FINAL SITE INSPECTION REPORT, REVISION 1
NORWOOD LANDFILL
NORWOOD, DELAWARE COUNTY, PENNSYLVANIA

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
bgs	below ground surface
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLP	Contract Laboratory Program
CRQL	Contract-Required Quantitation Limit
CVAA	Cold Vapor Atomic Absorption
DELCORA	Delaware County Regional Water Quality Control Authority
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
gpm/ft	gallons per minute per foot
HRS	Hazard Ranking System
ICP-AES	Inductively Coupled Plasma-Atomic Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
mg/kg	milligrams per kilogram
OLEM	Office of Land and Emergency Management
OSRTI	Office of Superfund Remediation and Technology Innovation Table 6
PA	Preliminary Assessment
PADEP	Pennsylvania Department of Environmental Protection
PaGWIS	Pennsylvania Groundwater Information System
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
RBC	EPA Region III Risk-Based Concentration
RDL	reporting detection limit
RSL	EPA Regional Screening Level
SI	Site Investigation
SIM	Selective Ion Monitoring
START	Eastern Area Superfund Technical Assessment and Response Team

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TDD	Technical Direction Document
TDL	target distance limit
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WESTON®	Weston Solutions, Inc.

1.0 INTRODUCTION

Under the Eastern Area Superfund Technical Assessment and Response Team (START) Contract No. EP-S3-15-02, Technical Direction Document (TDD) No. W503-17-03-001, the U.S. Environmental Protection Agency (EPA) Region III tasked Weston Solutions, Inc. (WESTON®) to conduct a Site Inspection (SI) of the Norwood Landfill site (the Site) located in Norwood, Delaware County, Pennsylvania.

The SI was conducted in accordance with EPA *Guidance for Performing Site Inspections Under CERCLA* (Reference [Ref.] 1). The purposes of the SI were to collect sufficient analytical data and information concerning conditions at the Site to assess the relative threat posed to human health and the environment with respect to actual or potential releases of hazardous substances, and to determine the need for additional action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) based on criteria as set forth in EPA *Hazard Raking System; Final Rule* (Ref. 2). The original SI sampling effort in September 2017 included soil sampling in right-of-way areas adjacent to residential properties. Based on the analytical results from that effort showing elevated contaminant concentrations, EPA gained access and WESTON performed additional SI sampling at residential properties in May 2018. This report revision incorporates the results of the May 2018 sampling effort into the previous SI report dated February 2018.

2.0 SITE BACKGROUND

This section presents a description of the Site and its location, provides a discussion of the Site's ownership and history, and presents a summary of previous site investigation activities.

2.1 SITE LOCATION AND DESCRIPTION

The Site consists of a suburban residential neighborhood in lower Norwood, Delaware County, Pennsylvania. The geographic coordinates of the approximate center of the Site are 39°52'55.76" north latitude and 75°17'29.04" west longitude (Ref. 3). As shown on Figure 1, Site Location Map, land use at the Site and the surrounding area is primarily residential. Norwood Borough

Park borders the Site to the northeast, beyond which is the former Norwood Borough permitted landfill, former borough sewage treatment plant, and current location of a Delaware County Regional Water Quality Control Authority (DELCORA) pumping station; wooded areas and Muckinipattis Creek are located to the east, wooded areas and Darby Creek are located to the south, Norwood Elementary School is located to the northwest, and additional residential areas are located north and west of the Site (Figures 1 and 2).

The Site consists of residential areas in lower Norwood where residents allege that materials excavated during the construction of the Walt Whitman Bridge, potentially containing elevated concentrations of heavy metals and polychlorinated biphenyls (PCBs), were used for fill prior to construction of the homes. It is also reported that undeveloped areas surrounding the residential neighborhood were used by the Borough of Norwood as a landfill and may also have been used as a waste dump by the nearby DELCROA as well as Glenolden Laboratories (and, subsequently, Merck, Sharp, and Dohme Pharmaceutical Laboratories).

2.2 SITE OWNERSHIP

The Site consists of a residential area located in a lower Norwood neighborhood and the surrounding property between E. Winona Avenue and Darby Creek. Various individuals own the properties in the residential area. According to the Delaware County Real Estate Parcels and Tax Records System, the folio number for the property surrounding the lower Norwood neighborhood is 310000600903 and the current owner is the Norwood Borough Authority (Ref. 4). No previous owners are listed for this property.

2.3 PREVIOUS INVESTIGATIONS

In 1993, the U.S. Fish and Wildlife Service (USFWS) conducted a Level I Contamination Survey of two tracts of land, Tract 24 and Tract 35, which are located southwest of E. Winona Avenue. Tract 35 appears to be part of folio 310000600903, which is part of the undeveloped portion of the Site (Figure 2). The Level I Contamination Survey noted that the Borough of Norwood historically had used Tract 35 as a municipal landfill and that debris was scattered

across the property at the time of the survey. Observed debris included glass jars and bottles, automobile frames and parts, aluminum siding, asphalt, concrete, and tires (Ref. 5).

In 1999, Program Management Company conducted a Level II Survey of Tracts 24 and 35 for USFWS, during which test pits were excavated and samples of soil (21 shallow and 17 deep), sediment (7), surface water (6), and groundwater (10) were collected. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides, PCBs, chlorinated herbicides, Target Analyte List (TAL) metals (total and dissolved for groundwater samples), and cyanide. Analytical results for surface soils and sediment samples were compared to EPA Region III Risk-Based Concentrations (RBCs) residential and industrial soil screening levels and results for the surface water and groundwater samples were compared to EPA RBCs for tap water, where applicable (Ref. 5).

VOCs were not detected above RBCs in any of the soil samples. Eleven of the 21 shallow soil samples contained the SVOC benzo(a)pyrene at concentrations above the residential RBC of 87 micrograms per kilogram (µg/kg), with results ranging from 160 µg/kg to 2,100 µg/kg, and 8 of the 17 deep samples contained concentrations above the residential RBC, with results ranging from 150 to 3,000 µg/kg. PCBs were detected in seven shallow and five deep soil samples at concentrations exceeding the residential RBC of 320 µg/kg, with a maximum total concentration of 1,280 µg/kg. One pesticide (chlordane) in one deep sample contained a concentration of 4,400 µg/kg, which exceeds the residential RBC of 1,800 µg/kg. Concentrations of arsenic were detected above the residential RBC of 0.43 milligrams per kilogram (mg/kg) in all the shallow and deep soil samples, with the exception of one shallow soil sample. The results ranged from 1.0 mg/kg to 34.3 mg/kg. Concentrations of lead exceeded the EPA action level of 400 mg/kg in 4 of the 21 shallow and 2 of the 17 deep soil samples, with results ranging from 402 mg/kg to 1,160 mg/kg (Ref. 5).

Concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene exceeded the tap water RBCs in one surface water sample. These exceedances were detected in sample SW-4, which was collected from the southwest corner of Tract 35 (Figure 2). Manganese was detected

above the RBC in one surface water sample, SW-5, which was also collected near the southwest corner of Tract 35. No other contaminants were detected above the tap water RBC in the surface water samples (Ref. 5).

The Level II Survey Report provides conflicting information regarding the locations of the collected sediment samples and associated data. In Section 2.2 of the report, sediment samples SED-1 through SED-7 are identified as having been collected at co-located surface water sample locations, with the exception of SED-3, which was a sediment location only. However, the sediment data tables in the report present the sample IDs as SE-1 through SE-7. Both sets of sediment designations are shown separately in Figure 2-1 (Sample Location Map) of the report, along with an extra location labeled "SE-8" and designation of the SE-1 through SE-8 locations as "Existing Sediment Sample Locations" (Ref. 5). Based on these considerations, it is believed that the sample IDs in the Level II Survey Report data tables are incorrect, and that the sediment data actually coincide with the locations labeled SED-1 through SED-7. The report does not present any previous results that might be associated with locations SE-1 through SE-8.

Several SVOCs, such as benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene, were detected above their residential and industrial soil RBCs in the sediment samples. The sample with the highest detections of SVOCs was sample SED-2; two samples, SED-6 and SED-7, were non-detect for SVOCs. Three metals, arsenic, iron, and lead, were detected at concentrations exceeding residential or industrial RBCs. Arsenic was detected above the industrial soil RBC of 3.8 mg/kg in six of the seven sediment samples, with results ranging from 9.1 mg/kg to 32.3 mg/kg. Lead was detected in one sediment sample above the action level of 400 mg/kg, at a concentration of 814 mg/kg. Concentrations of iron in the majority of the sediment samples exceeded the residential RBC of 23,000 mg/kg. Several VOCs were detected in the sediment samples; however, the concentrations did not exceed residential or industrial soil RBCs. Several pesticides were detected in the sediment samples with concentrations below applicable RBCs, with the exception of the concentration of dieldrin of 60 µg/kg in one sample, SED-2, which exceeds the residential soil RBC of 40 µg/kg. PCBs were detected in several samples below the industrial soil RBC; however, the concentrations of PCBs

in two of the seven samples did exceed the residential soil RBC of 320 µg/kg, with results ranging from 380 µg/kg to 650 µg/kg (Ref. 5).

One VOC, chloroform, was detected in one groundwater sample at a concentration of 1.6 micrograms per liter (µg/L), which exceeds the tap water RBC of 0.15 µg/L. Concentrations of benzo(a)anthracene exceeded the tap water RBC of 0.092 µg/L in 5 of the 10 groundwater samples, with results ranging from 0.2 µg/L to 0.6 µg/L. Benzo(b)fluoranthene exceeded the tap water RBC of 0.092 µg/L in 5 of the 10 groundwater samples, with results ranging from 0.3 µg/L to 0.8 µg/L. Benzo(a)pyrene exceeded the tap water RBC of 0.0092 µg/L in 5 of the 10 groundwater samples, with results ranging from 0.2 µg/L to 0.6 µg/L. Concentrations of 1,4-dichlorobenzene exceeded the tap water RBC of 0.47 µg/L in 3 of the 10 groundwater samples, with results ranging from 0.8 µg/L to 2.2 µg/L. Indeno(1,2,3-cd)pyrene exceeded the tap water RBC of 0.092 µg/L in 3 of the 10 groundwater samples, with results ranging from 0.3 µg/L to 0.4 µg/L. Bis(2-ethylhexyl)phthalate was detected in one groundwater sample at a concentration of 6.2 µg/L, which exceeds the tap water RBC of 4.8 µg/L. Concentrations of total arsenic exceeded the tap water RBC of 0.045 µg/L in 4 of the 10 groundwater samples, with results ranging from 5 µg/L to 32.7 µg/L. Total aluminum in two samples exceeded the tap water RBC of 37,000 µg/L, at concentrations of 52,900 µg/L and 46,700 µg/L. Total iron was detected above the tap water RBC of 11,000 µg/L in all 10 groundwater samples, ranging in concentrations from 12,300 µg/L to 163,000 µg/L. Total lead exceeded the action level of 15 µg/L in 9 of the 10 groundwater samples, with results ranging from 25.2 µg/L to 1,150 µg/L. Total manganese exceeded the tap water RBC of 730 µg/L in 5 of the 10 groundwater samples, with results ranging from 1,450 µg/L to 4,810 µg/L (Ref. 5).

Although constituents were detected in samples collected as part of the Level II Survey, the report attributed concentrations of the constituents to natural conditions in the area, impacts from surface water runoff from adjacent properties and streets, and nonhazardous materials previously disposed on the property (Ref. 5). The Level II Survey did not include comparisons of the analytical results to background levels.

In July 2017, EPA conducted a CERLA Preliminary Assessment (PA) of the Site. As part of the PA, the 1999 Level II Survey surface water and sediment data were re-evaluated in comparison to EPA Region 3 Biological Technical Assistance Group (BTAG) screening levels for freshwater. Numerous VOCs, SVOCs, pesticides, PCBs, and inorganics were determined to be present in the surface water and sediment at concentrations exceeding BTAG levels; however, based on the information provided in the USFWS report, it was not known whether the concentrations of contaminants were attributable to the alleged disposal and potentially contaminated fill material at the Norwood Landfill site (Ref. 6).

No previous investigations have been conducted in the residential portions of the Site. As stated in Section 2.1, EPA received complaints from concerned citizens regarding the historical use of the surrounding area as a waste dump for landfill material and laboratory equipment, as well as the use of potentially contaminated fill material prior to during construction of the housing development.

3.0 SOURCE CHARACTERISTICS

This section describes the sources associated with the Site and provides information on the source sampling locations and analytical data.

3.1 SOURCE DESCRIPTION

For Hazard Ranking System (HRS) purposes, a source is defined as an area where a hazardous substance has been deposited, stored, or placed, as well as those soils that have become contaminated from the migration of a hazardous substance. The potential sources associated with the Site are potentially contaminated fill material (i.e., soil) from areas excavated when the Walt Whitman Bridge was constructed, as well as potentially contaminated soil in undeveloped areas surrounding the residential neighborhood where dumping and landfilling may have occurred. Sampling locations and analytical results are presented in the following sections.

3.2 SAMPLING LOCATIONS

On September 26 and 27, 2017, WESTON collected a total of 20 surface (0 to 6 inches below ground surface [bgs]) soil and 9 subsurface (24 to 48 inches bgs) soil samples, including 1 duplicate surface soil sample, 2 background surface soil samples, and 1 background subsurface soil sample, from the Norwood Landfill site in accordance with the EPA-approved *Final Field Sampling and Analysis Plan for the Norwood Landfill Site* prepared by WESTON (i.e., the FSP) (Ref. 7). A photographic documentation log of the samples is provided in Appendix A and the field logbook notes are provided in Appendix B.

As shown in Figure 3, soil samples collected in September 2017 are located in the wooded right-of-way area behind the homes along E. Winona Avenue and throughout the wooded area adjacent to Darby Creek. The surface (0 to 6 inches bgs) soil samples collected directly behind the homes, SS-01 through SS-06, were collected to determine whether fill material used during the construction of the Lower Norwood neighborhood may contain contaminants at concentrations that may pose a risk to human health. Additionally, boreholes were dug and subsurface soil samples were collected at three locations, SB-01, SB-04 and SB-05, to a depth of 48 inches bgs to determine whether landfill material was present below the surface. As indicated in the field logbook notes provided in Appendix B, no debris or landfill material was observed at locations SB-01 and SB-04; glass debris was observed at location SB-05. Samples were collected from the boreholes between 24 and 48 inches bgs.

With the exception of sample locations SS-17, SS-18, and SB-18, the remainder of the samples were collected throughout the wooded area adjacent to Darby Creek, including sample SS-12, collected near the public fishing dock location on Muckinipattis Creek, and samples SS-19 and SB-19, collected near the public fishing dock located on Darby Creek. In general, glass and plastic debris was observed at several of the subsurface soil sample locations throughout the wooded area. Additionally, municipal trash and debris was observed on the ground surface throughout the wooded area. To document background levels of constituents, samples SS-17, SS-18, and SB-18 were collected at Norwood Borough Park from areas not suspected of having been impacted by historical dumping or placement of materials excavated during the

construction of the Walt Whitman Bridge as fill. One small piece of glass was observed in the soil at surface soil location SS-17, collected along the edge of a baseball field, but no fill or debris was found at location SS-18 or SB-18.

3.3 ANALYTICAL RESULTS

The surface and subsurface soil samples were submitted to and analyzed by the assigned Contract Laboratory Program (CLP) laboratory for low level TAL VOCs, SVOCs, pesticides, and PCBs; for TAL polycyclic aromatic hydrocarbons (PAHs) by Selective Ion Monitoring (SIM); for TAL metals through Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES); and mercury through Cold Vapor Atomic Absorption (CVAA). Analysis was conducted in accordance with EPA CLP Methods SOM02.4 for organics and ISM02.4 for inorganics (Refs. 8 and 9).

Analytical summary tables for results detected above the reporting detection limit (RDL) (i.e. adjusted contract-required quantitation limits [CRQLs] with respect to dilution factor and percent solids) are provided in Tables 1, 2, and 3. The tables also reflect the concentrations of compounds or elements that are considered to be elevated due to being detected in soil samples 3 times above the concentrations detected in the background samples (SS-17 and SS-18 for the surface soil samples and SB-18 for the subsurface soil samples). Results for compounds or elements that were not detected above RDLs in the background samples are also considered to be elevated if they were detected at a concentration equal to or greater than the background sample RDL. Sample result qualifiers, where applicable, are included in the analytical summary data tables; however, they are not included in the following discussion of analytical results. The laboratory analytical data packages are included in Attachment 1.

The soil analytical results were compared to EPA Regional Screening Levels (RSLs) for industrial and residential soil based on target cancer risk of 1E-06 and target hazard quotient of 0.1. EPA RSLs are generic risk-based concentrations that are intended to assist risk assessors and others in initial screening level evaluations of environmental measurements. RSLs combine human health toxicity values with standard exposure pathway (i.e., inhalation, dermal, and

ingestion) factors to estimate contaminant concentrations in environmental media (soil, air, and water) that are considered by EPA to be health protective based on human exposures over a lifetime. RSLs do not address impacts to ecological targets. RSLs are included here for comparison purposes only; they are not legally enforceable standards (Ref. 10).

As shown in Table 1, elevated concentrations of VOCs were detected in several of the soil samples. Five surface soil samples (SS-02, SS-03, SS-04, SS-05, and SS-06) and two subsurface soil samples (SB-09 and SB-13) contained elevated concentrations of acetone and/or methylene chloride. Detected concentrations did not exceed EPA RSLs for residential or industrial soil. One surface soil sample, SS-02, contained an elevated concentration of toluene at 6.2 µg/kg, well below the EPA RSLs, and one surface soil sample, SS-14, contained an elevated concentration of ethanol, for which there are no RSLs. Two subsurface soil samples, SB-09 and SB-13, contained elevated concentrations of ethylbenzene, 2-butanone, 1,4-dichlorobenzene, and/or styrene; however, the concentrations did not exceed EPA RSLs. As further discussed in the attached data validation report, a portion of the analytical results for sample SS-19 were rejected because laboratory internal standards were not within control limits.

Surface soil samples were analyzed for PAHs by means of SIM analysis to achieve lower detection limits, and by routine SVOC analysis. As shown in Table 1, numerous PAHs were detected in the surface soil samples by SIM analysis. Surface soil sample SS-06 was not analyzed by SIM analysis due to high levels of PAHs detected in the sample during routine SVOC analysis. Concentrations of naphthalene (two samples as high as 37 µg/kg), 2-methylnaphthalene (three samples as high as 68 µg/kg), acenaphthylene (four samples as high as 40 µg/kg), acenaphthene (seven samples as high as 100 µg/kg), fluorene (six samples as high as 110 µg/kg), phenanthrene (seven samples at estimated concentrations as high as 1,100 J µg/kg), anthracene (eight samples as high as 250 µg/kg), fluoranthene (one sample at an estimated concentration of 2,000 J µg/kg), pyrene (two samples at estimated concentrations as high as 2,300 J µg/kg), and benzo(a)anthracene (two samples at estimated concentrations as high as 1,400 J µg/kg) were detected at elevated concentrations in the surface soil samples. With the exception of the concentrations of benzo(a)anthracene in sample SS-14, and its duplicate SS-20, exceeding the EPA RSL for residential soil of 1,100 µg/kg, elevated concentrations of PAHs

detected by SIM analysis in surface soil samples did not exceed applicable EPA RSLs for residential or industrial soil.

Also shown in Table 1, the majority of the detections of PAHs by SIM analysis in the nine subsurface soil samples were at elevated concentrations, with the exception of SB-01, which only contained elevated concentrations of phenanthrene. Elevated concentrations of benzo(a)pyrene in five subsurface soil samples (SB-08, SB-09, SB-10, SB-13, and SB-19) exceeded the EPA RSL for residential soil of 110 µg/kg. Additionally, the elevated concentrations of dibenzo(a,h)anthracene in subsurface soil samples SB-08, SB-09, and SB-19 meet or exceed the EPA RSL for residential soil of 110 µg/kg.

As shown in Table 1, SVOCs were detected in the soil samples by routine SVOC analysis. Surface soil sample SS-06 contained the majority of the elevated detections of SVOCs in the surface soil samples, with concentrations of benzo(a)anthracene (2,900 µg/kg), benzo(b)fluoranthene (4,700 µg/kg), benzo(a)pyrene (2,300 µg/kg), and indeno(1,2,3-cd)pyrene (1,400) exceeding the applicable EPA RSLs for residential soil. Elevated SVOC concentrations in the subsurface soil samples were comparable to SIM analysis results and exceedances.

As shown in Table 2, PCBs were detected in the majority of the soil samples, including the background surface soil samples SS-17 and SS-18. SS-17 contained 36 µg/kg of Aroclor-1254 and 17 µg/kg of Arloclor-1260. SS-18 contained 77 µg/kg of Aroclor-1254 and 57 µg/kg of Arloclor-1260. Two surface soil samples, SS-05 and SS-09, contained elevated concentrations of PCBs. SS-05 contained 450 µg/kg of Aroclor-1254, which exceeds the EPA RSL for residential soil of 120 µg/kg. SS-05 and SS-09 contained elevated concentrations of Aroclor-1260 at 240 µg/kg and 280 µg/kg, respectively, which meet or exceed the EPA RSL for residential soil of 240 µg/kg. PCBs were not detected at elevated concentrations in the subsurface soil samples.

As shown in Table 2, twelve surface soil samples contained elevated concentrations of pesticides such as 4,4-DDD (two samples as high as 130 µg/kg), 4,4-DDE (five samples as high as

23 µg/kg), 4,4-DDT (five samples as high as 66 µg/kg), cis- and trans-chlordane (six samples as high as 24 µg/kg and 25 µg/kg, respectively), heptachlor (one sample at 2.4 µg/kg), heptachlor epoxide (one sample at 3.5 µg/kg), dieldrin (three samples as high as 85 µg/kg), and aldrin (one sample at 18 µg/kg). With the exception of the concentration of dieldrin in sample SS-05 exceeding the EPA RSL for residential soil of 34 µg/kg, elevated concentrations did not exceed EPA RSLs for residential or industrial soil. Six subsurface soil samples contained elevated concentrations of pesticides such as 4-DDD (three samples as high as 72 µg/kg), 4,4-DDE (four samples as high as 55 µg/kg), 4,4-DDT (three samples as high as 24 µg/kg), cis- and trans-chlordane (five samples as high as 30 µg/kg and 27 µg/kg, respectively), heptachlor (one sample at 2.2 µg/kg), heptachlor epoxide (one sample at 2.2 µg/kg), dieldrin (two samples as high as 540 µg/kg), aldrin (two samples as high as 440 µg/kg), and endrin ketone (one sample at 18 µg/kg). With the exception of the concentrations of dieldrin and aldrin in sample SB-05 exceeding the EPA RSLs for residential and industrial soil of 34 µg/kg and 140 µg/kg (dieldrin) and 39 µg/kg and 180 µg/kg (aldrin), respectively, elevated concentrations did not exceed EPA RSLs for residential or industrial soil.

Table 3 summarizes the inorganics that were detected in the surface and subsurface soil samples. Inorganics that were detected at elevated concentrations in the surface soil samples include cadmium (two samples at 2.3 mg/kg), cobalt (one sample at 16.3 mg/kg), copper (one sample at 64.2 mg/kg), lead (four samples as high as 358 mg/kg), manganese (one sample at 710 mg/kg), and potassium (six samples as high as 3,180 mg/kg). Inorganics that were detected at elevated concentrations in the subsurface soil samples include barium (three samples as high as 235 mg/kg), cadmium (two samples as high as 4.5 mg/kg), copper (three samples as high as 100 mg/kg), lead (seven samples as high as 1,630 mg/kg), manganese (one sample at 525 mg/kg), mercury (five samples as high as 0.96 mg/kg), nickel (one sample at 35.8 mg/kg), potassium (two samples as high as 1,500 mg/kg), silver (two samples as high as 2.9 mg/kg), and zinc (six samples as high as 1,130 mg/kg). The elevated concentration of cobalt in surface soil sample SS-07 exceeded the EPA RSL for residential soil of 2.3 mg/kg. Additionally, the concentrations of manganese in surface soil sample SS-05 and subsurface soil sample SB-05 exceeded the EPA RSL for residential soil of 180 mg/kg. Two subsurface soil samples, SB-09

and SB-13, contained elevated concentrations of lead exceeding the lead screening level. There is no RSL for lead; however, one of the subsurface soil samples contained concentrations above the EPA recommended level of 400 mg/kg for residential soil, but below the recommended level of 1,200 mg/kg for industrial soil, and another subsurface soil sample contained a concentration of lead above the EPA recommended level of 1,200 mg/kg for industrial soil.

The concentrations of arsenic detected in all the surface and subsurface soil samples, including the background samples, exceeded the EPA RSL of 0.68 mg/kg for residential soil, and all but two samples exceed the EPA RSL of 3 mg/kg for industrial soil. The concentrations of the remaining detected inorganics did not exceed EPA RSLs for residential or industrial soil.

3.4 SOURCE CONCLUSIONS

Analytical results for surface and subsurface soil samples collected from the Site document the presence of hazardous substances, including VOCs, SVOCs, pesticides, PCBs, and inorganics, at concentrations significantly above background.

4.0 GROUNDWATER MIGRATION PATHWAY

This section describes the Site's hydrogeological setting, targets associated with the groundwater migration pathway, and conclusions regarding the groundwater migration pathway.

4.1 REGIONAL AND SITE GEOLOGY

The Site is located in the Lowland and Intermediate Upland Section of the Atlantic Coastal Plain Physiographic Province, which is characterized by a flat upper terrace surface underlain by unconsolidated to poorly consolidated sand and gravel. These deposits rest upon bedrock comprising schist, gneiss, and other metamorphic rocks (Ref. 11). The Site is underlain by the Quaternary Age unconsolidated deposits classified as Trenton gravel, which consists of gray or pale-reddish-brown, gravelly sand interstratified with crossbedded sand and clay/silt beds; the unit also includes areas of alluvium and swamp deposits. The Trenton gravel deposits are generally less than 20 feet thick; however, the unit may be as thick as 50 feet locally (Ref. 12). In the vicinity of the Site, the Wissahickon Formation underlies the Trenton gravel deposits. The

Wissahickon Formation consists of dark- to light-gray, well-foliated schist and gneiss, having some quartz and feldspar-rich layers (Ref. 12). The Wissahickon Formation was originally sediment of variable thickness and composition. The original sediments have been completely recrystallized by metamorphism. The formation is highly variable in composition and degree of metamorphism. Its thickness is estimated to be 5,000 to 8,000 feet (Ref. 12).

4.2 REGIONAL AND SITE HYDROGEOLOGY

Groundwater flow in the Atlantic Coastal Plain Physiographic Province is through intergranular (i.e., primary) openings, under either unconfined or confined aquifer conditions (Ref. 13). Groundwater occurs mainly in the weathered zone above bedrock and in bedrock fractures to depths of about 300 feet bgs. The water table in Delaware County near the Delaware River estuary fluctuates in response to tides. The amplitude of these fluctuations decreases with distance from the estuary. Tidal effects are most pronounced in the unconsolidated deposits, which can transmit gradient changes over long distances because of high hydraulic conductivity (Ref. 12). For the purposes of this SI, it is assumed that the Delaware River is a hydrologic boundary.

The unconsolidated deposits of the Trenton gravel are discontinuous in extent and variable in depth. The sediments are poorly sorted, and the wide range in grain size causes the hydrologic properties to vary considerably. In many areas, the deposits are too thin to yield much water to wells over a sustained period, but they do provide temporary storage of water that recharges the underlying units. The depths to water in wells in the Trenton gravel range from 0.1 to 15 feet bgs. This shallow depth to water is related to the proximity of the Trenton gravel to the Delaware River. Measured specific capacities of wells in the Trenton gravel range from 1.3 to 2.6 gallons per minute per foot (gpm/ft) (Ref. 12).

The Wissahickon Formation is the most productive of the water-bearing rock units in Delaware County. Water is present in joint planes and locally in fault planes. The reported depths of wells in the Wissahickon Formation range from 43 to 675 feet bgs; the median is 187 feet bgs. The specific capacities of wells in the Wissahickon Formation range from 0.004 to 2.9 gpm/ft., and

the median is 0.2 gpm/ft. Most of the water-bearing zones are penetrated within 300 feet bgs (Ref. 12).

4.3 GROUNDWATER TARGETS

Potential groundwater targets can include persons who obtain drinking water from private domestic wells within the 4-mile radius target distance limit (TDL) of the Site and persons supplied drinking water from public water suppliers whose water source is from groundwater wells within the 4-mile TDL.

The primary public water supplier serving persons within a 4-mile TDL is Aqua Pennsylvania Water Company (Aqua Pennsylvania). The primary sources of water for Aqua Pennsylvania include 8 surface water intakes and 28 groundwater wells (Refs. 14 and 15). There are no supply wells for Aqua Pennsylvania located within the 4-mile TDL; therefore, persons served through this supply network are not considered as targets as part of this SI (Ref. 16).

Based on the Pennsylvania Groundwater Information System (PaGWIS) database search, there are no public supply wells within the 4-mile TDL, but nine domestic wells were identified within the 4-mile radius TDL, as shown in Figure 4, 4-Mile Radius Map with Distance Rings (Ref. 16). The majority of the wells appear to be owned by businesses, and one well is owned by Upper Darby Township (Ref. 16). Upper Darby Township is supplied potable water by the Aqua Pennsylvania main system; therefore, the use of the well identified in PaGWIS as domestic is not expected to be a drinking water well (Refs. 16 and 17). Additionally, Upper Darby Township was not listed in the Pennsylvania Drinking Water Reporting System as a public water supplier (Ref. 18). The wells identified in PaGWIS range in depth from 95 feet to 600 feet. One well is completed in the Trenton gravel. The remainder of the wells are completed in the Wissahickon Formation, Pennsauken Formation, or the Gabbro/Gabbroic Gneiss Formation. Using the U.S. Census Bureau persons-per-household value of 2.65 for Delaware County, approximately 24 persons rely on private domestic wells within the 4-mile TDL (Ref. 19). No public supply wells were identified within the 4-mile TDL (Ref. 16). Persons within a 4-mile radius of the Site in

New Jersey who may rely on groundwater for potable use are not considered potential targets because the Delaware River is assumed to be a regional hydrologic boundary.

The table below provides a summary of domestic wells within 4 miles of the Site and the population served.

Radial Distance (miles)	Domestic Wells	Population Served	Public Supply Wells	Population Served	Total Population Served
0.00 to 0.25	0	0	0	0	0
0.25 to 0.50	0	0	0	0	0
0.50 to 1.0	0	0	0	0	0
1.0 to 2.0	0	0	0	0	0
2.0 to 3.0	4	11	0	0	11
3.0 to 4.0	5	13	0	0	13
Total	9	24	0	0	24

Refs. 16 and 19

4.4 GROUNDWATER CONCLUSIONS

Groundwater samples were not collected as part of this SI. Shallow groundwater samples (3 to 6 feet bgs) were collected in 1999 from locations within the undeveloped portion of the Site. As previously discussed in Section 2.3, one VOC and six SVOCs, primarily PAHs, were detected in several of the groundwater samples at concentrations exceeding the EPA RBCs for tap water. Additionally, concentrations of total aluminum, arsenic, iron, lead, and manganese exceeded the tap water RBCs in several groundwater samples. A background groundwater sample was not collected as part of that assessment.

The majority of persons within a 4-mile radius of the Site are supplied drinking water by Aqua Pennsylvania, whose source water consists of groundwater wells outside the 4-mile TDL and surface water. Potential targets associated with the groundwater migration pathway include the approximate 24 persons who rely on the nine private domestic wells that were identified within a

4-mile radius of the Site; however, as previously noted, the majority of the identified domestic wells appear to be owned by businesses rather than private citizens.

5.0 SURFACE WATER MIGRATION PATHWAY

This section describes the Site's hydrologic setting, targets associated with the surface water migration pathway, and conclusions regarding the surface water migration pathway.

5.1 HYDROLOGIC SETTING

The Site is located on the Lowland and Intermediate Upland Section of the Atlantic Coastal Plain Physiographic Province and is characterized by flat terrain with low relief ranging from 0 to 200 feet high. The surface is well-draining in a dendritic pattern (Ref. 9). The Site is bordered by Muckinipattis Creek to the east, which flows into Darby Creek at the southeast corner of the Site, and by Darby Creek to the south, which flows for approximately 2.25 miles to the west/southwest before converging with the Delaware River. The 15-mile downstream TDL is completed in the Delaware River as shown in Figure 5.

The Site is situated in the Darby Creek watershed and is part of the Delaware River Basin (Ref. 20). Portions of the Site consist of fully developed urban properties surrounded by undeveloped areas that are overgrown with brush and trees. Surface water runoff in the developed portions of the Site most likely flows to storm drains along E. Winona Avenue and Essex Road. The ground surface is relatively flat near the Site; surface water runoff in the undeveloped portions of the Site would most likely percolate into the ground or run off into Darby Creek to the south or Muckinipattis Creek to the east. Both Darby Creek and Muckinipattis Creek are tidally-influenced in the vicinity of the Site (Ref. 20).

5.2 SURFACE WATER TARGETS

The primary public water supplier near the Site is Aqua Pennsylvania, which obtains its source water from 8 surface water intakes and 28 groundwater wells that provide drinking water to approximately 820,000 persons in Montgomery, Chester, and Delaware Counties (Ref. 15). None of the surface water intakes are located along the 15-mile TDL for the Site (Ref. 16); therefore,

persons served through this supply network are not potential targets associated with the surface water migration pathway.

According to the Pennsylvania Fish and Boat Commission, there are three access points for boats along the 15-mile TDL, one on Darby Creek and two on the Delaware River (Ref. 21). Additionally, there is a floating dock on the Muckinipattis Creek just above its confluence with Darby Creek and another floating dock on Darby Creek just below its confluence with Muckinipattis Creek. Based on the presence of several access points to the waterways at and near the Site, it is assumed that recreational fishing (and possibly fishing for consumption) occurs within the 15-mile TDL. Additionally, fishing line was observed in several of the sediment sample ponar grabs during the September 2017 sampling event.

As shown in Figures 1 and 5, John Heinz National Wildlife Refuge is located along Darby Creek across from the Site. John Heinz National Wildlife Refuge consists of a freshwater tidal marsh that encompasses roughly 285 acres (Ref. 22). The tidal portion of Darby Creek and its side channels flow through the refuge and tidal marsh. Darby Creek is known to support a diversity of estuarine fish species such as killifish and mummichogs. Anadromous fish, such as the blueback herring and alewife, use tidal streams and rivers like Darby Creek and its side channels as nursery habitat for juveniles. The American eel, the only catadromous fish species in Atlantic Coast estuaries, spends most of its adult life in freshwater and is common in tidal creeks, rivers, and marsh channels. Waterfowl, like the American black duck, lesser scaup, and northern pintail, as well as shorebirds, like black-bellied plover, greater yellowlegs, and semipalmated sandpiper, also utilize open water habitats along Darby Creek for migratory stopovers (Ref. 22).

State endangered species such as the least bittern (*Ixobrychus exilis*) are known to breed at the refuge. Other Pennsylvania endangered species that have been observed at the refuge during migration, but are considered occasional or rare in abundance, include the yellow-crowned night-heron (*Nyctanassa violacea*), common tern (*Sterna hirundo*), black tern (*Chlidonias niger*), king rail (*Rallus elegans*), short-eared owl (*Asio flammeus*), and loggerhead shrike (*Lanius ludovicianus*). The king rail historically nested at the Site (prior to 2000). The federally endangered piping plover (*Charadrius melodus*), listed as extirpated in Pennsylvania, is an

occasional "accidental" occurrence during migration. Bald eagles (*Haliaeetus leucocephalus*), a former federally listed endangered species that has recovered and been delisted, have historically utilized the refuge for hunting and roosting. The first known bald eagle nest on the refuge was built in 2009 and the first two refuge eaglets successfully hatched in 2010. The pair has returned to breed on the refuge every year since (Ref. 20). The refuge also supports several rare species of turtle such as the state-endangered eastern mud turtle (*Kinosternon subrubrum*), the northern diamond-backed terrapin (*Malaclemys terrapin*), and a significant population of the state-threatened eastern redbelly turtle (*Pseudemys rubriventris)*. Redbelly turtles are associated with the freshwater tidal marsh and open waters of Darby Creek. A state-endangered species, the southern coastal plain leopard frog (*Lithobates sphenocephalus utricularius*), is known to inhabit and breed at the refuge in shallow open water and in isolated vernal pools (Ref. 22). In addition to the federally or state-listed threatened or endangered species observed at John Heinz National Wildlife Refuge, three federally listed threatened or endangered species, the Atlantic sturgeon (*Acipenser oxyrinchus*), the bog turtle (*Glyptemys muhlenbergii*), and the sensitive joint-vetch (*Aeschynomene virginica*), are known to occur within Delaware County, along with more than 50 state-listed threatened and endangered species including the peregrine falcon (*Falco peregrinus)*, the osprey (*Pandion haliaetus)*, several additional birds, several turtles, and many plants associated with wetland and marshy habitats (Ref. 23). Approximately 1.14 miles of wetlands are located along Darby Creek, with an additional 7.28 miles of wetland frontage located along the TDL in the Delaware River (Ref. 24).

5.3 SAMPLING LOCATIONS

On September 26, 2017, WESTON collected 12 co-located surface water and sediment samples, including 3 background samples (2 from Muckinipattis Creek and 1 from Darby Creek) and 1 duplicate sample, in accordance with the EPA-approved *Final Field Sampling and Analysis Plan for the Norwood Landfill Site* (Ref. 7). The samples were collected to determine whether there has been a release of hazardous substances associated with source areas to the surface water pathway. The surface water and sediment sample locations are shown in Figure 3. Field sampling forms are provided in Appendix B.

Co-located surface water and sediment samples SW-01/SD-01, SW-02/SD-02, and SW-03/SD-03 were collected from Muckinipattis and Darby Creeks to document background conditions upstream of potential source areas associated with the Site. The SW-01/SD-01 samples were collected from Muckinipattis Creek upstream of the former Norwood Borough permitted landfill and former borough sewage treatment plant (current location of DELCORA pumping station), the SW-02/SD-02 samples were collected from Muckinipattis Creek just downstream from the former Norwood Borough permitted landfill and former borough sewage treatment plant, and the SW-03/SD-03 samples were collected upstream of potential source areas on Darby Creek. As noted in Section 5.1, both Darby and Muckinipattis Creeks are tidally-influenced in the vicinity of the Site. Trash was generally observed floating in the creeks as well as along the creek banks. Fishing line was entangled in the ponar sampler at sample locations SW-03/SD-03 and SW-04/SD-04.

5.4 ANALYTICAL RESULTS

Surface water and sediment samples were submitted to and analyzed by the assigned CLP laboratory for TAL VOCs, SVOCs, pesticides, and PCBs; for PAHs by SIM; for TAL metals by ICP-AES for sediment samples and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for surface water samples; and mercury through CVAA. Analysis was conducted in accordance with EPA CLP Methods SOM02.4 for organics and ISM02.4 for inorganics (Refs. 8 and 9).

Analytical summary tables for results detected above RDLs (i.e., adjusted CRQLs with respect to dilution factor and percent solids) are provided in Tables 4 through 6. The surface water and sediment sample analytical results were compared to EPA Region 3 BTAG freshwater screening criteria (Ref. 25). The tables also reflect the elevated concentrations of compounds or elements that were detected in the samples 3 times above the concentrations detected in the background samples (SW-01/SD-01 and SW-03/SD-03). Samples containing compounds or elements that were not detected above the RDL in the background sample are considered to be elevated if they were detected at a concentration equal to or greater than the background sample RDL. Sample result qualifiers, where applicable, are included in the analytical summary data tables; however,

they are not included in the following discussion of analytical results. The laboratory analytical data packages are included in Attachment 1.

VOCs, SVOCs, PAHs, PCBs, and pesticides were not detected above RDLs in the surface water samples.

As shown in Table 4, concentrations of aluminum, barium, iron, and manganese in all the surface water samples exceeded the applicable BTAG screening levels. Additionally, concentrations of lead exceeded the BTAG screening level in the majority of the samples. However, the concentrations of these metals were not elevated compared to background with the exception of the concentration of lead (24.8 µg/L) in one sample (SW-11). Surface water sample SW-11 also contained elevated concentrations of copper (15.7 µg/L) and nickel (18.1 µg/L) that did not exceed applicable BTAG screening levels.

VOCs were not detected above RDLs in the sediment samples. As further discussed in the attached data validation report, a portion of the analytical results for sample SD-11 were rejected because laboratory internal standards were not within control limits.

Sediment samples were analyzed for PAHs by means of SIM analysis to achieve lower detection limits and by routine SVOC analysis. As shown in Table 5, background sample SD-02, collected just downstream of the former Norwood Borough permitted landfill and former borough sewage treatment plant, contained the highest concentrations of PAHs. Many of the detections exceeded applicable BTAG values. Concentrations of PAHs detected in the downstream samples were not elevated with respect to background. However, the concentrations of indeno(1,2,3-cd)pyrene in samples SD-03, SD-08, and SD-12 exceed the EPA BTAG value of 17 µg/kg.

As shown in Table 5 one sample, SD-11, contained an elevated concentration of a pesticide (methoxychlor at 57 µg/kg). The concentration of methoxychlor in sample SD-11 exceeds the EPA BTAG value of 18.7 µg/kg. Additionally, the concentrations of cis- and trans-chlordane detected in background sample SD-02 exceed the EPA BTAG values of 3.24 µg/kg for chlordane. PCBs were not detected above the RDLs in the sediment samples.

As shown in Table 6, concentrations of arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, and zinc in the sediment samples exceeded the applicable BTAG screening levels. However, with the exception of the concentration of mercury (1.1 mg/kg) detected in sample SD-12, the concentrations of these metals were not elevated compared to background. Sample SD-12 is a duplicate of SD-04. An elevated concentration of mercury was not detected in sample SD-04.

5.5 SURFACE WATER CONCLUSIONS

A release of hazardous substances to the surface water migration pathway attributable to the Site has not been documented. With the exception of the concentration of copper and nickel in one surface water sample, SW-11, and the concentrations of mercury in one sediment sample, SD-12, elevated concentrations of hazardous substances were not detected in the surface water and sediment samples. In general, the sample containing the highest concentrations is background sample SD-02, which was collected just downstream of the former Norwood Borough permitted landfill and former borough sewage treatment plant.

Areas of alleged disposal and alleged fill material from the Delaware River directly border Muckinipattis Creek and Darby Creek. There are no drinking water targets associated with the surface water migration pathway. Access to the creeks is unrestricted, with public access for recreational purposes, including fishing along Darby and Muckinipattis Creeks. Potential targets associated with the surface water migration pathway include Muckinipattis Creek, Darby Creek, and the Delaware River as fisheries, four federally-listed endangered species, more than 50 state-listed threatened and endangered species, the John Heinz National Wildlife Refuge, and 8.42 miles of wetland frontage located along the 15-mile TDL.

6.0 SOIL EXPOSURE AND AIR MIGRATION PATHWAYS

This section provides information regarding the physical conditions of the Site and targets associated with the soil exposure and air migration pathways. The analytical results for soil samples collected at the Site are discussed in Section 3.3.

6.1 PHYSICAL CONDITIONS

The Site consists of a residential lower Norwood neighborhood and the surrounding property located between E. Winona Avenue and Darby Creek. The residential portion of the Site consists of paved roads and individual residential houses. The portion of the Site surrounding the neighborhood where alleged dumping occurred is undeveloped and overgrown with heavy brush and trees. Portions of the undeveloped areas are used for recreational purposes (i.e., fishing docks along Muckinipattis and Darby Creeks, and the Historic Morton Morton House).

6.2 SOIL AND AIR TARGETS

It has been alleged that potentially contaminated material from areas excavated when the Walt Whitman Bridge was constructed was used as fill material during construction of the houses in the lower Norwood neighborhood and that the undeveloped areas surrounding the residential neighborhood have been used as a waste dump; therefore, residents who reside in the lower Norwood neighborhood are potential targets located on and within 200 feet of potential contamination. No schools or daycare centers are located on the Site or within 200 feet of potential source areas. Norwood Borough Park is located approximately 1,000 feet northeast of the Site. John Heinz National Wildlife Refuge is approximately 1,130 feet south of the Site, across Darby Creek. Norwood Elementary School is located approximately 1,700 feet to the northwest. The estimated population and wetland acreage within a 4-mile radius of the Site are summarized in the tables below (Refs. 24 and 26).

Radial Distance from Site (miles)	Population (number of persons)
0.00 - 0.25	764
>0.25 - 0.50	2,521
>0.50 - 1.0	10,667
>1.0 - 2.0	41,090
>2.0 - 3.0	57,454
>3.0 - 4.0	85,818
Total	198,315

Ref. 26

Radial Distance from Site (miles)	Wetlands (acreage)
0.00 - 0.25	6.13
>0.25 - 0.50	89.68
>0.50 - 1.0	190.19
>1.0 - 2.0	510.62
>2.0 - 3.0	190.33
>3.0 - 4.0	236.41
Total	1,223.36

Ref. 24

6.3 SAMPLING LOCATIONS

As discussed in Section 3.2, in September 2017, WESTON collected a total of 20 surface (0 to 6 inches bgs) soil samples and 9 subsurface (24 to 48 inches bgs) soil samples, including duplicate and background samples, from the right-of-way area behind the residences along E. Winona Avenue and in the wooded area along Muckinipattis and Darby Creeks.

Based on analytical data from the September 2017 sampling event discussed in Section 3.3, during which samples collected from the right-of-way area behind the residences along E. Winona Avenue and in the wooded area along Muckinipattis and Darby Creeks contained

elevated concentrations (i.e., concentration detected 3 times above background levels, or concentrations detected above background RDLs for compounds or elements that were not detected above RDLs in the background samples) of PAHs, pesticides, metals, and PCBs, EPA mailed out letters to approximately 37 residences along E. Winona Avenue, as well as to a few residents, living along Essex Road, Love Lane, Martin Lane, and Mohawk Avenue, who expressed interest in having their property sampled. EPA gained access to 21 residential properties to collect soil samples. On May 23 and 24, 2018, WESTON collected a total of 21 surface (0 to 12 inches bgs) soil samples from 21 residential properties, including 2 duplicate samples, in accordance with the EPA-approved *Addendum to the Final Field Sampling and Analysis Plan for the Norwood Landfill Site* prepared by WESTON (Ref. 27). Sample locations are shown on Figure 3. A photographic documentation log of the sampling effort is provided in Appendix A and the field logbook notes are provided in Appendix B.

6.4 ANALYTICAL RESULTS

The residential surface soil samples were submitted to and analyzed by the assigned Contract Laboratory Program (CLP) laboratory for low level TAL VOCs, SVOCs, pesticides, and PCBs; for TAL PAHs by SIM; for TAL metals through ICP-AES; and for mercury through CVAA. Analysis was conducted in accordance with EPA CLP Methods SOM02.4 for organics and ISM02.4 for inorganics (Refs. 8 and 9).

Analytical summary tables for results detected above the RDLs (i.e., adjusted CRQLs with respect to dilution factor and percent solids) are provided in Tables 7, 8, and 9. The tables also reflect the concentrations of compounds or elements that are considered to be elevated due to being detected in soil samples 3 times above the concentrations detected in the background samples (SS-17 and SS-18 during the September 2017 sampling event). Results for compounds or elements that were not detected above RDLs in the background samples are also considered to be elevated if they were detected at a concentration equal to or greater than the background sample RDL. Sample result qualifiers, where applicable, are included in the analytical summary data tables; however, they are not included in the following discussion of analytical results. The laboratory analytical data packages are included in Attachment 1.

The residential soil analytical results were compared to EPA RSLs for residential soil based on a target cancer risk of 1E-06 and target hazard quotient of 0.1. EPA RSLs are generic risk-based concentrations that are intended to assist risk assessors and others in initial screening level evaluations of environmental measurements. RSLs combine human health toxicity values with standard exposure pathway (i.e., inhalation, dermal, and ingestion) factors to estimate contaminant concentrations in environmental media (soil, air, and water) that are considered by EPA to be health protective based on human exposures over a lifetime. RSLs are included here for comparison purposes only; they are not legally enforceable standards (Ref. 10).

As shown in Table 7, concentrations of VOCs were detected in several of the residential soil samples. Four residential surface soil samples (RS-04, RS-06, RS-13, and RS-21) contained elevated concentrations of acetone ranging from 16 µg/kg to 68 µg/kg, three residential surface soil samples (RS-01, RS-01D, and RS-05) contained elevated concentrations of 2-hexanone ranging from 12 µg/kg to 18 µg/kg, and three residential surface soil samples (RS-06, RS-09, and RS-14) contained elevated concentrations of styrene ranging from 19 µg/kg to 46 µg/kg . The elevated concentrations of VOCs in the residential surface soil samples did not exceed EPA RSLs for residential soil. As further discussed in the attached data validation report, a portion of the analytical results for the VOC analysis was rejected because laboratory internal standards were not within control limits. Additionally, all VOC data associated with sample RS-17 and its duplicate RS-17D were rejected due to the samples not being analyzed within the technical holding time.

Residential surface soil samples were analyzed for PAHs by means of SIM analysis to achieve lower detection limits, and by routine SVOC analysis, with the exception of samples RS-19, RS-20, and RS-21, which were not analyzed by SIM analysis due to high levels of PAHs detected in the samples during routine analysis. As shown in Table 7, PAHs were detected in the residential surface soil samples by SIM analysis; however, the concentrations of detected PAHs by SIM analysis in the samples were not elevated with respect to the concentrations detected in the background sample or the background RDL. Additionally, the detected concentrations did not exceed applicable EPA RSLs for residential soil.

As shown in Table 7, SVOCs were detected in the majority of the residential surface soil samples by routine SVOC analysis. Elevated concentrations of SVOCs, in particular PAHs, were primarily detected in three residential surface soil samples (RS-19, RS-20, and RS-21), including naphthalene (as high as 240 µg/kg), acenaphthene (as high as 240 µg/kg), dibenzofuran (as high as 250 µg/kg), fluorene (as high as 270 µg/kg), phenanthrene (as high as 6,500 µg/kg), anthracene (as high as 1,300 µg/kg), carbazole (as high as 550 µg/kg), fluoranthene (as high as 18,000 µg/kg), pyrene (as high as 15,000 µg/kg), butylbenzylphthalate (as high as 1,300 µg/kg), benzo(a)anthracene (as high as 9,100 µg/kg), chrysene (as high as 9,900 µg/kg), benzo(b)fluoranthene (as high as 15,000), benzo(k)fluoranthene (as high as 4,600 µg/kg), benzo(a)pyrene (as high as 9,700 µg/kg), indeno(1,2,3-cd)pyrene (as high as 6,900 µg/kg), and benzo(g,h,i)perylene (as high as 7,600 µg/kg). Additionally, residential surface soil samples RS-05 and RS-11 contained elevated concentrations of phenanthrene. The concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene in residential surface soil samples RS-19, RS-20, and RS-21 exceed applicable EPA RSLs for residential soil.

As shown in Table 8, low levels of PCBs, primarily Aroclor-1260, were detected in the majority of the soil samples, including the background surface soil samples SS-17 and SS-18. SS-17 contained 36 µg/kg of Aroclor-1254 and 17 µg/kg of Arloclor-1260, whereas, SS-18 contained 77 µg/kg of Aroclor-1254 and 57 µg/kg of Arloclor-1260. One residential surface soil sample, RS-19, contained an elevated concentration of PCBs (Arochlor-1260) at 310 µg/kg, which exceeds the EPA RSL for residential soil of 240 µg/kg. The remaining detected concentrations of PCBs were not elevated with respect to background and did not exceed applicable EPA RSLs.

As shown in Table 8, the majority of the residential surface soil samples contained elevated concentrations of at least one pesticide, with samples RS-19, RS-20, and RS-21 containing elevated concentrations of the majority of pesticides analyzed. However, with the exception of the concentrations of dieldrin in samples RS-02 (170 µg/kg) and RS-12 (1,300 µg/kg), the elevated concentrations of pesticides detected in the residential surface soil samples did not exceed applicable EPA RSLs for residential soil.

Table 9 presents a summary of the inorganics that were detected in the residential surface soil samples. Inorganics that were detected at elevated concentrations in the residential surface soil samples include antimony (one sample at 4.2 mg/kg), cadmium (one sample at 3.4 mg/kg), copper (one sample at 264 mg/kg), lead (two samples ranging from 283 mg/kg to 1,800 mg/kg), and zinc (eight samples ranging from 193 mg/kg to 918 mg/kg). The elevated concentration of antimony in residential surface soil sample SS-19 exceeded the EPA RSL of 3.1 mg/kg for residential soil. Additionally, SS-19 contained an elevated concentration of lead exceeding the lead screening level. There is no RSL for lead; however, EPA recommends a screening residential soil level of 400 mg/kg.

The concentrations of arsenic and cobalt detected in all the residential surface soil samples, as well as the background samples collected in September 2017, exceeded the EPA RSL of 0.68 mg/kg and 2.3 mg/kg for residential soil, respectively. Additionally, the concentration of manganese in the majority of the residential surface soil samples and one of the background samples exceeded the EPA RSL of 180 mg/kg for residential soil. The concentrations of the remaining detected inorganics did not exceed EPA RSLs for residential soil.

6.5 SOIL EXPOSURE AND AIR MIGRATION PATHWAY CONCLUSIONS

Soil samples collected from residential property and within 200 feet of residences contain concentrations of VOCs, SVOCs (particularly PAHs), pesticides, PCBs, and inorganics that were also detected in soil samples collected from the area of concern at elevated concentrations with respect to background. However, with the exception of the concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene in residential surface soil samples RS-19, RS-20, and RS-21; the concentration of PCBs in sample RS-19; the concentrations of dieldrin in sample RS-02 and RS-12; and the concentrations of antimony and lead in sample RS-19; elevated concentrations of constituents did not exceed applicable EPA RSLs for residential soil.

Potential targets associated with the soil exposure and air migration pathway include the residents of the lower Norwood neighborhood where potentially contaminated sediment was

used for fill prior to building the neighborhood and where portions of the area were allegedly used as a waste dump, as well as the entire population located within a 4-mile radius of the Site (198,315 persons).

7.0 SUMMARY

The Site consists of residential areas in lower Norwood where residents allege that materials excavated during the construction of the Walt Whitman Bridge, potentially containing elevated concentrations of heavy metals and PCBs, were used for fill prior to construction of the homes, as well as undeveloped areas surrounding the residential neighborhood that were reportedly used by the Borough of Norwood as a landfill. Additionally, residents allege that the undeveloped areas may also have been used as a waste dump by the Delaware County Regional Water Authority as well as Glenolden Laboratories (and, subsequently, Merck, Sharp, and Dohme Pharmaceutical Laboratories).

The surface and subsurface soil samples collected in September 2017 from the right-of-way access area behind the homes along E. Winona Ave. and from the wooded area along Muckinipattis and Darby Creeks confirmed the presence of elevated concentrations of PAHs, pesticides, PCBs, and inorganics. Elevated concentrations of numerous PAHs in several samples exceeded EPA RSLs for residential soil. One surface soil sample, SS-05, contained concentrations of PCBs and pesticides above EPA RSLs for residential soil and one subsurface soil sample, SB-05, contained concentrations of pesticides above EPA RSLs for industrial soil. With the exception of the elevated concentrations of lead in two subsurface soil samples, SB-09 and SB-13, elevated concentrations of inorganics did not exceed EPA RSLs for residential soil.

Groundwater samples were not collected as part of this SI. Shallow groundwater samples (3 to 6 feet bgs) were collected in 1999 from locations within the undeveloped portion of the Site. As previously discussed in Section 2.3, one VOC and six SVOCs, primarily PAHs, were detected in several of the groundwater samples at concentrations exceeding the EPA RBC for tap water. Additionally, concentrations of total aluminum, arsenic, iron, lead, and manganese exceeded the tap water RBC in several groundwater samples.

The majority of persons within a 4-mile radius of the Site are supplied drinking water by Aqua Pennsylvania, which obtains source water from surface water intakes and groundwater wells. All of the groundwater wells are located outside the 4-mile radius of the Site, and none of the surface water intakes are located downstream of the Site along the 15-mile surface water pathway TDL. Potential targets associated with the groundwater migration pathway include the approximately 24 persons who rely on the nine private domestic wells that were identified within a 4-mile radius of the Site; however, as previously noted, the majority of the identified domestic wells appear to be owned by businesses rather than private citizens.

Areas of alleged disposal and alleged fill material from the Delaware River directly border Muckinipattis Creek and Darby Creek. There are no drinking water targets associated with the surface water migration pathway. Access to the creeks is unrestricted, with public access for recreational purposes, including fishing along Darby and Muckinipattis Creeks. Potential targets associated with the surface water migration pathway include the Muckinipattis Creek, Darby Creek, and the Delaware River as fisheries; four federally-listed endangered species; more than 50 state-listed threatened and endangered species; the John Heinz National Wildlife Refuge; and 8.42 miles of wetland frontage located along the 15-mile TDL.

Soil samples collected in May 2018 from residential property and within 200 feet of residences contain concentrations of VOCs, SVOCs (particularly PAHs), pesticides, PCBs, and inorganics that were also detected in soil samples collected from the non-residential area of concern at elevated concentrations with respect to background. However, with the exception of the concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene in residential surface soil samples RS-19, RS-20, and RS-21; the concentration of PCBs in sample RS-19; the concentrations of dieldrin in sample RS-02 and RS-12; and the concentrations of antimony and lead in sample RS-19, elevated concentrations of constituents did not exceed applicable EPA RSLs for residential soil.

No schools or daycare centers are located on the Site or within 200 feet of potential source areas. Norwood Borough Park is located approximately 1,000 feet northeast of the Site. John Heinz National Wildlife Refuge is approximately 1,130 feet south of the Site, across Darby Creek.

Norwood Elementary School is located approximately 1,700 feet to the northwest. Additionally, portions of the Site are used for recreational purposes. There are approximately 198,315 persons residing within a 4-mile radius of the Site.

REFERENCES

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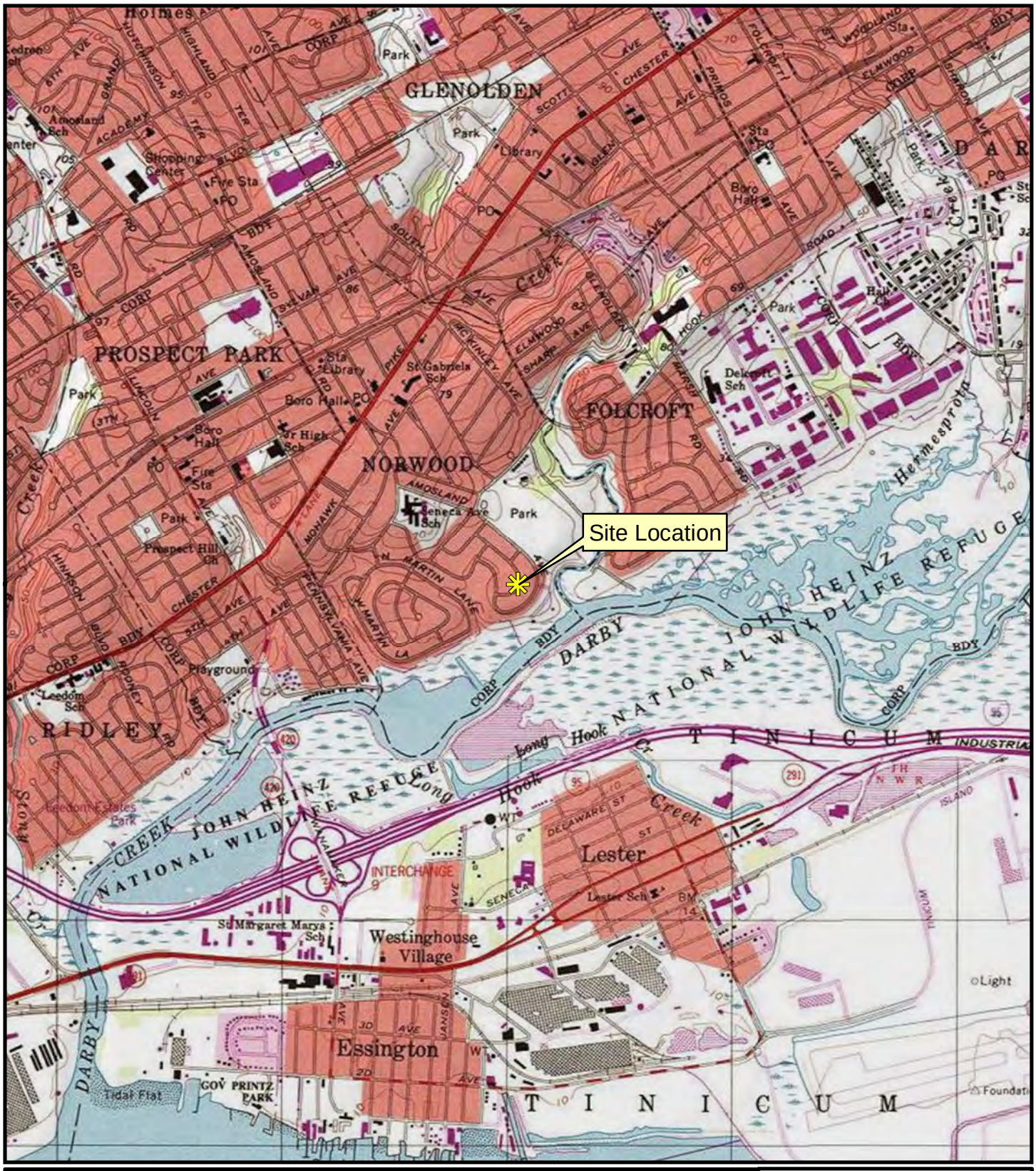
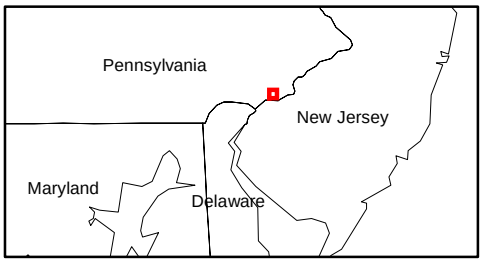
FIGURES





USGS 7.5 Minute Quadrangle
Landsdowne, Pa. 1974.

The source of this map image is Esri, used by the EPA with Esri's permission

Coordinate System:
WGS84 UTM Zone 18N Feet

N

0 2,000

Feet

Norwood Landfill Site
Norwood, Delaware County, PA

Figure 1
Site Location Map

TDD#: W503-17-03-001
Contract: EP-S3-15-02
Prepared: 11/13/2017

WESTON SOLUTIONS

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Legend

- Parcels Previously Sampled by USFWS
- Muckinipattis Creek

Data Sources
Imagery: ESRI, Bing Mapping Service
The source of this map image is Esri, used by the EPA with Esri's permission

Shapefiles: US Fish and Wildlife Service

Coordinate System:
WGS 1984 UTM Zone 18N
Linear Unit: Foot US

Datum: WGS 1984

N

0 175 350
Feet

Norwood Landfill Site
Norwood, Delaware County, PA

Figure 2
Site Layout

TDD#: W503-17-03-001
Contract: EP-S3-15-02
Prepared: 1/11/2018

WESTON SOLUTIONS

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Former Norwood Borough Permitted Landfill
Former Wastewater Treatment Plant
DELCORA Pumping Station
Public Fishing Dock
Historic Morton Morton House
Public Fishing Dock
Norwood Elementary School
Muckinipattis Creek
Tract 35
Tract 24
SW/SED-01
SW/SED-02
SW/SED-03
SW/SED-04
SW/SED-12
SW/SED-05
SW/SED-06
SW/SED-07
SW/SED-08
SW/SED-09
SW/SED-10
SW/SED-11
SS-01
SS-02
SS-03
SS-04
SS-05
SS-06
SS-07
SS-08
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SS-11
SS-12
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SS-20
RS-01
RS-02
RS-03
RS-04
RS-05
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RS-07
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RS-11
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bing

Legend

- Parcels Previously Sampled by USFWS
- Muckinipattis Creek
- SW/Sed Sample Locations
- Residential Surface Soil Sample Locations
- Surface Soil Sample Locations
- Surface and Subsurface Sample Locations

Data Sources
Imagery: ESRI, Bing Mapping Service
The source of this map image is Esri, used by the EPA with Esri's permission

Shapefiles: US Fish and Wildlife Service

Coordinate System:
WGS 1984 UTM Zone 18N
Linear Unit: Foot US

Datum: WGS 1984

N

0 175 350
Feet

Norwood Landfill Site
Norwood, Delaware County, PA

Figure 3
Sample Location Map

TDD#: W503-17-03-001
Contract: EP-S3-15-02
Prepared: 9/10/2018

WESTON SOLUTIONS

File: Y:\EPA_Region_III\Norwood_Landfill\MXD\Sample_Location_Map_Actual.mxd, 9/10/2018 3:36:25 PM, ricksc

(b) (9)

Legend

- Norwood Landfill Site
- Domestic Wells
- NWI Wetlands
- John Heinz National Wildlife Refuge

Distance Buffers

- 0.25 Miles
- 0.5 Miles
- 1 Miles
- 2 Miles
- 3 Miles
- 4 Miles

Notes:
NWI- National Wetlands Inventory

Data Sources
Imagery: USGS 7.5-Minute Series Topogrpahic Quadrangles
The source of this map image is Esri, used by the EPA with Esri's permission

Shapefiles: Weston generated

Coordinate System:
WGS 1984 UTM Zone 18N
Linear Unit: Foot US

Datum: WGS 1984

N

0 2,200 4,400
Feet

Norwood Landfill Site
Norwood, Delaware County, PA

Figure 4
4-Mile Radius Map with Distance Rings

TDD#: W503-17-03-001
Contract: EP-S3-15-02
Prepared: 1/11/2018

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Norwood Landfill Site

Probable Point of Entry

Figure 5
15-Mile Downstream Surface Water Pathway Map
Norwood Landfill Site
Norwood, Delaware County, PA

Legend

- Norwood Landfill Site
- Probable Point of Entry
- Mile Marker
- Fifteen Mile Surface Water Pathway
- NWI Wetlands
- John Heinz National Wildlife Refuge

Note:
NWI - National Wetlands Inventory

Wetlands data from the U.S. Fish & Wildlife Service wetlands geodatabase website: http://www.fws.gov/wetlands/Data/DataDownload.html Reference 49 of the HRS documentation record).

N W E S

0 1,125 2,250 4,500 6,750 9,000
Feet

0 0.275 0.55 1.1
Miles

SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Bridgeport NJ/PA, 1970; Landsdowne, PA, 1974; Marcus Hook, PA/NJ/DE, 1970; Penns Grove, NJ/DE, 1970.

The source of this map image is Esri, used by the EPA with Esri's permission

TDD#: W503-17-03-001
Contract: EP-S3-15-02
Date: 1/11/2018

WESTON SOLUTIONS

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TABLES

Table 1
Norwood Landfill
Surface and Subsurface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:			NL-2017-SS-01		NL-2017-SB-01		NL-2017-SS-02		NL-2017-SS-03		NL-2017-SS-04		NL-2017-SB-04		NL-2017-SS-05		NL-2017-SB-05	
CLP Sample Number:			C0AB2		C0AF5		C0AB2		C0AB3		C0AB5		C0AF6		C0AB6		C0AF8	
Units:	**EPA RSL Residential (µg/kg)**	**EPA RSL Industrial (µg/kg)**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017	
Sample Depth:			0-6		24-48		0-6		0-6		0-6		24-48		0-6		24-48	
Sample Type:			Field		Field		Field		Field		Field		Field		Field		Field	
VOC			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	67,000,000	11	U	11	U	27		32		12	U	12	U	12	U	12	U
Methylene chloride	57,000	1,000,000	33	U	5.4	U	40		41		36		6	U	39		6	U
Ethylbenzene	5,800	25,000	5.6	U	5.4	U	6.2	U	6.5	U	5.8	U	6	U	6.1	U	6	U
Toluene	490,000	4,700,000	5.6	U	5.4	U	6.2		6.5	U	5.8	U	6	U	6.1	U	6	U
Ethanol	NL	NL	5.6	U	5.4	U	6.2	U	6.5	U	5.8	U	6	U	6.1	U	6	U
2-Butanone	2,700,000	19,000,000	11	U	11	U	12	U	13	U	12	U	12	U	12	U	12	U
Chlorobenzene	28,000	130,000	5.6	U	5.4	U	6.2	U	6.5	U	5.8	U	6	U	6.1	U	6	U
1,2-Dichlorobenzene	180,000	930,000	5.6	U	5.4	U	6.2	U	6.5	U	5.8	U	6	U	6.1	U	6	U
1,4-Dichlorobenzene	2,600	11,000	5.6	U	5.4	U	6.2	U	6.5	U	5.8	U	6	U	6.1	U	6	U
Isopropyl benzene	NL	NL	5.6	U	5.4	U	6.2	U	6.5	U	5.8	U	6	U	6.1	U	6	U
Styrene	600,000	3,500,000	5.6	U	5.4	U	6.2	U	6.5	U	5.5	J	6	U	6.1	U	6	U
SVOC SIM																		
Naphthalene	3,800	17,000	3.9	U	4.0	U	1.7	J	2.3	J	3.9	U	3.1	J	35		670	J
2-Methylnaphthalene	24,000	300,000	1.4	J	4.0	U	2.2	J	2.9	J	1.4	J	3.7		33		1300	J
Acenaphthylene	NL	NL	1.6	J	4.0	U	1.7	J	4.2		3.9	U	5.8		40		14	
Acenaphthene	360,000	4,500,000	2.2	J	4.0	U	1.4	J	3.0	J	3.9	U	4.6		56		28	
Fluorene	240,000	3,000,000	2.1	J	4.0	U	1.1	J	3.6	J	3.9	U	5.1		75		7.8	
Phenanthrene	NL	NL	53		9.6		23		70		11		66		830	J	130	
Anthracene	1,800,000	23,000,000	10		2.5	J	3.5	J	16		1.8	J	16		180		15	
Fluoranthene	240,000	3,000,000	160		14		51		140		26		130		920	J	85	
Pyrene	180,000	2,300,000	170		17		61		150		31		150		1100	J	99	
Benzo(a)anthracene	1,100	21,000	100		8.3		31		84		17		85		590	J	43	
Chrysene	110,000	2,100,000	100		6.4		33		84		19		75		530	J	40	
Benzo(b)fluoranthene	1,100	21,000	150		7.9		42		130		28		110		740	J	80	
Benzo(k)fluoranthene	11,000	210,000	44		3.2	J	15		46		9.4		36		230		18	
Benzo(a)pyrene	110	2,100	89		6.5		28		74		17		70		**530**	J	48	
Indeno(1,2,3-cd)pyrene	1,100	21,000	60		3.8	J	21		55		12		47		350	J	33	
Dibenzo(a,h)anthracene	110	2,100	20		4.0	U	6.3		18		4.2		16		**120**		3.8	U
Benzo(g,h,i)perylene	NL	NL	55		4.5		20		53		12		44		370	J	41	
SVOCs																		
Naphthalene	3,800	17,000	200	U	210	U	190	U	200	U	200	U	190	U	190	U	690	
4-Chloroanaline	NL	NL	390	U	400	U	380	U	380	U	390	U	360	U	370	U	380	U
2-Methylnaphthalene	24,000	300,000	200	U	210	U	190	U	200	U	200	U	190	U	190	U	1,100	J
1,1-Biphenyl	4,700	20,000	200	U	210	U	190	U	200	U	200	U	190	U	190	U	190	
Acenaphthylene	NL	NL	200	U	210	U	190	U	200	U	200	U	190	U	190	U	190	U
Acenaphthene	360,000	4,500,000	200	U	210	U	190	U	200	U	200	U	190	U	61	J	190	U
Fluorene	240,000	3,000,000	200	U	210	U	190	U	200	U	200	U	190	U	65	J	190	U
Phenanthrene	NL	NL	47	J	210	U	190	U	71	J	200	U	54	J	770		140	J
Anthracene	1,800,000	23,000,000	200	U	210	U	190	U	200	U	200	U	190	U	140	J	190	U
Carbozole	NL	NL	390	U	400	U	380	U	380	U	390	U	360	U	66	J	380	J
Dibenzofuran	NL	NL	200	U	210	U	190	U	200	U	200	U	190	U	370	U	190	U
Fluoranthene	240,000	3,000,000	140	J	210	U	61	J	160	J	200	U	100	J	840		100	J
Pyrene	180,000	2,300,000	120	J	210	U	57	J	140	J	200	U	100	J	980		110	J
Benzo(a)anthracene	1,100	21,000	75	J	210	U	190	U	77	J	200	U	60	J	480		60	J
Chrysene	110,000	2,100,000	88	J	210	U	39	J	95	J	200	U	61	J	500		70	J
bis(2-ethylhexyl)phthalate	NL	NL	42	J	210	U	79	J	220		200	U	190	U	98	J	980	
Benzo(b)fluoranthene	1,100	21,000	110	J	210	U	51	J	130	J	200	U	81	J	670		190	U
Benzo(k)fluoranthene	11,000	210,000	200	U	210	U	190	U	44	J	200	U	190	U	180	J	190	U
Benzo(a)pyrene	110	2,100	72	J	210	U	190	U	81	J	200	U	57	J	**460**		190	U
Indeno(1,2,3-cd)pyrene	1,100	21,000	44	J	210	U	190	U	52	J	200	U	39	J	310		190	U
Dibenzo(a,h)anthracene	110	2,100	200	U	210	U	190	U	200	U	200	U	190	U	**110**	J	190	U
Benzo(g,h,i)perylene	NL	NL	43	U	210	U	190	U	51	J	200	U	190	U	350		190	U
Dimethylphthalate	NL	NL	240		280		280		310		230		320		350		280	
Di-n-butylphthalate	NL	NL	200	U	210	U	190	U	200	U	200	U	190	U	190	U	50	J
Butylbenzylphthalate	NL	NL	200	U	210	U	190	U	200	U	200	U	190	U	190	U	480	
Benzyldehyde	170,000	82,000	390	U	400	U	380	U	380	U	390	U	360	U	370	U	380	U
Acetophenone	780,000	12,000,000	390	U	400	U	380	U	380	U	390	U	360	U	370	U	41	J
Phenol	1,900,000	25,000,000	70	J	67	J	74	J	89	J	65	J	60	J	92	J	80	J

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 1
Norwood Landfill
Surface and Subsurface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:			NL-2017-SS-06		NL-2017-SS-07		NL-2017-SS-08		NL-2017-SB-08		NL-2017-SS-09		NL-2017-SB-09		NL-2017-SS-10		NL-2017-SB-10	
CLP Sample Number:			C0AB7		C0AB8		C0AB9		C0AF7		C0AC0		C0AF0		C0AC1		C0AE8	
Units:	**EPA RSL Residential (µg/kg)**	**EPA RSL Industrial (µg/kg)**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		0-6				0-6		24-40		0-6		24-36	
Sample Type:			Field		Field		Field		Field		Field		Field		Field		Field	
VOC			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	67,000,000	12	U	12	U	12	U	10	U	16	U	14	J+	14	U	12	U
Methylene chloride	57,000	1,000,000	41		6	U	6	U	5.1	U	7.8	U	6.2	U	6.9	U	6.2	U
Ethylbenzene	5,800	25,000	6.1	U	6	U	6	U	5.1	U	7.8	U	45		6.9	U	6.2	U
Toluene	490,000	4,700,000	6.1	U	6	U	6	U	5.1	U	7.8	U	6.2	U	6.9	U	6.2	U
Ethanol	NL	NL	6.1	U	6	U	6	U	5.1	U	7.8	U	6.2	U	6.9	U	6.2	U
2-Butanone	2,700,000	19,000,000	12	U	12	U	12	U	10	U	16	U	12	U	14	U	12	U
Chlorobenzene	28,000	130,000	6.1	U	6	U	6	U	5.1	U	7.8	U	6.2	U	6.9	U	6.2	U
1,2-Dichlorobenzene	180,000	930,000	6.1	U	6	U	6	U	5.1	U	7.8	U	3.6	J	6.9	U	6.2	U
1,4-Dichlorobenzene	2,600	11,000	6.1	U	6	U	6	U	5.1	U	7.8	U	10		6.9	U	6.2	U
Isopropyl benzene	NL	NL	6.1	U	6	U	6	U	5.1	U	7.8	U	4.9	J	6.9	U	6.2	U
Styrene	600,000	3,500,000	6.1	U	6	U	6	U	5.1	U	7.8	U	35		6.9	U	6.2	U
SVOC SIM																		
Naphthalene	3,800	17,000	---		3.4	J	10		33		13		130		6.7		10	
2-Methylnaphthalene	24,000	300,000	---		4.8		11		12		10		63		6.3		16	
Acenaphthylene	NL	NL	---		1.7	J	5.9		54		13		27	J	14		17	
Acenaphthene	360,000	4,500,000	---		3.6	J	100		15		29		150		11		13	
Fluorene	240,000	3,000,000	---		2.8	J	110		24		25		120		13		14	
Phenanthrene	NL	NL	---		32		1100	J	350	J	520	J	1100	J	290		230	
Anthracene	1,800,000	23,000,000	---		6.8		250		110		130		240		78		58	
Fluoranthene	240,000	3,000,000	---		54		1200	J	620	J	920	J	1500	J	660	J	470	J
Pyrene	180,000	2,300,000	---		70		1200	J	700	J	1000	J	1700	J	720	J	530	J
Benzo(a)anthracene	1,100	21,000	---		38		620	J	430	J	600	J	900	J	450	J	340	J
Chrysene	110,000	2,100,000	---		36		470	J	380	J	480	J	930	J	390	J	280	
Benzo(b)fluoranthene	1,100	21,000	---		51		610	J	640	J	760	J	**1300**	**J**	610	J	500	J
Benzo(k)fluoranthene	11,000	210,000	---		17		220		220		200		480	J	180		110	
Benzo(a)pyrene	110	2,100	---		34		**420**	**J**	**520**	**J**	**500**	**J**	**850**	**J**	**410**	**J**	**320**	**J**
Indeno(1,2,3-cd)pyrene	1,100	21,000	---		25		250		360	J	310		490	J	260		220	
Dibenzo(a,h)anthracene	110	2,100	---		6.4		80		**110**		80		**140**		80		65	
Benzo(g,h,i)perylene	NL	NL	---		22		230		400	J	300		450	J	230		250	
SVOCs																		
Naphthalene	3,800	17,000	170	J	210	U	190	U	190	U	290	U	120	J	210	U	190	U
4-Chloroanaline	NL	NL	370	U	400	U	360	U	360	U	560	U	64	J	400	U	370	U
2-Methylnaphthalene	24,000	300,000	120	J	210	U	190	U	190	U	290	U	220	U	210	U	190	U
1,1-Biphenyl	4,700	20,000	51	J	210	U	190	U	190	U	290	U	220	U	210	U	190	U
Acenaphthylene	NL	NL	190	U	210	U	190	U	190	U	290	U	220	U	210	U	190	U
Acenaphthene	360,000	4,500,000	760		210	U	93	J	63	J	290	U	140	J	210	U	190	U
Fluorene	240,000	3,000,000	890		210	U	99	J	190	U	290	U	110	J	210	U	190	U
Phenanthrene	NL	NL	11,000		210	U	1,000		250		380		1,100		220		200	
Anthracene	1,800,000	23,000,000	1,400		210	U	220		99	J	75	J	200	J	57	J	52	J
Carbozole	NL	NL	910		400	U	100	J	360	U	560	U	150	J	400	U	370	U
Dibenzofuran	NL	NL	580		210	U	49	J	190	U	290	U	69	J	210	U	190	U
Fluoranthene	240,000	3,000,000	5,000		62	J	1,200		510		790		1,500		690		410	
Pyrene	180,000	2,300,000	8,600		55	J	940		430		670		1,400		490		440	
Benzo(a)anthracene	1,100	21,000	**2,900**		210	U	500		280		380		720		330		270	
Chrysene	110,000	2,100,000	4,300		210	U	490		310		370		860		350		280	
bis(2-ethylhexyl)phthalate	NL	NL	130	J	65	J	55	J	190	U	240	J	350		76	J	310	
Benzo(b)fluoranthene	1,100	21,000	**4,700**		46	J	570		430	J-	540		**1,100**		480		360	
Benzo(k)fluoranthene	11,000	210,000	1,200		210	U	200		120	J	200	J	310		170	J	120	J
Benzo(a)pyrene	110	2,100	**2,300**		210	U	**400**		**350**	**J-**	**410**		**720**		**340**		**270**	
Indeno(1,2,3-cd)pyrene	1,100	21,000	**1,400**		210	U	220		260	J-	220		500		200	J	180	J
Dibenzo(a,h)anthracene	110	2,100	**410**		210	U	69	J	76	J	65	J	**160**	J	61	J	55	J
Benzo(g,h,i)perylene	NL	NL	1,300		210	U	200		310	J-	240	J	530		200	J	230	
Dimethylphthalate	NL	NL	370		430		450		220		500	J	350		210	U	270	
Di-n-butylphthalate	NL	NL	190	U	210	U	190	U	190	U	86	J	160	J	210	U	190	U
Butylbenzylphthalate	NL	NL	190	U	210	U	190	U	190	U	290	U	220	U	210	U	190	U
Benzyldehyde	170,000	82,000	370	U	400	U	360	U	360	U	560	U	420	U	400	U	370	U
Acetophenone	780,000	12,000,000	370	U	400	U	360	U	360	U	560	U	420	U	400	U	370	U
Phenol	1,900,000	25,000,000	97	J	110	J	110	J	360	U	290	U	160	U	210	U	190	U

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 1
Norwood Landfill
Surface and Subsurface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:			NL-2017-SS-11		NL-2017-SS-12		NL-2017-SS-13		NL-2017-SB-13		NL-2017-SS-14		NL-2017-SS-15		NL-2017-SS-16	
CLP Sample Number:			C0AC2		C0AC3		C0AC4		C0AF1		C0AC5		C0AC6		C0AC7	
Units:	**EPA RSL Residential (µg/kg)**	**EPA RSL Industrial (µg/kg)**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		0-6		24-48		0-6		0-6		0-6	
Sample Type:			Field		Field		Field		Field		Dup of SS-20		Field		Field	
VOC			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	67,000,000	12	U	13	U	12	U	43		14	U	15	U	13	U
Methylene chloride	57,000	1,000,000	6.1	U	6.3	U	5.8	U	10	UJ	6.9	U	7.3	U	6.3	U
Ethylbenzene	5,800	25,000	6.1	U	6.3	U	5.8	U	10	U	6.9	U	7.3	U	6.3	U
Toluene	490,000	4,700,000	6.1	U	6.3	U	5.8	U	10	U	6.9	U	7.3	U	6.3	U
Ethanol	NL	NL	6.1	U	6.3	U	5.8	U	10	U	6.6	J	7.3	U	6.3	U
2-Butanone	2,700,000	19,000,000	12	U	6.3	U	12	U	15	J	14	U	15	U	13	U
Chlorobenzene	28,000	130,000	6.1	U	13	U	5.8	U	4.1	J	6.9	U	7.3	U	6.3	U
1,2-Dichlorobenzene	180,000	930,000	6.1	U	6.3	U	5.8	U	10	U	6.9	U	7.3	U	6.3	U
1,4-Dichlorobenzene	2,600	11,000	6.1	U	6.3	U	5.8	U	10	J-	6.9	U	7.3	U	6.3	U
Isopropyl benzene	NL	NL	6.1	U	6.3	U	5.8	U	10	U	6.9	U	7.3	U	6.3	U
Styrene	600,000	3,500,000	6.1	U	6.3	U	5.8	U	10	U	6.9	U	7.3	U	6.3	U
SVOC SIM																
Naphthalene	3,800	17,000	4.7		3.2	J	3.9		45		27		7.1		18	
2-Methylnaphthalene	24,000	300,000	3.5	J	3.6	J	1.9	J	28		30		5.8		19	
Acenaphthylene	NL	NL	18	J	4.9		2.1	J	6.6	J	38		4.9		10	
Acenaphthene	360,000	4,500,000	7.3		2.8	J	5.7		60		58		10		33	
Fluorene	240,000	3,000,000	12		2.8	J	5.1		77		56		9.2		53	
Phenanthrene	NL	NL	250		53		83		1000	J	1000	J	200		1100	J
Anthracene	1,800,000	23,000,000	52		15		17		250		240		36		240	
Fluoranthene	240,000	3,000,000	440		150		110		960	J	2000	J	360	J	1000	J
Pyrene	180,000	2,300,000	450		180		120		890	J	2200	J	370	J	940	J
Benzo(a)anthracene	1,100	21,000	260		100		69		460		**1400**	**J**	210		560	J
Chrysene	110,000	2,100,000	210		92		50		360		1100	J	180		440	J
Benzo(b)fluoranthene	1,100	21,000	300		140		79		420		**1700**	**J**	250		520	J
Benzo(k)fluoranthene	11,000	210,000	61		34		20		110		520	J	57		140	
Benzo(a)pyrene	110	2,100	**190**		100		44		**280**		**1200**	**J**	**160**		**330**	
Indeno(1,2,3-cd)pyrene	1,100	21,000	120		61		25		150		750	J	100		190	
Dibenzo(a,h)anthracene	110	2,100	32		20		8.0		30		**230**		28		58	
Benzo(g,h,i)perylene	NL	NL	110		63		21		76		690	J	92		160	
SVOCs																
Naphthalene	3,800	17,000	230	U	210	U	190	U	300	U	220	U	230	U	230	U
4-Chloroanaline	NL	NL	230	U	400	U	360	U	580	U	430	U	440	U	450	U
2-Methylnaphthalene	24,000	300,000	230	U	210	U	190	U	300	U	220	U	230	U	230	U
1,1-Biphenyl	4,700	20,000	230	U	210	U	190	U	300	U	220	U	230	U	230	U
Acenaphthylene	NL	NL	230	U	210	U	190	U	300	U	65	J	230	U	230	U
Acenaphthene	360,000	4,500,000	230	U	210	U	190	U	300	U	220	U	230	U	54	J
Fluorene	240,000	3,000,000	230	U	210	U	190	U	71	J	68	J	230	U	86	J
Phenanthrene	NL	NL	210	J	52	J	69	J	810		860		180	J	1,200	
Anthracene	1,800,000	23,000,000	45	J	210	U	190	U	180	J	190	J	230	U	240	
Carbozole	NL	NL	440	U	400	U	360	U	83	J	63	J	440	U	100	J
Dibenzofurn	NL	NL	230	U	210	U	190	U	300	U	220	U	230	U	63	J
Fluoranthene	240,000	3,000,000	400	J	160	J	110	J	870		1,800		400	J	1,300	
Pyrene	180,000	2,300,000	340		140	J	91	J	620		1,600		280		950	
Benzo(a)anthracene	1,100	21,000	200	J	80	J	54	J	350		980		180	J	590	
Chrysene	110,000	2,100,000	200	J	86	J	51	J	340		940		170	J	560	
bis(2-ethylhexyl)phthalate	NL	NL	230	U	210	U	190	U	100	J	110	J	230	U	230	U
Benzo(b)fluoranthene	1,100	21,000	240		110	J	59	J	310		**1,300**		210	J	560	
Benzo(k)fluoranthene	11,000	210,000	78	J	210	U	190	U	110	J	430		65	J	190	J
Benzo(a)pyrene	110	2,100	**170**	J	82	J	41	J	**230**	**J**	**950**		**140**	J	**380**	
Indeno(1,2,3-cd)pyrene	1,100	21,000	100	J	54	J	190	U	120	J	550		98	J	210	
Dibenzo(a,h)anthracene	110	2,100	230	U	210	U	190	U	**300**		**170**	J	230	U	73	J
Benzo(g,h,i)perylene	NL	NL	85	J	61	J	190	U	110	J	570		97	J	180	J
Dimethylphthalate	NL	NL	390		440		160	J	680		430		500		540	
Di-n-butylphthalate	NL	NL	230	U	210	U	190	U	300	U	220	U	170	J	230	U
Butylbenzylphthalate	NL	NL	230	U	210	U	190	U	300	U	220	U	170	J	230	U
Benzyldehyde	170,000	82,000	440	U	400	U	360	U	580	U	430	U	160	J	450	U
Acetophenone	780,000	12,000,000	440	U	400	U	360	U	580	U	430	U	440	U	450	U
Phenol	1,900,000	25,000,000	87	J	210	U	190	U	300	U	220	U	66	J	85	J

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 1
Norwood Landfill
Surface and Subsurface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:			NL-2017-SS-17		NL-2017-SS-18		NL-2017-SB-18		NL-2017-SS-19		NL-2017-SB-19		NL-2017-SS-20	
CLP Sample Number:			C0AC8		C0AC9		C0AF4		C0AD0		C0AE7		C0AD1	
Units:	**EPA RSL Residential (µg/kg)**	**EPA RSL Industrial (µg/kg)**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		24-48		0-6		24-30		0-6	
Sample Type:			Background		Background		Background		Field		Field		Dup of SS-14	
VOC			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	67,000,000	11	U	12	U	10	U	7.1	R	11	U	13	U
Methylene chloride	57,000	1,000,000	6.5	J	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
Ethylbenzene	5,800	25,000	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
Toluene	490,000	4,700,000	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
Ethanol	NL	NL	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
2-Butanone	2,700,000	19,000,000	11	U	12	U	10	U	7.1	R	11	U	13	U
Chlorobenzene	28,000	130,000	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
1,2-Dichlorobenzene	180,000	930,000	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
1,4-Dichlorobenzene	2,600	11,000	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
Isopropyl benzene	NL	NL	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
Styrene	600,000	3,500,000	5.7	U	5.9	U	5.1	U	7.1	R	5.5	U	6.5	U
SVOC SIM														
Naphthalene	3,800	17,000	9.1		5.9		3.9	U	37		170		18	
2-Methylnaphthalene	24,000	300,000	9.3		6.1		3.9	U	68		88		17	
Acenaphthylene	NL	NL	7.6	J	6.4		3.9	U	24		11		26	
Acenaphthene	360,000	4,500,000	7.1		5.1		3.9	U	47		310		35	
Fluorene	240,000	3,000,000	6.7		4.0		3.9	U	45		270		33	
Phenanthrene	NL	NL	140		150		2.5	J	960	J	1500	J	690	J
Anthracene	1,800,000	23,000,000	20		20		3.9	U	150		430	J	210	
Fluoranthene	240,000	3,000,000	230		610	J	6.4		1200	J	1400	J	1700	J
Pyrene	180,000	2,300,000	250		650	J	8.4		1300	J	1400	J	2300	J
Benzo(a)anthracene	1,100	21,000	140		370	J	3.8	J	730	J	900	J	**1300**	**J**
Chrysene	110,000	2,100,000	130		550	J	5.4		650	J	650	J	1000	J
Benzo(b)fluoranthene	1,100	21,000	200		**1100**	**J**	8.2		900	J	890	J	**1500**	J
Benzo(k)fluoranthene	11,000	210,000	52		320		2.7	J	260		340	J	410	J
Benzo(a)pyrene	110	2,100	**110**		**550**	**J**	5.1		**580**	J	**610**	**J**	**1100**	J
Indeno(1,2,3-cd)pyrene	1,100	21,000	82		490	J	4.4		370		370	J	620	J
Dibenzo(a,h)anthracene	110	2,100	24		**140**		3.9	U	**120**		**130**		**180**	
Benzo(g,h,i)perylene	NL	NL	79		500	J	4.5		350		320		560	J
SVOCs														
Naphthalene	3,800	17,000	190	U	210	U	200	U	260	U	130	J	210	U
4-Chloroanaline	NL	NL	370	U	400	U	390	U	500	U	420	U	410	U
2-Methylnaphthalene	24,000	300,000	190	U	210	U	200	U	260	U	59	J	210	U
1,1-Biphenyl	4,700	20,000	190	U	210	U	200	U	260	U	220	U	210	U
Acenaphthylene	NL	NL	190	U	210	U	200	U	260	U	220	U	210	U
Acenaphthene	360,000	4,500,000	190	U	210	U	200	U	260	U	260		210	U
Fluorene	240,000	3,000,000	190	U	210	U	200	U	260	U	230		210	U
Phenanthrene	NL	NL	130	J	130	J	200	U	750		1,200		570	
Anthracene	1,800,000	23,000,000	190	U	210	U	200	U	110	J	330		160	J
Carbozole	NL	NL	370	U	400	U	390	U	65	J	200	J	410	U
Dibenzofuran	NL	NL	190	U	210	U	200	U	260	U	150	J	210	U
Fluoranthene	240,000	3,000,000	230	J	580		200	U	890		1,300		1,700	
Pyrene	180,000	2,300,000	190	J	610		200	U	870		1,000		1,800	
Benzo(a)anthracene	1,100	21,000	100	J	290		200	U	510		670		960	
Chrysene	110,000	2,100,000	130	J	550		200	U	550		620		890	
bis(2-ethylhexyl)phthalate	NL	NL	340		750		200	U	51	J	220	U	76	J
Benzo(b)fluoranthene	1,100	21,000	150	J	910		200	U	700		730		**1,200**	
Benzo(k)fluoranthene	11,000	210,000	52	J	240		200	U	220	J	240		400	
Benzo(a)pyrene	110	2,100	98	J	**480**		200	U	**490**		**490**		**860**	
Indeno(1,2,3-cd)pyrene	1,100	21,000	58		420		200	U	340		280		510	
Dibenzo(a,h)anthracene	110	2,100	**190**		**120**	J	200	U	**110**	J	98	J	**160**	J
Benzo(g,h,i)perylene	NL	NL	53		480		200	U	340		250		520	
Dimethylphthalate	NL	NL	300		320		370		440		380		300	
Di-n-butylphthalate	NL	NL	190	U	210	U	200	U	200	J	220	U	210	U
Butylbenzylphthalate	NL	NL	190	U	210	U	200	U	260	U	220	U	210	U
Benzyldehyde	170,000	82,000	370	U	400	U	390	U	500	U	420	U	410	U
Acetophenone	780,000	12,000,000	370	U	400	U	390	U	500	U	420	U	410	U
Phenol	1,900,000	25,000,000	75	J	65	J	80	J	260	U	64	J	210	U

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
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Red values indicate 3x background values (or above background RDL if background is non-detect)
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Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
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Table 2
Norwood Landfill
Surface and Subsurface Soil Samples

Sample Number:	EPA RSL Residential (µg/kg)	EPA RSL Industrial (µg/kg)	NL-2017-SS-01		NL-2017-SB-01		NL-2017-SS-02		NL-2017-SS-03		NL-2017-SS-04		NL-2017-SB-04		NL-2017-SS-05		NL-2017-SB-05	
CLP Sample Number:			C0AB2		C0AF5		C0AB2		C0AB3		C0AB5		C0AF6		C0AB6		C0AF8	
Units:			µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017	
Sample Depth:			0-6		24-48		0-6		0-6		0-6		24-48		0-6		24-48	
Sample Type:			Field		Field		Field		Field		Field		Field		Field		Field	
PCB			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1254	120	970	39	U	40	U	38	U	38	U	39	U	36	U	**450**		38	U
Aroclor-1260	240	990	16	J	40	U	13	J	14	J	8	J	25	J	**240**	J	38	U
Pesticides																		
4,4-DDE	2,000	9,300	2.5	J	0.68	J	3.8	U	3.8	U	3.9	U	5.1	J	7.7		5.4	
4,4-DDD	190	2,500	3.9	UJ	4	U	3.8	U	3.8	U	3.9	U	2.5	J	3.7	U	11	J
4,4-DDT	1,900	8,500	6.6	J	1.8	J	3.8	U	3.8	U	3.9	U	3.4	J	3.7	U	24	J
cis-Chlordane[1]	1,700	7,700	2	UJ	2.1	U	1.9	U	2	U	2	U	1.9	U	24		15	
trans-Chlordane[1]	1,700	7,700	2	UJ	2.1	U	1.9	U	2	U	2	U	1.9	U	25		13	J
Heptachlor	130	630	2	UJ	2.1	U	1.9	U	2	U	2	U	1.9	U	2.4	J	1.5	J
Heptachlor epoxide	70	330	2	UJ	2.1	U	1.9	U	2	U	2	U	1.9	U	1.9	U	1.9	U
Dieldrin	34	140	3.9	UJ	4	U	6.8	J	3.8	U	3.9	U	3.6	U	**85**		**540**	
Aldrin	39	180	2	UJ	2.1	U	1.9	U	2	U	2	U	1.9	U	18	J	**440**	
Endrin ketone	NL	NL	3.9	UJ	4	U	3.8	U	3.8	U	3.9	U	3.6	U	3.7	U	18	

Notes:
[1] The RSL values in table are for Chlordane
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 2
Norwood Landfill
Surface and Subsurface Soil Samples

Sample Number:	EPA RSL Residential (µg/kg)	EPA RSL Industrial (µg/kg)	NL-2017-SS-06		NL-2017-SS-07		NL-2017-SS-08		NL-2017-SB-08		NL-2017-SS-09		NL-2017-SB-09		NL-2017-SS-10		NL-2017-SB-10	
CLP Sample Number:			C0AB7		C0AB8		C0AB9		C0AF7		C0AC0		C0AF0		C0AC1		C0AE8	
Units:			µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		0-6				0-6		24-40		0-6		24-36	
Sample Type:			Field		Field		Field		Field		Field		Field		Field		Field	
PCB			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1254	120	970	37		40	U	36	U	36	U	**170**		42	U	40	U	37	U
Aroclor-1260	240	990	13	J	6.8	J	36	U	36	U	**280**		42	U	53	J	37	U
Pesticides																		
4,4-DDE	2,000	9,300	3.7	U	0.71	J	3.6	U	3.6	U	16	J	55	J	16	J	2.8	J
4,4-DDD	190	2,500	3.7	U	4	U	3.6	U	3.6	U	130		72	J	4	U	4.5	
4,4-DDT	1,900	8,500	0.73	J	4	U	3.6	U	3.6	U	22	J	4.3	UJ	66		13	J
cis-Chlordane[1]	1,700	7,700	1.9	U	2.1	U	1.9	U	1.9	U	18		9.9	J	17	J	30	
trans-Chlordane[1]	1,700	7,700	1.9	U	2.1	U	1.9	U	1.9	U	7.1	J	7.1	J	6.9	J	27	
Heptachlor	130	630	1.9	U	2.1	U	1.9	U	1.9	U	2.9	U	2.2	J	0.5	J	1.9	U
Heptachlor epoxide	70	330	1.9	U	2.1	U	1.9	U	1.9	U	2.9	U	2.2	J	3.5	J	1.9	U
Dieldrin	34	140	3.7	U	4	U	3.6	U	3.6	U	5.6	U	4.3	J	6.5	J	2.5	J
Aldrin	39	180	0.69	J	2.1	U	1.9	U	1.9	U	2.9	U	2.2	UJ	2.1	U	1.9	U
Endrin ketone	NL	NL	3.7	U	4	U	3.6	U	3.6	U	5.6	U	4.3	UJ	4	U	3.7	U

Notes:
[1] The RSL values in table are for Chlordane
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 2
Norwood Landfill
Surface and Subsurface Soil Samples

Sample Number:	EPA RSL Residential (µg/kg)	EPA RSL Industrial (µg/kg)	NL-2017-SS-11		NL-2017-SS-12		NL-2017-SS-13		NL-2017-SB-13		NL-2017-SS-14		NL-2017-SS-15		NL-2017-SS-16	
CLP Sample Number:			C0AC2		C0AC3		C0AC4		C0AF1		C0AC5		C0AC6		C0AC7	
Units:			µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		0-6		24-48		0-6		0-6		0-6	
Sample Type:			Field		Field		Field		Field		Dup of SS-20		Field		Field	
PCB			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1254	120	970	44	U	40	U	36	U	58	U	43	U	44	UJ	45	U
Aroclor-1260	240	990	44	U	9.5	J	7	J	58	U	58		25	J	5	J
Pesticide																
4,4-DDE	2,000	9,300	23	J	4	U	1.3	J	5.8	U	11	J	14	J	2.5	J
4,4-DDD	190	2,500	4.4	U	4	U	1.3	J	5.8	U	4.3	U	5.5	J	0.16	J
4,4-DDT	1,900	8,500	36	J	4	U	3	J	5.8	U	22		8.4	J	1.2	J
cis-Chlordane[1]	1,700	7,700	2.3	U	1.5	J	1.9	U	21	J	9.2	J	2.3	UJ	2.3	UJ
trans-Chlordane[1]	1,700	7,700	2.3	U	0.72	J	1.9	U	26	J	5.5	J	2.3	UJ	2.3	UJ
Heptachlor	130	630	2.3	U	2.1	U	1.9	U	3	U	2.2	U	2.3	UJ	2.3	UJ
Heptachlor epoxide	70	330	2.3	U	2.1	U	1.9	U	3	U	2.2	U	2.3	UJ	2.3	UJ
Dieldrin	34	140	4.4	U	2.6	J	3.6	U	5.8	U	4.3	U	4.4	UJ	4.5	UJ
Aldrin	39	180	2.3	U	2.1	U	1.9	U	8.7	J	2.2	U	2.3	UJ	2.3	UJ
Endrin ketone	NL	NL	4.4	U	4	U	3.6	U	5.8	U	4.3	U	4.4	UJ	4.5	UJ

Notes:
[1] The RSL values in table are for Chlordane
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 2
Norwood Landfill
Surface and Subsurface Soil Samples

Sample Number:	EPA RSL Residential (µg/kg)	EPA RSL Industrial (µg/kg)	NL-2017-SS-17		NL-2017-SS-18		NL-2017-SB-18		NL-2017-SS-19		NL-2017-SB-19		NL-2017-SS-20	
CLP Sample Number:			C0AC8		C0AC9		C0AF4		C0AD0		C0AE7		C0AD1	
Units:			µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		24-48		0-6		24-30		0-6	
Sample Type:			Background		Background		Background		Field		Field		Dup of SS-14	
PCB			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1254	120	970	36	U	77		39	U	50	U	42	U	41	U
Aroclor-1260	240	990	17	J	57		39	U	34	J	42	U	23	J
Pesticide														
4,4-DDE	2,000	9,300	3.3	J	4	U	3.9	U	8.5	J	5.3	J	3.9	J
4,4-DDD	190	2,500	3.6	U	4	U	3.9	U	5	U	4.2	UJ	4.1	UJ
4,4-DDT	1,900	8,500	4.2	J	4	U	3.9	U	21		20	J	9.9	J
cis-Chlordane[1]	1,700	7,700	1.9	U	2.1	U	2	U	11	J	8.7	J	5.3	J
trans-Chlordane[1]	1,700	7,700	1.9	U	2.1	U	2	U	11		8.1	J	2.8	J
Heptachlor	130	630	1.9	U	2.1	U	2	U	2.6	U	2.2	UJ	2.1	UJ
Heptachlor epoxide	70	330	1.9	U	2.1	U	2	U	2.6	U	2.2	UJ	2.1	UJ
Dieldrin	34	140	3.6	U	4	U	3.9	U	5	U	4.2	UJ	4.1	UJ
Aldrin	39	180	1.9	U	2.1	U	2	U	2.6	U	2.2	UJ	2.1	UJ
Endrin ketone	NL	NL	3.6	U	4	U	3.9	U	5	U	4.2	UJ	4.1	UJ

Notes:
[1] The RSL values in table are for Chlordane
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 3
Norwood Landfill
Surface and Subsurface Soil Sample
Inorganic Analytical Results Summary

Sample Number:	EPA RSL Residential (mg/kg)	EPA RSL Industrial (mg/kg)	NL-2017-SS-01		NL-2017-SB-01		NL-2017-SS-02		NL-2017-SS-03		NL-2017-SS-04		NL-2017-SB-04		NL-2017-SS-05		NL-2017-SB-05	
CLP Sample Number:			C0AB2		C0AF5		C0AB2		C0AB3		C0AB5		C0AF6		C0AB6		C0AF8	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/28/2017	
Sample Depth:			0-6		24-48		0-6		0-6		0-6		24-48		0-6		24-48	
Sample Type:			Field		Field		Field		Field		Field		Field		Field		Field	
Metal			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	77,000	110,000	7680		7290		5720		6670		8570		6170		11900		8870	
Antimony	3.1	47	0.61	J	5.1	UJ	0.64	J	0.76	J	0.58	J	4.8	UJ	0.94	J	1.7	J
Arsenic	0.68	3	**7.2**		**2.9**		**4.5**		**5.4**		**5.0**		**3.7**		**4.5**		**2.1**	
Barium	1,500	22,000	46.9		39.0		35.2		39.8		38.3		54.7		220		117	
Beryllium	16	230	0.59		0.54		0.44		0.49		0.56		0.51		0.84		0.84	
Cadmium	7.1	98	0.79		0.63		0.59		0.77		0.68		0.56		2.0		2.4	
Calcium	NL	NL	1510	J	713		843	J	2580	J	1380	J	542		3690	J	2900	
Chromium[1]	12,000	180,000	17.3		15.3		12.4		12.9		15.3		12.4		27.0		35.3	J
Cobalt	2.3	35	**5.3**	J	**5.6**		**5.0**	J	**5.7**	J	**5.2**	J	**4.1**		**9.9**	J	**9.4**	
Copper	310	4,700	22.0	J	12.1		14.9	J	15.6	J	17.1	J	54.3		50.2	J	72.8	J
Iron	5,500	82,000	**16000**		**15200**		**12800**		**13700**		**14800**		**12800**		**27300**		**37600**	
Lead[2]	400	1,200	31.7		17.3		48.0		46.1		25.2		46.2		316		228	
Magnesium	NL	NL	1990	J	1650		1390	J	1960	J	1970	J	1680		4050	J	4170	
Manganese	180	2,600	165	J	114		**202**	J	**328**	J	**300**	J	65.4		**292**	J	**292**	J
Mercury	1.1	4.6	0.059	J	0.1	UJ	0.087	J	0.10	J	0.068	J	0.98	UJ	0.60		0.5	
Nickel	150	2,200	11.2		9.9		8.7		11.4		11.1		8.5		17.7		35.8	
Potassium	NL	NL	447	J	387	J	330	J	502	J	579	J	675		3180	J	1410	
Selenium	390	5,800	3.0	U	3.0	UJ	3.0	U	2.9	U	3.0	U	2.8	UJ	2.9	U	2.9	UJ
Silver	390	5,800	0.45	J	0.52	J	0.40	J	0.40	J	0.42	J	0.43	J	0.91	J-	2.0	J-
Sodium	NL	NL	97.1	J	76.4	J	62.9	J	69.6	J	82.0	J	108	J	168	J	174	J
Thallium	0.078	1	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.1	UJ
Vanadium	39	580	29.3		24.9		24.4		27.8		28.5		22.1		**45.8**		34.5	
Zinc	2,300	35,000	72.2	J	41.6		65.0	J	108	J	89.0	J	41.0		178	J	259	J

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
[1] There is no RSL for total chromium; values shown are for chromium III
[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use
mg/kg = milligrams per kilogram
J = Reported value is estimated; actual value may be higher or lower
J- = Reported value is estimated, actual value is expected to be lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 3
Norwood Landfill
Surface and Subsurface Soil Sample
Inorganic Analytical Results Summary

Sample Number:	EPA RSL Residential (mg/kg)	EPA RSL Industrial (mg/kg)	NL-2017-SS-06		NL-2017-SS-07		NL-2017-SS-08		NL-2017-SB-08		NL-2017-SS-09		NL-2017-SB-09		NL-2017-SS-10		NL-2017-SB-10	
CLP Sample Number:			C0AB7		C0AB8		C0AB9		C0AF7		C0AC0		C0AF0		C0AC1		C0AE8	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/28/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		0-6				0-6		24-40		0-6		24-36	
Sample Type:			Field		Field		Field		Field		Field		Field		Field		Field	
Metal			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	77,000	110,000	5700		16800		8300		8580		12000		8490		8090		8030	
Antimony	3.1	47	0.63	J	1.1	J	0.52	J	0.56	J	0.93	J	0.54	J	0.84	J	0.83	J
Arsenic	0.68	3	**3.9**		**4.8**		**3.5**		**3.6**		**5.9**		**4.2**		**5.1**		**3.2**	
Barium	1,500	22,000	44.1		92.0		51.8		65.3		159		232		120		92.6	
Beryllium	16	230	0.42		1.0		0.71		0.72		0.88		0.91		0.61		0.63	
Cadmium	7.1	98	1.1		1.7		0.75		0.91		2.3		4.5		1.3		1.3	
Calcium	NL	NL	2350	J	1290	J	892	J	3520		3860		5130		8450		5840	
Chromium[1]	12,000	180,000	13.6		29.7		18.0		17.1		31.0		33.9		25.4		23.0	
Cobalt	2.3	35	**4.3**	J	**16.3**	J	**6.8**	J	**6.7**		**9.8**		**10.3**		**6.9**		**6.9**	
Copper	310	4,700	26.4	J	33.1	J	15.0	J	22.2		64.2		100		50.6		32.9	
Iron	5,500	82,000	**12700**		**35100**		**15600**		**18100**		**31500**		**46700**		**17900**		**19200**	
Lead[2]	400	1,200	52.1		55.1		20.7		42.0		263		**401**		164		131	
Magnesium	NL	NL	1430	J	3070	J	2180	J	3240		4760		3480		4010		3590	
Manganese	180	2,600	**402**	J	**483**	J	**182**	J	**390**		**456**		**316**		**710**		**525**	
Mercury	1.1	4.6	0.096	J	0.075	J	0.042	J	0.24		0.64		0.96		0.35		0.22	
Nickel	150	2,200	10.6		17.7		12.2		13.0		29.3		41.7		18.8		16.7	
Potassium	NL	NL	512	J	3080	J	1040	J	1130		2560		1500		1380		1210	
Selenium	390	5,800	2.8	U	3.3	U	2.8	U	2.9	UJ	4.1	U	3.4	UJ	3.2	U	2.9	UJ
Silver	390	5,800	0.70	J	0.89	J	0.39	J	0.62	J	1.3	J-	2.9	J-	0.60	J	0.69	J
Sodium	NL	NL	64.0	J	157	J	84.3	J	141	J	163	J	257	J	117	J	116	J
Thallium	0.078	1	2.0	U	2.3	U	2.0	U	2.0	U	2.9	U	2.4	U	2.3	U	2.1	U
Vanadium	39	580	22.7		**78.1**		29.1		29.6		**41.6**		30.1		34.3		38.5	
Zinc	2,300	35,000	183	J	66.9	J	42.6	J	52.3		269		398		190		130	

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
[1] There is no RSL for total chromium; values shown are for chromium III
[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use
mg/kg = milligrams per kilogram
J = Reported value is estimated; actual value may be higher or lower
J- = Reported value is estimated, actual value is expected to be lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 3
Norwood Landfill
Surface and Subsurface Soil Sample
Inorganic Analytical Results Summary

Sample Number:	EPA RSL Residential (mg/kg)	EPA RSL Industrial (mg/kg)	NL-2017-SS-11		NL-2017-SS-12		NL-2017-SS-13		NL-2017-SB-13		NL-2017-SS-14		NL-2017-SS-15		NL-2017-SS-16	
CLP Sample Number:			C0AC2		C0AC3		C0AC4		C0AF1		C0AC5		C0AC6		C0AC7	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:			9/28/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		0-6		24-48		0-6		0-6		0-6	
Sample Type:			Field		Field		Field		Field		Dup of SS-20		Field		Field	
Metal			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	77,000	110,000	7580		10600		7440		4230		9210		7560		6750	
Antimony	3.1	47	0.99	J	0.75	J	0.78	J	7.3	UJ	1.1	J	1.2	J	0.68	J
Arsenic	0.68	3	**7.3**		**4.2**		**2.6**		**2.0**		**6.1**		**3.2**		**3.1**	
Barium	1,500	22,000	75.8		110		112		235		116		108		90.3	
Beryllium	16	230	0.63		0.74		0.53		0.72		0.79		0.53		0.61	
Cadmium	7.1	98	1.1		1.1		1.2		3.8		2.3		1.2		0.99	
Calcium	NL	NL	511		2920		2250		3760		3270		2820		1840	
Chromium[1]	12,000	180,000	16.9		21.0		18.0		54.0		24.9		17.5		18.0	
Cobalt	2.3	35	**5.8**		**8.7**		**6.4**		**7.1**		**7.0**		**5.7**		**5.7**	
Copper	310	4,700	39.1		27.2		31.5		303		46.7		29.9		22.9	
Iron	5,500	82,000	**17700**		**22600**		**16000**		**51800**		**32100**		**16300**		**16200**	
Lead[2]	400	1,200	251		87.4		254		**1630**		210		177		145	
Magnesium	NL	NL	1510		3100		2880		1350		2490		3090		1910	
Manganese	180	2,600	**281**		**272**		**207**		**243**		**333**		**201**		**197**	
Mercury	1.1	4.6	0.13		0.11		0.2		0.58		0.44		0.18		0.37	
Nickel	150	2,200	10.4		16.0		16.0		28.1		16.8		13.2		10.5	
Potassium	NL	NL	569		1760		2530		527	J	1380		1750		1130	
Selenium	390	5,800	3.4	U	3.1	UJ	2.7	UJ	4.3	UJ	3.3	UJ	3.5	UJ	3.5	UJ
Silver	390	5,800	0.57	J	0.77	J	0.67	J	2.2	J-	1.2	J-	0.66	J	0.61	J
Sodium	NL	NL	86.4	J	114	J	103	J	253	J	154	J	104	J	74.0	J
Thallium	0.078	1	2.4	U	2.2	U	2.0	U	3.0	U	2.3	U	2.5	U	2.5	U
Vanadium	39	580	35.7		**40.1**		28.2		16.9		**51.4**		32.4		27.3	
Zinc	2,300	35,000	92.2		67.7		157		1130		224		125		129	

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
[1] There is no RSL for total chromium; values shown are for chromium III
[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use
mg/kg = milligrams per kilogram
J = Reported value is estimated; actual value may be higher or lower
J- = Reported value is estimated, actual value is expected to be lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 3
Norwood Landfill
Surface and Subsurface Soil Sample
Inorganic Analytical Results Summary

Sample Number:	EPA RSL Residential (mg/kg)	EPA RSL Industrial (mg/kg)	NL-2017-SS-17		NL-2017-SS-18		NL-2017-SB-18		NL-2017-SS-19		NL-2017-SB-19		NL-2017-SS-20	
CLP Sample Number:			C0AC8		C0AC9		C0AF4		C0AD0		C0AE7		C0AD1	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:			9/28/2017		9/28/2017		9/28/2017		9/27/2017		9/27/2017		9/27/2017	
Sample Depth:			0-6		0-6		24-48		0-6		24-30		0-6	
Sample Type:			Background		Background		Background		Field		Field		Dup of SS-14	
Metal			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	77,000	110,000	7970		5970		9310		7120		10100		8220	
Antimony	3.1	47	1.1	J	0.72	J	0.58	J	1.8	J	0.90	J	0.95	J
Arsenic	0.68	3	**5.9**		**4.5**		**3.5**		**7.8**		**5.0**		**5.0**	
Barium	1,500	22,000	55.6		63.5		36.7		139		79.8		112	
Beryllium	16	230	0.63		0.45		0.86		0.63		0.83		0.60	
Cadmium	7.1	98	0.67		0.70		1.0		1.6		1.5		1.8	
Calcium	NL	NL	1610		4600		36.0	J	2760		4640		6490	
Chromium[1]	12,000	180,000	15.8		16.9		22.0		22.2		24.5		20.3	
Cobalt	2.3	35	**4.4**		**3.8**	J	**8.0**		**6.0**		**7.8**		**6.5**	
Copper	310	4,700	18.3		19.8		14.6		54.0		31.1		39.5	
Iron	5,500	82,000	**14300**		**11600**		**23100**		**19400**		**25500**		**20700**	
Lead[2]	400	1,200	84.4		74.4		8.2		358		105		193	
Magnesium	NL	NL	1940		3560		2510		2410		3890		4600	
Manganese	180	2,600	179		**206**		145		**280**		**252**		287	
Mercury	1.1	4.6	0.18		0.38		0.11	UJ	0.2		0.12	UJ	0.42	
Nickel	150	2,200	11.5		11.0		11.7		16.5		13.9		15.5	
Potassium	NL	NL	515		173	J	380	J	1250		902		1330	
Selenium	390	5,800	2.8	UJ	3.1	UJ	3.0	UJ	3.9	UJ	3.3	UJ	3.1	UJ
Silver	390	5,800	0.54	J	0.51	J	0.72	J	0.95	J	0.92	J	0.84	J
Sodium	NL	NL	79.4	J	67.3	J	188	J	146	J	182	J	125	J
Thallium	0.078	1	2.0	U	2.2	U	2.2	U	2.8	U	2.3	U	2.2	U
Vanadium	39	580	38.1		33.7		37.2		**42.4**		**40.2**		**39.4**	
Zinc	2,300	35,000	62.3		92.2		29.8		229		98.4		194	

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL; highlighted values indicate exceedance of industrial RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
[1] There is no RSL for total chromium; values shown are for chromium III
[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use
mg/kg = milligrams per kilogram
J = Reported value is estimated; actual value may be higher or lower
J- = Reported value is estimated, actual value is expected to be lower
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
NL = No listed value
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Table 4
Norwood Landfill
Surface Water Samples Inorganics Analytical Results Summary

Sample ID:	EPA BTAG Freshwater (µg/L)	NL-2017-SW-01		NL-2017-SW-02		NL-2017-SW-03		NL-2017-SW-04		NL-2017-SW-05		NL-2017-SW-06		NL-2017-SW-07		NL-2017-SW-08		NL-2017-SW-09		NL-2017-SW-10		NL-2017-SW-11		NL-2017-SW-12	
CLP Sample Number:		MC0AA0		MC0AA1		MC0AA2		MC0AA3		MC0AA4		MC0AA5		MC0AA6		MC0AA7		MC0AA8		MC0AA9		MC0AB0		MC0AB1	
Units:		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
Sample Date:		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017	
Sample Type:		Background		Background		Background		Dup of SW-12		Field		Field		Field		Field		Field		Field		Field		Dup of SW-04	
Metals		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	87	**170**		**363**		**456**		**201**		**277**		**595**		**232**		**319**		**289**		**321**		**674**		**202**	
Antimony	30	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Arsenic	5	1.8		1.6		1.7		1.3		1.2		1.9		1.4		1.6		1.5		1.2		2.2		1.4	
Barium	4	**75.2**		**75.3**		**69.5**		**54.0**		**65.9**		**75.3**		**66.8**		**65.9**		**61.1**		**57.8**		**60.7**		**54.8**	
Beryllium	0.66	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	0.25	0.12	J	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.22	J	1.0	U
Calcium	116,000	34500		33700		31200		27600		30600		32700		31700		30700		29500		28200		28300		28200	
Chromium	85	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.5		2.0	U	2.0	U	2.0	U	2.0	U	24.3		2.0	U
Cobalt	23	0.62	J	0.75	J	0.73	J	0.37	J	0.54	J	1.0		0.56	J	0.70	J	0.61	J	0.54	J	6.0		0.41	J
Copper	9	3.4		4.2		3.9		2.7		3.3		5.0		2.9		3.7		3.3		3.6		**15.7**		3.0	
Iron	300	**1450**		**1460**		**1560**		**768**		**1220**		**2120**		**1160**		**1500**		**1340**		**1290**		**2130**		**812**	
Lead	2.5	**2.5**		**4.5**		**3.9**		1.9		**3.1**		**6.0**		2.3		**3.6**		**2.9**		**3.1**		**24.8**		2.2	
Magnesium	82,000	14200		13800		12700		10800		12200		13300		12600		12200		11700		11000		10900		11200	
Manganese	120	**255**		**245**		**211**		**136**		**182**		**297**		**228**		**244**		**231**		**162**		**218**		**141**	
Mercury	0.026	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	52	2.0		2.4		2.1		1.7		1.9		2.7		1.9		2.0		2.1		2.0		18.1		1.8	
Potassium	53,000	5620		4820		4240		3920		4070		4480		4340		4150		3980		3850		3830		4110	
Selenium	1	1.2	J	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Silver	3.2	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Sodium	680,000	46000		42300		38900		35400		37600		40200		39200		37800		36800		35400		35500		37300	
Thallium	0.8	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Vanadium	20	1.4	J	2.3	J	2.4	J	1.9	J	2.1	J	3.1	J	1.8	J	2.4	J	2.1	J	2.3	J	2.8	J	1.8	J
Zinc	120	40.6		22.7		17.2		7.2		12.1		20.0		37.5		27.1		14.0		13.1		104		9.6	

Notes:
Data compared to EPA BTAG freshwater screening criteria (1997)
Bold values indicate exceedance of BTAG criteria
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/L = micrograms per liter
Q = Data qualifier
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit
J = Reported value is estimated; actual value may be higher or lower

Table 5
Norwood Landfill
Sediment Samples
Organic Analytical Results Summary

Sample ID:	EPA BTAG Freshwater (µg/kg)	NL-2017-SD-01		NL-2017-SD-02		NL-2017-SD-03		NL-2017-SD-04		NL-2017-SD-05		NL-2017-SD-06		NL-2017-SD-07		NL-2017-SD-08		NL-2017-SD-09		NL-2017-SD-10		NL-2017-SD-11		NL-2017-SD-12	
CLP Sample Number:		C0AD2		C0AD3		C0AD4		C0AD5		C0AD6		C0AD7		C0AD8		C0AD9		C0AE0		C0AE1		C0AE2		C0AE3	
Units:		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg	
Sample Date:		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017	
Sample Type:		Background		Background		Background		Dup of SD-12		Field		Field		Field		Field		Field		Field		Field		Dup of SD-04	
SVOC SIM		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Naphthalene	176	5.0	U	40		3.9	J	7.1		11	U	5.0	J	11	U	11	U	10	U	11	U	11	U	15	
2-Methylnaphthalene	20.2	5.0	U	20		9.7	U	2.3	J	11	U	2.2	J	11	U	11	U	10	U	11	U	11	U	4.9	J
Acenaphthylene	5.9	5.0	U	**10**		9.7	U	6.7	U	11	U	8.1	U	11	U	11	U	10	U	11	U	11	U	3.7	J
Acenaphthene	6.7	5.0	U	**68**		3.9	J	6.7	U	11	U	8.1	U	11	U	11	U	10	U	11	U	11	U	11	U
Fluorene	77.4	5.0	U	72		3.6	J	6.7	U	11	U	8.1	U	11	U	11	U	10	U	11	U	11	U	2.5	J
Phenanthrene	204	8.5		**1200**	J	49		14		16		17		11		6.6	J	7.3	J	11	U	3.8	J	20	
Anthracene	57.2	5.0	U	**270**		11		6.7	U	4.6	J	4.9	J	11	U	11	U	10	U	11	U	11	U	4.9	J
Fluoranthene	423	19		**2000**	J	88		32		35		38		32		14		15		5.9	J	9.8	J	43	
Pyrene	195	22		**1900**	J	99		38		44		49		41		18		18		8.0	J	12		55	
Benzo(a)anthracene	108	13		**1100**	J	52		20		19		23		21		16		8.0	J	6.9	J	11	U	29	
Chrysene	166	14		**1000**	J	52		20		22		24		25		17		9.6	J	8.1	J	11	U	29	
Benzo(b)fluoranthene	190 (H)	20		**1500**	J	79		33		31		31		35		34		13		14		11	U	43	
Benzo(k)fluoranthene	240	6.5		**450**		24		9.4		9.4	J	9.8		12		11		4.1	J	11	U	11	U	13	
Benzo(a)pyrene	150	14		**940**	J	50		22		20		21		22		25		7.2	J	7.7	J	11	U	29	
Indeno(1,2,3-cd)pyrene	17	12		**600**	J	**34**		14		14		15		16		**17**		5.8	J	5.9	J	11	U	**19**	
Dibenzo(a,h)anthracene	33	5.0	U	**180**		11		6.7	U	4.9	J	4.6	J	4.5	J	6.4	J	10	U	11	U	11	U	11	U
Benzo(g,h,i)perylene	170	13		**570**	J	32		14		17		17		18		17		5.7	J	6.1	J	11	U	22	
SVOC																									
Dimethylphthalate	NL	590	U	350	U	990		770		1,200		920		470	J	390	J	470	J	190	J	280	J	990	
Fluorene	77.4	260	U	**81**	J	500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Phenanthrene	204	260	U	**890**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Anthracene	57.2	260	U	**170**	J	500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Carbozole	NL	500	U	110	J	970	U	340	U	1,100	U	810	U	1,100	U	1,100	U	1,000	U	1,100	U	1,100	U	1,100	U
Fluoranthene	423	260	U	**1,700**		500	U	670	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Pyrene	195	260	U	**1,200**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Benzo(a)anthracene	108	260	U	**700**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Chrysene	166	260	U	**840**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Bis(2-ethylhexyl)phthalate	NL	260	U	230	J	500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Benzo(b)fluoranthene	27.2*	260	U	**1,000**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Benzo(k)fluoranthene	27.2*	260	U	**370**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Benzo(a)pyrene	150	260	U	**670**		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Indeno(1,2,3-cd)pyrene	NL	260	U	390		500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Dibenzo(a,h)anthracene	33	260	U	**120**	J	500	U	340	U	590	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Benzo(g,h,i)perylene	170	260	U	**380**		500	U	340	U	50	U	420	U	560	U	570	U	520	U	540	U	540	U	560	U
Phenol	420	84	J	600	U	160	J	96	J	190	J	120	J	1,100	U	1,100	U	1,000	U	1,100	U	1,100	U	140	J
Pesticides																									
4,4-DDE[1]	3.16/5.28*	4.9	U	1.5	J	9.7	U	6.7	U	11	U	0.63	J	11	U	0.53	J	10	U	11	U	11	U	11	U
4,4-DDD[1]	4.8/5.28*	4.9	U	6	U	9.7	U	6.7	U	11	U	8.1	U	11	U	11	U	10	U	11	U	11	U	11	U
4,4-DDT[1]	4.16/5.28*	4.9	U	6	U	9.7	U	6.7	U	11	U	8.1	U	11	U	11	U	10	U	11	U	11	U	11	U
Methoxychlor	18.7	25	U	31	U	50	U	34	U	59	U	42	U	56	U	57	U	9.9	J	54	U	**57**		56	U
cis-Chlordane[2]	3.24*	2.5	U	**4.5**	J	5	U	3.4	U	5.9	U	4.2	U	5.6	U	5.7	U	5.2	U	5.4	U	5.4	U	5.6	U
trans-Chlordane[2]	3.24*	2.5	U	**3.9**	J	5	U	3.4	U	5.9	U	4.2	U	5.6	U	5.7	U	5.2	U	5.4	U	5.4	U	5.6	U

Notes:

[1] The second BTAG value shown is for total combined DDD, DDE and DDT

[2] The BTAG values in table are for Chlordane

Data compared to EPA BTAG freshwater sediment screening criteria (1997)

Bold values indicate exceedance of BTAG criteria

Red values indicate 3x background values (or above background RDL if background is non-detect)

J = Reported value is estimated; actual value may be higher or lower

µg/kg = micrograms per kilogram

NL = No listed value

Q = Qualifier

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit

Table 6
Norwood Landfill
Sediment Samples
Inorganic Analytical Results Summary

Sample ID:	EPA BTAG Freshwater (mg/kg)	NL-2017-SD-01		NL-2017-SD-02		NL-2017-SD-03		NL-2017-SD-04		NL-2017-SD-05		NL-2017-SD-06		NL-2017-SD-07		NL-2017-SD-08		NL-2017-SD-09		NL-2017-SD-10		NL-2017-SD-11		NL-2017-SD-12	
CLP Sample Number:		MC0AD2		MC0AD3		MC0AD4		MC0AD5		MC0AD6		MC0AD7		MC0AD8		MC0AD9		MC0AE0		MC0AE1		MC0AE2		MC0AE3	
Units:		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Sample Date:		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017		9/26/2017	
Sample Type:		Background		Field		Background		Dup of SD-12		Field		Field		Field		Field		Field		Field		Field		Dup of SD-04	
Metals		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	NL	12300		10900		17400		13900		13800		15700		13000		14200		11800		11800		11900		25200	
Antimony	2	6.5	U	1.2	J	12.1	U	0.90	J	0.72	J	11.0	U	0.77	J	0.69	J	1.2	J	13.8	U	14.2	U	1.3	J
Arsenic	9.8	4.2		9.6		**15.0**		**12.5**		**10.4**		**19.3**		9.7		**10.2**		**15.1**		**9.9**		9.4		**26.6**	
Barium	NL	109		122		177		136		154		196		150		160		141		140		151		223	
Beryllium	NL	1.0		0.86		1.5		1.2		1.2		1.5		1.2		1.2		1.1		1.1	J	1.1	J	2.2	
Cadmium	0.99	**1.4**		**1.7**		**2.3**		**1.6**		**3.0**		**4.1**		**2.8**		**3.2**		**2.0**		**1.9**		**3.0**		**2.8**	
Calcium	NL	1100	J	4040	J	4210	J	2390	J	6980	J	3780	J	4740	J	4940	J	4850	J	4520	J	5070	J	2580	J
Chromium	43.4	26.5		33.6		**71.1**		**63.4**		**44.2**		**103**		**44.3**		**48.8**		**44.0**		**44.9**		43.1		**115**	
Cobalt	50	9.9	J	11.2	J	19.4	J	16.2	J	15.6	J	15.7	J	14.6	J	16.5	J	13.4	J	12.3	J	12.9	J	22.9	J
Copper	31.6	22.9	J	**53.7**	J	**71.2**	J	**52.1**	J	**69.4**	J	**111**	J	**66.2**	J	**70.6**	J	**67.7**	J	**61.6**	J	**64.1**	J	**79.1**	J
Iron	20,000	25100		27100		33300		24900		30500		36300		30300		32100		30700		30100		30000		37700	
Lead	35.8	23.5		**73.3**		**105**		**82.7**		**91.5**		**214**		**86.6**		**94.9**		**78.9**		**74.5**		**77.4**		**172**	
Magnesium	NL	3760	J	5980	J	6560	J	4520	J	6670	J	5870	J	6050	J	6470	J	5940	J	5790	J	5720	J	6650	J
Manganese	460	216	J	**747**	J	**697**	J	443	J	**807**	J	**601**	J	**770**	J	**848**	J	**718**	J	**789**	J	**793**	J	**420**	J
Mercury	0.18	0.14	J	**0.22**		**0.31**		**0.55**		**0.28**		**0.84**		**0.29**		**0.33**		**0.3**		**0.28**	J	**0.28**		**1.1**	
Nickel	22.7	18.4		**25.8**		**36.1**		**29.4**		**32.4**		**41.2**		**30.5**		**34.7**		**26.9**		**25.0**		**26.2**		**43.1**	
Potassium	NL	947	J	2500	J	2000	J	1260	J	2060	J	1840	J	1960	J	2150	J	1820	J	1790	J	1960	J	1800	J
Selenium	2	3.8	UJ	4.7	UJ	7.1	U	5.0	UJ	2.8	U	6.4	U	3.1	U	2.9	U	7.6	U	8.0	U	8.3	U	8.3	U
Silver	1	0.80	J	1.2	J	1.3	J-	1.0	J	1.3	J-	4.6	J-	1.3	J-	1.4	J-	1.3	J	1.2	J-	2.4	R	1.3	J-
Sodium	NL	196	J	248	J	343	J	251	J	363	J	324	J	348	J	376	J	325	J	318	J	355	J	394	J
Thallium	NL	2.7	U	3.4	U	5.1	U	3.6	U	2.0	U	4.6	U	2.2	U	2.1	U	5.4	U	5.7	U	5.9	U	5.9	U
Vanadium	NL	38.0		39.5		53.5		42.8		40.6		58.1		38.8		42.0		39.0		37.5		38.0		71.7	
Zinc	121	64.8	J	**244**	J	**265**	J	**174**	J	**279**	J	**418**	J	**265**	J	**284**	J	**262**	J	**242**	J	**239**	J	**311**	J

Notes:
Data compared to EPA BTAG freshwater sediment screening criteria (1997)
Bold values indicate exceedance of BTAG criteria
Red values indicate 3x background values (or above background RDL if background is non-detect)
J = Reported value is estimated; actual value may be higher or lower
J- = Reported value is estimated, actual value is expected to be lower
mg/kg = milligrams per kilogram
NL = No listed value
Q = Qualifier
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 7
Norwood Landfill
Residential Surface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:		NL-RS-01		NL-RS-01D		NL-RS-02		NL-RS-03		NL-RS-04		NL-RS-05	
CLP Sample Number:		C0AG1		C0AH1		C0AH5		C0AH4		C0AH3		C0AH2	
Units:	**EPA RSL**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:	**Residential**	5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:	**(µg/kg)**	0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Dup of NL-RP-SS-01		Field		Field		Field		Field	
VOCs		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	14	U	14	U	12	U	15	U	68		12	U
2-Hexanone	20,000	16		18		12	U	15	U	13	U	12	
2-Butanone	2,700,000	14	U	14	U	12	U	15	U	8	J	12	U
Chloroform	320	6.9	U	7.2	U	4.1	J	7.7	U	6.7	U	6.2	U
1,1,1-Trichloroethane	810,000	2.2	J	3.8	J	4.3	J	7.7	U	3.8	J	6.2	U
Styrene	600,000	6.9	U	7.2	U	5.9	U	7.7	U	6.7	U	6.2	U
SVOCs (PAHs by SIM)													
Naphthalene	3,800	3.3	J	6.3		1.7	J	2.5	J	2.5	J	2.2	J
2-Methylnaphthalene	24,000	2.7	J	4.7		1.5	J	3.4	J	3.5	J	2.7	J
Acenaphthylene	NL	7.3		9.0		2.6	J	7.0		2.1	J	5.3	
Acenaphthene	360,000	5.9		13		1.7	J	1.0	J	1.1	J	12	
Fluorene	240,000	7.6		12		4.5	U	5.1	U	4.5	U	13	
Pentachlorophenol	1,000	9.4	U	1.7	J	9.1	U	10	U	9.1	U	9.1	U
Phenanthrene	NL	110		160		30		20		17		250	
Anthracene	1,800,000	25		32		6.8		5.8		3.3	J	29	
Fluoranthene	240,000	250		350		95		66		49		660	
Pyrene	180,000	190		260		62		56		39		480	
Benzo(a)anthracene	1,100	130		190		41		34		25		300	
Chrysene	110,000	120		170		40		42		28		340	
Benzo(b)fluoranthene	1,100	170		280		59		71		40		460	
Benzo(k)fluoranthene	11,000	46		64		22		24		12		170	
Benzo(a)pyrene	110	**120**		**190**		45		44		29		**320**	
Indeno(1,2,3-cd)pyrene	1,100	53		54		17		18		9.5		220	
Dibenzo(a,h)anthracene	110	4.6	U	4.5	U	4.5	U	5.1	U	4.5	U	4.5	U
Benzo(g,h,i)perylene	NL	45	J	44	J	14	J	15	J	8.5	J	240	
SVOCs													
naphthalene	3,800	240	U	230	U	230	U	260	U	230	U	230	U
2-Methylnaphthalene	24,000	240	U	230	U	230	U	260	U	230	U	230	U
Acenaphthene	360,000	240	U	230	U	230	U	260	U	230	U	230	U
Dibenzofuran	7,300	240	U	230	U	230	U	260	U	230	U	230	U
Flourene	240,000	240	U	230	U	230	U	260	U	230	U	230	U
Phenanthrene	NL	140	J	180	J	38	J	260	U	230	U	230	
Anthracene	1,800,000	36	J	36	J	230	U	260	U	230	U	28	J
Carbazole	NL	460	U	450	U	450	U	510	U	450	U	450	U
Di-n-butylphthalate	630,000	43	J	44	J	230	U	260	U	230	U	230	U
Fluoranthene	240,000	280	J	390	J	100	J	89	J	61	J	630	
Pyrene	180,000	250		310		85	J	66	J	46	J	460	
Butylbenzylphthalate	290,000	240	U	230	U	230	U	260	U	230	U	230	U
Benzo(a)anthracene	1,100	150	J	200	J	49	J	41	J	31	J	270	
Chrysene	110,000	170	J	220	J	60	J	54	J	35	J	360	
bis(2-Ethylhexyl)phthalate	39,000	130	J	410	J	340	J	84	J	32	J	370	J
Benzo(b)fluoranthene	1,100	200	J	300		93	J	90	J	50	J	480	
Benzo(k)fluoranthene	11,000	79	J	110	J	26	J	27	J	230	U	180	J
Benzo(a)pyrene	110	**150**	J	**210**	J	53	J	52	J	31	J	**310**	
Indeno(1,2,3-cd)pyrene	1,100	93	J	140	J	34	J	34	J	230	U	200	J
Benzo(g,h,i)perylene	NL	85	J	140	J	36	J	36	J	25	J	220	J

Notes:
Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 7
Norwood Landfill
Residential Surface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:		NL-RS-06		NL-RS-07		NL-RS-08		NL-RS-09		NL-RS-10		NL-RS-11	
CLP Sample Number:		C0AH1		C0AH0		C0AG9		C0AG8		C0AG7		C0AG6	
Units:	**EPA RSL**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:	**Residential**	5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:	**(µg/kg)**	0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Field		Field		Field		Field		Field	
VOCs		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	46		13	U	13	U	14	U	13	U	12	U
2-Hexanone	20,000	17	U	13	U	13	U	14	U	13	U	12	U
2-Butanone	2,700,000	11	J	13	U	13	U	14	U	13	U	12	U
Chloroform	320	8.4	U	6.6	U	6.6	U	6.9	U	6.4	U	6	U
1,1,1-Trichloroethane	810,000	8.4	U	6.6	U	1.6	J	6.9	U	2.4	J	3.3	J
Styrene	600,000	19	J	6.6	U	6.6	U	25	J	6.4	U	6	U
Naphthalene	3,800	2.4	J	2.3	J	1.5	J	1.7	J	1.7	J	4.5	
2-Methylnaphthalene	24,000	3.5	J	2.7	J	1.6	J	2.1	J	2.0	J	5.2	
Acenaphthylene	NL	2.8	J	2.8	J	2.8	J	2.1	J	2.2	J	5.0	
Acenaphthene	360,000	6.4		11		0.77	J	1.1	J	1.7	J	13	
Fluorene	240,000	6.1		13		4.6	U	4.8	U	4.5	U	11	
Pentachlorophenol	1,000	11	U	9.3	U	9.3	U	9.7	U	9.1	U	8.9	U
Phenanthrene	NL	73		180		12		18		25		160	
Anthracene	1,800,000	14		25		2.9	J	4.0	J	5.0		24	
Fluoranthene	240,000	220		370		45		54		67		430	
Pyrene	180,000	150		240		39		45		55		300	
Benzo(a)anthracene	1,100	78		150		24		28		36		200	
Chrysene	110,000	100		140		30		30		38		210	
Benzo(b)fluoranthene	1,100	140		210		42		46		52		290	
Benzo(k)fluoranthene	11,000	34		56		15		14		15		110	
Benzo(a)pyrene	110	77		**130**		33		34		38		**190**	
Indeno(1,2,3-cd)pyrene	1,100	33		50		15		16		18		68	
Dibenzo(a,h)anthracene	110	5.2	U	4.6	U	4.6	U	4.8	U	4.5	U	4.4	U
Benzo(g,h,i)perylene	NL	28	J	44	J	14	J	14	J	16	J	65	J
naphthalene	3,800	270	U	240	U	240	U	250	U	230	U	230	U
2-Methylnaphthalene	24,000	270	U	240	U	240	U	250	U	230	U	230	U
Acenaphthene	360,000	270	U	240	U	240	U	250	U	230	U	230	U
Dibenzofuran	7,300	270	U	240	U	240	U	250	U	230	U	230	U
Flourene	240,000	270	U	240	U	240	U	250	U	230	U	230	U
Phenanthrene	NL	110	J	210	J	240	U	25	J	36	J	210	J
Anthracene	1,800,000	270	U	30	J	240	U	250	U	230	U	33	J
Carbazole	NL	520	U	460	U	460	U	480	U	450	U	440	U
Di-n-butylphthalate	630,000	270	U	240	U	240	U	250	U	230	U	25	J
Fluoranthene	240,000	250	J	410	J	48	J	64	J	96	J	580	
Pyrene	180,000	170	J	310		44	J	62	J	89	J	460	
Butylbenzylphthalate	290,000	270	U	240	U	48	J	250	U	230	U	230	U
Benzo(a)anthracene	1,100	110	J	150	J	29	J	36	J	50	J	250	
Chrysene	110,000	130	J	190	J	34	J	44	J	47	J	310	
bis(2-Ethylhexyl)phthalate	39,000	6800	J	96	J	44	J	56	J	49	J	150	J
Benzo(b)fluoranthene	1,100	180	J	230	J	59	J	56	J	79	J	410	
Benzo(k)fluoranthene	11,000	69	J	88	J	240	U	250	U	27	J	140	J
Benzo(a)pyrene	110	**110**	J	**150**	J	32	J	40	J	51	J	**250**	
Indeno(1,2,3-cd)pyrene	1,100	64	J	89	J	240	U	28	J	32	J	160	J
Benzo(g,h,i)perylene	NL	73	J	90	J	28	J	28	J	32	J	180	J

Notes:
Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 7
Norwood Landfill
Residential Surface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:		NL-RS-12		NL-RS-13		NL-RS-14		NL-RS-15		NL-RS-16		NL-RS-17		NL-RS-17D	
CLP Sample Number:		C0AG5		C0AG4		C0AG3		C0AG2		C0AH6		C0AH9		C0AJ0	
Units:	**EPA RSL**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:	**Residential**	5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/24/2018		5/24/2018	
Sample Depth:	**(µg/kg)**	0-12		0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Field		Field		Field		Field		Field		Dup of NL-RP-SS-17	
VOCs		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	13	U	16		4.7	U	12	U	12	U	11	R	11	R
2-Hexanone	20,000	13	U	13	U	11	U	12	U	12	U	11	R	11	R
2-Butanone	2,700,000	13	U	13	U	11	U	12	U	12	U	11	R	11	R
Chloroform	320	6.3	U	6.3	U	5.7	U	6	U	5.8	U	5.4	R	5.4	R
1,1,1-Trichloroethane	810,000	1.4	J	3.4	J	5.7	U	6	U	5.8	U	5.4	R	5.4	R
Styrene	600,000	6.3	U	6.3	U	46	J	6	U	5.8	U	5.4	R	5.4	R
Naphthalene	3,800	2.5	J	1.3	J	1.0	J	1.1	J	2.6	J	1.3	J	1.6	J
2-Methylnaphthalene	24,000	2.7	J	1.6	J	1.0	J	1.1	J	2.7	J	1.7	J	2.1	J
Acenaphthylene	NL	2.5	J	1.1	J	1.1	J	1.7	J	40		2.8	J	3.5	J
Acenaphthene	360,000	3.4	J	0.78	J	0.66	J	1.6	J	4.4		1.5	J	1.2	J
Fluorene	240,000	4.4	U	4.5	U	4.3	U	4.4	U	6.3		4.1	U	4.1	U
Pentachlorophenol	1,000	9.0	U	9.1	U	8.7	U	1.7	J	8.6	U	8.4	U	8.3	U
Phenanthrene	NL	57		18		12		22		150		21		23	
Anthracene	1,800,000	9.9		2.9	J	2.1	J	5.2		51		4.2		4.4	
Fluoranthene	240,000	120		58		38		66		450		55		64	
Pyrene	180,000	91		47		31		53		350		41		50	
Benzo(a)anthracene	1,100	49		28		18		38		220		25		32	
Chrysene	110,000	48		32		20		38		260		28		32	
Benzo(b)fluoranthene	1,100	57		46		30		53		420		41		54	
Benzo(k)fluoranthene	11,000	17		15		10		20		130		15		19	
Benzo(a)pyrene	110	44		35		24		42		**220**		28		37	
Indeno(1,2,3-cd)pyrene	1,100	22		19		13		20		170		10		14	
Dibenzo(a,h)anthracene	110	4.4	U	4.5	U	4.3	U	4.4	U	4.2	U	4.1	U	4.1	U
Benzo(g,h,i)perylene	NL	20	J	17	J	12	J	18	J	68	J	8.3	J	11	J
naphthalene	3,800	230	U	230	U	220	U	230	U	220	U	210	U	210	U
2-Methylnaphthalene	24,000	230	U	230	U	220	U	230	U	220	U	210	U	210	U
Acenaphthene	360,000	230	U	230	U	220	U	230	U	220	U	210	U	210	U
Dibenzofuran	7,300	230	U	230	U	220	U	230	U	220	U	210	U	210	U
Flourene	240,000	230	U	230	U	220	U	230	U	220	U	210	U	210	U
Phenanthrene	NL	120	J	30	J	220	U	34	J	170	J	36	J	40	J
Anthracene	1,800,000	230	U	230	U	220	U	32	J	55	J	210	U	210	U
Carbazole	NL	440	U	450	U	430	U	440	U	420	U	410	U	410	U
Di-n-butylphthalate	630,000	24	J	230	U	220	U	230	U	220	U	210	U	210	U
Fluoranthene	240,000	210	J	96	J	56	J	77	J	500		85	J	110	J
Pyrene	180,000	170	J	81	J	45	J	80	J	440		68	J	83	J
Butylbenzylphthalate	290,000	230	U	230	U	220	U	38	J	220	U	210	U	210	U
Benzo(a)anthracene	1,100	91	J	41	J	22	J	50	J	220		40	J	48	J
Chrysene	110,000	100	J	57	J	31	J	61	J	320		42	J	64	J
bis(2-Ethylhexyl)phthalate	39,000	120	J	55	J	39	J	100	J	210	J	30	J	34	J
Benzo(b)fluoranthene	1,100	150	J	89	J	37	J	74	J	500		73	J	87	J
Benzo(k)fluoranthene	11,000	49	J	25	J	220	U	31	J	180	J	210	U	26	J
Benzo(a)pyrene	110	93	J	52	J	28	J	50	J	**260**		48	J	56	J
Indeno(1,2,3-cd)pyrene	1,100	47	J	29	J	220	U	29	J	190	J	29	J	40	J
Benzo(g,h,i)perylene	NL	53	J	30	J	220	U	31	J	200	J	34	J	42	J

Notes:
Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 7
Norwood Landfill
Residential Surface Soil Samples
VOC and SVOC Analytical Results Summary

Sample Number:		NL-RS-18		NL-RS-19		NL-RS-20		NL-RS-21		NL-2017-SS-17		NL-2017-SS-18	
CLP Sample Number:		C0AJ1		C0AJ2		C0AJ3		C0AJ4		C0AC8		C0AC9	
Units:	**EPA RSL**	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:	**Residential**	5/24/2018		5/24/2018		5/24/2018		5/24/2018		9/28/2017		9/28/2017	
Sample Depth:	**(µg/kg)**	0-12		0-12		0-12		0-12		0-6		0-6	
Sample Type:		Field		Field		Field		Field		Background		Background	
VOCs		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Acetone	6,100,000	15	U	18	U	14	U	16		11	U	12	U
2-Hexanone	20,000	20	U	18	U	22	U	16	U	11	U	12	U
2-Butanone	2,700,000	15	U	18	U	14	U	16	U	11	U	12	U
Chloroform	320	7.4	U	8.8	U	7.2	U	7.9	U	5.7	U	5.9	U
1,1,1-Trichloroethane	810,000	7.4	U	8.8	U	7.2	U	7.9	U	5.7	U	5.9	U
Styrene	600,000	7.4	U	8.8	U	7.2	U	7.9	U	5.7	U	5.9	U
Naphthalene	3,800	2.2	J							9.1		5.9	
2-Methylnaphthalene	24,000	2.2	J							9.3		6.1	
Acenaphthylene	NL	3.4	J							7.6	J	6.4	
Acenaphthene	360,000	3.9	J							7.1		5.1	
Fluorene	240,000	6.3								6.7		4.0	
Pentachlorophenol	1,000	9.9	U							7.4	U	8.4	U
Phenanthrene	NL	76								140		150	
Anthracene	1,800,000	21								20		20	
Fluoranthene	240,000	170								230		610	J
Pyrene	180,000	130								250		650	J
Benzo(a)anthracene	1,100	75								140		370	J
Chrysene	110,000	62								130		550	J
Benzo(b)fluoranthene	1,100	100								200		**1100**	**J**
Benzo(k)fluoranthene	11,000	33								52		320	
Benzo(a)pyrene	110	69								**110**		**550**	**J**
Indeno(1,2,3-cd)pyrene	1,100	23								82		490	J
Dibenzo(a,h)anthracene	110	4.9	U							24		**140**	
Benzo(g,h,i)perylene	NL	20	J							79		500	J
naphthalene	3,800	250	U	1300	U	1200	U	240	J	190	U	210	U
2-Methylnaphthalene	24,000	250	U	1300	U	1200	U	150	J	190	U	210	U
Acenaphthene	360,000	250	U	240	J	1200	U	240	J	190	U	210	U
Dibenzofuran	7,300	250	U	1300	U	1200	U	250	J	190	U	210	U
Flourene	240,000	250	U	270	J	1200	U	240		190	U	210	U
Phenanthrene	NL	120	J	6500		2500		4700		130	J	130	J
Anthracene	1,800,000	28	J	1300		460	J	430	J	190	U	210	U
Carbazole	NL	490	U	550	J	380	J	380	J	190	U	210	U
Di-n-butylphthalate	630,000	42	J	130	J	1200	U	1300	U	190	U	210	U
Fluoranthene	240,000	200	J	18000		6300		6900		230	J	580	
Pyrene	180,000	160	J	15000		4700		5400		190	J	610	
Butylbenzylphthalate	290,000	250	U	230	J	150	J	1300	U	100	J	290	
Benzo(a)anthracene	1,100	98	J	**9100**		**2500**		**2200**		130	J	550	
Chrysene	110,000	110	J	9900		3200		3000		340		750	
bis(2-Ethylhexyl)phthalate	39,000	350	J	870	J	520	J	190	J	150	J	910	
Benzo(b)fluoranthene	1,100	140	J	**15000**		**4400**		**3800**		52	J	240	
Benzo(k)fluoranthene	11,000	40	J	4600		1400		1300		98	J	**480**	
Benzo(a)pyrene	110	95	J	**9700**		**2700**		**2200**		58		**420**	
Indeno(1,2,3-cd)pyrene	1,100	61	J	**6900**		**2000**		**1600**		**190**		**120**	J
Benzo(g,h,i)perylene	NL	64	J	7600		2200		1700		53		480	

Notes:
Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
µg/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
J+ = Reported value is estimated; actual value is expected to be higher
J- = Reported value is estimated, actual value is expected to be lower
NL = No listed value
Q = Qualifier
R = Data were rejected. The sample jar for this specific sample was broken in transit. Soil remaining in sealed baggie was analyzed.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit isapproximate and may be inaccurate or imprecise

Table 8
Residential Surface Soil Samples
PCB and Pesticide Analytical Results

Sample Number:	EPA RSL Residential (µg/kg)	NL-RS-01		NL-RS-01D		NL-RS-02		NL-RS-03		NL-RS-04		NL-RS-05	
CLP Sample Number:		C0AG1		C0AH1		C0AH5		C0AH4		C0AH3		C0AH2	
Units:		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:		0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Dup of NL-RP-SS-01		Field		Field		Field		Field	
PCB		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor 1254	120	45	U	44	U	43	U	50	U	47	U	45	U
Aroclor-1260	240	76	J	81	J	42	J	27	J	21	J	31	J
Pesticide													
alpha-BHC	86	2.3	U	2.3	U	2.2	U	2.6	U	2.4	U	2.3	U
beta-BHC	300	2.3	U	2.3	U	2.2	U	2.6	U	2.4	U	2.3	U
delta-BHC	NL	2.3	U	2.3	U	2.2	U	2.6	U	2.4	U	2.3	U
gamma-BHC (Lindane)	570	2.3	U	2.3	U	2.2	U	2.6	U	2.4	U	0.54	J
Heptachlor	130	3.1	J	1.0	J	2.2	U	2.6	U	0.98	J	2.3	U
Aldrin	39	0.58	J	2.3	U	2.3		2.6	U	1.2	J	0.28	J
Heptachlor epoxide	70	7.2	J	8.0	J	1.4	J	0.96	J	2.4	U	2.3	U
Endosulfan I	47,000 (E)	0.38	R	2.3	U	0.49	R	0.71	R	2.4	U	2.3	U
Dieldrin	34	2.6	J	2.8	J	**170**		4.6	J	4.7	U	0.60	R
4,4'-DDE	2,000	7.9	J	9.9	J	7.2		3.0	J	0.44	J	0.66	J
Endrin	1,900	0.82	R	4.4	U	0.60	R	1.1	J	1.4	J	0.74	J
Endosulfan II	47,000 (E)	4.5	U	4.4	U	4.3	U	5.0	U	4.7	U	4.5	U
4,4'-DDD	190	5.0	R	2.5	R	0.39	R	1.1	R	4.7	U	4.5	U
Endosulfan sulfate	47,000 (E)	1.3	J	4.4	U	4.3	U	0.44	J	4.7	U	0.92	R
4,4'-DDT	1,900	14	J	23	J	9.5		4.8	J	4.7	U	4.5	U
Methoxychlor	32,000	23	U	2.6	J	4.5	J	3.3	J	2.4	J	23	
Endrin ketone (*)	1,900	0.75	R	4.4	U	4.3	U	0.73	R	4.7	U	4.5	U
Endrin aldehyde (*)	1,900	0.29	R	0.39	R	1.9	J	1.0	J	1.5	J	0.35	R
cis-Chlordane (*)	1,700	30	J	25	J	12		11		0.92	R	0.89	J
trans-Chlordane (*)	1,700	24	J	14	J	4.3	J	6.7	J	1.1	J	0.61	J

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
(*) = Endrin and Chlordane values, respectively.
(E) = Endosulfan value
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
ug/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 8
Residential Surface Soil Samples
PCB and Pesticide Analytical Results

Sample Number:	EPA RSL Residential (µg/kg)	NL-RS-06		NL-RS-07		NL-RS-08		NL-RS-09		NL-RS-10		NL-RS-11	
CLP Sample Number:		C0AH1		C0AH0		C0AG9		C0AG8		C0AG7		C0AG6	
Units:		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:		0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Field		Field		Field		Field		Field	
PCB		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Arochlor-1254	120	52	U	46	U	45	U	47	U	16	J	43	U
Aroclor-1260	240	30	J	24	J	31	J	17	J	44	U	87	
Pesticide													
alpha-BHC	86	2.7	U	2.4	U	2.3	U	2.4	U	2.3	U	2.2	U
beta-BHC	300	2.7	U	2.4	U	2.3	U	2.4	U	2.3	U	2.2	U
delta-BHC	NL	2.7	U	2.4	U	2.3	U	2.4	U	2.3	U	2.2	U
gamma-BHC (Lindane)	570	2.7	U	1.0	J	2.3	U	2.4	U	2.3	U	2.2	U
Heptachlor	130	2.7	U	2.4	U	2.3	U	2.4	U	2.3	U	2.2	U
Aldrin	39	2.7	U	2.4	U	2.3	U	2.4	U	2.3	U	2.2	U
Heptachlor epoxide	70	0.47	J	0.56	R	2.3	U	2.4	U	2.2	J	0.44	J
Endosulfan I	47,000 (E)	0.46	R	2.4	U	0.36	R	0.38	R	0.97	R	2.2	U
Dieldrin	34	3.0	J	0.48	R	0.80	J	4.7	U	1.6	J	19	
4,4'-DDE	2,000	3.1	J	1.1	J	6.4		12		1.8	J	290	
Endrin	1,900	0.46	R	0.54	J	0.58	R	0.83	R	0.44	J	9.1	
Endosulfan II	47,000 (E)	5.2	U	4.6	U	4.5	U	4.7	U	4.4	U	4.3	U
4,4'-DDD	190	5.2	U	4.6	U	0.40	R	0.38	R	4.4	U	1.0	J
Endosulfan sulfate	47,000 (E)	1.4	R	220		0.42	R	0.51	R	4.4	U	0.61	J
4,4'-DDT	1,900	8.0	J	4.6	U	6.3		7.3	J	4.4	U	130	
Methoxychlor	32,000	2.7	J	9.2	J	0.83	R	2.1	J	5.7	J	10	J
Endrin ketone (*)	1,900	5.2	U	0.75	J	0.75	R	4.7	U	4.4	U	4.3	U
Endrin aldehyde (*)	1,900	2.0	J	4.6	U	4.5	U	1.1	R	0.39	R	0.53	R
cis-Chlordane (*)	1,700	1.5	J	2.4		0.45	J	2.4	U	2.3		1.9	J
trans-Chlordane (*)	1,700	0.63	J	0.91	J	2.3	U	0.36	R	3.9	R	1.7	J

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
(*) = Endrin and Chlordane values, respectively.
(E) = Endosulfan value
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
ug/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower
approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 8
Residential Surface Soil Samples
PCB and Pesticide Analytical Results

Sample Number:	EPA RSL Residential (µg/kg)	NL-RS-12		NL-RS-13		NL-RS-14		NL-RS-15		NL-RS-16	
CLP Sample Number:		C0AG5		C0AG4		C0AG3		C0AG2		C0AH6	
Units:		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Field		Field		Field		Field	
PCB		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1254	120	44	U	47	U	42	U	44	U	44	U
Aroclor-1260	240	32	J	47	U	42	U	44	U	19	J
Pesticide											
alpha-BHC	86	11	U	2.4	U	2.2	U	2.3	U	2.3	U
beta-BHC	300	11	U	2.4	U	2.2	U	2.8	J	2.3	U
delta-BHC	NL	11	U	2.4	U	2.2	U	2.3	U	2.3	U
gamma-BHC (Lindane)	570	11	U	2.4	U	2.2	U	2.3	U	2.3	U
Heptachlor	130	11	U	2.4	U	2.2	U	2.9	J	2.3	U
Aldrin	39	53		2.4	U	2.2	U	2.3	U	2.3	U
Heptachlor epoxide	70	11	U	0.25	J	2.2	U	29	J	0.30	J
Endosulfan I	47,000 (E)	2.4	J	0.53	J	2.2	U	9.7	R	2.2	J
Dieldrin	34	**1300**		1.2	J	2.0	J	3.5	R	1.2	R
4,4'-DDE	2,000	29		0.84	R	0.68	J	15	J	3.6	J
Endrin	1,900	1.7	J	4.7	U	0.52	R	1.1	R	0.77	J
Endosulfan II	47,000 (E)	22	U	4.7	U	4.2	U	4.4	U	4.4	U
4,4'-DDD	190	22	U	4.7	U	4.2	U	1.7	R	0.32	J
Endosulfan sulfate	47,000 (E)	6.7	J	8.9	J	0.49	R	0.73	J	4.4	U
4,4'-DDT	1,900	25		4.7	U	4.2	U	9.0	J	5.3	
Methoxychlor	32,000	7.4	J	5.4	J	1.3	J	150	J	15	J
Endrin ketone (*)	1,900	4.9	J	0.76	J	4.2	U	6.3	J	4.4	U
Endrin aldehyde (*)	1,900	22	U	0.38	J	1.2	R	1.2	R	0.41	J
cis-Chlordane (*)	1,700	11	U	0.99	J	2.2	U	120		2.3	U
trans-Chlordane (*)	1,700	1.6	J	0.93	J	0.37	R	66		2.6	

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
(*) = Endrin and Chlordane values, respectively.
(E) = Endosulfan value
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
ug/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 8
Residential Surface Soil Samples
PCB and Pesticide Analytical Results

Sample Number:	EPA RSL Residential (µg/kg)	NL-RS-17		NL-RS-17D		NL-RS-18		NL-RS-19		NL-RS-20		NL-RS-21		NL-2017-SS-17		NL-2017-SS-18	
CLP Sample Number:		C0AH9		C0AJ0		C0AJ1		C0AJ2		C0AJ3		C0AJ4		C0AC8		C0AC9	
Units:		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Sample Date:		5/24/2018		5/24/2018		5/24/2018		5/24/2018		5/24/2018		5/24/2018		9/28/2017		9/28/2017	
Sample Depth:		0-12		0-12		0-12		0-12		0-12		0-12		0-6		0-6	
Sample Type:		Field		Dup of NL-RP-SS-17		Field		Field		Field		Field		Background		Background	
PCB		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1254	120	41	U	41	U	49	U	51	U	48	U	50	U	36	U	77	
Aroclor-1260	240	35	J	33	J	100	J	**310**		39	J	50	U	17	J	57	
Pesticide																	
alpha-BHC	86	2.1	U	2.1	U	2.5	U	2.6	U	2.5	U	0.48	J	1.9	U	2.1	U
beta-BHC	300	2.1	U	2.1	U	2.5	U	2.6	U	2.5	U	2.6	U	1.9	U	2.1	U
delta-BHC	NL	2.1	U	2.1	U	2.5	U	2.6	U	2.5	U	0.32	R	1.9	U	2.1	U
gamma-BHC (Lindane)	570	2.1	U	2.1	U	2.5	U	3.7	J	2.2	J	65		1.9	U	2.1	U
Heptachlor	130	0.57	J	0.37	J	2.5	U	0.79	J	0.83	R	6.3	J	1.9	U	2.1	U
Aldrin	39	2.1	U	0.28	R	0.58	J	2.3	J	2.5	U	2.6	U	1.9	U	2.1	U
Heptachlor epoxide	70	4.9		5.1		0.36	R	3.1	J	3.7		4.1	J	1.9	U	2.1	U
Endosulfan I	47,000 (E)	0.41	R	0.43	R	2.5	U	4.7	R	0.33	R	0.33	R	1.9	U	2.1	U
Dieldrin	34	2.4	J	2.6	J	5.5		17	R	1.2	R	9.4	R	3.6	U	4	U
4,4'-DDE	2,000	30		31		2.1	J	19	J	1.8	J	1.1	R	3.3	J	4	U
Endrin	1,900	3.6	J	4.0	J	0.97	J	1.4	R	1.1	J	23	J	3.6	U	4	U
Endosulfan II	47,000 (E)	4.1	U	4.1	U	4.9	U	8.0		2.7	J	15	R	3.6	U	4	U
4,4'-DDD	190	0.83	J	0.71	R	2.5	J	9.2	R	1.8	R	4.9	R	3.6	U	4	U
Endosulfan sulfate	47,000 (E)	0.87	J	4.1	U	4.9	U	5.1	U	4.8	U	2.6	R	3.6	U	4	U
4,4'-DDT	1,900	24		27		6.1		36	J	6.4		6.0	R	4.2	J	4	U
Methoxychlor	32,000	2.8	J	3.1	J	1.6	J	200	J	100		650	J	19	U	21	U
Endrin ketone (*)	1,900	0.59	J	4.1	U	4.9	U	7.0	R	9.7		130	J	3.6	U	4	U
Endrin aldehyde (*)	1,900	0.39	R	0.45	R	0.34	J	3.3	J	2.0	J	21	R	3.6	U	4	U
cis-Chlordane (*)	1,700	16		16		4.7		39	J	16		9.6	R	1.9	U	2.1	U
trans-Chlordane (*)	1,700	5.1	J	5.5	J	4.1	J	46	J	8.9	J	9.4	R	1.9	U	2.1	U

Notes:
Data compared to EPA RSLs for residential and industrial soil TR= 1E-06 HQ 0.1 (Ref. 10)
(*) = Endrin and Chlordane values, respectively.
(E) = Endosulfan value
Bold values indicate exceedance of residential RSL
Red values indicate 3x background values (or above background RDL if background is non-detect)
ug/kg = micrograms per kilogram
J = Reported value is estimated; actual value may be higher or lower approximate and may be inaccurate or imprecise.
NL = No listed value
Q = Qualifier

Table 9
Norwood Landfill
Residential Surface Soil Samples
Inorganic Analytical Results

Sample Number:		NL-RS-01		NL-RS-01D		NL-RS-02		NL-RS-03		NL-RS-04		NL-RS-05	
CLP Sample Number:		MC0AG1		MC0AH1		MC0AH5		MC0AH4		MC0AH3		MC0AH2	
Units:	**EPA RSL Residential (mg/kg)**	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:		0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Dup of NL-RP-SS-01		Field		Field		Field		Field	
Metals		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7,700	**10100**		**12300**		**13600**		**10900**		**12200**		**13000**	
Antimony	3.1	1.2	UJ	1.3	UJ	1.2	UJ	1.3	UJ	1.1	UJ	1.2	UJ
Arsenic	0.68	**4.4**		**4.2**		**5.4**		**8.2**		**4.2**		**4.5**	
Barium	1,500	104		96.2		53.5		64.5		37.1		49.6	
Beryllium	16	0.61		0.65		0.59	J	0.42	J	0.44	J	0.57	J
Cadmium	7.1	0.90		0.96		0.47	J	0.61	J	0.10	J	0.27	J
Calcium	NL	6280	J	4930	J	1960	J	2890	J	661	J	1400	J
Chromium[1]	12,000	21.5	J	22.3	J	19.0	J	16.3	J	15.8	J	23.3	J
Cobalt	2.3	**7.2**		**7.2**		**9.4**		**4.7**		**4.0**		**6.3**	
Copper	310	72.5	J	70.6	J	18.3	J	20.6	J	10.2	J	19.2	J
Iron	5,500	**16400**		**18100**		**18600**		**14400**		**14700**		**18600**	
Lead[2]	400	248	J	172	J	51.5	J	109	J	32.8	J	46.3	J
Magnesium	NL	3160	J	3690	J	2730	J	1610	J	1830	J	2330	J
Manganese	180	**465**		**452**		**464**		**362**		105		**235**	
Mercury	1.1	0.13		0.19		0.045	J	0.12	J	0.047	J	0.061	J
Nickel	150	15.0		15.2		12.0		10.5		9.5		14.8	
Potassium	NL	2500		2920		2170		946		1280		1240	
Selenium	390	0.45	J	0.51	J	3.1	U	1.0	J	0.45	J	3.0	U
Silver	390	0.36	J	0.38	J	0.61	U	0.10	J	0.57	U	0.61	U
Sodium	NL	40.5	J	59.4	J	85.5	J	33.3	J	77.4	J	37.7	J
Thallium	0.078	0.60	U	0.64	U	0.61	U	0.67	U	0.57	U	0.61	U
Vanadium	39	26.2		26.7		26.4		29.4		26.9		30.4	
Zinc	2,300	521		529		78.2		264		53.4		96.9	

Notes:

Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)

Bold values indicate exceedance of residential RSL

Red values indicate 3x background values (or above background RDL if background is non-detect)

[1] There is no RSL for total chromium; values shown are for chromium III

[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use

mg/kg = milligrams per kilogram

J = Reported value is estimated; actual value may be higher or lower

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

NL = No listed value

Q = Qualifier

Table 9
Norwood Landfill
Residential Surface Soil Samples
Inorganic Analytical Results

Sample Number:	EPA RSL Residential (mg/kg)	NL-RS-06		NL-RS-07		NL-RS-08		NL-RS-09		NL-RS-10		NL-RS-11	
CLP Sample Number:		MC0AH1		MC0AH0		MC0AG9		MC0AG8		MC0AG7		MC0AG6	
Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018	
Sample Depth:		0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Field		Field		Field		Field		Field	
Metals		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7,700	**8990**		**11100**		**11300**		**13500**		**13100**		**12900**	
Antimony	3.1	1.3	UJ	1.3	UJ	1.2	UJ	1.3	UJ	1.3	UJ	1.1	UJ
Arsenic	0.68	**5.7**		**4.3**		**6.5**		**9.7**		**4.4**		**4.9**	
Barium	1,500	39.3		40.3		47.7		44.2		26.8		41.3	
Beryllium	16	0.56	J	0.44	J	0.36	J	0.56	J	0.50	J	0.46	J
Cadmium	7.1	0.35	J	0.31	J	0.67		0.22	J	0.10	J	0.31	J
Calcium	NL	1720	J	1240	J	3320	J	936	J	479	J	875	J
Chromium[1]	12,000	18.2	J	23.6	J	19.6	J	17.1	J	17.1	J	16.6	J
Cobalt	2.3	**5.8**		**4.7**		**3.6**		**5.5**		**4.6**		**5.8**	
Copper	310	19.1	J	16.6	J	25.2	J	19.8	J	14.9	J	16.5	J
Iron	5,500	**12300**		**13500**		**12300**		**15200**		**17800**		**17400**	
Lead[2]	400	61.6	J	46.6	J	70.9	J	47.8	J	38.8	J	190	J
Magnesium	NL	1560	J	1700	J	1670	J	1810	J	2090	J	1850	J
Manganese	180	**553**		**231**		167		**282**		145		**293**	
Mercury	1.1	0.16		0.095	J	0.079	J	0.15		0.095	J	0.085	J
Nickel	150	12.6		11.6		9.2		10.2		10.2		11.1	
Potassium	NL	1190		933		1020		1030		1420		1220	
Selenium	390	0.94	J	0.41	J	3.1	U	0.58	J	0.44	J	0.60	J
Silver	390	0.11	J	0.49	J	0.31	J	0.091	J	0.67	U	0.10	J
Sodium	NL	26.5	J	71.2	J	35.9	J	38.0	J	27.7	J	87.2	J
Thallium	0.078	0.67	U	0.63	U	0.62	U	0.65	U	0.67	U	0.57	U
Vanadium	39	31.1		25.4		16.2		25.9		28.5		25.7	
Zinc	2,300	193		76.1		116		203		49.0		233	

Notes:

Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)

Bold values indicate exceedance of residential RSL

Red values indicate 3x background values (or above background RDL if background is non-detect)

[1] There is no RSL for total chromium; values shown are for chromium III

[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use

mg/kg = milligrams per kilogram

J = Reported value is estimated; actual value may be higher or lower

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

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Q = Qualifier

Table 9
Norwood Landfill
Residential Surface Soil Samples
Inorganic Analytical Results

Sample Number:	EPA RSL Residential (mg/kg)	NL-RS-12		NL-RS-13		NL-RS-14		NL-RS-15		NL-RS-16		NL-RS-17		NL-RS-17D	
CLP Sample Number:		MC0AG5		MC0AG4		MC0AG3		MC0AG2		MC0AH6		MC0AH9		MC0AJ0	
Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		µg/kg	
Sample Date:		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/23/2018		5/24/2018		5/24/2018	
Sample Depth:		0-12		0-12		0-12		0-12		0-12		0-12		0-12	
Sample Type:		Field		Field		Field		Field		Field		Field		Dup of NL-RP-SS-17	
Metals		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7,700	**12600**		**12300**		**12800**		**12200**		**12500**		**11800**		**11800**	
Antimony	3.1	1.1	UJ	1.3	UJ	1.2	UJ	1.2	UJ	1.3	UJ	1.0	UJ	1.1	UJ
Arsenic	0.68	**4.9**		**5.3**		**4.4**		**5.4**		**8.2**		**4.7**		**5.1**	
Barium	1,500	39.0		45.4		29.4		38.9		44.4		53.0		60.0	
Beryllium	16	0.54	J	0.60	J	0.54	J	0.37	J	0.60	J	0.52		0.49	J
Cadmium	7.1	0.31	J	0.37	J	0.58	U	0.33	J	0.44	J	0.19	J	0.22	J
Calcium	NL	1380	J	895	J	209	J	1750	J	2130	J	1130	J	1620	J
Chromium[1]	12,000	18.5	J	17.2	J	17.5	J	18.9	J	22.6	J	14.1	J	17.4	J
Cobalt	2.3	**6.8**		**6.9**		**6.2**		**5.7**		**7.2**		**6.7**		**5.2**	
Copper	310	17.5	J	15.1	J	12.8	J	30.0	J	18.9	J	15.6	J	14.6	J
Iron	5,500	**18500**		**16400**		**16700**		**16900**		**17100**		**14500**		**15500**	
Lead[2]	400	54.7	J	69.2	J	35.9	J	41.3	J	30.6	J	37.4	J	38.2	J
Magnesium	NL	2050	J	2000	J	1880	J	2160	J	2940	J	1620	J	1900	J
Manganese	180	**429**		**342**		**189**		**257**		**283**		**322**		**283**	
Mercury	1.1	0.076	J	0.078	J	0.17		0.14		0.032	J	0.034	J	0.053	J
Nickel	150	14.4		11.5		11.6		11.2		14.3		10.9		9.7	
Potassium	NL	1230		1050		1090		1280		1420		1030		1170	
Selenium	390	0.74	J	3.2	U	2.9	U	0.42	J	3.2	U	0.37	J	0.42	J
Silver	390	0.57	U	0.63	U	0.58	U	3.7		0.64	U	0.50	U	0.54	U
Sodium	NL	26.3	J	30.3	J	22.0	J	29.3	J	84.2	J	61.1	J	55.5	J
Thallium	0.078	0.57	U	0.63	U	0.58	U	0.58	U	0.64	U	0.50	U	0.54	U
Vanadium	39	30.4		28.7		25.8		23.8		32.8		20.9		24.5	
Zinc	2,300	152		54.3		52.8		132		95.2		113		139	

Notes:

Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)

Bold values indicate exceedance of residential RSL

Red values indicate 3x background values (or above background RDL if background is non-detect)

[1] There is no RSL for total chromium; values shown are for chromium III

[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use

mg/kg = milligrams per kilogram

J = Reported value is estimated; actual value may be higher or lower

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Table 9
Norwood Landfill
Residential Surface Soil Samples
Inorganic Analytical Results

Sample Number:	EPA RSL Residential (mg/kg)	NL-RS-18		NL-RS-19		NL-RS-20		NL-RS-21		NL-2017-SS-17		NL-2017-SS-18	
CLP Sample Number:		MC0AJ1		MC0AJ2		MC0AJ3		MC0AJ4		MC0AC8		MC0AC9	
Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Sample Date:		5/24/2018		5/24/2018		5/24/2018		5/24/2018		9/28/2017		9/28/2017	
Sample Depth:		0-12		0-12		0-12		0-12		0-6		0-6	
Sample Type:		Field		Field		Field		Field		Background		Background	
Metals		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7,700	**11100**		**9500**		**10800**		**12800**		**7970**		5970	
Antimony	3.1	1.5	UJ	**4.2**	J	1.3	UJ	1.5	UJ	1.1	J	0.72	J
Arsenic	0.68	**4.8**		**5.9**		**4.4**		**7.8**		**5.9**		**4.5**	
Barium	1,500	94.0		181		64.3		90.2		55.6		63.5	
Beryllium	16	0.24	J-	0.24	J-	0.24	J-	0.33	J-	0.63		0.45	
Cadmium	7.1	0.40	J	3.4		1.2		0.43	J	0.67		0.70	
Calcium	NL	1900		8960		2690		2060		1610		4600	
Chromium[1]	12,000	20.8		25.2		26.1		20.4		15.8		16.9	
Cobalt	2.3	**6.7**		**6.7**		**7.1**		**6.6**		**4.4**		**3.8**	J
Copper	310	31.3		264		33.3		29.1		18.3		19.8	
Iron	5,500	**15200**		**25300**		**15500**		**18200**		**14300**		**11600**	
Lead[2]	400	129		**1800**		110		283		84.4		74.4	
Magnesium	NL	2380		4250		2120		1710		1940		3560	
Manganese	180	**286**		**419**		**373**		**479**		179		**206**	
Mercury	1.1	0.10	J	0.88		0.076	J	0.36		0.18		0.38	
Nickel	150	13.7		29.3		23.3		11.9		11.5		11.0	
Potassium	NL	1490		1040		1080		1310		515		173	J
Selenium	390	0.65	J	1.0	J	0.74	J	1.0	J	2.8	UJ	3.1	UJ
Silver	390	0.22	J	0.42	J	0.24	J	0.21	J	0.54	J	0.51	J
Sodium	NL	26.6	J	69.3	J	56.1	J	84.4	J	79.4	J	67.3	J
Thallium	0.078	0.74	U	0.72	U	0.63	U	0.76	U	2.0	U	2.2	U
Vanadium	39	29.0		25.3		30.3		37.9		38.1		33.7	
Zinc	2,300	161		914		828		196		62.3		92.2	

Notes:

Data compared to EPA RSLs for residential soil TR= 1E-06 HQ 0.1 (Ref. 10)

Bold values indicate exceedance of residential RSL

Red values indicate 3x background values (or above background RDL if background is non-detect)

[1] There is no RSL for total chromium; values shown are for chromium III

[2] There is no RSL for lead in soil; however, EPA recommends soil with lead concentrations less than 400 mg/kg is safe for residential use

mg/kg = milligrams per kilogram

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