

INTERIM VAP PHASE II PROPERTY ASSESSMENT

**NORTHERN TIER WHITTIER PENINSULA
COLUMBUS, OHIO**

PREPARED FOR:

**COLUMBUS & FRANKLIN COUNTY
METROPOLITAN PARK DISTRICT
WESTERVILLE, OHIO**

PREPARED BY:

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TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 General	1
1.2 Purpose and Objectives of the Phase II Property Assessment	1
1.3 Phase I and II Property Assessment Personnel	1
1.4 Methodologies Used and Limiting Conditions	2
1.5 Limitations and Exceptions of Assessment	3
2.0 BACKGROUND	4
2.1 Property Location and Legal Description	4
2.2 Property History	4
2.2.1 History of Buildings on the Property	4
2.2.2 Summary of Historical Land Use	6
2.3 Current Land Use	6
2.4 Future Intended Land Use	6
3.0 PREVIOUS INVESTIGATIONS AND PHASE I SUMMARY	7
3.1 Previous Site Assessments	7
3.1.1 1998 – Dodson-Stilson Limited VAP Phase I Property Assessment	7
3.1.2 2002 – DLZ Preliminary Phase II Environmental Site Investigation	7
3.1.3 1999 – Sharp and Associates, Inc. – Certification of Closure (Area 1 and 2) 347 Maier Place	8
3.2 Summary of Current VAP Phase I Property Assessment	9
3.3 Update to the VAP Phase I Property Assessment	9
4.0 ELIGIBILITY AND IDENTIFIED AREAS	10
4.1 Eligibility for the Voluntary Action Program	10
4.2 Identified Areas (IAs)	11
5.0 SITE CONCEPTUAL MODEL	13
5.1 Chemicals of Concerns (COCs)	13
5.2 Future Land Use	14
5.3 Point of Compliance	14
5.4 Preliminary Exposure Pathway Completeness Determination	15
5.4.1 Receptor Identification	15
5.4.2 Pathway Identification	15
5.4.2.1 Soil	16

TABLE OF CONTENTS (Continued)

	Page
5.4.2.2 Groundwater	16
6.0 PHASE II PROPERTY ASSESSMENT FIELD ACTIVITIES AND METHODS	18
6.1 General Scope of Work	18
6.2 Soil Sampling	18
6.2.1 Geoprobe® Soil Sampling	18
6.2.2 Hand-Auger Sampling	20
6.2.3 Monitoring Well Drilling and Installation	20
6.3 Monitoring Well Development	22
6.4 Monitoring Well Groundwater Sampling	23
6.4.1 Equipment Calibration	23
6.4.2 Wellhead Inspection	23
6.4.3 Elevations	23
6.4.4 Well Water Evacuation	24
6.4.5 Sample Withdrawal and Handling	24
6.5 Sample Identification and Transport	25
6.6 QA/QC Evaluation	26
6.7 Monitoring Well Abandonment	26
7.0 GEOLOGY AND HYDROGEOLOGY	28
7.1 Physical Setting	28
7.1.1 Physiography Setting	28
7.1.2 Topography and Surface Drainage	28
7.2 Geology	28
7.2.1 Regional Geology	28
7.2.1.1 Glacial Geology	28
7.2.1.2 Bedrock Geology	29
7.2.2 Property-Specific Geology	31
7.3 Hydrogeology	32
7.3.1 Regional Hydrogeology	32
7.3.2 Property-Specific Hydrogeology	34
7.3.2.1 Occurrence of Groundwater	34
7.3.2.2 Groundwater Flow Direction	34

TABLE OF CONTENTS (Continued)

	Page
7.3.2.3 Groundwater Recharge and Discharge	35
7.3.2.4 Groundwater Classification	36
8.0 RESULTS AND EVALUATION	37
8.1 Applicable Standards	37
8.1.1 Future Land Uses	37
8.1.2 Soil	37
8.1.2.1 Soil Multiple-Chemical Standard Calculation	39
8.1.2.2 MCS and Petroleum Releases	40
8.1.3 Groundwater	40
8.2 Recreational Standard Calculation	40
8.2.1 Background Concentration Determination	43
8.3 Soil Analytical Results by Identified Area and Land Use	43
8.3.1 IA-2	44
8.3.1.1 IA-2 Multiple-Chemical Standard Evaluation	44
8.3.2 IA-3	45
8.3.2.1 IA-3 Multiple-Chemical Standard Evaluation	45
8.3.3 IA-4	45
8.3.3.1 IA-4 Multiple-Chemical Standard Evaluation	46
8.3.4 IA-5	47
8.3.4.1 IA-5 Multiple-Chemical Standard Evaluation	47
8.3.5 IA-6	47
8.3.5.1 IA-6 Multiple-Chemical Standard Evaluation	48
8.3.6 IA-7	48
8.3.6.1 IA-7 Multiple-Chemical Standard Evaluation	49
8.3.7 IA-8	49
8.3.7.1 IA-8 Multiple-Chemical Standard Evaluation	50
8.3.8 IA-9	50
8.3.8.1 IA-9 Multiple-Chemical Standard Evaluation	51
8.3.9 IA-10	51
8.3.9.1 IA-10 Multiple-Chemical Standard Evaluation	51
8.3.10 IA-11	52
8.3.10.1 IA-11 Multiple-Chemical Standard Evaluation	52

TABLE OF CONTENTS (Continued)

	Page
8.3.11 IA-12	53
8.3.11.1 IA-12 Multiple-Chemical Standard Evaluation	53
8.3.12 IA-13	54
8.3.12.1 IA-13 Multiple-Chemical Standard Evaluation	54
8.3.13 IA-14	54
8.3.13.1 IA-14 Multiple-Chemical Standard Evaluation	55
8.3.14 IA-15	55
8.3.14.1 IA-15 Multiple-Chemical Standard Evaluation	56
8.3.15 IA-16	56
8.3.15.1 IA-16 Multiple-Chemical Standard Evaluation	56
8.3.16 Multiple-Chemical Determination Summary	56
8.4 Groundwater Analytical Results	56
8.4.1 Groundwater Multiple-Chemical Standard Evaluation	57
8.5 QA/QC Evaluation	57
8.6 Exposure Pathway Analysis	58
8.6.1 Soils	59
8.6.2 Groundwater	60
8.7 Soil/Water Partition Equation	61
8.8 Protection of Groundwater Meeting Unrestricted Potable Use Standards	64
8.8.1 Shallow Saturated Zone	64
8.8.2 Silurian-Devonian Aquifer	64
8.9 Preliminary Human Health Based Risk Screening	65
8.9.1 IA-2	68
8.9.2 IA-3	68
8.9.3 IA-4	68
8.9.4 IA-5	69
8.9.5 IA-6	69
8.9.6 IA-7	69
8.9.7 IA-8	69
8.9.8 IA-9 and IA-10	70
8.9.9 IA-11 and IA-12	70

TABLE OF CONTENTS (Continued)

	Page
8.9.10 IA-13	71
8.9.11 IA-14	71
8.9.12 IA-15	71
8.9.13 IA-16	71
8.9.14 Groundwater	72
9.0 PRELIMINARY ECOLOGICAL RISK EVALUATION	73
9.1 Preliminary Ecological Evaluation	73
9.1.1 Water Quality	74
9.1.2 Sediment Quality	74
9.1.3 Fauna Species	75
9.1.4 Flora Species	76
10.0 COMPLIANCE WITH VAP APPLICABLE STANDARDS	77
10.1 Overview	77
10.2 Residential Land Use	78
10.2.1 Soils – Direct Contact	78
10.2.2 Inhalation of Vapors (Indoors and Outdoors) and Fugitive Dusts	79
10.3 Groundwater	79
10.4.1 Dermal Contact and Ingestion	79
10.4.2 Inhalation of Vapors (Indoors and Outdoors)	82
10.5 Calculated Leach-Derived Groundwater Concentrations	82
10.5.1 Dermal Contact and Ingestion	82
11.0 RECOMMENDATIONS	83
12.0 REFERENCES	84

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

Figure	Description
1	Property Location Map
2	Property Map
3	Identified Areas
4	Monitoring Well and Soil Boring Locations
5	Off-Site Background Sampling Locations
6	Cross-Section Location
7	Cross Section A-A'
8	Cross Section B-B'
9	Cross Section C-C'
10	Groundwater Flow Map – August 26, 2004
11	Groundwater Flow Map – May 22, 2005
12	Soil Direct Contact Exceedances Within 2 Ft. Point of Compliance
13	Soil Exceedances Below the 2 Ft. Point of Compliance
14	Groundwater Exceedances
15	Soil Exceedances and Areas of Potential Inhalation Risk

LIST OF TABLES

Table	Description
1	Identified Areas and Chemicals of Concern
2	Summary of Analytical Methods
3	Exposure Pathways Prior to Applicable Standards Determination
4	Monitoring Well Survey Data
5	Groundwater Elevations
6	QA/QC Data
7	General Stratigraphic Sequence of the Consolidated Rocks in Franklin County

8	Identified Area
9A-O	Soil Analytical Results

TABLE OF CONTENTS (Continued)

LIST OF TABLES (Continued)

10	Off-Site Arsenic Sampling Results – May 9, 2005
11	Groundwater Analytical Results
12	Applicable Standards Determination and Complete Pathway Determination
13A	Comparison with Ohio EPA Leach-Based Soil Values
13B	Calculated Leach-Derived Groundwater Concentrations Compared with UPUS
14	BUSTR Tier 1 Inhalation Action Levels
15	Toxicity and Volatility Checklist – Per Identified Area

LIST OF APPENDICES

Appendix	Description
A	Phase II Personnel Resumes
B	Property Legal Description
C	PCB Release Summary Letter Report
D	Soil Boring and Monitoring Well Logs
E	Field Sheets: Well Development Forms and Field Sampling Sheets
F	Geotechnical Analyses
G	USGS Professional Paper 1423-C Figure 30
H	Laboratory Analytical Reports and Chain of Custody Documentation
I	Multiple Chemical Standards Determination Calculations
J	Recreational Direct Contact Standards Calculations

1.0 INTRODUCTION

1.1 General

Burgess & Niple, Inc. (B&N) was retained by the Columbus & Franklin County Metropolitan Park District (Metro Parks) to conduct a Phase II Property Assessment (Phase II) following the Ohio Environmental Protection Agency (EPA) Voluntary Action Program (VAP) protocol for a series of properties located on the Northern Tier of the Whittier Peninsula (Northern Tier), southwest of central property, (2) Cunard-Lang Concrete property, and (3) Sarah and Pauline Maier Scholarship Foundation Columbus, Ohio. The Property evaluated in this Phase II is defined as follows: (1) Koch Asphalt property. The Property location map is presented on Figure 1 and a Property map is presented on Figure 2.

The Phase II activities were conducted according to the contract between Metro Parks and B&N, which was signed on June 24, 2004, under Metro Park's Purchase Order No. 4P00461.

1.2 Purpose and Objectives of the Phase II Property Assessment

The purpose of this project was to conduct a Phase II to assess the potential environmental impacts of the Identified Areas (IAs) reported in the Phase I Property Assessment (Phase I). The Phase I was conducted by B&N under the direction of Mr. Larry S. Smith, Professional Engineer (PE) and VAP CP No. 133, and was completed in September 2004. The Phase I concluded that “. . . *there was reason to believe that a release of hazardous substances or petroleum has or may have occurred on, underlying, or emanating from the property.*”

B&N performed the Phase II consistent with the requirements of the Ohio EPA VAP protocol outlined under the Ohio Administrative Code (OAC) 3745-300-07, and in accordance with the format and procedures outlined by the American Society for Testing and Materials (ASTM) in its Practice E1903-97.

1.3 Phase I and II Property Assessment Project Personnel

Mr. Thomas J. Mignery, CPG, Hydrogeologist and Ohio EPA VAP CP No. 125, served as overall Project Director and was responsible for approval of work plans and the final Phase I and Phase II reports. Mr. Larry S. Smith, PE and VAP CP No. 133, served as Project Manager for both the Phase I and Phase II Property Assessments.

Mr. James S. Ridgeway, PE, served as the Project Engineer for the Phase I Property Assessment, and was responsible for the site inspections and evaluation of the data. Additional project personnel included Mr. Joseph R. Christopher. Mr. Christopher and Mr. Smith were the primary authors of the Phase I Property Assessment report.

Mr. Christopher R. Everett served as the Project Hydrogeologist for the Phase II Property Assessment and was responsible for work plan preparation and data evaluation. Additional personnel included Ms. Julie Carpenter and Mr. David Walker. Mr. Everett, Ms. Carpenter, and Mr. Smith were the primary authors of the Phase II report.

Resumes for each of the B&N personnel listed above are included in Appendix A.

1.4 **Methodologies Used and Limiting Conditions**

The following summarizes the activities, methodologies, and protocols performed or followed throughout the Phase II.

A subsurface investigation was conducted from June 2004 to May 2005, which included advancing 81 Geoprobe® borings throughout accessible areas of the Property. Geoprobe® drilling services were provided by Envirocore, Limited (Envirocore). Soil samples were collected during the subsurface investigation. Selected soil samples were submitted for analysis to American Analytical Laboratories, Inc. (AAL) or TestAmerica Laboratories, Inc. (TestAmerica); both are VAP-certified laboratories. The subsurface investigation was performed in accordance with protocols outlined in *Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring* (Ohio EPA, February 1995).

Thirteen monitoring wells were installed by Wright's Drilling, Inc. (Wrights Drilling), of Mt. Sterling, Ohio, concurrently with the Geoprobe® investigation. Selected soil samples collected from each of the monitoring well borings were submitted for analysis to AAL and

TestAmerica as a supplement to the Geoprobe® soil samples. Boring advancement, soil sampling, and monitoring well installation were performed in accordance with protocols outlined in the *Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring* (Ohio EPA, February 1995).

Thirteen new and four existing monitoring wells installed at the Property were developed and sampled during the Phase II in accordance with the *Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring* (Ohio EPA, February 1995). All groundwater samples were submitted to AAL for analysis.

Twenty-seven Geoprobe® borings were completed within the Maier building. Due to overhead clearance constraints, two monitoring wells inside the Maier building were installed using the Geoprobe® unit during the Phase II investigation. Additionally, proposed boring locations were adjusted based on field observations, location of underground obstructions throughout the Property, location of subsurface utilities, and inaccessibility of the sampling units.

Six previously installed monitoring wells were abandoned during the Phase II by Wrights Drilling on May 3, 2005, under the direction of a B&N geologist. It is not known who installed the wells. They were not properly constructed as they did not have any type of sand pack or grout, and were lacking a protective casing, providing a conduit for contamination into the subsurface. The monitoring wells were abandoned using the protocol outlined in the *State of Ohio Technical Guidance for Sealing Unused Wells* (State Coordinating Committee on Groundwater, 1996).

1.5 **Limitations and Exceptions of Assessment**

The Phase II was based on existing environmental data obtained from various sources, including, but not limited to, the B&N Phase I (September 2004). B&N cannot discount the possibility that releases may have occurred and impacted subsurface conditions that are not documented in available records. The age of the Property and the longevity and variety of historical operations prevent the possibility of identification of all releases that may have occurred on the Property.

The findings, conclusions, and recommendations presented herein are based on the level of effort and investigative techniques defined under the scope of services. B&N has conducted this investigation in a manner consistent with sound engineering practices and with professional judgment. No other warranty or guarantee, expressed or implied, is made, except as set in the Contract Services between B&N and Metro Parks. This report does not attempt to evaluate past or present compliance with federal, state, and local government or land-use laws and regulations, except to the extent the compliance relates to releases of hazardous substances or petroleum and to factors which may affect the eligibility of the Property under the VAP. B&N makes no guarantee regarding the completeness or accuracy of any information obtained in review of public or private files.

2.0 BACKGROUND

2.1 Property Location and Legal Description

The Property is located along the Northern Tier of the Whittier Peninsula, southwest of downtown Columbus, Ohio, along the east side of West Whittier Street, and approximately 250 feet east of the Scioto River. A legal description of the Property is located in Appendix B. The Property location is shown on the Southwest Columbus U.S. Geological Survey (USGS) map presented as Figure 1.

2.2 Property History

2.2.1 History of Buildings on the Property

A review of historical information on the Property was conducted to identify past land use that may have contributed to environmental concerns. To determine the historical use of the Property, city directories, publications, historic plot plans, Sanborn Fire Insurance Maps, and aerial photographs were reviewed.

The northern and northeastern portions of the property previously consisted of the Hocking Railroad Company. These portions of the Property contained several buildings and a roundhouse associated with a railroad car maintenance and fabrication operation. This part of the Property has undergone many changes in land use. After the railroad operation ceased

operations, the present day Sarah and Pauline Maier Scholarship Foundation warehouse was constructed. This present structure is divided into two halves; the southern half is considered an adjacent property owned by City Properties, Inc. The northern half is on the Property and consists of steel column-and-beam construction with concrete floors. This building does not have a basement. Access is gained via several large doors located along the elevated perimeter of the structure. Two abandoned railroad spurs enter the building from the north. The interior of the building is segregated into four approximately equal-sized rooms, separated by block walls containing entrances into the adjoining rooms. This warehouse has been used as a storage facility and as a vehicle parts manufacturing/electrostatic painting operation.

Two small block buildings associated with the Maier Warehouse are located in the northern gravel lot, adjacent to Interstates 70/71 and a City of Columbus substation. These were previously used as housing facilities for natural gas pumping and metering. They are both presently burned out and filled with general debris and trash left behind by vagrants that have lived in them at one time or another.

The central portion of the Property once contained several ancillary buildings associated with historic asphalt operations. Historical structures consisted of aboveground storage tanks, underground storage tanks, maintenance buildings, and offices. This portion of the Property is now vacant.

The western portion of the Property previously contained several block buildings associated with historical concrete/block manufacturing operations. As with the central portion of the Property, all of these structures have been demolished and the area is vacant.

The surrounding area to the south contains a two-story warehouse building (the Lazarus Distribution Center). This structure was constructed in 1947 and subsequently expanded in 1955. The building consists of steel column-and-beam construction with concrete floors on the first and second levels. The exterior is brick, with the original building walls containing metal-framed windows on the second floor. The building has no basement areas.

The Lazarus Distribution Center Boiler House, on the northeast side of the Lazarus Distribution Center, was constructed in 1947 and expanded in 1955. The boiler house building matches the original two-story warehouse construction with brick exterior walls. Inside elements

included a high-bay room containing two boilers and a separate two-story room with six boilers, three on each floor. There is no basement in the boiler house.

A building located at 514 Furnace Street is another building adjacent to the Property. The building is a concrete block building with a concrete floor and roof structure. The 514 Furnace Street building has no basement. The 514 Furnace Street building has been vacant for several years, but contained numerous drums including several labeled glycerin, coconut oil, and Mackadet BSC, as well as empty plastic bottles, paper, and cardboard debris. The drums and debris were removed in July 2004. The building appears to have been occupied on occasion by vagrants.

A large American Electric Power (AEP) electrical substation is located along Maier Place Drive. This substation is immediately adjacent to the north of the Maier Warehouse property and south of Interstate 70/71.

2.2.2 **Summary of Historical Land Use**

The Whittier Peninsula, the area containing the Property and surrounding areas, has historically been used for a number of industrial facilities and processing plants, as well as being owned in part by coal companies. The operations of these historic practices include a railroad car repair and manufacturing complex, asphalt processing, concrete manufacturing, storage and distribution facilities, automotive machining, and electrostatic painting. Property use and historic documentation confirmed building construction and property development on the Property as far back as the late 1800s.

2.3 **Current Land Use**

No industrial operations are currently present on the Property. The Property consists of an empty warehouse (Maier Warehouse). The Cunard-Lang and Koch properties are currently unoccupied and all structures associated with former operations have been removed.

The City Properties, Inc. warehouse is located immediately adjacent to the Property. This area is used for warehousing.

The Lazarus property, located south of the Property, is currently being used by the Columbus Public School District as a warehouse facility. This property also contains a boiler house; however, the boilers are no longer operational. The 514 Furnace Street building has been vacated and the debris and drums were removed in July 2004.

The area to the south of the Lazarus warehouse is presently used by the City of Columbus for a police impound lot. The area to the southeast of the Property is Columbus Scrap. Areas of trash and debris were observed throughout the property during the site investigation.

2.4 **Future Intended Land Use**

The intended future use of the Property is for an urban park or nature preserve, essentially recreational land use. There are no recreational land-use standards under the VAP; therefore they will be developed as part of the Property-specific risk assessment. Under the VAP, recreational

land use is defined as Modified Residential land use. Recreational land use terminology will be used throughout most of the report.

3.0 PREVIOUS INVESTIGATIONS AND PHASE I SUMMARY

3.1 Previous Site Assessments

Previous environmental investigations that have been completed for the Property include the following:

- Dodson-Stilson - Limited VAP Property Assessment (1998)
- DLZ Ohio, Inc. (DLZ) - Phase II ESA Preliminary Report (2002)
- Sharp and Associates, Inc.- Certification of Closure (Area 1 and 2) 347 Maier Place (1999)
- Metcalf & Eddy – Closure Plan (Vol. 1 and 2) 347 Maier Place
- Burgess & Niple, Inc. – VAP Phase I Property Assessment – Northern Tier (December 2004).

B&N reviewed the previous environmental assessments and preliminary reports during preparation of the Phase I Property Assessment. The following sections summarize these reports.

3.1.1 1998 – Dodson-Stilson Limited VAP Phase I Property Assessment

Dodson-Stilson determined that the Property warranted a Phase II environmental assessment due to the potential presence of leaking underground storage tanks (LUSTs), polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and other adverse impacts due to past operations on the Northern Tier. Asbestos-containing materials (ACMs) were observed during this Phase I ESA. Significant environmental concerns associated with the Cunard-Lang property were not evident; however, access to the property was limited during the 1998 study.

3.1.2 2002 – DLZ Preliminary Phase II Environmental Site Investigation

DLZ conducted a Preliminary Phase II Environmental Site Investigation for most of the Whittier Peninsula, including the areas of the Property previously occupied by the Koch Asphalt and Cunard-Lang Concrete, but excluding the Maier building. A study of the Property was completed by drilling numerous borings around the Property and installing four monitoring wells. The Phase II Environmental Site Investigation was prepared for the City of Columbus with the monitoring performed during June through August 2002.

Arsenic and lead were detected in near-surface soil samples on the Property. Arsenic was detected above the Ohio VAP Generic Residential Standard in greater than 50 percent of the soil samples collected. Semivolatile compounds were present in isolated locations on the Koch property and the off-site City property. The City property is located south of the Lazarus property.

Groundwater samples exceeded Ohio VAP Generic Unrestricted Potable Use Standards (UPUS) for semivolatile compounds. Groundwater exceedances were detected on the southern portion of the Whittier Peninsula, north of the Lazarus warehouse.

3.1.3 1999 – Sharp and Associates, Inc. – Certification of Closure (Area 1 and 2) 347 Maier Place

Information from the review of the Certification of Closure for the hazardous waste storage areas on the Property (Maier Warehouse) prepared by Sharp and Associates, Inc., is summarized as follows:

- Several 55-gallon drums containing various chemicals and waste materials were removed from the property in February 1990.
- Two hazardous waste storage areas contaminated with chemicals and metals were identified on the northern side of the Maier Warehouse property.
- An Ohio EPA-approved closure plan was developed for the two hazardous waste storage areas.
- Contaminated soil was removed and disposed of at an Ohio EPA-approved facility.

- The Ohio EPA granted closure, releasing the Maier Foundation from financial obligations relating to the two hazardous waste storage areas.

3.2 Summary of Current VAP Phase I Property Assessment

B&N conducted a Phase I Property Assessment (Phase I) following the Ohio EPA VAP protocol for the Property. A VAP Phase I Property Assessment report was prepared (December 2004). Based on the results of the Phase I, a Phase II Property Assessment was conducted as documented in this report because it was determined that “. . . there is reason to believe that a release of hazardous substances or petroleum has or may have occurred on, underlying, or is emanating from the Property.” (OAC 3745-300-06(B)). These areas of releases or potential releases are called Identified Areas (IAs).

The VAP Phase I determined that there are 13 IAs on the Property that must be addressed under the Phase II Property Assessment. The IAs are discussed in Section 4.2 of this report. Figure 3 presents the IAs listed in the Phase I.

3.3 Update to the VAP Phase I Property Assessment

Three additional IAs have been added to the Phase I based on information and data gained during the Phase II. Thirteen IAs were originally identified during the Phase I. However, with additional information, IA-14 through IA-16 were added. The following describes the newly added IAs. Figure 3 also presents the IAs added during the Phase II investigation.

- IA-14 – Railroad spurs within the Maier Warehouse – based on observed surface staining on the cobbles within the railroad spurs, additional sampling was recommended. Potential COCs were VOCs, SVOCs, and inorganics.
- IA-15 – Former concrete sump along Furnace Street – VOCs and SVOCs were the COCs for this area.
- IA-16 – PCB release – During the week of March 20, 2005, a pole-mounted transformer along Furnace Street was pulled from the pole and broken open for the apparent purpose of salvaging parts. Oils within the transformer were released to the ground. Cleanup was performed by a subcontractor to American Electric Power, owner of the transformer. Samples were collected from the transformer oil-impacted media. Results indicated <1 part per million (ppm) of

PCBs in the impacted media. B&N added this area as an IA and collected confirmation PCB samples of the shallow soils in the area of the release. Appendix C contains a copy of the transformer cleanup and sampling summary report.

4.0 ELIGIBILITY AND IDENTIFIED AREAS

4.1 Eligibility for the Voluntary Action Program

Generally, VAP properties cannot be under the jurisdiction of another environmental program or under a consent order. A property is ineligible for participation in the VAP program if it is subject to one or more of the following programs:

- National Priorities List (NPL) pursuant to Comprehensive Environmental Response, and Compensation Liability Act (CERCLA);
- Underground injection control (UIC) program;
- Hazardous substance underground storage tank (USTs) systems;
- Federal or state permit obligations under Resource Conservation and Recovery Act (RCRA);
- PCB requirements of assessment, removal or remediation under Toxic Substance Control Act (TSCA);
- Federal enforcement;
- Closure under Ohio solid waste or hazardous waste laws and regulations;
- Petroleum USTs;
- Oil and gas assessment, removal or remediation;
- State enforcement; or
- Any property subject to UST regulations.

Eligibility under the VAP was evaluated after reviewing the Phase I documentation, and additional information collected during the Phase II. Based on the information evaluated, the Property meets the VAP eligibility issues.

4.2 **Identified Areas (IAs)**

The Identified Areas for the Property are shown on Figure 3, and are described as follows:

- **Identified Area 1:** Adjacent railroad to the east and LUST northeast along Short Street and Fulton Avenue.
- **Identified Area 2:** LUSTs at northeast side of Maier Warehouse.
- **Identified Area 3:** Area located north of Maier Warehouse.
- **Identified Area 4:** Historic railroad operations and floor staining at Maier Property.
- **Identified Area 5:** Historic operations; railroad, drum storage, and floor staining at the Maier Warehouse.
- **Identified Area 6:** Historic operations, asbestos in Maier Warehouse.
- **Identified Area 7:** Historic coal yard and evidence of stained soil.
- **Identified Area 8:** LUSTs on Koch Property.
- **Identified Area 9:** Historic operations on Koch Property.
- **Identified Area 10:** Historic operations; petroleum aboveground storage tanks on Koch Property.
- **Identified Area 11:** Historic operations; potential LUST on Cunard-Lang Property.
- **Identified Area 12:** Historic operations; potential LUST on Cunard-Lang Property.

- **Identified Area 13:** LUST on Maier Property.
- **Identified Area 14:** Railroad spurs in the Maier Warehouse.
- **Identified Area 15:** Former concrete sump Furnace Street.
- **Identified Area 16:** PCB release area, Furnace Street.

10.0 COMPLIANCE WITH VAP APPLICABLE STANDARDS

10.1 Overview

Table 12 provides a summary of how the VAP applicable standards for the Property could be met, broken down by complete pathway, and providing possible strategies for meeting the standards. A preliminary human health risk screening and preliminary ecological risk evaluation were performed using the maximum concentrations of COCs in soil and groundwater across the Property.

The following discussion on compliance with applicable standards is based on the results of the direct contact evaluation, soils leaching to groundwater evaluation, preliminary risk screening, and preliminary ecological risk evaluation. Use of statistically analyzed data and site-specific characteristics in a Property-specific human health risk assessment could change the outcome of the preliminary risk screening. Figure 15 present areas where concentrations of COCs in soils exceed direct-contact standards or leach-based standards, or warrant further inhalation risk assessment.

For the Property, the complete exposure pathways for the human health-based risk assessment are:

1. Dermal contact with and ingestion of soil,
2. Inhalation of vapors (indoors and outdoors) from soil,
3. Inhalation of fugitive dusts from soil,
4. Dermal contact with and ingestion of groundwater,
5. Inhalation of vapors (indoors and outdoors) from groundwater
6. Dermal contact with and ingestion of calculated leach-derived groundwater, and
7. Inhalation of vapors (indoors and outdoors) from calculated leach-derived groundwater.

The receptors for the Property involve the following:

1. Child and adult recreational visitors,

2. Commercial workers (such as park employees) on the Property,
3. The construction/excavation worker on the Property, and
4. The ecological resources.

The following presents a discussion demonstrating compliance with VAP applicable standards by complete exposure pathway.

10.2 Recreational Land Use

10.2.1 Soils – Direct Contact

Property-specific SCGDCSSs were calculated for the Whittier Peninsula Property based on the future intended lands use as that of a metro park or nature preserve. Since the VAP does not have single-chemical recreational standards developed, these standards were developed using default exposure values from the *Support Document for the Development of Generic Numerical Standards and Risk Assessment Procedures* (Ohio EPA, February 2002) and some Property-specific physical characteristics and exposure values (all of which are discussed in Sections 7.2 and 7.3). Property-specific recreational standards are listed on Tables 9A through 9O. Exceedances are primarily due to PAHs, in particular benzo(a)pyrene and dibenzo(a,h)anthracene, in the area of the Koch property, and also to arsenic and lead in the area of the Maier Warehouse. The following summarizes the soil sampling results in which recreational, commercial, or construction worker exposure standards were exceeded.

- Metals were detected below the northwest portion of the Maier Warehouse (IA-4) building foundation above recreational standards. These included arsenic in three soil samples and lead in one of the soil samples. In addition, one of the arsenic samples exceed VAP commercial soil standards and the lead concentration exceeded both the VAP commercial and construction worker exposure soil standard.
- Arsenic was detected in a sample collected from IA-14 (the railroad spurs within the Maier Warehouse) above the calculated background concentration.

- Benzo(a)pyrene within soils in IA-8 (east central portion of the Koch property) exceeds the calculated recreational standard. In addition, TPH DRO (C₁₀₋₂₀) exceeds the VAP soil saturation standard.
- Several soil samples collected from IA-9 (southern portion of the Koch property) contained PAHs (in particular benzo(a)pyrene and dibenzo(a,h)anthracene) above recreational standards.
- TPH GRO was detected above VAP soil saturation standards in one of the soil samples collected from IA-10 (northern portion of the Koch property).
- Lead was detected in a soil sample collected from IA-12 (northwest portion of the Property, adjacent to Whittier Street) which exceeds the calculated recreational standard, the commercial land-use standard, and the construction worker exposure standard.
- Arsenic was also detected in one of the samples collected from IA-15, adjacent to the former concrete sump located along Furnace Street above the calculated background concentration.

Depending on the redevelopment plan, removal of soils or capping the area with some type of structure such as a parking area or construction of a lined wetland would alleviate the risk posed by direct contact. In some instances, soil removal may be required. Additionally, a Declaration of Institutional Controls should be implemented designating land use as Modified Residential, which involves recreational land use. Measures to meet the VAP standards will be presented in a Remedial Action Plan (RAP)

10.2.1.2 Inhalation of Vapors (Indoors and Outdoors) and Fugitive Dusts

The preliminary risk screening indicates the inhalation pathway may pose some potential risk to receptor populations on the Property due to the variety of VOCs and SVOCs detected in the soils across the Property. A Property-specific human health risk assessment is recommended to fully determine the inhalation risk posed by these compounds detected in the soils at the Property, and if warranted, cleanup to meet the VAP standards will be presented in the RAP.

10.3 Groundwater

10.3.1 Dermal Contact and Ingestion

Groundwater was detected at an approximate elevation of 14 feet bgs across the Property. Groundwater results from October 2004 indicate that groundwater does not meet UPUS in the parking area between the Maier building and the Koch property, although groundwater sampling results during the most recent sampling event, May 2005, indicate that UPUS is not exceeded in this area. It is recommended that a Declaration of Institutional Controls be implemented to prohibit extraction of groundwater from the Property, except for environmental assessment.

The groundwater classification for this zone is Critical Resource with no USD, and therefore the response requirements as established in OAC 3745-300-10(F)(2) apply. These measures involve the following.

1. Restoring or remediating groundwater to UPUS, or protecting receptors from being exposed to groundwater that does not meet UPUS.

Response: A groundwater-use restriction on the Property will be implemented, and groundwater remediation may be conducted to meet VAP risk-based standards.

2. Protecting receptors being exposed to the groundwater that does not meet UPUS when used for nonpotable purposes.

Response: A groundwater-use restriction on the Property will be implemented to protect the receptors.

3. Protecting important ecological resources on the Property from being exposed to groundwater with concentrations above UPUS.

Response: Due to the historically industrial nature of the Property, there do not appear to be any important ecological receptors. However, with the intended future land use as recreational, development of the Property into an urban park

may create ecological receptors. Therefore, Metro Parks is currently assessing the ecological risks. It is expected that after a more comprehensive ecological risk assessment is conducted, most of the Property, if not all, will meet the applicable VAP standards.

4. Ensure that groundwater leaving the Property meets UPUS.

Response: The groundwater which does not meet UPUS is relatively centrally located on the Property, surrounding monitoring wells MW-24 and MW-40 on the Koch portion of the Property. Groundwater samples collected from around the impacted area and at the Property boundary meet UPUS. Three monitoring wells are located downgradient of the impacted wells. These include MW-23, MW-15S and MW-15D (a well cluster), and MW-20, which is located at the Property boundary and is approximately 700 feet from MW-24. These wells have not had any detections of the COCs detected in the impacted monitoring wells. In addition, the Property has been developed for over 100 years. It is likely that if impacted groundwater were moving off-Property, it would have been detected in these downgradient wells. As part of the Property-specific human health risk assessment, a two-dimensional model, such as BioScreen, will be used to determine an approximate time at which groundwater may reach the Property boundary at a concentrations that will exceed UPUS. It should also be noted, however, that COCs in groundwater will continue to attenuate, and that COCs in groundwater will most likely not reach the Property boundary at concentrations exceeding UPUS.

5. Take measures to ensure that contaminated groundwater that has left the Property does not exceed UPUS when it reaches wells currently used for potable purposes.

Response: Groundwater samples collected from wells at the Property boundary meet UPUS.

6. Take measures to protect receptors off the Property from being exposed to groundwater that does not meet UPUS when used for nonpotable purposes.

Response: Off-site migration does not apply since groundwater leaving the Property meets UPUS.

7. Protecting important ecological resources off the Property from being exposed to groundwater with concentrations above UPUS.

Response: This is not applicable as the groundwater meets UPUS at the Property boundary.

To eliminate exposure to this groundwater zone, groundwater-use restrictions will be implemented and groundwater monitoring may be implemented to ensure that impacted water is not leaving the Property.

10.4.2 Inhalation of Vapors (Indoor and Outdoor)

Groundwater at the Property contains concentrations of VOCs and SVOCs which are sufficiently volatile and toxic as to warrant further evaluation of the inhalation pathway. Therefore, it is recommended that a Property-specific risk assessment be performed to evaluate these inhalation pathways, and, if needed, remedial measures will be provided in a RAP.

10.5 Calculated Leach-Derived Groundwater Concentrations

10.5.1 Dermal Contact and Ingestion

According to the Leach-Based Soil Values, two compounds (arsenic and naphthalene) have concentrations in soil that have the potential to exceed UPUS if leaching were to occur. Removal of soils surrounding borings 3-SB-16, in the southern portion of the Koch property, and GP-92, below the foundation in the Maier Warehouse property, will eliminate the potential for contaminants to leach to the groundwater. However, as it has already been recommended to prohibit potable and nonpotable groundwater use at the Property, direct contact of groundwater as the result of leaching will also be prohibited for residential, recreational, or commercial receptor populations, and soil removal is unnecessary.

In addition, a calculated leach-derived groundwater concentration using the soil/water partitioning equation indicates that soils surrounding boring 3-SB-15 (0-5 ft) has the potential to exceed UPUS. Therefore, it is recommended that the soils surrounding this boring also be removed.