SECTION 1.0
INTRODUCTION

Evans Environmental & Geosciences, LLC (EE&G) was retained by the City of Fort Lauderdale (CFL) to prepare this Site Assessment Report Addendum II (SARA II) and Site Rehabilitation Plan (SRP) for CFL's Former Trash Transfer Station property, located at 1901 NW 6th Street (the northwest corner of Sistrunk Boulevard and NW 19th Avenue), in Fort Lauderdale, Broward County, Florida (hereafter referred to as the *Property*).

The objective of this report is to provide a response to the October 18, 2007 correspondence issued by the Florida Department of Environmental Protection (FDEP), provide a summary of the expanded site assessment activities, and to reiterate the previously proposed Site Rehabilitation Plan for the *Property* and surrounding area.

This SARA II/SRP includes the following sections:

- Section 2.0 - Response to FDEP correspondence comments.
- Section 3.0 – Expanded Site Assessment Findings.
- Section 4.0 – Site Rehabilitation Plan.

1.1 SITE LOCATION AND SETTING

The *Property* encompasses approximately 3.5 acres, and is located at the northwest corner of Sistrunk Boulevard (NW 6th Street) and NW 19th Avenue, in Fort Lauderdale, Broward County, Florida. The property is located in the southwest 1/4 of the northwest 1/4 of Section 4, in Township 50 South and Range 42 East; longitude 80° 10' 1" and latitude 26° 7' 46". Refer to **Figure 1** for the portion of the USGS Topographic Map depicting the location of the *Property*. An Area Map is provided as **Figure 2**. A Site Layout Map showing existing monitoring wells is provided as **Figure 3**. The *Property* is currently fenced to minimize unauthorized access, and is used only by limited CFL staff for the storage of equipment. Additionally, a pump station is located on the southwestern portion of the *Property*. The surrounding property use consists of residential properties to the north (across NW 7th Street), Lincoln Park and the CFL One-Stop-Shop to the east (across NW 19th Avenue), commercial properties (beyond which are residential properties) to the south (across NW 6th Street), and a major highway (I-95) and railroad corridor to the west.

SECTION 2.0
RESPONSE TO FDEP COMMENTS

The FDEP issued correspondence, dated October 18, 2007, in response to the SARA/SRP, prepared by EE&G, dated August 31, 2007. Please refer to **Appendix A** for a copy of the FDEP correspondence. The following provides a specific response to each of the 12 FDEP comments. Please note that details of the expanded site assessment are provided in Section 3 of this report, which may further address the FDEP comments.

Response to FDEP Comment No. 1

No response required.

Response to FDEP Comment No. 2

EE&G acknowledges the FDEP comments concerning the potential for leaching of heavy metals from source soils, and has proposed a long-term Natural Attenuation Monitoring Plan (NAMP) in Section 4.2 of this report to evaluate the potential concern to public health and the environmental. However, please note that no evidence of arsenic or lead were detected in groundwater samples collected outside the *Property* during recent groundwater sampling events. Residual concentrations of total antimony have been detected on the eastern-adjoining Lincoln Park; however, that constituent appears to be isolated to the park, and was not detected in off-site wells. Furthermore, considering that the area is outside the influence of public and private potable wells, and that the Primary Drinking Water constituents tested were limited to within city-owned properties, the potential for leaching of heavy metals from source soils that have been in-place and in contact with groundwater for decades does not appear to pose a significant on-going health risk. Therefore, a NAMP is an appropriate response to this issue.

Response to FDEP Comment No. 3

The *Property* and surrounding areas were not located within the influence of public or private drinking water wells. Furthermore, the FDOH did not report the presence of permitted private wells in the residential neighborhoods located immediately adjoining the *Property*. No evidence of private wells were located in the northern-adjoining residential neighborhood, located due north of the Property. EE&G interviewed residents to determine the presence of private irrigation wells, and conducted a walk-through survey, following which no wells were identified in the area between NW 19th and 20th Avenues, and NW 7th and 8th Streets. Based on the limited extent of groundwater (affected with Secondary Drinking Water Standard Constituents) no need for further investigation of this issue appeared necessary. The SAR discussed the presence of private irrigation wells in the residential neighborhood south of NW 6th Street; however, these were determined too far south to be of concern. EE&G did not have access to the commercial properties located along NW 20th Avenue to assess for private irrigation wells. However, considering no evidence of tested Primary Drinking Water Standard Constituents (antimony, arsenic and lead) were detected in monitoring wells located outside the *Property* or Lincoln Park. Therefore, no further assessment of this issue appears warranted. Please see Section 3.3 and 3.4 of this report for the Expanded Groundwater Assessment Methodology and Findings.

Response to FDEP Comment No. 4

EE&G acknowledges the typographical error identified, and clarifies that soil samples were collected on both the east and west sides of NW 19th Avenue. Concerning the second point, EE&G's report correctly identified the city-owned lot on the southeast corner of NW 6th Court and NW 17th Avenue, where one soil sample was collected.

Response to FDEP Comment No. 5

Pursuant to FDEP recommendations, EE&G expanded the soil sampling plan as requested. Please see Section 3.1 and 3.2 of this report for the Expanded Soil Assessment Methodology and Findings.

Response to FDEP Comment No. 6

Pursuant to FDEP recommendations, EE&G included the analysis of polynuclear aromatic hydrocarbons (PAHs) to representative soil samples. However, it is important to note that the March 27, 2007 Health Consultation report, the Florida Department of Health concluded: "based on the distribution and measured levels, polycyclic aromatic hydrocarbons (PAHs) in Durrs neighborhood soil do not apper to be related to the Lincoln Park Complex site." Please see Section 3.1 and 3.2 of this report for the Expanded Soil Assessment Methodology and Findings.

Response to FDEP Comment No. 7

EE&G acknowledges FDEP's comment, and used both field observations and laboratory analyses to assess for the presence of incineration debris and related constituents of concern in soil samples.

Response to FDEP Comment No. 8

Pursuant to FDEP recommendations, EE&G installed monitoring well MW-12 in the immediate vicinity of former SB-ROW-14, located on the city-owned vacant lot on the west side of NW 19th Terrace and north of NW 7th Street. Please see Section 3.3 and 3.4 for the Expanded Groundwater Assessment Methodology and Findings.

Response to FDEP Comment No. 9

EE&G collected a full round of groundwater samples from existing monitoring wells in representative areas on and around the *Property*. However, groundwater samples were only analyzed for select heavy metals, as dioxin/furans had previous been assessed during the SAR, and not found to be present above the 3.0 pg/L GCTL, with the exception of one well located in the interior of the *Property*, which contained only 3.22 pg/L. Sufficient delineation was provided in the SAR. Please see Section 3.3 and 3.4 for the Expanded Groundwater Assessment Methodology and Findings.

Response to FDEP Comment No. 10

Pursuant to FDEP recommendations, EE&G will install a bright-colored filter fabric liner to serve as a visible/distinctive layer at the base of the Right-of-Way Source Removal excavation, separating the overlying clean backfill from the underlying soils.

Response to FDEP Comment No. 11

EE&G acknowledges FDEP's recommendation for properly characterizing, handling and disposing of excavated soils. Representative soils collected from proposed excavation areas were analyzed for lead and arsenic using the Toxicity Characteristic Leaching Procedure (TCLP), and no evidence of hazardous waste was identified (see SARA – August 2007).

Response to FDEP Comment No. 12

Pursuant to FDEP recommendations, EE&G installed monitoring well MW-12 in the immediate vicinity of former SB-ROW-14, located on the city-owned vacant lot on the west side of NW 19th Terrace and north of NW 7th Street. Additionally, MW-1r was installed on the northwestern corner of the *Property* to replace former MW-1 (found to be destroyed). Finally, MW-13 was installed on the northeastern-adjoining city-owned One Stop Shop property. Please see Section 3.3 and 3.4 for the Expanded Groundwater Assessment Methodology and Findings.

SECTION 3.0
EXPANDED SITE ASSESSMENT METHODLOGY & FINDINGS

EE&G conducted an expanded sampling event to further assess the extent and magnitude of the affected soils and groundwater in the vicinity of the *Property*. Soil and groundwater sampling was conducted in accordance with FDEP-Standard Operating Procedures (SOPs) as specified in Chapter 62-160, Florida Administrative Code (FAC). The samples were collected in laboratory supplied, pre-cleaned sample bottles, placed on ice, and transported to a National Environmental Laboratory Accreditation Conference (NELAC) certified laboratory for analyses.

3.1 EXPANDED SOIL ASSESSMENT METHODOLOGY

EE&G supervised the advancement of soil borings on and around the *Property*. The objective of the soil sampling event was to build upon previous sampling data, and further assess for the presence of buried incineration debris, and the extent of affected soils containing heavy metals, PAHs, and dioxins/furans. The soil samples were collected utilizing the direct-push drilling technique, which involved hydraulically driving a sampling device to the desired depth, collecting the sample, and extracting the device. Stainless steel sampling equipment was washed with alconox and water between sampling points. Soil samples were collected from surface grade to depth of 8 to 12-feet BLS. The groundwater table interface was encountered at approximately 6-feet BLS. Soil cores were inspected for signs of debris or staining, and samples collected from the 0 to 0.5-foot, 0.5 to 2.0-foot, 2 to 4-foot, and 4 to 6-foot BLS intervals of each boring.

EE&G advanced a total of 49 additional soil borings in the following locations on November 6 and 7, 2007, and on February 25, 2008. Refer to **Figure 4** for a Soil Boring Location Map.

- To assess the extent of affected soil south of the Property, EE&G advanced two soil borings along the northern ROW area of NW 6th Street, due south of the *Property* (SB-ROW-59 and 60), and on the western ROW area of NW 19th Avenue, southeast of the *Property* (SB-ROW-51).

- To assess the extent of affected soil east and northeast of the *Property*, EE&G advanced four soil borings along the eastern ROW of NW 19th Avenue, due east and northeast of the *Property* (SB-ROW-48, 49, 50 and 51).

- To assess for the presence of affected soil further east of *Property* (and east of Lincoln Park), EE&G advanced seven soil borings in a CFL-owned vacant lot (SB-ROW-54) and ROW areas along NW 6th Court, NW 6th Place, and NW 16th Avenue (SB-ROW-53, 55, 56, 57 and 58). These borings were advanced around a HUD-assisted apartment complex, in the vicinity of the former borings SB-ROW-10 and RS2LPSB-2. One additional soil boring (SB-ROW-61) was advanced on February 25, 2008 to confirm findings from SB-ROW-56.

- To assess the extent of affected soil north of the Property, EE&G advanced soil borings in the following locations:

  - Five soil borings were advanced along the western ROW area along NW 19th Avenue (SB-ROW-16, 17, 18, 19 and 20), at distances approximately 10-feet, 20-feet, 50-feet, 100-feet and 200-feet north of NW 7th Street.

- Two soil borings were advanced in a city-owned vacant lot on the northwest corner of NW 19th Avenue and NW 7th Street (SB-ROW-21 and 22).

- Ten soil borings were advanced along the eastern and western ROW areas of NW 19th Terrace (SB-ROW-24, 25, 26, 27, 28, 29, 30, 31, 44 and 45), at distances approximately 10-feet, 20-feet, 50-feet, 100-feet and 200-feet north of NW 7th Street.

- Two soil borings were advanced in a city-owned vacant lot on the east side of NW 19th Terrace, approximately 75-feet north of NW 7th Street (SB-ROW-23 and 25), to further assess the area around former SB-ROW-14.

- Two soil borings were advanced in a city-owned vacant lot on the east side of NW 19th Terrace, approximately 250-feet north of NW 7th Street (SB-ROW-46 and 47), to further assess the area around former SB-ROW-12. Two additional soil borings (SB-ROW-62 and 63) were advanced in this lot on February 25, 2008 to confirm findings from SB-ROW-47.

- Eight soil borings were advanced along the eastern and western ROW areas of NW 20th Terrace (SB-ROW-35, 36, 37, 38, 39, 40, 41 and 42), at distances approximately 10-feet, 20-feet, 50-feet and 100-feet north of NW 7th Street.

- Four soil borings were advanced in a city-owned vacant lot on the northeast corner of NW 20th Avenue and NW 7th Street (SB-ROW-32, 33, 34 and 43) to further assess the area around former SB-ROW-13.

- Two soil borings were advanced on the northwestern corner of the *Property* (SB-28 and SB-29).

EE&G selected the following samples for laboratory analyses:

- EE&G had a total of 123 soil samples, representing the 0 to 0.5-feet, 0.5 to 2.0-feet and 4 to 6-feet BLS intervals, collected from the initial 41 soil borings (SB-ROW-16 through SB-ROW-59), and one additional soil sample collected from the 4 to 6-feet BLS of SB-ROW-40 (inadvertently included in analyses), analyzed for the following constituents:

  - Total arsenic, barium and lead by EPA Method 6010B.

  - Polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270.

  - Note: samples collected from the 4 to 6-foot interval were archived, with the exception of SB-ROW-40.

- EE&G had a total of 14 soil samples, representing the 0 to 0.5-feet and 0.5 to 2.0-feet BLS intervals, collected from six additional soil borings (SB-ROW-59, 60, 62 and 63, and SB-28 and SB-29) analyzed for the following constituents:

  - Total arsenic, barium and lead by EPA Method 6010B.

- EE&G selected the following 31 soil samples for analysis of dioxins/furans by EPA Method 8290. These soil samples were selected based on field observations, proximity and distance from the *Property*, and initial heavy metal/PAH screening results.

  - NW 19th Avenue (0 to 0.5-feet BLS): SB-ROW-16, 17, 18, 19, 21, 22 and 48. Note: also included sample collected from the 0.5 to 2.0-feet BLS interval of SB-ROW-19.

  - NW 19th Terrace (0 to 0.5-feet BLS): SB-ROW-23, 24, 26, 29, 31, 46 and 47. Note: also included samples collected from the 0.5 to 2.0-feet BLS interval of SB-ROW-23 and 25.

  - NW 20th Avenue (0 to 0.5-feet BLS): SB-ROW-38 and 41.

  - NW 6th Court/6th Place/16th Avenue (0 to 0.5 feet BLS): SB-ROW-53, 54, 56, 57, 58 and 61. Note: also included samples collected from the 0.5 to 2.0-feet BLS interval of SB-ROW-58 and 61.

  - NW 6th Street; south of *Property* (0 to 0.5 feet and 0.5 to 2.0-feet BLS): SB-ROW-60.

  - Northwestern corner of *Property* (0 to 0.5 feet and 0.5 to 2.0-feet BLS): SB-ROW-29.

3.2 EXPANDED SOIL ASSESSMENT FINDINGS

3.2.1 Lithology and Debris Observations

The natural lithology on and surrounding the *Property* generally consisted of the following:

- Approximately 0 to 0.5-feet BLS interval – sod and top soil (or pavement and fill).
- Approximately 0.5 to 2-feet BLS interval - gray or tan fine-grained sand.
- Approximately 2 to 4-feet BLS interval - tan fine-grained sand.
- Approximately 4 to 12-feet BLS intervals - tan or brown/dark brown fine-grained sand (groundwater table observed at approximately 6-feet BLS)
- Intermittent tan limestone was encountered at approximately 10 to 12-feet in several soil borings.

An important objective of the soil assessment was to visually assess for the presence of buried incinerator debris. Based on the field observations during the original SAR, debris had previously been documented in several soil borings, which consisted of glass shards (often melted/fused), slag, rust scale, scrap metal, and miscellaneous degraded trash. No direct evidence of a distinctive “ash” layer was observed; however, the debris was intermixed with fine-grain sands. Based on the 49 additional soil borings advanced at and beyond the boundaries of the *Property* during this SARA II, no evidence of debris was observed, with the exception of the following locations:

- Residual and intermittent glass shards and asphalt fragments were observed at the northwestern corner of NW 19th Avenue and NW 7th Street, reported in SB-ROW-18 and 19. These fragments were mixed with soil collected from approximately 0.5 to 2.0-feet BLS. Furthermore, deeper intermittent asphalt fragments were observed at approximately 6-feet BLS. Based on the lithology, the presence of deeper asphalt fragments, and the lack of melted glass and metal fragments, it is suspected that these soils were disturbed during more recent utility or public works projects, and not directly related to incineration debris deposition.

- Residual and intermittent glass shards, rust staining, and *de minimus* plastic scraps were observed in deeper portions of SB-ROW-25, located along the eastern ROW area of NW 19th Terrace, approximately 100-feet north of NW 7th Street. This sample was collected from a property where the previous residential structure was razed, and debris may have been associated with that demolition effort. Based on the lithology, the isolated depth of these intermittent fragments, and the lack of melted glass and metal fragments, it is suspected that the debris was related to demolition activities, and not directly related to incineration debris deposition.

- Residual and intermittent glass shards were observed in the 0.5 to 2.0-feet BLS interval of SB-ROW-28, located on the northwestern corner of NW 19th Terrace and NW 7th Street. The glass shards were not melted, and may have been indicative of *de minimus* broken glass, and not directly related to incineration debris deposition.

- Residual and intermittent glass shards were observed in the 0 to 0.5-feet BLS interval of SB-ROW-32, located within the city-owned lot at the northeastern corner of NW 20th Avenue and NW 7th Street. The glass shards were not melted, and were located in an area that is prone for *de minimus* dumping, and was not directly related to incineration debris deposition.

- Glass and brick fragments were observed in the 2.5 to 3.0-feet BLS interval of SB-ROW-36, and to a lesser extent in SB-ROW-37 (due north of 36), located on the northeastern corner of NW 20th Avenue and NW 7th Street. These fragments appeared to be more indicative of the incineration debris observed on the *Property*.

- Glass and brick fragments were observed in the 1 to 3-feet BLS interval of SB-ROW-51, located on the northwestern corner of NW 19th Avenue and NW 6th Street. These fragments appeared to be more indicative of the incineration debris observed on the *Property*.

- Residual and intermittent asphalt fragments were observed in SB-ROW-53 (located on the northern ROW of NW 6th Court, east of NW 18th Avenue), and SB-ROW-57 (located on the southern ROW of NW 6th Place, east of NW 18th Avenue), at a depth of approximately 4-feet BLS. However, based on the lithology of deeper asphalt fragment and the lack of glass and metal fragments, it is suspected that these soils were disturbed during more recent utility or public works projects, and not related to incineration debris deposition.

- Residual and intermittent glass shards were observed in the 0 to 1.5-feet BLS interval of SB-ROW-54, located on the city-owned lot at the southeastern corner of NW 17th Avenue and NW 6th Court. The glass shards were not melted, and may have been indicative of *de minimus* broken glass, and not directly related to incineration debris deposition.

Based on the field observations, it does not appear that visible incineration debris was deposited beyond the inferred extent illustrated in **Figure 5** (taken from the original SAR).

3.2.2 Soil Analytical Results

Analytical results were compared with the FDEP *Contaminant Cleanup Target Levels*, per Chapter 62-777, FAC, which regulates the Soil Cleanup Target Levels (SCTLs) for *residential-use direct exposure*, *commercial-use direct exposure*, and *leachability*. A summary of the soil sampling laboratory results are provided in **Tables 1**, **2** and **3**. A copy of the laboratory reports and sample chain of custody forms are provided in **Appendix B**. The following is a summary of the assessment findings per each individual constituent of concern.

3.2.2.1 Arsenic

A site map illustrating the arsenic concentrations in soil samples collected by EE&G for the original SAR and this expanded SARA II is provided as **Figure 6**. The following summarizes the interpretation of the laboratory data.

- A total of 168 soil samples were collected from areas beyond the *Property* boundary and analyzed for total arsenic. Out of these 168 soil samples, only 35 total arsenic concentrations that exceeded the 2.1 milligrams per kilogram (mg/Kg) SCTL for *residential-use direct exposure*.

- All off-site arsenic concentrations were below the 12.0 mg/Kg SCTL for *commercial-use direct exposure*, except the four samples collected from SB-ROW-8 and SB-ROW-9, which were located on the western edge of the NW 19th Avenue right-of-way between NW 6th and 7th Streets (approximately 300-feet away from the nearest residences), immediately adjoining the former incinerator site.

- When interpreting the spatial distribution of off-site arsenic concentrations above the 2.1 mg/Kg SCTL, it appeared that most were concentrated along the NW 19th Avenue ROW ROW, between NW 6th and 7th Streets (SB-ROW-7, 8, 9 and 51), and along NW 7th Street ROW, between NW 19th Terr. and 20th Ave. (SB-ROW-1, 2, 3, 32, 34, 36 and 37).

  - Slightly elevated arsenic concentrations in the range of approximately 5 to 9 mg/Kg appeared to be grouped near NW 7th Street and NW 20th Avenue (in and around the northern-adjoining city-owned vacant lot), approximately 5 to 75 feet north of the *Property* (SB-ROW-1, 2, 3, 32, 34, 36 and 37).

- A group of lower arsenic concentrations in the range of approximately 4 to 5 mg/Kg were observed along NW 19th Terrace and one along NW 19th Avenue, approximately 100 to 300 feet north of the *Property* (SB-ROW-12, 17, 30 and 31). However, these intermittent results were from surficial samples (0 to 0.5-feet BLS) and were surrounded by other lower concentrations (many being below laboratory method reporting limits).

- It is likely that the intermittent arsenic results throughout the northern-adjoining residential neighborhood was related to other potential sources (such as historic application of pesticides/herbicides, or fill material), and not necessarily directly related to incineration debris deposition.

- No evidence of arsenic-affected soils, above SCTLs, were detected in the samples collected east of Lincoln Park during the SARA II expanded site assessment.

3.2.2.2 Barium

A site map illustrating the arsenic concentrations in soil samples collected by EE&G for the original SAR and this expanded SARA II is provided as **Figure 7**. The following summarizes the interpretation of the laboratory data.

- A total of 168 soil samples were collected from areas beyond the *Property* boundary and analyzed for total barium. Out of these 168 soil samples, only six total barium concentrations that exceeded the 120 mg/Kg SCTL for *residential-use direct exposure*.

- All off-site barium concentrations were below the 1,600 m/Kg SCTL for *leachability* and the 130,000 mg/Kg SCTL for *commercial-use direct exposure*.

- When interpreting the spatial distribution of off-site barium concentrations above the 120 mg/Kg SCTL, it appeared that most were concentrated along the NW 19th Avenue ROW, between NW 6th and 7th Streets (SB-ROW-8, 9 and 51), and near the northeastern corner of NW 7th Street and NW 20th Avenue (SB-ROW-2 and 34).

- Slightly elevated barium concentrations, above 50 mg/Kg (but below the 120 mg/Kg SCTL) were grouped near NW 7th Street and NW 20th Avenue (in and around the northern-adjoining city-owned vacant lot), approximately 5 to 75 feet north of the *Property* (SB-ROW-1, 2, 32, 34, 36, and 37), near NW 7th Street and NW 19th Terrace (SB-ROW-3 and 28), and in city-owned vacant lots east of NW 19th Terrace and north of NW 7th Street (SB-ROW-14, 22, 23 and 25).

- No evidence of barium-affected soils, above SCTLs, were detected in the samples collected east of Lincoln Park during the SARA II expanded site assessment.

3.2.2.3 Lead

A site map illustrating the lead concentrations in soil samples collected by EE&G for the original SAR and this expanded SARA II is provided as **Figure 8**. The following summarizes the interpretation of the laboratory data.

- A total of 168 soil samples were collected from areas beyond the *Property* boundary and analyzed for total lead. Out of these 168 soil samples, only 10 total lead concentrations that exceeded the 400 mg/Kg SCTL for *residential-use direct exposure*.

- All off-site lead concentrations were below the 1,400 mg/Kg SCTL for *commercial-use direct exposure*, except for the 0.5 to 2-foot BLS samples collected from SB-ROW-8 (located on the western edge of the NW 19th Avenue right-of-way between NW 6th and 7th Streets) and SB-ROW-34 (located in the city-owned vacant and fenced lot, on the northeastern corner of NW 7th Street and NW 20th Avenue).

- When interpreting the spatial distribution of off-site lead concentrations above the 400 mg/Kg SCTL, it appeared that most were concentrated along the NW 19th Avenue ROW, between NW 6th and 7th Streets (SB-ROW-8, 9 and 51), and in the city-owned vacant and fenced lot, on the northeastern corner of NW 7th Street and NW 20th Avenue (SB-ROW-34). However, isolated elevated lead concentrations above the 400 mg/Kg SCTL also were detected in the following off-site locations:

  - The soil sample collected from the 0.5 to 2-feet BLS interval of SB-ROW-47 (located in the city-owned lot, approximately 300-feet north of the *Property*) contained 431 mg/Kg of total lead. Therefore, EE&G remobilized and advanced two additional confirmation borings (SB-ROW-62 and 63) in the immediate vicinity of former MW-ROW-47. Based on the confirmation sampling, and the other borings in the area (SB-ROW-12, 16, 44, 45 and 46), no other evidence of elevated lead was detected above the 400 mg/Kg SCTL in this area. Therefore, this initial result appeared isolated and was considered an anomaly, and not directly related to an incineration debris source. It is noteworthy that this lot previous contained residential structures that were demolished a few years ago. Therefore, the lead levels may be related to *de minimus* demolition debris.

  - The soil sample collected from the 0.5 to 2-feet BLS interval of SB-ROW-50 (located along the eastern edge of the NW 19th Avenue ROW, adjoining the city-owned One Stop Shop, due east of the former incinerator lot) contained 407 mg/Kg of total lead. Based on the other sampling results in the area (SB-ROW-6, 7, 20, 48, 49 and 50), no other evidence of elevated lead was detected above the 400 mg/Kg SCTL in this area. Therefore, this result appeared isolated and was considered an anomaly, and not directly related to an incineration debris source.

  - The soil sample collected from the 0.5 to 2-feet BLS interval of SB-ROW-29 (located along the western edge of the NW 19th Terrace ROW, approximately 20-feet north of NW 7th Street) contained 480 mg/Kg of total lead. Based on the other sampling results in the area (SB-ROW-3, 24, 25, 26, 27, 28 and 30), no other evidence of elevated lead was detected above the 400 mg/Kg SCTL in this area. Therefore, this result appeared isolated and was considered an anomaly, and not directly related to an incineration debris source.

- No evidence of lead-affected soils, above SCTLs, were detected in the samples collected east of Lincoln Park during the SARA II expanded site assessment.

- Slightly elevated lead concentrations, above 100 mg/Kg (but well below the 400 mg/Kg SCTL) were grouped in areas located immediately to the north (SB-ROW-1, 2, 3, 14, 23, 32, 36 and 37), east (SB-ROW-7, 49 and 51) and south (SB-ROW-59 and 60) of the

Property, and two samples located east of Lincoln Park (SB-ROW-54 and 57). While a few of these borings located on the immediately adjoining ROW (SB-ROW-1, 2, 3 and 7) contained signs of incineration-related debris, a majority of others did not exhibit signs of debris. Therefore, no direct correlation can be attributed to a incineration source for these slightly elevated lead concentrations – below the 400 mg/Kg SCTL – located in the northern and eastern-adjoining residential areas.

3.2.2.4 Dioxins/Furans

The following table summarizes the Toxicity Equivalent Factor (TEF) used when evaluating the Toxicity Equivalent Quotients (TEQs), which were summed and used to compare against the SCTLs for *residential-use direct exposure* (7.0 pg/G) and *commercial-use direct exposure* (30.0 pg/G). EE&G used ½ the detection limit as the value for congeners whose results were reported below laboratory method reporting limits. Additionally, EE&G used direct empirical values when presented (not ½ the detection limit), which may have presented a conservative estimate of dioxin/furan concentrations.

Dioxin/Furan Congener	Toxicity Equivalent Factor (TEF)
2,3,7,8-TCDD	1
1,2,3,7,8-PeCDD	1
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.0001
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
1,2,3,4,7,8-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.0001

A site map illustrating the dioxin/furan TEQ concentrations in the soil samples collected by EE&G for the original SAR and this expanded SARA II is provided as **Figure 9**. The following summarizes the interpretation of the laboratory data.

- A total of 59 soil samples were collected from areas beyond the *Property* boundary and analyzed for dioxins/furans. Out of these 59 soil samples, 24 contained dioxins/furan concentrations that exceeded the 7 pg/G SCTL for *residential-use direct exposure*.

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- All off-site dioxin/furan concentrations were below the 30 pg/G SCTL for *commercial-use direct exposure*, except for the 0.5 to 2-foot BLS sample collected from SB-ROW-2 (located on the northeastern corner of NW 7th Street and NW 20th Avenue), the 0.5 to 2-foot BLS sample collected from SB-ROW-8 (located on the western ROW of NW 19th Avenue, between NW 6th and 7th Street), and the 0 to 0.5-foot BLS sample collected from SB-ROW-13 (located in the city-owned vacant and fenced lot, on the northeastern corner of NW 7th Street and NW 20th Avenue).

- When interpreting the spatial distribution of off-site dioxin/furan concentrations above the 7 pg/G SCTL, it appeared that the highest concentrations (> 10 pg/G) were grouped along the NW 19th Avenue ROW, between NW 6th and 7th Streets (SB-ROW-6, 7, 8 and 9), along NW 7th Street, between NW 19th Avenue and NW 20th Avenue (SB-ROW-1, 2, 3, 4, and 22), and in the city-owned vacant and fenced lot, on the northeastern corner of NW 7th Street and NW 20th Avenue (SB-ROW-13). However, isolated slightly elevated dioxin/furan concentrations just above the 7 pg/G SCTL also were detected in the following off-site locations:

  - The soil sample collected from the 0 to 0.5-foot BLS interval of SB-ROW-56 (located on the western ROW of NW 16th Avenue – in the residential area east of Lincoln Park) contained 9.06 pg/G of dioxins/furans. Considering the remote location from the *Property* (over 600-feet east) and the lack of debris or other COCs, EE&G remobilized and advanced one confirmation boring (SB-ROW-61) in the immediate vicinity of former MW-ROW-56. Based on the confirmation sampling, and the other borings in the area (SB-ROW-10, 53, 54, 57 and 58), no other evidence of elevated dioxins/furans was detected above the 7 pg/G SCTL in this area. Therefore, this initial result appeared isolated and was considered an anomaly, and not directly related to an incineration debris source.

  - The soil samples collected from the 0 to 0.5-foot BLS interval of SB-ROW-38 and 41 (located along the western edge of the NW 20th Avenue ROW) contained 7.53 pg/G and 7.42 pg/G of dioxins/furans. However, considering their proximity to Interstate I-95 and the adjoining commercial/industrial facilities, and the lack of debris or other elevated COCs, these results may be more indicative of general background concentrations of this area, and not directly related to an incineration debris source.

  - The soil sample collected from the 0 to 0.5-foot BLS interval of SB-ROW-12 contained 7.77 pg/G of dioxins/furans during the initial SAR sampling event. Therefore, EE&G advanced two additional confirmations soil borings in the vicinity of this boring (SB-ROW-46 and 47) during this SARA II, neither of which contained dioxins/furans above the 7 pg/G SCTL. Therefore, this initial result was considered to be isolated and an anomaly, and not directly related to an incineration debris source.

- The soil samples collected from the 0 to 0.5-feet BLS interval of SB-ROW-14 (8.85 pg/G), SB-ROW-16 (7.79 pg/G), SB-ROW-18 (7.95 pg/G), SB-ROW-19 (9.53 pg/G), SB-ROW-23 (7.30 pg/G), SB-ROW-24 (7.0 pg/G), and the 0.5 to 2-foot BLS interval of SB-ROW-25 (7.97 pg/G) were located in the northern-adjoining residential neighborhood, but did not contain definitive evidence of incineration debris (melted/fused glass and metal fragments), or significantly elevated levels of other COCs. Furthermore, these samples were surrounded by other borings with lower dioxin/furan concentrations (below SCTLs). Therefore, considering their proximity to Interstate I-95 and the adjoining commercial/industrial facilities, these results may be more indicative of general background concentrations of this area, and not directly related to an incineration debris source.

- The soil sample collected from the 0.5 to 2-feet BLS interval of SB-ROW-29 (located along the western edge of the NW 19th Terrace ROW, approximately 20-feet north of NW 7th Street) contained 480 mg/Kg of total lead. Based on the other sampling results in the area (SB-ROW-3, 24, 25, 26, 27, 28 and 30), no other evidence of elevated lead was detected above the 400 mg/Kg SCTL in this area. Therefore, this result appeared isolated and was considered an anomaly, and not directly related to an incineration debris source.

3.2.2.5 PAHs

The following table summarizes the TEFs used when evaluating the carcinogenic PAH TEQs - benzo(a)pyrene (BAP) equivalents, which were summed and used to compare against the SCTLs for *residential-use direct exposure* (0.1 mg/Kg) and *commercial-use direct exposure* (0.7 mg/Kg). EE&G used ½ the detection limit as the value for compounds whose results were reported below laboratory method reporting limits.

PAH Compound	TEF
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenz(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

A site map illustrating the dioxin/furan TEQ concentrations in the soil samples collected by EE&G for the original SAR and this expanded SARA II is provided as **Figure 10**. The following summarizes the interpretation of the laboratory data.

- A total of 150 soil samples were collected from areas beyond the *Property* boundary and analyzed for PAHs. Out of these 150 soil samples, 29 contained BAP-equivalent concentrations that exceeded the 0.1 mg/Kg SCTL for *residential-use direct exposure*.

- All off-site BAP-equivalent concentrations were below the 0.7 mg/Kg SCTL for *commercial-use direct exposure*, except the 0 to 0.5-foot BLS intervals of six samples, including SB-ROW-1 (1.31 mg/Kg), SB-ROW-16 (0.8 mg/Kg), SB-ROW-28 (0.8 mg/Kg),

SB-ROW-35 (2.1 mg/Kg), SB-ROW-39 (0.9 mg/Kg), SB-ROW-41 (3.4 mg/Kg), and SB-ROW-43 (0.5 mg/Kg). These samples were grouped in the vicinity of NW 7th Street and NW 20th Avenue, extending north along NW 20th Avenue, and one anomalous reading in SB-ROW-16 (located on the western ROW of NW 19th Avenue, approximately 200-feet north of NW 7th Street).

- Several BAP-equivalent concentrations are conservatively elevated due to the process required to calculate TEQ (using ½ detection limits on congeners reported below laboratory method reporting limits). The following nine soil samples contain either all or a majority of the congeners below laboratory method reporting limits; however, due to the TEQ calculation requirements, these samples were reported to contain conservatively high BAP-equivalent concentrations (up to 0.4 mg/Kg): SB-ROW-17 (0.5-ft), SB-ROW-18 (6-ft), SB-ROW-24 (0.5-ft), SB-ROW-26 (0.5-ft), SB-ROW-31 (0.5-ft), SB-ROW-38 (0.5-ft), SB-ROW-49 (0.5-ft), SB-ROW-49 (2-ft), SB-ROW-57 (0.5-ft). Due to the elevated laboratory detection limits, these samples are reported above SCTLs, but may actually be below SCTLs.

- Three soil samples contained elevated concentrations of benzo(a)anthracene above the 0.8 mg/KG SCTL for *leachability*, including SB-ROW-35 (1.03 mg/Kg @ 0.5-ft.), SB-ROW-41 (1.65 mg/Kg @ 0.5-ft), and SB-ROW-43 (0.85 mg/Kg @ 0.5-ft), all of which were located along NW 20th Avenue. However, no evidence of petroleum-affected groundwater was detected during the SAR sampling event. Therefore, considering their proximity to the adjoining commercial/industrial facilities and Interstate I-95, it is likely that these elevated PAH concentrations were related to the presence of surficial asphalt or activities on the adjoining industries, and not directly related to an incineration debris source.

Based on the laboratory results and spatial distribution of BAP-equivalent concentrations, the PAHs detected around the *Property* are most likely related to anthropogenic sources such as automobile combustion or inherent with the fill used in the area, not directly related to an incineration debris source.

3.2.3 Statistical Analyses of Soil Results

EE&G conducted a statistical analysis of the arsenic and dioxin/furan results to predict the 95% Upper Confidence Limit (UCL) of these constituents that will remain in soils following the proposed Source Removal event (see Section 4.1 of this report). EE&G utilized the FDEP UCL Calculator, Version 1.0, to conduct this statistical analysis. A printout of the data sets used along with the FDEP UCL results is provided in **Appendix C**. The following is a summary of the UCL findings:

- This analysis assumed that soils along the western ROW of NW 19th Avenue, the northern and southern ROW of NW 7th Street, and the southern 50-feet of the city-owned lot (northwestern corner of NW 7th Street and NW 20th Avenue) will be excavated to a depth of 2-feet BLS, and replaced with clean fill.

- Please note that this calculation did not include soil samples collected from within the boundary of the *Property*, as this area will remain fenced and access restricted until future development is implemented.

- Arsenic: Using only the remaining soil sample results (post-excavation), EE&G calculated the following UCL results:

  - If all 121 soil samples are taken into consideration, collected from the 0 to 0.5-feet, 0.5 to 2-feet, and 2 to 4-feet BLS intervals (outside the proposed excavation area), a UCL value of 1.67 mg/Kg was calculated.

  - If the 86 soil samples are taken into consideration, collected only from the 0 to 0.5-feet and 0.5 to 2-feet intervals (outside the proposed excavation area), a UCL value of 2.01 mg/Kg was calculated.

- Dioxins/Furans: Using only the remaining soil sample results (post-excavation), EE&G calculated the following UCL results:

  - If all 37 soil samples are taken into consideration, collected from the 0 to 0.5-feet and 0.5 to 2-feet BLS intervals (outside the proposed excavation area), a UCL value of 6.52 pg/G mg/Kg was calculated.

  - If the 24 soil samples are taken into consideration, collected only from the 0 to 0.5-feet interval (outside the proposed excavation area), a UCL value of 6.32 mg/Kg was calculated.

  - If the 13 soil samples are taken into consideration, collected only from the 0.5 to 2-feet BLS interval (outside the proposed excavation area), a UCL value of 6.93 pg/G mg/Kg was calculated.

No statistical analysis was conducted using barium or lead, as the majority of these constituent concentrations above SCTLs were located within proposed excavation areas. Furthermore, the aforementioned arsenic and dioxin/furan UCL calculation results were considered representative of the remaining affected soils. UCLs for PAHs were not considered, as this issue was previously discussed and not attributed to the former incinerator.

Based on these results, EE&G predicts that post-Source Removal soils beyond the *Property* boundary will meet SCTLs using the 95% UCL evaluation method.

3.3 GROUNDWATER ASSESSMENT METHODOLOGY

The objective of the groundwater assessment was to further assess for the presence and extent of affected groundwater by constituents of concern related to the historic incineration activities. Refer to **Figure 3** for a Monitoring Well Location Map. The following summarizes the groundwater assessment activities:

- On December 12, 2007, EE&G supervised the installation of two monitoring wells, labeled MW-12 (located in the northern-adjoining residential neighborhood – east of NW 19th Terrace) and MW-13 (located on the northeastern-adjoining CFL One Stop Shop). The wells were installed by Cornell Environmental Drilling, a Florida-licensed well drilling contractor, and used to provide delineation of affected groundwater to the north and northeast of the *Property*. Additionally, the contractor retrofitted MW-11 (located in the northern-adjoining residential neighborhood, east of NW 20th Avenue), which was found to be damaged. Monitoring wells were installed using direct-push technology, and consisted of a 1-inch diameter casing, with a pre-packed well screen extending from approximately 2 to 12-feet BLS, sealed with bentonite. The top of the PVC riser was fitted with a water tight locking cap, within a protective manhole. Well Completion Reports are provided in **Appendix D**.

- On December 19, 2007, EE&G collected groundwater samples from monitoring wells MW-2R, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9 (located in the northern-adjoining residential neighborhood), MW-10 MW-11, MW-12 (located in the northern-adjoining residential neighborhood), MW-13 (located on the northeastern-adjoining CFL One Stop Shop), MW-UST-W, and MW-LPCGW-15 (located on the eastern-adjoining Lincoln Park). Groundwater samples were analyzed for the following constituents:

  - Total aluminum, antimony, arsenic, iron, lead, and manganese by 6010B.

- On February 25, 2008, EE&G supervised the installation of one monitoring well, labeled MW-1R, located in the northwestern corner of the *Property*. This well was installed by Cornell Environmental Drilling, a Florida-licensed well drilling contractor, and used to replace the original MW-1, which was found to be destroyed. The monitoring well was installed using direct-push technology, and consisted of a 1-inch diameter casing, with a pre-packed well screen extending from approximately 5 to 15-feet BLS, sealed with bentonite. The top of the PVC riser was fitted with a water tight locking cap, within a protective manhole. Well Completion Reports are provided in **Appendix D**.

- On February 26, 2008, EE&G collected groundwater samples from monitoring wells MW-1R and MW-11. Groundwater samples were analyzed for the following constituents:

  - MW-1R was analyzed for total aluminum, antimony, arsenic, iron, lead, and manganese by 6010B.

  - MW-11 was analyzed only for total arsenic and lead by 6010B to verify the December 2007 sampling results.

3.4 GROUNDWATER ASSESSMENT FINDINGS

Analytical results were compared with the FDEP *Contaminant Cleanup Target Levels*, per Chapter 62-777 FAC, which regulates the Groundwater Cleanup Target Levels (GCTLs) and Natural Attenuation Default Source Concentrations (NADSCs). A summary of the groundwater sampling laboratory results are provided in **Table 4**. A copy of the laboratory reports, sample chain of custody forms, and groundwater sampling logs are provided in **Appendix E**.

3.4.1 Primary Drinking Water Standard Constituents

A site map illustrating the three Primary Drinking Water constituents concentrations (antimony, arsenic and lead) in the groundwater samples collected by EE&G for this SARA II is provided as **Figure 11**. Based on the groundwater sampling events conducted in December 2007 and February 2008, the three Primary Drinking Water Standard constituents tested (antimony, arsenic and lead) were detected above applicable GCTLs only in samples collected from monitoring wells located on the *Property* (arsenic and lead) and the eastern-adjoining city-owned Lincoln Park (antimony). No groundwater samples collected off-site contained Primary Drinking Water standard constituents above GCTLs (with the exception of the aforementioned Lincoln Park well that contained antimony). The following is a summary of the findings per each individual constituent of concern.

Antimony

Total antimony was detected above the 0.006 mg/L GCTL in only one groundwater sample, collected from monitoring well MW-LPCGW-15 (located on the eastern-adjoining Lincoln Park) during the SARA II sampling events. This groundwater samples contained 0.00984 mg/L of total antimony, and was well below the 0.06 mg/L NADSC. Total antimony concentrations in the remaining 13 wells sampled were either below laboratory method reporting limits and/or below the 0.006 mg/L GCTL.

Based on the findings from the original SAR sampling events, as confirmed by these SARA II sampling events, it appears that an isolated area of antimony-affected groundwater persists on the eastern-adjoining Lincoln Park, but was not detected above the GCTL in wells sampled on the *Property* or in wells located in the northern-adjoining residential neighborhood.

Arsenic

The highest total arsenic concentration detected was the groundwater sample collected from monitoring well MW-10, located near the central/eastern portion of the *Property*. This groundwater sample contained 0.0714 milligrams per liter (mg/L) of total arsenic, which exceeded the 0.010 mg/L GCTL, but was below the 0.10 mg/L NADSC. Groundwater samples collected from two other wells, MW-2R (located near the northern boundary of the *Property*) 0.0165 mg/L) and MW-8 (located near the eastern boundary of the *Property*), also contained 0.0165 mg/L and 0.0126 mg/L of total arsenic, both of which exceeded the 0.010 mg/L GCTL, but were well below the 0.10 mg/L NADSC. Total arsenic was detected slightly above the GCTL in MW-11 during the initial December 2007 sampling event. However, based on the subsequent February 2008 confirmation sampling event, arsenic concentrations dropped below the 0.10 mg/L GCTL. Total arsenic concentrations in the remaining 10 wells sampled were either below laboratory method reporting limits and/or below the 0.10 mg/L GCTL.

Based on the findings from the original SAR sampling events, as confirmed by these SARA II sampling events, it appears that an area of arsenic-affected groundwater persists on the northern and eastern portions of the *Property*. However, no evidence of arsenic-affected groundwater above the 0.010 mg/L GCTL was detected off-site monitoring wells.

Lead

Total lead was detected above the 0.015 mg/L GCTL in only one groundwater sample, collected from monitoring well MW-10 (located near the central/eastern portion of the *Property*) during the SARA II sampling events. This groundwater samples contained 0.0318 mg/L of total lead, which was well below the 0.15 mg/L NADSC. Total lead concentrations in the remaining 13 wells sampled were either below laboratory method reporting limits and/or below the 0.015 mg/L GCTL.

Based on the findings from the original SAR sampling events, as confirmed by these SARA II sampling events, it appears that an area of lead-affected groundwater persists near the central/eastern portion of the *Property*. However, no evidence of lead-affected groundwater above the 0.015 mg/L GCTL was detected in off-site monitoring wells.

3.4.2 Secondary Drinking Water Standard Constituents

A site map illustrating the three Secondary Drinking Water constituents concentrations (aluminum, iron, and manganese) in the groundwater samples collected by EE&G for this SARA II is provided as **Figure 12**. Based on the groundwater sampling events conducted in December 2007 and February 2008, the three Secondary Drinking Water Standard constituents tested were detected above the applicable GCTLs in both on-site and off-site wells, but are considered to pose minimal health concerns to the public, as these are regulated only for aesthetic concerns (taste and appearance) in drinking water supplies. However, this area is outside the influence of public or private drinking water wells, and therefore, the presence of these constituents does not appear to pose a significant health risk. The following is a summary of the findings per each individual constituent of concern.

Aluminum

Total aluminum was detected in groundwater samples collected from six of the 14 total monitoring wells sampled in December 2007 and February 2008 at concentrations in excess of the 0.20 mg/L GCTL. Concentrations detected above the GCTL ranged from 0.268 mg/L to 1.87 mg/L (MW-8); however, all were below the 2.0 mg/L NADSC. Total aluminum concentrations in the remaining eight wells sampled were below laboratory method reporting limits and/or below the 0.20 mg/L GCTL.

Based on the findings from the original SAR sampling events, as confirmed by these SARA II sampling events, it appears that an area of aluminum-affected groundwater persists across a majority of the *Property*, and extends offsite to the north, east and west. However, as previously stated the presence of aluminum in groundwater does not pose a significant threat to human heath, as it is regulated for drinking water to minimize organoleptic concerns, and no public or private drinking water wells exist in the vicinity of the *Property*.

Iron

Total iron was detected in groundwater samples collected from 12 of the 14 total monitoring wells sampled in December 2007 and February 2008 at concentrations in excess of the 0.30 mg/L GCTL. Concentrations detected above the GCTL ranged from 0.361 mg/L to 7.88 mg/L (MW-5). Furthermore, iron concentrations in two groundwater samples also exceeded the 3.0 mg/L NADSC, including MW-2R (located on the northern boundary of the *Property*) and MW-5 (located on the western boundary of the *Property*). Total iron concentrations in the remaining two wells sampled were below the 0.30 mg/L GCTL.

Based on the findings from the original SAR sampling events, as confirmed by these SARA II sampling events, it appears that an area of iron-affected groundwater persists across a majority of the *Property*, and extends offsite to the north, east and west. However, as previously stated the presence of iron in groundwater does not pose a significant threat to human heath, as it is regulated for drinking water to minimize organoleptic concerns, and no public or private drinking water wells exist in the vicinity of the *Property*.

Manganese

Total manganese was detected in groundwater samples collected from three of the 14 total monitoring wells sampled in December 2007 and February 2008 at concentrations in excess of the 0.05 mg/L GCTL. Concentrations detected above the GCTL included MW-5 (0.16 mg/L), MW-11 (0.196 mg/L), and MW-13 (0.0977 mg/L). All total manganese concentrations were below the 0.50 mg/L NADSC. Total manganese concentrations in the remaining 13 wells sampled were below laboratory method reporting limits and/or below the 0.05 mg/L GCTL.

Based on the findings from the original SAR sampling events, as confirmed by these SARA II sampling events, it appears that an area of manganese-affected groundwater persists on the western (MW-5) and southern (MW-11) boundaries of the *Property*, and also was detected to lesser extent in one off-site sample collected northeast of the *Property* (MW-13). However, as previously stated the presence of manganese in groundwater does not pose a significant threat to human heath, as it is regulated for drinking water to minimize organoleptic concerns, and no public or private drinking water wells exist in the vicinity of the *Property*.

3.4.3 Site-Specific Groundwater Flow Assessment Results

Refer to **Table 5** for a Summary of Groundwater Elevations, and **Figure 13** for the Site-Specific Groundwater Flow Map. Based on the March 14, 2008 measurements, groundwater is relatively static across the *Property*; however, when expanded to include the northern and eastern offsite wells, a distinctive east-southeastern flow direction was documented.

SECTION 4.0
SITE REHABILITATION PLAN

The following Site Rehabilitation Plan (SRP) was based upon the initial findings of the SAR, which were further supported by the expanded assessment findings presented in the SARA and this SARA II. The proposed SRP utilizes a three tier approach to addressing the soil and groundwater impacts identified during the site assessment, each of which are further discussed below, including:

- Source Removal of affected surficial soils on adjoining Right-of-Way (ROW) areas.
- Natural Attenuation Monitoring Plan (NAMP) to assess groundwater quality.
- Temporary No Further Action with Conditions (NFAC) for the *Property*.

4.1 RIGHT-OF-WAY SOURCE REMOVAL EVENT

The following Source Removal Plan is will be implemented in April 2008. This plan was previously presented in the February 2008 SAR, and FDEP comments addressed in the August 2007 SARA. Funding has been allocated by CFL to implement the Source Removal Plan. EE&G completed the expanded site assessment (presented in Section 3 of this SARA II) to further delineate the proposed excavation boundaries and support the plan's rationale.

The Source Removal Plan will address surficial soils containing elevated constituents of concern (COCs) that were identified along the northern and eastern adjoining ROW areas, due north and east of the *Property*. The objective of this Source Removal is to be proactive with respect to minimizing potential direct-exposure concerns from contact with surficial soils. The objective of this Source Removal is not to remove all affected soils from the adjoining ROW areas, to address surrounding private properties, or to address the soils on the *Property*. CFL understands that by addressing only the upper 2-feet of soils during this Source Removal, that additional Source Removal or remediation may be required as a result of the NAMP findings, additional soil assessment findings, and/or future redevelopment activities.

Following excavation activities, EE&G will install a visible/distinctive geotextile filter fabric, and backfill with clean sand/rock, which will create an Engineering Control along the ROW areas and provide a protective 2-foot thick barrier of non-impacted, imported fill, that will minimize the potential for direct-exposure concerns. A site map illustrating the approximate extent of the proposed Source Removal excavation area is provided as **Figure 13**. The following is a summary of the proposed Source Removal activities:

- Soils will be excavated from surface grade to a minimum depth of 2-feet BLS, along the following areas:

  1) The western ROW edge along NW 19th Avenue, between NW 6th Street and NW 7th Street.

  2) The northern and southern ROW edges along NW 7th Street, between NW 19th Avenue and NW 20th Avenue, including the small city-owned lot on the northwestern corner of NW 19th Avenue and NW 7th Street.

3) Approximately 50-feet of soils will be excavated along the southern boundary of the CFL-owned vacant and fenced lot, located on the northeastern corner of NW 20th Avenue and NW 7th Street.

- Soils will be loaded directly into awaiting transport trucks or temporarily stockpiled on visquene on the *Property*. The excavated soils will be transported to Waste Management's Central Landfill, located in Pompano Beach, Florida. Pre-disposal authorization will be obtained from Waste Management prior to initiation of Source Removal activities. EE&G will schedule the project to ensure soils are not stockpiled on the *Property* for more than 15 days following excavation. Stockpiled soils will be covered with visquene nightly.

- Prior to initiation of excavation, EE&G will obtain necessary permits, and install ingress/egress barricades.

- A Dust Control and Erosion Control Plan will be implemented during Source Removal activities to minimize migration of affected media. Air monitoring will be performed routinely at the upwind and downwind perimeter of the construction activities on the site to document that adequate dust control measures are being implemented throughout the remediation implementation.

- EE&G intends to backfill excavated areas the same day they are excavated. However, if conditions prevent that from occurring, a security guard will be posted overnight when any excavated areas are left exposed.

- The excavated areas will be backfilled with at least 2-feet of imported sand/rock, and sodded to maintain the Engineering Control.

- A visible/distinctive geotextile fabric will be placed at the base of the excavation to serve as a barrier between underlying potentially affected soils and overlying clean fill.

- No subsurface confirmation sampling will be collected, as the SAR and SARA II data have confirmed that affected soils will be left in-place beneath the Engineering Control in some areas along the ROW areas.

- EE&G have a verbal commitment from the FDEP to provide Targeted Brownfields Assessment (TBA) grant funding to assist with the costs for transportation and disposal.

The Source Removal Plan is anticipated to be initiated during the week of April 7, 2008, and will be completed in approximately 20 to 30 days. A final Source Removal Report will be issued to the FDEP by May 31, 2008.

Please note, as previously discussed in Section 3.2.3, EE&G has shown that post-Source Removal soils (outside the *Property* boundary) will be below SCTLs for target compounds (Arsenic and Dioxins/Furans) using the 95% UCL evaluation method. A UCL value of 6.52 pg/G was calculated for Dioxins/Furans in the top 2-feet of soils remaining outside the excavation areas. A UCL value of 2.01 mg/Kg was calculated for Arsenic in the top 2-feet of soils remaining outside the excavation areas. Values within the *Property* boundary were not included in the UCL calculations, as these soils will be managed using temporary Engineering and Institutional Controls (as discussed in Section 4.3).

4.2 NATURAL ATTENUATION MONITORING PLAN

Due to the presence of only Secondary Drinking Water Standard constituents, and only intermittent primary heavy metals (arsenic, lead and antimony), EE&G is not recommending active remediation to address the groundwater impacts. Therefore, monitoring is an acceptable alternative to evaluate the need for further action.

Based on the assessment findings, EE&G recommends that the affected groundwater on the *Property* be addressed under a NAMP. The objective of the NAMP will be to collect a sufficient amount of data, from which a technical evaluation can be made to assess the behavior of the affected groundwater over time. Furthermore, the NAMP will provide confirmation data concerning the boundary groundwater quality. The NAMP is proposed for a period of up to 5 years, with the following sampling protocol:

- Year 1: Quarterly sampling of groundwater from seven on-site boundary monitoring wells (MW-1R, MW-2R, MW-5, MW-7, MW-8, MW-11, and MW-UST-W) and four offsite wells (MW-9, MW-12, MW-13, and LPCGW-15). Groundwater samples will be analyzed for total aluminum, antimony, arsenic, iron, lead, and manganese. The 1st Year NAMP will be conducted as follows:
  - May 2008 – Collect 1st Quarter, Year 1 groundwater samples.
  - August 2008 - Collect 2nd Quarter, Year 1 groundwater samples.
  - November 2008 – Collect 3rd Quarter, Year 1 groundwater samples.
  - February 2009 - Collect 4th Quarter, Year 1 groundwater samples.
- Upon completion of the first year of monitoring, recommendations will be made for additional monitoring (if warranted), including the number of monitoring wells to be sampled, and the number of constituents to be tested. FDEP will be petitioned to allow for the removal of tested constituents from the future Semi-Annual sampling plan if they were below GCTLs during at least the last two consecutive quarterly sampling events during Year 1.
- Years 2 – 5 (if warranted): Semi-Annual sampling of groundwater from selected monitoring wells (based upon approval from FDEP for any modifications in the NAMP).
- Site-specific groundwater flow maps will be provided during each sampling event.
- Quarterly/Semi-Annual Status Reports will be submitted to the FDEP within 45 days of each sampling event.

4.3 TEMPORARY NO FURTHER ACTION WITH CONDITONS PLAN FOR *PROPERTY*

EE&G recommends that the *Property* be closed under a temporary No Further Action with Conditions (NFAC) status, using Engineering and Institutional Controls, until a final decision is made with respect to the highest and best re-use options for redevelopment. CFL understands that any redevelopment strategy will require that, at a minimum, a more permanent Engineering Control, and property handling/disposal of affected soils disturbed and not re-used under such Engineering Control.

4.3.1 Engineering Control

The western half of the *Property* is partially covered with an acceptable Engineering Control, consisting of buildings and surrounding asphalt/concrete pavement. Smaller landscaped areas exist on the western portion, some of which support large trees. The eastern half of the *Property* consists of a large grassy lot. The *Property* is fenced, and used only by limited CFL staff as a maintenance warehouse and pump station. Therefore, the concern for direct exposure is considered low.

CFL is in the process of a City-wide evaluation to determine the highest and best use of surplus City-owed real estate (including the *Property*). Therefore, implementing a site-wide Engineering Control would be cost prohibitive at this time, and may not be compatible with the final redevelopment plan. Therefore, EE&G proposes that the *Property* to remain fenced, with proper signage, and access restricted from non-authorized personnel, and that the current configuration be maintained until a final decision is made with respect to the highest and best re-use strategy. This strategy will also be applied to the northern-adjoining city-owned vacant and fenced lot, located at the northeastern corner of NW 7th Street and NW 20th Avenue.

4.3.2 Institutional Control

EE&G recommends that a temporary Institutional Control be executed to memorialize the appropriate restrictions, and that a communication plan be implemented to inform and educate City staff who will have access to the *Property*. The CFL attorney will prepare a draft Institutional Control document (under separate cover), which will address the temporary restrictions to be implemented at the *Property* (and northern-adjoining City-owned property) until a final redevelopment plan is implemented. The objective of the Institutional Control is to ensure that efforts to minimize the aforementioned exposure concerns are maintained, and will include the following technical components:

- Soils that exceed the SCTLs will be allowed to remain onsite; however, soil removal, treatment and disposal criteria in Rules 62-780.500(5), FAC, shall apply if excess soils excavated during maintenance and/or redevelopment cannot be reused on the *Property*, beneath a protective engineering control.

- The *Property* will remained fenced, and unauthorized access restricted.

- An Operation, Maintenance and Monitoring Plan will be prepared for the City to implement so that all site workers are aware of buried debris and proper management of soils disturbed, and maintenance of the existing ground cover.

- Groundwater on the *Property* will not be used for potable or irrigation purposes.