

March 18, 2015  
ECT No. 140365-0001

*Via Email*

Mr. George Houston  
Florida Department of Environmental Protection  
Central District Brownfields Coordinator  
3319 Maguire Blvd., Suite 232  
Orlando, Florida 32803

**Re: Phase II Report Addendum  
Orange County - Waste Cleanup  
Creative Digital Village  
68 acres of land within city limits of Orlando, FL generally located east of Parramore  
Avenue, south of Colonial Drive (S.R. 50), west of Hughey Avenue and  
north of a CSX Railroad  
WCU Site ID: COM\_320731  
BF Site ID No: BF480401007**

Dear Mr. Houston:

Environmental Consulting & Technology, Inc. (ECT) is submitting this Phase II Report Addendum per your letter dated March 02, 2015 (copy provide in **Attachment A**). Each comment is reiterated below in bold followed by ECT's response.

**1. Figure 12 depicts the groundwater elevations and flow direction on July 21, 2014. However, there are no groundwater elevation isocontours depicted on the map as required by Rule 62-780.600(8)(9), Florida Administrative Code (F.A.C). Please revise Figure 12 to depict groundwater elevation contours and the groundwater flow direction.**

Figure 12 has been revised to reflect the above comment. Revised Figures are provided in **Attachment B**.

**2. Tables 3, 4, and 5 lists the soil analytical results for the soil samples collected at 1-3 feet, 3-5 feet, and 5-7 below land surface (bls.), respectively. These tables list the Arsenic Residential Direct Exposure (Residential) Soil Cleanup Target Level (SCTL) as 2.0 milligrams per kilogram (mg/kg), the Dieldrin Residential SCTL as 60 mg/kg, the Dieldrin Commercial Direct Exposure (Commercial) SCTL as 300 mg/kg, and the Dieldrin Leachability Based on Groundwater Criteria (Leachability) SCTL as 2 mg/kg. However, in Chapter 62-777, F.A.C., the Arsenic Residential**

3660 Maguire  
Blvd., Suite 107  
Orlando, FL  
32803

(407) 903-0005

FAX  
(407) 903-0030

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**SCTL is 2.1 mg/kg, the Dieldrin Residential SCTL is 0.06 mg/kg, the Dieldrin Commercial SCTL is 0.3 mg/kg, and the Dieldrin Leachability SCTL is 0.002 mg/kg. Also Dieldrin was misspelled in Table 4. It was spelled “Dealdrin”. Please revise these tables, accordingly.**

Tables 3 through 5 have been revised to reflect the above comment. All revised Tables are provided in **Attachment C**. ECT acknowledges that units presented in Tables 3-5 for dieldrin SCTLs and the laboratory results were reported in ug/kg, and not mg/kg. This reporting inconsistency has not changed the recommendations presented in the Phase II ESA or this Phase II ESA Addendum.

**3. Figure 6 contains symbols which depict whether a soil sample contained a concentration of Dieldrin above or below a SCTL in the 1-3 feet bls sampling interval and Figure 8 contains symbols which depict whether a soil sample contained a concentration of Dieldrin above or below the a SCTL in the 3-5 feet bls sampling interval. Review of these figures indicates that they were constructed using the incorrect values for the Dieldrin SCTLs listed in Tables 3, 4, and 5. Please revise these figures accordingly.**

Figures 6 and 8 have been revised to reflect the above comment. All revised Figures are provided in **Attachment B**.

**4. Figures 5 through 9 do not depict the soil laboratory analytical result for each soil sample location. Please revise these figures to depict the soil analytical result for each soil sample location.**

Figures 5 through 9 have been revised to reflect the above comment. Revised Figures are provided in **Attachment B**.

**5. Review of the report indicates that soil samples were collected from 1-3 feet bls, 3-5 feet bls, and 5-7 feet bls. While we don’t object to continuing collecting soil samples at 1-3 feet bls, 3-5 feet bls, and 5-7 feet bls, Rule 62-780.600(5)(c)1 F.A.C, states that “If a surficial discharge of metals or semi-volatile organic compounds is known or suspected, the sampling intervals shall be as follows: land surface to six inches, six inches to two feet, and two-foot intervals thereafter to the extent necessary to define the soil contamination.” Since soil samples were not collected at 0 to 6 inches, please collect soil samples from 0 to 6 inches at all soil sampling locations for laboratory analysis for Arsenic and Dieldrin.**

The rationale for not sampling the 0-1’ soil horizon was based upon the Phase I ESA historical research for the Site, along with the following observations and assumptions:

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The 1919 and 1925 Sanborn Fire Insurance Maps reviewed and provided in the Phase I ESA, revealed the existence of various structures associated with the former USDA facility located on, and nearby, the Site. The 1925 Sanborn also revealed the southern and eastern sections of the City of Orlando Exposition Park, where the former Amway Arena was located, and where the Bob Carr Performing Arts Center is currently located. Beginning with the 1947 aerial through 1994, considerable redevelopment of the Site and area has occurred, including the creation of the on-site pottery studio and associated buildings and kilns, the expansion of the tennis courts, and expansion of the parking areas. In these non-pervious areas, it was assumed that the 0-1' soil horizon was disturbed by either re-grading, removal, addition, or compaction to accommodate for these structures and features. After careful consideration and field observations, it was determined that the 0-1' soil horizon in the non-pervious areas was non-native material, and sampling this soil horizon would not provide beneficial information for determining the "surficial discharge of metals or semi-volatile organic compounds" from the pre-1925 former USDA operations.

In the pervious areas of the Site, the soil borings revealed a thick layer of mulch and/or detritus in the 0-1' soil horizon and sampling this horizon would also not provide beneficial information for determining the "surficial discharge of metals or semi-volatile organic compounds" from the pre-1925 former USDA operations.

We apologize for not stating and/or clarifying our rationale for initializing sampling from 1-3' soil horizon in Section 4.0 of the Phase II ESA. It was the intent of this sampling plan to maximize the amount of information obtained cost-effectively and efficiently from the native soils, since assessment dollars were utilized from the Environmental Protection Agency (EPA) Brownfield Cooperative Agreement BF-95498212.

**6. It is stated in the Report that this property was the site of the former USDA Entomology Laboratory. However, there is no discussion on why the soil sample laboratory analyses were limited to just Arsenic and Dieldrin considering that the USDA Entomology Laboratory may have used other organopesticides. Please provide a rationale for limiting the soil assessment to just Arsenic and Dieldrin.**

The soil laboratory analyses were limited to arsenic and dieldrin based upon the following information:

Professional Services Industries (PSI) completed a Phase II ESA Report dated November 22, 2006 for this location. It is stated in Section 2.2.2 of this report that:

"PSI collected five two-point composite soil samples (CS-1 through CS-5, see Figure 4), from various areas of the former Armory/USDA laboratories site

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suspected to be the areas of greatest likelihood of impact (i.e., likely storage areas). The composite samples were collected from a depth of 1 to 2 feet below land surface (ft bls) at each location and were submitted for laboratory analysis by EPA Method 8081 for organochlorine pesticides, EPA Method 8141 for organophosphorus pesticides, EPA Method 8151 for chlorophenoxy pesticides, and the eight RCRA metals.”

In Section 3.4.2 of this same report, PSI states:

“Of the detected parameters, arsenic concentrations exceed the Chapter 62-777, FAC DE-1 SCTL of 2.1 mg/kg in Composite Soil Samples CS-1 and CS-2.”

Additionally, the Draft Analysis of Brownfield Cleanups Alternatives (ABCA) prepared by Cardno TBE dated November 4, 2011 utilized the Phase II ESA prepared by PSI dated November 22, 2006 to secure an EPA Brownfield Cleanup Grant that addresses Benzo(a)pyrene (BaP), BaP equivalents, and arsenic soil impacts.

Based upon this previous information, BaP, BaP equivalents, and arsenic were the target soil contaminants identified requiring further assessment in the Phase II ESA prepared by ECT. Since dieldrin groundwater impacts above groundwater cleanup target levels (GCTLs) were identified, ECT and the City of Orlando performed soil sampling for dieldrin near the monitoring wells exceeding dieldrin GCTLs along with the tennis courts area. No SCTL Direct Exposure Residential (DER) exceedances for dieldrin were identified in any of these soil samples.

We apologize for not stating and/or clarifying our sampling rationale in Section 4.0 of the Phase II ESA. A copy of the Cardno TBE Draft ABCA, which contains the PSI Phase II ESA Report dated November 22, 2006, is provided in **Attachment C**.

**7. It is recommended in the report that additional soil and groundwater assessment be performed. While we concur with this recommendation, the scope of the additional soil assessment for Dieldrin will need to be reconsidered because the determination of the extent of soil contamination was based on the soil analytical results being compared to incorrect Dieldrin SCTLs. Please submit a plan detailing the next phase of site assessment activities for review.**

A scope of work for additional assessment activities is provided in **Appendix D**.

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**CLOSING**

Should you have any questions, or require any additional information, please do not hesitate to contact either of the undersigned at (407) 903-0005.

Sincerely,

**ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.**



Jeffrey J., Peters, P.G.  
Principal Scientist



James J. Orioles, P.E.  
Senior Engineer

C: Dan Dashtaki, City of Orlando  
David J. Bass, City of Orlando

**ATTACHMENTS**

Attachment A FDEP Letter dated March 02, 2015  
Attachment B Revised Figures  
Attachment C Revised Tables  
Attachment D Cardno TBE Draft ABCA  
Attachment E Scope of Work

**ATTACHMENT A**

**FDEP Letter dated March 02, 2015**



**FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION**

CENTRAL DISTRICT  
3319 MAGUIRE BOULEVARD, SUITE 232  
ORLANDO, FLORIDA 32803-3767

RICK SCOTT  
GOVERNOR

CARLOS LOPEZ-CANTERA  
LT. GOVERNOR

JONATHAN P. STEVERSON  
SECRETARY

March 02, 2015

**BY ELECTRONIC MAIL**

[david.bass@cityoforlando.net](mailto:david.bass@cityoforlando.net)

Mr. David Bass  
Assistant City Attorney  
City of Orlando  
400 South Orange Avenue  
Orlando, Florida 32801

SPCD-WCU-15-3040

Orange County - Waste Cleanup  
Creative Digital Village  
68 acres of land within city limits of Orlando, FL generally located east of Parramore Avenue, south of Colonial Drive (S.R. 50), west of Hughey Avenue and north of a CSX Railroad  
WCU Site ID: COM\_320731  
BF Site ID No: BF480401007

**August 2014 Phase II Environmental Site Assessment Report – Orlando Downtown Recreation Complex and Tennis Centre Parcel**

Dear Mr. Bass:

We have reviewed August 2014 Phase II Environmental Site Assessment Report – Orlando Downtown Recreation Complex and Tennis Centre Parcel (Report), that was submitted on your behalf by ECT, Inc on December 2, 2014 for the Creative Digital Village Brownfield site; specifically for the site assessment activities that were conducted at 649 Bentley Street, Orlando, and have the following comments:

1. Figure 12 depicts the groundwater elevations and flow direction on July 21, 2014. However, there are no groundwater elevation isocontours depicted on the map as required by Rule 62-780.600(8)(9), Florida Administrative Code (F.A.C). Please revise Figure 12 to depict groundwater elevation contours and the groundwater flow direction.
2. Tables 3, 4, and 5 lists the soil analytical results for the soil samples collected at 1-3 feet, 3-5 feet, and 5-7 below land surface (bls.), respectively. These tables list the Arsenic Residential Direct Exposure (Residential) Soil Cleanup Target Level (SCTL) as 2.0 milligrams per kilogram (mg/kg), the Dieldrin Residential SCTL as 60 mg/kg, the Dieldrin Commercial Direct Exposure (Commercial) SCTL as 300 mg/kg, and the Dieldrin Leachability Based on Groundwater Criteria (Leachability) SCTL as 2 mg/kg. However, in Chapter 62-777, F.A.C., the Arsenic Residential SCTL is 2.1 mg/kg, the Dieldrin Residential SCTL is 0.06 mg/kg, the Dieldrin Commercial

SCTL is 0.3 mg/kg, and the Dieldrin Leachability SCTL is 0.002 mg/kg. Also Dieldrin was misspelled in Table 4. It was spelled “Dealdrin”. Please revise these tables, accordingly.

3. Figures 6 contains symbols which depict whether a soil sample contained a concentration of Dieldrin above or below a SCTL in the 1-3 feet bls sampling interval and Figure 8 contains symbols which depict whether a soil sample contained a concentration of Dieldrin above or below the a SCTL in the 3-5 feet bls sampling interval. Review of these figures indicates that they were constructed using the incorrect values for the Dieldrin SCTLs listed in Tables 3, 4, and 5. Please revise these figures accordingly.
4. Figures 5 through 9 do not depict the soil laboratory analytical result for each soil sample location. Please revise these figures to depict the soil analytical result for each soil sample location.
5. Review of the report indicates that soil samples were collected from 1-3 feet bls, 3-5 feet bls, and 5-7 feet bls. While we don’t object to continuing collecting soil samples at 1-3 feet bls, 3-5 feet bls, and 5-7 feet bls, Rule 62-780.600(5)(c)1 F.A.C, states that “If a surficial discharge of metals or semi-volatile organic compounds is known or suspected, the sampling intervals shall be as follows: land surface to six inches, six inches to two feet, and two-foot intervals thereafter to the extent necessary to define the soil contamination.” Since soil samples were not collected at 0 to 6 inches, please collect soil samples from 0 to 6 inches at all soil sampling locations for laboratory analysis for Arsenic and Dieldrin.
6. It is stated in the Report that this property was the site of the former USDA Entomology Laboratory. However, there is no discussion on why the soil sample laboratory analyses were limited to just Arsenic and Dieldrin considering that the USDA Entomology Laboratory may have used other organopesticides. Please provide a rationale for limiting the soil assessment to just Arsenic and Dieldrin.
7. It is recommended in the report that additional soil and groundwater assessment be performed. While we concur with this recommendation, the scope of the additional soil assessment for Dieldrin will need to be reconsidered because the determination of the extent of soil contamination was based on the soil analytical results being compared to incorrect Dieldrin SCTLs. Please submit a plan detailing the next phase of site assessment activities for review.

We anticipate receiving the response to these comments on or before April 2, 2015. Please submit a digital copy of your response to these comments to [DEP\\_CD@dep.state.fl.us](mailto:DEP_CD@dep.state.fl.us), with a copy to [George.Houston@dep.state.fl.us](mailto:George.Houston@dep.state.fl.us). If the file is very large, you may post it to the Waste Cleanup folder on the Central District’s ftp site at:

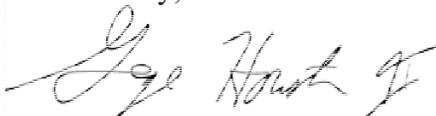
[ftp://ftp.dep.state.fl.us/pub/incoming/Central\\_District/Waste\\_Cleanup/](ftp://ftp.dep.state.fl.us/pub/incoming/Central_District/Waste_Cleanup/). After posting the document, send an e-mail to [DEP\\_CD@dep.state.fl.us](mailto:DEP_CD@dep.state.fl.us), with a copy to [George.Houston@dep.state.fl.us](mailto:George.Houston@dep.state.fl.us), alerting us that it has been posted.

Please note: For site rehabilitation cost Voluntary Cleanup Tax Credit applications, the annual application deadline is January 31, or the following business day, of the year following the calendar year for which an applicant is claiming site rehabilitation costs. Therefore, all 2015 calendar year costs (i.e., site rehabilitation conducted and paid for in 2015) must be claimed in an application submitted by January 31, 2016. No prior year costs can be claimed.

A copy of the Voluntary Cleanup Tax Credit Rule and application can be found here  
<http://www.dep.state.fl.us/waste/categories/vctc/pages/publications.htm>

If you have any questions concerning this correspondence, please contact me at (407) 897-4322 or by e-mail at [george.houston@dep.state.fl.us](mailto:george.houston@dep.state.fl.us).

Sincerely,

A handwritten signature in black ink, appearing to read "George Houston II". The signature is written in a cursive style with a large initial "G".

George Houston II, P.G.  
Brownfields Coordinator  
Central District

GH/gh

Attachment: Executed Brownfields Site Rehabilitation Agreement

c: Dan Dashtaki – City of Orlando - [dan.dashtaki@cityoforlando.net](mailto:dan.dashtaki@cityoforlando.net)  
Jeff Peters – ECT - [jpeters@ectinc.com](mailto:jpeters@ectinc.com)

## **ATTACHMENT B**

### **Revised Figures**



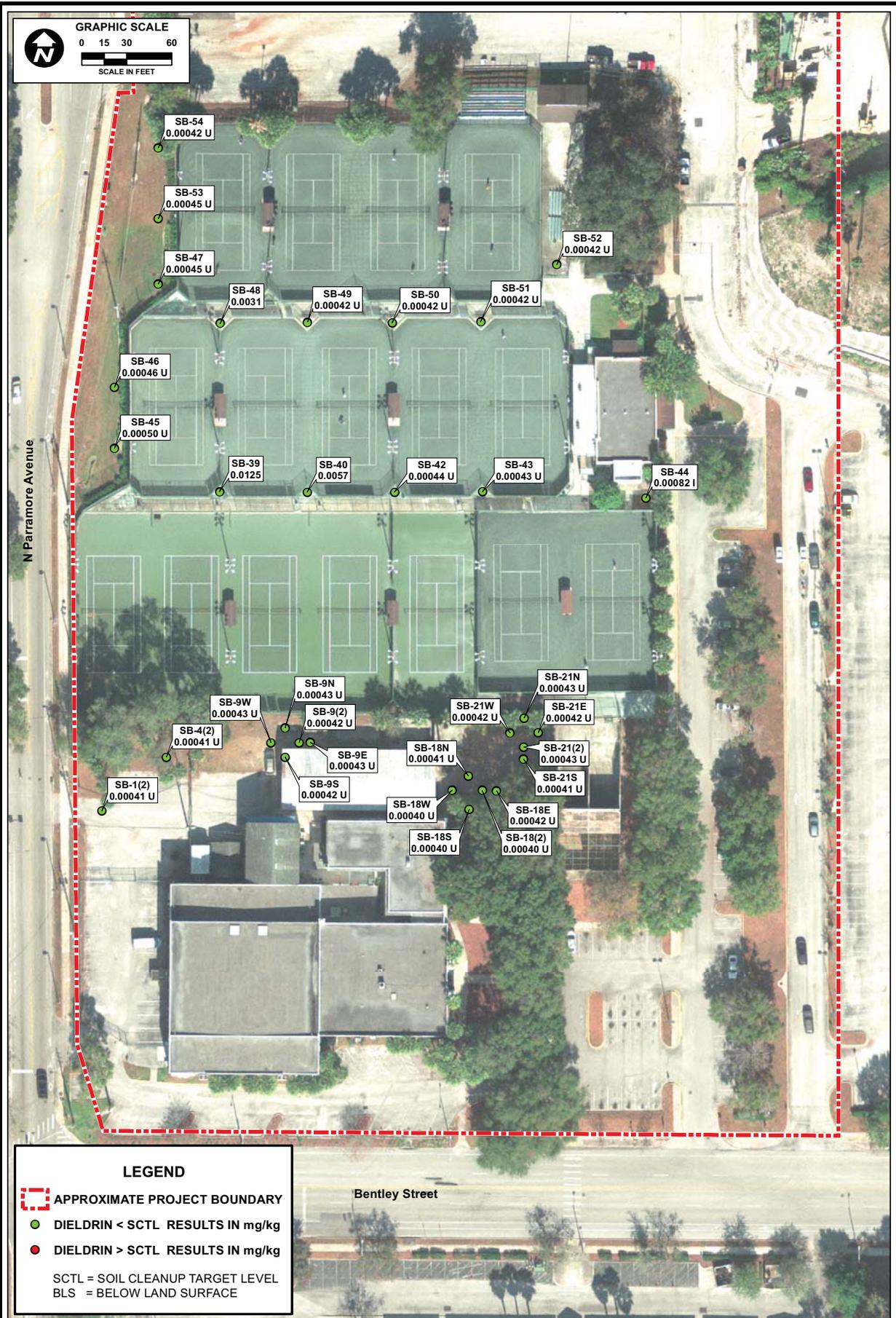


FIGURE 6.  
DIELDRIN 1-3 FT BLS  
ORLANDO DOWNTOWN RECREATION COMPLEX & TENNIS CENTRE  
CITY OF ORLANDO, ORANGE COUNTY, FLORIDA  
SECTION 26, TOWNSHIP 22S, RANGE 29E  
SOURCE: FDOT Aerial, 2012; ECT, 2015.



FIGURE 7.  
 ARSENIC 3-5 FT BLS  
 ORLANDO DOWNTOWN RECREATION COMPLEX & TENNIS CENTRE  
 CITY OF ORLANDO, ORANGE COUNTY, FLORIDA  
 SECTION 26, TOWNSHIP 22S, RANGE 29E

SOURCE: FDOT Aerial, 2012; ECT, 2015.



FIGURE 8.  
DIELDRLIN 3-5 FT BLS  
ORLANDO DOWNTOWN RECREATION COMPLEX & TENNIS CENTRE  
CITY OF ORLANDO, ORANGE COUNTY, FLORIDA  
SECTION 26, TOWNSHIP 22S, RANGE 29E  
SOURCE: FDOT Aerial, 2012; ECT, 2015.



FIGURE 9.  
 ARSENIC 5-7 FT BLS  
 ORLANDO DOWNTOWN RECREATION COMPLEX & TENNIS CENTRE  
 CITY OF ORLANDO, ORANGE COUNTY, FLORIDA  
 SECTION 26, TOWNSHIP 22S, RANGE 29E  
 SOURCE: FDOT Aerial, 2012; ECT, 2015.

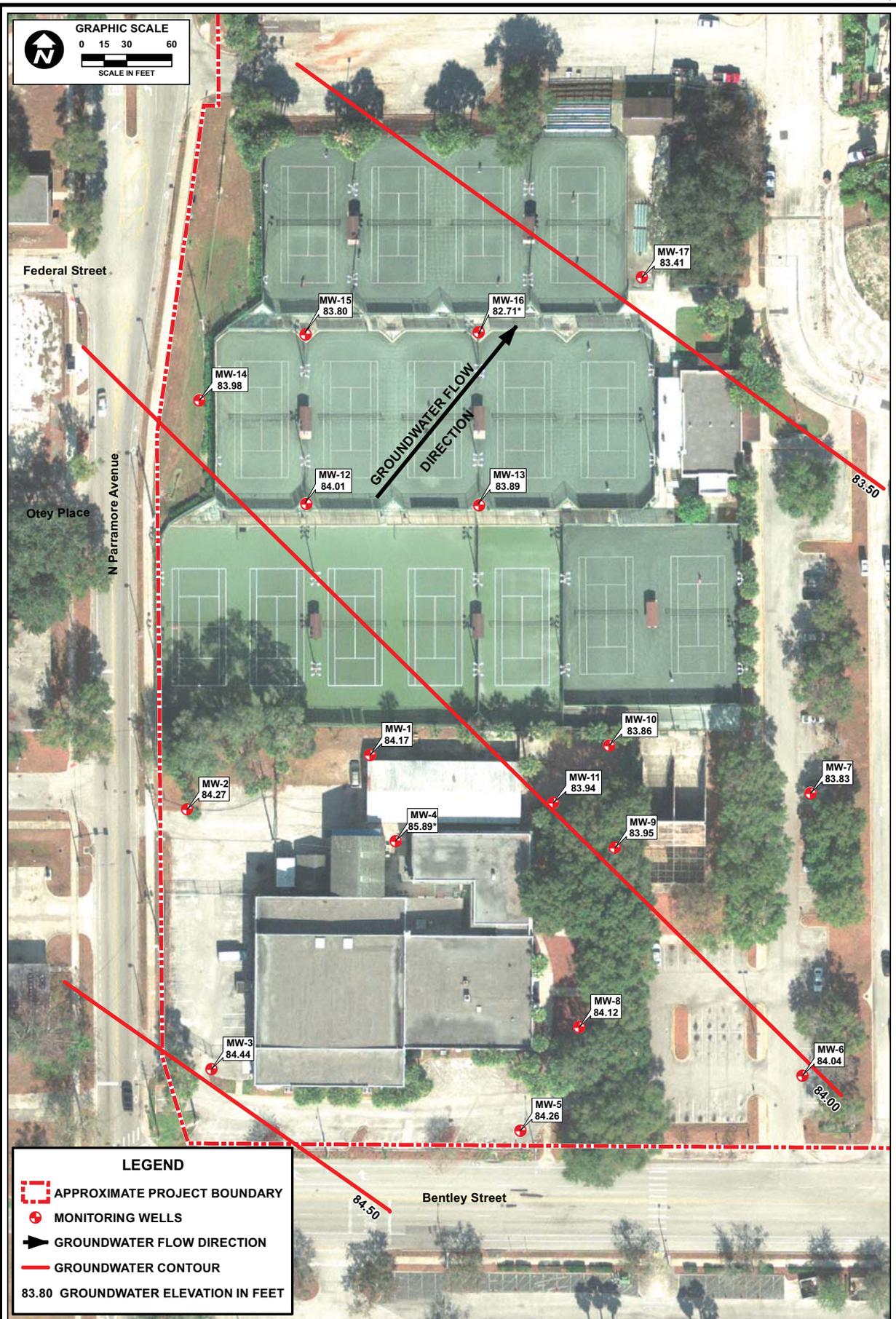
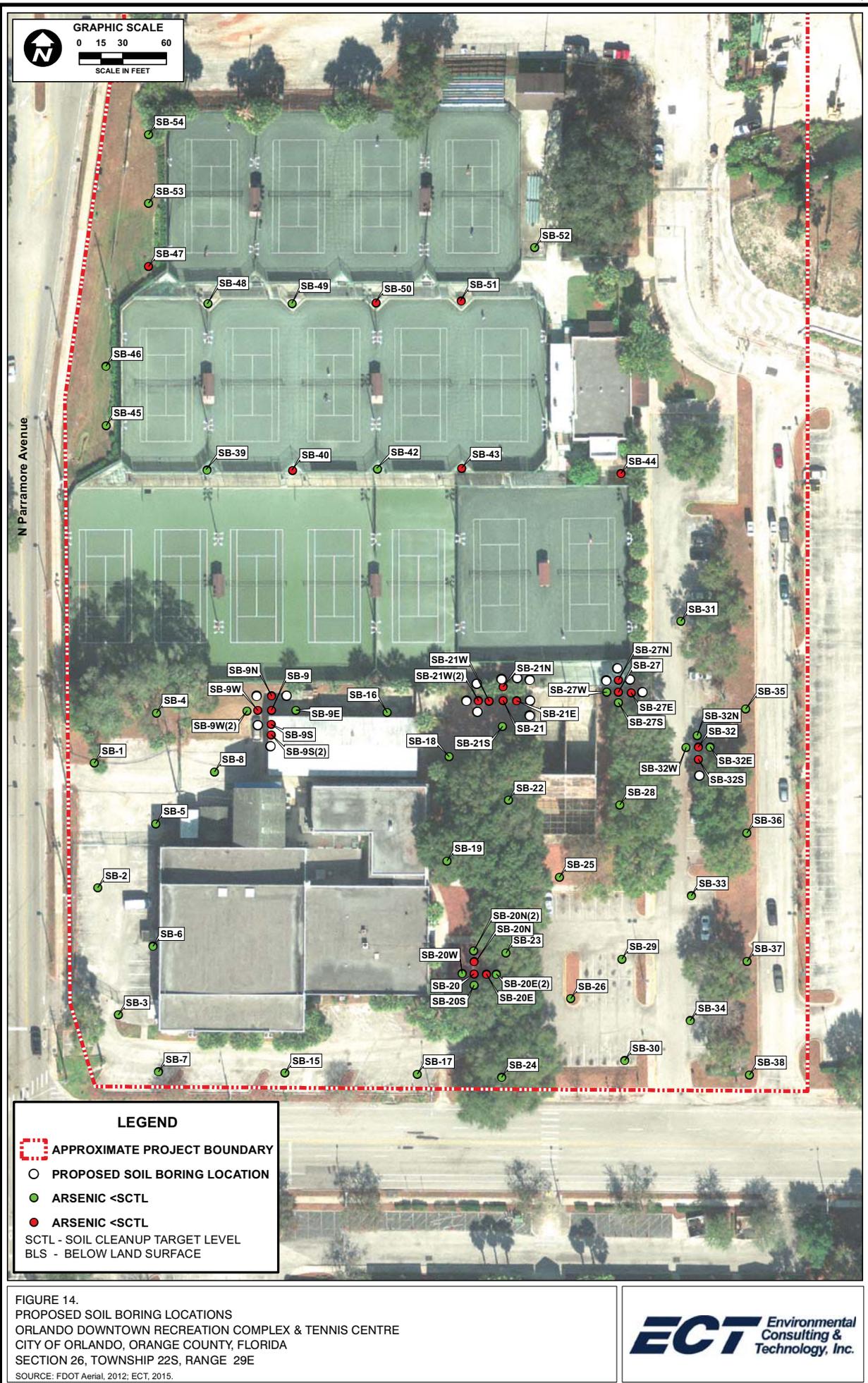


FIGURE 12.  
GROUNDWATER ELEVATION AND FLOW DIRECTION - JULY 21, 2014  
ORLANDO DOWNTOWN RECREATION COMPLEX & TENNIS CENTRE  
CITY OF ORLANDO, ORANGE COUNTY, FLORIDA  
SECTION 26, TOWNSHIP 22S, RANGE 29E  
SOURCE: FDOT Aerial, 2012; ECT, 2015.



## ATTACHMENT C

### Revised Tables

### TABLE 3: SOIL ANALYTICAL RESULTS - 1-3 FT BLS

Site Name:		Orlando Recreation Complex and Tennis Centre		Revision date: March, 2015	
Sample ID	Sample Location	Sample Depth (ftbls)	Date	Arsenic	Dieldrin
<b>Direct Exposure Residential (mg/kg)</b>				2.1	0.06
<b>Direct Exposure Commercial/Industrial (mg/kg)</b>				12	0.3
<b>Leachability Based on GW Criteria</b>				***	0.002
SB1 1-3 1/16/14	SB-1	1-3	01/16/14	0.27I	
SB1-2 1-3 5/21/2014	SB-1(2)	1-3	05/20/14		0.00041U
SB2 1-3 1/16/14	SB-2	1-3	01/16/14	0.23I	
SB3 1-3 1/16/14	SB-3	1-3	01/16/14	0.20I	
SB4 1-3 1/16/14	SB-4	1-3	01/16/14	0.31I	
SB4-2 1-3 5/21/2014	SB-4(2)	1-3	05/21/14		0.00041U
SB5 1-3 1/16/14	SB-5	1-3	01/16/14	0.19I	
SB6 1-3 1/16/14	SB-6	1-3	01/16/14	0.31I	
SB7 1-3 1/16/14	SB-7	1-3	01/16/14	1.5	
SB8 1-3 1/16/14	SB-8	1-3	01/16/14	0.18I	
SB9 1-3 1/16/14	SB-9	1-3	01/16/14	<b>6.9</b>	
SB9-2 1-3 5/20/2014	SB-9(2)	1-3	05/20/14		0.00042U
SB9-E 1-3 5/20/2014	SB-9E	1-3	05/20/14	0.80	0.00043U
SB9-N 1-3 5/20/2014	SB-9N	1-3	05/20/14	<b>53.3</b>	0.00043U
SB9-S 1-3 5/20/2014	SB-9S	1-3	05/20/14	<b>13.6</b>	0.00042U
SB9-S2 6/6/14 1-3'	SB-9S(2)	1-3	06/06/14	<b>115</b>	
SB9-W 1-3 5/20/2014	SB-9W	1-3	05/20/14	<b>18.3</b>	0.00043U
SB9-W2 6/6/14 1-3'	SB-9W(2)	1-3	06/06/14	1.0	
SB15 1-3 1/16/14	SB-15	1-3	01/16/14	0.10I	
SB16 1-3 1/16/14	SB-16	1-3	01/16/14	0.46	
SB17 1-3 1/16/14	SB-17	1-3	01/16/14	0.22I	
SB18 1-3 1/16/14	SB-18	1-3	01/17/14	0.60	
SB18 1-3-2 5/20/2014	SB-18(2)	1-3	05/20/14		0.00040U
SB18-E 1-3 5/20/2014	SB-18E	1-3	05/20/14		0.00042U
SB18-N 1-3 5/20/2014	SB-18N	1-3	05/20/14		0.00041U
SB18-S 1-3 5/20/2014	SB-18S	1-3	05/20/14		0.00040U
SB18-W 1-3 5/20/2014	SB-18W	1-3	05/20/14		0.00040U
SB19 1-3 1/16/14	SB-19	1-3	01/16/14	0.97	
SB20 1-3 1/16/14	SB-20	1-3	01/16/14	<b>3.6</b>	
SB20-E 1-3 5/20/2014	SB-20E	1-3	05/20/14	<b>3.8</b>	
SB20-E2 6/6/14 1-3'	SB-20E(2)	1-3	06/06/14	0.84	
SB20-N 1-3 5/20/2014	SB-20N	1-3	05/20/14	<b>3.7</b>	
SB20-N2 6/6/14 1-3'	SB-20N(2)	1-3	06/06/14	0.90	
SB20-S 1-3 5/20/2014	SB-20S	1-3	05/20/14	0.82	
SB20-W 1-3 5/20/2014	SB-20W	1-3	05/20/14	1.1	

### TABLE 3: SOIL ANALYTICAL RESULTS - 1-3 FT BLS

Site Name:		Orlando Recreation Complex and Tennis Centre		Revision date: March, 2015	
Sample ID	Sample Location	Sample Depth (ftbls)	Date	Arsenic	Dieldrin
<b>Direct Exposure Residential (mg/kg)</b>				2.1	0.06
<b>Direct Exposure Commercial/Industrial (mg/kg)</b>				12	0.3
<b>Leachability Based on GW Criteria</b>				***	0.002
SB21 1-3 1/16/14	SB-21	1-3	01/16/14	<b>49.7</b>	
SB21-2 1-3 5/20/2014	SB-21(2)	1-3	05/21/14		0.00043U
SB21-E 1-3 5/20/2014	SB-21E	1-3	05/21/14	<b>51.8</b>	0.00042U
SB21-N 1-3 5/20/2014	SB-21N	1-3	05/21/14	<b>111</b>	0.00043U
SB21-S 1-3 5/20/2014	SB-21S	1-3	05/21/14	1.4	0.00041U
S21-W 1-3 5/20/2014	SB-21W	1-3	05/21/14	<b>83.0</b>	0.00042U
SB21-W2 6/6/14 1-3'	SB-21W(2)	1-3	06/06/14	<b>110</b>	
SB22 1-3 1/16/14	SB-22	1-3	01/16/14	0.49I	
SB23 1-3 1/16/14	SB-23	1-3	01/16/14	0.31I	
SB24 1-3 1/16/14	SB-24	1-3	01/16/14	1.5	
SB25 1-3 1/16/14	SB-25	1-3	01/16/14	0.48	
SB26 1-3 1/16/14	SB-26	1-3	01/16/14	1.1	
SB27 1-3 1/16/14	SB-27	1-3	01/16/14	<b>2.5</b>	
SB27-E 1-3 5/20/2014	SB-27E	1-3	05/20/14	<b>3.1</b>	
SB27-N 1-3 5/20/2014	SB-27N	1-3	05/20/14	<b>2.4</b>	
SB27-S 1-3 5/20/2014	SB-27S	1-3	05/20/14	1.4	
SB27-W 1-3 5/20/2014	SB-27W	1-3	05/20/14	1.2	
SB28 1-3 1/16/14	SB-28	1-3	01/16/14	0.90	
SB29 1-3 1/16/14	SB-29	1-3	01/16/14	1.4	
SB30 1-3 1/16/14	SB-30	1-3	01/16/14	1.5	
SB31 1-3 1/16/14	SB-31	1-3	01/16/14	1.4	
SB32 1-3 1/16/14	SB-32	1-3	01/16/14	<b>40.7</b>	
SB32-E 1-3 6/2/2014	SB-32E	1-3	06/02/14	1.1	
SB32-N 1-3 6/2/2014	SB-32N	1-3	06/02/14	0.7	
SB32-S 1-3 6/2/2014	SB-32S	1-3	06/02/14	<b>5.6</b>	
SB32-W 1-3 6/2/2014	SB-32W	1-3	06/02/14	0.98	
SB33 1-3 1/16/14	SB-33	1-3	01/16/14	0.44I	
SB34 1-3 1/16/14	SB-34	1-3	01/16/14	0.60	
SB35 1-3 1/16/14	SB-35	1-3	01/16/14	1,1	
SB36 1-3 1/16/14	SB-36	1-3	01/16/14	0.15I	
SB37 1-3 1/16/14	SB-37	1-3	01/16/14	0.44I	

### TABLE 3: SOIL ANALYTICAL RESULTS - 1-3 FT BLS

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<b>Direct Exposure Commercial/Industrial (mg/kg)</b>				12	0.3
<b>Leachability Based on GW Criteria</b>				***	0.002
SB38 1-3 1/16/14	SB-38	1-3	01/16/14	1.9	
SB39 1-3 6/3/14	SB-39	1-3	06/03/14	1.8	0.0125
SB40 1-3 6/3/14	SB-40	1-3	06/03/14	<b>3.0</b>	0.0057
SB42 1-3 6/3/14	SB-42	1-3	06/03/14	1.5	0.00044U
SB43 1-3 6/3/14	SB-43	1-3	06/03/14	<b>10.4</b>	0.00043U
SB44 1-3 6/3/14	SB-44	1-3	06/03/14	<b>3.5</b>	0.000821 <sup>a</sup>
SB45 1-3 6/3/14	SB-45	1-3	06/03/14	1.7	0.00050U
SB46 1-3 6/3/14	SB-46	1-3	06/03/14	2.1	0.00046U
SB47 1-2.5 5/20/14	SB-47	1-2.5	05/20/14	<b>2.6<sup>a</sup></b>	0.00045U
SB48 1-3 6/3/14	SB-48	1-3	06/03/14	1.2	0.0031
SB49 1-3 6/3/14	SB-49	1-3	06/03/14	1.2	0.00042U
SB50 1-3 6/3/14	SB-50	1-3	06/03/14	<b>5.1</b>	0.00042U
SB51 1-3 6/3/14	SB-51	1-3	06/03/14	<b>2.2</b>	0.00042U
SB52 1-3 6/3/14	SB-52	1-3	06/03/14	0.87	0.00042U
SB53 1-2.5 5/20/14	SB-53	1-2.5	05/20/14	1.3	0.00045U
SB54 1-3 5/20/14	SB-54	1-3	05/20/14	0.87	0.00042U
<b>BEANS @ SW PICNIC</b>	PICNIC	BEANS	06/06/14	0.29U	
<b>BEANS @ SB21</b>	SB-21	BEANS	06/06/14	0.68U	

Notes:

SCTL = Soil Cleanup Target Levels as provided in Table II of Chapter 62-777, F.A.C.

**Bold** = Exceedance of Direct Exposure Residential SCTL

mg/kg = Milligrams Per Kilogram

Analytical Results = mg/kg

I = The reported value is between the laboratory Method Detection Limit & the laboratory Practical Quantitation Limit

U = Analyte included in the analysis, but not detected

ftbls = feet below land surface

\*\*\* = Leachability value may be derived using the SPLP Test to calculate site-specific SCTL's

<sup>a</sup>= elevated reporting limits due to matrix interference

## TABLE 4: SOIL ANALYTICAL RESULTS - 3-5 FT BLS

Site Name:		Orlando Recreation Complex and Tennis Centre		Revision date: March, 2015	
Sample ID	Sample Location	Sample Depth (ftbls)	Date	Arsenic	Dieldrin
Direct Exposure Residential (mg/kg)				2.1	0.06
Direct Exposure Commercial/Industrial (mg/kg)				12	0.3
Leachability Based on GW Criteria				***	0.002
SB1-2 3-5 5/21/14	SB-1(2)	3-5	05/21/14		0.00041U
SB9 3-5 1/16/14	SB-9	3-5	01/16/14	1.3	
SB9-2 3-5 1/16/14	SB-9(2)	3-5	05/20/14		0.00043U
SB9-E 3-5 5/20/2014	SB-9E	3-5	05/20/14	0.51	0.00042U
SB9-N 3-5 5/20/2014	SB-9N	3-5	05/20/14	<b>11.6</b>	0.00041U
SB9-S 3-5 5/20/2014	SB-9S	3-5	05/20/14	1.1	0.00041U
SB9-S2 6/6/14 3-5'	SB-9S(2)	3-5	06/06/14	<b>3.9</b>	
SB9-W 3-5 5/20/2014	SB-9W	3-5	05/20/14	<b>3.6</b>	0.00041U
SB9-W2 6/6/14 3-5'	SB-9W(2)	3-5	06/06/14	0.49	
SB18-2 3-5 5/20/2014	SB-18(2)	3-5	05/20/14		0.00040U
SB18-E 3-5 5/20/2014	SB-18E	3-5	05/20/14		0.00041U
SB18-N 3-5 5/20/2014	SB-18N	3-5	05/20/14		0.00041U
SB18-S 3-5 5/20/2014	SB-18S	3-5	05/20/14		0.00040U
SB18-W 3-5 5/20/2014	SB-18W	3-5	05/20/14		0.00040U
SB20 3-5 1/16/14	SB-20	3-5	01/16/14	0.44I	
SB20-E 3-5 5/20/2014	SB-20E	3-5	05/20/14	0.40I	
SB20-E2 6/6/14 3-5'	SB-20-E(2)	5-Mar	06/06/14	0.35I	
SB20-N 3-5 5/20/2014	SB-20N	3-5	05/20/14	0.38I	
SB20-N2 6/6/14 3-5'	SB-20N(2)	3-5	06/06/14	0.43I	
SB20-S 3-5 5/20/2014	SB-20S	3-5	05/20/14	0.32I	
SB20-W 3-5 5/20/2014	SB-20W	3-5	05/20/14	0.39I	
SB21 3-5 1/16/14	SB-21	3-5	01/16/14	1.1	
SB21-2 3-5 5/20/2014	SB-21(2)	3-5	05/20/14		0.00041U
SB21-E 3-5 5/20/2014	SB-21E	3-5	05/20/14	1.7	0.00041U
SB21-N 3-5 5/20/2014	SB-21N	3-5	05/20/14	<b>69.2</b>	0.00041U
SB21-S 3-5 5/20/2014	SB-21S	3-5	05/20/14	0.78	0.00041U
SB21-W 3-5 5/20/2014	SB-21W	3-5	05/20/14	<b>9.4</b>	0.00042U
SB21-W2 6/6/14 3-5'	SB-21W(2)	3-5	06/06/14	<b>32.2</b>	
SB27 3-5 1/16/14	SB-27	3-5	01/16/14	0.54	
SB27-E 3-5 5/20/2014	SB-27E	3-5	05/20/14	0.52	
SB27-N 3-5 5/20/2014	SB-27N	3-5	05/20/14	0.55	
SB27-S 3-5 5/20/2014	SB-27S	3-5	05/20/14	0.52	
SB27-W 3-5 5/20/2014	SB-27W	3-5	05/20/14	0.40I	
SB32 3-5 1/16/14	SB-32	3-5	01/16/14	1.1	
SB32-E 3-5 5/20/2014	SB-32E	3-5	05/20/14	0.22I	
SB32-N 3-5 5/20/2014	SB-32N	3-5	05/20/14	0.41I	
SB32S 3-5 5/20/2014	SB-32S	3-5	05/20/14	0.31I	
SB32-W 3-5 5/20/2014	SB-32W	3-5	05/20/14	0.48	
SB39 3-5 6/3/14	SB-39	3-5	06/03/14	0.85	0.00050I
SB40 3-5 6/3/14	SB-40	3-5	06/03/14	<b>3.6<sup>a</sup></b>	0.00044U

## TABLE 4: SOIL ANALYTICAL RESULTS - 3-5 FT BLS

Site Name: Orlando Recreation Complex and Tennis Centre				Revision date: March, 2015	
Sample ID	Sample Location	Sample Depth (ftbls)	Date	Arsenic	Dieldrin
<b>Direct Exposure Residential (mg/kg)</b>				2.1	0.06
<b>Direct Exposure Commercial/Industrial (mg/kg)</b>				12	0.3
<b>Leachability Based on GW Criteria</b>				***	0.002
SB42 3-5 6/3/14	SB-42	3-5	06/03/14	0.99	0.00041U
SB43 3-5 6/3/14	SB-43	3-5	06/03/14	1.7	0.00041U
SB44 3-5 6/3/14	SB-44	3-5	06/03/14	0.68	0.00040U
SB45 3-5 6/3/14	SB-45	3-5	06/03/14	1.1	0.00040U
SB46 3-5 6/3/14	SB-46	3-5	06/03/14	1.9	0.00046U
SB48 3-5 6/3/14	SB-48	3-5	06/03/14	<b>4.3</b>	0.00281 <sup>a</sup>
SB49 3-5 6/3/14	SB-49	3-5	06/03/14	<b>2.5</b>	0.0028
SB50 3-5 6/3/14	SB-50	3-5	06/03/14	1.3	0.00040U
SB51 3-5 6/3/14	SB-51	3-5	06/03/14	0.99	0.00043U
SB52 3-5 6/3/14	SB-52	3-5	06/03/14	0.54	0.00041U
SB54 3-4 5/20/2014	SB-54	3-4	05/20/14	2.1	0.00044U

Notes:

- SCTL = Soil Cleanup Target Levels as provided in Table II of Chapter 62-777, F.A.C.
- Bold** = Exceedance of Direct Exposure Residential SCTL
- mg/kg = Milligrams Per Kilogram
- Analytical Results = mg/kg
- I = The reported value is between the laboratory Method Detection Limit & the laboratory Practical Quantitation Limit
- U = Analyte included in the analysis, but not detected
- ftbls = feet below land surface
- \*\*\* = Leachability value may be derived using the SPLP Test to calculate site-specific SCTL's
- <sup>a</sup> = elevated reporting limits due to matrix interference



**ATTACHMENT D**  
**Cardno TBE Draft ABCA**

US EPA Brownfields Cleanup  
Grant Application ABCA DRAFT

**Draft Analysis of Brownfields Cleanup Alternatives**  
**Former Orlando Centroplex Site**  
**Southeast Corner of the West Amelia Street/North Parramore Avenue Intersection**  
**Orlando, FL**

*Prepared for*



City of Orlando  
400 South Orange Avenue  
Orlando, FL 32802-4990

*Prepared by*



November 4, 2011

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**FIGURES**

<b>Figure</b>	<b>Description</b>
1	USGS / Site Vicinity Map
2	Site Boundary Map

**TABLE**

<b>Table</b>	<b>Description</b>
1	Treatment Alternatives Comparison Table

**APPENDIX**

A	Phase II ESA (PSI, November 2006)
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## 1.0 Introduction and Background

### 1.1 Introduction

The City of Orlando (City) is applying for an Environmental Protection Agency (EPA) Brownfields Cleanup Grant. This draft Analysis of Brownfields Cleanup Alternatives (ABCA) has been prepared in accordance with US Environmental Protection Agency (EPA) FY 2012 Brownfields Assessment, Revolving Loan Fund and Cleanup (ARC) Grant Guideline requirements.

The site is located within the Downtown Economic Enhancement District (DEED) brownfield area originally designated in 2004 and expanded in 2007. The City of Orlando will enter the subject site into a voluntary BSRA under the Florida Brownfields Redevelopment Act, Chapter 376.77-376.85, Florida Statutes with the Florida Department of Environmental Protection (FDEP). This voluntary agreement provides the framework and schedule for the remaining remediation activities including confirmatory sampling. The site will be remediated under authority of Chapter 62-785, Florida Administrative Code, Brownfields Cleanup Criteria. The City will comply fully with federal procurement procedures as required by 40 CFR 31.16 in contracting a qualified environmental engineering firm (familiar with brownfields assessment and remediation process within the state of Florida) for remedial activities at this location. Once the BSRA is executed, the site will be remediated under the authority of Chapter 62.785 FAC, the Brownfields Cleanup Criteria Rule. This draft ABCA is being prepared to demonstrate and document that the appropriate cleanup methods have been evaluated and will be applied at the former Centroplex site.

This ABCA provides information on the following:

- Information about the site and contamination issues (e.g., exposure pathways, identification of contaminant sources, etc.), cleanup standards, applicable laws, alternatives considered, and the proposed cleanup.
- A discussion of the effectiveness, implementability, and cost of the cleanup methods considered.
- An analysis of reasonable alternatives including no action.

The Draft ABCA, once approved, will be placed in an Administrative Record File (ARF) located at the City of Orlando Economic Development Department offices in Orlando, Florida. The document may also be placed in additional locations to facilitate public comment. Public notice will be given that the document is available for review and comment and a written response to significant comments will be provided and included in the ARF.

## 1.2 Background

The subject site comprises approximately 8.2 acres in Downtown Orlando, Florida located in Section 26, Township 22 South, Range 29 East, as referenced on the U.S. Geological Survey (USGS) "Orlando West, FL", 7.5-minute series Quadrangle map (See Figure 1). The site is bounded to the north by West Amelia Street, to the west by North Parramore Avenue, to the south by West Livingston Street and to the east by a parking lot and the eastern portion of the vacant, former Amway Arena; the western portion of the arena is located on the northeastern portion of the area defined as the subject property. The subject property is located in an urban area developed with municipal and commercial properties and includes the area outlined on Figure 2. Current land use within the area defined as the subject property includes the Downtown Recreation and Tennis Center, the western portion of the vacant former Amway Arena and various asphalt-paved parking lots.

Previous uses of the property were identified through research conducted as part of a Phase I Environmental Site Assessment (ESA) conducted for the subject site in July 2005 and research conducted during an October 2011 Phase I ESA for the former Amway Arena site (the western portion of which is located on the subject site). Non-residential, historical land uses of significance on the subject site are as follows:

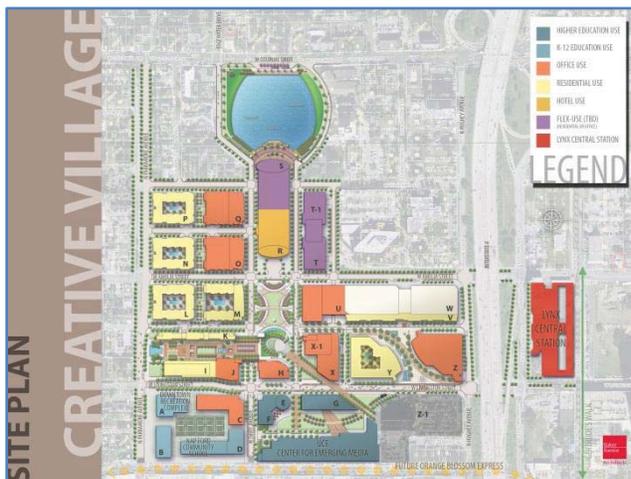
- A USDA Bureau of Entomology laboratory was identified at 602 West Amelia Avenue (currently West Amelia Street) from 1915 until sometime prior to 1923 (northeastern portion of the site).
- The western portion of the former Amway Arena (1989-Present) is located on the northeastern portion of the site.
- A USDA Bureau of Entomology laboratory was identified at 415 North Parramore Avenue from 1933 until sometime prior to 1958 (central portion of western perimeter of the subject site).
- A USDA Bureau of Entomology research laboratory was identified at 419 North Parramore Avenue from 1953 until prior to 1958 (central portion of western perimeter of the subject site).
- A former dry cleaner was identified at 441 North Parramore Avenue from 1963 until prior to 1983 (north portion of west perimeter of the subject site).
- A potential gasoline station (Jackson's Minit Market/Majik Maket No. 20) was identified at 439 North Parramore Avenue from 1963 until sometime prior to 1983 (north-central portion of the western perimeter of the site).
- A Former Florida National Guard Armory/ Naval Reserve Training Center was identified at 655 West Livingston Street (southwest corner of the subject site) from 1948 until 1973. The address shifted to 649 West Livingston Street in approximately 1978, with the property then listed as the Orlando Recreation Department with various sub-listings including the Orlando Tennis Center, Downtown Recreation Complex and Nap Ford Community School noted between 1978 and present.

Based on the Recognized Environmental Concerns (RECs) identified July 2005 Phase I ESA, a Phase II ESA was conducted (by others) in November 2006. Soil samples and both shallow and deeper interval groundwater samples were collected from portions of the site correlating to identified RECs. The results of the Phase II ESA identified soil and groundwater contamination at the former National Guard Armory/Naval Reserve Training Center (Armory) site. This location was also referred to as a USDA facility in both the 2005 Phase I ESA and 2006 Phase II ESA, but it appears based on subsequent research conducted as part of the October 2011 Phase I ESA that the USDA facilities were located north of the areas assessed during the 2006 Phase II ESA.

The soil contamination detected at the Armory site consisted of arsenic in excess of the State Commercial/Industrial Direct-Exposure (C/I) Soil Cleanup Target Level (SCTL) as referenced in Chapter 62-777, Florida Administrative Code (FAC). In addition, four of the carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) were detected in one soil sample, and the subsequently calculated benzo(a)pyrene (BaP) equivalents concentration exceeded the Residential Direct-Exposure SCTL (R-SCTL). The pesticide dieldrin was detected in excess of the Groundwater Cleanup Target Level (GCTL), referenced in Ch., 62-777 FAC, in the groundwater sample from one temporary well location on the Armory site. No other soil or groundwater impacts associated with historical property use were identified during the November 2006 Phase II ESA and no subsequent sampling is known to have occurred.

### 1.3 Project Goals/Reuse Plan

Based on the above findings, corrective actions are required to allow for redevelopment of the property. The follow provides a description of the mixed-use development proposed for the site. Therefore cleanup to residential criteria is selected as the applicable goal for remedial efforts at the site.



The overall Creative Village project involves the replacement of aging and obsolete public infrastructure currently in place to support the 60-acre City-owned Orlando Centroplex venue. The improvements included as part of the overall project will implement the City's vision for this area and allow for the rejuvenation of this area as a live, work, learn and play mixed-use community built around a foundation of technology based employment and educational opportunities, mixed-income and attainable housing, neighborhood commercial and public open

spaces. The technology-based employment and educational expansion opportunities at Creative Village will help expand the regional Orlando economic cluster of tech-based, digital media production, modeling and simulation industries.

The uses currently occupying the overall Creative Village project area include the now vacant Amway Arena (the NBA Orlando Magic's old arena), the Bob Carr Performing Arts Center, Nap Ford Charter School (K-5), the University of Central Florida (UCF) Center for Emerging Media, the Downtown Orlando Tennis and Community Recreation Center and associated parking garages. Currently, the area associated with the clean-up grant is substantially covered by asphalt, concrete and buildings and includes a road network that became disjointed after the construction of the Amway Arena in 1988. Various underground utilities travel into and through the project area to provide service to the uses on site, as well as to the surrounding residential neighborhood to the west and north and the City's Downtown to the east.

The intended mixed of uses proposed within the clean-up grant area as part of the Creative Village project that include new public infrastructure (roads, drainage, water, sewer, irrigation, telecommunication, street lighting and streetscape improvements), vertical construction totaling 275,000 square feet of office space, 550 affordable and mixed income multifamily housing units, 40,000 square feet of commercial retail space and a community park.

## 2.0 Applicable Regulations and Cleanup Standards

The Florida Department of Environmental Protection (FDEP) will provide regulatory oversight of all assessment and remediation conducted at the subject site. Daily direct oversight of assessment and remediation activities will be performed by a State of Florida licensed professional engineer, competent through education and experience to provide direction and oversight throughout the process. Additional review and regulatory oversight will be provided by the EPA Project Officer administering the grant activities. Copies of all reports generated throughout the process will be submitted to both the FDEP and EPA for review and comment. In addition, Quarterly Reports will be submitted to the EPA Project Officer to document progress on the project.

Consistent with criteria specific in Rule 62-785, F.A.C., Brownfield Cleanup Criteria, the lower of the Florida R-SCTL and Leachability Based on Groundwater ( $L_{GW}$ -SCTL) will be the soil contamination screening and remediation standards for this project. Based on data collected during the November 2006 Phase II ESA, the following COCs exceed one or both of the referenced target levels (the appropriate SCTLs from Rule 62-777 F.A.C are provided for reference):

<u>Contaminant</u>	<u>R-SCTL (mg/kg)</u>	<u><math>L_{GW}</math>-SCTL (mg/kg)</u>
Benzo(a)pyrene	0.1	8
BaP Equivalents	0.1	8
Arsenic	2.1	Derive using SPLP

No Applicable or Relevant and Appropriate Requirements (ARARs) for soil were identified as part of this ABCA.

The Florida GCTLs specified in Rule 62-777 F.A.C. will be the groundwater contamination screening and remediation standards for this project. Based on data collected during the November 2006 Phase II ESA, the following COC exceed the referenced target level (the appropriate GCTL from Rule 62-777 F.A.C is provided for reference):

<u>Contaminant</u>	<u>GCTL (<math>\mu</math>g/L)</u>
Dieldrin	0.002

No ARARs specific to groundwater impacts detected at the site were identified as part of this ABCA.

In summary, the overriding cleanup objectives for the former Centroplex site will be designed to be protective of human health and the environment, based on anticipated residential/mixed-use assumptions, and will comply with applicable State and Federal laws.

## 3.0 Exposure Analysis

### 3.1 Evaluation

Preparation of an ABCA requires an evaluation be made as to the possible corrective actions and their respective costs to remedy effected areas. Not all remedies are physical or chemical and may include other types of remedies such as institutional controls (e.g. restriction on residential development recorded on the deed). Excess public risk requires four factors, all of which must be present to produce excess risk from contaminants at a site. These are:

- A chemical with sufficient toxicity to do harm (whether acute or chronic),
- A sufficient quantity of the chemical to be toxic and do harm,
- A receptor on which to do harm, and
- A pathway by which a sufficient amount of the contaminant can actually reach a receptor and do harm.

Corrective actions to remedy affected areas rarely eliminate all chemicals of concern. It is generally the intent to remove, treat or immobilize the concentrations of chemicals of concern to levels producing an acceptable risk to human health and the environment. The degree of acceptable risk has to be determined by the public through legislative and regulatory processes. This has been accomplished by the development and implementation of FDEP regulatory programs to implement State standards (Chapter 62-777, FAC, the Contaminant Cleanup Criteria rule).

### 3.2 Exposure Pathways

In order for possible contaminants of concern to do harm to public health or the environment, they must occupy a point of exposure accessible to the population at risk. Compounds to which populations are not currently, or likely to be exposed via complete exposure pathways do not constitute a probable condition of elevated risk.

The three potential receptor populations are:

- Construction worker – persons involved in the redevelopment of the property
- Industrial/commercial worker – persons who occupy the property under conditions of full-time employment
- Residents – persons who reside on or adjacent to the property

Based on assessment data detailed in **Section 1.2**, the primary contaminants of concern (COCs) in soil are arsenic and PAHs. Risk of exposure to the site soils were examined for three potential receptor populations deemed most likely to be exposed to identified contaminants of concern. The primary exposure pathways identified at this site include ingestion of site soils and inhalation of potential fugitive dust emissions during site remediation and redevelopment activities.

Based on the groundwater data detailed in **Section 1.2**, the primary COC in groundwater is the pesticide dieldrin. No potable wells exist on the subject or adjacent properties, no irrigation wells are planned at the site and potable water is available from the City of Orlando; therefore, a completed pathway for the ingestion of site groundwater does not appear to be present.

## 4.0 Evaluation of Cleanup Alternatives

### 4.1 Cleanup Alternatives Development

Based on the evaluation of assessment findings presented in this ABCA and conservative assumptions of future site use for residential/mixed-use development, various alternatives were considered for managing the identified impacts, as discussed below.

### 4.2 Soil Remedial Alternatives

The alternatives for mitigating the risks associated with identified contaminated soil at the property are summarized and compared in **Table 1**. A brief discussion of each alternative is provided below. For identified soil impacts, the following four remediation alternatives were evaluated for this site.

- No Further Action
- Capping (Engineering Control)
- In-situ Solidification/Stabilization
- Excavation and Offsite Disposal

Each of these alternatives has been evaluated with respect to effectiveness, implementability, and cost. The following sections provide a synopsis of each technology and the final evaluation results.

#### 4.2.1 No Action

##### Technology Description

The No Action option involves leaving the site in essentially its current condition, with no remediation activities being performed prior to development.

##### Effectiveness

Because environmental impacts have been documented at the site, this option would result in future exposure potential to impacted media as a result of potential residential/mixed-use development. This potential for exposure does not meet the objectives of this project and this corrective action alternative has been omitted from further consideration.

##### Implementability

The No Action alternative would be easy to implement because it requires no significant additional activities be performed on the site. Fencing and/or warning signs may be required if contaminants are left unabated. For the purposes of this ABCA, institutional controls and engineering controls are not considered an element of the No Action alternative.

**Cost**

There would be minimal cost associated with implementing No Action alternative at the site. If warning signs or other access control measures were considered for portions of the facility, then the cost for signs and fences would be approximately \$22 per linear foot of perimeter.

**4.2.2 Capping (Engineering Control)****Technology Description**

Capping involves placing an impermeable cover over contaminated materials. Caps do not clean up the contaminated material. Instead, they isolate the contaminated media and keep it in place so it will not come into contact with people or the environment.

**Effectiveness**

If designed appropriately, a cap can be effective in 1) stopping rainwater from seeping through contaminated material and carrying the contamination into groundwater or surface water features, 2) stopping wind from blowing contaminants throughout the site or off site, and 3) keeping people and animals from coming into direct contact with the impacted material.

**Implementability**

Cap design can range from the simple placement of a single layer of asphalt over the materials of concern to multilayer systems. The top layer is typically comprised of soil and vegetation to stabilize the site, uptake moisture, and prevent erosion. The second layer is typically comprised of a drainage system (pipes, gravel, etc.) to manage water that seeps through the top layer. A gas venting system is often placed beneath the drainage system, depending on the nature of the waste. The bottom layer is typically impermeable material; either clay or a geotextile barrier.

While construction and maintenance of a cap is generally simple to implement, it is not practical for this property for several reasons. First, the documented impacts to soil do not appear to be significant enough in areal extent to warrant large scale capping. Second, the site re-grading that will be required to complete installation of underground utilities, re-align roads and construct new buildings throughout the site make the construction and maintenance of a cap system impractical.

**Cost**

Multi-layer capping systems can range from approximately \$80,000 to \$120,000 per acre, depending on the design. While only limited portions of the subject site would be subject to capping, the limitations outlined in the implementability discussion render further consideration of capping impracticable.

**4.2.3 In-situ Solidification/Stabilization****Technology Description**

Solidification/stabilization is a cleanup method that prevents or slows the release of contaminants from impacted soils or sludge. Due to the presence of arsenic impacts in addition to PAH contaminants, this technology was evaluated over other methods of in-situ treatment

such as bioremediation (which would not address arsenic impacts effectively). This technology does not typically destroy the contaminants; rather, it prevents them from moving into the surrounding environment. Typically, cement or similar binding agents are used to solidify the impacted soil or sludge. Stabilization; however, may only consist of a chemical reagent that binds contaminants to the subsurface media, thereby preventing migration.

### **Effectiveness**

Solidification/stabilization can be effective if future disturbances of the subsurface will not occur. However, changes in water chemistry can often result in leaching of contaminants from solidified/stabilized material, resulting in impacted groundwater or surface water. An institutional control to prevent future contact with and disturbance of the solidified/stabilized material is typically required. In addition, the effectiveness of this technology (particularly stabilization) relies on the injected stabilizer contacting all impacted material, which may prove difficult.

### **Implementability**

Solidification involves mixing impacted soil with a substance (like cement) that causes the soil to harden. Soil mixing can be performed in-situ using large augers (deep) or land farming techniques (shallow), or the impacted soils can be excavated and mixed with binding agents ex-situ. Once the ex-situ mixture dries to form a solid block or granular aggregate, it can be returned to the site (left in place) or removed to another location.

Stabilization typically involves the injection of chemicals that bind with the contaminated material to (in theory) render the material inert or non-leachable. Soils could be left in place beneath planned parking lots; however, leaving solidified soils in areas where residential buildings are to be constructed (including related buried utilities) could be problematic. Also, due to the challenge of ensuring adequate mixing and contact with the solidification/stabilization binding or chemical agents, especially under structures or roadways, effectiveness of the solidification/stabilization activities may be difficult to predict. In addition, on-going obligations in the form of long-term annual groundwater sampling may be required to monitor the effectiveness of the solidification/stabilization. For these reasons, solidification/stabilization is considered impractical for this project.

### **Cost**

The cost to solidify impacted material is directly related to the amount of material being addressed, the nature of the binding agent(s) used, and the final disposition of the solidified material. Additionally, costs for cement-based stabilization techniques may vary according to availability and short term cost variability for concrete, and the chemical nature of the contaminant. Published costs for solidification/stabilization include \$65 to \$105 per cubic yard for shallow applications typical of the subject site. Assuming 2,000 cubic yards of material (includes safety factor for additional soil encountered during work) were solidified or stabilized in-place, the associated cost would be between ±\$130,000 and ±\$210,000.

## 4.2.4 Excavation and Offsite Disposal

### Technology Description

Excavation is digging up impacted soils from a site. Offsite disposal requires detailed characterization of the waste characteristics, contamination levels, identification of the appropriate disposal or treatment facility, and a determination of transportation issues associated with transfer of the material (site access and distance to the disposal or treatment facility).

### Effectiveness

Removal of contaminated material from a site is typically the most effective remediation technology that can be implemented, as it does not rely on chemical processes, dispersion and contact with reagents or binders, or soil conditions and is effective regardless of contaminant type (i.e. VOCs, SVOCs, metals, etc.)

### Implementability

Many factors affect the implementability of a soil excavation project. Access must be available to remove the impacted material and an appropriate treatment or disposal facility must be identified that can manage the levels and types of contamination. Generally, excavation is limited to materials that are unconsolidated and easily removed using backhoes, excavators, and similar equipment. The depths of excavation are also typically limited to approximately 20-ft, unless shoring or benching is implemented to access deeper soils. Shoring can be difficult in some instances, and benching can result in substantially increased volumes of soil being managed.

Lastly, if excavation is extended below the water table, dewatering of the excavation area is required and treatment of impacted groundwater is typically an additional component of the project. These factors can affect the cost and implementability of excavation at a given location.

### Cost

The cost of excavation can vary widely based on the variables discussed above. Additionally, transportation and disposal costs offsite can also vary substantially based on the method of treatment or disposal, fuel costs, and the distance to the final disposal facility. Costs are typically separated based on the following tasks: excavation and staging of material, transportation and disposal, and backfilling and compaction. While costs can vary significantly, the following costs reflect recent excavation from above the water table, and transportation to a permitted disposal facility. Please note that project management, laboratory analysis, and regulatory negotiations are not included in these costs.

<b>Task</b>	<b>Unit</b>	<b>Estimated Unit Price</b>
Mobilization to site	LS	\$4,000
Excavation and staging - (unconsolidated materials only)	Cubic Yard	\$15 - \$22

Transportation & Disposal (non-hazardous)	Ton	\$50 - \$70
(hazardous)	Ton	\$100 - \$130
Fill Material	Cubic Yard	\$12.00 - \$22.00
Fill Placement and Compaction	Cubic Yard	\$10.00 - \$18.00

Limited areas of subsurface impacts have been documented at the subject site and the extent of those impacts has not been fully delineated at this time. In addition, excavation in some untested areas may be required during site grading activities (soils will be evaluated to determine if they are impacted prior to offsite disposal). Therefore, it is difficult to accurately estimate the volume of impacted soils that may require action at this time and, as a result, the costs associated with excavation and disposal activities. However, for budgetary and comparison purposes a volume of 2,000 cubic yards was used. Using the unit costs provided above, the capital costs would range from  $\pm$ \$218,000 to  $\pm$ \$324,000. This cost does not include project management costs, sampling, and laboratory analyses.

### **4.3 Groundwater Remedial Alternatives**

While contaminant impacts to groundwater have been identified in one temporary monitor well at the site, sufficient delineation of the identified impacts has not been conducted to date. Based on this lack of data, a detailed evaluation of remedies is not practical at this time. Additionally, due to a lack of current or proposed future use of the shallow water at the site, active remediation may not be pursued. General cleanup and mitigation options include:

- No Action
- Institutional/Engineering Controls
- Various in-situ & ex-situ options

Preliminary comparison of these alternatives is contained in **Table 1**. The options will be more fully evaluated once sufficient assessment data is available to define the extent and magnitude of the preliminarily identified groundwater impact

## 5.0 Final Remedy Selection

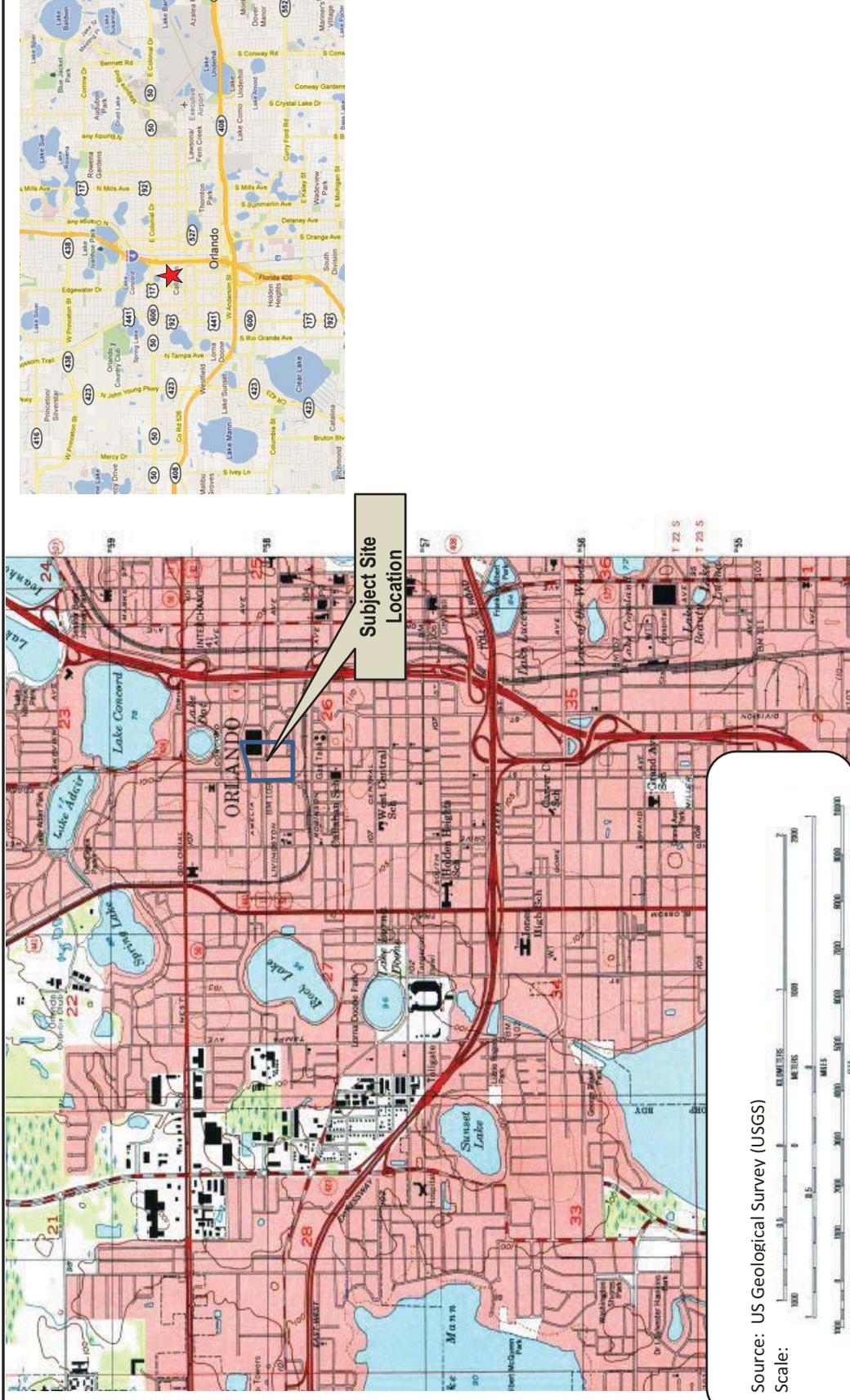
Based on this Draft ABCA evaluation; excavation with off-site disposal is chosen as the soil remedy best suited to achieve the goals of protecting human health and the environment at this site. This remedy requires no long term monitoring or maintenance and has the best long-term reliability of the methods evaluated. Once the contaminants are excavated and disposed, the areas removed are not subjected to continued releases from the source material or “re-bound” of contaminants as is typical of certain in-situ treatments.

The excavation and off-site disposal will be handled as an interim remedial action to address soil impacts identified to-date. It is anticipated that the FDEP will require additional soil and groundwater assessment that could potential increase the volume/type of impacted soil requiring removal. As previously discussed, the final groundwater remedy is anticipated to include an institutional control to prevent groundwater use. However, this alternative will be further evaluated and a selection made once the extent and magnitude of the groundwater impacts have been fully defined.

# Figures

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DRAFT



Source: US Geological Survey (USGS)

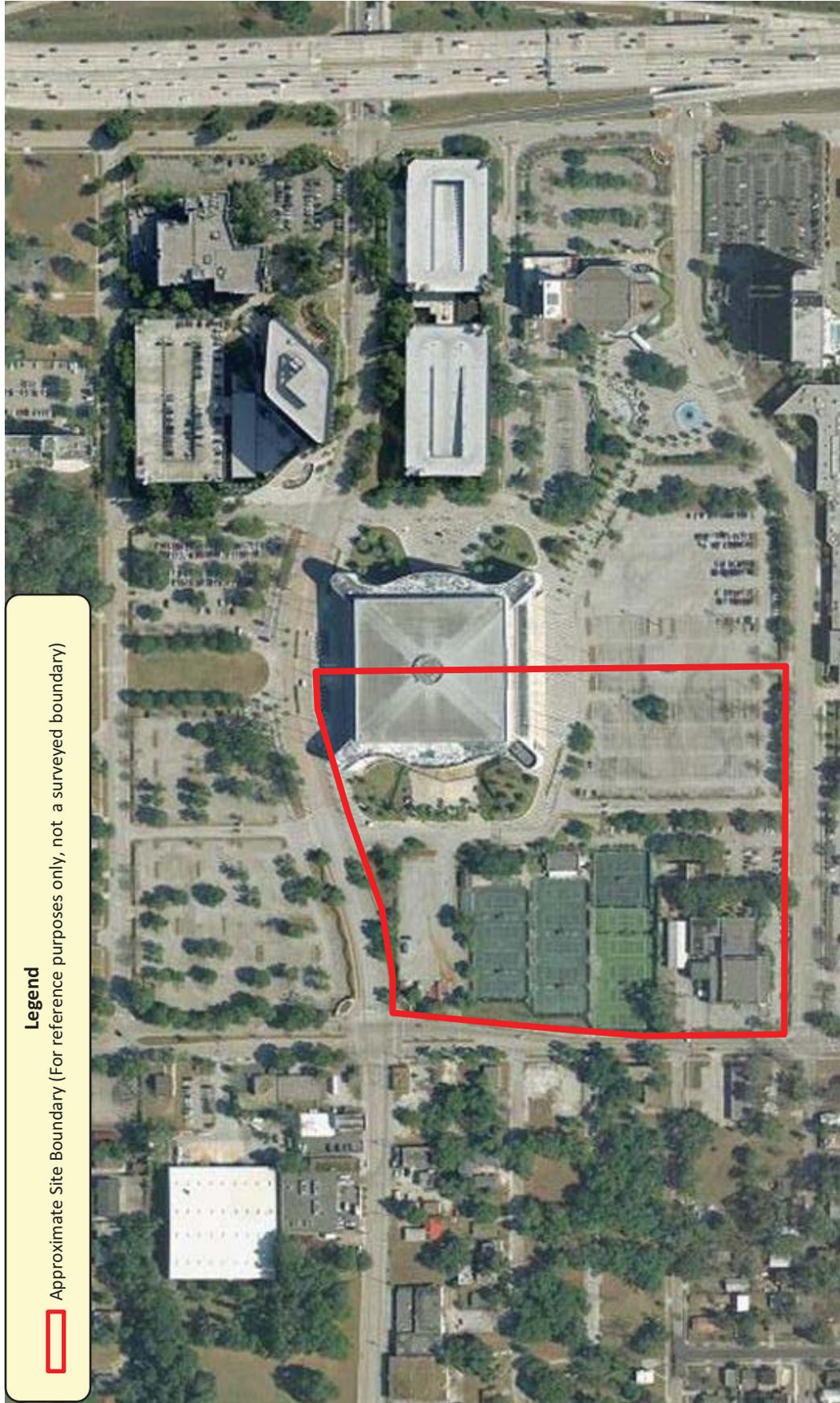
Scale:



Former Orlando Centropex  
SE Corner of West Amelia Street/North  
Parramore Avenue Intersection  
Orlando, Orange County, Florida

Figure 1  
USGS/Site Vicinity Map

DRAFT



**Legend**

 Approximate Site Boundary (For reference purposes only, not a surveyed boundary)



1 in = 400 ft

Former Orlando Centroplex  
SE Corner of West Amelia Street/North  
Parramore Avenue Intersection  
Orlando, Orange County, Florida

**Figure 2**  
**Site Boundary Map**

# Table

---

**Table 1**  
**Treatment Alternatives Comparison Table**

Technology	Process Description	Pros	Cons	Feasibility	Cost Effectiveness
1 No Further Action	Leaving the site in its current condition with no remediation	-No technical challenges -No implementation	-May not meet ARARs	No, not protective of human health or the environment	Yes - Negligible Costs
2 Capping	Placing an impermeable cover over contaminated materials	-Simple to install/Implement -Effective in stopping rainwater from seeping to contaminated materials -Minimizes potential exposure	-Requires ongoing maintenance of Cap and institutional controls to limit disturbance of Cap -Intermittent detection does not support continuous capping	No, due to spatial distribution of impacts	- not cost effective based on known contaminant distribution
3 In Situ Solidification / Stabilization	Mixing cement or similar binding agents or injecting chemical reagents that bind with the contaminants to render them immobile	- effective on multiple contaminant types including those found on site	- Continuous contact with shallow water table may overtime weaken the matrix and allow leaching to occur	No, due to spatial distribution of impacts	\$65 to \$105/cubic yard - not cost effective based on known contaminant distribution
4 Excavation & Offsite Disposal	Digging up impacted soils from the site with transportation for treatment or disposal	-Removes contamination from site	-Requires characterization of wastes -Could require dewatering -Increased volumes of soil	Yes, site is cleared with open access for heavy equipment	Yes - allows surgical removal of multiple small impacted areas and eliminates long-term monitoring and maintenance costs
5 In-Situ Bioremediation of Groundwater	Injection of microbes into the soil to transform organic contaminants to water and harmless gases	-Effective in removing contamination with right conditions	-Equipment required for injection - Permitting process add time and additional costs	Yes, if site conditions are favorable for treatment technology	Yes - But may require multiple treatments substantially increasing the cost

DRAFT

# Appendix A

Phase II Environmental Site Assessment (PSI, November 2006)



# CITY OF ORLANDO

July 16, 2010

Leigh Kellett Fletcher, Esq.  
Stearns Weaver Miller Weissler  
Alhadeff & Sitterson, P.A.  
Suntrust Financial Centre  
401 E. Jackson Street, Suite 2200  
Tampa, Florida 33601-3299

**Re: Phase II Environmental Site Assessment Report**

Dear Leigh:

Enclosed please find a copy of the Phase II Environmental Site Assessment Report for the Creative Village site.

If you have any questions, feel free to contact me at (407) 246-3478.

Sincerely,

Wesley C. Powell  
Assistant City Attorney

WCP:ra  
Enc.

---

**OFFICE OF LEGAL AFFAIRS**

CITY HALL • 400 SOUTH ORANGE AVENUE • P.O. BOX 4990 • ORLANDO, FLORIDA 32802-4990  
PHONE (407) 246-2295 • FAX (407) 246-2854 • <http://www.cityoforlando.net>

November 22, 2006

Mr. Dan Dashtaki  
**CITY OF ORLANDO**  
Public Works Department  
5100 L.B. McLeod Road  
Orlando, Florida 32811

Re: Phase II Environmental Site Assessment Report  
**Centroplex Site**  
600 Amelia Avenue  
Orlando, Orange County, Florida

**PSI Project Number: 663-6G060**

Dear Mr. Dashtaki:

Pursuant to your request, Professional Service Industries, Inc. (PSI) has performed Phase II Environmental Site Assessment (ESA) at the above-referenced property. Two copies of the Phase II ESA Report have been prepared for your use.

Thank you for choosing PSI as your consultant for this project. If you have any questions regarding the information contained herein, or if we can be of additional service, please contact the undersigned at (407) 304-5560.

Respectfully submitted,

**PROFESSIONAL SERVICE INDUSTRIES, INC.**



Diane M. Green  
Project Scientist



Scott J. Jorgenson  
Senior Engineer



Jeffrey M. Martineau, CHMM  
District Manager – Environmental Services

Enclosures

SSJ/DG/JMM;jaw  
Phase II ESA Report.doc

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## 1.0 INTRODUCTION

Professional Service Industries, Inc. (PSI) has performed Phase II Environmental Site Assessment (ESA) activities at the Centroplex Site located in Orlando, Orange County, Florida.

### 1.1 Authorization

Authorization to perform the Phase II ESA was given by the approval of PSI's proposal (PSI Proposal No. PO-663-6G0116) between the City of Orlando Public Works Department and PSI dated August 23, 2006. Written authorization to proceed was provided by Mr. Dan Dashtaki on September 12, 2006.

### 1.2 Site Description

The subject property is located in downtown Orlando, Florida in Section 26, Township 22 South, Range 29 East, as referenced on the U.S. Geological Survey (USGS) "Orlando West, FL" 7.5 Minute Quadrangle map (Figure 1). The subject property includes the outlined areas shown on Figure 2 and is located in an urban setting with significant development.

The subject site is bounded by North Parramore Avenue to the west, West Livingston Street to the south, West Amelia Avenue to the north and the western portion of the T.D. Waterhouse Center to the east. Within the project boundaries are the western portion of the T.D. Waterhouse Center, and the Downtown Recreation and Tennis Center. The site boundaries, regional features, and nearby off-site properties are shown on Figure 2.

### 1.3 Project Background, Purpose, and Scope

PSI conducted a Phase I ESA of the subject property (PSI Project No. 663-5E070) for the City of Orlando in July 2005. The results of the Phase I ESA identified several recognized environmental conditions (RECs) in connection with the Centroplex site. The purpose of the Phase II ESA was to further evaluate the RECs identified during the Phase I ESA and to determine whether hazardous substances or petroleum products have been disposed or released at the property. The following RECs were identified during the Phase I ESA:

#### On-site RECs

- **REC:** A dry cleaning facility was listed in the city directories reviewed from at least 1961 until 1977. The exact location of the former facility could not be determined; however, based on the address of the facility (437 and 441 N. Parramore Avenue), it is estimated that the facility was located on the subject property between West Livingston Avenue and West Amelia Street. The estimated location of this facility is currently developed as a parking lot proximate to the tennis courts of the Downtown Recreation and Tennis Center (Figure 2). Based on the nature of dry cleaning facilities and the typical use of solvents, this facility is considered to be evidence of a REC in connection with the subject property.



**Scope:** Using Geoprobe® methodologies, seven soil borings were performed for organic vapor testing using an organic vapor analyzer equipped with a photionization detector (OVA-PID), three soil samples were collected for laboratory analysis, five groundwater samples were collected using a Geoprobe® screen point sampler, and one groundwater sample was collected from a temporary monitoring well (Figure 3). Three of the groundwater samples collected using Geoprobe® methodologies, were collected from the deeper zone of the shallow aquifer, and one of the samples was collected from the shallow zone of the same aquifer. Soil and groundwater samples collected from the former dry cleaning area were submitted for laboratory analysis by U.S. Environmental Protection Agency (EPA) Method 8021 for volatile organic halogens (VOHs).

- **REC:** An armory, U.S. Department of Agriculture (USDA) automobile storage facility, and various USDA laboratories were historically located in the southwest section of the subject property, the current location of the Downtown Recreational and Tennis Center. Based on review of Sanborn maps, an oil underground storage tank (UST) was shown to be located on the property from at least 1950 until 1965. Documentation concerning the UST, including subsurface investigations was not either provided or located. The possibility exists that chemicals were stored on the subject property in connection with the USDA laboratories that could have been inadvertently released onto the subject property. In addition, based on the nature of armories, automotive storage lots, and the potential materials stored, as well as the lack of information regarding the UST, the armory and USDA automobile storage facility are considered to be evidence of a REC in connection with the subject property at this time.

**Scope:** To address the former armory and USDA Laboratories site (Figure 4), several soil and groundwater samples were collected. Near the former oil tank, PSI performed four soil borings to obtain samples for organic vapor testing using an OVA equipped with flame ionization detector (OVA-FID), collected one soil sample for laboratory analysis, and installed one temporary groundwater monitoring well. The soil and groundwater samples were submitted for laboratory analysis by EPA Method 8260 for volatile organic compounds (VOCs), EPA Method 8310/8270 for polynuclear aromatic hydrocarbons (PAHs), laboratory method Florida Petroleum Residual Organics (FL-PRO) for total petroleum hydrocarbons (TPH), and the eight Resource Conservation and Recovery Act (RCRA) metals including silver, arsenic, barium, cadmium, chromium, mercury, lead, and selenium.

To address the remainder of the former armory and USDA Laboratories property, PSI collected five composite soil samples and installed three temporary monitoring wells. Composite soil samples and the three groundwater samples collected from the temporary monitoring wells were submitted for laboratory analysis by EPA Method 8081 for organochlorine pesticides, EPA Method 8141 for organophosphorus pesticides, EPA Method 8151 for chlorophenoxy pesticides, and the eight RCRA metals (total and dissolved).

#### Off-site REC

- **REC:** Based on historical Sanborn maps and city directories reviewed, filling stations and/or automotive repair service stations were formerly located adjacent to the north of the subject property at the intersection of West Amelia Street and North Parramore Avenue (Figure 5). No documentation concerning groundwater or soil investigations at these facilities was found during the course of the Phase I ESA. Based on the nature of these facilities, their historical



presence, and lack of information, the on and off-site filling stations are considered to be evidence of a REC in connection with the subject property.

**Scope:** Using Geoprobe® methodologies, PSI performed four soil borings for organic vapor testing using an OVA-FID and installed one temporary monitoring well. The groundwater sample was submitted for laboratory analysis by EPA Method 8260 for VOCs, EPA Method 8310/8270 for PAHs, and laboratory method FL-PRO for TPH.

PSI has prepared this Phase II ESA report, which includes appropriate sampling location maps and technical evaluation of the data. This report summarizes the results from the field studies, methodologies employed, and provides conclusions based on the data obtained.

#### **1.4 Quality Assurance/Quality Control Measures**

Drilling and sampling operations were directed by a PSI field supervisor, and field personnel are Occupational Safety and Health Association (OSHA)-trained in accordance with 29 CFR 1910.120. Prior to subsurface drilling activities, PSI notified the utility service alert in accordance with local practices. Investigative derived waste from the site was returned to its respective boreholes.

All field decontamination and sampling procedures were performed in general accordance with the Florida Department of Environmental Protection's (FDEP's) Standard Operating Procedure (SOP) FS/001-01 for field activities. Field decontaminated soil and groundwater sampling equipment and disposable tubing were utilized in order to minimize cross-contamination of the soil and groundwater samples. Decontamination of equipment was accomplished by washing the equipment with a non-phosphate detergent and distilled water solution followed by a distilled water rinse, subsequent isopropanol rinse, and final distilled water rinse. Additionally, all personnel utilized single-use disposable gloves during temporary monitoring well installation and soil and groundwater sample collection to reduce the potential for cross-contamination.

Laboratory analytical procedures for all sampling events on site were performed by Southern Research Laboratories, Inc. (SRL), Florida Department of Health (FDOH #E83484). SRL is located in Orlando, Florida.



## 2.0 ASSESSMENT ACTIVITIES

Field investigation and sampling activities were conducted on September 28 and 29, and October 3 and 5, 2006 under the direction of Diane Green, Project Scientist with PSI. All soil cuttings generated during the performance of soil borings and temporary monitoring well installations were returned to their respective boreholes. The approximate soil boring and temporary monitoring well locations are provided on Figures 3 through 5.

### 2.1 Soil Lithology Determination

Soil lithology determination was made from soils retrieved from the Geoprobe® drill rig and hand auger soil borings. Soil types were logged on Soil OVA Sample Data sheets (Appendix A). PSI personnel identified soil types at 15 soil boring locations to maximum depths ranging from 11 to 48 feet below land surface (BLS).

### 2.2 Soil and Groundwater Assessment Activities

On September 28, 29, and October 3, 2006, PSI personnel performed soil borings and collected soil samples from the former dry cleaner, former amory/USDA Laboratories and adjacent to the former off-site filling station. Soil borings were performed using stainless steel hand auger and Geoprobe® drill rig methodologies. Soil samples were advanced into the water table and samples were collected at approximate two-foot intervals in each area. Additionally, PSI personnel collected groundwater samples from both temporary monitoring wells and Geoprobe® screen points. A groundwater elevation survey was performed on October 5, 2006.

To determine the presence of organic vapor concentrations within the on-site soils, soil samples were collected and screened in the field using a calibrated OVA-FID or OVA-PID following guidelines for headspace analysis. For assessment of petroleum compounds in soil, glass sample jars were half-filled with soil, covered in aluminum foil, sealed, and set aside to allow the volatiles to equilibrate throughout the headspace. The organic vapor response for each soil sample was determined by inserting the probe of the OVA-FID into the headspace of the sample container and recording the highest sustained reading. Both total organic vapor readings and carbon filter readings were obtained to account for the presence of naturally occurring methane in the on-site soils. The resultant total non-methane hydrocarbon level is calculated by subtracting the carbon-filtered response from the total response. For solvent-related soil assessment, an OVA-PID was used following the same methodology with the exception of filtering methane. Copies of the Soil OVA Sample Data Sheets and Field Equipment Calibration Logs are included as Appendix A.

In general accordance with the FDEP's SOPs for field activities, groundwater samples were collected by first purging a minimum of one calculated well volume of water from the shallow monitoring wells utilizing a peristaltic pump and then purged until three consecutive readings for field parameters demonstrated proper stabilization. For collection of the groundwater samples to be analyzed for volatile compounds, the tubing was removed from the well while still connected to the pump, and the groundwater was fed into laboratory-supplied sample containers by reversing the directional flow of the pump. The groundwater samples collected for semi-volatile analysis were pumped up into the tubing by the peristaltic pump. A sample container with a vacuum lid



was placed in-line between the well and the peristaltic pump, so that the groundwater did not pass through the pump. Groundwater samples collected for metals, pesticides, and TPH analysis were collected from the effluent tubing of the peristaltic pump. Additionally, during the collection of groundwater samples for metals analysis, samples were field-filtered prior to preservation if turbidity values exceeded 20 nephelometric turbidity units (NTUs) to represent dissolved metal concentrations. The field filtering was performed to prevent potential false-positive results due to sediment in the turbid groundwater samples. Groundwater Sampling Logs and Field Calibration Sheets are included in Appendix A.

## 2.2.1 Former Dry Cleaner

### Soil Assessment

On September 28 and 29, 2006, using a Geoprobe® rig, PSI performed seven soil borings (SB-1 through SB-7) at the locations shown on Figure 3. Locations were based upon review of Sanborn® Fire Insurance maps indicating the addresses identified during Phase I ESA activities. Soil samples were screened using the OVA-PID in the manner described previously and, based on the field screening results, Soil Samples SB-3@4', and SB-4@8', and SB-7@4' were collected at depths of 4 feet, 8 feet, and 4 feet BLS for laboratory analysis by EPA Method 8021 for VOHs.

### Groundwater Assessment

Based on field observations and OVA-PID responses, PSI installed Temporary Monitoring Well TMW-5 at the location of Soil Boring SB-6. Temporary Monitoring Well TMW-5 was installed to a depth of approximately 20 feet BLS with a screened interval from 10 to 20 feet BLS. Temporary Monitoring Well TMW-5 was constructed using 10 feet of 1-inch diameter, 0.010-inch factory slotted polyvinyl chloride (PVC) well screen coupled with solid PVC riser. The annular space was filled with 20/30-grade silica sand as a filter pack.

Additionally, using Geoprobe® methodologies, three deep and two shallow groundwater samples were collected from the former Armory/USDA Laboratories area. Groundwater samples were collected at Geoprobe® Points GP-1 through GP-5 using the Geoprobe® Screen Point 15 Groundwater Sampling System. The system consists of a four-foot long 0.5-inch diameter, stainless steel 0.04-inch slotted screen driven inside of a two-inch stainless steel casing. Once the sampling system is advanced to the desired depth, the top pin is released, and the casing is pulled back allowing the screen to be exposed to the native soil and groundwater. Deep Geoprobe® Points GP-1 and GP-3 were advanced to a depth of 48 feet BLS with a screened interval between 44 and 48 feet BLS. Deep Geoprobe® Point GP-2 was advanced to a depth of approximately 44 feet BLS with a screened interval from approximately 40 to 44 feet BLS. In lieu of additional shallow temporary monitoring wells in former dry cleaner area, PSI utilized the screen point sampler due to site lithology inhibiting well installation with the Geoprobe® rig. Shallow Geoprobe® Points GP-4 and GP-5 were advanced to a depth of approximately 18 feet BLS with a screened interval from approximately 14 to 18 feet BLS.

Groundwater samples collected from Temporary Monitoring Well TMW-5 and Geoprobe® Points GP-1 through GP-5 were submitted for laboratory analysis by EPA Method 8021 for



VOHs. The approximate temporary monitoring well and screen point sampling locations are depicted on Figure 3.

## 2.2.2 Former Armory/USDA Laboratories

### Soil Assessment

The two RECs identified in this area include a former UST, which was identified during review of Sanborn® maps, and the historical use of the property as an armory and USDA laboratories. Using hand auger methodologies, PSI performed four soil borings (HA-1 through a HA-4)(Figure 4) proximate to the former oil UST. Soil samples were collected for field screening using an OVA-FID in the manner described in Section 2.2. Based on the field observations and screening results, one soil sample (HA-4@4') was collected from Soil Boring HA-4 at a depth of approximately 4 feet BLS and submitted to the laboratory for analysis by EPA Method 8260 for VOCs, EPA Method 8270 for PNAs, laboratory method FL-PRO for TPH, and the eight RCRA metals.

Additionally, PSI collected five two-point composite soil samples (CS-1 through CS-5, see Figure 4), from various areas of the former Armory/USDA laboratories site suspected to be the areas of greatest likelihood of impact (i.e., likely storage areas). The composite samples were collected from a depth of 1 to 2 feet BLS at each location and were submitted for laboratory analysis by EPA Method 8081 for organochlorine pesticides, EPA Method 8141 for organophosphorus pesticides, EPA Method 8151 for chlorophenoxy pesticides, and the eight RCRA metals.

### Groundwater Assessment

On September 28 and 29, 2006, PSI installed Temporary Monitoring Wells TMW-1 through TMW-4 at the locations shown on Figure 4. Temporary Monitoring Wells TMW-1 through TMW-3 were installed to an approximate depth of 18 feet BLS. Temporary Monitoring Well TMW-4 was installed to a depth of approximately 14 feet BLS adjacent to the former UST location. Each temporary monitoring well was constructed of 10 feet of 1-inch diameter, 0.010-inch factory slotted PVC well screen coupled with solid PVC riser. The temporary monitoring wells were installed to a depth at which the well screen intersected the groundwater table surface.

Groundwater samples collected from Temporary Monitoring Wells TMW-1 through TMW-4 were submitted for laboratory analysis by EPA Method 8081 for organochlorine pesticides, EPA Method 8141 for organophosphorus pesticides, EPA Method 8151 for chlorophenoxy pesticides, and the eight RCRA metals. The groundwater sample collected from Temporary Monitoring Well TMW-4 was submitted for laboratory analysis by EPA Method 8260 for VOCs, EPA method 8270 for PAHs, laboratory method FL-PRO for TPH, and eight RCRA metals.



### 2.2.3 Former Off-Site Filling Station

#### Soil Assessment

On October 3, 2006, using a drill rig equipped with solid stem augers, PSI performed Soil Borings SB-8 through SB-11 along the south side of West Amelia Avenue (Figure 5). Soil samples were collected for field screening using an OVA-FID in the manner previously discussed.

#### Groundwater Assessment

Using Geoprobe® methodologies, PSI installed one shallow temporary monitoring well (TMW-6) at the location of Soil Boring SB-8, closest to the former filling station. A groundwater sample was collected from Temporary Monitoring Well TMW-6 and submitted for laboratory analysis by EPA Method 8260 for VOCs, EPA Method 8310/8270 for PAHs, and laboratory method FL-PRO for TPH.



### 3.0 DATA ANALYSIS AND INTERPRETATION

Analysis and interpretation of the data generated during the field investigation and laboratory analyses is presented in the following sections. Where appropriate, the results are compared with regulatory limits for the chemicals and compounds identified in the applicable media. A copy of the laboratory analytical reports and chain of custody documentation is provided in Appendix B.

#### 3.1 Physical Characteristics of the Assessment Area

##### Regional Topography

According to the 1956 (photo revised 1980 and 1995) USGS "ORLANDO WEST, FLA." quadrangle map (Figure 1), the property is located approximately 105 to 110 feet above mean sea level. The contour lines in the area of the property indicate the site vicinity is relatively flat. Lake Dot is located approximately 600 feet north of the northeast corner of the subject property. The entire property is shaded pink on the map indicating an urban setting.

Based upon review of the USGS topographic map, the anticipated regional groundwater flow in the vicinity of the subject property is towards the northeast. Actual groundwater flow may be locally influenced by seasonal rainfall, proximity to surface bodies of water (lakes, rivers, canals), surface topography, underground structures, soil and bedrock geology, production wells and other factors.

##### Regional Soils

Review of the "Soil Survey of Orange County, Florida" publication developed by the USDA Soil Conservation Service (SCS), in cooperation with the University of Florida, issued August 1989, indicates that the soils in the area where the subject property is located are Millhopper-Urban land complex in the northern section of the property and Ona fine sand in the central and south sections of the property.

Millhopper-Urban land complex consists of 53 percent Millhopper soil that is nearly level to gently sloping and moderately well drained. Slopes range from 0 to 5 percent. Permeability is rapid in the surface and subsurface layers, and slow to moderate in the subsoil. The available water capacity is low in the surface and subsurface layers and low to medium in the subsoil.

Ona fine sand is nearly level and poorly drained with smooth slopes that range from 0 to 2 percent. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is medium in the surface layer and subsoil and low in the substratum.

##### Regional Hydrogeology

Based upon review of the Florida Geological Survey Report of Investigations No. 50 (Groundwater Resources of Orange County, Florida), groundwater occurs within two aquifer systems within the site vicinity including the surficial aquifer and the Floridan aquifer.



Groundwater is obtained in Orange County from a nonartesian aquifer composed of clastic materials of late Miocene to Recent age, several discontinuous shallow artesian aquifers in the Hawthorn Group of middle Miocene age, and the Floridan aquifer composed of limestone of Eocene age. Water levels of the surficial Floridan aquifer range from about 15 feet to 60 feet below the land surface. The quality of the groundwater in Orange County ranges from moderately hard in the western and central areas to saline in the extreme eastern part of the County.

Based upon review of the USGS topographic map, the anticipated regional groundwater flow in the vicinity of the subject property is to the north, towards Lake Dot, which is located approximately 150 feet north of the subject property. Actual groundwater flow may be locally influenced by seasonal rainfall, proximity to surface bodies of water (lakes, rivers, canals), surface topography, underground structures, soil and bedrock geology, production wells and other factors beyond the scope of this study. Investigations that have previously been conducted in conjunction with the Former Greyhound Bus facility and off-site MGP indicate that groundwater flow direction on the subject property is generally to the north and northeast.

### **3.2 Soil Lithology**

Soil lithology was recorded at each soil boring from land surface to the termination depth of the borehole (Appendix A). Through subsurface investigation, soil lithology beneath the site was found to primarily consist of white, orange, and brown fine-grained sands throughout the assessment area. Some localized areas with clayey sand and sandy clay were encountered, but were not found consistently in the assessment area.

### **3.3 Groundwater Elevation Survey**

On October 5, 2006, PSI personnel surveyed the top of casing (TOC) elevations and measured depth to groundwater to the nearest one-hundredth of a foot at Temporary Monitoring Wells TMW-1 through TMW-3 to determine relative groundwater elevations at each location. Groundwater elevation survey data indicates that groundwater flow direction in assessment area is to the northeast (Figure 6), which is toward the Lake Dot and is generally consistent with topographical data. A groundwater elevation data summary is provided as Table 1.

### **3.4 Soil and Groundwater Assessment Results**

#### **3.4.1 Former Dry Cleaner**

##### Soil Assessment Results

The field screening of vadose (unsaturated) zone soil samples collected from Soil Borings SB-1 through SB-7 indicated OVA-PID responses ranging from approximately 0 parts per million (ppm) to a maximum of 3.8 ppm from a soil sample collected from Soil Boring SB-4 at a depth of 8 feet BLS. Based on the OVA-PID results, PSI collected three soil samples for laboratory analysis including Soil Samples SB-3@4', SB-4@8', and SB-7@4'. The recorded OVA-PID responses for Soil Borings SB-3 at a depth of 4 feet BLS, SB-4 at a depth of 8 feet BLS, and SB-7 at a depth of 4 feet BLS was 0.4 ppm, 3.8 ppm, and 0.5 ppm, respectively.



Laboratory analytical results for Soil Samples SB-3@4', SB-4@8', and SB-7@4' indicate that none of the tested parameters were detected at concentrations above their respective laboratory method detection limits (LMDLs). A soil analytical data summary (detected parameters only) has been provided as Table 2.

### Groundwater Assessment Results

PSI installed Temporary Monitoring Well TMW-5 at the location of Soil Boring SB-6 and collected groundwater samples using Geoprobe® groundwater sampling methodologies from Geoprobe® Points GP-1 through GP-5. With the exception of chloroform, which was reported at concentrations of 0.8 micrograms per liter ( $\mu\text{g/L}$ ) and 7  $\mu\text{g/L}$  from groundwater samples collected from Geoprobe Point GP-2 and GP-4, respectively, no compounds exceeded their respective LMDLs. The concentrations of chloroform do not exceed its Chapter 62-777, FAC Groundwater Cleanup Target Level (GCTL). A groundwater analytical data summary (detected parameters only) has been included as Table 3.

### **3.4.2 Former Armory/USDA Laboratories**

#### Soil Assessment Results

Visual inspection of soil samples showed no staining and soil screening results of samples collected in the vicinity of the former oil UST indicated that OVA-FID responses of all samples collected from Soil Borings HA-1 through HA-4 were less than 1 ppm. Laboratory analytical results of Soil Sample HA-4@4' identified the following parameters which exceed their respective LMDLs:

- Arsenic – 4.02 milligrams per kilogram (mg/kg)
- Barium – 44.8 mg/kg
- Chromium – 5.51 mg/kg
- Lead – 4.50 mg/kg
- Naphthalene – 0.89 mg/kg
- Acenaphthene – 0.14 mg/kg
- Fluorene – 1.0 mg/kg
- Pyrene – 0.86 mg/kg
- Benzo(a)anthracene – 0.18 mg/kg
- Chrysene – 0.23 mg/kg
- Benzo(b)fluoranthene – 0.39 mg/kg
- Benzo(k)fluoranthene – 0.14 mg/kg
- Benzo(a)pyrene – 0.50 mg/kg
- TPH – 11.2 mg/kg

Of the above exceedances, arsenic and benzo(a)pyrene exceed their respective Chapter 62-777, Florida Administrative Code (FAC) Direct Exposure Residential (DE-I) Soil Cleanup Target Levels (SCTLs) of 2.1 mg/kg and 0.1 mg/kg. Since benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, and indeno (1,2,3-cd)pyrene were present in Soil Sample HA-4@4', a calculation converting these test parameters and their respective concentrations to Total Benzo(a)pyrene Equivalent value was



performed. The calculation and conversion is included on Table 4 and indicates that the concentration after conversion of 0.6 mg/kg exceeds the Chapter 62-777, FAC DE-I SCTL of 0.1 mg/kg.

In addition to the soil samples collected from the oil UST area, PSI collected 5 Composite Soil Samples CS-1 through CS-5 for laboratory analysis. The following test parameters were detected above their respective LMDLs:

**CS-1**

- Arsenic – 51.4 mg/kg
- Barium – 14.4 mg/kg
- Chromium – 2.37 mg/kg
- Lead – 2.44 mg/kg

**CS-2**

- Arsenic – 144 mg/kg
- Barium – 27.6 mg/kg
- Chromium – 2.44 mg/kg
- Lead – 5.61 mg/kg
- Mercury – 0.040 mg/kg

**CS-3**

- Barium – 11.3 mg/kg
- Chromium – 1.55 mg/kg
- Lead – 1.38 mg/kg

**CS-4**

- Arsenic – 1.55 mg/kg
- Barium – 24.1 mg/kg
- Chromium – 1.96 mg/kg
- Lead – 6.72 mg/kg
- Mercury – 0.022 mg/kg

**CS-5**

- 4,4-DDE – 2.7 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ )
- 4,4-DDT – 3.2  $\mu\text{g}/\text{kg}$
- Arsenic – 1.20 mg/kg
- Barium – 39.8 mg/kg
- Chromium – 3.28 mg/kg
- Lead – 17.3 mg/kg
- Mercury – 0.060 mg/kg

Of the detected parameters, arsenic concentrations exceed the Chapter 62-777, FAC DE-I SCTL of 2.1 mg/kg in Composite Soil Samples CS-1 and CS-2.

A soil analytical data summary (detected parameters only) has been provided as Table 2.



### Groundwater Assessment Results

Laboratory analytical results of groundwater samples collected from Temporary Monitoring Wells TMW-1 through TMW-4 reveal the following test parameters, which exceed their respective LMDLs.

#### TMW-1

- Dieldrin – 0.234  $\mu\text{g/L}$
- Barium – 0.038 milligrams per Liter
- Chromium – 0.009 mg/L
- Lead – 0.008 mg/L
- Mercury – 0.0002 mg/L
- Silver – 0.003 mg/L

#### TMW-2

- Barium – 0.057 mg/L
- Chromium – 0.015 mg/L
- Lead – 0.008 mg/L
- Silver – 0.003 mg/L

#### TMW-3

- Barium – 0.052 mg/L
- Chromium – 0.010 mg/L
- Lead – 0.007 mg/L
- Silver – 0.003 mg/L

#### TMW-4

- Barium – 0.004 mg/L
- Lead – 0.007 mg/L
- Silver – 0.003 mg/L

Of the above-listed test parameters, dieldrin from the sample collected from Temporary Monitoring Well TMW-1 exceeds the Chapter 62-777, FAC GCTL of 0.002  $\mu\text{g/L}$  and Natural Attenuation Default Concentration (NADC) of 0.2  $\mu\text{g/L}$ .

A groundwater analytical data summary (detected parameters only) has been included as Table 3.

### **3.4.3 Former Off-Site Filling Stations**

#### Soil Assessment Results

Using the OVA-FID, the field screening of vadose smear zone soil samples collected from Soil Borings SB-8, SB-9, SB-10, and SB-11 indicated an OVA-FID response of less than one ppm for each sample.



### Groundwater Assessment Results

The laboratory analytical results for the groundwater sample collected from Temporary Monitoring Well TMW-6 identified chloroform at a concentration of 1.0  $\mu\text{g/L}$ , which does not exceed its Chapter 62-777, FAC GCTL of 70  $\mu\text{g/L}$ . No other test parameters were detected at concentrations exceeding their respective LMDLs. A groundwater analytical data summary (detected parameters only) has been included as Table 3.



## 4.0 CONCLUSIONS AND RECOMMENDATIONS

PSI has performed a Phase II ESA at the subject site in compliance with PSI Proposal No. (PSI Proposal No. PO-663-6G0116) between the City of Orlando and PSI. Based on the results of this assessment, the following conclusions and recommendations have been developed.

### 4.1 Conclusions

Based on the results of this Phase II ESA, PSI concludes the following:

- Soil and groundwater in the vicinity of the former dry cleaner (Figure 3) does not appear to be impacted by solvent-related constituents at concentrations exceeding their respective Chapter 62-777, FAC, criteria.
- Soil and groundwater in the vicinity of the former Armory/USDA laboratories site (Figure 4) has been impacted by arsenic, benzo(a)pyrene, and/or dieldrin at concentrations exceeding state criteria. The soil sample collected from the former oil UST area had arsenic and benzo(a)pyrene concentrations exceeding their respective Chapter 62-777, FAC DE-I SCTLs. Composite Soil Samples CS-1 and CS-2, which were collected north of the main buildings and adjacent to the shed structures, indicated arsenic concentrations exceeding its Chapter 62-777, FAC DE-I and DE-II SCTLs.

The groundwater sample collected from Temporary Monitoring Well TMW-1 located in the former Armory/USDA laboratories site adjacent to the shed structures, had a dieldrin concentration exceeding its Chapter 62-777, FAC GCTL and NADC.

- Soil and groundwater in the vicinity of the former off-site filling station (Figure 5) near West Amelia and North Parramore Avenue do not appear to be impacted by petroleum and/or solvent-related constituents at concentrations exceeding their respective Chapter 62-777, FAC, criteria.
- In the vicinity of the former Armory/USDA laboratories, groundwater was determined to flow to the northeast towards Lake Dot. Based on PSI's review of historical data collected by others, groundwater flow in the area of this investigation is consistent with PSI's findings.

### 4.2 Recommendations

Based on the results of these assessment activities and the conclusions presented above, PSI recommends the following:

- Based on the findings of this Phase II ESA, PSI recommends further soil and groundwater assessment in the former Armory/USDA Laboratories area to determine the extents both vertically and horizontally of petroleum-related compounds, metals, and pesticides in soil and groundwater beneath the site. Specifically, assessment should be performed to address the arsenic and benzo(a)pyrene concentrations in soils at the former oil UST and arsenic in the area surrounding Composite Soil Samples CS-1 and



CS-2. Soil and groundwater quality should be further assessed to address dieldrin concentrations identified in the vicinity of Temporary Monitoring Well TMW-1.

- No additional assessment is recommended at the former dry cleaner and former off-site filling station areas.
- PSI recommends that the client contact legal counsel to discuss the liabilities associated with the purchase and ownership of an impacted property.



## 5.0 REPRESENTATIONS

### 5.1 Warranty

The field observations, measurements, and research reported herein are considered sufficient in detail and scope to form a reasonable basis for a Phase II ESA of this property. The assessment, conclusions, and recommendations presented herein are based upon the subjective evaluation of limited data. They may not represent all conditions at the subject site as they reflect the information gathered from specific locations. PSI warrants that the findings and conclusions contained herein have been promulgated in accordance with generally accepted environmental investigation methodologies and only for the site described in this report.

The Phase II ESA has been developed to provide the client with information regarding degree of impact (not delineation) relating to the subject property. It is necessarily limited to the conditions observed and to the information available at the time of the work.

Due to the limited nature of the work, there is a possibility that there may exist conditions which could not be identified within the scope of the assessment or which were not apparent at the time of report preparation. It is also possible that the testing methods employed at the time of the report may later be superseded by other methods. The description, type, and composition of what are commonly referred to as "hazardous materials or conditions" can also change over time. PSI does not accept responsibility for changes in the state of the art, nor for changes in the scope of various lists of hazardous materials or conditions. PSI believes that the findings and conclusions provided in this report are reasonable. However, no other warranties are implied or expressed.

As directed by the client, PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

### 5.2 Use By Third Parties

This report was prepared pursuant to PSI and the City of Orlando. Because of the importance of the communication between PSI and its client, reliance or any use of this report by anyone other than the City of Orlando for whom it was prepared, is prohibited and therefore not foreseeable to PSI.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third party beneficiary to PSI's agreement with the City of Orlando contract. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.



## TABLES

**TABLE 1                      GROUNDWATER ELEVATION DATA SUMMARY**

**PROJECT:**                      **CENTROPLEX SITE**  
**LOCATION:**                      **600 AMELIA AVENUE, ORLANDO, ORANGE COUNTY, FLORIDA**  
**PSI PROJECT #:**                **663-6G060**

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October 5, 2006				
WELL NUMBER	TOC ELEVATION (REL)	DEPTH TO FLUID (BTOC)	FREE PRODUCT THICKNESS	GROUNDWATER ELEVATION (REL)
TMW-1	100.00	13.93	0.00	86.07
TMW-2	99.97	13.61	0.00	86.36
TMW-3	99.05	12.35	0.00	86.70

**NOTES:**

1. TOC = Top of Casing.
2. REL = TOC elevations are relative to each other, measured from a common point.
3. BTOC = Below Top of Casing.
4. TOC elevations for Temporary Monitoring Wells TMW-1 through TMW-3 were surveyed by PSI personnel on October 5, 2006.
5. All measurements are in feet.



TABLE 3

## GROUNDWATER ANALYTICAL DATA SUMMARY (Detected Parameters Only)

PROJECT: CENTROPLEX SITE  
 LOCATION: 600 AMELIA AVENUE, ORLANDO, ORANGE COUNTY, FLORIDA  
 PSI PROJECT #: 663-6G060

Sample Identification	Sample Date	REC Area	Detected Parameters							
			Chloroform (µg/L)	Dieldrin (µg/L)	Barium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Silver (mg/L)	
TMW-1	09/28/06	Former Armory/USDA	NS	0.234	0.038	0.009	0.008	0.0002	0.003 (I)	
TMW-2	09/28/06	Former Armory/USDA	NS	<0.02	0.057	0.015	0.008	<0.005	0.003 (I)	
TMW-3	09/28/06	Former Armory/USDA	NS	<0.02	0.052	0.010	0.007	<0.005	0.003 (I)	
TMW-4	09/28/06	Former UST	<1	NS	0.004	<0.005	0.007	<0.005	0.003	
TMW-5	10/03/06	Dry Cleaner	<1	NS	NS	NS	NS	NS	NS	
TMW-6	10/03/06	Off-site Gas Station	1	NS	NS	NS	NS	NS	NS	
GP-1	09/28/06	Dry Cleaner	<1	NS	NS	NS	NS	NS	NS	
GP-2	09/29/06	Dry Cleaner	0.8 (I)	NS	NS	NS	NS	NS	NS	
GP-3	09/29/06	Dry Cleaner	<1	NS	NS	NS	NS	NS	NS	
GP-4	09/29/06	Dry Cleaner	7	NS	NS	NS	NS	NS	NS	
GP-5	09/29/06	Dry Cleaner	<1	NS	NS	NS	NS	NS	NS	
Chapter 62-777, FAC GCTLs			70	0.002	2	0.1	0.015	0.002	0.1	
Chapter 62-777, FAC NADCS			700	0.2	20	1	0.15	0.02	1	

## Notes:

1. µg/L = Micrograms per liter or parts per billion (ppb).
  2. mg/L = Milligrams per liter or parts per million (ppm).
  3. NS = Test parameter was not sampled.
  4. I = Result is between the Method Detection Limit (MDL) and Practical Quantification Limit (PQL).
  5. < = Test parameter not detected above the MDL.
  6. FAC = Florida Administrative Code.
  7. GCTLs = Groundwater Cleanup Target Levels.
  8. NADCS = Natural Attenuation Default Concentrations.
- Bolded values represent concentrations detected above their respective Chapter 62-777, FAC criteria.**

**TABLE 4**                      **Benzo(a)pyrene Conversion Table**

**SITE NAME:**                      Centroplex Site  
**ADDRESS:**                        600 Amelia Avenue  
**CITY/COUNTY:**                  Orlando/Orange  
**STATE:**                              Florida  
**PSI PROJECT NO.:**              663-6G060  
**SAMPLE ID:**                       HA-4@4'  
**DEPTH (FEET):**                    4

**INSTRUCTIONS:** Calculate Total Benzo(a)pyrene Equivalents only if at least one of the carcinogenic PAHs is detected in the sample at a concentration equal to or higher than the Method Detection Limit (MDL), whether quantified with certainty (the concentration reported has no qualifier) or estimated (the concentration reported has a "J" or "M" qualifier). Enter the contaminant concentrations (in mg/kg) for all seven carcinogenic PAHs in the yellow boxes using the following criteria: if quantified with certainty enter the reported value; if not detected at the MDL (the concentration reported is the MDL followed by the "U" qualifier) enter 1/2 of the reported value; if detected at a concentration lower than the MDL and the concentration is estimated (has the "T" qualifier) enter the estimated value; if detected at a concentration equal to or higher than the MDL but lower than the Practical Quantitation Limit (PQL) and the concentration is estimated (has the "I" qualifier) enter the estimated value; if detected at a concentration equal to or higher than the MDL but lower than the PQL and it is not estimated (the concentration reported is the PQL followed by the "M" qualifier) enter 1/2 of the reported value.

Contaminant	Concentration (mg/kg)	Toxic Equivalency Factor	Benzo(a)pyrene Equivalents
Benzo(a)pyrene	0.50	1.0	0.500
Benzo(a)anthracene	0.18	0.1	0.018
Benzo(b)fluoranthene	0.39	0.1	0.039
Benzo(k)fluoranthene	0.14	0.01	0.001
Chrysene	0.23	0.001	0.000
Dibenz(a,h)anthracene	0.001	1.0	0.001
Indeno(1,2,3-cd)pyrene	0.001	0.1	0.00010

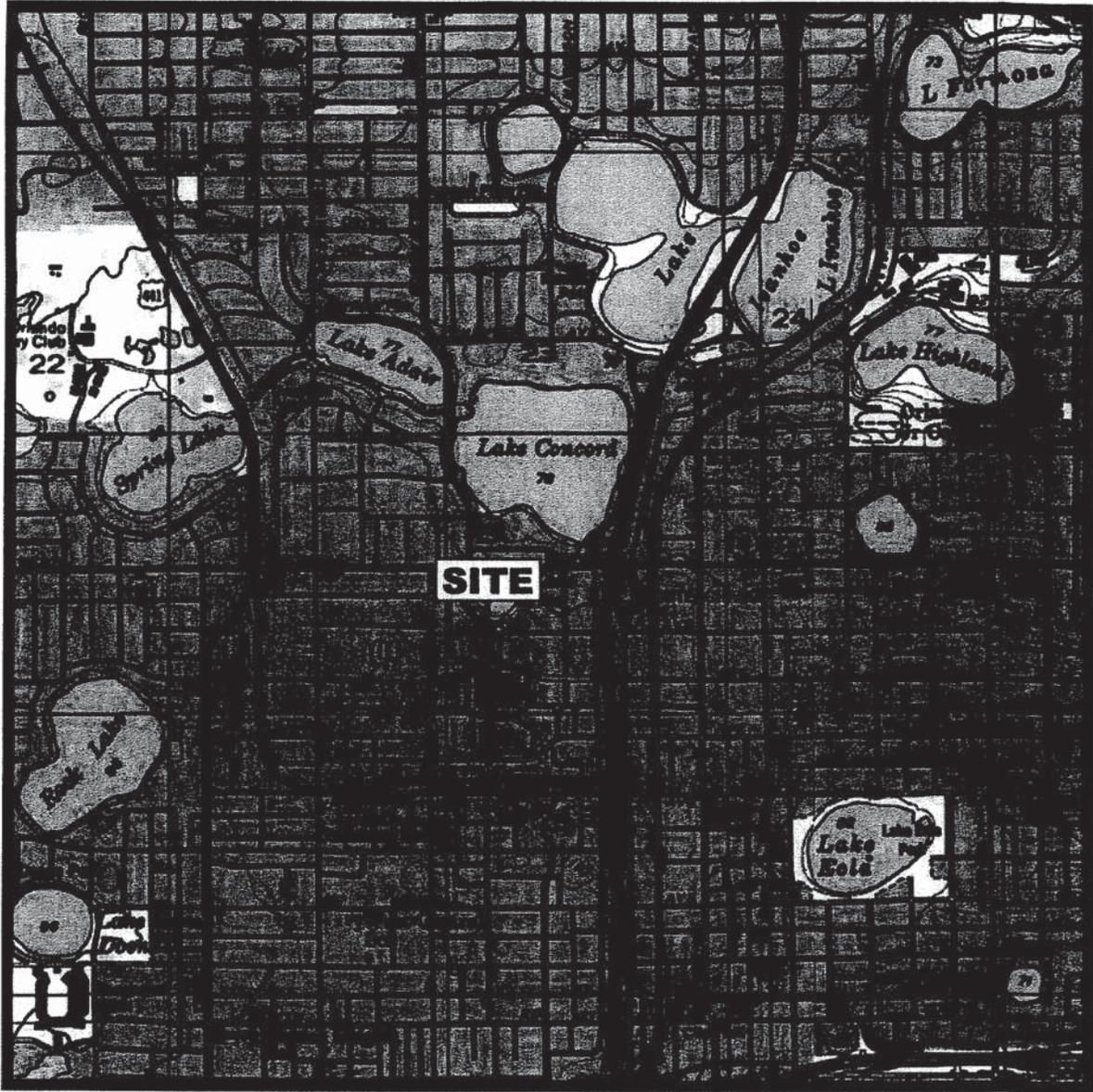
DE Residential SCTL = 0.1 mg/kg; Total Benzo(a)pyrene Equivalents = 0.6

**The concentration shown EXCEEDS the Direct Exposure Residential SCTL!**

## FIGURES

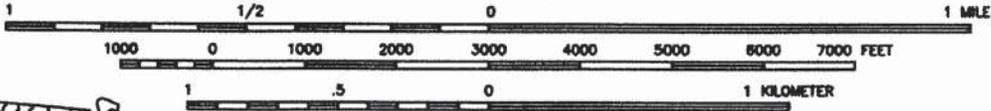
APPROXIMATE SITE LOCATION

NORTH



NOTE: THIS MAP TAKEN FROM USGS QUADRANGLE MAP

SCALE 1:24000



ORANGE COUNTY

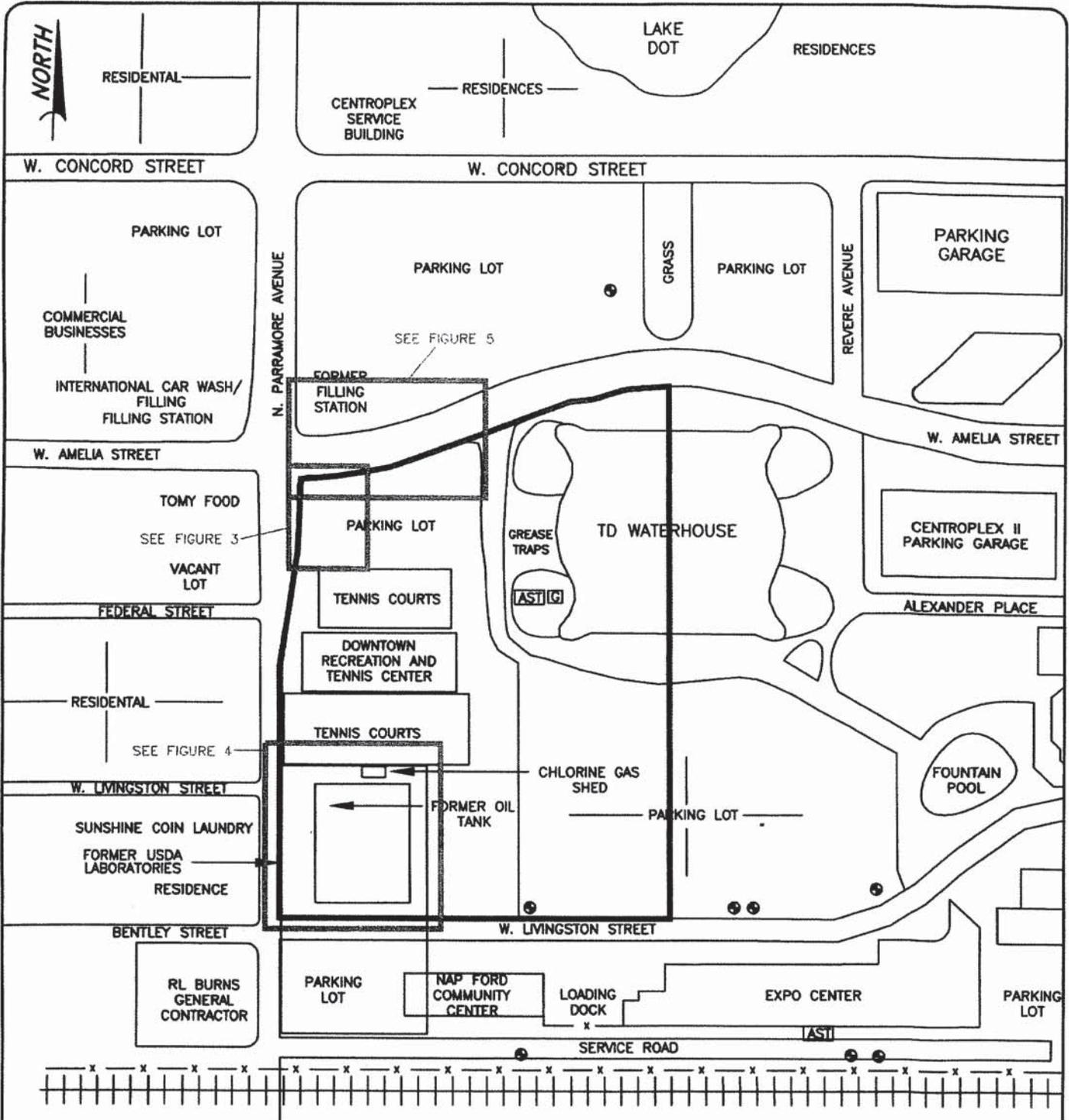
CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MAP NAME: "ORLANDO WEST, FL"  
DATE: 1995  
TOWNSHIP: 22 SOUTH  
RANGE: 29 EAST  
SECTION: 26

6638G060 Fl.dwg



USGS VICINITY MAP  
CENTROPLEX SITE  
ORLANDO, ORANGE COUNTY, FLORIDA



**LEGEND**

- PROJECT BOUNDARY
- EXISTING MONITORING WELL
- AST ABOVE GROUND STORAGE TANK
- RAILROAD TRACKS
- FENCE
- NOTE: HISTORIC FACILITIES AND LOCATIONS DISPLAYED IN BLUE LETTERING



**SITE MAP**  
CENTROPLEX SITE  
ORLANDO, ORANGE COUNTY, FLORIDA

6636G060 F2.dwg

CHKD. BY: DG	DRAWN BY: CMF	DATE: 10/23/06	SCALE: NOTED	REVISION:	PROJECT NO.: 663-6G060	FIGURE NO.: 2
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SIDEWALK

GP-3  
(DEEP)



TRAILERS



TREE

SB-2

SB-3/SB-3@4'/GP-2/GP-5  
(DEEP)(SHALLOW)

SB-1/GP-1/GP-4  
(DEEP)(SHALLOW)



SB-7/SB-7@4'

TRAILER

SB-4/SB-4@8'

TMW-5/SB-6

DRUMS & DEBRIS

SB-5

DUMPSTER  
AREA



TRAILER

PARRAMORE AVENUE

(81' TO MEDIAN OF  
OF PARRAMORE FROM  
FENCE LINE)

EQUIPMENT STORAGE

**LEGEND**

- APPROXIMATE SOIL BORING LOCATION
- ⊙ APPROXIMATE GEOPROBE SAMPLING LOCATION
- ⊕ APPROXIMATE TEMPORARY MONITORING WELL LOCATION
- ⊠ APPROXIMATE SOIL SAMPLE LOCATION
- x — FENCE
- ⊠ CABLE UTILITY BOXES



6636060 F3.dwg

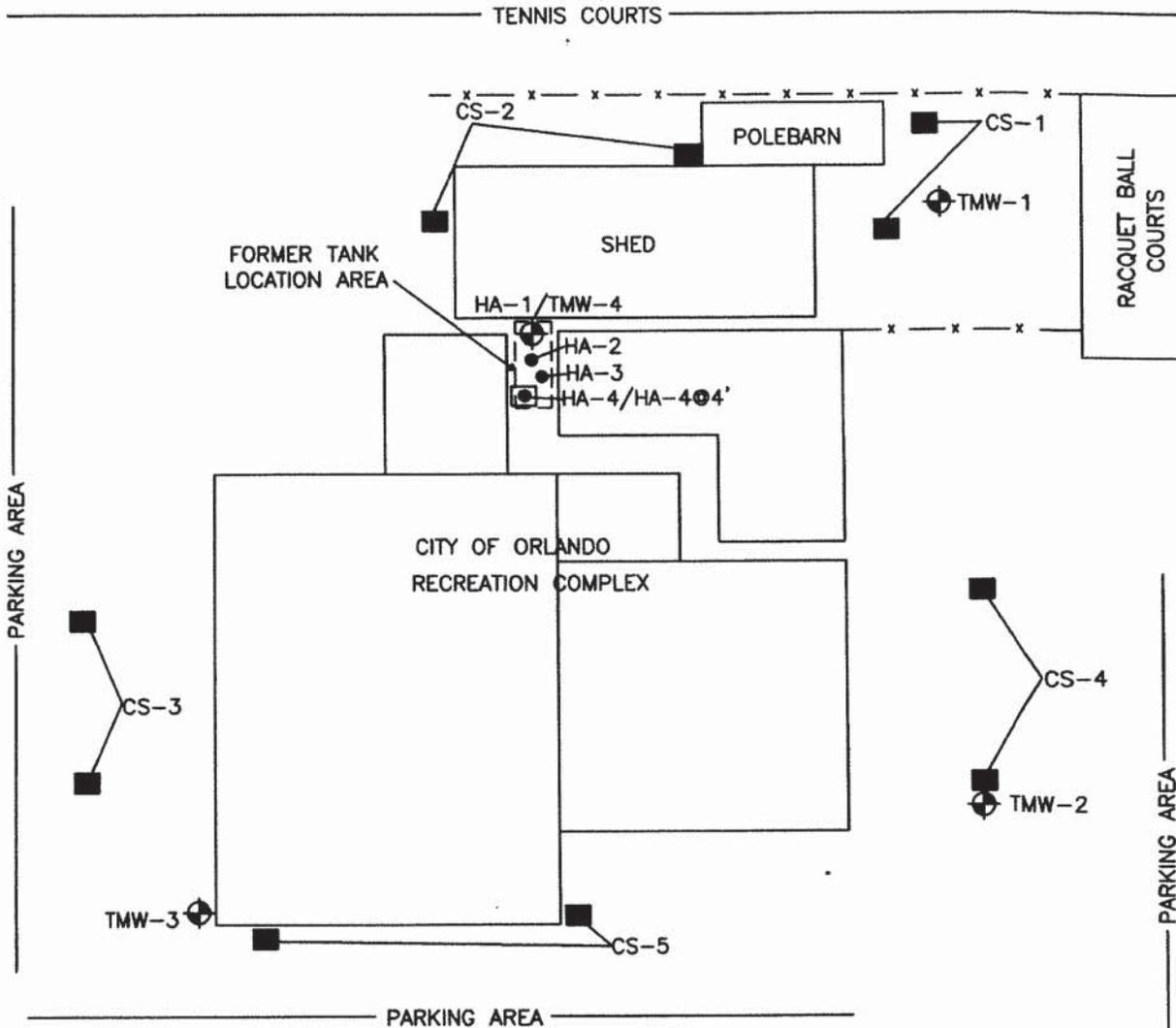


**SAMPLING LOCATIONS MAP (FORMER DRY CLEANER)**  
**CENTROPLEX SITE**  
 ORLANDO, ORANGE COUNTY, FLORIDA

CHKD. BY: DG	DRAWN BY: CMF	DATE: 10/22/06	SCALE: NOTED	REVISION:	PROJECT NO.: 663-6G060	FIGURE NO.: 3
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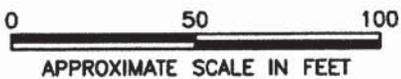
N. PARRAMORE AVENUE



W. LIVINGSTON STREET

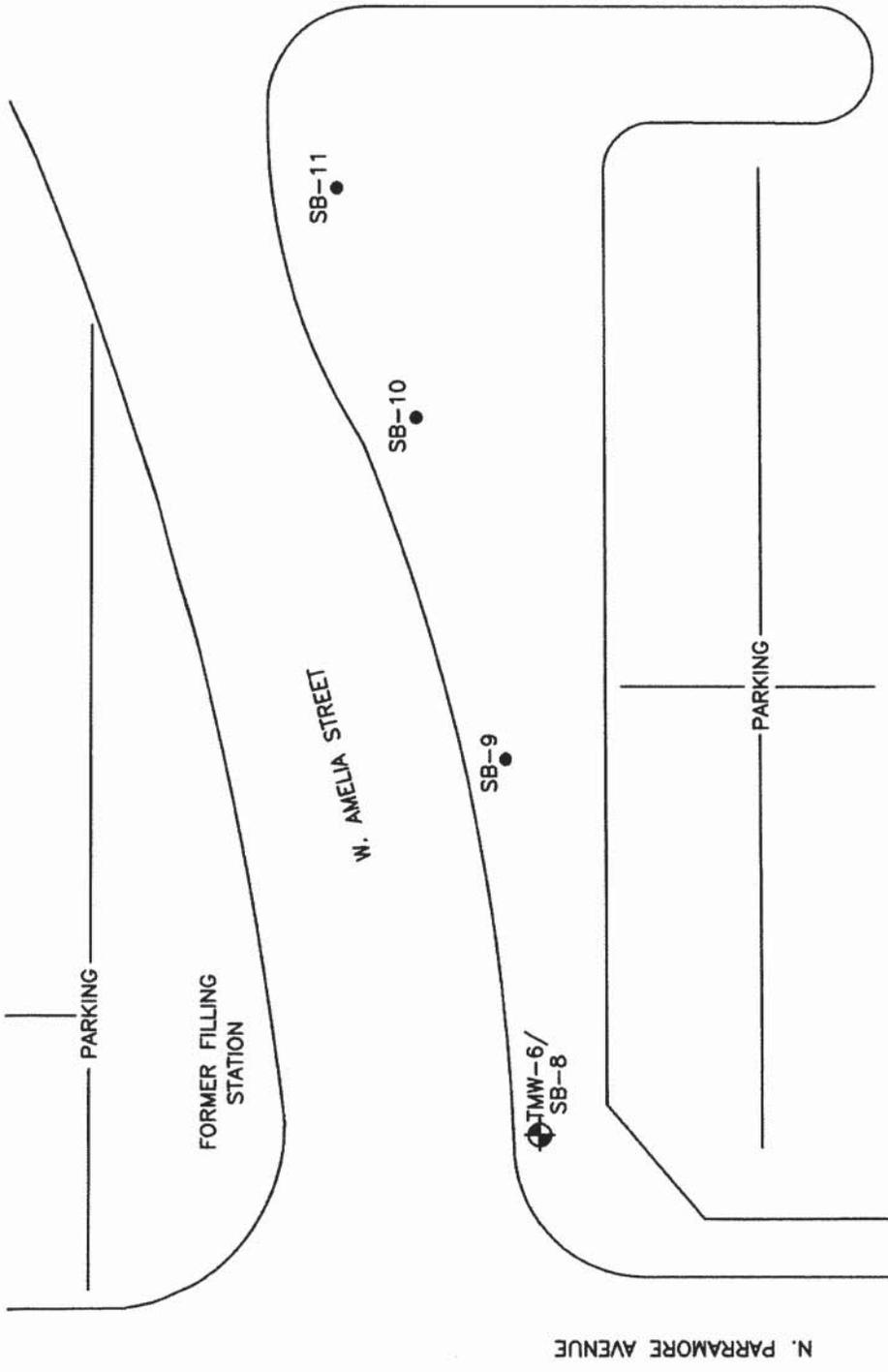
**LEGEND**

- APPROXIMATE SOIL BORING LOCATION
- ⊕ APPROXIMATE TEMPORARY MONITORING WELL LOCATION
- ⊙ APPROXIMATE SOIL SAMPLE LOCATION
- APPROXIMATE COMPOSITE SOIL SAMPLE LOCATION
- x - FENCE

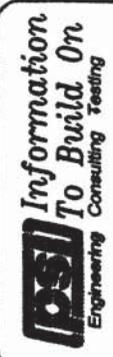


**SAMPLING LOCATIONS MAP (FORMER ARMORY/USDA LABORATORIES)**  
 CENTROPLEX SITE  
 ORLANDO, ORANGE COUNTY, FLORIDA

66.36G060 F4.dwg



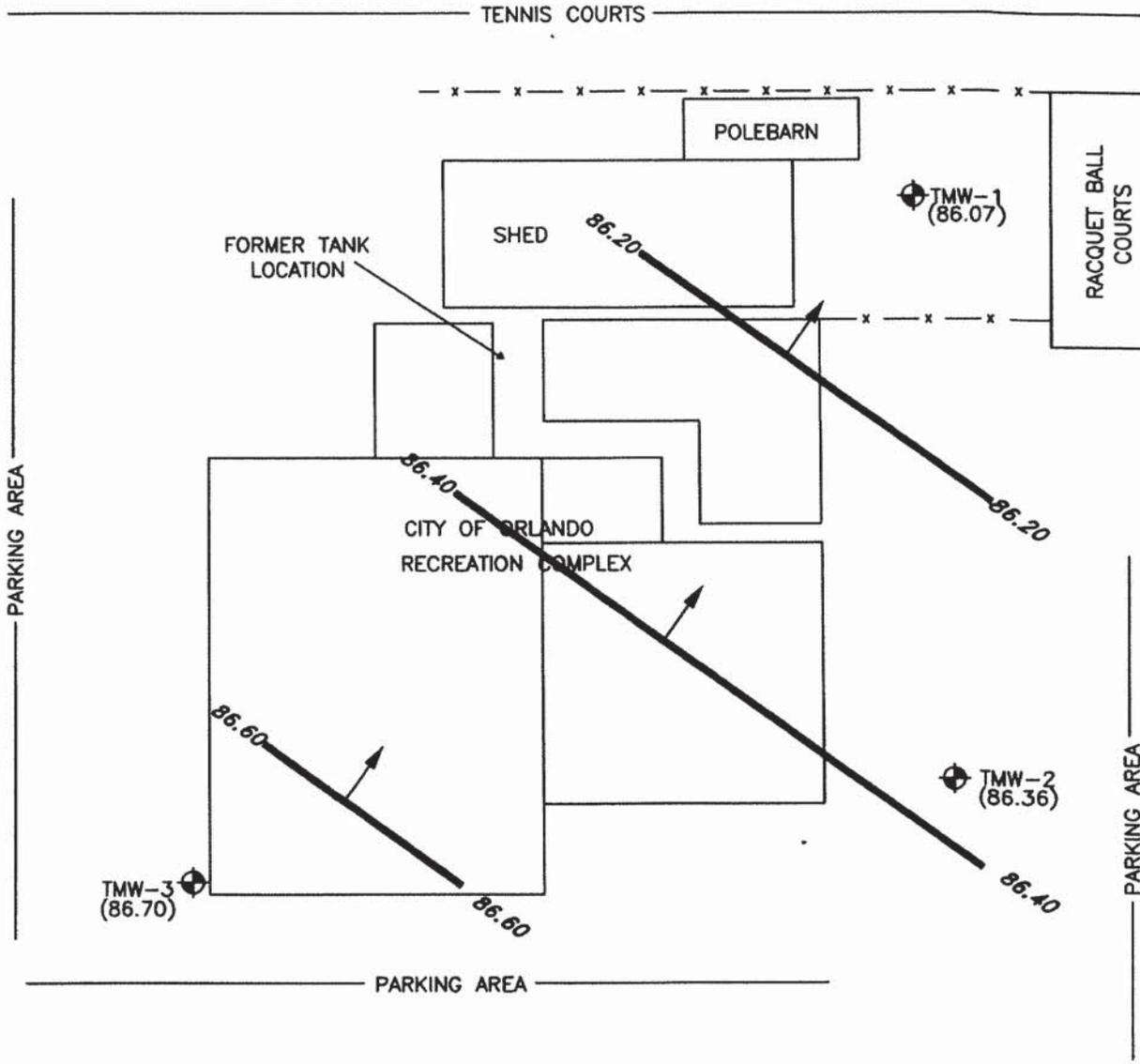
- APPROXIMATE SOIL BORING LOCATION
- ⊕ APPROXIMATE TEMPORARY MONITORING WELL LOCATION



SAMPLING LOCATIONS MAP (FORMER OFF-SITE FILLING STATION)  
 CENTROPLEX SITE  
 ORLANDO, ORANGE COUNTY, FLORIDA



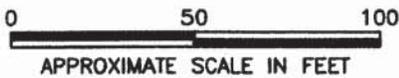
N. PARRAMORE AVENUE



W. LIVINGSTON STREET

**LEGEND**

- APPROXIMATE TEMPORARY MONITORING WELL LOCATION
- FENCE
- (86.07) APPROXIMATE GROUNDWATER ELEVATION IN FEET
- APPROXIMATE LINE OF EQUAL GROUNDWATER ELEVATION IN FEET CONTOUR INTERVAL: 0.20 FEET
- GROUNDWATER FLOW DIRECTION



**GROUNDWATER ELEVATION CONTOUR MAP (10/05/06)**  
 CENTROPLEX SITE  
 ORLANDO, ORANGE COUNTY, FLORIDA

6636G060 F6.dwg

## **ATTACHMENT E**

### **Scope of Work**

## **Attachment E** **Scope of Work**

Environmental Consulting & Technology, Inc. (ECT), will undertake the following tasks supplemental site assessment (SSA) activities at the Orlando Recreation Complex and Tennis Centre, 649 Bentley Street, Orlando, Florida 32801 (Site), funded under EPA Cooperative Agreement No. BF-95498212.

### **Background**

ECT performed Phase II Environmental Site Assessment (ESA) activities at the Site on various dates throughout 2014. A Phase II ESA Report was completed in August 2014, and reviewed by the FDEP Central District in March 2015. Comments related to this review by the FDEP are previously addressed within this document. The Soil Cleanup Target Level – Direct Exposure Residential (SCTL-DER) criteria was exceeded for arsenic at various locations throughout the Site. Four of these areas will be addressed with SSA activities. Areas within the tennis courts will not be addressed at this time. The surface cover of the clay/asphalt tennis courts currently provides sufficient direct exposure protection to the subsurface soils. If future redevelopment activities move or remove the tennis courts, the soils in this area will be addressed.

Petroleum impacts associated with the former underground storage tank (UST) were below SCTL-DER and groundwater cleanup target levels (GCTLs), therefore no additional Phase II activities are planned for this area.

### **Scope of Work**

The scope of work proposed for the supplemental Phase II ESA activities will be to expand the analytical data set by collecting and analyzing additional soil samples in order to better define the horizontal and vertical extent of arsenic in the soil Refer to **Figure 14** for the proposed soil sampling locations. Spatial limitations may prohibit the performance of certain soil borings. If this occurs, documentation of such limitations will be provided in the Supplemental Phase II ESA report.

ECT proposes to complete 17 soil borings (SBs) to assist in the delineation of the arsenic-impacted soils. The 17 SBs will be completed to a depth no greater than seven feet below land surface (7 ft bls). The 0-1' soil horizon (asphalt/concrete/soil/mulch) will not be sampled. One composite soil sample will be obtained from a depth of 1-3 ft bls and analyzed according to EPA Method 6010C for arsenic. One composite soil sample will also be obtained from a depth of 3-5 ft bls and analyzed according to EPA Method 6010C if the soil sample from 1-3 ft bls exceeds SCTL-DER criteria. One composite soil sample will also be obtained from a depth of 5-7 ft bls and analyzed according to EPA Method 6010C if the soil sample from 3-5 ft bls exceeds SCTL-DER criteria. Upon completion of the soil borings, the extracted soil will be placed back into the borehole and surface finished to match original conditions.

**Schedule**

ECT will initiate Supplemental Phase II ESA activities after receipt of Service Authorization #16. ECT proposes to submit the Supplemental Phase II ESA Report within 30 days of the completion of field activities.