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July 22, 2016

Mr. Brian Wright, P.G.
North Carolina Department of Environmental Quality
Division of Waste Management
Superfund Section
Pre-Regulatory Landfill Unit
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Subject: Remedial Investigation - First Phase Investigation
Airport Landfill
Winston-Salem, Forsyth County, North Carolina
Site Identification Number: NONCD0000307
Task Order 307FP-1

Dear Mr. Wright:

CDM Smith Inc. (CDM Smith) is pleased to submit this Remedial Investigation - First Phase Investigation report for the Airport Landfill (Site) located in Winston-Salem, Forsyth County, North Carolina, as part of Task Order 307FP-1. The investigation was performed in accordance with Task Order 307FP-1 and the Work Plan approved by the North Carolina Department of Environmental Quality's (NCDEQ) Division of Waste Management - Superfund Section - Inactive Hazardous Sites Branch - Pre-Regulatory Landfill Unit on April 1, 2016.

Field activities were completed from June 13-16, 2016, as summarized in the notes provided in **Appendix A**. Geophysical survey services were performed by a North Carolina certified subcontractor. The results of the Site evaluation, sensitive environment search, and waste boundary delineation are discussed below.

## Site Evaluation

The Site is located at 1200 Fairchild Road, Winston-Salem, North Carolina, and is owned by Smith Reynolds Airport. The Site property encompasses approximately 523 acres based on the Winston-Salem and Forsyth County Geographic Information System database and is located on Parcel Identification Numbers (PIN) 6837-90-2200 and 6837-91-9226. Elevation at the Site ranges from 898 to 960 feet above mean sea level based on the March 2007 Light Detection and Ranging imaging data from North Carolina OneMap. The current United States Geological Survey (USGS) Topographic Map is shown on **Figure 1** and a site map is presented on **Figure 2**.

Airport runways are located in the central, western, and southern portions of PIN 6837-90-2200. The northern and western portions of this parcel contain airport operation and administrative buildings. The northern portion of the parcel is wooded with unpaved roads and is transected by Brushy Fork. Brushy Fork also flows along part of the eastern parcel boundary. The eastern portion of the parcel is wooded and includes areas that have been timbered. A pond and multiple drainage channels are located in the eastern portion of the parcel. A majority of the estimated waste disposal area is located on this parcel as shown on Figure 2.

PIN 6837-91-9226 is wooded with timbered areas. Several drainage channels transect this parcel and Brushy Fork is located along the eastern border of the parcel. The estimated waste disposal area is located in a small portion of the southwest corner of the parcel as shown on Figure 2.

On June 13-14, 2016, CDM Smith conducted a Site walkthrough using a Trimble GeoXH handheld Global Positioning System (GPS) unit to collect northing and easting coordinates for Site features, including drainage channels, perimeter fencing, surface waters, seeps, and surficial waste. Eight drainage features, one pond, five seeps, and three culverts were identified within the investigation area as shown on Figure 2. GPS coordinates for the surficial waste, seeps, pond, and stormwater culverts are presented in **Table 1**. The GPS coordinates are reported in decimal degrees to the seventh order using the North American Datum of 1983 format with accuracy in the thousandths of a meter following differential correction. Latitude and longitude are also provided using the World Geodetic System 1984 format.

## Surface Water

No springs or surface water intakes were identified within 1,000 feet of the estimated waste disposal area. Surface water bodies and seeps were identified during the Site evaluation which was completed in conjunction with waste boundary delineation activities. Brushy Fork is located east of the Site and flows south to Salem Creek. An Unnamed Tributary located northeast of the Site flows into Brushy Fork. A pond is located in the northwest corner of the estimated waste disposal area.

A small portion of a drainage channel begins within the eastern area of the estimated waste disposal area. Multiple drainage channels are located to the north and east of the estimated waste disposal area. Stormwater from each drainage channel flows directly into Brushy Creek or to another drainage channel that ultimately flows to Brushy Creek. Surface water and drainage channel locations are shown on **Figure 3**. The location of each feature in relation to the estimated waste disposal area and the flow direction is summarized in **Table 2**.

Four seeps were identified within the estimated waste disposal area. One seep was identified approximately 275 feet east of the southern portion of the estimated waste disposal area. Seep locations are provided on Figure 2 and GPS coordinates are provided in Table 1.

## Groundwater

No water supply wells or springs were observed within 1,000 feet of the waste disposal boundary. This is based on a windshield survey and a review of available data from the NCDEQ Public Water Supply Section, the City of Winston-Salem, and Forsyth County.

### Utility Survey

The City of Winston-Salem was contacted to obtain the most current utility information for the Site. Gravity sewers and municipal water lines are located to the east of the Site within 1,000 feet. Overhead power lines are also located east of the Site in the residential neighborhood. No utilities were identified within the estimated waste disposal area. Utility locations are shown on **Figure 4**. Note that power line location data was not available.

### Zoning

According to the Forsyth County GeoData Explorer Map database, the Site is zoned as a General Industrial (GI) District. The GI District is intended to accommodate a wide range of assembling, fabricating, and manufacturing activities. The GI District designation is for uses which may have significant environmental impacts. Parcels to the east of the Site are zoned Residential Single Family. Zoning classifications are provided on **Figure 5**.

### Local Geology

The Site is located in the Piedmont Physiographic Province of North Carolina, which is characterized by gentle to steep, hilly terrain with small quantities of alluvium. Saprolitic soils are common in the Piedmont Province and are characterized by bright colors, preserved structures, and can contain an abundance of clay minerals (Gair, 1989). A transition zone is typically found between the saprolite and bedrock and generally consists of highly weathered bedrock. According to the North Carolina Geologic Map (Brown and Parker, 1985), the Site is located within the Milton Belt, which is characterized by large areas of metamorphic, metavolcanic, and plutonic rocks. The age of the Milton Belt is estimated to range from 570 to 325 million years old. According to the geologic map, biotite gneiss and schist underlie the Site.

### Local Hydrogeology

The transition zone beneath the saprolite is generally the zone in which most lateral groundwater flow takes place (Daniel, 1987). This zone has the permeability of the crystalline material enhanced by shrink and swell cracking caused by the hydration of mineral grains. Weathering of grains in the transition zone is much less than in the saprolite, where formation of clay minerals by weathering often inhibits groundwater flow. Groundwater flow and the depth of the water table in the transition zone generally mirrors, and is largely controlled by, surface topography. The depth of the water table in the Piedmont tends to vary seasonally in response to precipitation and the growing season. From mid-April through October, vegetation intercepts much of the infiltrating precipitation before it reaches the water table, and evapotranspiration rates are increased. Generally, the water table will rise and fall with the seasons (i.e. highest in the spring and lowest in the fall). Based on local topography and surficial hydrology, groundwater likely flows east toward Brushy Fork.

## Sensitive Environment Search

An environmentally sensitive area search was conducted to identify the existence of any areas located on or within 500 feet of the Site. Site information was sent to the agencies listed in **Table 3**, which also includes a summary of responses received. Copies of responses received are provided in **Appendix B**. Environmentally sensitive areas are shown on **Figure 6**.

According to the NCDEQ's Division of Water Resources, the Site is considered to be in an environmentally sensitive area for the Protection and Maintenance of Aquatic Life. The Site is located in the Yadkin Pee-Dee River Basin which drains to Brushy Fork and Salem Creek. The streams are impaired for benthos and do not meet standards for supporting aquatic life. Salem Creek is also covered under a total daily maximum load for fecal coliform bacteria and turbidity.

The U.S. Department of the Interior's Fish and Wildlife Services recently listed the northern long-eared bat as threatened under the Endangered Species Act. The habitat for the bat might be present within the vicinity of the Site.

The North Carolina Wildlife Resources Commission recommended maintaining an undisturbed, native, forested buffer along Brushy Fork and other streams and wetlands, as well as installing sediment and erosion controls. This recommendation was provided to maintain streambank stability and to provide travel paths for wildlife.

## Geophysical Survey

A single-frequency electromagnetic (EM) survey was completed by a licensed subcontractor under the supervision of CDM Smith on June 13-16, 2016, to delineate the horizontal extent of buried waste in the subsurface. The estimated waste disposal area was surveyed using north-south and east-west transects spaced approximately 100 feet apart. Transect spacing was modified as needed based on Site conditions. Each transect extended approximately 25 feet beyond the estimated waste disposal area. A Geonics EM31-MK1 ground conductivity meter and Trimble AG-114 GPS unit were used to complete the geophysical survey. GPS coordinates were collected every 25 to 50 feet along the estimated waste boundary as identified by the geophysical survey and are provided in **Table 4**.

The estimated waste disposal area on PINs 6837-90-2200 and 6837-91-9226 as determined by the geophysical survey is shown on **Figure 7** and encompasses approximately 16 acres. The waste disposal area likely extends west beyond the fence separating the survey area and one of the airport runways based on elevated conductivity at the fence line.

Negative EM values were detected near the estimated waste disposal boundary and are indicative of surficial or shallow metallic waste. Surficial waste was observed at several of these locations during the site evaluation. Two isolated areas of increased conductivity north and southeast of the estimated waste disposal area are interpreted to be either the result of lithology changes, buried waste, or interference from the adjacent chain link fence. The geophysical investigation summary report is provided in **Appendix C**.

Surficial waste was primarily located outside the estimated waste disposal boundary to the north and east and consisted of metal, drums, tires, concrete, glass, glass bottles, metal cans, an air conditioning grate, plastic bottles, fabric, ceramic, insulation, ceramic roofing, plastic, and a large metal ring. There is approximately 14 cubic yards of surficial waste within the investigation area, which includes approximately one cubic yard within the estimated waste disposal area. Surficial waste locations are provided on Figure 2 and GPS coordinates are provided in Table 1.

## References


- Brown, P.M. and Parker, J.M., 1985. North Carolina Geologic Map, North Carolina Geologic Survey Resources and Community Development, 1:500,000.

- Daniel, III, C.C. 1987. Statistical Analysis Relating Well Yield to Construction Practices and Siting of Wells in the Piedmont and Blue Ridge Provinces of North Carolina. USGS Water Resources Report 86-4132.

- Gair, J.E., 1989. Mineral Resources of the Charlotte 1°x 2° Quadrangle, North Carolina and South Carolina, USGS Prof. Paper 1462, Geology of the Charlotte Quadrangle, p. 7-15.


## Report Certification

The report certification as specified in the *Inactive Hazardous Sites Program, Guidelines for Addressing Pre-Regulatory Landfills & Dumps, November 2015* is provided in **Appendix D**.

## Sole Use Statement

This report is solely intended for use by the NCDEQ for the services that were performed in accordance with CDM Smith's proposal dated April 14, 2016, as authorized by NCDEQ Task Order 307FP-1 dated May 12, 2016.

If you have any questions or require further explanation, do not hesitate to call me at (919) 325-3569.

Very truly yours,

Mathew F. Colone, P.G.
CDM Smith Inc.

cc: Daniel Forbes, CDM Smith

# Tables

# Table 1
# Site-Specific Global Positioning System Data
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Site Feature | Easting | Northing | Latitude | Longitude | Estimated Waste Volume (cubic yards) |
|---|---|---|---|---|---|
| Surficial Waste | 1639006.37 | 871264.25 | 36.13774 | -80.22252 | 0.19 |
| Surficial Waste | 1639149.49 | 871373.69 | 36.13805 | -80.22204 | 0.19 |
| Surficial Waste | 1639034.19 | 871514.02 | 36.13843 | -80.22243 | 0.15 |
| Surficial Waste | 1638930.91 | 871492.40 | 36.13837 | -80.22278 | 0.27 |
| Surficial Waste | 1638944.51 | 871493.70 | 36.13837 | -80.22274 | 0.04 |
| Surficial Waste | 1638939.11 | 871481.12 | 36.13834 | -80.22275 | 0.04 |
| Surficial Waste | 1638946.06 | 871473.64 | 36.13832 | -80.22273 | 0.04 |
| Surficial Waste | 1638917.94 | 871501.87 | 36.13839 | -80.22283 | 0.04 |
| Surficial Waste | 1638881.67 | 871545.77 | 36.13851 | -80.22295 | 0.27 |
| Surficial Waste | 1638854.32 | 871532.63 | 36.13848 | -80.22304 | 0.07 |
| Surficial Waste | 1638860.21 | 871511.79 | 36.13842 | -80.22302 | 0.07 |
| Surficial Waste | 1638833.42 | 871517.73 | 36.13843 | -80.22311 | 0.30 |
| Surficial Waste | 1638785.81 | 871543.59 | 36.13850 | -80.22328 | 0.19 |
| Surficial Waste | 1638673.70 | 871527.12 | 36.13845 | -80.22366 | 0.07 |
| Surficial Waste | 1638703.22 | 871651.79 | 36.13880 | -80.22356 | 0.19 |
| Surficial Waste | 1638711.60 | 871725.37 | 36.13900 | -80.22354 | 0.11 |
| Surficial Waste | 1638770.88 | 871663.35 | 36.13883 | -80.22333 | 0.07 |
| Surficial Waste | 1638838.25 | 871658.47 | 36.13882 | -80.22310 | 0.04 |
| Surficial Waste | 1638956.51 | 871695.33 | 36.13893 | -80.22270 | 0.02 |
| Surficial Waste | 1639714.49 | 871980.35 | 36.13973 | -80.22015 | 0.04 |
| Surficial Waste | 1639857.04 | 872053.35 | 36.13994 | -80.21967 | 0.04 |
| Surficial Waste | 1639556.55 | 871337.29 | 36.13796 | -80.22066 | 7.41 |
| Surficial Waste | 1639713.12 | 870442.81 | 36.13551 | -80.22009 | 0.02 |
| Surficial Waste | 1639905.75 | 870451.29 | 36.13554 | -80.21944 | 0.27 |
| Surficial Waste | 1639810.94 | 871073.70 | 36.13725 | -80.21979 | 1.85 |
| Surficial Waste | 1639903.15 | 871121.95 | 36.13738 | -80.21948 | 0.37 |
| Surficial Waste | 1639866.05 | 871082.69 | 36.13727 | -80.21960 | 0.19 |
| Surficial Waste | 1639858.32 | 871058.94 | 36.13721 | -80.21962 | 1.11 |
| Surficial Waste | 1639695.92 | 871249.22 | 36.13773 | -80.22018 | 0.02 |
| Surficial Waste | 1639782.21 | 871182.66 | 36.13755 | -80.21989 | 0.02 |
| Surficial Waste | 1639852.67 | 871147.96 | 36.13745 | -80.21965 | 0.02 |
| Surficial Waste | 1640015.01 | 871381.91 | 36.13810 | -80.21911 | 0.19 |
| Surficial Waste | 1639050.30 | 872337.56 | 36.14069 | -80.22241 | 0.04 |
| Surficial Waste | 1639260.90 | 871072.75 | 36.13723 | -80.22165 | 0.02 |
| Surficial Waste | 1639426.83 | 870641.07 | 36.13605 | -80.22107 | 0.02 |
| Culvert | 1639314.81 | 871881.59 | 36.13945 | -80.22150 | -- |
| Culvert | 1639452.35 | 872963.21 | 36.14242 | -80.22108 | -- |
| Culvert | 1639471.98 | 873021.74 | 36.14259 | -80.22101 | -- |
| Pond | 1638964.55 | 871164.50 | 36.16747 | -80.22266 | -- |

# Table 1
# Site-Specific Global Positioning System Data
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Site Feature | Easting | Northing | Latitude | Longitude | Estimated Waste Volume (cubic yards) |
|---|---|---|---|---|---|
| Seep | 1639495.67 | 870826.54 | 36.13656 | -80.22084 | -- |
| Seep | 1639537.82 | 870646.38 | 36.13606 | -80.22069 | -- |
| Seep | 1639900.03 | 870446.88 | 36.13553 | -80.21946 | -- |
| Seep | 1639594.55 | 870864.49 | 36.13667 | -80.22051 | -- |
| Seep | 1639595.80 | 870831.90 | 36.13658 | -80.22050 | -- |

**Notes:**

1. Global Positioning System coordinates were collected on June 13-14, 2016.
2. Total estimated waste volume: 13.9 cubic yards
3. Northing and Easting Coordinates - North American Datum 1983 State Plane Feet North Carolina
4. Latitude and Longitude Coordinates - World Geodetic System 1984

# Table 2
# Surface Water Summary
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Surface Water Feature | Location in Relation to the Site | Type | Flow Direction |
|---|---|---|---|
| Brushy Fork | 500 feet East of the Site | Stream | South to Salem Creek |
| Unnamed Tributary | 600 feet Northeast of the Site | Stream | Southwest to Brushy Fork |
| Unnamed Pond | Northwest Area of the Site | Pond | -- |
| Drainage Channel 1 | 1,000 feet Northeast of the Site | Stream | Southeast to Brushy Fork |
| Drainage Channel 2 | 400 feet North of the Site | Stream | Southeast to Brushy Fork |
| Drainage Channel 3 | 720 feet Northeast of the Site | Drainage Feature | East to Drainage Channel 1 |
| Drainage Channel 4 | 700 feet Northeast of the Site | Drainage Feature | East to Drainage Channel 1 |
| Drainage Channel 5 | 400 feet Northeast of the Site | Drainage Feature | South to Drainage Channel 2 |
| Drainage Channel 6 | 500 feet East of the Site | Drainage Feature | North to Drainage Channel 7 |
| Drainage Channel 7 | 275 feet East of the Site | Drainage Feature | Northeast to Brushy Fork |
| Drainage Channel 8 | Eastern Area of the Site | Stream | Northeast to Brushy Fork |

**Notes:**
1. Site - Airport Landfill
2. (--) Not Applicable

# Table 3
# Sensitive Environments Summary
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Sensitive Environment | Contact | Results |
|---|---|---|
| State Parks<br>Areas Important to Maintenance of Unique Natural Communities<br>Sensitive Areas Identified Under the National Estuary Program<br>Designated State Natural Areas<br>State Seashore, Lakeshore, and River Recreational Areas<br>Sensitive Aquatic Habitat<br>Rare Species, Important Natural Communities, Natural Areas, and Conservation Areas<br>State Wild and Scenic Rivers | Allison Weakley<br>Suzanne Mason<br>NC Natural Heritage Program<br>Office of Land and Water Stewardship<br>allison.weakley@ncdenr.gov<br>suzanne.mason@ncdenr.gov<br>natural.heritage@ncdenr.gov | None |
| National Seashore, Lakeshore, and River Recreational Areas<br>National Parks or Monuments<br>Federal Wild and Scenic Rivers | Ms. Anita Barnett<br>National Parks Service<br>Public Affairs Office<br>Anita_Barnett@nps.gov<br>(404) 507-5706 | No response |
| Designated and Proposed Federal Wilderness and Natural Areas<br>National Preserves and Forests<br>Federal Land Designated for Protection of Natural Ecosystems | Ms. Heather Luczak<br>U.S. Forest Service<br>hluczak@fs.fed.us<br>(828) 257-4817 | None |
| State-Designated Areas for Protection or Maintenance of Aquatic Life | Melanie Williams<br>Division of Water Resources<br>Basinwide Planning Section<br>melanie.williams@ncdenr.gov<br>(919) 707-9119 | The Site is located in the Yadkin Pee-Dee River Basin and drains to Brushy Fork and Salem Creek. The stream is Impaired for benthos and does not meet standards for supporting aquatic life. Salem Creek is covered under a total daily maximum load for fecal coliform bacteria and turbidity which was approved in 2006. The Site is considered to be in an environmentally sensitive area for the maintenance and protection of aquatic life. Any activity needs to eliminate fecal coliform bacteria and sediment loading to this stream. |
| State Preserves or Forests | Mr. Chris Carlson<br>NC Division of Forest Resources<br>chris.carlson@ncdenr.gov<br>(919) 857-4819 | None |

# Table 3
# Sensitive Environments Summary
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Sensitive Environment | Contact | Results |
|---|---|---|
| Endangered Species | Mr. Pete Benjamin<br>U.S. Fish and Wildlife Service<br>pete_benjamin@fws.gov<br>(919) 856-4520 ext. 11 | No response |
| National and State Historical Sites | Environmental.Review@ncdenr.gov<br>(Ms. Renee Gledhill-Early<br>NC Department of Cultural Resources<br>(919) 807-6579) | No response |
| Areas Identified Under Coastal Protection Legislation, Coastal Barriers, or Units of a Coastal Barrier Resources System | Ms. Angela Willis<br>Angela.Willis@ncdenr.gov<br>NC Division of Coastal Management<br>(252) 808-2808 ext. 201 | Not applicable |
| National or State Wildlife Refuge<br>State Lands Designated for Wildlife or Game Management Wetlands<br>Migratory Pathways and Feeding Areas Critical for Maintenance of Anadromous Fish Species within River Reaches or Areas in Lakes or Coastal Tidal Waters in which such Fish Spend Extended Periods of Time<br>Spawning Areas Critical for the Maintenance of Fish/Shellfish Species within River, Lake, or Coastal Tidal Waters | Ms. Gabriela Garrison<br>NC Wildlife Resources<br>gabriela.garrison@ncwildlife.org<br>(919) 409-7350 | The U.S. Fish and Wildlife Service recently listed the northern long-eared bat as threatened under the Endangered Species Act. Habitat for the northern long-eared bat may be present in the vicinity of the project site. NC Wildlife Resources recommends maintaining an undisturbed, native, forested buffer along streams and wetlands. Sediment and erosion controls should be installed. |
| Marine Sanctuaries | Mr. Matt Stout<br>NOAA<br>matthew.stout@noaa.gov<br>(301) 713-3125 ext.273 | Not applicable |
| Wetlands | Dorothy Harrington<br>US Army Corps of Engineers<br>(919) 554-4884 ext. 28 | No response |

# Table 4
# Estimated Waste Boundary Global Positioning System Data
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Location | Easting | Northing | Latitude | Longitude |
|---|---|---|---|---|
| 1 | 1638541.32 | 871480.22 | 36.13832 | -80.22410 |
| 2 | 1638568.55 | 871467.51 | 36.13829 | -80.22401 |
| 3 | 1638592.15 | 871449.36 | 36.13824 | -80.22393 |
| 4 | 1638619.39 | 871433.02 | 36.13819 | -80.22384 |
| 5 | 1638644.80 | 871418.50 | 36.13815 | -80.22375 |
| 6 | 1638668.40 | 871403.98 | 36.13812 | -80.22367 |
| 7 | 1638692.00 | 871389.45 | 36.13808 | -80.22359 |
| 8 | 1638721.05 | 871380.37 | 36.13805 | -80.22349 |
| 9 | 1638746.47 | 871380.37 | 36.13805 | -80.22340 |
| 10 | 1638779.14 | 871387.64 | 36.13807 | -80.22329 |
| 11 | 1638813.64 | 871391.27 | 36.13809 | -80.22318 |
| 12 | 1638848.13 | 871398.53 | 36.13811 | -80.22306 |
| 13 | 1638878.99 | 871402.16 | 36.13812 | -80.22296 |
| 14 | 1638908.04 | 871402.16 | 36.13812 | -80.22286 |
| 15 | 1638931.64 | 871396.71 | 36.13810 | -80.22278 |
| 16 | 1638955.24 | 871389.45 | 36.13809 | -80.22270 |
| 17 | 1638987.92 | 871376.74 | 36.13805 | -80.22259 |
| 18 | 1639009.71 | 871367.67 | 36.13803 | -80.22251 |
| 19 | 1639029.68 | 871358.59 | 36.13800 | -80.22244 |
| 20 | 1639044.20 | 871358.59 | 36.13800 | -80.22239 |
| 21 | 1639071.43 | 871367.66 | 36.13803 | -80.22230 |
| 22 | 1639085.96 | 871385.82 | 36.13808 | -80.22225 |
| 23 | 1639102.29 | 871400.34 | 36.13812 | -80.22220 |
| 24 | 1639116.82 | 871418.50 | 36.13817 | -80.22215 |
| 25 | 1639142.23 | 871431.21 | 36.13821 | -80.22206 |
| 26 | 1639164.02 | 871434.84 | 36.13822 | -80.22199 |
| 27 | 1639189.44 | 871433.02 | 36.13821 | -80.22191 |
| 28 | 1639227.56 | 871423.95 | 36.13819 | -80.22178 |
| 29 | 1639265.68 | 871413.05 | 36.13816 | -80.22165 |
| 30 | 1639294.73 | 871403.97 | 36.13814 | -80.22155 |
| 31 | 1639327.41 | 871394.90 | 36.13811 | -80.22144 |
| 32 | 1639361.90 | 871385.82 | 36.13809 | -80.22132 |
| 33 | 1639390.95 | 871378.56 | 36.13807 | -80.22122 |
| 34 | 1639421.81 | 871371.30 | 36.13805 | -80.22112 |
| 35 | 1639447.23 | 871358.59 | 36.13802 | -80.22103 |
| 36 | 1639479.90 | 871354.96 | 36.13801 | -80.22092 |
| 37 | 1639508.95 | 871342.25 | 36.13797 | -80.22082 |
| 38 | 1639534.37 | 871331.36 | 36.13795 | -80.22073 |
| 39 | 1639559.79 | 871318.65 | 36.13791 | -80.22065 |
| 40 | 1639568.86 | 871302.31 | 36.13787 | -80.22061 |
| 41 | 1639581.57 | 871280.52 | 36.13781 | -80.22057 |
| 42 | 1639594.28 | 871253.29 | 36.13773 | -80.22053 |
| 43 | 1639605.17 | 871224.25 | 36.13765 | -80.22049 |
| 44 | 1639616.06 | 871200.64 | 36.13759 | -80.22045 |
| 45 | 1639625.14 | 871173.41 | 36.13751 | -80.22042 |

# Table 4
# Estimated Waste Boundary Global Positioning System Data
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Location | Easting | Northing | Latitude | Longitude |
|---|---|---|---|---|
| 46 | 1639637.85 | 871140.73 | 36.13743 | -80.22037 |
| 47 | 1639650.56 | 871109.87 | 36.13734 | -80.22033 |
| 48 | 1639657.82 | 871084.45 | 36.13727 | -80.22030 |
| 49 | 1639670.53 | 871057.23 | 36.13720 | -80.22026 |
| 50 | 1639674.16 | 871028.18 | 36.13712 | -80.22025 |
| 51 | 1639679.61 | 870991.87 | 36.13702 | -80.22023 |
| 52 | 1639685.05 | 870961.01 | 36.13693 | -80.22021 |
| 53 | 1639690.50 | 870939.22 | 36.13687 | -80.22019 |
| 54 | 1639692.31 | 870908.36 | 36.13679 | -80.22018 |
| 55 | 1639690.50 | 870870.23 | 36.13668 | -80.22019 |
| 56 | 1639692.31 | 870835.74 | 36.13659 | -80.22018 |
| 57 | 1639692.31 | 870812.14 | 36.13652 | -80.22018 |
| 58 | 1639688.68 | 870784.91 | 36.13645 | -80.22019 |
| 59 | 1639685.05 | 870757.68 | 36.13637 | -80.22020 |
| 60 | 1639674.16 | 870732.26 | 36.13630 | -80.22023 |
| 61 | 1639668.71 | 870703.21 | 36.13622 | -80.22025 |
| 62 | 1639659.64 | 870679.61 | 36.13616 | -80.22028 |
| 63 | 1639654.19 | 870650.57 | 36.13608 | -80.22030 |
| 64 | 1639645.11 | 870630.60 | 36.13602 | -80.22033 |
| 65 | 1639639.66 | 870616.07 | 36.13598 | -80.22035 |
| 66 | 1639626.96 | 870590.66 | 36.13591 | -80.22039 |
| 67 | 1639614.25 | 870561.61 | 36.13583 | -80.22043 |
| 68 | 1639608.80 | 870536.19 | 36.13576 | -80.22045 |
| 69 | 1639606.99 | 870510.78 | 36.13569 | -80.22045 |
| 70 | 1639605.17 | 870481.73 | 36.13561 | -80.22046 |
| 71 | 1639605.17 | 870459.95 | 36.13555 | -80.22046 |
| 72 | 1639599.73 | 870425.45 | 36.13546 | -80.22047 |
| 73 | 1639597.91 | 870392.77 | 36.13537 | -80.22048 |
| 74 | 1639592.46 | 870367.35 | 36.13530 | -80.22050 |
| 75 | 1639587.02 | 870345.57 | 36.13524 | -80.22051 |
| 76 | 1639581.57 | 870323.79 | 36.13518 | -80.22053 |
| 77 | 1639579.75 | 870309.26 | 36.13514 | -80.22054 |
| 78 | 1639576.13 | 870296.55 | 36.13510 | -80.22055 |
| 79 | 1639541.63 | 870296.55 | 36.13510 | -80.22067 |
| 80 | 1639508.95 | 870294.74 | 36.13510 | -80.22078 |
| 81 | 1639478.09 | 870296.55 | 36.13510 | -80.22088 |
| 82 | 1639452.67 | 870294.74 | 36.13510 | -80.22097 |
| 83 | 1639429.07 | 870296.55 | 36.13510 | -80.22105 |
| 84 | 1639412.73 | 870302.00 | 36.13511 | -80.22110 |
| 85 | 1639390.95 | 870334.68 | 36.13520 | -80.22118 |
| 86 | 1639363.72 | 870378.25 | 36.13532 | -80.22127 |
| 87 | 1639325.59 | 870429.08 | 36.13546 | -80.22140 |
| 88 | 1639303.81 | 870474.47 | 36.13558 | -80.22148 |
| 89 | 1639274.76 | 870507.14 | 36.13567 | -80.22158 |
| 90 | 1639240.27 | 870541.64 | 36.13577 | -80.22170 |

# Table 4
# Estimated Waste Boundary Global Positioning System Data
# Airport Landfill
# Winston-Salem, Forsyth County, North Carolina

| Location | Easting | Northing | Latitude | Longitude |
|---|---|---|---|---|
| 91 | 1639218.48 | 870567.05 | 36.13584 | -80.22177 |
| 92 | 1639187.62 | 870601.55 | 36.13593 | -80.22188 |
| 93 | 1639167.65 | 870637.86 | 36.13603 | -80.22195 |
| 94 | 1639133.16 | 870672.35 | 36.13612 | -80.22206 |
| 95 | 1639098.66 | 870715.92 | 36.13624 | -80.22218 |
| 96 | 1639075.06 | 870746.78 | 36.13632 | -80.22226 |
| 97 | 1639047.83 | 870779.46 | 36.13641 | -80.22236 |
| 98 | 1639022.42 | 870810.33 | 36.13650 | -80.22244 |
| 99 | 1638998.81 | 870846.63 | 36.13660 | -80.22253 |
| 100 | 1638978.84 | 870866.61 | 36.13665 | -80.22259 |
| 101 | 1638958.87 | 870892.02 | 36.13672 | -80.22266 |
| 102 | 1638937.09 | 870919.25 | 36.13679 | -80.22274 |
| 103 | 1638913.49 | 870951.93 | 36.13688 | -80.22282 |
| 104 | 1638888.07 | 870979.16 | 36.13696 | -80.22291 |
| 105 | 1638869.92 | 871002.76 | 36.13702 | -80.22297 |
| 106 | 1638848.13 | 871029.99 | 36.13709 | -80.22304 |
| 107 | 1638826.35 | 871057.23 | 36.13717 | -80.22312 |
| 108 | 1638808.19 | 871084.46 | 36.13724 | -80.22318 |
| 109 | 1638790.04 | 871109.87 | 36.13731 | -80.22324 |
| 110 | 1638764.62 | 871140.74 | 36.13740 | -80.22333 |
| 111 | 1638735.57 | 871169.78 | 36.13747 | -80.22343 |
| 112 | 1638721.05 | 871193.38 | 36.13754 | -80.22348 |
| 113 | 1638697.45 | 871218.80 | 36.13761 | -80.22356 |
| 114 | 1638679.29 | 871235.14 | 36.13765 | -80.22362 |
| 115 | 1638661.14 | 871253.29 | 36.13770 | -80.22369 |
| 116 | 1638632.09 | 871284.16 | 36.13779 | -80.22379 |
| 117 | 1638615.75 | 871304.12 | 36.13784 | -80.22384 |
| 118 | 1638593.97 | 871329.54 | 36.13791 | -80.22392 |
| 119 | 1638574.00 | 871354.96 | 36.13798 | -80.22399 |
| 120 | 1638557.66 | 871378.56 | 36.13804 | -80.22404 |
| 121 | 1638548.58 | 871398.53 | 36.13810 | -80.22407 |
| 122 | 1638543.14 | 871414.87 | 36.13814 | -80.22409 |
| 123 | 1638541.32 | 871440.28 | 36.13821 | -80.22410 |
| 124 | 1638541.32 | 871458.44 | 36.13826 | -80.22410 |

**Notes:**

1. Global Positioning System data for the estimated waste boundary was collected on June 16, 2016.
2. Northing and Easting Coordinates - North American Datum 1983 State Plane Feet North Carolina
3. Latitude and Longitude Coordinates - World Geodetic System 1984

# Figures


Topographic data from the United States Geologic Survey 2010.

N

0 250 500 1,000 1,500 Feet

1 inch = 500 feet

CDM Smith

## Figure 1: United States Geological Survey Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*


Parcel data is from Winston-Salem, 2016.
Contours from NCONEMAP, 2007.

CDM Smith

N

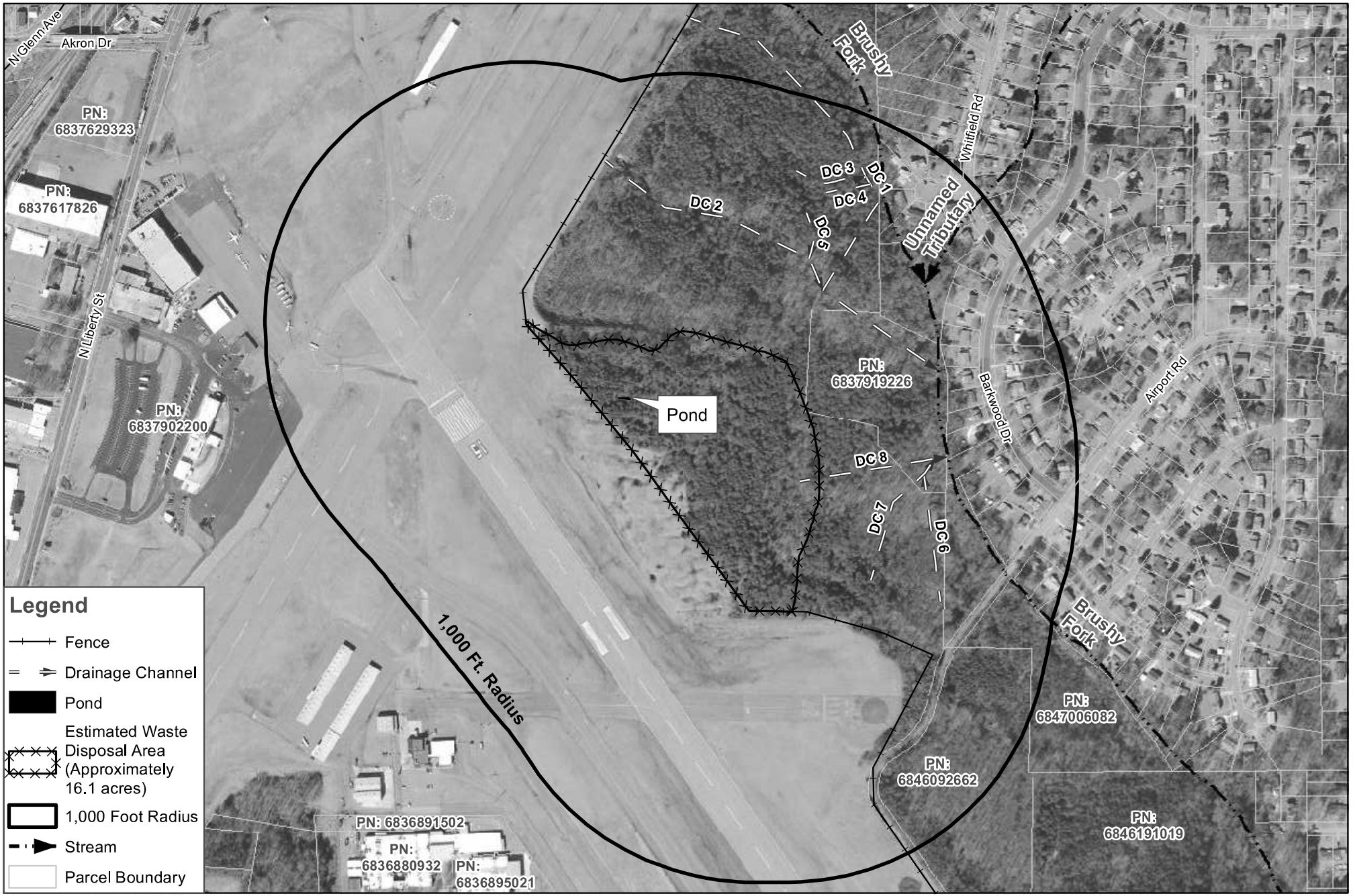
0 250 500 1,000 1,500 Feet

1 inch = 500 feet

# Figure 2: Site Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*




Ortho from NCONEMAP 2014.
Parcels from Winston-Salem (2016).

N

0 250 500 1,000 1,500 Feet

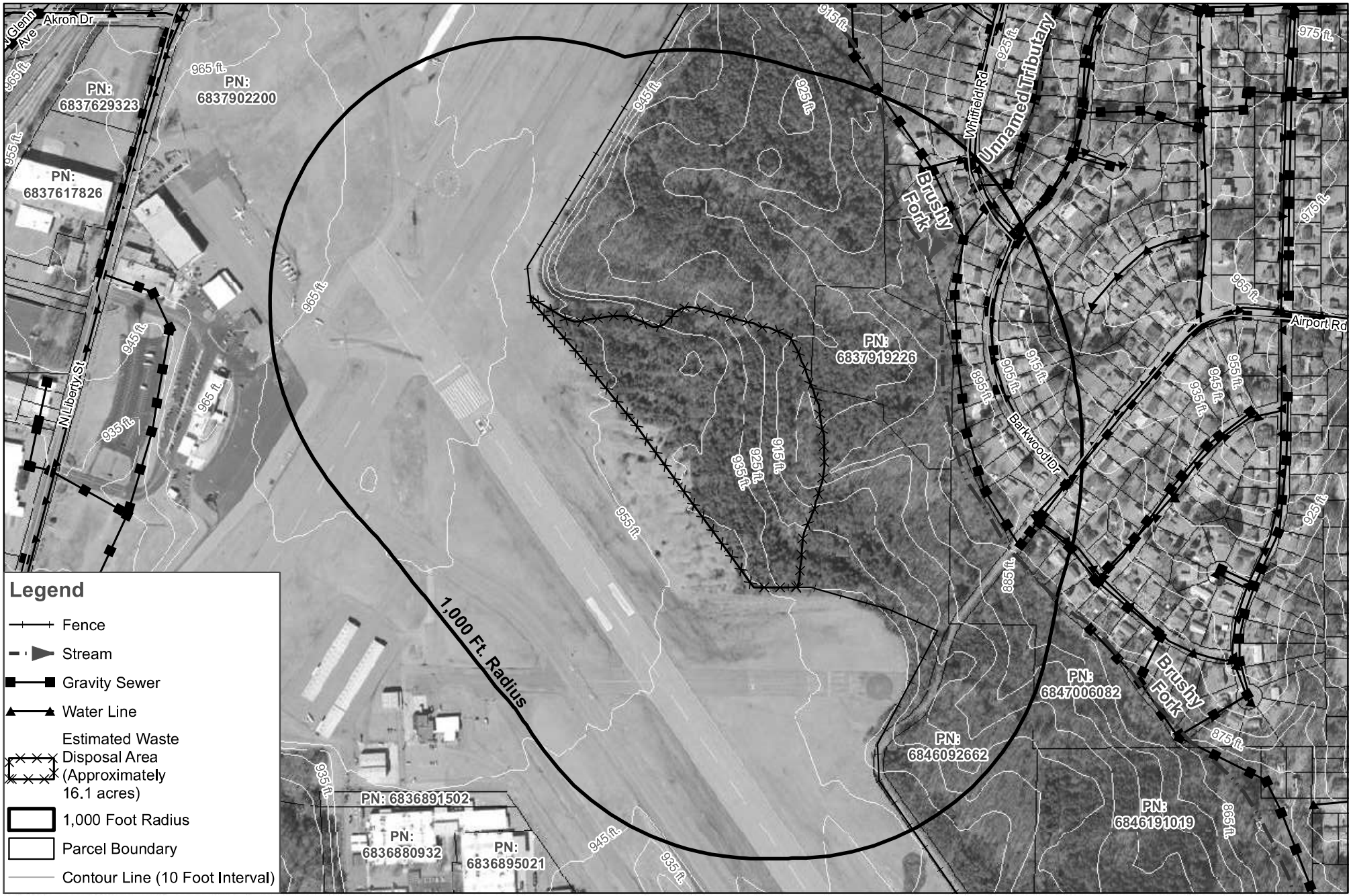
1 inch = 500 feet

CDM Smith

# Figure 3: Surface Water Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*




Utility data and parcels from Winston-Salem, 2016.
Contours from NCONEMAP, 2007.

CDM Smith

N

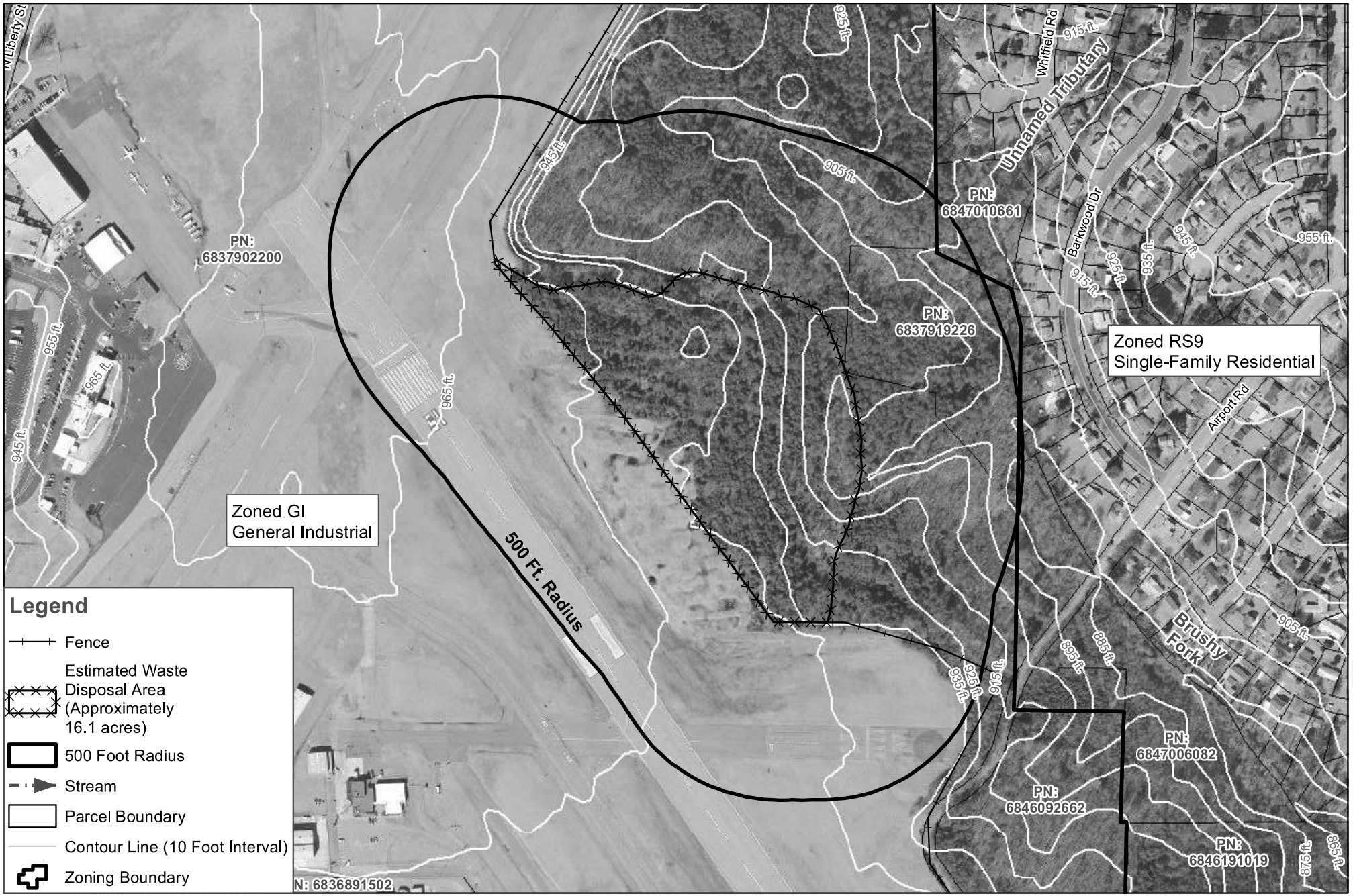
0 250 500 1,000 1,500 Feet

1 inch = 500 feet

# Figure 4: Utilities Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*




Utility data and parcels
from Winston-Salem, 2016.
Contour data from NCONEMAP, 2007.

CDM Smith

N

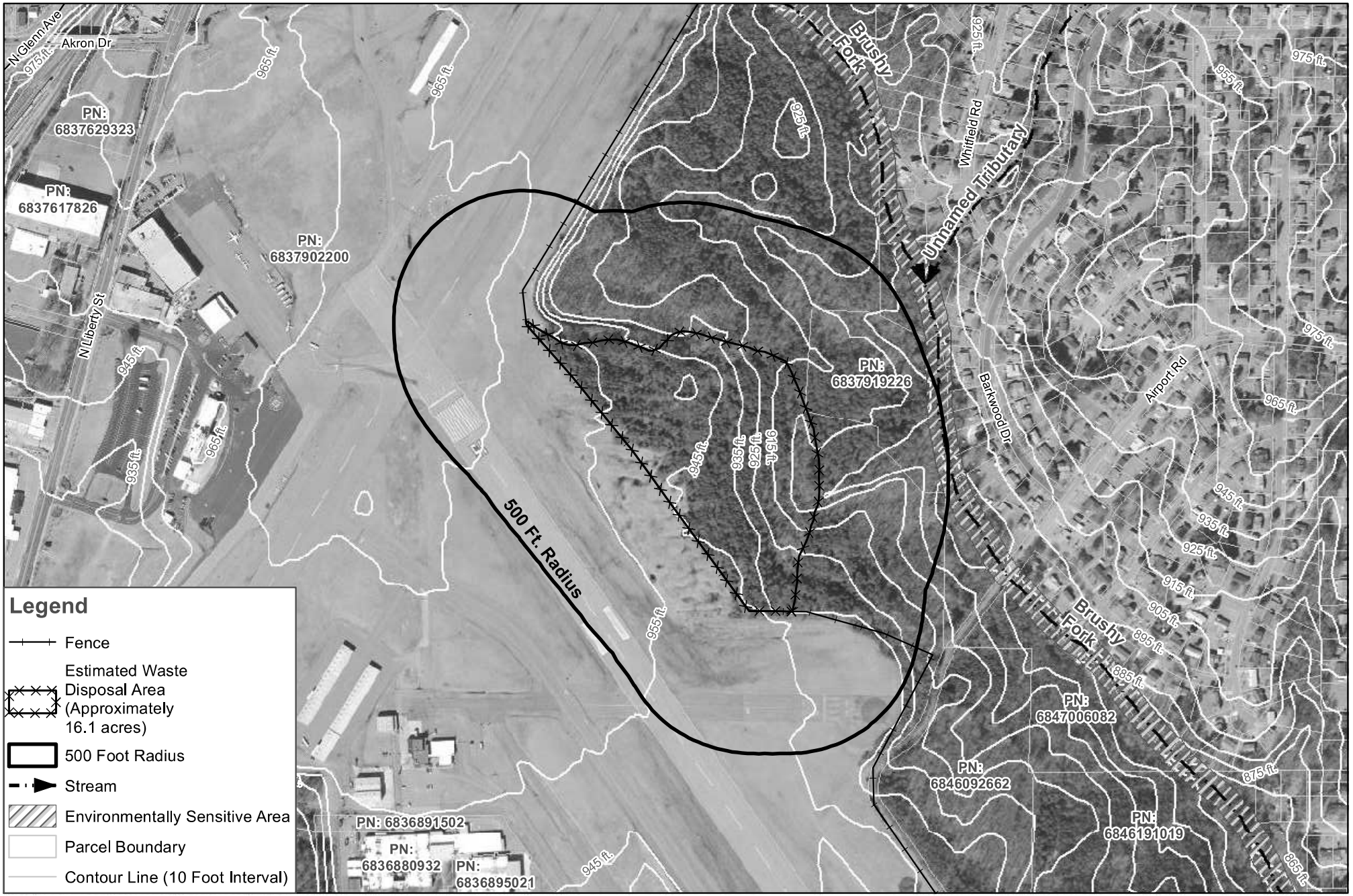
0 250 500 1,000 Feet

1 inch = 400 feet

# Figure 5: Vicinity Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*




Ortho from NCONEMAP 2014.
Parcels from Winston-Salem (2016).
Contour data from NCONEMAP, 2007.

CDM Smith

N

0 250 500 1,000 1,500 Feet

1 inch = 500 feet

# Figure 6: Sensitive Environments Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*


Parcel data is from Winston-Salem, 2016.
Contours from NCONEMAP, 2007.

CDM Smith

N

0 250 500 1,000 1,500 Feet

1 inch = 500 feet

# Figure 7: Geophysical Survey Results Map

**Airport Landfill**
**1200 Fairchild Road**
**Winston-Salem, Forsyth County, North Carolina**

*Site Identification Number: NONCD0000307*

# Appendix A

# Field Notes

Airport Landfill
Site Identification Number:  NONCD0000307

Projects (continued)

Printed in China

6-13-16 70°F Sunny

0630 M. Darwin and J. Bauer depart Raleigh office

0900 Arrive onsite. Surveyors onsite Pyramid: Eric Cross, Tim Leatherman, Sarah Montgomery

Go over plan with surveyors

0915 Begin GPS site features

D = Drainage feature

SF = Surficial Waste

P = Pond

L = leachate

1130 Offsite for lunch

1230 onsite. continue GPS site features

D5 (Drainage 5) Has water, running water.

D6 has running water

D13 has running water

Jaelle Bauer

6-13-16 80°F sunny

Surficial waste Estimated volumes

| | | |
|---|---|---|
| SF2 | 30 ft³ | telephone pole, plastic sheeting, glass bottles, roofing, metal, tires |
| SF3 | 100 ft³ | Tires, wood, plastic, car parts, metal, bike |
| SF4 | 15 ft³ | long plastic sheeting, tires |
| SF5 | 25 ft³ | large piece of metal, tires |
| SF6 | 4 ft³ | Hose, metal |
| SF7 | 1 ft³ | Tire |
| SF8 | 100 ft³ | Tarp, wood planks |
| SF9 | 150 ft³ | wood pallets |
| SF10 | 1000 ft³ | Concrete |
| SF11 | 500 ft³ | C+D |
| SF12 | 1200 ft³ | C+D |
| SF13 | 500 ft³ | C+D |
| SF14 | 5 ft³ | Metal |
| SF15 | 5 ft³ | metal |
| SF16 | 4 ft³ | metal |
| SF17 | 7.3 ft³ | drum |
| SF18 | 1 ft³ | tire |
| SF19 | 1 ft³ | tire |

6-13-16 85°F sunny

| | | |
|---|---|---|
| SF20 | 1 ft³ | Metal |
| SF21 | 1 ft³ | Tire |
| SF22 | 7.3 ft³ | drum |
| SF23 | 2 ft³ | metal cart |
| SF24 | 2 ft³ | Tire, metal |
| SF25 | 8 ft³ | Metal, tires |
| SF26 | 5 ft³ | metal, concrete |
| SF27 | 2 ft³ | metal |
| SF28 | 5 ft³ | metal |
| SF29 | 3 ft³ | Metal |
| SF30 | 2 ft³ | Metal |
| SF31 | 1 ft³ | Metal |
| SF32 | 0.5 ft³ | Metal |
| SF33 | 1 ft³ | Glass bottles, metal cans |
| SF34 | 1 ft³ | A/C grate |
| SF35 | 200 ft³ | Metal, tires |
| SF36 | >0.5 ft³ | plastic bottles |
| SF37 | 7.3 ft³ | Drum, concrete, fabric |
| SF38 | 50 ft³ | Glass bottles, metal, ceramic, tires |
| SF39 | 10 ft³ | Metal, insulation |
| SF40 | 5 ft³ | Ceramic roofing |

6-13-16 85°F Sunny

Surficial waste Estimated volume

SF41 30 ft³ Drums, glass, metal

1630 M. Darwin and J. Bauer finish for the day. Will complete tomorrow

1745 Surveyors finish for the day. Will continue ~~tomorrow~~ JB tomorrow. Offsite

Jaelle Bauer

6-14-16 70°F Sunny

0800 J. Bauer and M. Darwin arrive onsite. Surveyors onsite

0820 Continue GPS site features. Surveyors continue geophysical survey.

1000 Complete site GPS walk through. Begin windshield receptor survey.

1200 J. Bauer and M. Darwin offsite for lunch

1300 Onsite

1415 Complete ~~GPS~~ JB windshield survey.

1430 M. Darwin offsite

1630 M. Darwin returns to Raleigh office. Surveyors finish for the day. J. Bauer and surveyors offsite. Will continue tomorrow

Jaelle Bauer

6-14-16 75°F sunny

Surficial waste Estimated volume

| | | |
|---|---|---|
| SF42 | 0.5ft³ | Tire, glass |
| SF43 | 0.5ft³ | Glass, metal, plastic |
| SF44 | 0.5ft³ | Metal |
| SF45 | 5ft³ | Metal ring in the stream (DS) |
| SF46 | 1ft³ | Plastic bottles |
| SF47 | >0.5ft³ | Plastic |
| SF48 | 0.5ft³ | Plastic |

Jacob Bauer

6-15-16 70°F cloudy/rain

0800 J. Bauer and surveyors onsite
Surveyors get ready
0830 continue geophysical survey
1130 offsite for lunch
1230 onsite
1600 offsite, will finish tomorrow

Jacob Bauer

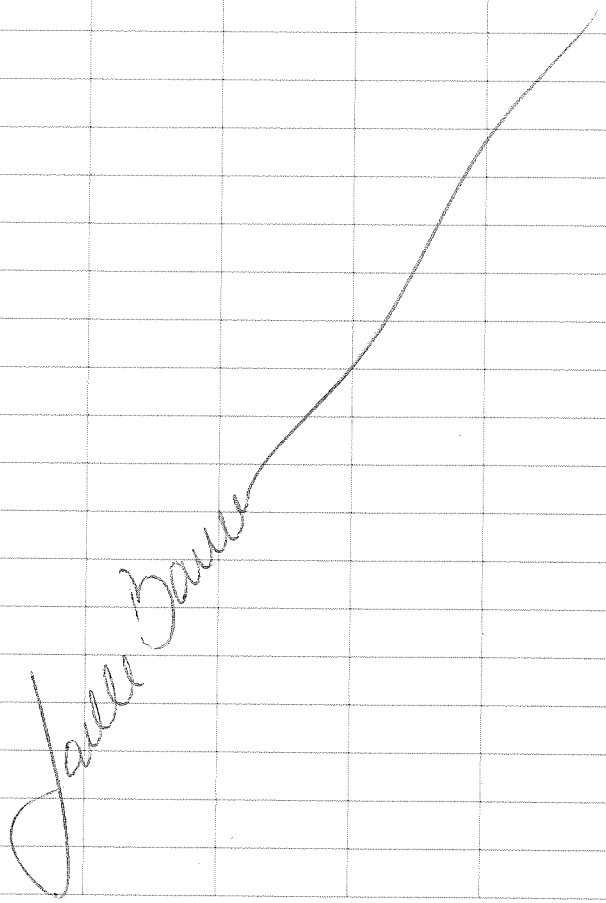
6-16-16 75°F P. Cloudy

0800 J. Bauer and surveyors onsite

0830 Surveyors begin surveying

1300 Complete geophisical survey offsite.

1600 Return to Raleigh office



# Appendix B

# Sensitive Environment Responses

Airport Landfill
Site Identification Number:  NONCD0000307

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801


July 8, 2016

Ms. Bridget Wlosek
CDM Smith, Inc.
4600 Park Road, Ste. 240
Charlotte, NC 28209

Dear Ms. Wlosek:

Subject: Site Assessment of Winston-Salem Airport Landfill, 1200 Fairchild Road, Winston-Salem, Forsyth County, North Carolina (Site Identification No: NONCD0000307)

In your letter of June 10, 2016 (received via email on June 13, 2016), you requested our comments about the subject project. The following comments are provided in accordance with the provisions of the National Environmental Policy Act (42 U.S.C.§ 4321 et seq.) and section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

While we have no concerns with the proposed assessment, we recommend efforts be made to insure that Brushy Fork Creek is not being contaminated by the site. According to our records and a review of the information you provided, no federally listed species or their habitats occur on the subject site. Therefore, we believe the requirements under section 7 of the Act are fulfilled. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of these identified actions that may affect listed species or critical habitat in a manner not previously considered, (2) these actions are subsequently modified in a manner that was not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the identified actions.

Thank you for allowing us to comment on this project. Please contact Mr. Allen Ratzlaff of our staff at 828/258-3939, Ext. 229, if you have any questions. In any future correspondence concerning this project, please reference our Log Number 4-2-16-501.

Sincerely,

- - original *signed* - -

Janet Mizzi
Field Supervisor

Bridget,
The property located at 1200 Fairchild Rd., Winston Salem, NC is located in the Yadkin Pee-Dee River Basin and drains to Brushy Fork [AU#: 12-94-12-6], then to Salem Creek (Middle Fork Muddy Creek) [AU#: 12-94-12-(4)]. The closest water quality sampling station is located about 4.5 miles downstream from the site on Salem Creek. This site indicates that the stream is Impaired for benthos and is not meeting standards for supporting aquatic life. Salem Creek is covered under a TMDL (total daily maximum load) for fecal coliform bacteria and turbidity which was approved in 2006.

For these reasons, the 1200 Fairchild Road property is considered to be in an environmentally sensitive area for the maintenance and protection of aquatic life. Please take extra precaution to reduce fecal coliform bacteria and sediment loading to this stream. For more information about this stream and it's watershed, see Chapter 2 of the 2010 Yadkin Pee-Dee River Basinwide Plan. For more information about the stream's impairment, see the Draft 2016 Impaired Waters List.

If you have any question, please let me know.
Thanks,
Melanie

**Melanie Williams**
River Basin Planner
Basinwide Planning Section
Department of Environmental Quality

919 707 9119 office
919 707 9000 main office
Melanie.Williams@ncdenr.gov

Physical Address: 512 North Salisbury St.,Raleigh, NC, 27604
Mailing Address: 1611 Mail Service Center, Raleigh, NC, 27699-1611

# North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

June 21, 2016

Ms. Bridget Wlosek
CDM Smith
4600 Park Road, Suite 240
Charlotte, NC 28209

Subject: Request for Environmental Information for the Rolesville Dump, Wake County, North Carolina.

Dear Ms. Wlosek,

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the subject information. Comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

On behalf of the North Carolina Department of Environmental Quality, CDM Smith is requesting environmental information regarding the Airport Landfill, located at 1200 Fairchild Road in Winston-Salem, Forsyth County. The project area drains to Brushy Fork in the Yadkin-PeeDee River basin.

There are no national refuges or state-owned, wildlife-designated lands within the project vicinity, nor are there migratory or feeding grounds for anadromous fish or endangered/threatened species. However, the U.S. Fish and Wildlife Service (USFWS) recently listed the northern long-eared bat (*Myotis septentrionalis*) as threatened under the Endangered Species Act. Habitat for the northern long-eared bat may be present in the vicinity of the project site. As such, consultation with the USFWS may be required. For more information, please see http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEB.html or contact the USFWS at (919) 856-4520 to ensure that potential issues related to this species are addressed.

Aerial maps and images indicate Brushy Fork flows east of the project site. The NCWRC recommends maintaining a minimum 100-foot undisturbed, native, forested buffer along perennial streams, and a minimum 50-foot buffer along intermittent streams and wetlands. Wide riparian buffers are helpful in maintaining stream bank stability. In addition, these buffers provide a travel corridor for wildlife species.

Sediment and erosion control measures should be installed prior to any land clearing, construction or disturbance. The use of biodegradable and wildlife-friendly sediment and erosion control devices is strongly recommended. Silt fencing, fiber rolls and/or other products should have loose-weave netting that is made of natural fiber materials with movable joints between the vertical and horizontal twines. Silt fencing or similar products that have been reinforced with plastic or metal mesh should be avoided as they impede the movement of terrestrial wildlife species. Excessive silt and sediment loads can have

**Mailing Address:** Habitat Conservation • 1721 Mail Service Center • Raleigh, NC 27699-1721
**Telephone:** (919) 707-0220 • **Fax:** (919) 707-0028

detrimental effects on aquatic resources including destruction of spawning habitat, suffocation of eggs and clogging of gills.

Developers are encouraged to consider additional measures to protect aquatic and terrestrial wildlife species in developing landscapes. The NCWRC's *Guidance Memorandum to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality* (August 2002; http://www.ncwildlife.org/Portals/0/Conserving/documents/2002_GuidanceMemorandumforSecondaryandCumulativeImpacts.pdf) details measures to minimize secondary and cumulative impacts to aquatic and terrestrial wildlife resources. In addition, the NCWRC's Green Growth Toolbox (http://www.ncwildlife.org/GreenGrowth/index.htm) provides information on nature-friendly planning and discusses how to address growth while concurrently conserving priority aquatic and terrestrial habitat.

If I can provide further assistance, please call (910) 409-7350 or email gabriela.garrison@ncwildlife.org.

Sincerely,

Gabriela Garrison

Gabriela Garrison
Eastern Piedmont Habitat Conservation Coordinator
Habitat Conservation Program

NORTH CAROLINA DEPARTMENT OF NATURAL AND CULTURAL RESOURCES

| **Pat McCrory** | **Bryan Gossage** | **Susan Kluttz** |
|---|---|---|
| Governor | Executive Director | Secretary |
| | Clean Water Management Trust Fund | |

NCNHDE-1735

June 11, 2016

Bridget Wlosek
CDM Smith Inc.
4600 Park Rd Suite 240
Charlotte, NC 28209
john.finnegan@ncdenr.gov

RE: Airport Landfill; Site Identification Number: NONCD0000307

Dear Bridget Wlosek:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources from our database that have been compiled for the project referenced above.

A query of the NCNHP database, based on the project area mapped with your request, indicates that there are no records for rare species, important natural communities, natural areas, or conservation/managed areas within the proposed project boundary. Please note that although there may be no documentation of natural heritage elements within the project boundary, it does not imply or confirm their absence; the area may not have been surveyed. The results of this query should not be substituted for site-specific surveys where suitable habitat exists. In the event that rare species are found within the project area, please contact the NCNHP so that we may update our records.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists and is included for reference.

Tables of natural areas and conservation/managed area within a one-mile radius of the project area, if any, are also included in this report. The location of the natural areas and conservation/managed areas can be viewed online on the Natural Heritage Data Explorer found at: https://ncnhde.natureserve.org/.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

The NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve (DNP), Registered Heritage Area (RHA), or Federally-listed species are documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Suzanne Mason at suzanne.mason@ncdcr.gov or 919.707.8637.

Sincerely,
NC Natural Heritage Program

**Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area**
**Airport Landfill**
**Project No. Site Identification Number: NONCD0000307**
**June 11, 2016**
**NCNHDE-1735**

**No Element Occurrences are Documented Within a One-mile Radius of the Project Area**

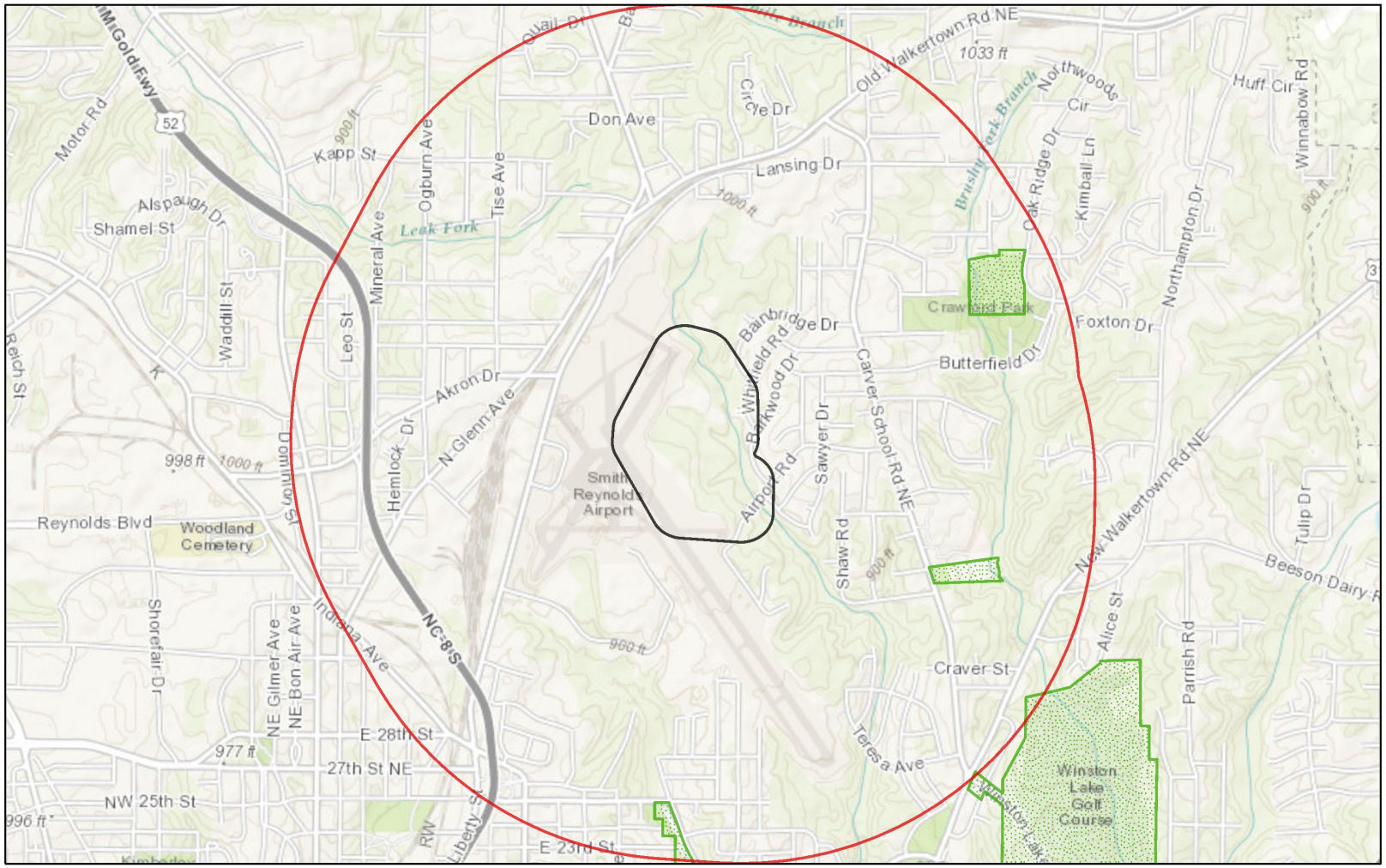
**No Natural Areas are Documented Within a One-mile Radius of the Project Area**

**Managed Areas Documented Within a One-mile Radius of the Project Area**

| Managed Area Name | Owner | Owner Type |
|---|---|---|
| Forsyth County Open Space | Forsyth County: multiple local government | Local Government |
| Forsyth County Open Space | Forsyth County: multiple local government | Local Government |
| Forsyth County Open Space | Forsyth County: multiple local government | Local Government |
| Forsyth County Open Space | Forsyth County: multiple local government | Local Government |

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on June 11, 2016; source: NCNHP, Q4 October 2015. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

# NCNHDE-1735: Airport Landfill




June 11, 2016

- Project Boundary
- Buffered Project Boundary
- Managed Area (MAREA)

1:27,111

0 0.225 0.45 0.9 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,

# Appendix C

# Geophysical Survey Report

Airport Landfill
Site Identification Number: NONCD0000307

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

PYRAMID ENVIRONMENTAL & ENGINEERING
(PROJECT 2016-139)

# GEOPHYSICAL SURVEY

## GEOPHYSICAL INVESTIGATION TO DELINEATE BURIED WASTE – WINSTON AIRPORT LANDFILL NONCD0000307

**1200 FAIRCHILD ROAD, WINSTON-SALEM, NC**

**JUNE 22, 2016**

**Report prepared for:**

**Daniel Forbes, Geologist**
**CDM Smith**
**5400 Glenwood Avenue, Suite 400**
**Raleigh, NC 27612**

**Prepared by:** _____

**Eric C. Cross, P.G.**
**NC License #2181**

**Reviewed by:** _____

**Douglas A. Canavello, P.G.**
**NC License #1066**

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406
P: 336.335.3174 F: 336.691.0648
C257: GEOLOGY C1251: ENGINEERING

**GEOPHYSICAL INVESTIGATION REPORT**
**Winston Airport Landfill**
**Winston-Salem, North Carolina**

# Table of Contents



# Figures

## EXECUTIVE SUMMARY

**Project Description:** Pyramid Environmental conducted a geophysical investigation for CDM Smith (CDM) at the Winston Airport Landfill former waste disposal area (NONCD0000307). Conducted on June 13-16, 2016, the geophysical investigation was performed to locate and delineate the horizontal extents of the buried waste across the property associated with the former landfill.

**Geophysical Results:**

- The EM31 mapping of the Winston Airport Landfill site was successful in delineating the horizontal extents of the buried waste across the site.
- The area containing buried waste associated with the former landfill generally exhibited a conductivity range of 20 mS/m to 50+ mS/m.
- The horizontal extent of the buried waste covers an area of approximately 16.1 acres within the survey boundaries. The buried waste also likely extends to the west onto the adjacent airport property.
- Isolated EM anomalies exhibiting negative conductivity values are interpreted to be the result of surface or shallow buried metallic objects. Deteriorated metal drums were observed by Pyramid during the survey at locations that corresponded to negative EM values.
- Two minor areas at the northern and southern boundaries of the survey area also exhibited increased conductivity, likely resulting from a change in soil type, isolated buried debris not associated with the landfill, and/or interference from an adjacent chain-link fence.

## INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for CDM Smith (CDM) at the Winston Airport Landfill former waste disposal area (NONCD0000307). Conducted on June 13-16, 2016, the geophysical investigation was performed to locate and delineate the horizontal extents of the buried waste across the property associated with the former landfill.

The property generally consisted of recently cleared, undeveloped land containing a combination of open grassy areas and lightly to heavily vegetated regions with some dense forest along the surface water drainage features. A significant upward slope was present across the majority of the western boundary of the survey area. CDM provided Pyramid with a geo-referenced shapefile that was used as a guide for the boundary of the survey area. A chain-link fence was also present across the western survey boundary, marking the edge of the adjacent airport property. Pyramid was directed not to extend the geophysical survey to the west, beyond this fence line. The geophysical survey was designed to provide comprehensive coverage of the site within the proposed survey boundaries, with the understanding that heavily wooded areas may result in some limited coverage and/or deviations from the established transect lines.

**Figure 1** provides a map showing the actual geophysical survey boundary, as well as the track of the geophysical instrument recorded during the survey. The track of the survey was logged using the GPS which is discussed below.

## FIELD METHODOLOGY

Pyramid utilized electromagnetic geophysical methods to delineate the horizontal extents of buried waste at the subject property. Specifically, Pyramid utilized a Geonics EM31-MK1 ground conductivity meter which measures apparent ground conductivity (quadrature phase) and metal detection (in-phase) conditions down to a maximum depth of 18 feet below surface. The EM31 instrument was coupled to a Trimble AG-114 GPS unit to record the position of the EM data to sub-meter accuracy during the survey.

The EM31 method determines electrical properties of the earth materials by inducing electromagnetic currents in the ground and measuring the secondary magnetic field produced by these currents. An alternating current is generated in the transmitter coil

located at one end of the instrument. The secondary magnetic field, which is produced by currents through the earth, induces a corresponding alternating current in the receiver coil located at the opposite end of the instrument.

After compensating for the primary field, which can be computed from the relative positions and orientations of both coils, the magnitude and relative phase of the secondary field are measured. These measurements are then converted to components of in-phase and 90 degrees out-of-phase (quadrature) with the transmitted field. The out-of-phase or quadrature component, using certain simple assumptions, is converted to a measure of apparent ground conductivity in millisiemens per meter (mS/m). The in-phase component responds to high conductive areas (above 100 mS/m) or to areas containing metallic objects and debris and the values are expressed in terms of relative units or parts per thousand. Therefore, the in-phase data can be used to identify areas that may contain buried metallic material across areas recording lower conductivity values.

In accordance with our proposal and the guidelines set forth by CDM, Pyramid performed a series of transects using the EM31 instrument in the north-south direction spaced 100 feet apart and in the east-west direction spaced 100 feet apart (see **Figure 1**). The locations of these 100-foot spaced lines were generated prior to the field work using GIS software and loaded onto a data logger coupled to the Trimble GPS antenna. The EM31 instrument is carried by a Pyramid employee as he walks along each transect. During data collection, the 100-foot lines are visible by the Pyramid employee on the data logger to maintain position and assure full coverage of the site. As mentioned previously, deviations from the formal transect lines were made in cases where heavy vegetation, standing water, and/or significant topographic obstacles were present.

Data were downloaded, processed, and interim results viewed at the end of each field day. Preliminary maps were emailed to the CDM project manager throughout the week of data collection. Lastly, additional transect lines were added to the south of the original proposed survey boundary at the request of the CDM field technicians present on-site to extend the survey limits based on their field observations.

## DISCUSSION OF RESULTS

A contour map of the EM31 quadrature results (conductivity) is presented in **Figure 2**. The presence of buried waste associated with a formal landfill will typically result in a significant increase in ground conductivity relative to the surrounding native soil. The figure clearly shows a large region of increased conductivity in the west-southwest portion of the survey area. Conductivity values increase to values of 20+ mS/m near the center of the survey area, and continue to increase to values of 50+ mS/m at the west boundary. The majority of the remaining portions of the survey area exhibited conductivity values ranging from 0-15 mS/m, typical of native sandy soils. This large area is interpreted to be the buried waste associated with the former landfill. The northern, eastern and southern boundaries are delineated on **Figure 2** by a blue dashed line. The survey boundary stopped at the west fence line adjacent to the airport property. The data suggest that the zone of high conductivity extends west beyond the survey boundary, ultimately indicating that the horizontal extent of the former landfill stretched further west than the geophysical survey boundary and onto the airport property.

It should also be noted that isolated EM anomalies exhibiting negative conductivity values were observed within the survey area. Many of these features are located near the perimeter of what is interpreted to be the edge of buried waste, with additional isolated features to the north and southeast. Such negative values are typically an indication of metallic objects, either surface metal or shallow buried metallic debris. Pyramid observed deteriorated metal drums at various locations across the site that corresponded to the negative EM anomalies on the map. The majority of these features are within the interpreted area of buried waste associated with the former landfill.

Two additional areas of increased conductivity were mapped outside of the interpreted former landfill buried waste. These areas were located at the northwestern and southern edges of the survey area, and are likely the result of either soil type changes (i.e. increased clay/moisture content), isolated buried debris not associated with the landfill, or interference from adjacent chain-link fences.

**Figure 3** provides a perimeter outline of the horizontal extents of buried waste at the Winston Airport Landfill site. Additionally, in accordance with the materials requested by CDM, this figure includes a table of coordinates of the waste perimeter, beginning at the northwest corner and extending clockwise around the waste area. These coordinates are in the North American Datum of 1983 (NAD83), listed as longitude and latitude.

This area was input into GIS-based software and determined to cover approximately 16.1 acres.

In summary, the EM31 mapping of the Winston Airport Landfill site was successful in delineating the horizontal extents of the buried waste across the site. The buried waste was observed to extend up to the western boundary of the geophysical survey area, and likely continues onto the adjacent airport property.

## SUMMARY & CONCLUSIONS

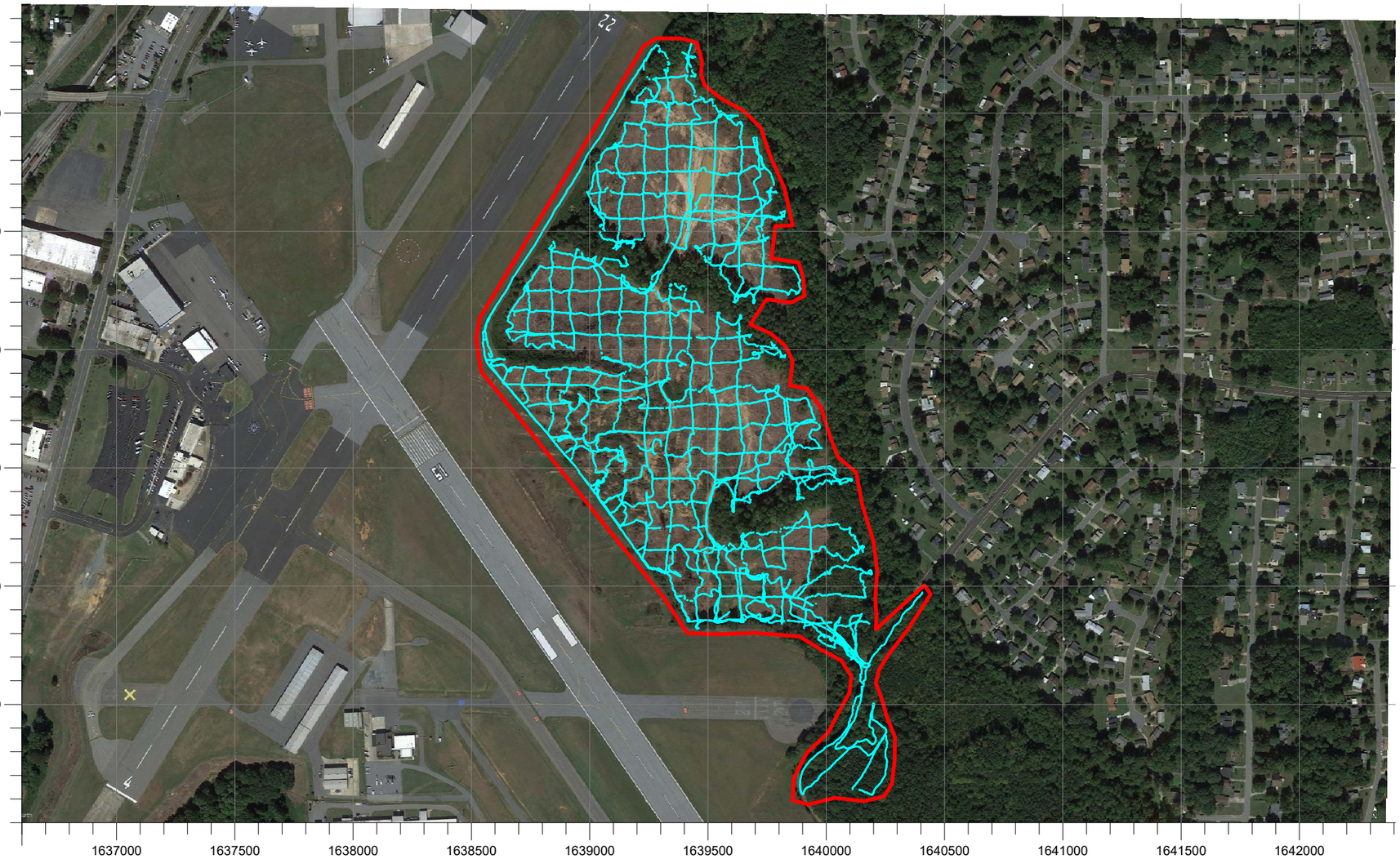
Pyramid's evaluation of the geophysical data collected at the Winston Airport Landfill NONCD0000307, provides the following summary and conclusions:

- The EM31 mapping of the Winston Airport Landfill site was successful in delineating the horizontal extents of the buried waste across the site.
- The area containing buried waste associated with the former landfill generally exhibited a conductivity range of 20 mS/m to 50+ mS/m.
- The horizontal extent of the buried waste cover an area of approximately 16.1 acres within the survey boundaries. The buried waste also likely extends to the west onto the adjacent airport property.
- Isolated EM anomalies exhibiting negative conductivity values are interpreted to be the result of surface or shallow buried metallic objects. Deteriorated metal drums were observed by Pyramid during the survey at locations that corresponded to negative EM values.
- Two minor areas at the northern and southern boundaries of the survey area also exhibited increased conductivity, likely resulting from a change in soil type, isolated buried debris not associated with the landfill, and/or interference from an adjacent chain-link fence.

## LIMITATIONS

Geophysical surveys have been performed and this report prepared for CDM in accordance with generally accepted guidelines for EM31 surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. The EM31 results obtained for this project have been used to delineate the suspected disposal area. However, some of the buried waste may not be detected by the EM31 investigation. Furthermore, some EM31 apparent conductivity anomalies may be in response to changes in soil character and not due to buried waste. The EM31 data is a function of the average conditions within the upper 15-18 feet of soil directly underlying the instrument at the time of data collection.

# WINSTON AIRPORT LANDFILL - GEOPHYSICAL SURVEY BOUNDARIES AND INSTRUMENT TRACK




NC STATE PLANE, NORTHING (NAD83, FEET)

NC STATE PLANE, EASTING (NAD83, FEET)

N

TITLE
GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS

PROJECT
FORMER LANDFILL DELINEATION
WINSTON-SALEM AIRPORT, NC

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C
503 INDUSTRIAL AVENUE
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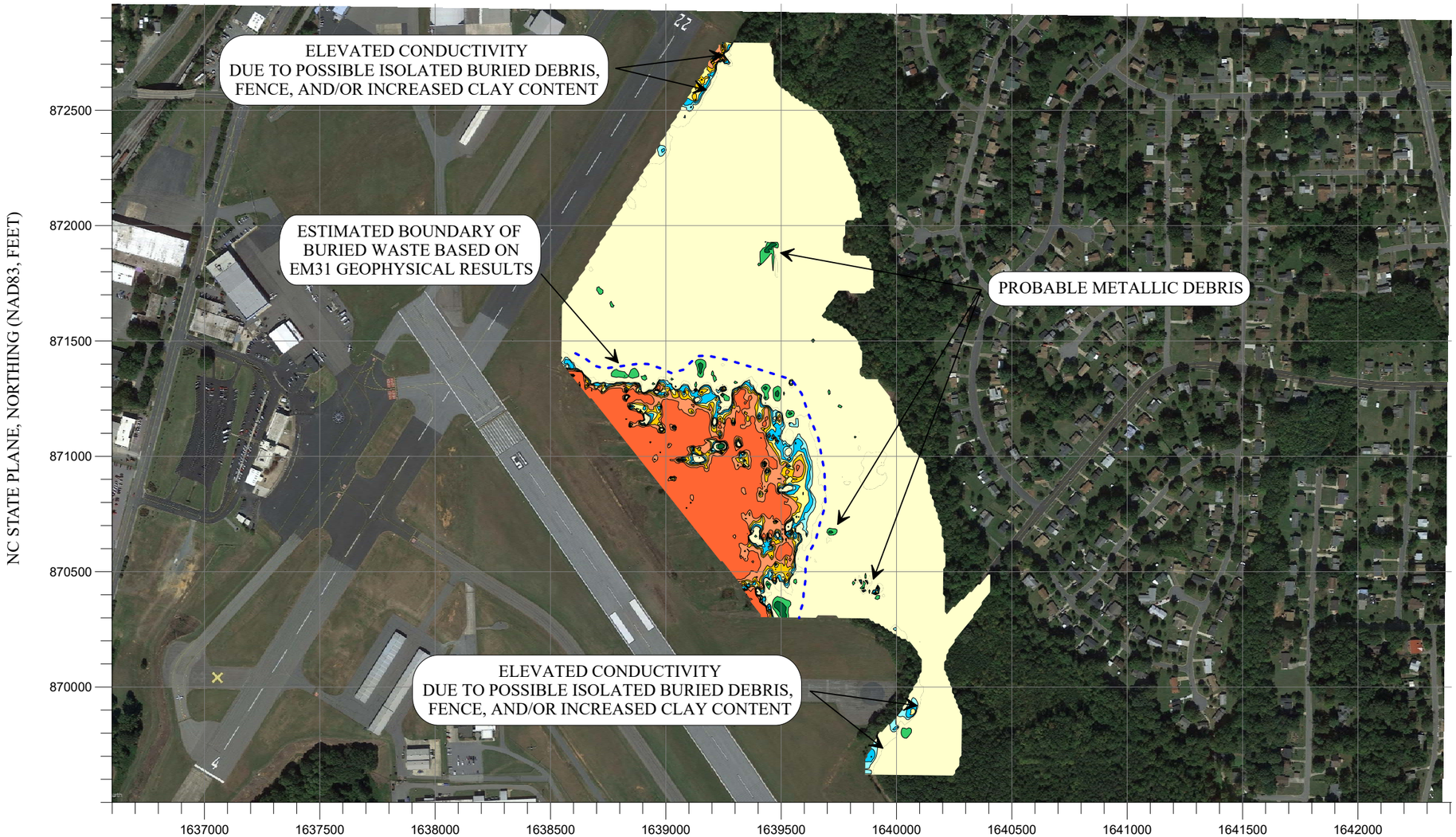
License # C1251 Eng. / License # C257 Geology

| DATE | CLIENT |
|---|---|
| 6/20/2016 | CDM-SMITH |
| PYRAMID PROJECT #: 2016-139 | **FIGURE 1** |

# WINSTON LANDFILL - EM31 QUADRATURE PHASE RESULTS




## LOCATION OF FORMER LANDFILL BURIED WASTE AS EVIDENCED BY INCREASED CONDUCTIVITY VALUES (mS/m)

The contour plot shows the quadrature phase results of the EM31 instrument in millisiemens per meter (mS/m). The EM31 data were collected from June 13-16, using a Geonics EM31 instrument coupled to a Trimble AG-114 GPS antenna.

EM31 Quadrature Phase Response
(millisiemens per meter)

50 40 35 30 25 22 15 -4 -5 -25 -200

Higher conductivity values associated with buried waste

Negative conductivity values associated with metallic objects

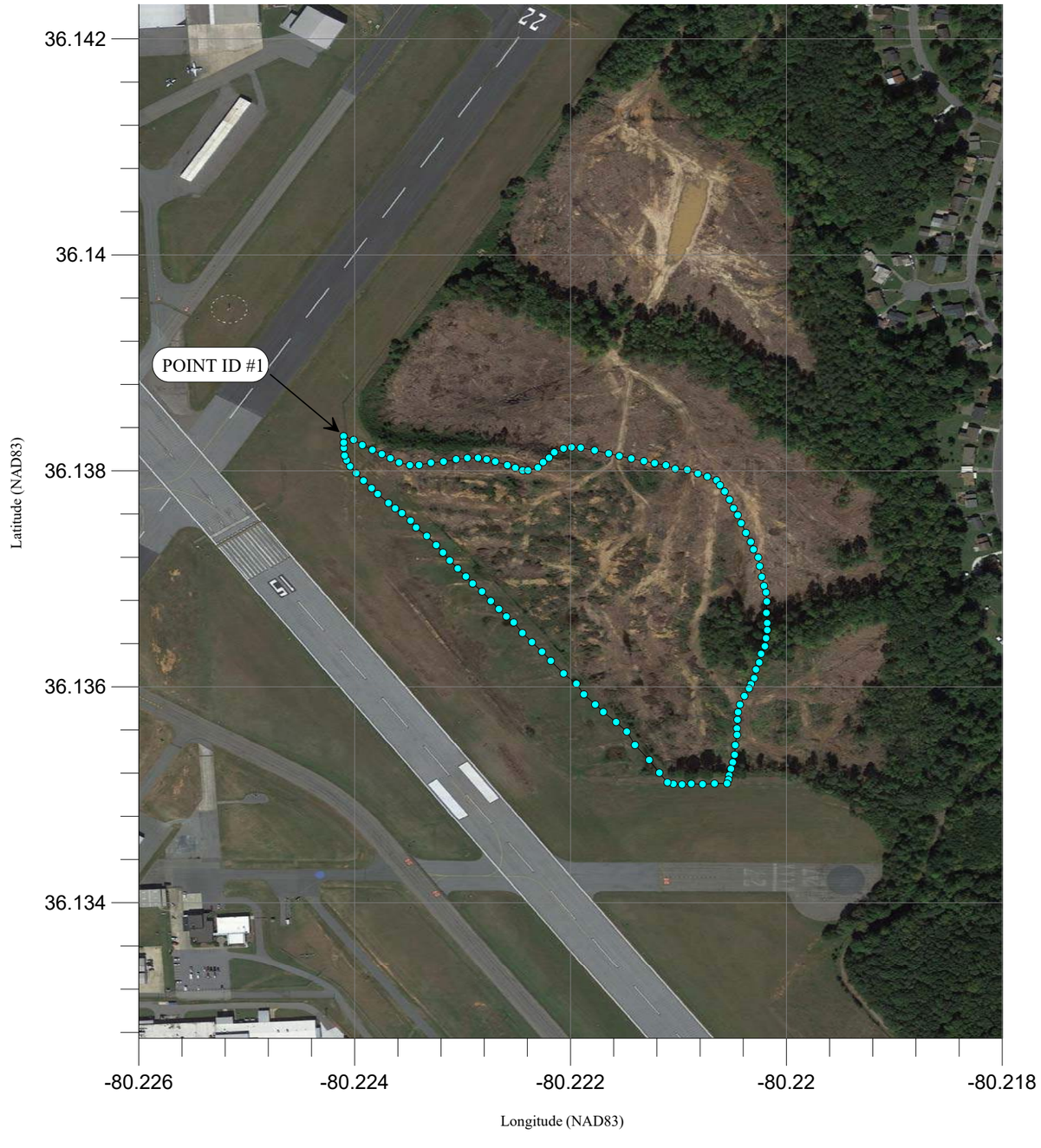
ESTIMATED BOUNDARY OF BURIED WASTE

N

| | |
|---|---|
| TITLE: EM31 QUADRATURE PHASE CONDUCTIVITY RESULTS | |
| PROJECT: FORMER LANDFILL DELINEATION WINSTON SALEM AIRPORT, NC | |
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology |
| DATE: 6/20/2016 | CLIENT: CDM SMITH |
| PYRAMID PROJECT #: 2016-139 | **FIGURE 2** |

N

# WINSTON LANDFILL - APPROXIMATE BOUNDARY OF BURIED WASTE




The table below lists the coordinates of the approximate edge of buried waste at the Winston Airport Landfill, as indicated by the results of the EM31 survey. Point ID #1 starts at the northwest corner of the waste boundary, and the points continue clockwise around the buried waste perimeter. The coordinates below are in decimal degrees using the North AmericanDatum of 1983 format and latitude and longitude using World Geodetic System 1984 format.

| Point ID | Longitude | Latitude | Point ID | Longitude | Latitude | Point ID | Longitude | Latitude |
|---|---|---|---|---|---|---|---|---|
| 1 | -80.22410182 | 36.13832067 | 43 | -80.22048874 | 36.13765356 | 85 | -80.22117708 | 36.13520293 |
| 2 | -80.22400908 | 36.13828669 | 44 | -80.22045087 | 36.1375891 | 86 | -80.2212711 | 36.13532169 |
| 3 | -80.22392841 | 36.13823763 | 45 | -80.220419 | 36.13751461 | 87 | -80.22140231 | 36.13546002 |
| 4 | -80.22383551 | 36.13819367 | 46 | -80.22037461 | 36.13742528 | 88 | -80.22147797 | 36.13558395 |
| 5 | -80.22374884 | 36.13815464 | 47 | -80.22033029 | 36.13734094 | 89 | -80.22157769 | 36.13567272 |
| 6 | -80.22366832 | 36.13811555 | 48 | -80.22030464 | 36.13727137 | 90 | -80.22169593 | 36.1357663 |
| 7 | -80.22358779 | 36.13807645 | 49 | -80.22026048 | 36.13719701 | 91 | -80.22177075 | 36.13583537 |
| 8 | -80.22348906 | 36.1380525 | 50 | -80.22024697 | 36.13711734 | 92 | -80.22187669 | 36.13592908 |
| 9 | -80.22340299 | 36.13805336 | 51 | -80.22022702 | 36.1370178 | 93 | -80.22194583 | 36.13602813 |
| 10 | -80.22329264 | 36.13807442 | 52 | -80.22020729 | 36.13693321 | 94 | -80.22206406 | 36.13612171 |
| 11 | -80.22317599 | 36.13808556 | 53 | -80.22018794 | 36.13687356 | 95 | -80.22218268 | 36.13624022 |
| 12 | -80.22305949 | 36.13810667 | 54 | -80.22018051 | 36.13678885 | 96 | -80.22226388 | 36.13632419 |
| 13 | -80.22295514 | 36.13811769 | 55 | -80.22018507 | 36.13668407 | 97 | -80.22235746 | 36.13641303 |
| 14 | -80.22285678 | 36.13811867 | 56 | -80.22017749 | 36.13658939 | 98 | -80.2224448 | 36.13649694 |
| 15 | -80.22277663 | 36.13810451 | 57 | -80.22017651 | 36.13652456 | 99 | -80.22252623 | 36.13659587 |
| 16 | -80.22269641 | 36.13808536 | 58 | -80.22018767 | 36.13644964 | 100 | -80.22259469 | 36.13665005 |
| 17 | -80.22258523 | 36.13805156 | 59 | -80.22019883 | 36.13637472 | 101 | -80.22266337 | 36.13671918 |
| 18 | -80.22251108 | 36.13802737 | 60 | -80.22023466 | 36.13630454 | 102 | -80.22273827 | 36.13679324 |
| 19 | -80.22244308 | 36.13800311 | 61 | -80.22025189 | 36.13622457 | 103 | -80.22281955 | 36.1368822 |
| 20 | -80.2223939 | 36.1380036 | 62 | -80.22028164 | 36.13615944 | 104 | -80.22290675 | 36.13695614 |
| 21 | -80.22230206 | 36.13802945 | 63 | -80.22029888 | 36.13607948 | 105 | -80.22296921 | 36.13702035 |
| 22 | -80.22225364 | 36.13807981 | 64 | -80.22032878 | 36.13602432 | 106 | -80.22304412 | 36.13709441 |
| 23 | -80.22219892 | 36.13812025 | 65 | -80.22034662 | 36.13598424 | 107 | -80.22311902 | 36.13716847 |
| 24 | -80.2221505 | 36.13817061 | 66 | -80.22038859 | 36.135914 | 108 | -80.22318163 | 36.13724265 |
| 25 | -80.22206496 | 36.13820638 | 67 | -80.22043041 | 36.13583379 | 109 | -80.22324416 | 36.13731185 |
| 26 | -80.22199134 | 36.13821709 | 68 | -80.2204478 | 36.13576379 | 110 | -80.22333152 | 36.13739576 |
| 27 | -80.2219052 | 36.13821296 | 69 | -80.22045289 | 36.13569392 | 111 | -80.22343109 | 36.13747456 |
| 28 | -80.22177573 | 36.13818932 | 70 | -80.22045782 | 36.13561407 | 112 | -80.22348125 | 36.13753889 |
| 29 | -80.22164618 | 36.13816068 | 71 | -80.22045692 | 36.13555424 | 113 | -80.22356223 | 36.1376079 |
| 30 | -80.22154744 | 36.13813673 | 72 | -80.22047392 | 36.13545931 | 114 | -80.22362439 | 36.13765217 |
| 31 | -80.22143641 | 36.13811291 | 73 | -80.22047871 | 36.13536949 | 115 | -80.22368662 | 36.13770142 |
| 32 | -80.22131923 | 36.13808914 | 74 | -80.22049609 | 36.13529949 | 116 | -80.22378627 | 36.13778521 |
| 33 | -80.22122056 | 36.13807017 | 75 | -80.22051363 | 36.13523947 | 117 | -80.22384243 | 36.1378395 |
| 34 | -80.22111575 | 36.13805127 | 76 | -80.22053116 | 36.13517945 | 118 | -80.22391726 | 36.13790858 |
| 35 | -80.22102916 | 36.13801722 | 77 | -80.22053671 | 36.1351395 | 119 | -80.22398594 | 36.13797771 |
| 36 | -80.22091836 | 36.13800836 | 78 | -80.22054847 | 36.13510447 | 120 | -80.22404225 | 36.13804198 |
| 37 | -80.22081947 | 36.13797443 | 79 | -80.22066527 | 36.1351033 | 121 | -80.22407382 | 36.13809653 |
| 38 | -80.22073295 | 36.13794537 | 80 | -80.22077584 | 36.13509721 | 122 | -80.22409295 | 36.13814122 |
| 39 | -80.22064635 | 36.13791132 | 81 | -80.22088042 | 36.13510116 | 123 | -80.22410016 | 36.13821097 |
| 40 | -80.22061494 | 36.13786675 | 82 | -80.22096641 | 36.13509531 | 124 | -80.22410092 | 36.13826084 |
| 41 | -80.220571 | 36.13780734 | 83 | -80.2210464 | 36.1350995 | | | |
| 42 | -80.22052683 | 36.13773297 | 84 | -80.22110195 | 36.13511391 | | | |

TITLE
BURIED WASTE BOUNDARY
AND PERIMETER COORDINATES

PROJECT
FORMER LANDFILL DELINEATION
WINSTON-SALEM AIRPORT, NC

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C
503 INDUSTRIAL AVENUE
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License # C1251 Eng. / License # C257 Geology

| DATE | 6/20/2016 | CLIENT | CDM SMITH |
|---|---|---|---|
| PYRAMID PROJECT #: | 2016-139 | | **FIGURE 3** |

# Appendix D

# Report Certification

Airport Landfill
Site Identification Number:  NONCD0000307

## REPORT CERTIFICATION

**Document Name:** Remedial Investigation - First Phase Investigation

**Site Name:** Airport Landfill

**Site ID:** NONCD0000307

**Task Order:** Task Order 307FP-1

I certify that, to the best of my knowledge, after thorough investigation, the information contained in or accompanying this certification is true, accurate, and complete.

Mathew F. Colone, P.G.
*Project Manager*

Mathew F. Colone
*Signature*

7/22/2016
*Date*

Before me personally appeared Mathew F. Colone to me known and known to me to be the person described in and who executed the foregoing instrument, and acknowledge to and before me that Mathew F. Colone executed said instrument for the purposes therein expressed.

Witness my hand and official seal this 22 day of July, 2016.

*Notary Public*

3/31/2019
*My Commission Expires On*

North Carolina
*State of*

Wake
*County of*

JOSEPH N. JONES NOTARY My Comm. Exp. 03-31-2019 PUBLIC DURHAM COUNTY, NC