former and existing UST complexes (THP-1), at the former service bays (TB-2), north of the northern pump island (TB-3), and at a former pump island (TB-4). Additionally, one soil sample was collected from beneath each of the five dispensers (TD-1 through TD-5). Groundwater was encountered in TB-2 and TB-3 at approximately 33 to 36 feet bgs and groundwater samples were collected from TB-2 and TB-3 via temporarily well points. Maximum concentrations of 16 mg/kg TPH-g (TD-3), TPH as diesel (TPH-d) at concentrations ranging from 110 mg/kg to 5,000 mg/kg (TD-1 through TD-5), and benzene at concentrations below LRLs were reported in soil samples. TPHg was not reported above the LRLs and a maximum concentration of 0.7 µg/L benzene (TB-3) was reported in groundwater samples (EMCON, 1994).

1994 Well Installation: In October 1994, Hydro advanced boring MW-7 to a total depth of 45 feet bgs, and borings MW-8 and MW-9 were advanced to total depths of 40 feet bgs. First encountered groundwater was at approximately 27 feet bgs to 32 feet bgs. TPH-g and BTEX were not detected above their respective LRLs in soil samples collected from 25 feet bgs in each boring. The three borings were subsequently converted into monitoring wells MW-7 through MW-9 (Hydro, 1995).

1997 Offsite Well Installation: In July 1997, Pacific Environmental Group (PEG) drilled one boring (MW-10) offsite to a depth of approximately 37.5 feet bgs. Soil samples were collected and the boring was subsequently converted into a monitoring well. First groundwater was encountered at approximately 26 feet bgs. No TPH-g, BTEX or methyl tertiary butyl ether (MTBE) was detected in soil samples at concentrations above their respective LRLs in MW-10. TPH-g and BTEX were not detected in the groundwater sample from MW-10 at concentrations above their respective LRLs. However, MTBE was detected at concentration of 13 µg/L using EPA Method 8020 (PEG, 1997).

1998 UST and Associated Piping and Dispenser Removal: In August 1998, Environmental Resolutions, Inc. (ERI) removed the three gasoline USTs (6,000-gallon, 10,000-gallon, and 12,000-gallon), one 6,000-gallon diesel UST, and associated dispensers and piping from the site. There was no visible evidence of leakage from the USTs removed. A total of eight native soil samples were collected from beneath each end of the removed USTs (denoted as A through H on **Figure 2**) at depths of 14 to 16 feet bgs, and a total of 18 soil samples (denoted as I through Z on **Figure 2**) were collected from the former dispenser locations and from beneath the associated product lines at three feet bgs (ERI, 1998).

TPH-g was reported in five of the eight UST excavation samples at concentrations ranging from 3.7 mg/kg (S-15-T2S) to 5,300 mg/kg (S-15-T1S). TPH-d was detected at 630 mg/kg (S-15-T1N) and 800mg/kg (S-15 T1S) into two samples, benzene concentrations ranged between 0.40 mg/kg (S-15-T1N) to 0.95 mg/kg (S-16-T3N) in three samples, MTBE concentrations ranged between 0.028 mg/kg (S-14-T4S) to 5.3 mg/kg (S-16-T3N) in seven samples, and lead was not reported in the sample analyzed for lead. TPH-g was reported in nine of the eighteen dispenser and product line samples with concentrations ranging between 1.4 mg/kg (S-3-PL12) to 7,200 mg/kg (S-3-D4). TPH-d was detected between 4.8 mg/kg (S-3-PL12) to 190 mg/kg (S-3-PL11) in five samples, benzene was detected between 0.0089 mg/kg (S-3-PL12) to 22 mg/kg (S-3-D4) in three samples and MTBE was detected between 0.048 mg/kg (S-3-PL12) to 15 mg/kg (S-3-PL1) in ten samples (ERI, 1998).

During the 1998 UST replacement activities, approximately 389 tons of soil and backfill were transported off-site disposal. The existing 10,000-gallon diesel and three 12,000-gallon gasoline USTs were installed as replacements (ERI, 1998).

1999 Groundwater Recovery Test: In April 1999, Alisto Engineering Group (Alisto) conducted groundwater recovery tests on wells MW-1 through MW-4, MW-6, MW-7 and MW-10 to assess the spatial variation in hydraulic conductivity in the shallow water-bearing zone across the Site. Testing by the Bouwer-Rice method yielded hydraulic conductivities of 2.46 x 10^{-2} ft/min for MW-1, 2.42 x 10^{-4} ft/min for MW-2, 3.82 x 10^{-4} ft/min for MW-3, 5.75 x 10-4 ft/min for MW-4, 1.99 x 10^{-2} ft/min for MW-6 1.09 x 10^{-4} ft/min for MW-7 and 8.78 x 10^{-5} ft/min for MW-10. The geometric mean of the hydraulic conductivity and flow velocity values were calculated to be 1.37 x 10-5 feet per second and 73.85 feet per year, respectively (Alisto, 1999).

1999 Extraction Well Installation: In November 1999, Cambria Environmental Technology, Inc. (Cambria) installed two 4-inch diameter wells (EX-1 and EX-2) on-site to facilitate potential remedial activities at the site. Well EX-1 was drilled to 39.5 feet bgs and EX-2 was drilled to 36.5 feet bgs. Groundwater was first encountered at 26 feet bgs. No TPH-G or BTEX, and relatively low MTBE concentrations (below 0.012 mg/kg) were reported in soil samples collected from EX-1 and EX-2 (Cambria, 2000).

2000 Interim Remedial Action and Recovery Testing: Between March 16 and April 30, 2000, Cambria conducted interim remedial activities at the site to evaluate the effectiveness of hydrocarbon and MTBE reduction using short-term groundwater extraction. During eight extraction events, approximately 10,900 gallons of groundwater was extracted from wells EX-1, EX-2 and MW-2. During the extraction events, stable to slightly decreasing hydrocarbon and MTBE concentration trends were reported in samples collected from wells MW-2 and EX-1, located immediately southwest of the existing USTs. Samples from well EX-2, located north of the existing USTs, exhibited lower hydrocarbon and MTBE concentrations than MW-2 and EX-1. In April 2000, during the batch extraction events, recovery tests were conducted on wells EX-1, EX-2 and MW-2. Based on the recovery test measurements, the calculated hydraulic conductivity values ranged from 1.85 x 10^{-4} ft/min to 8.33 x 10^4 ft/min with resulting flow velocities of 16 ft/year to 73 ft/year at well MW-2 (Cambria, 2000).

The calculated hydraulic conductivity values ranged from 2.02 x 10^{5} ft/min to 3.85 x 10^{-5} ft/min for well EX-1 with resulting flow velocities of 1.8 to 3.4 Ft/yr. And a well EX-2, the calculated hydraulic conductivity values ranged from 3.04 x 10^{-4} ft/min to 2.13 x 10^{-3} ft/min for resulting flow velocities of 27 ft/year to 187 ft/year. The geometric mean of these values is a hydraulic conductivity of 3.0 x 10^{-4} ft/min and resulting flow velocity of 26 ft/year (Cambria, 2000).

2001 Dual-Phase Extraction Pilot Test: From October 29, through November 2, 2001, Cambia performed a dual phase soil vapor and groundwater extraction (DPE) pilot test on the monitoring wells with the highest historical hydrocarbon concentrations (i.e., MW-2 and MW-4) and the extraction wells (EX-1 and EX-2) at the site. The DPE test results indicated that the vacuum influence was limited to within 18 to 28 feet of the extraction well. Water levels typically decreased several feet in the extraction wells and had a varied response in the observation wells. Estimated vapor-phase removal rates were approximately 200-pounds of hydrocarbon per day in wells MW-4 and EX-1, and less than 5-pounds of hydrocarbon per day in wells MW-2 and EX-2 (Cambria 2002).

Soil vapor concentrations showed a decreasing trend in wells MW-4 and EX-1 during the short-term pilot tests. Grab water samples collected before and after the pilot tests remained the same order of magnitude. A total of 6,500 gallons of water was extracted during the DPE pilot test and appropriately disposed off-site. Overall, the test results indicated that DPE is a feasible remedial alternative for the site (Cambria, 2002). Alameda County Environmental Health (ACEH) approved Cambria's August 8, 2002, *Dual Phase Extraction Pilot Test Report* as a Corrective Action Plan (CAP).

2005 Soil and Water Investigation: In Fall 2005, URS completed nine Geoprobe soil borings with co-located Hydropunch borings. The first phase of work was on-site source area characterization: five boring locations (A-1 through A-5) were advanced in the vicinity of the possible hydrocarbons source areas such as locations of former and current USTs, products dispensers, and in the vicinity of MW-4 to adequately characterize the lateral and vertical extent of petroleum hydrocarbons in soils in the identified source areas. An off-site assessment was completed during the second phase of work (borings A-7 through A-10) to further define the downgradient, cross-gradient, and up-gradient extent of the groundwater plume (soil boring A-6 was unable to be advanced due to close proximity to electric lines and product piping). Maximum concentrations of gasoline range organics (GRO), benzene, and MTBE were detected in soil at concentrations of 490 mg/kg [A-4 (23.5-24')], 0.11 mg/kg [A-5 (35-35.5')], and 0.84 mg/kg [A-1 (46-46.5')], respectively. Maximum concentrations of GRO, benzene, and MTBE were detected in ground water at concentrations of 510,000 µg/L [A-2 (21.3')], 11,000 µg/L [A-4 (34-36')], and 39,000 ug/L [A-4 (34-36')], respectively (URS, 2005).

The cross-gradient and downgradient lateral extents of the dissolved hydrocarbon plume were characterized during the last investigation. However, the vertical extent of the dissolved-phase hydrocarbons on the southern portion of the site was not defined. Specifically, significantly elevated concentrations were detected in Hydropunch groundwater samples collected from the bottom depths of soil borings A-2, A-3 and A-4. The bottom Hydropunch sample from boring A-2 (40-42 ft bgs) contained concentrations of GRO, benzene, and MTBE at 36,000 µg/L. 1,800 µg/L, and 110 µg/L, respectively. The bottom Hydropunch sample from boring A-3 (34-36 ft bgs) contained concentrations of GRO, benzene, and MTBE at 12,000µg/L, 21µg/L, and 8.3µg/L respectively. The bottom Hydropunch sample from boring A-4 (34-36 ft bgs) contained GRO, benzene, and MTBE concentrations of 120,000µg/L, 11,000µg/L and 39,000 µg/L respectively (URS, 2005).

Therefore, the vertical extent of dissolved phase petroleum hydrocarbon contamination remains unknown in this southern area of the site (URS, 2005). A work plan for soil and water investigation to delineate the vertical extent of contamination in the southern portion of the site was submitted to ACEH in October 2006.

2007 Soil and Groundwater Investigation: In April 2007, Stratus Environmental, Inc. (Stratus) advanced cone penetrometer test (CPT) borings in three locations onsite (CPT-1 through CPT-3) to maximum depths of 60 feet bgs. CPT-1 was advanced southwest of the dispenser islands and southeast of monitoring well MW-1; CPT-2 was advanced south of the dispenser islands and southwest of monitoring well MW-4; CPT-3 was advanced in the eastern corner of the side as requested by the ACEH. An Ultraviolet Induced Fluorescence (UVIF) module was used at each CPT boring location, analyzing the vertical extent of petroleum hydrocarbons in additional to providing soil profiling data. Groundwater samples were collected from multiple depths at each boring locations; physical soil samples were not collected during this investigation.

- GRO was detected above laboratory reporting limits in five of the seven groundwater samples, ranging from 170 µg/L (CPT-3-28-32') to 170,000 µg/L (CPT-1-37-41').
- Benzene was detected above laboratory reporting limits in four of the seven groundwater samples, ranging from 0.51 µg/L (CPT-3-23-27') to 7,700 µg/L (CPT-2-37-41').
- Toluene was detected above laboratory reporting limits in three of the seven groundwater samples, ranging from 57 µg/L (CPT-1-30-34') to 670 µg/L (CPT-2-28-32').

- Ethylbenzene was detected above laboratory reporting limits in four of the seven groundwater samples, ranging from 530 µg/L (CPT-2-37-41') to 2,600 µg/L (CPT-1-37-41').
- Total xylenes were detected above laboratory reporting limits in four of the seven groundwater samples, ranging from 290 µg/L (CPT-2-37-41') to 9,600 µg/L (CPT-1-37-41').
- MTBE was detected above laboratory reporting limits in five of the seven groundwater samples, ranging from 4.4 µg/L (CPT-3-56-60') to 6,500 µg/L (CPT-2-37-41').
- TBA was detected above laboratory reporting limits in groundwater sample CPT-2-37-41' at 2,400 µg/L.

2007-2008 DPE System Installation: Construction of the DPE system was started by Broadbent & Associates, Inc (BAI) and Stratus in late 2007. The system consists of a thermal/catalytic oxidizer with a 25 horsepower liquid ring blower designed to extract water and vapor from six on-site extraction wells. Extracted vapor were to be treated by thermal/catalytic oxidation and discharged to the atmosphere under the oversight of the Bay Area Air Quality Management District. Extracted groundwater was to be treated by a sediment filter and three 1,000 pounds carbon vessels before being discharged into the City of Oakland sanitary sewer system. DPE wells DPE-1 through DPE-5 were installed at the site to total depths ranging from 35 feet to 40 feet bgs. Well MW-2 was overdrilled and destroyed to allow DPE-4 to be installed in the same borehole. The system is currently connected to six wells (DPE-1 through DPE-5 and EX-1) (BAI, 2008a).

As of the end of the fourth quarter 2008 the system had not been started. BAI and Stratus were still coordinating with Pacific Gas & Electric (PG&E) to install electrical service to the system. Natural gas was completed to the site and system in third quarter 2008 (BAI, 2008a).

During DPE construction activities, on-site groundwater monitoring well MW-11 was installed to a total depth of 40 feet bgs on the southern corner of the site. Soil samples collected at 20 feet and 30 feet bgs reported maximum concentrations of 1.9 mg/kg GRO and 0.0089 mg/kg benzene. MTBE was not reported above the LRL in either of the soil samples (BAI, 2008a).

2009-2011 DPE System Startup Efforts: In 2009, Antea Group (formerly Delta Consultants) began coordinating with nearby businesses (Eastmont Mall and Burger King) for the 3-phase power source. Due to financial consideration, Antea Group also explored another alternative for the startup of the DPE system, which included reconfiguring the current system for single phase power.

2011-2012 Remedial Action Site Investigation: Antea Group submitted the *Remedial Action Investigation Work Plan*, dated August 03, 2011 to the ACEH. The ACEH approved the proposed scope of work in an agency letter to Antea Group dated September 1, 2011. In October 2011, Antea Group and subcontractors advanced borings C-1 through C-5, and advanced and installed remedial wells SVE-1 and AS-1 per the August 2011 Work Plan. Antea Group submitted a *Remedial Investigation Work Plan Addendum*, dated December 13, 2011 which proposes a postponement of the AS/SVE pilot test described in the August 3, 2011 *Remedial Action Investigation Work Plan* to utilize a new remedial strategy called Plume Stop, a product created by Regenesis. Between March 26 and 30, 2012, Antea Group and Regenesis oversaw subcontractor Vironex inject Plume Stop at nine soil boring locations using direct push technology.

2013 CPT Site Investigation: Antea Group submitted the *Pilot Test Evaluation and Additional Assessment Work Plan* dated April 29, 2013 to the ACEH. The ACEH approved the scope of work in an agency letter dated July 4, 2013. In October 2013, Antea Group and subcontractors advanced borings CPT-4 through CPT-12 using a CPT rig equipped with Ultraviolet Optical Screening Tool (UVOST) technology. Confirmation soil sampling was conducted in separate borings adjacent to the CPT borings (except CPT-11). Results of the investigation were reported in the *Site Investigation Report* dated January 24, 2014 submitted to the ACEH and uploaded to GeoTracker.

FREE PRODUCT RECOVERY DURING GROUNDWATER MONITORING EVENTS

Free product was observed in groundwater monitoring well MW-2 between the 1993 and 1998, at thicknesses ranging from 2.60 feet (3/30/1994) to less than 0.01 feet (10/2/1997 to 7/21/1998). When free product was observed in the well, it was removed by bailer. Between 1993 and 1998, a cumulative total of 24.90 gallons of free product had been removed from the well (Alisto, 1998).

Free product was also observed in well MW-4 during the third quarter 2001 (0.03 inches), fourth quarter 2006 (0.11 inches), first quarter 2008 (0.01 inches), and third quarter 2008 (0.05 inches); and in EX-2 during the second quarter 2007 (0.01 inch). With the exception of 1.5 gallons of a free product/water mixture recovered from MW-4 during the third quarter 2008 (BAI, 2008b), free product was not recovered from these wells when observed.

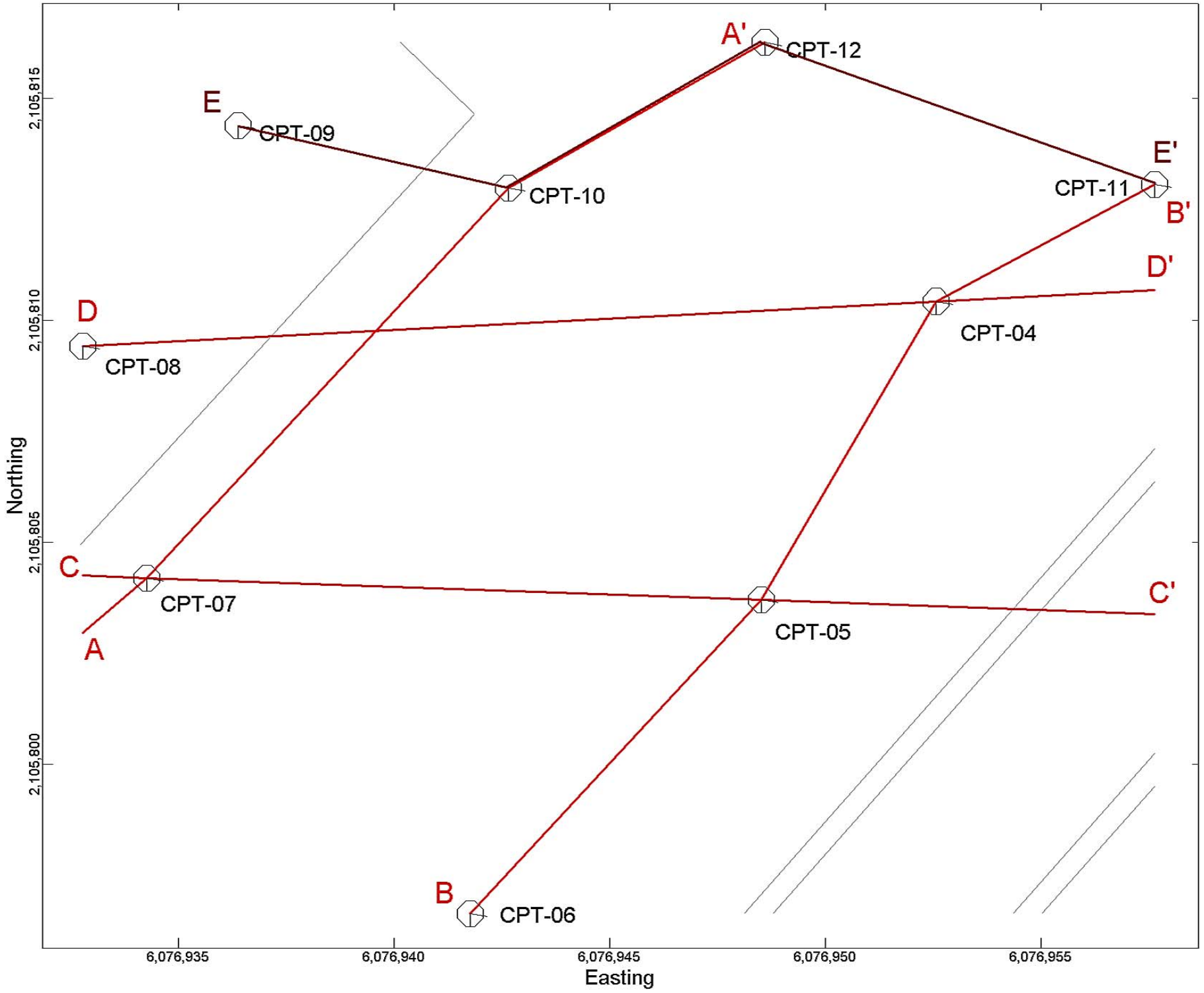
SENSTIVE RECEPTORS

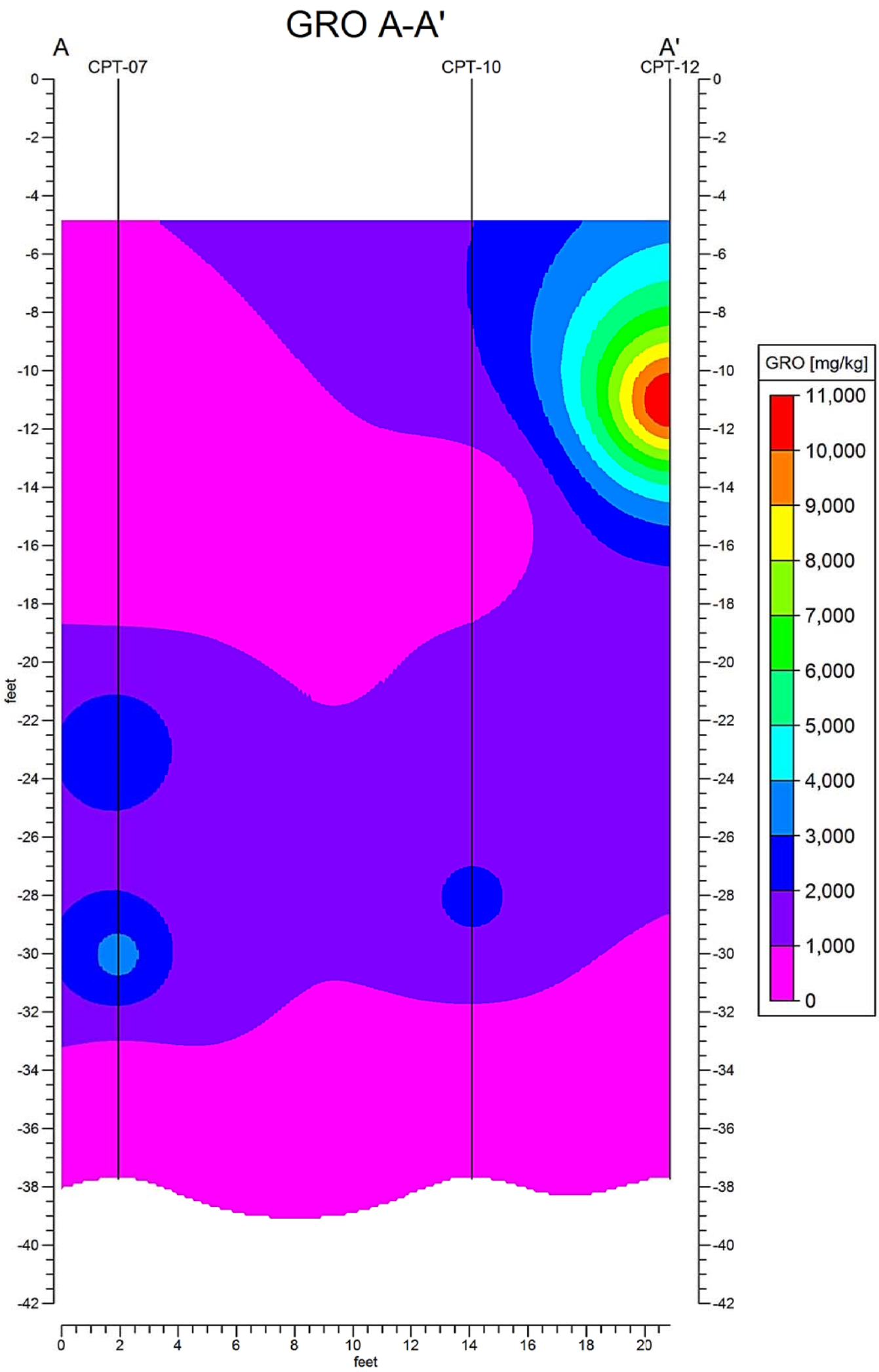
2000 Potential Receptor Survey, Expanded Site Plan and Well Search: In October 2000, Alisto completed a potential receptor survey, prepared an expanded site plan with neighboring property parcel information and underground utilities mapped, and identified wells in the vicinity of the site. A review of the files of the California Department of Water Resources (DWR) was performed to identify all known wells within one-half mile radius of the site. The results of the well search revealed that there were 17 wells other than the on-site monitoring sells. Of these, 11 were offsite monitoring wells; four were cathodic protection wells, one an industrial well, and one an irrigation well for a nearby cemetery. No domestic/municipal water supply wells were identified from review of the DWR files (Alisto, 2000).

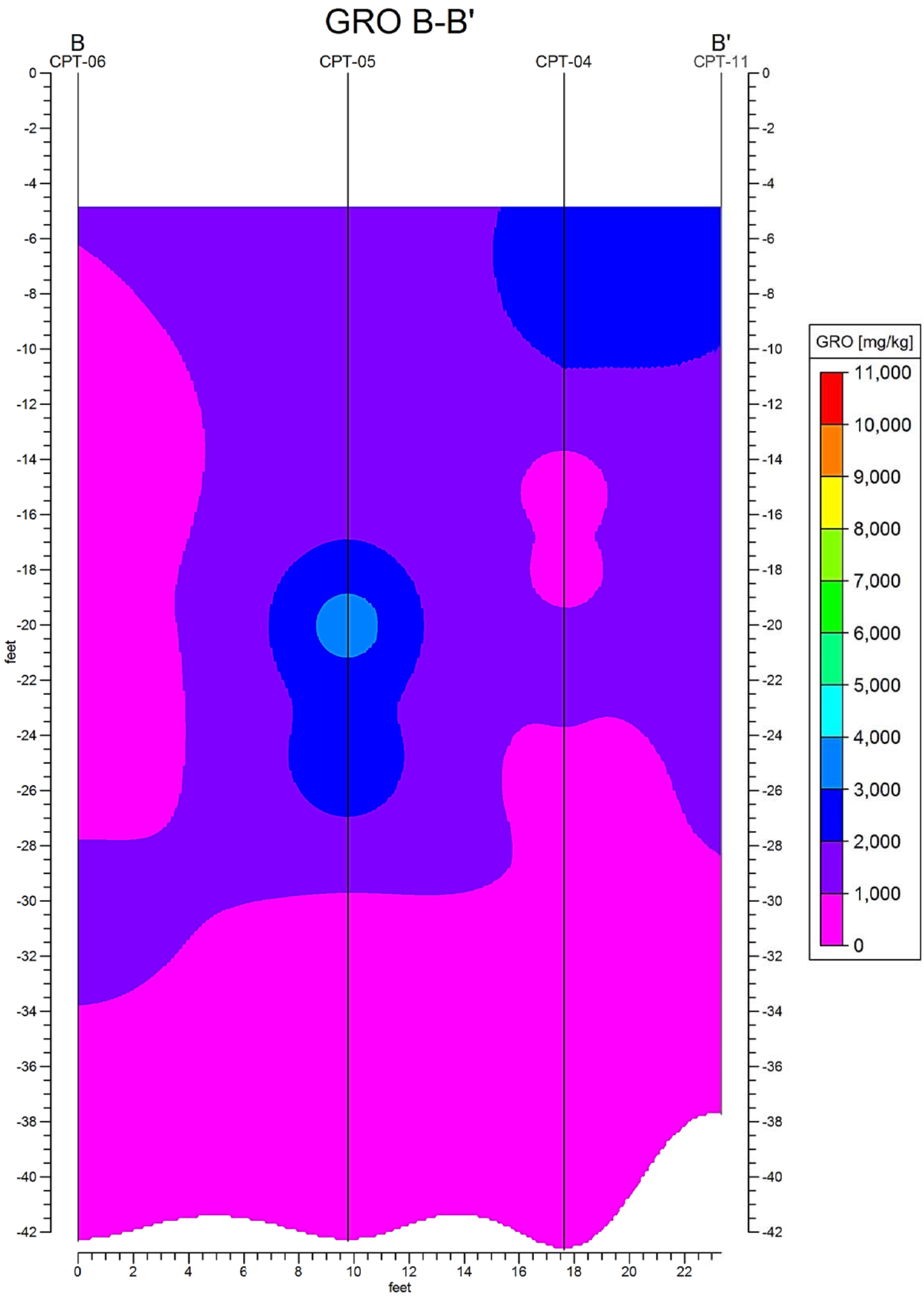
2010 Sensitive Receptor Survey: Delta Consultants (Delta) submitted a *Sensitive Receptor Survey* in October 2010. As part of that receptor survey, Delta conducted a records review (environmental database search), a well radius search, and a search for other sensitive receptors which have the potential to be affected by the petroleum hydrocarbon release at the site. Delta's review of the historical aerial photographs indicated that the site in 1939 was primarily used for agricultural purposes with small family residences. In general, the site was developed to the current conditions with the station building in 1974. The historical topographic maps support the indication of residential houses and agriculture in the site region as early as 1915 to 1948. The well search indicated that 10 wells were within a one-mile radius of the site. DWR indicated the presence of 7 wells within a one-mile radius of the site. However, no records were found for the status of these wells as being active or abandoned. The main surface water bodies were Lake Merritt located northwest of the site and San Leandro Bay located west of the site. Several churches, schools and day care centers were located within a one-mile radius of the site. Based on the above identified receptors' distances form the site, directions from the site, and extent of hydrocarbon impact at the site, they were not anticipated to be affected by the petroleum hydrocarbon release at the site.

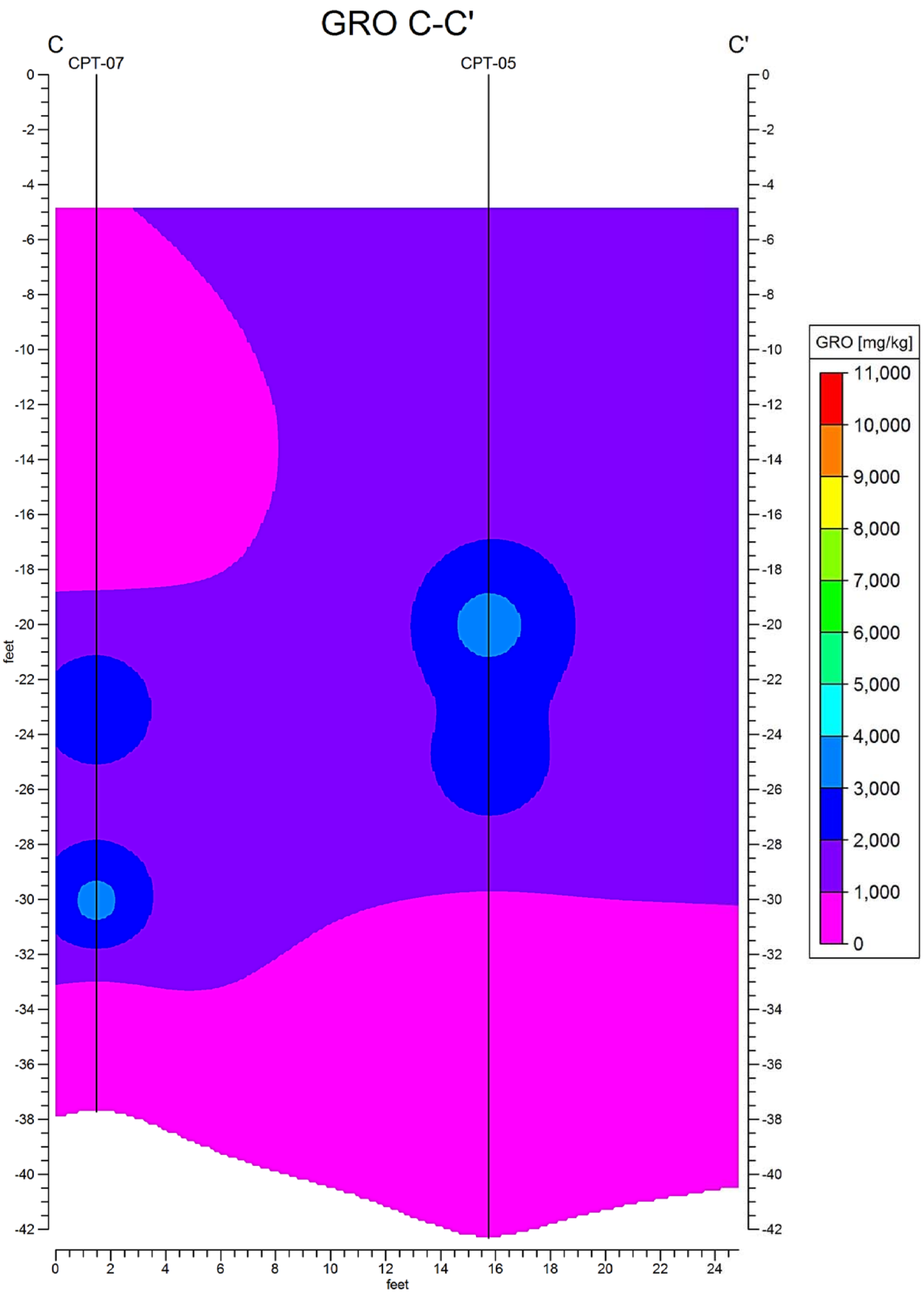
Appendix B

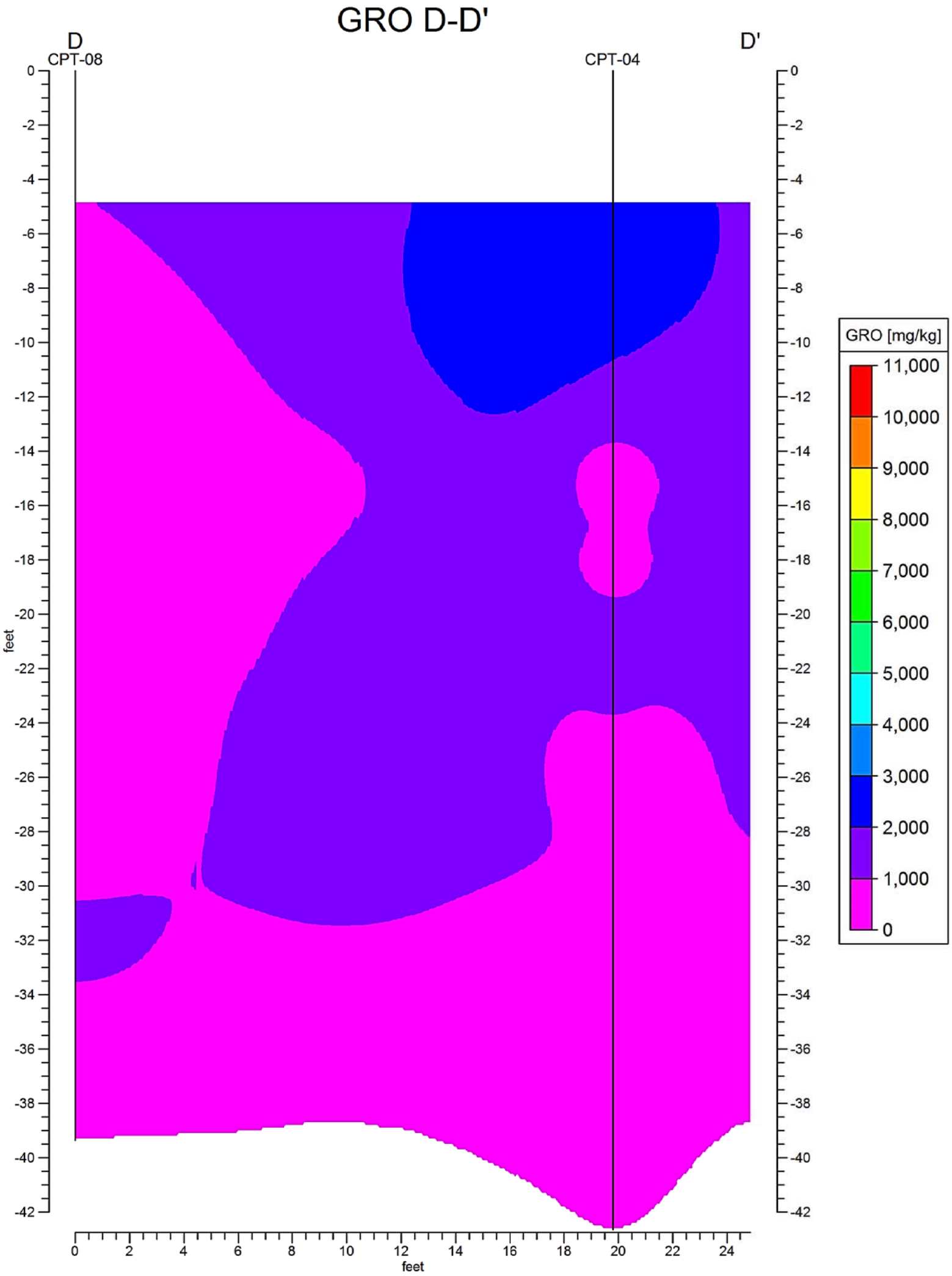
Concentration Cross Sections

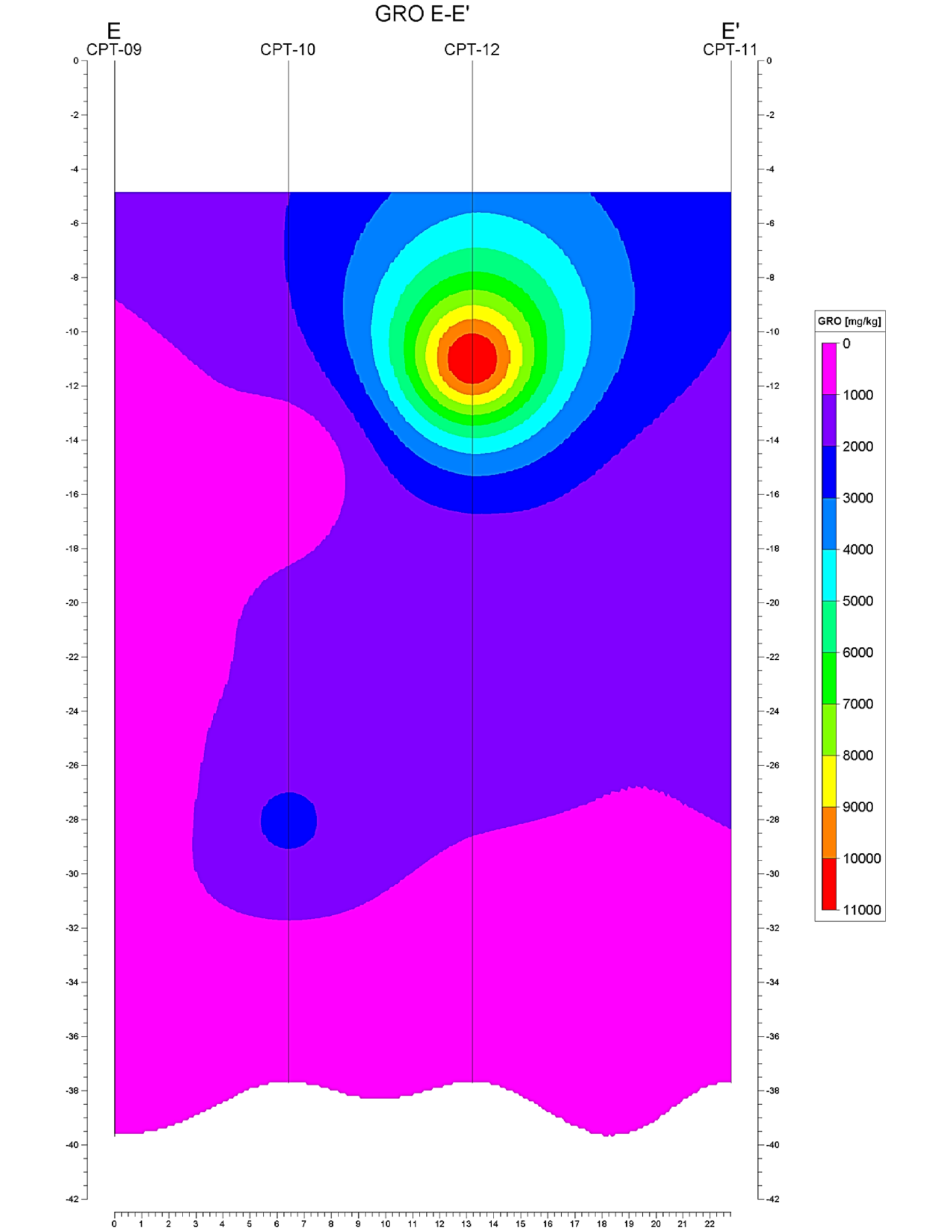

A'
CPT-12
E
CPT-09
CPT-10
E'
CPT-11
B'
D'
D
CPT-08
CPT-04
C
CPT-07
C'
CPT-05
A
B
CPT-06
2,105,815
2,105,810
2,105,805
2,105,800
Northing
6,076,935
6,076,940
6,076,945
6,076,950
6,076,955
Easting

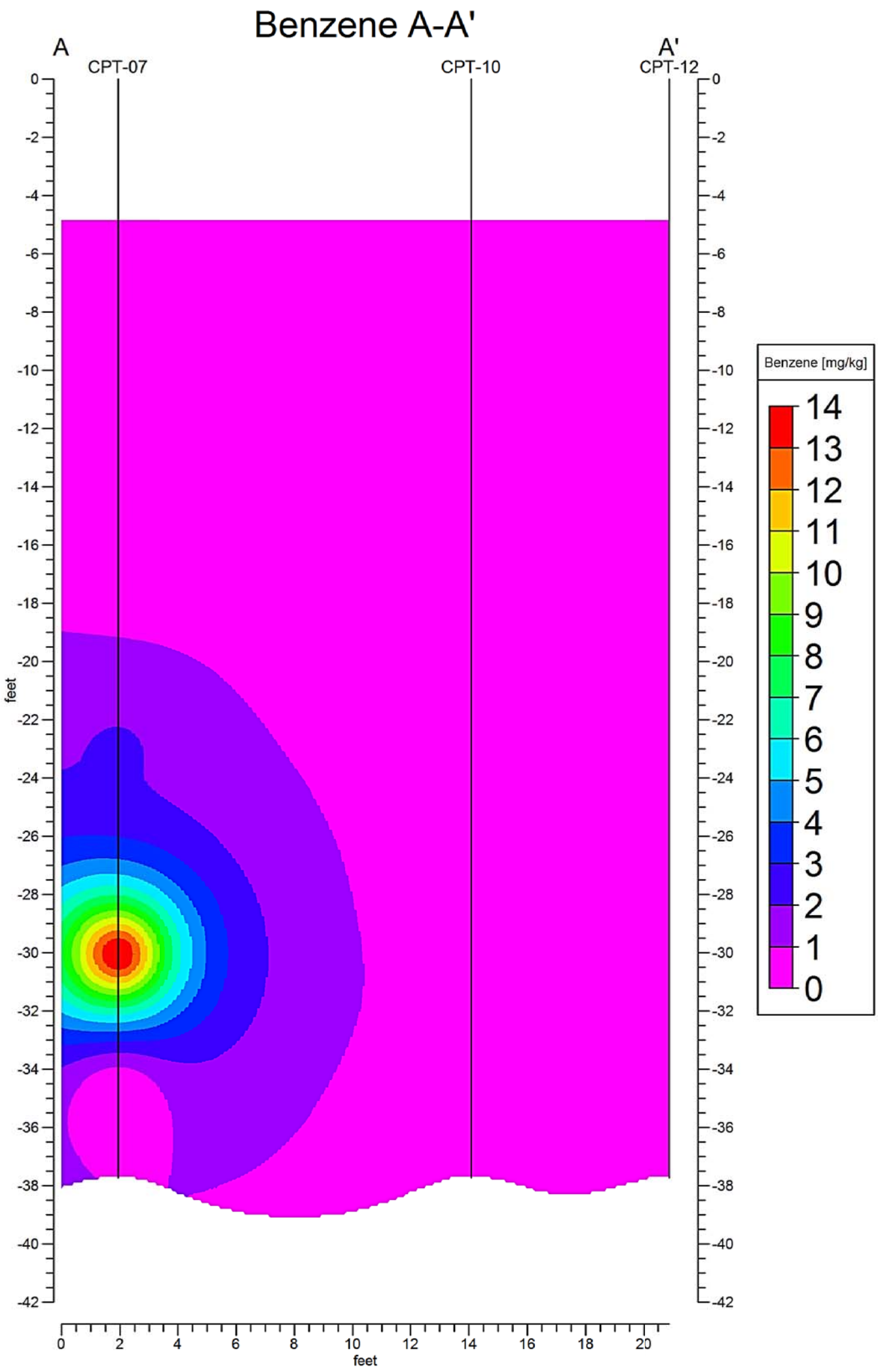

GRO A-A'
A
A'
CPT-07
CPT-10
CPT-12
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0
2
4
6
8
10
12
14
16
18
20
feet
GRO [mg/kg]
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

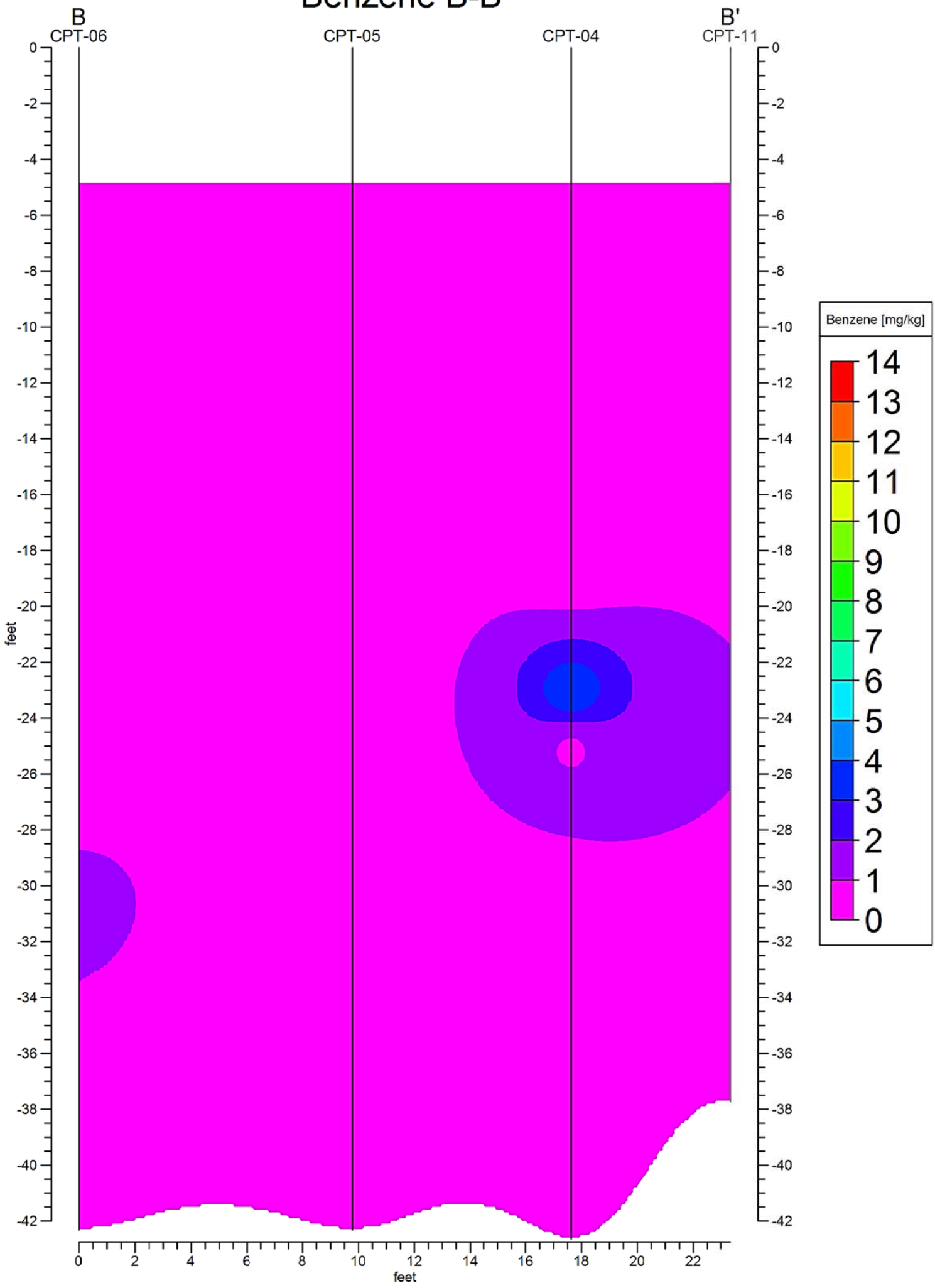

GRO B-B'
B
CPT-06
CPT-05
CPT-04
B'
CPT-11
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0
2
4
6
8
10
12
14
16
18
20
22
feet
GRO [mg/kg]
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

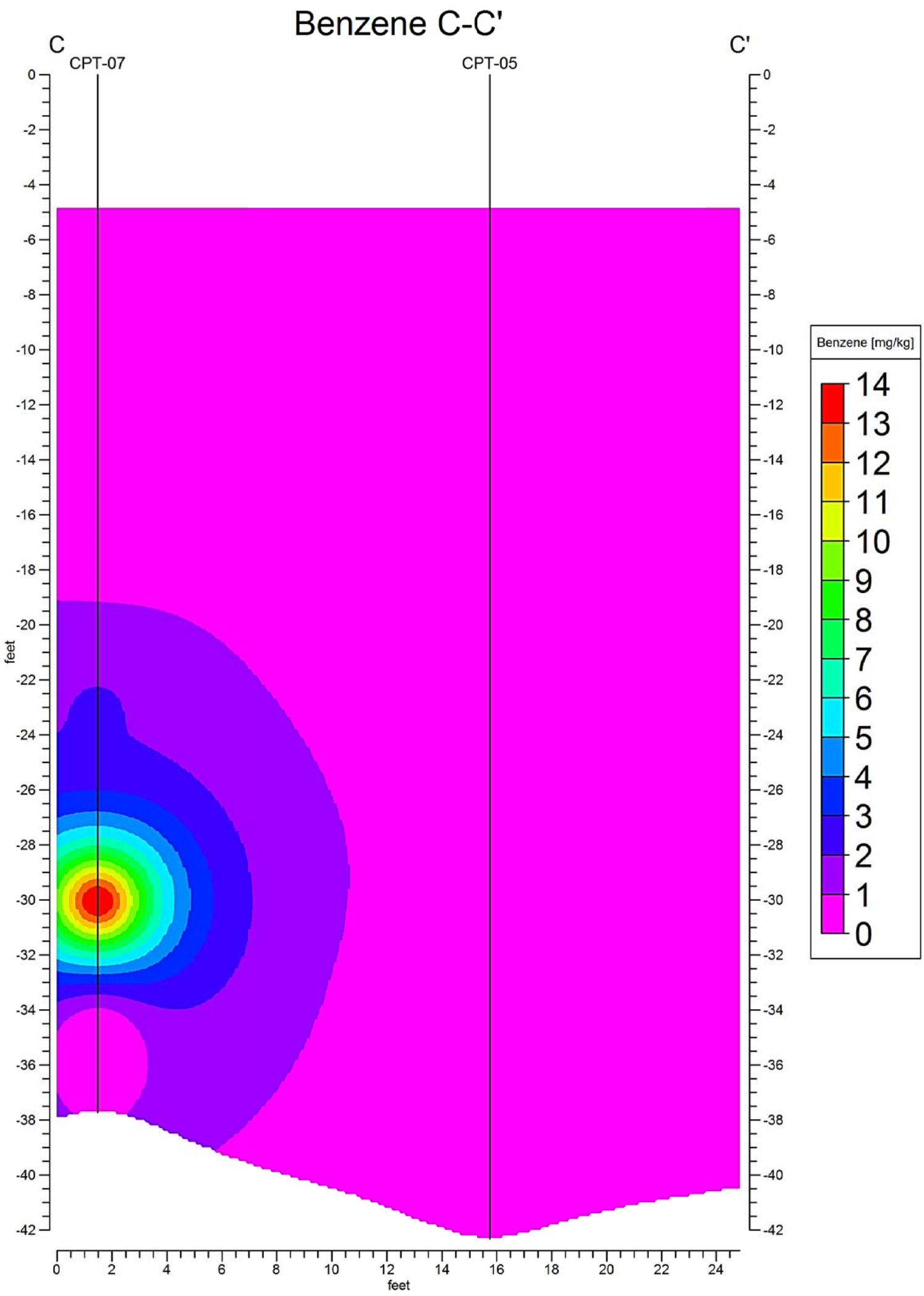

GRO C-C'
C
C'
CPT-07
CPT-05
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
feet
0
2
4
6
8
10
12
14
16
18
20
22
24
feet
GRO [mg/kg]
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

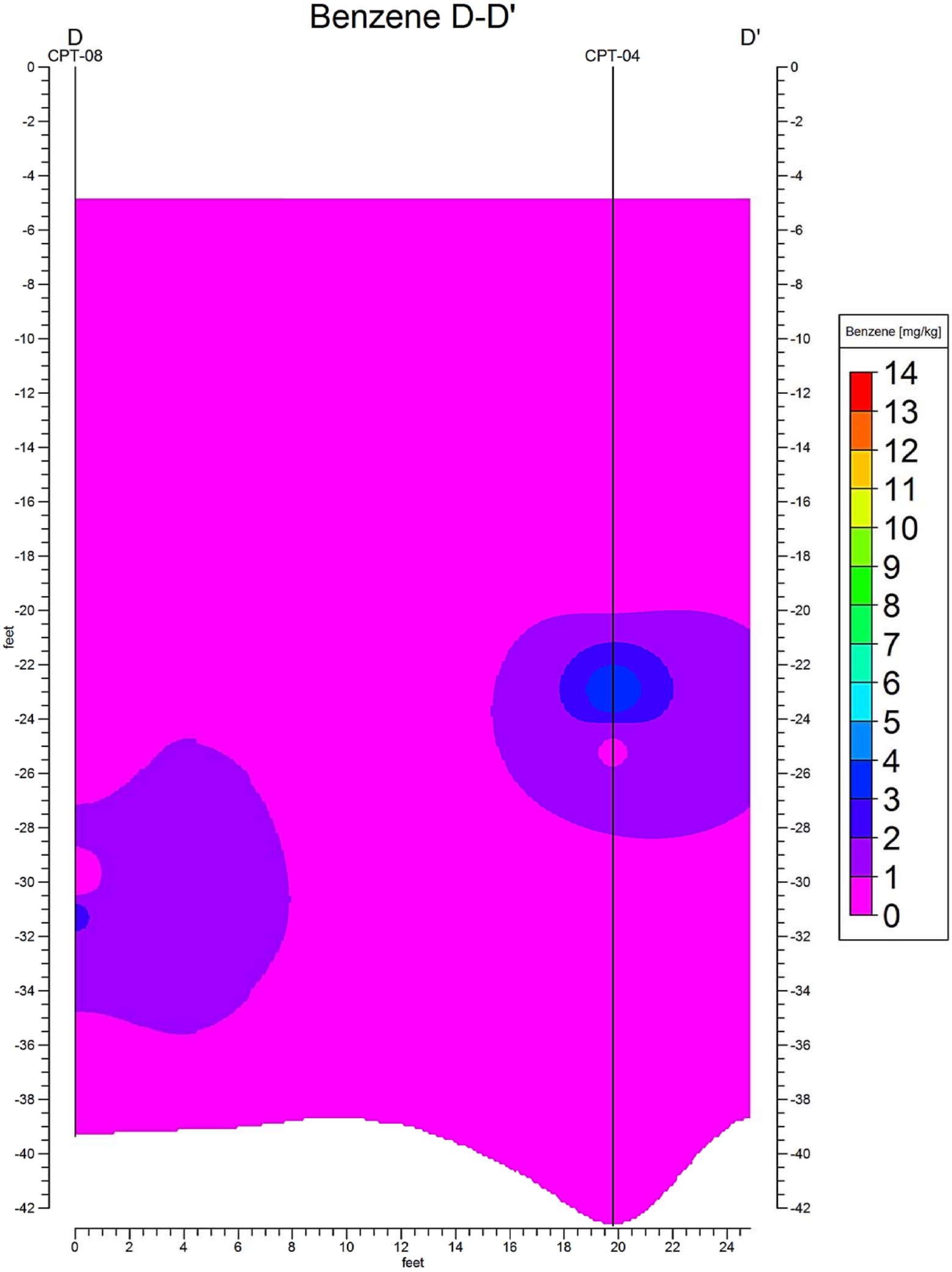

GRO D-D'
D
D'
CPT-08
CPT-04
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0
2
4
6
8
10
12
14
16
18
20
22
24
feet
GRO [mg/kg]
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

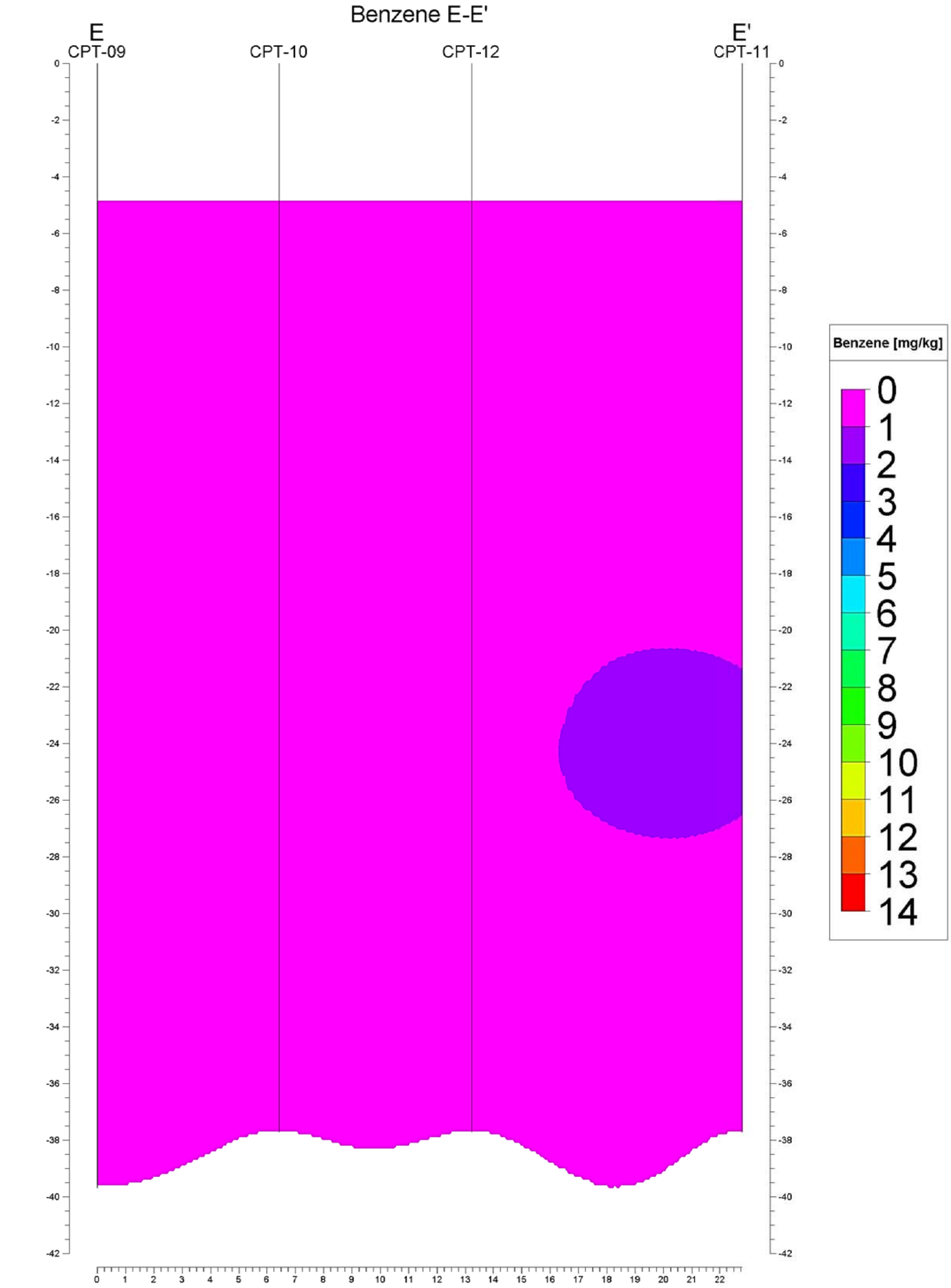

GRO E-E'
E
E'
CPT-09
CPT-10
CPT-12
CPT-11
GRO [mg/kg]
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000

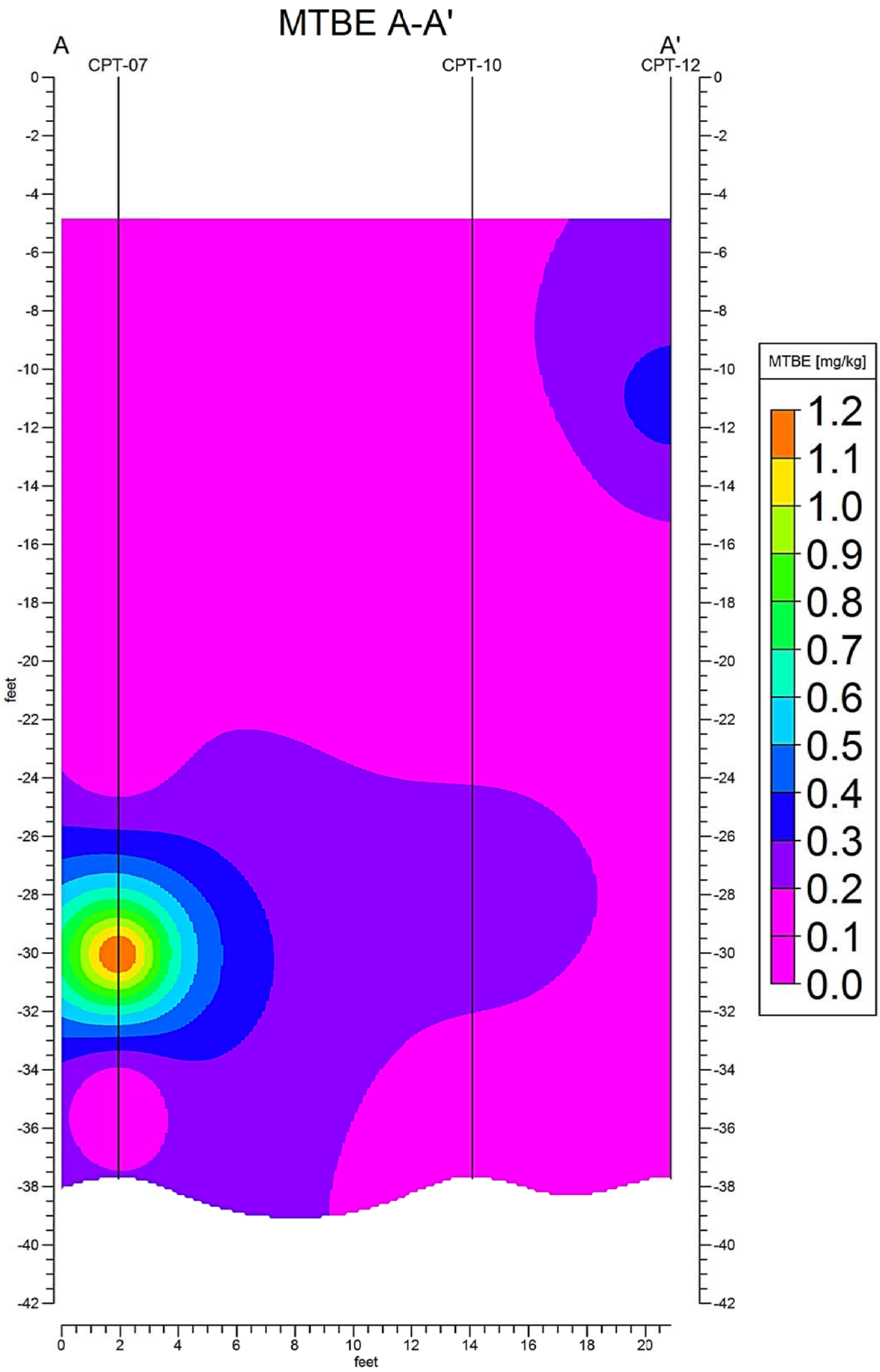

Benzene A-A'
A
A'
CPT-07
CPT-10
CPT-12
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0
2
4
6
8
10
12
14
16
18
20
feet
Benzene [mg/kg]
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

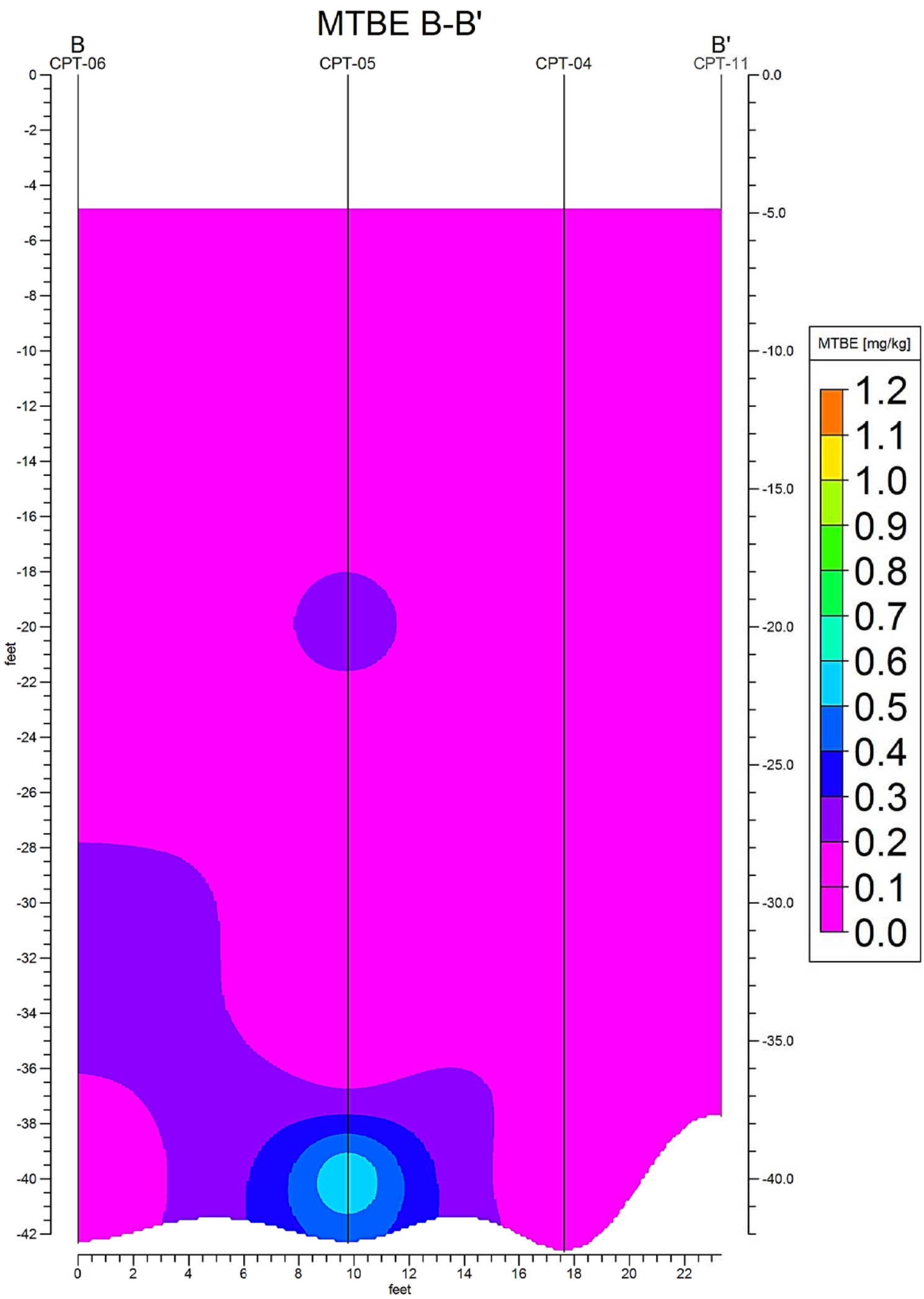

Benzene B-B'
B
CPT-06
CPT-05
CPT-04
B'
CPT-11
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0
2
4
6
8
10
12
14
16
18
20
22
feet
Benzene [mg/kg]
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

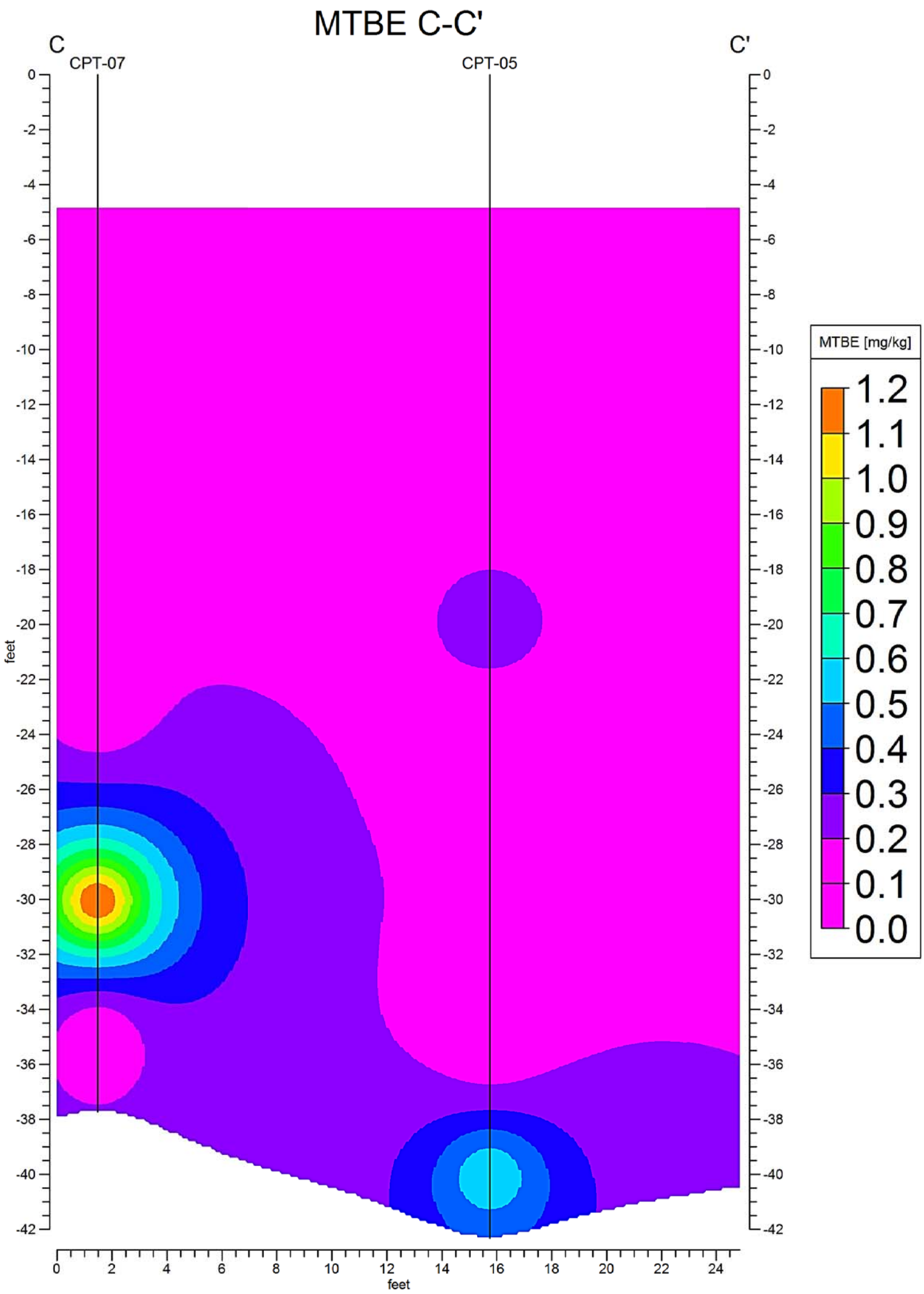

Benzene C-C'
C
C'
CPT-07
CPT-05
feet
feet
Benzene [mg/kg]
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

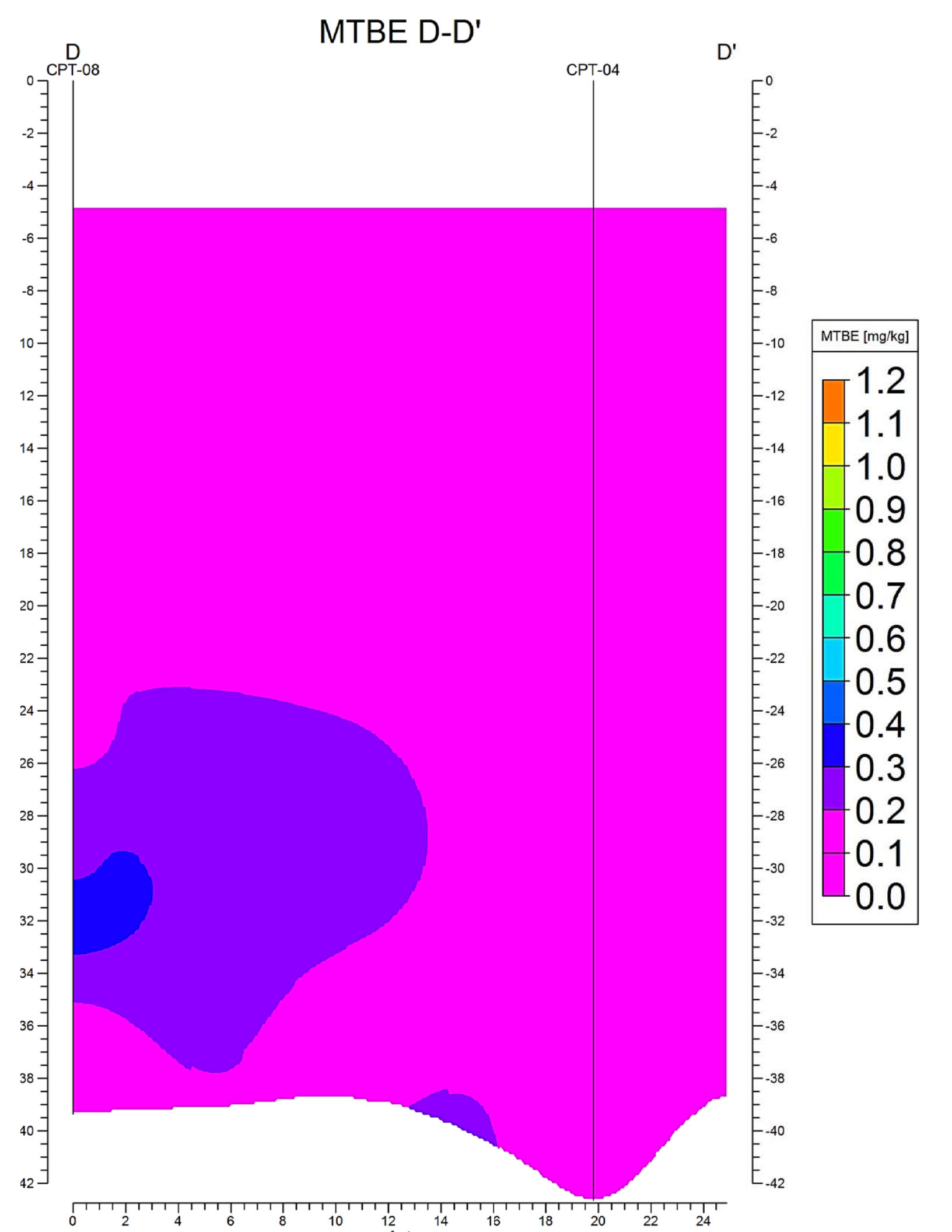

Benzene D-D'
D
D'
CPT-08
CPT-04
feet
feet
Benzene [mg/kg]
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

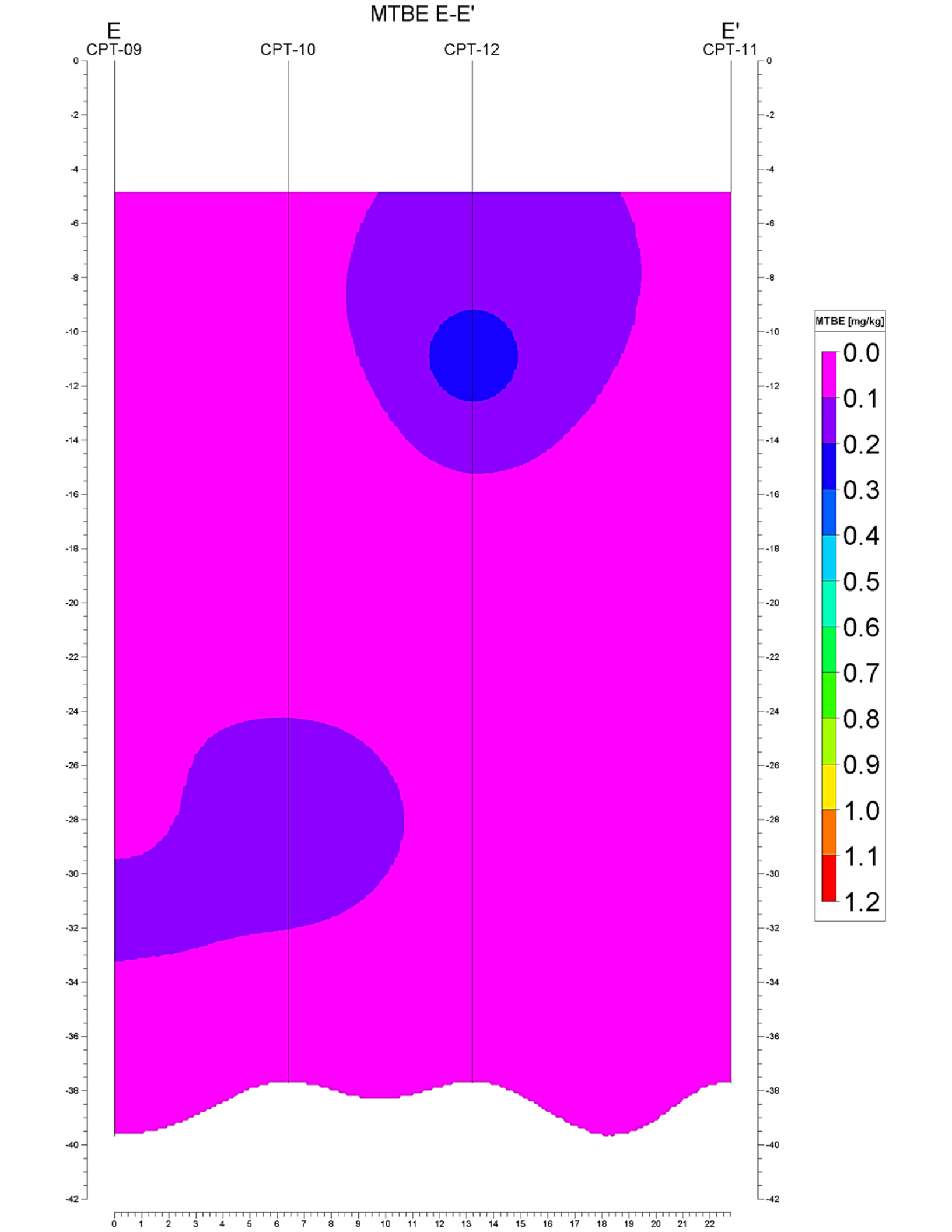

Benzene E-E'
E
CPT-09
CPT-10
CPT-12
E'
CPT-11
Benzene [mg/kg]
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14


MTBE A-A'
A
A'
CPT-07
CPT-10
CPT-12
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0
2
4
6
8
10
12
14
16
18
20
feet
MTBE [mg/kg]
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0


MTBE B-B'
B
CPT-06
CPT-05
CPT-04
B'
CPT-11
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
0
2
4
6
8
10
12
14
16
18
20
22
feet
MTBE [mg/kg]
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0


MTBE C-C'
C
C'
CPT-07
CPT-05
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42
feet
0
2
4
6
8
10
12
14
16
18
20
22
24
feet
MTBE [mg/kg]
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0


MTBE D-D'
D
D'
CPT-08
CPT-04
MTBE [mg/kg]
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0


MTBE E-E'
E
E'
CPT-09
CPT-10
CPT-12
CPT-11
MTBE [mg/kg]
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2