

**FINAL
TECHNICAL MEMORANDUM
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PRELIMINARY FINDINGS FROM SOIL BORINGS
for
PROPERTIES ON AND ADJACENT TO THE NORTHWEST
QUADRANT OF THE PROPOSED I-25/CIMARRON (US 24)
INTERCHANGE REDEVELOPMENT

COLORADO SPRINGS, EL PASO COUNTY, COLORADO**

**Prepared for:
Colorado Department of Transportation, Region 2
1480 Quail Lake Loop
Colorado Springs, CO 80906
CDOT Project Number: IM-0252-413 (18331)
Jacobs Project Number: WVXX1313**

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1.0 Introduction

This technical memorandum presents initial field observations and field screening results from the advancement of 18 soil borings in support of the Phase II Environmental Site Assessment (ESA) for properties on and adjacent to the northwest quadrant of the proposed I-25/Cimarron Street (US 24) Interchange Redevelopment Project, Colorado Springs, Colorado.

Preliminary results identify the potential presence of volatile organic compounds (VOCs) and petroleum, oils, and lubricants (POL)-related constituents in soils associated with project properties. Additional observations are presented to include general soil characteristics and groundwater depths for the site.

Following receipt and review of laboratory analytical data, a Site Characterization/Phase II ESA Report will be prepared presenting sampling procedures, analytical results and data packages, data validation, sample locations, nature and extent of contamination, and conclusions and recommendations. Soil and groundwater samples were submitted to the laboratory for the following chemical analyses: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), gasoline range organics (GRO), total petroleum hydrocarbons (TPH), metals, and polychlorinated hydrocarbons (PCBs). Laboratory analytical results for soils and groundwater are expected 29 May 2014. The Draft Phase II ESA Site Characterization Report is due 26 June 2014.

2.0 General Technical Approach

The soil sampling program for the Phase II ESA was completed the week of 27 April 2014 and involved the (1) collection and continuous photoionization detector (PID) field screening of soil samples via hollow stem auger from 18 soil borings; (2) collection of soil samples from two intervals within each of 18 soil borings for laboratory analysis; and (3) installation of 17 monitoring wells. Groundwater well development and sampling was completed the week of 5 May 2014.

Figure 1 presents the soil boring locations collected from the following properties acquired by CDOT:

- Pikes Peak Motor Company - 531 West Cucharas Street
- DMI Collision - 215 South Chestnut Street, which contains two businesses:

Figure 1 - Soil Boring Locations



- Pikes Peak Motor Company located at 221 South Chestnut
- DMI Collision Center, 305 South Chestnut Street
- TECC Painting - 311 South Chestnut Street, which contains two businesses:
 - TECC Painting
 - Martin Racing
- Salvage Yard - 331 South Chestnut Street

Soil borings were advanced using an 8.5-inch outer diameter hollow stem auger (HSA) to a depth extending approximately five feet beyond the level of groundwater. Soil samples were collected in continuous sample tubes at 2-foot intervals, screened for potential contamination using the PID, and two soil samples per borehole were identified for laboratory analysis. Soil was placed in sealed plastic bags and screened by PID headspace analysis at intervals exhibiting visual or olfactory signs of contamination, as well as within the interval of soil/groundwater interface. PID results were recorded and are the basis for preliminary findings presented below.

3.0 Preliminary Findings

In general, soil characteristics across the site consisted of asphalt with gravel road base extending up to two feet below ground surface (bgs), followed by dark gray compacted clayey silt extending to the groundwater interface. Initial groundwater was measured within a lens of brownish-tan coarse sand situated immediately below the confining silt layer.

Five of the 18 soil borings had detectable concentrations above background of VOCs or POL-related constituents when performing PID headspace analysis. Visual and olfactory signs of potential POL-related constituents were also noted. Soil borings with elevated PID readings include SB-07, SB-09, SB-13, SB-15, and SB-16 (Figure 1). Three of the five soil borings with elevated PID readings (SB-07, SB-13, and SB-16) are located near suspected oil/water separators. Soil boring logs for each of the five locations exhibiting elevated PID readings are provided in Attachment A.

Table 1 presents PID readings by soil interval and the depth to groundwater for each of the borings exhibiting elevated PID readings.

Table 1: - Soil Borings, Depth Intervals with PID Detections, and Groundwater Depths

Soil Boring Location	Sample Interval (depth in feet below ground surface)	PID Screening Result (headspace analysis in ppm)	Depth to Groundwater (below top of well casing)
SB-07	1' to 4'	380	7.48'
	4' to 6'	2,549	
	6' to 8'	3,646	
	8' to 10'	2,302	
	11' to 13'	267	
	14' to 16'	141	
SB-09	2' to 4'	89	6.6'
	4' to 6'	343	
	6' to 8'	223	
	8' to 12'	44	
SB-13	0 to 2'	115	6.4'
	2' to 4'	517	
	4' to 6'	1,385	
	6' to 8'	1,699	
	8' to 10'	2,679	
	10' to 12'	107	
	12' to 14'	42	
SB-15	9' to 11'	232	8.45'
SB-16	4' to 6'	63	8.27
	6' to 8'	132	
	8' to 10'	59	
	10' to 12'	13	
	12' to 14'	185	
	14' to 16'	5	

A two-inch groundwater monitoring well was installed in each of the soil boring locations (excluding SB-10), for a total of seventeen groundwater monitoring wells installed to date. Groundwater elevation data will be calculated and a potentiometric surface map will be generated following an elevation survey to determine groundwater flow direction and gradient. Groundwater flow is currently anticipated to be southeast towards Monument and Fountain Creeks.

Groundwater depth averages 12-feet in the north end of the site; 6-feet in the middle of the site; and 8.5-feet in the south end of the site.

4.0 Preliminary Recommendations

The nature and extent of contamination for properties associated with the proposed I-25/Cimarron (US 24) Interchange Redevelopment Project will not be known until laboratory data collected during the Phase II ESA is received, technically reviewed and interpreted.

Potential VOC or POL-related contaminants were qualitatively identified through PID field screening at five soil boring locations as follows: SB-07, SB-09, SB-13, SB-15, and SB-16. Though the level and extent of VOC or POL-related contaminants are not currently known, the presence of subsurface contamination may be surmised and the need to address soil

contamination during construction planning should be considered. Preparation of a Materials Management Plan (MMP) is recommended to address worker safety and appropriate handling and disposal of potentially contaminated materials. An MMP should include, at a minimum, site action levels, sampling and analysis procedures, waste handling procedures, and a waste management plan to reduce impacts to construction caused by potentially-contaminated groundwater and/or soil.

Design elements resulting in intrusive activities at the site (e.g. site grading, installation of pilings/piers) should be considered to allow for potential schedule impacts and cost implications associated with subsurface contamination. Design elements should factor in the potential for subsurface soil and groundwater contamination. It should be noted that potential contamination at the site has not yet been fully delineated at this time, and volumes have not been calculated for impacted media.

ATTACHMENT A
SOIL BORINGS

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CLIENT: CDOT

PROJECT #: WVXX1313

BORING #: **SB-07**

SITE LOCATION: Cimarron & I-25

DRILLING COMPANY: Precision Sampling

RIG TYPE: D-23 Rubber Tire

DRILLING METHOD: Hollow Stem Auger

HOLE DIAMETER: 4 1/4 ID

START DATE 4/29/2014

END DATE: 4/29/2014

Depth (bgs)	Lithology	Sample Size/Location	Time	Borehole Screening (ppm)	Groundwater	MATERIAL DESCRIPTION
5		SB07-1	930	0.0		0.0 - 1.0 ft: Asphalt pieces with gravelly roadbase.
				60.0		1.0 - 2.0 ft: Clayey silt with some sand and gravel.
				12.0		Moderate fuel odor. Dark grey.
				12.0		2.0 - 5.0 ft: Silty clay, dark grey to black.
10		SB07-8	1030	396.0		Strong fuel odor.
				2916.0	▼	5.0 - 7.8 ft: Silty clay, medium brown. Strong fuel odor.
				194.0		7.8 - 11.0 ft: Silty clay with sand, dark grey. Strong fuel odor. Moist.
				386.0		11.0 - 11.5 ft: Silty sand, medium grey. Strong fuel odor. Wet.
15		SB07-11	1005	426.0	▼	11.5 - 13.5 ft: Silty clay with some sand (10%), medium grey. Moderate to strong fuel odor.
				1017.0		13.5 - 16.0 ft: Clayey silt with sand (30%), medium brown. Slight fuel odor.
				187.0		
				64.4		
20				46.6		
				23.3		
				21.0		
				25.6		
25						

GW Level Notes:

- ▼ = GW level measured at time of drilling 11.00
(point of soil saturation). ft below top of casing
- ▲ = Final GW level measured from 7.48
monitoring well. ft below top of casing

SAMPLE SUMMARY:

SB07-1 and SB07-1-FD from 1-4 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO
 SB07-8 from 8-10 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO
 SB07-11 from 11-13 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO

NOTES:

Headspace results (headspace readings collected from soil placed in sealed plastic bags):
 (1'-4': 380 ppm); (4'-6': 2549 ppm); (6'-8': 3646 ppm); (8'-10': 2302 ppm); (11'-13': 267 ppm); (14'-16': 141 ppm).

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CLIENT: CDOT

PROJECT #: WVXX1313

BORING #: **SB-09**

SITE LOCATION: Cimarron & I-25

DRILLING COMPANY: Precision Sampling

RIG TYPE: D-23 Rubber Tire

DRILLING METHOD: Hollow Stem Auger

HOLE DIAMETER: 4 1/4 ID

START DATE 4/29/2014

END DATE: 4/29/2014

Depth (bgs)	Lithology	Sample Size/Location	Time	Borehole Screening (ppm)	Groundwater	MATERIAL DESCRIPTION
5		SB09-4	1210	0.0		0.0 - 1.5 ft: Asphalt pieces with gravelly roadbase.
				1.5		1.5 - 7.0 ft: Silty clay, grey, slight petroleum odor
10		SB09-8	1145	1.2	▼	7.0 - 10.0 ft: Sandy silt with gravel (10%), grey. Wet. Slight petroleum odor.
				6.8		10.0 - 12.0 ft: Silty sand with gravel. Minimal odor. Grey.
				16.3		12.0 - 16.0 ft: Coarse sand with some gravel. Grey. minimal odor.
				181.0		
15				6.2		
				1.8		
				1.0		
				0.0		
				0.2		
				0.2		
20				0.0		
				0.0		
				0.0		
				0.0		
25				0.0		
				0.0		

GW Level Notes:

- ▼ = GW level measured at time of drilling 8.00
(point of soil saturation). ft below top of casing
- ▼ = Final GW level measured from 6.60
monitoring well. ft below top of casing

SAMPLE SUMMARY:

SB09-4 from 4-6 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO
 SB09-8 from 8-12 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO

NOTES:

Headspace results (headspace readings collected from soil placed in sealed plastic bags):
 (3'-4': 89 ppm); (4'-6': 343 ppm); (6'-8': 223 ppm); (8'-12': 44.6 ppm);

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CLIENT: CDOT

PROJECT #: WVXX1313

BORING #: **SB-13**

SITE LOCATION: Cimarron & I-25

DRILLING COMPANY: Precision Sampling

RIG TYPE: D-23 Rubber Tire

DRILLING METHOD: Hollow Stem Auger

HOLE DIAMETER: 4 1/4 ID

START DATE 4/30/2014

END DATE: 4/30/2014

Depth (bgs)	Lithology	Sample Size/Location	Time	Borehole Screening (ppm)	Groundwater	MATERIAL DESCRIPTION
5		SB13-4	1240	0.8		0.0 - 1.0 ft: Asphalt pieces with gravelly roadbase.
				0.2		1.0 - 3.5 ft: Silty sand, medium grey, slight fuel odor.
10		SB13-8	1255	2.8		3.5 - 5.0 ft: Coarse sand with some gravel. Strong fuel odor. Medium grey.
				836.0		5.0 - 6.0 ft: Clayey silt, grey. Grey. Strong fuel odor.
				2036.0	▼	6.0 - 10.0 ft: Gravelly sand. Appears to be product at 8.0' bgs. Black. Wet.
				788.0	▼	10.0 - 14.0 ft: Coarse sand with some gravel. Medium brown. No odor. Wet.
15				3200.0		
				2679.0		
				3.8		
				0.9		
20				0.2		
				0.0		
				0.0		
				0.0		
25						

GW Level Notes:

- ▼ = GW level measured at time of drilling 8.00
(point of soil saturation). ft below top of casing
- ▼ = Final GW level measured from 6.40
monitoring well. ft below top of casing

SAMPLE SUMMARY:

SB13-4 from 4-6 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO
 SB13-8 from 8-10 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO

NOTES:

Headspace results (headspace readings collected from soil placed in sealed plastic bags):
 (1'-2': 115 ppm); (2'-4': 517 ppm); (4'-6': 1385 ppm); (6'-8': 1699 ppm); (8'-10': 2679 ppm);
 (10'-12': 107 ppm); (12'-14': 42.3 ppm).

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CLIENT: CDOT

PROJECT #: WVXX1313

BORING #: **SB-15**

SITE LOCATION: Cimarron & I-25

DRILLING COMPANY: Precision Sampling

RIG TYPE: D-23 Rubber Tire

DRILLING METHOD: Hollow Stem Auger

HOLE DIAMETER: 4 1/4 ID

START DATE 4/30/2014

END DATE: 4/30/2014

Depth (bgs)	Lithology	Sample Size/Location	Time	Borehole Screening (ppm)	Groundwater	MATERIAL DESCRIPTION
5		SB15-0	1540	0.0		0.0 - 6.0 ft: Sandy gravel road base. Reddish brown. No odor.
				0.0		
				0.0		
				0.0		
				0.0		
10		SB15-10	1615	0.0	▼	6.0 - 8.0 ft: Sandy gravel road base. Reddish brown. No odor. Moist. 8.0 - 9.5 ft: Clayey silt, mottled brown/black. No odor. Wet at 9.5' bgs. 9.5 - 14.0 ft: Silty sand with gravel, reddish brown. Slight fuel odor at 9.5' bgs. Wet.
				0.0		
				0.0		
				0.9		
				7.7		
15				9.0		
				0.0		
				0.0		
				0.0		
				0.0		
20						
25						
<p style="text-align: center;"><u>GW Level Notes:</u></p> <p>▼ = GW level measured at time of drilling <u>9.50</u> (point of soil saturation). ft below top of casing</p> <p>▼ = Final GW level measured from <u>8.45</u> monitoring well. ft below top of casing</p>						
<p>SAMPLE SUMMARY:</p> <p>SB15-0 from 0-2 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO</p> <p>SB15-10 from 10-12 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO</p>						
<p>NOTES:</p> <p>Headspace results (headspace readings collected from soil placed in sealed plastic bags): (9'-11': 232 ppm)</p>						

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CLIENT: CDOT

PROJECT #: WVXX1313

BORING #: **SB-16**

SITE LOCATION: Cimarron & I-25

DRILLING COMPANY: Precision Sampling

RIG TYPE: D-23 Rubber Tire

DRILLING METHOD: Hollow Stem Auger

HOLE DIAMETER: 4 1/4 ID

START DATE 5/1/2014

END DATE: 5/1/2014

Depth (bgs)	Lithology	Sample Size/Location	Time	Borehole Screening (ppm)	Groundwater	MATERIAL DESCRIPTION
5		SB16-0	1115	0.0		0.0 - 3.0 ft: Sandy silt with gravelly roadbase. Some asphalt pieces. No odor.
				0.0		3.0 - 4.8 ft: Clayey silt, medium brown. No odor.
				0.0		4.8 - 6.0 ft: Clayey silt, some sand and gravel. Slight to moderate fuel odor. Grey.
				0.8		6.0 - 12.0 ft: Clayey silt, grey. Moderate fuel odor. Moist.
				5.0		12.0 - 13.5 ft: Clayey silt, grey. Strong fuel odor. Wet.
10				13.7	▼	13.5 - 16.0 ft: Coarse sand, medium brown. No odor.
				11.2		
				-		
				-		
				-		
15		SB16-12	1135	1.3	▼	
				1.8		
				0.1		
				13.5		
				0.2		
20				0.0		
25						

GW Level Notes:

▼ = GW level measured at time of drilling 12.00
(point of soil saturation). ft below top of casing

▼ = Final GW level measured from 8.27
monitoring well. ft below top of casing

Note: Oil product measured at 8.26 ft below top of casing

SAMPLE SUMMARY:
 SB16-0 from 0-2 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO
 SB16-12 from 12-14 ft bgs for VOC, SVOC, PCB, DRO, metals, and GRO

NOTES:
 Headspace results (headspace readings collected from soil placed in sealed plastic bags):
 (4'-6': 634 ppm); (6;-8': 132 ppm); (8'-10': 59.4 ppm);(10'-12': 13.2 ppm);(12;-14;': 185 ppm);(14;-16': 4.7 ppm)