

**SITE INVESTIGATION  
&  
REMEDIAL INVESTIGATION  
REPORT**

**Bayley Ellard Fields  
Madison Avenue & Danforth Road  
Block 201 Lot 1.02  
Borough of Madison, Morris County, NJ**

**NJDEP Case# 10-01-08-0946-32**

**October 25, 2010  
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**The Borough of Madison**

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## TABLE OF CONTENTS

1.0 Introduction and History .....	1
2.0 Site Description	
2.1 General Site Location and Description .....	1
2.2 Topography, & Drainage .....	1
2.3 Geology and Soils .....	2
3.0 Areas of Environmental Concern.....	2
3.1 AOC Site Investigation .....	2
4.0 Remedial Investigations .....	8
4.1 Summary of Analytical Results .....	11
5.0 Ground Water Investigation .....	12
6.0 Baseline Ecological Evaluation .....	14
7.0 Public Notification and Community Outreach .....	17
8.0 Conclusions & Recommendations.....	17

### TABLES

TABLE 1: Test Pit Soil Sample Results.....	5
TABLE 2: Surface Soil (Cap) Sample Results at 0.25 ft.....	6
TABLE 3: Surface Soil (Cap) Sample Results at 0.5 ft.....	6
TABLE 4: Surface Soil (Cap) Sample Results at 1.0 ft.....	7
TABLE 5: Surface Soil (Cap) Sample Results at 2.0 ft.....	7
TABLE 6: Remedial Investigation Soil Sample Results.....	9
TABLE 7: Remedial Investigation SPLP Sample Results.....	11
TABLE 8: Particle Size Analysis .....	12

### FIGURES

FIGURE 1: Borough Tax Map.....	Follows
FIGURE 2: USGS Map .....	1
FIGURE 3: NJDEP -imap.....	1

### APPENDICES

A. Test Pit Logs	
B. Soil Boring Logs	
C. Lab Results (CD w/ summary tables and full reports bounded in separate binders)	
C-1 Test Pit Soil Sample Results 7/16/09	
C-2 Test Pit Soil Sample Results 12/23/09	
C-3 Surface Soil Sample Results 8/10/09; 8/11/09 & 8/21/09	
C-4 Soil Borings Soil Sample Results 9/24/09	
C-5 Soil Borings Soil Sample Results 9/28/09	
C-6 SPLP Results 12/23/09	
C-7 SPLP Results 1/8/10	
D. BEE supporting Tables	
E. Draft Copy of Public Notice	

### ATTACHMENTS

Map titled: Site Investigation – Remedial Investigation Map Proposed Block 102 Lot 1.02, Borough of Madison, Morris County, NJ prepared by Borbas Surveying and Mapping LLC

## **1.0 INTRODUCTION & HISTORY**

As requested by Madison Borough, PK ENVIRONMENTAL (PK) completed Site Investigations (SI) and a Remedial Investigation (RI) for Block 201 Lot 1.02, located at 205 Madison Avenue in the Borough of Madison, Morris County, NJ. The 10.0-acre study area (site) known as the Bayley Ellard Athletic Field was owned by Roman Catholic Diocese of Paterson, and purchased by the Borough of Madison for use as municipal athletic fields.

Based upon a review of historic documentation provided by the Borough of Madison, there was clear indication that, from sometime prior to November 1970 through November 1972, landfill operations were conducted on the Bayley Ellard property. In May 1982, 30,000-cubic yards of additional soil material from the Schering/Plough site (aka Giralda Farms) was used as fill to improve additional athletic fields at the same elevation to an adjoining existing ball field. Review of historic aerial photos also indicated that extensive site clearing and re-grading occurred in the northeast corner of the property between 1963 and 1970.

In planning for the potential municipal recreation needs of Madison Borough, and as requested by the Borough, on-site test pits and soil sampling were conducted which confirmed that this area was filled with historic fill material consisting of mostly soil and construction debris including brick, concrete, wood, metal, pipe, electric wiring, rug, glass, slate, asphalt, ceramic tile, styrofoam, ash, and plastic pipe. Based upon diligent inquiry into the history of the site, the fill material is non-indigenous material that was used to raise the topographic elevations of the site. Soil contamination consistent with historic fill was confirmed during the site investigation activities.

## **2.0 SITE DESCRIPTION**

### **2.1 General Site Location & Description**

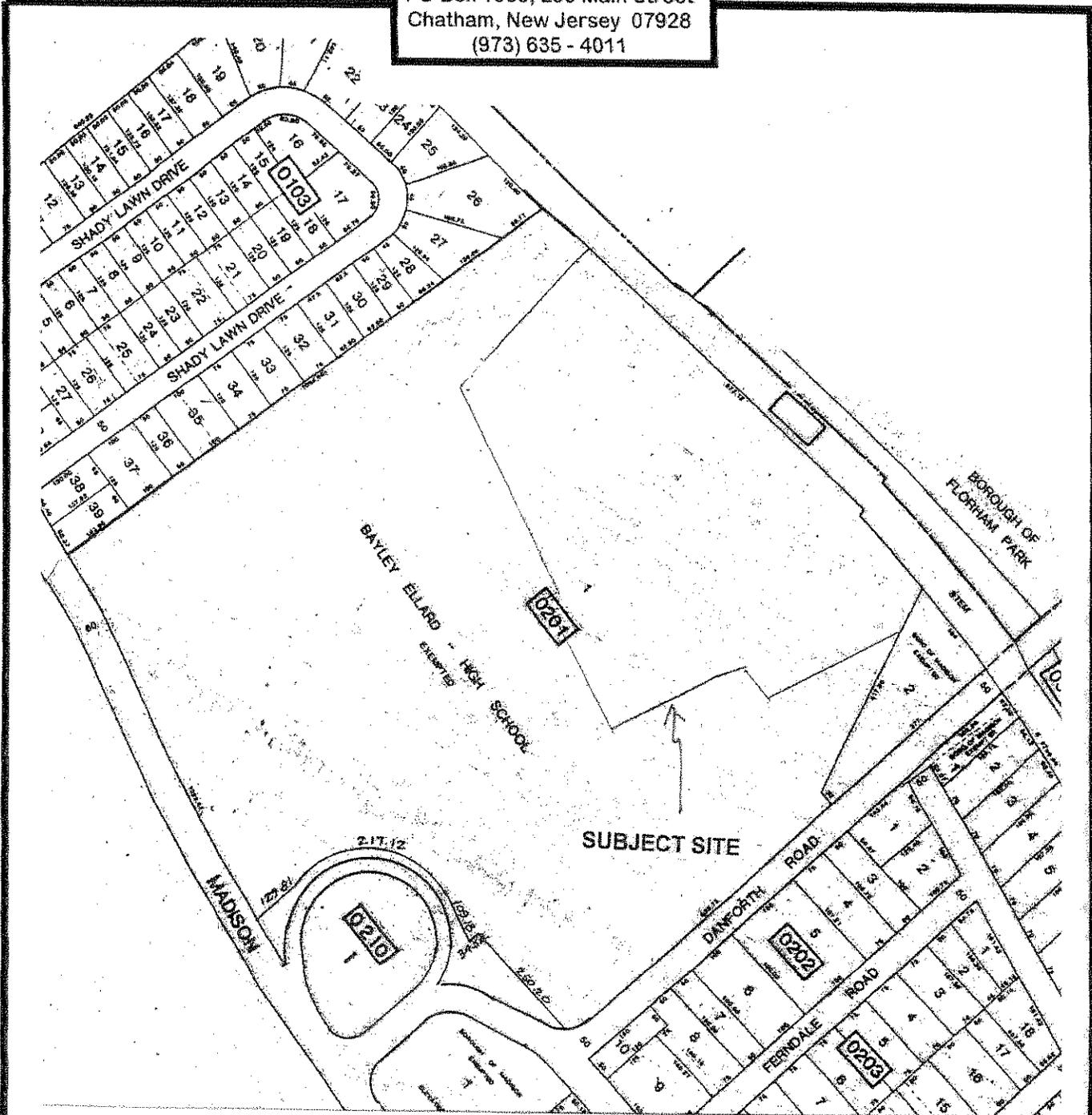
The 10-acre site consists of Block 201 Lot 1.02, and as depicted on **Figure 1, Location Map**, from the Borough of Madison tax maps, the site adjoins Conrail Railroad tracks and the Borough of Florham Park municipal boundary to the northeast. The site also borders a stormwater detention basin (Lot 1.01), vacant Borough owned property and Danforth Road to the southeast; the former Bayley Ellard mansion/school (Lot 1), the Sunrise Assisted Living facility (Lot 1.01) to the southwest; and vacant land (Lot 1.01) and residential properties adjoining Shady Lane Drive to the northwest.

The site presently consists of active athletic fields and maintained lawn, with a narrow area of steeply sloping shrubby successional woodlands located at the northern border of the site, near the railroad corridor.

### **2.2 Topography & Drainage**

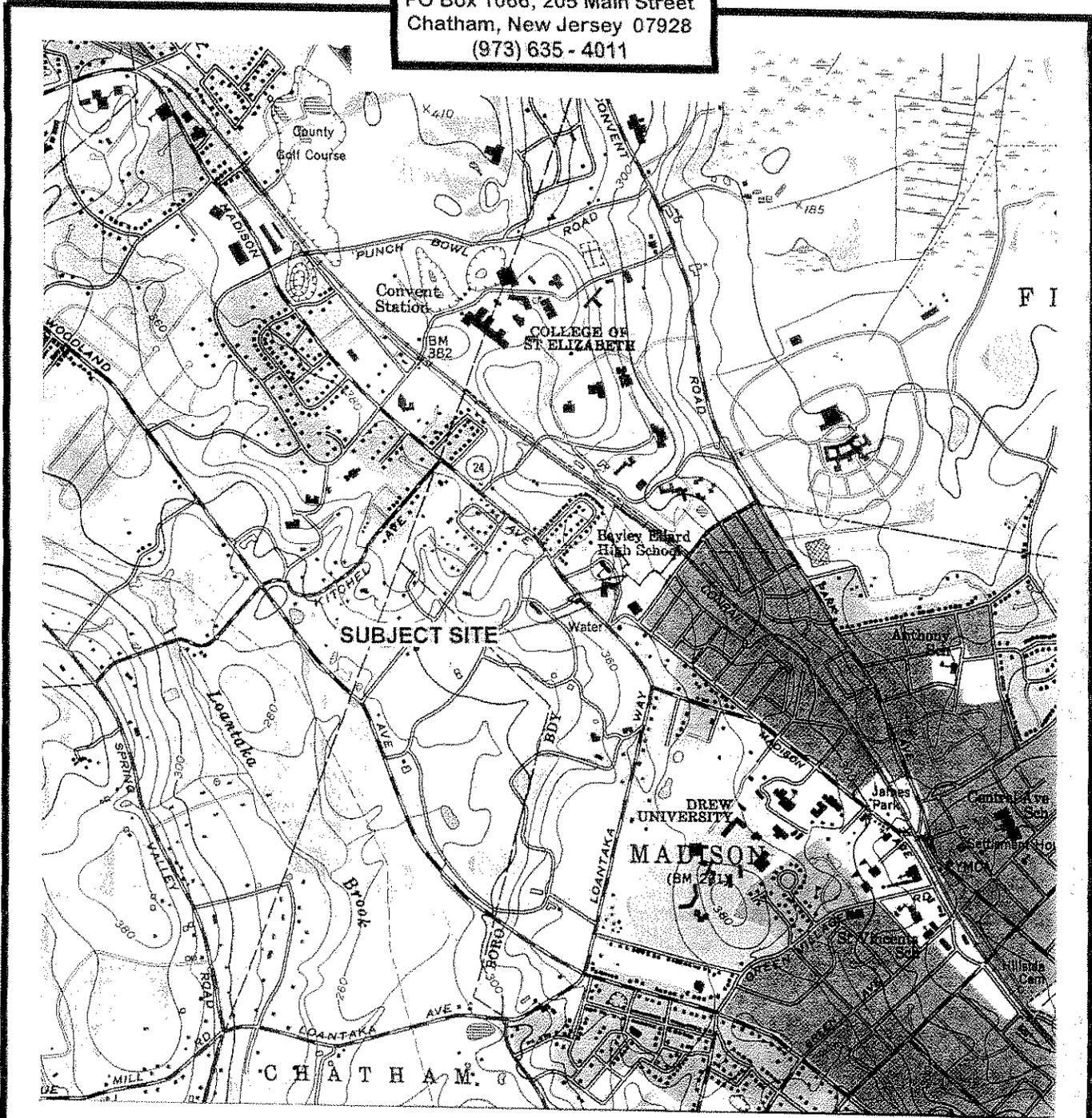
**Topography and Drainage** – Figure 2, the USGS Vicinity Map (Morristown Quadrangle) indicates that the site is located in a moderately sloping area, which slopes downward from the southwest to the northeast. On-site elevations range from a high of approximately 360-feet above mean sea level (msl) in the southwest portion of the site to a low of approximately 330-feet msl near the railroad ROW. As depicted on Figure 3 (NJDEP iMapNJ), there are no surface waters, water

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**FIGURE 1 - TAX MAP**  
SOURCE: Borough of Madison Tax Map  
Block 201 Lot 1.02  
Madison Borough, Morris County, NJ  
NTS

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**FIGURE 2 - USGS TOPOGRAPHIC MAP**  
SOURCE: USGS Map – Morristown, NJ Quad  
Block 201 Lot 1.02  
Madison Borough, Morris County, NJ  
SCALE: 1 inch = 2000 feet



features or wetlands on or within 200-feet of the site. As depicted on the map titled "Site Investigation - Remedial Investigation Map Lot 1.02 Block 201 Tax map Sheet 2, Borough of Madison Morris County, New Jersey", prepared by J. Peter Borbas, PLS, the majority of the site is gently sloping, with a steeply sloping grassed embankment located along the southwest property boundary, and a steeply sloping wooded embankment along the northeast property boundary. The site drains northeast, via overland flow, towards the railroad ROW, and there is an off-site, man-made drainage ditch located alongside the railroad tracks.

**Hydrogeology** - The site is situated within the Black Brook HUC-14 sub-watershed and the Whippany River HUC-11 watershed. Based upon various on-site soil borings completed to depths of 20-feet below ground surface (bgs), the exact on-site groundwater depth is unknown, but it is below 14-feet bgs. The groundwater gradient is expected to be in an easterly direction, similar to the surface water flows, however no information on the exact groundwater depth or gradient was obtained during investigative or remedial activities.

### **2.3 Geology & Soils**

**Geology** - According to the Bedrock Geologic Map of Northern New Jersey (Drake, et. al. 1996), the site is located within the New Jersey Piedmont physiographic province where it is underlain by the Boonton Formation, which consists of sandstone, siltstone and mudstone, fine grained minor dolomitic siltstone and shale. The surface geology consists of Rahway till depositions from receding glacial ice which was part of the late Wisconsinian Terminal moraine, which formed morainic ridges and knolls, as much as 200-feet thick.

**Soils** The USDA/SCS Web Soil Survey Map for Morris County indicates the following soil types on the site.

- **Haledon silt loam (HanB)**: These soils consist of somewhat poorly drained soils.
- **Urban Land-Haledon Complex (USHALB)**: These soils are generally covered with impervious surface and/or natural or disturbed soils in urbanized developed areas.

## **3.0 AREAS OF ENVIRONMENTAL CONCERN (AOC)**

Upon review of historic documentation provided by the Borough of Madison, there was clear indication that, from sometime prior to November 1970 through November 1972, filling operations were conducted on the Bayley Ellard property. In May 1982, 30,000-cubic yards of additional soil material from the Schering/Plough site (aka Giralda Farms) was used as additional on-site fill. As such, this area was identified as an area of environmental concern (AOC) requiring additional site investigations (SI).

### **3.1 AOC Site Investigation (SI)**

Based upon a review of the site specific historic data, Phase 1 Environmental Site Assessment reports, and historical aerial photographs, PK completed seven test pits (TP#1-TP#7) on July 16, 2009, three test pits (TP#8-TP#11) on August 20, 2009, test pit #12 on September 28, 2009, and test pits #13- #16 on December 23, 2009 throughout the AOC area. The test pits were excavated with a small back hoe and a track hoe, and the test pit locations are shown on the map titled "Site Investigation / Remedial Investigation Map prepared by Borbas Surveying and Mapping, LLC, Attachment 1". The test pits were excavated to

various depths with a maximum depth of approximately 11-feet bgs. These test pits visually confirmed that the area was filled with historic fill material consisting of mostly soil and construction debris including brick, concrete, wood, metal, pipe, rug, glass, slate, asphalt, styrofoam, ash, and plastic pipe. In TP#1, TP#-3, and TP#4, located along the northern fence line, we observed that the depth of historic fill extends deeper than 11-feet bgs, with varying shallower depths towards the south. Based upon these test pit observations and our professional judgment it was determined that the fill material did not meet the definition of a sanitary landfill, but did meet the definition of "historic fill" which is referenced at N.J.A.C. 7:26E-1.8 as *"non-indigenous material deposited to raise the topographic elevation of a site which was contaminated prior to emplacement and includes without limitation construction debris dredge spoils, incinerator residue, demolition debris, fly ash or non-hazardous waste. Historic fill material does not include any material which is substantially chromate chemical production waste or any other chemical production waste or waste from processing of metal or mineral ores, residues slag or tailings. IN addition historic fill material does not include a municipal solid waste landfill site"*. TP#6 and TP#7, located along the football field fence, documented the absence of debris, confirming that the historic fill material/debris is limited to the area north of the existing football field fence. Test pit soil logs are included in **Appendix A**.

Soil samples were obtained from TP#1, TP#2, TP#3, TP#4, TP#5, TP#13, and TP#16 at various depths ranging from 6-feet bgs to 11-feet bgs, within the AOC debris zone. Each sample was placed in an appropriate jar and delivered to Integrated Analytical Laboratory (IAL) in Randolph, NJ (NJ Certified Lab #14751), to be analyzed for Total Petroleum Hydrocarbon (TPHC) and Priority Pollutants (PP+40). As depicted in **Table 1**, the lab results indicate the absence of volatile organics, but the presence of several semi volatile base neutrals, lead, chlordane, and PCBs at elevated levels that exceed the residential direct contact soil remediation standards (RDCSRS). It was also noted that several of the soil sample results include concentrations of metals (beryllium, cadmium, mercury, and zinc) that exceed the "Default Impact to Groundwater" or IGW soil cleanup criteria, part of the Rule: N.J.A.C. 7:26D REMEDIATION STANDARDS, as recently published on November 4, 2009.

In order to establish the existence of clean "cap" soils, surface soil samples were collected from eighteen locations (C1-C18) at various shallow depths, as depicted on the attached map titled **Site Investigation / Remedial Investigation Map prepared by Borbas Surveying and Mapping, LLC, Attachment 1**. Because the fields were actively utilized for recreation, soil samples were collected from the surface soils 0-3" to address the ingestion-dermal health concerns. The discrete soil samples were collected by PK with a hand auger and/or a hydraulic soil boring rig, both of which were decontaminated between each sampling. Each sample was placed in an appropriate jar and delivered to Integrated Analytical Laboratory (IAL) in Randolph, NJ (NJ Certified Lab #14751), to be analyzed for Total Petroleum Hydrocarbon (TPHC) and Priority Pollutants (PP+40).

The IAL results indicate the absence of volatile organics (VO), but do indicate the presence of several base neutrals (BN), also referred to as polynuclear aromatic hydrocarbons (PAH), at levels that exceed the residential direct contact soil remediation standards (RDCSRS). Soil sample results, indicated the presence of several semi volatile base neutrals, also referred to as polynuclear aromatic hydrocarbons (PAHs), including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene at levels exceeding the RDCSRS for the ingestion-dermal health criterion. Based upon PK Environmental's recommendations to the Borough of Madison those portions of the playing fields were closed to use and remain closed (fenced with signage) until the remediation is complete.

Tables 2, 3, 4 and 5, presents the surface soil sampling results from various depths and Appendix C depicts the complete laboratory results.

- **C-1A, C-2A, C-3A, C-4A, C-8A, C-9A, C-11A, C17 and C18:** These samples were collected at depths 0- 3-inches bgs, and the lab results for **C-2A, C-9A, C-11A, C-17 and C-18** were all non-detect (ND) or below the RDCSRS for PAH. **C-1A, C-3A, C-4A** along the rear tree line, documented the presence of benzo(a)pyrene at levels slightly above the 0.2-ppm RDCSRS, at 0.275-ppm, 0.223-ppm, and 0.327-ppm, respectively, and non-detect (ND) or below the RDCSRS standards for all other contaminants. The lab results for **C-8A** located in the sanitary sewer easement along the fence, exceeded the RDCSRS for several PAH including benzo(a) anthracene, benzo(b) fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene.
- **C-1, C-4, C-7, C-9, C-12, C-14, and C-16:** These samples were collected at a depth of 0.- 0.5-foot bgs, and the lab results for **C-7, C-12, C-14 and C-16** were non-detect (ND) or below the RDCSRS. The results for **C-1** and **C-4** along the rear tree line, and **C-9** in the sanitary sewer easement along the fence, document the presence of benzo(a)pyrene at levels slightly above the 0.2-ppm RDCSRS, at 0.467-ppm and 0.486-ppm respectively and non-detect (ND) or below the RDCSRS for all other contaminants.
- **C-2, C-5, C-8, C-10, C-13, C-15:** These samples were collected at a depth of 0.5 – 1.0 foot bgs, and the results for **C-5, C-10, C-13, and C-15** were non-detect (ND) and/or below the RDCSRS. The lab results for **C-2** along the rear tree line, and **C-8** located in the sanitary sewer easement along the fence, document the presence of benzo(a)pyrene at levels slightly above the 0.2-ppm RDCSRS, at 0.512-ppm and 0.431-ppm respectively, and non-detect (ND) or below the RDCSRS for all other contaminants.
- **C-3, C-6, C-11:** These samples were collected at a depth of 1.5 -2.0-feet below the ground surface (bgs), and the lab results for **C-6** were non-detect (ND) or below the RDCSRS limits. The results for **C-3** along the rear tree line, and **C-11** located in the center of the northeast field, document the presence of benzo(a)pyrene at levels slightly above the 0.2-ppm RDCSRS, at 0.280-ppm and 0.208-ppm, respectively, and non-detect (ND) or below the RDCSRS for all other contaminants.

TABLE 1 – Test Pit Soil Sample Results

Contaminant	RDCSRS ppm 6-2-08	Default IGW Soil Screening criteria ppm	TP-1 7/16/09 (11ft)	TP-2 7/16/09 (6 ft)	TP-3 7/16/09 (9 ft)	TP-4 7/16/09 (11 ft)	TP-5 7/16/09 (7 ft)	TP-13 12/23/09 (6 ft)	TP-16 12/23/09 (8 ft)	D-1 12/23/09 (0.5 ft)	D-2 12/23/09 (0.5ft)
benzo(a)anthracene	0.6	0.5	0.09	0.7	3.9	0.6	0.9	ND	4.8	0.1	7.6
benzo(b)fluoranthene	0.6	2	0.1	1.0	4.6	0.86	1.3	ND	2.4	0.1	4.7
benzo(k)fluoranthene	6	16	0.1	0.9	5.0	0.9	1.0	ND	4.2	0.1	6.6
benzo(a)pyrene	0.2	0.2	0.1	1.0	5.5	0.9	1.3	ND	3.4	0.1	6.2
indeno(1,2,3-cd)pyrene	0.6	5	0.07	0.8	3.5	0.6	0.8	ND	1.1	0.06	2.2
dibenz(a,h)anthracene	0.2	0.5	ND	0.4	1.5	0.1	0.4	ND	0.3	ND	1.1
beryllium	16	0.5	0.8	ND	ND	ND	ND	0.7	0.7	0.53	0.6
cadmium	78	1	0.8	0.7	1.9	1.8	0.5	ND	1.3	ND	0.5
Lead	400	59	240	648	874	8470	965	16.1	696	66.2	227
mercury	23	0.1	.2	.3	.5	1.2	.3	0.04	0.3	0.13	0.2
silver	390	1	.6	.7	ND	ND	ND	ND	ND	ND	ND
Zinc	23000	600	267	227	763	1150	289	113	794	77	129
chlordane	0.2	0.03	0.3	0.1	0.6	0.8	0.1	ND	0.01	0.01	0.033
PCBs	0.2	0.2	ND	ND	2.1	ND	ND	ND	ND	ND	ND

KEY

Lead	Immobilized Chemicals
0.6	Results exceed only RDCSRS
0.6	Result exceeds only Default IGW Screening Criteria
0.6	Result exceeds both RDCSRS and Default IGW Screening Criteria

Surface Soil (Cap) Sample Results

TABLE 2 – Surface Soil (Cap) Sample Results  
 (Samples Collected at 0 - 0.25 ft)

Contaminant	RDCSRS ppm 6-2-08	C-1A 8/21/09	C-2A 8/21/09	C-3A 8/21/09	C-4A 8/21/09	C-8A 8/21/09	C-9A 8/21/09	C-11A 8/21/09	C-17 8/21/09	C-18 8/109
benzo(a)anthracene	0.6	0.3	0.1	0.2	0.3	1.8	0.1	ND	ND	ND
benzo(b)fluoranthene	0.6	0.3	0.1	0.2	0.2	1.4	0.1	ND	ND	ND
benzo(a)pyrene	0.2	0.3	0.17	0.22	0.3	1.5	0.1	ND	ND	ND
indeno(1,2,3-cd)pyrene	0.6	0.2	0.1	0.1	0.2	1.0	0.1	ND	ND	ND
dibenz(a,h)anthracene	0.2	0.1	ND	ND	0.1	0.4	ND	ND	ND	ND

TABLE 3 – Surface Soil (Cap) Sample Results  
 (Samples Collected at 0 - 0.50 ft)

Contaminant	RDCSRS ppm 6-2-08	C-1 8/10/09	C-4 8/10/09	C-7 8/10/09	C-9 8/10/09	C-12 8/11/09	C-14 8/11/09	C-16 8/11/09
benzo(a)pyrene	0.2	0.5	0.5	ND	0.3	0.1	ND	ND

KEY

Lead	Immobile Chemicals
0.6	Results exceed RDCSRS

**TABLE 4 – Surface Soil (Cap) Sample Results**  
 (Samples Collected at 0.5 - 1.0 ft)

Contaminant	RDCSRS ppm 6-2-08	C-2 8/10/09	C-5 8/10/09	C-8 8/10/09	C-10 8/10/09	C-13 8/11/09	C-15 8/11/09
benzo(a)pyrene	0.2	0.5	0.1	0.4	ND	ND	ND

**TABLE 5 – Surface Soil (Cap) Sample Results**  
 (Samples Collected at 1.5 - 2.0 ft)

Contaminant	RDCSRS ppm 6-2-08	C-3 8/10/09	C-6 8/10/09	C-11 8/11/09
benzo(a)pyrene	0.2	0.26	ND	0.21

**KEY**

Lead	Immobile Chemicals
0.6	Results exceed RDCSRS

## **4.0 REMEDIAL INVESTIGATION**

PK completed a remedial investigation (RI) of the historic fill, as per NJDEP 7:26E, 4.6(b). Seven borings and/or test pits were completed in suspected non-fill areas, spaced equidistantly around the perimeter of the contaminated fill material area. Test pit #10, and soil borings #1, 3, 6, 9, 15, & 21 delineate the horizontal limits of the historic fill AOC. (See Appendix A for test pit logs, Appendix B for soil boring logs, and Attachment 1 for a map of the soil boring and test pit locations). The vertical limits of historic fill were observed to be a maximum of 12-feet below grade, depending upon elevation, with the exception of SB-18, where debris was observed in the core, at 14-feet, however this conclusion could be inaccurate due to bore – hole cave in, and the “push” of debris into deeper soils.

Soil sampling was conducted as per N.J.A.C. 7:26E-3.6, 3.7 and 3.9. Each test bore - hole was installed, utilizing a hydraulic direct push soil coring hammer. A continuous soil boring, 2” diameter, was conducted from ground surface, through the fill material, until clean native (i.e. indigenous) soils were encountered. Typical soil boring depths were approximately 12'-16' below grade. However, deeper soil borings were performed in locations SB-11 SB-14, and SB-19 to determine the extent and thickness of a confining soil layer, and or the depth to ground water (see section 6.0, Ground Water Investigations). No ground water was encountered in any boring.

The soil core was observed over the entire length and observations were recorded as to soils type, presence of debris, odor and consistency. Field analysis for volatile organic compounds was conducted on the soils within the borings, with a Rae Systems Photo – Ionization Detector, (PID) which was calibrated to Isobutylene gas. Samples retrieved from core sampling at various depths were screened at 0.5' intervals for the presence of *volatile organic vapors* using the detector, and for hydrocarbons via visual and olfactory observations. There were no PID readings observed during the course of the remedial investigation, therefore all VOC samples were obtained from 9.5 – 10' or deeper.

Eighteen (18) soil samples were taken from within the fill zone for characterization purposes, as well as from the base of select borings (S-14B, S-19B) to vertically delineate clean soils. The fill material was observed to be homogenous throughout the area of concern. Demolition debris was encountered within all “fill” areas, and included small quantities of wood, metal, brick, steel, concrete, paving, carpet, plastic, etc. There was no evidence of chemical production waste or waste from processing of metal or mineral ores, residues, slag or tailings, free and/or residual product encountered during the investigation.

Based upon the results of the site investigation sample analysis, all remedial investigation soil samples were analyzed for total petroleum hydrocarbons, base neutral compounds, PCBs, pesticides and priority pollutant metals. Priority Pollutants plus 40 was conducted on 25% of the RI samples, as per NJAC 7:26E- 4.6 (b)3iii(2). A full laboratory analytical is presented in Appendix C. A summary of the results for the soil analysis are provided in the table below:

TABLE 6 – Remedial Investigation Soil Sample Results

Parameter	RDCSCC* (ppm)	IGW+	SB-7 9/24/09 7.5-8.0'	SB-8 9/24/09 7.5-8.0'	SB-10 9/24/09 7.0-7.5'	SB-11 9/24/09 10-10.5'	SB-12 9/24/09 11.5-12.1'	SB-13 9/24/09 3.5-4.0'	SB-14 9/28/09 6-6.5'	SB-14B 9/28/09 14.5-15'	SB-16 9/28/09 8-8.5'
Benzo [a] anthracene	.6	.5	2.97	2.83	1.14	2.88	3.07	ND	1.08	ND	0.406
Benzo [b] fluoranthene	.6	2	2.42	2.93	1.25	2.08	2.55	ND	1.06	ND	0.392
Benzo [k] fluoranthene	.2	16	1.73	2.00	0.899	2.21	2.12	ND	0.932	ND	0.265
Benzo [a] pyrene	.6	.2	2.37	1.98	1.27	2.43	2.61	ND	1.07	ND	0.347
Indeno [1,2,3-cd] pyrene	.6	5	1.47	1.58	0.963	1.48	1.62	ND	0.759	ND	0.241
Dibenz [a,h] anthracene	.2	.5	0.512	0.705	0.365	0.576	0.804	ND	0.286	ND	0.105
Naphthalene	6	16	0.436	0.076	0.089	0.142	0.216	ND	ND	ND	ND
Chlordane	.2	.03	ND	ND	ND	0.233	ND	ND	.041	ND	0.301
Lead	400	59	184	977	246	166	265	37.3	398	7.94	244
PCB's	.2	.2	ND	ND	ND	ND	ND	ND	0.011	ND	ND

\* RDCSCC (Residential Direct Contact Soil Cleanup Criteria) + Impact To Ground Water Screening Level

TABLE 6, continued

Parameter	RDCSCC* (ppm)	IGW+	SB-17 9/24/09 8-8.5'	SB-18 9/24/09 11.5-12.1'	SB-19 9/28/09 7.5-8.0'	SB-19B 9/28/09 14-14.5'	SB-20 9/28/09 4.0-4.5'	D-1 12/23/09 0.5-1.0'	D-2 12/23/09 0.5-1.0'	TP#13 12/23/09 6.0-6.5'	TP-#16 12/23/09 8.0-8.5'
Benzo [a] anthracene	.6	.5	0.128	35.1	1.63	ND	2.12	.107	7.61	ND	4.8
Benzo [b] fluoranthene	.6	2	ND	30.0	1.77	ND	1.72	.098	4.73	ND	2.39
Benzo [k] fluoranthene	.2	16	0.016	18.9	1.26	ND	1.50	.072	6.59	ND	4.20
Benzo [a] pyrene	.6	.2	0.066	28.1	1.45	ND	1.77	.080	6.20	ND	3.43
Indeno [1,2,3-cd] pyrene	.6	5	2.52	16.2	0.766	ND	0.863	.057	2.21	ND	1.07
Dibenz [a,h] anthracene	.2	.5	2.52	6.34	0.308	ND	0.371	ND	1.05	ND	.328
Naphthalene	6	16	ND	8.08#	0.064J	ND	0.052J	ND	0.527	ND	ND
Chlordane	.2	.03	ND	ND	ND	ND	ND	.009	.033	ND	.009
Lead	400	59	421	489	471	13	298	66.2	227	16.1	696
PCB's	.2	.2	5.50	ND	ND	ND	.093	ND	ND	ND	ND

\* RDCSCC (Residential Direct Contact Soil Cleanup Criteria)

# Naphthalene detected above the inhalation pathway soil clean up criteria, but **below** the direct dermal contact criteria (2400ppm) and below the impact to ground water screening level (16ppm).

**4.1 Summary of Analytical Results**

Results for analysis of the remedial investigation samples exhibited elevated levels of PAH, and metals typically associated with historic fill. Additionally, trace levels of Naphthalene (SB-18), pesticides (SB-11, SB-16) and PCB (SB-17) were also reported in excess of NJDEP's most stringent clean up criteria.

The PAH (Benzo [a] anthracene, Benzo [b] fluoranthene, Benzo [k] fluoranthene, Benzo [a] Pyrene, Indeno [1,2,3-cd] Pyrene and Dibenz [a,h] anthracene), PCB, Lead and Chlordane are listed as "immobile" chemicals within the NJDEP document entitled "Guidance for the Evaluation of Immobile Chemicals for the Impact to Ground Water Pathway".

The metals Beryllium, Cadmium, Mercury, Nickel, Silver, and Zinc were reported in excess of NJDEP's "Default Impact to Ground Water Screening Level" (from the guidance document entitled: Development of Site Specific Impact to Ground Water Soil Remediation Standards, Table 1) at several locations within the area of concern. As per the guidance document, additional soil samples were collected at 12 locations, biased to the highest total metals results, for follow up synthetic leachate (SPLP) analysis. All leachate results were below the Default Leachate Criteria. A full laboratory analytical report is presented as Appendix C. The sampling and analytical summary is presented in Table 4:

**TABLE 7- Remedial Investigation: SPLP Soil Sample Results**

<b>SPLP Parameter</b>	<b>DLC-GW* (ppm)</b>	TP-1 1/8/10 11.0-11.5'	TP-3 1/8/10 9.0'-9.5'	TP-4 1/8/10 11'-11.5'	SB-14 1/8/10 6.0'-6.5'	SB-17 1/8/10 8.0'-8.5'	SB-19 1/8/10 7.5'-8.0'	SB-20 1/8/10 4.0'-4.5'	C-11 1/8/10 0.5'-1.0'
Beryllium	.013	ND	~	~	~	~	~	ND	~
Cadmium	.052	~	ND	ND	~	~	~	~	~
Mercury	.026	~	~	ND	~	ND	ND	~	~
Nickel	1.3	~	~	~	~	~	~	~	0.00777
Silver	.520	ND	~	~	ND	~	ND	~	~
Zinc	26	~	~	0.061	~	~	0.014	~	~

<b>SPLP Parameter</b>	<b>DLC-GW* (ppm)</b>	D-1 12/23/09 0.5-1.0'	D-2 12/23/09 0.5-1.0'	TP#13 12/23/09 6.0-6.5'	TP-#16 12/23/09 8.0-8.5'
Beryllium	.013	~	ND	ND	ND
Cadmium	.052	~	~	~	ND
Mercury	.026	ND	~	~	ND
Zinc	26	~	~	~	0.126

\*Default Leachate Criteria for Class 2 Ground Water

## **5.0 GROUND WATER INVESTIGATION**

A ground water investigation was conducted at two boring locations within the AOC. Borings SB-11, and SB-19 were advanced to a depth of 20-feet bgs. Refusal was encountered in both bore holes at this depth, likely due to very tight sands. The bore holes were left open for two hours, then inspected with a Solinst water meter for the presence of ground water. Ground water was not observed to accumulate in these deeper borings, however a fine sand layer located at 19.5-feet bgs, was noted as wet, in SB-19. Therefore the saturated zone for shallow ground water may begin at this depth. Soil grain size (Sieve) analyses were conducted at three (3) different locations and depths within the AOC. The following table represents a summary of the findings:

**TABLE 8 – Particle Size Analysis**

<b>Particle Size</b>	SV-7 9/24/09 10.0-10.5'	SV12 9/24/09 15.5-16.0'	SB-19B 9/28/09 14-14.5'
%Gravel	0.86	4.42	0.74
%Coarse Sand	0.45	6.68	1.56
%Medium	31.06	44.04	35.05
%Fine Sand	20.6	9.74	30.72
%Silt and Clay	<b>49.61</b>	<b>35.05</b>	<b>31.84</b>

**Conclusions: Ground water monitoring is not warranted due to the following factors:**

- The vertical extent of the historic fill is approximately 12-feet below grade.
- Ground water is in excess of 20-feet below grade.
- Soil boring and test pit observations conclude that there is approximately 8' of clean native soils between the historic fill and the top of shallow ground water. This band of soil is comprised of over 15% silt and clay, thus providing a protective confining layer below the fill.
- Two soil samples (SB-14B, SB-19B) were obtained in native soils below the fill, at between 14-feet and 15-feet, which were analyzed for PP+40. Results were reported as "non-detect", and/or below the most stringent regulatory limits, therefore establishing a minimum zone of 2-feet of clean soils.
- SPLP analysis of metals Beryllium, Cadmium, Mercury, Nickel, Silver, and Zinc were reported below the Default Leachate Criteria, (Appendix A of NJDEP Guidance for the Use of the Synthetic Precipitation Leaching Procedure to Develop Site Specific Impact to Ground Water Remediation Standards) Therefore it can be concluded that there is no potential impact to ground water from these metals present in the historic fill.
- All other constituents detected within the fill zone (PAH, Lead, Chlordane, PCB) are classified as "immobile" also having no potential impact to ground water, based upon our evaluation of the contaminant, and the site conditions, as per NJDEP's Guidance for the Evaluation of Immobile Chemicals for the Impact to Ground Water Pathway, June 2, 2008: "Chemicals that have relatively low transport potential due to their high

soil adsorption coefficients, may over time, become irreversibly adsorbed to soil and therefore immobile under normal conditions. Therefore, it can be assumed that these chemicals do not pose a threat to ground water if an adequate zone of clean soil exists between the contamination and the groundwater". The following analysis of the site conditions supports the conclusion above:

- Soil pH was measured at neutral values, between 7 and 8.
- No co-solvent exists within the area of concern.
- Soil contamination concentrations are not indicative of free or residual product.
- There is a clean zone of at least 2-feet of soil between the contaminated zone and ground water.

Additional supporting documentation is reported in the soil boring logs, which can be found as Appendix B.

## **6.0 BASELINE ECOLOGICAL EVALUATION**

This Baseline Ecological Evaluation (BEE) was performed for the Bayley Ellard site located in the Borough of Madison, New Jersey. A BEE is required by the Industrial Site Recovery Act (ISRA) (N.J.S.A. 13:1K-6) and the Hazardous Site Remediation Act (N.J.S.A. 58:10B) at industrial sites. The NJDEP Site Remediation Program determines the need for and application of remediation standards to protect the environment by requiring an ecological evaluation and risk assessment be performed.

A tiered approach similar to the USEPA approach for performing ecological evaluations and risk assessments has been developed by the Site Remediation Program. The BEE (Tier 1) addresses the potential ecological effects so that sites without ecological concern can be eliminated from further site-specific investigation. Those sites that show the potential for adverse ecological effects from this BEE process will require further investigation and risk analysis at the Tier II level.

### **6.1 Approach**

The objective of the BEE, as outlined in NJDEP Site Remediation Newsletter (Volume 9 No1) Article 05, is to examine the site for the co-existence of (1) contaminants of potential ecological concern, (2) environmentally sensitive areas, and (3) a possible chemical migration pathway to these sensitive areas.

### **6.2 Contaminants of Potential Ecological Concern (COPEC)**

The guidance for conducting a BEE calls for comparing the maximum measured contaminant concentrations found on-site to be compared with published ecotoxicologically-based benchmarks or screening values, using a "weight of evidence" approach (NJDEP's Site Remediation Newsletter (Volume 9 No1, Article 05). The source of data for making these comparisons has been provided by PK Environmental. These data are from soil samples taken in September 2009 from sixteen location on the site. COPECs have been determined to be present in surface soils within the AOC.

### **6.3 Resources at Potential Risk**

A BEE requires that environmental resources as identified in the Guidelines be identified and be evaluated in terms of the potential for impact to these resources. A search for sensitive ecological features was completed via NJDEP iMapNJ, presented as Figure 3. Those resources that might be at risk from the Bayley Ellard Site are identified as follows:

- ***Surface Waters, Wetlands:***
- There are no surface waters or wetlands, nor any surface drains / catch basins located within the area of concern, or leading to any surface waters adjacent to the AOC. There is one utility corridor, a sewer easement, which bisects the AOC [See Attachment 1]. This corridor does not intersect with or terminate at any sensitive ecological features such as surface water or wetlands.

- ***Threatened and Endangered Species***

The Guidelines for conducting a Baseline Ecological Evaluation require that the Office of Natural Lands Management within the NJDEP be contacted in regards to the occurrences of State of Federally Listed Threatened or Endangered Species within .25 miles from the site. A search of NJiMAP and NJ GeoMAP did not reveal any state or federal species of special concern as shown on the Landscape Project data bases as being present on or within .25 miles of the site.

- ***Soils***

- Soils are an important natural resource that historically has been the most severely impacted from man's activities in the course of land development. Soils are important ecologically as a growth matrix for plant ground cover and as habitat for soil infauna, burrowing and foraging small mammals and birds. Knowledge of the character of on-site soils is important for performing a Baseline Ecological Evaluation to evaluate the potential for contaminant movement within the site and to adjacent natural resources of concern. At the Bayley Ellard site, the on-site soils within the area of concern are primarily fill material that has been imported to create playing and recreational purpose surfaces. These soils are certainly not likely to be native or from near-by sources. In fact, the exact source of these fill materials may not be easy to ascertain but likely is the source of any contaminants now present on-site.

- Surface (.25 inches) and below surface (.5 inches) soils were collected by PK at sixteen locations at the Bayley Ellard Site and submitted for analysis of semi-volatile organic compounds (SVOC), heavy metals and polynuclear aromatics compounds (PAHs). The sampling activities are discussed in Section 3.0 above

- ***Groundwater***

The remedial investigation has determined that there is no potential threat to ground water from the contaminants identified within the AOC (see Section 5.0 above).

## **6.4 Results and Discussions**

### ***6.4.1 Ecological Based Screening Criteria for all detected Contaminants of Concern***

The results of the Soil Analyses and Ecological Screening process are presented in Table1 of Appendix D. Each identified contaminant found in the surface soils on the Bayley Ellard site was compared to published toxicity endpoints found in USEPA or open literature documents for a myriad of species considered appropriate for a Baseline Ecological Evaluation (Appendix D, Table 2). The sampling locations that were analyzed indicate the presence of moderate to low levels of semi-volatile organic compounds (SVOCs) at the ppb range. However these same locations have levels of heavy metals at the part per million range.

### ***6.4.2 Ecological Evaluation of Soil Contaminants***

Ecotoxicological benchmarks are used extensively in ecological risk assessment to determine if chemicals present in or potentially released to the environment pose an

ecological threat. Screening ecological benchmarks are used to identify chemical concentrations in environmental media that are at or below thresholds for effects to ecological receptors. These benchmarks are derived from a multitude of sources, for a variety of sites throughout the United States, and therefore represent the most conservative estimates for the potential toxicological impacts. In some cases, certain benchmarks may be inappropriate for a particular study site, due to differences in types of habitat, and those species frequenting the site.

Ecological risks of environmental contaminants are evaluated by using a two-tiered process. In the first tier presented in this Baseline Ecological Evaluation, a screening assessment is performed where concentrations of contaminants in the environment are compared to no observed adverse effects level (NOAEL)-based toxicological benchmarks. These benchmarks represent concentrations of chemicals (i.e., concentrations presumed to be nonhazardous to the biota) in environmental media (water, sediment, soil, food, etc.). While exceedance of these benchmarks does not indicate any particular level or type of risk, concentrations below the benchmarks should not result in significant effects. In practice, when contaminant concentrations in soils are less than these toxicological benchmarks, the contaminants may be excluded from further consideration. However, if the concentration of a contaminant exceeds a benchmark, that contaminant should be retained as a contaminant of potential concern (COPC).

These benchmark values are based on observed toxicity in laboratory tests as well as being derived from models that take into account the potential for ingestion, incorporation and bio-magnification that could affect reproduction, and long term survival of the populations associated with the ecosystems associated with the site. The lowest published concentration for each compound that produced a toxic response was then used to derive an Ecological Hazard Quotient for each compound found on site by dividing the maximum concentration by the minimum benchmark value.

The Semi-volatile Organic Compounds and Heavy Metals detected in the surface soils at the Bayley Ellard site are presented in the attached Tables, and are compared to the **minimum or lowest published** ecological benchmarks. The maximum concentration of each contaminant is divided by the minimum benchmark value derived from the literature and approved data sources listed in Table 1, to produce an Ecological Hazard Quotient. The median concentration of each contaminant is divided by the minimum benchmark value as an indication of the possible ecological toxicity within the whole the site for each contaminant of concern as whereas **deriving a Ecological Hazard Quotient using the highest concentration from a single location presents the worst case possibility.**

The heavy metals; in particular, arsenic, cadmium, chromium, copper, lead, nickel, and zinc present at the Bayley Ellard site have the potential for causing ecotoxicity to the endemic populations of the on-site species. Given the paucity of upland species present on the site proper, this possibility of ecotoxicity is not as great as it would be for a more natural habitat with more species that might be contaminated with the same suite of contaminants. A possible exception to this generality is the impact to adventurous species that might frequent the site e.g. birds that might use the site as a source of earthworms, grubs and other delectables. In this instance, bioaccumulation of these heavy metals and possibly of some of the semi-volatile organics would be a cause for concern.

## **6.5 Conclusions**

The contaminants of concern on the Bayley Ellard site as discussed in the SI/RI do not pose a threat to surface waters, ground water, or other "environmentally sensitive areas", and there is minimal potential for migration of these contaminants off - site. The Baseline Ecological Evaluation revealed that although the contaminants present in the soils have the potential for eco-toxicity, the conditions at the Bayley Ellard site are not conducive for the contaminants to impact the ecology on-site or surrounding area.

Normally, the findings of a Baseline Ecological Evaluation such as those findings above, would lead to recommendations that may include more intense and detailed ecological studies targeted to a specific species or habitat be conducted. This referred to as a Tier II Study. A Tier II study is not recommended at this time.

Further ecological study is not warranted due to the following conclusions:

- Although there are contaminants of potential concern in the surface soils, there is a minimal amount of wildlife habitat available, i.e., the AOC is primarily athletic fields.
- Since capping the majority of the AOC is the remedy of choice for the Bayley Ellard site, the remedy will mitigate possible future ecological issues as well as the human health concerns. A most important aspect of this remedy is that the capping materials be as free of contamination as possible. The findings from the Baseline Ecological Evaluation shows the eco-toxicity potential now associated with the soils on-site and the value of diminishing this ecotoxicity potential by using contaminant free capping materials.

## **7.0 PUBLIC NOTIFICATION AND COMMUNITY OUTREACH**

PK has completed a search for sensitive populations and resources, as per N.J.A.C. 7:26E-1.4(f), utilizing the NJDEP's i-Map system and Borough of Madison Tax records. As referenced on the NJDEP Receptor Evaluation Form sensitive populations or resources identified on or within 200-feet of the property boundary included the on-site and adjoining recreation fields, off-site residences and residential properties. As per the US Census Bureau, English is the predominant language within the notification area. A notice of remediation will be sent to all property owners within a 200-foot radius, at least two weeks prior to the initiation of remedial activities. A draft Notice is included as **Appendix E**.

## **8.0 CONCLUSIONS & RECOMMENDATIONS**

Site Investigations (SI) which confirmed the presence of historic fill were completed in accordance with the NJDEP Technical Requirements for Site Remediation - Site Investigation – landfills and historic fill (N.J.A.C. 7:26E 3.12) and the remedial investigations identified the horizontal and vertical limits and characteristics of the fill material were completed in accordance with the NJDEP Technical Requirements for Site Remediation - Remedial Investigation – landfills and historic fill (N.J.A.C. 7:26E 4.6).

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Based upon these results, the Remedial Investigation (RI) is complete which has defined the historic fill area of concern (AOC) as 4.133 acres, which is defined by the line connecting SB-3, SB-21, SB-9, Test Pit #10, Test Pit #9, the southeastern property boundary of Lot 1.02, and the sanitary sewer easement along the northeastern property boundary. The results of the remedial investigation have fully characterized the chemical contamination of the soil, and documents that the historical fill material does not include any material which is substantially chromate chemical production waste or any other waste from processing of metal mineral ores, residues, slag or tailings. Furthermore, the remedial investigation of the soils had demonstrated that the chemical contaminants present are considered "immobile", and/or are not likely to leach or otherwise move within the area of concern. There is a sufficient layer of impervious, clean soil beneath the historic fill to be protective of groundwater; therefore further ground water investigations are not warranted.

Based upon the results of these investigations, it is recommended that the portion of the AOC to be utilized as municipal recreation fields be capped with suitable clean fill and/or asphalt parking areas, and that the remaining portions of the AOC which include the wooded embankment area, be fenced off to prevent human contact. In addition it is recommended that during fencing of this area visible and exposed debris including the deteriorating empty drums which were observed to be empty, dry, and in various stages of decay, be removed and properly disposed of.

Based upon our review, there is a concern with regard to the levels of polynuclear aromatic hydrocarbons (PAH), which were reported in excess of the current NJDEP Residential Direct Contact Soil Remediation Standards (**RDCSRS**) for the ingestion/dermal health criterion.

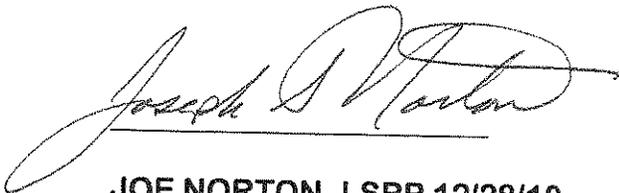
In addition, it is our recommendation, as referenced in two memorandums to the Borough of Madison dated September 2, 2009 and March 15, 2010, (copies included) that the previously identified portion of the playing fields continue to remain closed to use, until the remediation activities are completed. To ensure public safety, a semi-permanent secure fence and signage has been installed to ensure that the public is not in direct contact with surface soils in the AOC.

This report will be submitted to the NJDEP Site Remediation Program and upon completion of the "cap" a final Remedial Action Report (RAR), which will include documentation of the engineering control (cap), deed restrictions and schedule for future inspections and biannual reporting to the NJDEP regarding the engineering control features, will be prepared.



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**SANDRA KEHRLEY, PE, 12/28/10**  
**NJ PE LICENSE #38560**



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**JOE NORTON, LSRP 12/28/10**  
**LSRP #508607**

**APPENDIX C**

**Laboratory Results  
(CD)**

**APPENDIX A**

**Test Pit Logs**

**PK ENVIRONMENTAL  
TEST PIT LOGS**

<b>Log of Test Pit #1</b>			
Completion Date	7/16/2009		
Weather	80° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 3.0'	SM	brown stoney sandy mix with cobbles, some concrete
	3.0' - 11.0'	SM	brown sandy mix; brick, metal, pipe, carpet, concrete, rebar, wood, glass, slate
	11.0'	SM	dark brown sany mix with organic material and decaying wood; possible previous ground surface
PID meter reading: 0			
TP-1 sample @ 11'			
some horizontal seepage; groundwater not encountered			
test pit completed to 11.0'			

<b>Log of Test Pit #2</b>			
Completion Date	7/16/09		
Weather	80° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 1.5'	SM	brown stoney sandy mix; no debris
	1.5' - 7.0'	SM	brown sandy mix; some brick, metal, concrete and wood
	7.0' - 9.0'	SM	natural brown sandy mix
PID meter reading: 0			
TP-2 sample @ 6.0'			
groundwater not encountered			
test pit completed to 6.0'			

**PK ENVIRONMENTAL  
TEST PIT LOGS**

**Log of Test Pit #3**

Completion Date 7/16/2009  
 Weather 80° ; sunny  
 Method Back-hoe

Depth	Symbol	Description
0 - 2.0'	SM	brown stoney sandy mix; no debris
2.0' - 9.0'	SM	brown sandy mix; brick, metal, asphalt, pipe, concrete, hardened paint styrofoam, wire
back-hoe reach max'ed; natural soils not reached		

PID meter reading: 0  
 TP-3 sample @ 9.0'  
 groundwater not encountered  
 test pit completed to 9.0'

**Log of Test Pit #4**

Completion Date 7/16/2009  
 Weather 80° ; sunny  
 Method Back-hoe

Depth	Symbol	Description
0 - 0.5'	SM	brown stoney sandy mix with cobbles; no debris
0.5' - 11.0'	GM	brown gravelly mix with boulders; brick, pvc pipe, chain link fence, metal, burnt wood, chains, plastic bags, styrofoam, concrete, ash
back-hoe reach max'ed; natural soils not reached		

PID meter reading: 0  
 TP-4 sample @ 11.0'  
 groundwater not encountered  
 test pit completed to 11.0'

**PK ENVIRONMENTAL  
TEST PIT LOGS**

**Log of Test Pit #5**

Completion Date 7/16/2009  
 Weather 80° ; sunny  
 Method Back-hoe

Depth	Symbol	Description
0 - 1.0'	SM	brown stoney sandy mix with cobbles; no debris
1.0' - 7.0'	SM	brown sandy mix; small amounts of brick, asphalt, wood, metal

PID meter reading: 0  
 TP-5 sample @ 7.0'  
 minor water seepage; groundwater not encountered  
 test pit completed to 7.0'

**Log of Test Pit #6**

Completion Date 7/16/2009  
 Weather 80° ; sunny  
 Method Back-hoe

Depth	Symbol	Description
0 - 4.0'	SM	brown stoney sandy mix; no debris

PID meter reading: 0  
 no sample collected  
 groundwater not encountered  
 test pit completed to 4.0'

**Log of Test Pit #7**

Completion Date 7/16/2009  
 Weather 80° ; sunny  
 Method Back-hoe

Depth	Symbol	Description
0 - 5.0'	SM	brown stoney sandy mix with cobbles; no debris

PID meter reading: 0  
 no sample collected  
 groundwater not encountered  
 test pit completed to 5.0'

**PK ENVIRONMENTAL  
TEST PIT LOGS**

<b>Log of Test Pit #8</b>			
Completion Date	8/20/2009		
Weather	80° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 1.0'	GM	Quarry process and gravel
	1.0' - 2.5'	SM	brown sandy mix; no debris; treet stump and decaying roots @ 1.5' - 2.5'
	3.0' - 6.0'	SM/CM	yellowish brown sandy mix with some clay; native soils
PID meter reading: 0			
no sample collected			
groundwater not encountered			
test pit completed to 6.0'			

<b>Log of Test Pit #9</b>			
Completion Date	8/20/2009		
Weather	80° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 1.5'	SM	brown sandy mix, no debris
	1.5' - 9.0'	SM	brown sandy mix; brick, concrete, metal, ash, tar, shingles
	9.0' - 10.0'	SM	yellowish brown sandy mix with some clay; native soils root zone observed at 9.0'
PID meter reading: 0			
no sample collected			
groundwater not encountered			
test pit completed to 10.0'			

<b>Log of Test Pit #10</b>			
Completion Date	8/20/2009		
Weather	80° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 4.0'	SM	brown stoney sandy mix with cobbles; no debris
	4.0 - 5.0'	SM	brown sandy mix; no debris
	5.0' - 6.0'	CM	gray sandy clay; native soils
PID meter reading: 0			
no sample collected			
groundwater not encountered			
test pit completed to 6.0'			

**PK ENVIRONMENTAL  
TEST PIT LOGS**

<b>Log of Test Pit #11</b>			
Completion Date	8/20/2009		
Weather	80° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 4.5'	SM	brown stoney sandy mix with cobbles; no debris
	4.5 - 5.0'	CM	dark gray sandy clay; root zone observed @ 4.5'
PID meter reading: 0			
no sample collected			
groundwater not encountered			
test pit completed to 5.0'			

<b>Log of Test Pit #12</b>			
Completion Date	9/28/2009		
Weather	78° ; sunny		
Method	Back-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 3.5'	SM	brown stoney sandy mix with cobbles; no debris
	3.5' - 6.0'	SM	brown sandy mix; concrete, wood, ash, siag, tile, pipe, romex wire
	back-hoe reach max'ed; natural soils not reached		
PID meter reading: 0			
no sample collected			
groundwater not encountered			
test pit completed to 6.0'			

**PK ENVIRONMENTAL  
TEST PIT LOGS**

**Log of Test Pit #13**

Completion Date 12/23/2009  
 Weather 20° ; sunny  
 Method Track-hoe

Depth	Symbol	Description
0 - 1.0'	SM	brown sandy mix; no debris
1.0' - 6.0'	SM	brown sandy mix; automobile parts, empty/rusted/crushed drum, pipe, plastic tarp, concrete
6.0' - 7.0'	SM	yellowish brown sandy mix with some clay; native soils

PID meter reading: 0  
 TP-13 sample collected @ 6.0'  
 groundwater not encountered  
 test pit completed to 7.0'

**Log of Test Pit #14**

Completion Date 12/23/2009  
 Weather 20° ; sunny  
 Method Track-hoe

Depth	Symbol	Description
0 - 0.5'	SM	brown sandy mix; debris @ surface including empty/crushed drum (possible odor of cresote noted)
0.5' - 8.0'	SM	brown sandy mix with cobbles; tires, carpet, romex wire, hose, sewer pipe, brick, fire brick, concrete
8.0' - 9.0'	SM	yellowish brown sandy mix; native soils

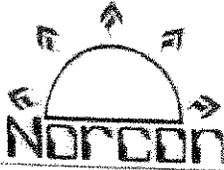
PID meter reading: 0  
 D-1 sample collected @ 0.5 -1.0 below drum  
 groundwater not encountered  
 test pit completed to 9.0'

**PK ENVIRONMENTAL  
TEST PIT LOGS**

<b>Log of Test Pit #15</b>			
Completion Date	12/23/2009		
Weather	20° ; sunny		
Method	Track-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 1.0'	SM	brown sandy mix; debris @ surface including concrete
	1.0' - 9.0'	SM	brown sandy mix; metal, brick, carpet, concrete
	8.0' - 9.0'	SM	yellowish brown sandy mix; native soils
PID meter reading: 0			
no sample collected			
groundwater not encountered			
test pit completed to 9.0'			

<b>Log of Test Pit #16</b>			
Completion Date	12/23/2009		
Weather	20° ; sunny		
Method	Track-hoe		
	<b>Depth</b>	<b>Symbol</b>	<b>Description</b>
	0 - 0.5'	SM	brown sandy mix; no debris
	0.5' - 8.0'	SM	brown sandy mix with cobbles; metal, pipe, brick, concrete
	8.0' - 9.0'	SM	yellowish brown sandy mix; native soils
PID meter reading: 0			
TP-16 sample @ 8.0'			
groundwater not encountered			
test pit completed to 9.0'			

**APPENDIX B**  
**Soil Boring Logs**



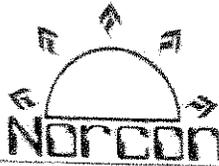
# BORING LOG

Drill Rig: Toro Date Drilled: August 20, 2009 Logged By: Joe Norton  
 Boring Dia: 2 Inches Boring Number: SB-1

Sample	Blow Count	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0			Clean soil, sandy mix of fine sand and loam
			0	5		Gravelly mix of fine to med sand, with clayey loam, brick and ash
			0			Gravelly mix, with wood, metal
			0			Sandy silty clay, gray with concrete
			0	10		poor recovery (1') Sandy mix of sand and silt, with concrete
			0			dark brown silty sand, trace gravel no debris
			0	15		brown fine sandy mix, trace gravel, no debris
						yellow medium sand, moist
				20		
				25		
				30		
				35		

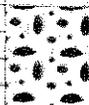
Completion Notes:  
 Boring was field screened with PID at 6" intervals.

Site:  
 Bayley Ellard Field  
 Block 201, Lot 1.02  
 Madison, NJ



## BORING LOG

Drill Rig: Toro	Date Drilled: August 20, 2009	Logged By:
Boring Dia: 2 Inches	Boring Number: SB-2	Joe Norton

Sample	Blow Count	Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
				0			Brown gravelly mix of fine sandy loam, medium sand and gravel
				0	5		Brown gravelly mix of fine sandy loam, medium sand and gravel
				0			Brown gravelly mix of sandy loam and gravel with brick and concrete
				0	10		Light brown gravelly mix of fine to medium sand with woody debris
				0			reddish brown fine to medium sand, no debris
				0	15		yellow medium sand, moist, no debris
					20		
					25		
					30		
					35		

**Completion Notes:**

Boring was field screened with PID at 6" intervals. Sample

**Site:**

Bayley Ellard Field  
Block 201, Lot 1.02  
Madison, NJ

Project No.:

Page 1



## BORING LOG

Drill Rig: Toro	Date Drilled: 9-28-09	Logged By:
Boring Dia: 2 Inches	Boring Number: SB-3	Joe Norton

Sample	Blow Count Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0			Light brown gravelly mix, cobbles
			0	5		Yellow brown sandy mix of silt fine sand and gravel
				10		Light brown sandy clay, with cobbles
				15		
				20		
				25		
				30		
				35		

**Completion Notes:**  
 Boring was field screened with PID at 6" intervals.  
 No fill observed in boring.

**Site:**  
 Bayley Ellard Field  
 Block 201, Lot 1.02  
 Madison, NJ



## BORING LOG

Drill Rig:	Toro	Date Drilled:	August 20, 2009
Boring Dia:	2 Inches	Boring Number:	SB-4
		Logged By:	Joe Norton

Sample	Blow Count Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0	0		Top soil
				5		Brown sandy mix of fine sandy loam, medium sand Dark gray sandy mix of fine sand, silt and clay
			0			Dark gray sandy mix of fine sand, silt and clay
				10	● ● ● ● ● ● ● ● ● ●	Light brown gravelly mix of silty sand and gravel Light brown sandy clay, trace gravel, no fill
				15		
				20		
				25		
				30		
				35		

**Completion Notes:**  
 Boring was field screened with PID at 6" intervals. No fill observed in boring.

**Site:**  
 Bayley Ellard Field  
 Block 201, Lot 1.02  
 Madison, NJ



## BORING LOG

Drill Rig: Toro	Date Drilled: August 20, 2009	Logged By: Joe Norton
Boring Dia: 2 Inches	Boring Number: SB-5	

Sample	Blow Count Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0			Top soil Brown sandy mix of fine sandy loam, medium sand Light brown sandy clay, trace gravel
			0	5		Light brown sandy clay, trace gravel Gray fine sand and silt
			0	10		Dark brown gravelly clay
				15		
				20		
				25		
				30		
				35		

**Completion Notes:**

Boring was field screened with PID at 6" intervals.  
No fill observed in boring.

**Site:**

Bayley Ellard Field  
Block 201, Lot 1.02  
Madison, NJ

Project No.:

Page 1



## BORING LOG

Drill Rig: Toro	Date Drilled: 9-28-09	Logged By:
Boring Dia: 2 Inches	Boring Number: SB-6	Joe Norton

Sample	Blow Count Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0	0		Light brown gravelly mix, cobbles
			0	5		Dark gray sandy mix of silt and fine sand, with organic mat Light brown sandy clay with cobbles
				10		
				15		
				20		
				25		
				30		
				35		

**Completion Notes:**  
 Boring was field screened with PID at 6" intervals.  
 No fill observed in boring. Refusal at 9'.

**Site:**  
 Bayley Ellard Field  
 Block 201, Lot 1.02  
 Madison, NJ

# PK ENVIRONMENTAL

## Subsurface Log

Project Name: Bailey Elyard  
 Location: NAOISG  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrliv, PE

Boring No.: SB-7  
 Date: 9/23  
 Method of Investigation: 2" Macro Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5			Full	TOP SOIL			N
		0.5-1.0							
		1.0-1.5							
2		1.5-2.0				SM, Reddish brown FINE SAND w/ COBBLES	0		N
2		2.0-2.5				"			
		2.5-3.0							
		3.0-3.5							
4		3.5-4.0				SM, DK BROWN / GRAY GRAVELLY SILT w/ BRICK + ASPHALT	0		N
4		4.0-4.5							
		4.5-5.0							
		5.0-5.5			50%				
6		5.5-6.0				SM, SILTY SAND w/ GRAVEL	0		N
6		6.0-6.5							
		6.5-7.0							
		7.0-7.5				SM, SILTY SAND TRC. GRVL.	0		N
8		7.5-8.0	X	SB-7		OL, DK BROWN / GRAY ORGANIC SILT	0		N
8		8.0-8.5							
		8.5-9.0			100%				
		9.0-9.5							
10		9.5-10.0				LT. OH-GRAY ORGANIC SILT + CLAY NO PLAST.	0		N
10		10.0-10.5							
		10.5-11.0							
		11.0-11.5				Reddish brown			
12	END	11.5-12.0				SL, SANDY CLAY	0		N
12		12.0-12.5							
		12.5-13.0							
		13.0-13.5							
14		13.5-14.0							
14		14.0-14.5							
		14.5-15.0							
		15.0-15.5							
16		15.5-16.0							
16		16.0-16.5							
		16.5-17.0							
		17.0-17.5							
18		17.5-18.0							
18		18.0-18.5							
		18.5-19.0							
		19.0-19.5							
20		19.5-20.0							

Sieve: SV-7 @ 10'

# PK ENVIRONMENTAL

## Subsurface Log

Project Name: Banley E Land  
 Location: MARSON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrlev, PE

Boring No.: S-8  
 Date: 9/24  
 Method of Investigation: 2" Macro Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5			36"	TOP SOIL 0-0.5			
		0.5-1.0							
		1.0-1.5							
2		1.5-2.0				6M - Brown FINE SAND w/ GRAVEL .5-2	O		
		2.0-2.5							
4		2.5-3.0			-	SM - Reddish Brown SAND w/ FINE SAND SAND - TR. ORG. 2.5-4.0 WOOD/BRICK	O		
		3.0-3.5							
		3.5-4.0							
6		4.0-4.5				SILTY SAND / ORG. DK GRAY SC. w/ WOOD	O		
		4.5-5.0							
		5.0-5.5							
8		5.5-6.0			36"	4-5'	O		
		6.0-6.5							
		6.5-7.0							
10		7.0-7.5				8-10' WOOD FILL			
		7.5-8.0	X SB-8						
		8.0-8.5							
12		8.5-9.0			9"	CONCRETE			
		9.0-9.5							
		9.5-10.0							
14		10.0-10.5			28"	10-12' DEBRIS SC - SILTY CLAY			
		10.5-11.0							
		11.0-11.5							
16		11.5-12.0			↓	TRUCK DIRT + GRAVEL			
		12.0-12.5							
		12.5-13.0							
18		13.0-13.5				LT. BROWN SC FINE SAND / CLAY		NO DEBRIS	
		13.5-14.0							
		14.0-14.5							
20		14.5-15.0			40"	SM - FINE MED SAND w/ GRAVEL		↓	
		15.0-15.5							
		15.5-16.0	END						
22		16.0-16.5							
		16.5-17.0							
		17.0-17.5							
24		17.5-18.0							
		18.0-18.5							
		18.5-19.0							
26		19.0-19.5							
		19.5-20.0							
		20.0-20.5							

**PK ENVIRONMENTAL**  
Subsurface Log

Project Name: Ballyellano  
 Location: MADISON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrliv, PE

NO SAMPLE  
SB-9

Boring No.: SB-9  
 Date: \_\_\_\_\_  
 Method of Investigation: 2" Macro Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-BTS 1.5-2.5 OM-Brown/Coarse ls	0		
		0.5-1.0							
		1.0-1.5							
2		1.5-2.0			30"	2.5-SM, DK BROWN SANDY MIX w/ GRAVEL			
		2.0-2.5							
4		2.5-3.0				2.5-4" CO SC, LT BROWN SANDY CLAY	0		
		3.0-3.5							
		3.5-4.0							
6		4.0-4.5				w GRAVEL + COBBLES	0		
		4.5-5.0							
		5.0-5.5							
8		5.5-6.0			24"	DK BROWN SC SILTY LOAM/CLAY 8-10	0		
		6.0-6.5							
		6.5-7.0							
10		7.0-7.5				LT BROWN SC. MOIST SANDY CLAY w/GRAVEL	0		
		7.5-8.0							
		8.0-8.5							
12		8.5-9.0				* NO TESTS * NO SAMPLE			
		9.0-9.5							
		9.5-10.0							
14		10.0-10.5			36"				
		10.5-11.0							
		11.0-11.5							
16		11.5-12.0	END						
		12.0-12.5							
		12.5-13.0							
18		13.0-13.5							
		13.5-14.0							
		14.0-14.5							
20		14.5-15.0							
		15.0-15.5							
		15.5-16.0							

# PK ENVIRONMENTAL

## Subsurface Log

Project Name: Bailey Island  
 Location: WADSWORTH  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrlev, PE

Boring No.: SB-10  
 Date: 9/24  
 Method of Investigation: 2" Macro Cores/Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-0.5 TS			
		0.5-1.0				0.5-2 GR BROWN			
		1.0-1.5				36" GRAVELLY MIX		0	
2		1.5-2.0				2-4 - GR			
		2.0-2.5				BROWN GRAVELLY MIX		0	TRACE ASPHALT @ 4'
		2.5-3.0				FINE SAND/GRAVEL			
4		3.0-3.5				LT. BROWN SL			
		3.5-4.0				4-7.0		0	NO DBS [NO]
		4.0-4.5				7.0-8.0 =			
6		4.5-5.0				DK GRAY			
		5.0-5.5				SL, SILT CLAY.		0	
		5.5-6.0				8-11 - LT. BROWN			
8		6.0-6.5				GR, FINE SAND			
		6.5-7.0				TRC. GRAVEL		0	
		7.0-7.5	X	SB-10		11-12		0	
10		7.5-8.0				DK BROWN GR			
		8.0-8.5							
		8.5-9.0							
12		9.0-9.5							
		9.5-10.0							
		10.0-10.5							
14		10.5-11.0							
		11.0-11.5							
		11.5-12.0							
16		12.0-12.5							
		12.5-13.0							
		13.0-13.5							
18		13.5-14.0							
		14.0-14.5							
		14.5-15.0							
20		15.0-15.5							
		15.5-16.0							
		16.0-16.5							

END



3/2/24



# PK ENVIRONMENTAL

## Subsurface Log

Project Name: Banley S/HARD  
 Location: MADISON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrlev, PE.

Boring No.: SB-12  
 Date: 9/24/09  
 Method of Investigation: 2" Macro-Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-0.5 T.S.			
		0.5-1.0				0.5-3.5			
		1.0-1.5							
2		1.5-2.0				Gravelly M.S.		0	
2		2.0-2.5				BROWN SAND & GRAVEL			
		2.5-3.0				W/ASPHALT			
		3.0-3.5							
4		3.5-4.0				3.5-4.0' CONCRETE		0	
4		4.0-4.5							
		4.5-5.0				POOR RECOVERY			
		5.0-5.5							
6		5.5-6.0				WOOD + MASONRY		0	
6		6.0-6.5			12"	DEBRIS			
		6.5-7.0							
		7.0-7.5							
8		7.5-8.0						0	
8		8.0-8.5				POOR RECOVERY			
		8.5-9.0							
		9.0-9.5							
10		9.5-10.0				WOOD + MASONRY		0	
10		10.0-10.5			12"	DEBRIS			
		10.5-11.0							
		11.0-11.5							
12		11.5-12.0				TO 11.5-12.0'		0	
12		12.0-12.5							
		12.5-13.0				12-14 DK GRAY			
		13.0-13.5				SL, MOIST		0	NO DEBRIS
14		13.5-14.0							
14		14.0-14.5							
		14.5-15.0				14-16' M. BROWN			
		15.0-15.5				SL - SANDY CLAY		0	
16		15.5-16.0				TRAC. GRAVEL			
16		16.0-16.5							
		16.5-17.0							
		17.0-17.5							
18		17.5-18.0							
18		18.0-18.5				* Stone @ 15.5-16.0'			
		18.5-19.0				SU-12			
		19.0-19.5							
20		19.5-20.0							

# PK ENVIRONMENTAL

## Subsurface Log

Project Name: Bayley Island  
 Location: MADISON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Keirlev, PE

Boring No.: SB-13  
 Date: 9/24/09  
 Method of Investigation: 2" Macro Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-0.5 TS			
		0.5-1.0							
		1.0-1.5							
2		1.5-2.0				0.5-2.0 SM		0	
2		2.0-2.5		40		Band Sandy Mix			
		2.5-3.0				2.0-4.0 BROWN			
		3.0-3.5				GRAY SANDY MIX SM		0	
4		3.5-4.0				W/ WOOD / ASPHALT			
4		4.0-4.5		X SB-13					
		4.5-5.0				4-6 = LT. BROWN			NO DEBRIS
		5.0-5.5				SANDY MIX		0	
6		5.5-6.0							
6		6.0-6.5		48		6-8 - ORANGE BROWN			
		6.5-7.0				SC w/ GRANULE		0	"
		7.0-7.5							
8		7.5-8.0							
8		8.0-8.5				8-10 - GRAY SC			
		8.5-9.0							
		9.0-9.5							
10		9.5-10.0						0	"
10		10.0-10.5		48					
		10.5-11.0				10-12 YELLOWS			
		11.0-11.5				SC w/ ORGANIC		0	"
12		11.5-12.0				MPT			
12		12.0-12.5							
		12.5-13.0							
		13.0-13.5							
14		13.5-14.0							
14		14.0-14.5							
		14.5-15.0							
		15.0-15.5							
16		15.5-16.0							
16		16.0-16.5							
		16.5-17.0							
		17.0-17.5							
18		17.5-18.0							
18		18.0-18.5							
		18.5-19.0							
		19.0-19.5							
20		19.5-20.0							

# PK ENVIRONMENTAL

## Subsurface Log

Project Name: Bailey Island  
 Location: MADISON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrlev, PE

Boring No.: SB-14  
 Date: 9/28  
 Method of Investigation: 2" Macro Cores/Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-0.5 - TS			
		0.5-1.0				0.5-2.0 - SM, ORANGE			
		1.0-1.5				2-4' - SM, LT. BROWN SANDY MIX OF FINE SAND + GRAVEL			
2		1.5-2.0				2-4' - SM, LT. BROWN SANDY MIX OF FINE SAND + GRAVEL			
	2	2.0-2.5			48'				
4		2.5-3.0							
		3.0-3.5							
	4	3.5-4.0							
4		4.0-4.5							
		4.5-5.0							
		5.0-5.5							
6		5.5-6.0							
		6.0-6.5	X	SB-14	18"	Point Recovery - SM, GRAY-BLACK SANDY MIX, W/ CONCRETE, WOOD + BRICK DEBRIS.			
		6.5-7.0							
8		7.0-7.5							
		7.5-8.0							
	8	8.0-8.5							
8		8.5-9.0							
		9.0-9.5							
		9.5-10.0							
10		10.0-10.5							
		10.5-11.0							
	10	11.0-11.5							END OF DEBRIS 10'
12		11.5-12.0							
		12.0-12.5							
		12.5-13.0							
12		13.0-13.5							
		13.5-14.0							
	12	14.0-14.5							
14		14.5-15.0	X						
		15.0-15.5							
	14	15.5-16.0							
16		16.0-16.5							
		16.5-17.0							
		17.0-17.5							
18		17.5-18.0							
		18.0-18.5							
	18	18.5-19.0							
18		19.0-19.5							
		19.5-20.0							
	20	20.0-20.5							



**PK ENVIRONMENTAL**  
Subsurface Log

Project Name: Bailey, ELARD  
 Location: MADISON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrley, PE

Boring No.: SB-16  
 Date: 9/28/07  
 Method of Investigation: 2" Macro Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-0.5' TS 0.5-4 yellow BROWN SM,		NO DEBRIS	
		0.5-1.0							
		1.0-1.5							
2		1.5-2.0			30"		0		
2		2.0-2.5							
		2.5-3.0							
		3.0-3.5							
4		3.5-4.0					0		
4		4.0-4.5				GRAY BLACK SM, SILT SAND, COBBLES WOOD, BRICK CERAMIC PEICES			
		4.5-5.0							
		5.0-5.5							
6		5.5-6.0			24"		0		
6		6.0-6.5							
		6.5-7.0							
		7.0-7.5							
8		7.5-8.0					0		
8	546	8.0-8.5	X	SB-16		Light GRAY SM SANDY MIX OF MED SAND, CONCRETE + BRICK			
		8.5-9.0							
		9.0-9.5							
10		9.5-10.0			24"		0		
10		10.0-10.5							
		10.5-11.0							
		11.0-11.5							
12		11.5-12.0					0	END OF DEBRIS	
12		12.0-12.5				SC, DARK BROWN FINE SAND, SANDY CLAY, w/ COBBLES			
		12.5-13.0							
		13.0-13.5							
14		13.5-14.0					0		
14		14.0-14.5							
		14.5-15.0							
		15.0-15.5							
16		15.5-16.0					0	END	
16		16.0-16.5							
		16.5-17.0							
		17.0-17.5							
18		17.5-18.0							
18		18.0-18.5							
		18.5-19.0							
		19.0-19.5							
20		19.5-20.0							

# PK ENVIRONMENTAL

## Subsurface Log

Project Name 3  
 Location: \_\_\_\_\_  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrlev, PE

Boring No.: SB-17  
 Date: 9/28/09  
 Method of Investigation: \_\_\_\_\_  
2" Macro Cores/Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations	
	No.	Depth (ft)	Blows per 6"	"N"	Recovery					
0		0-0.5				0-0.5' T.S.				
		0.5-1.0								
		1.0-1.5								
2	2	1.5-2.0			3/6"	0.5-3.0 DK. BRWN SM.	0			
		2.0-2.5								
4	4	2.5-3.0				3.0-4.0 - DK. BRWN SM. w/ BRICK	0		DEBRIS	
		3.0-3.5								
		3.5-4.0								
6	6	4.0-4.5				POOR RECOVERY - BRICK	0		DEBRIS	
		4.5-5.0								
		5.0-5.5								
8	8	5.5-6.0			6"	PEICES + SLAG	0		DEBRIS	
		6.0-6.5								
		6.5-7.0								
10	10	7.0-7.5				8.0-10' GRAY/BROWN GM, MED SAND	0		END OF DEPTH 10'	
		7.5-8.0								
		8.0-8.5								
12	12	8.5-9.0			24"	+ GRAVEL w/ BRICK	0			
		9.0-9.5								
		9.5-10.0								
14	14	10.0-10.5				10'-12' - ORANGE BRWN SC, FINE SAND SILT W/ CLAY WET	0			
		10.5-11.0								
		11.0-11.5								
16	16	11.5-12.0			36"	YELLOW - ORANGE SC, SILTY SAND w/ GRAY MOTTLING.	0			
		12.0-12.5								
		12.5-13.0								
18	18	13.0-13.5				SC, SILTY SAND w/ GRAY MOTTLING.	0			
		13.5-14.0								
		14.0-14.5								
20	20	14.5-15.0				SC, SILTY SAND w/ GRAY MOTTLING.	0			
		15.0-15.5								
		15.5-16.0								
18	18	16.0-16.5				SC, SILTY SAND w/ GRAY MOTTLING.	0			
		16.5-17.0								
		17.0-17.5								
18	18	17.5-18.0				SC, SILTY SAND w/ GRAY MOTTLING.	0			
		18.0-18.5								
		18.5-19.0								
20	20	19.0-19.5				SC, SILTY SAND w/ GRAY MOTTLING.	0			
		19.5-20.0								
		20.0-20.5								

# PK ENVIRONMENTAL

## Subsurface Log

Project Name: BANKY ELLIOTT  
 Location: MADISON  
 Drilling Company: Acorn Drilling  
 Drill Rig: Direct push probe rig  
 Site Project Manager: Joseph Norton/Sandra Kehrlev, PE

Boring No.: SB-18  
 Date: 9/28/05  
 Method of Investigation: 2" Macro Cores/ Continuous  
 Weather: \_\_\_\_\_

Depth (ft)	Sample					Sample/Core Description	Field Analytical Readings PID (ppm)	Core #	Groundwater and Other Observations
	No.	Depth (ft)	Blows per 6"	"N"	Recovery				
0		0-0.5				0-0.5 - TS, 0.5-1.0 - GA -		DEBRIS @ 1'	
		0.5-1.0							
		1.0-1.5							
2		1.5-2.0				2" DARK SANDY MIX OF SAND + GRAVEL	0		
		2.0-2.5							
		2.5-3.0							
4		3.0-3.5				1.0-4.0 - GA, w/DEBRIS	0		
		3.5-4.0							
		4.0-4.5							
6		4.5-5.0				1.0' ↓ DEBRIS	0		
		5.0-5.5							
		5.5-6.0							
8		6.0-6.5				BRICK, GLASS, TILE, SLAG WOOD	0		
		6.5-7.0							
		7.0-7.5							
10		7.5-8.0				w/GRAVELLY MIX OF MED SAND + GRAVEL BLACK/GA.	0		
		8.0-8.5							
		8.5-9.0							
12		9.0-9.5				12" CORR	0		
		9.5-10.0							
		10.0-10.5							
14		10.5-11.0				14' ↓	0		
		11.0-11.5							
		11.5-12.0							
16		12.0-12.5				GRAY GR. GRAVELLY MIX OF SIZY SAND GRAVEL	0		
		12.5-13.0							
		13.0-13.5							
18		13.5-14.0				END OF DEBRIS			
		14.0-14.5							
		14.5-15.0							
20		15.0-15.5							
		15.5-16.0							
		16.0-16.5							
18		16.5-17.0							
		17.0-17.5							
		17.5-18.0							
18		18.0-18.5							
		18.5-19.0							
		19.0-19.5							
20		19.5-20.0							



# BORING LOG

Drill Rig:

Date Drilled: 9/28/09

Logged By:

Boring Dia: 2"

Boring Number: SB-19

JN

Sample	Blow Counts	Completion	PID (ppm)	Depth	Lithology	Description
			0	0		0 - 1' INFIELD CLAY
				5		1 - 3' DK BROWN GM, FINE SAND, SILT GRAVEL
				10		3 - 4' BROWN SM, FINE/MED SAND w/ WOODY DEBRIS
				15		4 - 8' - DK GRAY GM, MED SAND, ORGANIC MAT, WOOD, CONCRETE
				20		5 - 12' POOR RECOVERY - WOOD / CONCRETE <u>END OF DEBRIS</u>
				25		12 - 13' - BLACK SILTY SAND/PEAT
				30		13 - 16' LT. BROWN SC
				35		16 - 20' - LT. BROWN SC FINE SILTY SAND MOIST Yellow
						18 - 20' LT. BROWN GM FINE/MED SAND SATURATED @ 19.5'

Refuse

Completion Notes:

Sample SB-19 @

7.5 - 8.0'

Sample SB-19 B @

14 - 14.5' + Seime

Site:

Barkey ELLARD

Project No.:

Page



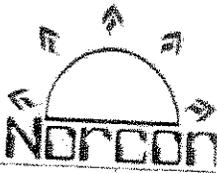
## BORING LOG

Drill Rig:	Toro	Date Drilled:	9-28-09	Logged By:	
Boring Dia:	2 Inches	Boring Number:	SB-20	Joe Norton	

Sample	Blow Count Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0			Top soil Light brown gravelly mix of fine to med sand, w/gravel and debris
			0	5		Dark gray sandy mix of fine sand, silt and clay w/gravel/wood/brick/concrete
			0	10		Light brown sandy clay, trace gravel, no fill or debris
				15		
				20		
				25		
				30		
				35		

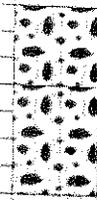
**Completion Notes:**  
 Boring was field screened with PID at 6" intervals.  
 No fill observed in boring after 8.0' Soil sample at 4.0'  
 - 4.5'

**Site:**  
 Bayley Ellard Field  
 Block 201, Lot 1.02  
 Madison, NJ



## BORING LOG

Drill Rig: Toro	Date Drilled: 9-28-09	Logged By:
Boring Dia: 2 Inches	Boring Number: SB-21	Joe Norton

Sample	Blow Count Total Recovery	Completion	PID (ppm)	Depth Feet	Lithology	Description
			0	0		Top soil Light brown gravelly mix of fine to med sand, w/gravel, no debris
			0	5		Yellow brown sandy mix of fine sand and silt, with gravel
			0	10		Light brown sandy clay, trace gravel, no fill or debris
				15		
				20		
				25		
				30		
				35		

<p><b>Completion Notes:</b> Boring was field screened with PID at 6" intervals. No fill observed in boring.</p>	<p><b>Site:</b> Bayley Ellard Field Block 201, Lot 1.02 Madison, NJ</p>
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**APPENDIX C**

**Laboratory Results  
(CD)**

**APPENDIX D**

**BEE – Supporting Tables**

Section 6.0, BEE Table 1

1	A	E	F	I	N	O	R	W	X	AC	AD	AO	AP	AU	AV	BA	BB	BF	BG	BH	BK	BL
2		Table 2. Soil Concentrations and Ecological Hazard Quotients at the 5-foot level at the Bayley Elard site																				
3		0.394	0.591	ND	ND	0.282	0.103	ND	ND	0.591	0.192	0.1										
4		0.119	0.145	ND	ND	0.070	ND	ND	ND	0.145	0.113	0.1										
5		ND	0.047	ND	ND	ND	ND	ND	ND	0.047	0.047	0.1										
6		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.047										
7		0.951	0.908	ND	ND	0.576	0.190	ND	ND	0.951	0.351	0.1										
8		ND	ND	ND	ND	0.576	0.190	ND	ND	0.951	0.351	0.1										
9		0.894	0.926	0.045	J	0.556	0.206	ND	ND	0.984	0.475	0.1										
10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1										
11		0.526	0.518	ND	ND	0.319	0.117	ND	ND	0.526	0.307	0.1										
12		0.563	0.506	ND	ND	0.348	0.120	ND	ND	0.563	0.32	0.1										
13		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1										
14		0.366	0.408	ND	ND	0.296	0.106	ND	ND	0.402	0.248	0.1										
15		0.548	0.451	ND	ND	0.343	0.121	ND	ND	0.548	0.365	0.1										
16		0.467	0.466	ND	ND	0.285	0.108	ND	ND	0.466	0.306	0.1										
17		0.365	0.357	ND	ND	0.102	ND	ND	ND	0.315	0.125	0.1										
18		0.103	0.199	ND	ND	0.102	ND	ND	ND	0.169	0.125	0.1										
19		0.382	0.414	ND	ND	0.256	0.085	ND	ND	0.414	0.284	0.1										
20		5.60	5.97	J	J	3.58	J	1.24	ND	5.60	1.19											
21		0.341	0.364	ND	ND	ND	ND	ND	ND	0.341	0.284											
22		6.14	6.35	J	J	3.58	J	1.24	ND	6.14	1.19											
23		0.087	0.015	ND	ND	0.047	ND	ND	ND	0.087	0.049	0.332										
24		115	133	51.9	127	127	45.8	ND	ND	115	0.049	0.332										
25		0.00759	ND	ND	0.00580	0.00580	ND	ND	ND	0.00759	0.0048	0.596										
26		0.016	0.00333	ND	0.012	0.012	0.000624	ND	ND	0.016	0.0048	0.596										
27		0.132	ND	ND	0.026	0.026	ND	ND	ND	0.132	0.079	0.224										
28		8.30	4.05	10.3	16.9	16.9	6.46	5.71	8.62	16.9	8.6	0.25										
29		ND	0.700	0.623	ND	ND	0.714	0.651	ND	ND	0.67	0.21										
30		0.476	ND	ND	ND	ND	ND	ND	ND	0.476	0.48	0.00222										
31		17.6	15.6	15.9	16.5	16.5	18.0	15.9	17.2	16.5	16.7	0.0075										
32		28.1	21.1	19.7	29.7	29.7	66.2	13.6	18.3	28.1	18	0.0075										
33		139	42.1	10.7	184	184	21.3	15.1	46.5	139	28	0.0075										
34		0.222	0.084	0.024	0.215	0.215	0.088	0.091	0.74	0.222	0.01	0.01										
35		14.9	15.2	15.8	13.9	13.9	16.2	10.9	13.4	14.9	14.3	0.00051										
36		178	85.7	47.4	196	196	59.5	50.7	68.3	178	85	0.00051										
37		0.00759	ND	ND	0.00580	0.00580	ND	ND	ND	0.00759	0.0048	0.596										
38		0.016	0.00333	ND	0.012	0.012	0.000624	ND	ND	0.016	0.0048	0.596										
39		0.132	ND	ND	0.026	0.026	ND	ND	ND	0.132	0.079	0.224										
40		8.30	4.05	10.3	16.9	16.9	6.46	5.71	8.62	16.9	8.6	0.25										
41		ND	0.700	0.623	ND	ND	0.714	0.651	ND	ND	0.67	0.21										
42		0.476	ND	ND	ND	ND	ND	ND	ND	0.476	0.48	0.00222										
43		17.6	15.6	15.9	16.5	16.5	18.0	15.9	17.2	16.5	16.7	0.0075										
44		28.1	21.1	19.7	29.7	29.7	66.2	13.6	18.3	28.1	18	0.0075										
45		139	42.1	10.7	184	184	21.3	15.1	46.5	139	28	0.0075										
46		0.222	0.084	0.024	0.215	0.215	0.088	0.091	0.74	0.222	0.01	0.01										
47		14.9	15.2	15.8	13.9	13.9	16.2	10.9	13.4	14.9	14.3	0.00051										
48		178	85.7	47.4	196	196	59.5	50.7	68.3	178	85	0.00051										
49																						
50																						
51																						
52																						

50. All concentrations are based on the dry weight of the soil.  
 51. The detection limit for all analytes is 0.1 mg/kg for the MPA.  
 52. All concentrations are based on the dry weight of the soil.



TEG Baseline Ecological Evaluation Geographical Information Query Sheet

	NJ State Plane:	Coordinates	
Site Name: <u>Bayley Ellard Site-</u> <u>Madison, NJ</u>	X= 510971.94	Y=705938.72	
	Within .25 mi	Within 500 ft.	Notes
Data Layers	Y/N	Y/N	
<u>Air Monitoring Stations</u>	N	N	
<u>Ambient Biomonitoring Network (AMNET)</u>	N	N	
<u>CAFRA</u>	N	N	
<u>Category One Waters</u>	N	N	
<u>Chromate Sites</u>	N	N	
<u>Fish Index Of Biotic Integrity</u>	N	N	
<u>Groundwater Contamination Areas (CEA)</u>	N	N	
<u>Groundwater Contamination Areas (CKE)</u>	N	N	
<u>Impervious Surface % (2002)</u>	<20%	<20%	
<u>Known Contaminated Sites List</u>	N	N	
<u>Land Use 1995</u>	NA	NA	Suburban
<u>Land Use 2002</u>	NA	NA	Suburban
<u>Land Use Change 1995-2002</u>	N	N	
<u>Landscape Project (Species Based Patches)</u>	N	N	
<u>Landscape Project (Bald Eagle Foraging)</u>	N	N	
<u>Landscape Project (Beach)</u>	N	N	
<u>Landscape Project (Emergent Wetlands)</u>	N	N	
<u>Landscape Project (Forest)</u>	N	N	
<u>Landscape Project (Forested Wetland)</u>	N	N	
<u>Landscape Project (Grassland)</u>	N	N	
<u>Landscape Project (Urban Peregrine)</u>	N	N	
<u>Landscape Project (Wood Turtle)</u>	N	N	
<u>Critical Environmental &amp; Historic Sites</u>	N	N	
<u>Natural Heritage Priority Sites</u>	N	N	
<u>NJEMS Sites</u>	Y	Y	
<u>Open Space (State)</u>	N	N	
<u>Pinelands Boundary</u>	N	N	
<u>Pinelands Management Area</u>	N	N	
<u>Public Community Water Supply Wells</u>	N	N	
<u>Sewer Service Areas</u>	Y	Y	
<u>Shellfish Classification</u>	N	N	
<u>Soils (SSURGO)</u>	NA	NA	
<u>State Plan Centers</u>	N	N	
<u>State Planning Areas</u>	N	N	
<u>Streams</u>	N	N	
<u>Sub-Watersheds (HUC14)</u>	NA	NA	
<u>Surface Water Quality Standards</u>	NA	NA	

<u>Urban Enterprise Zones</u>	N	N		
<u>Water Bodies</u>	N	N		
<u>Watershed Management Areas</u>	Y	Y		
<u>Watersheds by Name (HUC11)</u>	WMA 06	WMA 06		
<u>Well Head Protection Areas (Community)</u>	Y	Y		
<u>Well Head Protection Areas (Non-Community)</u>	Y	Y		
<u>Well Program Grid</u>	NA	NA		
<u>Wetlands (2002)</u>	N	N		

TEG Baseline Ecological Evaluation Geographical Information Query Sheet

	NJ State Plane:	Coordinates	
Site Name: Bayley Ellard Site- Madison, NJ	X= 510971.94	Y=705938.72	
	Within .25 mi	Within 500 ft.	Notes
Data Layers	Y/N	Y/N	
Air Monitoring Stations	N	N	
Ambient Biomonitoring Network (AMNET)	N	N	
CAFRA	N	N	
Category One Waters	N	N	
Chromate Sites	N	N	
Fish Index Of Biotic Integrity	N	N	
Groundwater Contamination Areas (CEA)	N	N	
Groundwater Contamination Areas (CKE)	N	N	
Impervious Surface % (2002)	<20%	<20%	
Known Contaminated Sites List	N	N	
Land Use 1995	NA	NA	Suburban
Land Use 2002	NA	NA	Suburban
Land Use Change 1995-2002	N	N	
Landscape Project (Species Based Patches)	N	N	
Landscape Project (Bald Eagle Foraging)	N	N	
Landscape Project (Beach)	N	N	
Landscape Project (Emergent Wetlands)	N	N	
Landscape Project (Forest)	N	N	
Landscape Project (Forested Wetland)	N	N	
Landscape Project (Grassland)	N	N	
Landscape Project (Urban Peregrine)	N	N	
Landscape Project (Wood Turtle)	N	N	
Critical Environmental & Historic Sites	N	N	
Natural Heritage Priority Sites	N	N	
NJEMS Sites	Y	Y	
Open Space (State)	N	N	
Pinelands Boundary	N	N	
Pinelands Management Area	N	N	
Public Community Water Supply Wells	N	N	
Sewer Service Areas	Y	Y	
Shellfish Classification	N	N	
Soils (SSURGO)	NA	NA	
State Plan Centers	N	N	
State Planning Areas	N	N	
Streams	N	N	
Sub-Watersheds (HUC14)	NA	NA	
Surface Water Quality Standards	NA	NA	

<i>Urban Enterprise Zones</i>	<i>N</i>	<i>N</i>		
<i>Water Bodies</i>	<i>N</i>	<i>N</i>		
<i>Watershed Management Areas</i>	<i>Y</i>	<i>Y</i>		
<i>Watersheds by Name (HUC11)</i>	<i>WMA 06</i>	<i>WMA 06</i>		
<i>Well Head Protection Areas (Community)</i>	<i>Y</i>	<i>Y</i>		
<i>Well Head Protection Areas (Non-Community)</i>	<i>Y</i>	<i>Y</i>		
<i>Well Program Grid</i>	<i>NA</i>	<i>NA</i>		
<i>Wetlands (2002)</i>	<i>N</i>	<i>N</i>		

PK ENVIRONMENTAL  
*Planning & Engineering*

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APPENDIX E

Draft Public Notice

**PK ENVIRONMENTAL**  
*Planning & Engineering*  
PO Box 1066, 205 Main Street  
Chatham, New Jersey 07928

*Sandra E. Kehrley, PE*  
*John P. Peel, PP*

*tel (973) 635-4011*  
*fax (973) 635-4023*

**DRAFT**  
**NOTICE**

**TO:** Madison Borough Clerk, Madison Health Officer, Morris County Health Department and All Property Owners  
Within 200 Feet of Block 201 Lot 1.02 (Madison Avenue and Danforth Road) Madison Township, Morris  
County, NJ

**FROM:** PK ENVIRONMENTAL

**DATE:** February x, 2010

**RE:** Remedial Activities – Proposed Cap over Historic Fill  
Bayley Ellard Field  
Block 201 Lot 1.02  
Madison Borough, Morris County, NJ

This notice is to provide you with legal notification that **PK ENVIRONMENTAL**, on behalf of the Borough of Madison, will soon begin work to remediate and cap 4.5 acre portion of Block 201 Lot 1.02, adjoining Danforth Road, Madison Borough, Morris County, NJ.

The work will be done under rules established by the New Jersey Department of Environmental Protection (DEP), which has assigned it **Incident #: 10-01-08-0946-32**. We are required by regulation to notify all neighboring properties within 200 feet of the remedial site.

The proposed remediation area consists of an existing active recreation fields. In planning for the proposed public recreation use of the study area, and as requested by the property owner, soil sampling was conducted for historic fill, which confirmed the presence of soil contamination with elevated levels of several semi volatile base neutrals, lead, chlordane, and PCBs at elevated levels that exceed the residential direct contact soil remediation standards (RDCSRS). The sampling was conducted in accordance with the NJDEP Technical Requirements for Site Remediation (N.J.A.C. 7:26E). Remediation activities will include capping a portion of the historic fill with clean soils and asphalt as well as security fencing a portion of the historic fill area to prevent public access.

A copy of any and all of our reports regarding the work will also be made available to Madison Borough officials, upon request. The reports are also available as part of the administrative record which is on file at the offices of the NJDEP. The file may be reviewed under the NJ Open Public Records Act (OPRA). Information regarding OPRA procedures is available at <http://www.state.nj.us/dep/opra/info.html>. Should you have any questions regarding the work, you can contact me directly at (973) 635-4011 and I will be happy to answer any questions you may have. In addition, you may contact the DEP Office of Community Relations, 401 East State Street, 5<sup>th</sup> floor Trenton NJ 08625 or at 609-984-3081.

We hope the work we are doing will progress smoothly and, in the end, restore the property as a valuable asset to the neighborhood. In the meantime, we appreciate your concerns and your patience and pledge to conduct our work efficiently and as responsible members of the community.

Sincerely,  
**PK ENVIRONMENTAL**

*Sandra Kehrley*

Sandra Kehrley, PE

cc: NJDEP Office of Community Relations  
NJDEP

**CERTIFIED MAIL**

**U.S. Census Bureau**  
**American FactFinder**



**TM-P028. Percent of Persons 5 Years and Over Who Speak a Language Other Than English at Home: 2000**  
 Universe: Population 5 years and over  
 Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data  
 United States by 3-Digit ZIP Code Tabulation Area

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see <http://factfinder.census.gov/home/en/datanotes/expsf3.htm>.

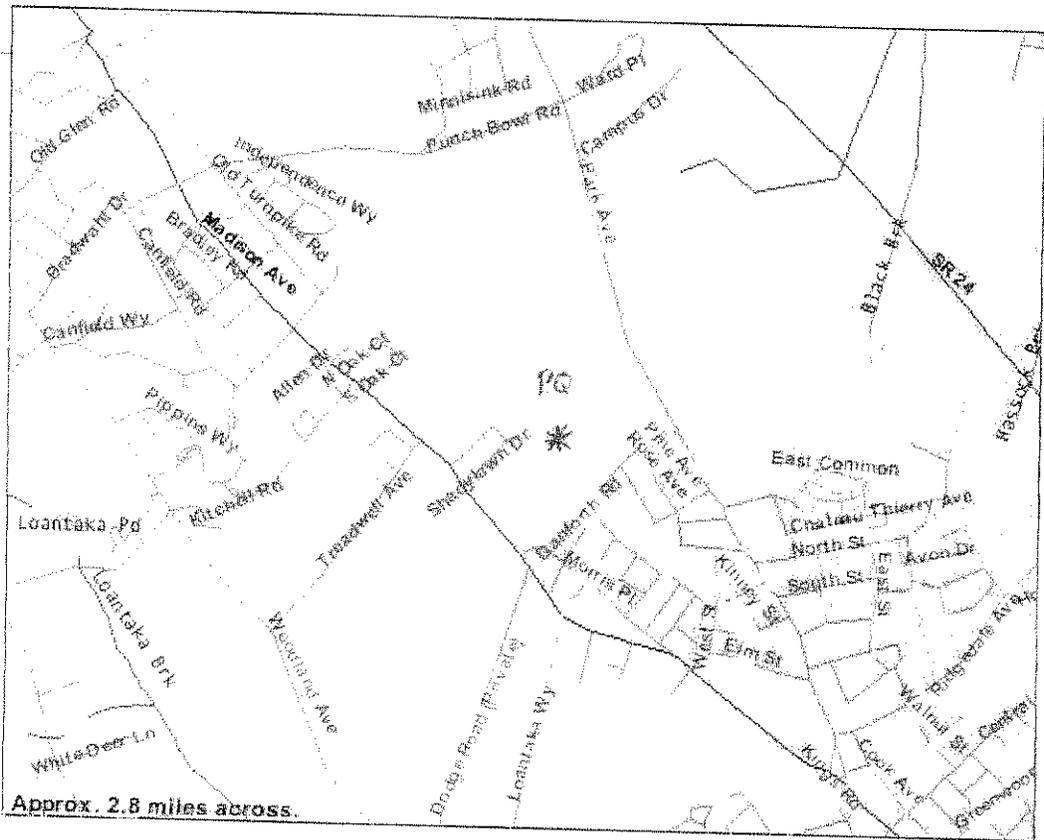
**Legend**

**Data Classes**

Percent	
	0.0 - 8.8
	9.9 - 19.3
	19.6 - 33.2
	34.0 - 54.6
	56.3 - 87.5

**Features**

- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P19.

**PK ENVIRONMENTAL**  
*Planning & Engineering*  
PO Box 1066, 205 Main Street  
Chatham, New Jersey 07928

*Sandra E. Kehrley, PE*  
*John P. Peel, PP*

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**Sensitive Population & Resource Checklist**  
**For**  
**Bayley Ellard Field – Incident #: 10-01-08-0946-32**

Persons Responsible for Conducting the Remediation:

**Sandra E. Kehrley, PE**  
**Joseph Norton, LSRP**  
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Site/Project Name:

**Remedial Activities – Proposed Cap over Historic Fill**  
**Bayley Ellard Field**  
**Block 201 Lot 1.02 (to be Know As)**  
**Madison Borough, Morris County, NJ**

NJDEP Project Interest Number: **Incident #: 10-01-08-0946-32**

The following sensitive populations and resources are located within 200 feet of the property boundary. Supporting information is attached.

- **Residences:** see attached certified list of residential property owners within 200 feet
- **Recreation fields:**
  - on-site owned by Borough of Madison
  - off-site owned by the Roman Catholic Diocese of Paterson
  - off-site owned by Fairleigh Dickenson University