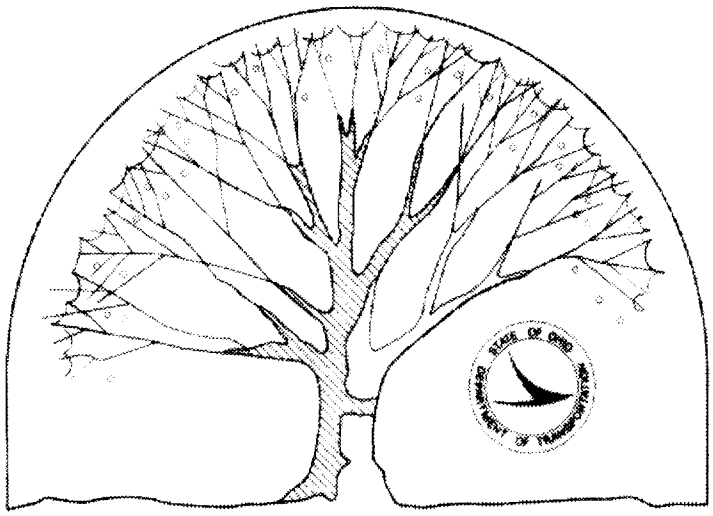
ENVIRONMENTAL SITE ASSESSMENT GUIDELINES



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APPENDICES

CHANGES TO THE GUIDELINES

The following are some of the more substantial changes from the 'Interim Guidelines: Dealing With Hazardous Waste Sites During Project Development' (revised 12/21/89):

1. A side by side comparison between ASTM and ODOT ESA guidelines was made and added.

2. A section discussing the relationship between Environmental Site Assessment and the Preliminary Development Process was added.

3. Guidance for the ESA Literature Search was added.

4. ESA Screening requirements were revised. In addition, an updated ESA Screening Checklist form was added as an appendix.

5. Aerial photographs required in the ESA Screening and Phase I ESA reports must be provided at an interpretable scale (1"=1000' or less) and must be clear.

6. Parcel-specific reporting requirements were added to the Phase I ESA guidance.

7. Guidance for the Phase II ESA Work Plan was added.

8. Guidance for the Phase II ESA was added.

9. Revised guidance regarding the management of investigation-derived waste was added as an appendix.

10. Guidance regarding the proposed acquisition of railroad right-of-way was added as an appendix.

11. Guidance on reconstruction/widening projects involving little or no new right-of-way was added as an appendix.

12. A list of commonly used acronyms and definitions was added as an appendix.

ASTM - ODOT: Side by Side Comparison

The American Society For Testing and Materials (ASTM) has arguably developed the most comprehensive and recognized environmental site assessment guidelines intended to satisfy the requirements to qualify for the 'innocent landowner defense' to CERCLA liability. Hence, ODOT's revised ESA guidelines were written to be generally consistent with ASTM's ESA Guidelines. However, since ASTM ESA guidelines were written for the purposes of commercial real estate transactions (which may not involve any construction activities) and not 'eminent domain' land acquisition for transportation projects (which are by their nature construction projects), there are differences between the two guidances. In addition, ASTM's ESA guidelines are intended for a single, complete real estate parcel. ODOT's ESA guidelines are frequently used to address many parcels where a small portion of each parcel is needed for the construction of the transportation project. The following are some of the most significant differences between the two guidances:

ASTM Transaction Screen Process vs. ODOT ESA Screening

The ASTM Transaction Screen Process is an alternative practice of 'appropriate inquiry' to the ASTM Phase I ESA Process and is intended for a single, complete real estate parcel. The ODOT ESA Screening is step one of a hierarchal process and is intended to identify all parcels within a transportation project study area and provide sufficient investigation to develop a list of suspect properties which require Phase I ESA studies.

ASTM Phase I ESA Process vs. ODOT Phase I ESA

1. The ASTM Phase I ESA Process involves minimum search distances of standard environmental record sources. The ODOT Phase I ESA requires that standard environmental record sources be researched for sites undergoing Phase I ESA study (within the transportation project area) and sites adjacent to the project area.

2. The ODOT Phase I ESA requires that aerial photographs, fire insurance maps, and city/county/street directories be reviewed. The ASTM Phase I ESA Process does not require review of all three sources.

3. The ODOT Phase I ESA requires aerial photographs be provided at an interpretable scale (1"=1000' or less) and that they be clear. The ASTM Phase I ESA Process does not specifically require aerial photographs.

4. The ASTM Phase I ESA Process states that 'recorded land title records' cannot be the sole historical source consulted since they only provide names and little or no information about uses. The ODOT Phase I ESA requires that 'property deeds' be researched if review of aerial photographs, fire insurance maps, and city/county/street directories do not provide sufficient historical information. Furthermore, neither ESA guideline explicitly requires a property deeds search be conducted. However, ODOT acknowledges that this type of search may be an appropriate and prudent investigative tool for some parcels.

5. The ASTM Phase I ESA Process requires that interior observations be made during the site reconnaissance. The ODOT Phase I ESA does not require interior observations of a building be made unless the whole acquisition of a suspect parcel is proposed.

6. The ASTM Phase I ESA Process has standards for obtaining environmental records (7.1.4 Reasonably Ascertainable/Standard Sources). These standards discuss reviewing environmental records that are 'reasonably ascertainable'. ODOT's position regarding environmental records is that there will be many cases where a regulatory file must be reviewed regardless of time and cost and what ASTM defines as 'reasonably ascertainable'. Hence, ODOT must be consulted regarding the application of ASTM's standard for obtaining environmental records.

7. The ODOT Phase I ESA may include non-invasive investigation (i.e. geophysical survey), if necessary. The ASTM Phase I ESA Process does not discuss such methods.

8. The ODOT Phase I ESA requires a diagram of the parcel being investigated be included in the report. The ASTM Phase I ESA Process does not explicitly require a parcel diagram.

9. The ODOT Phase I ESA requires construction plan sheets be provided (if available) and a discussion of the proposed construction activities. The ASTM Phase I ESA Process does not require such information since it is not specifically written for construction projects.

10. Generally, the ODOT Phase I ESA requires specific Phase II ESA recommendations, if applicable. The ASTM Phase I ESA Process does not specifically require this information.

ASTM Phase II ESA Process vs. ODOT Phase II ESA

1. The ODOT Phase II ESA process involves preparation of a formal work plan (if necessary). ASTM does not have a formal work plan step.

2. The ODOT Phase II ESA requires construction plan sheets be provided (if available) and a discussion of the proposed construction activities. The ASTM Phase II ESA Process does not require such information since many or most ASTM transactions may not involve construction activities.

3. The ODOT Phase II ESA may include non-invasive investigation (i.e. geophysical survey), if necessary. The ASTM Phase II ESA Process does not discuss such methods.

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INTRODUCTION

In general, Environmental Site Assessments (ESAs) are conducted in response to two federal laws: the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 (Public Law #96-510) as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986 (Public Law #99-499) and the Resource Conservation and Recovery Act (RCRA) of 1976 (Public Law #94-580). RCRA deals with waste management including the manufacture, storage, transportation, use, treatment, and disposal of wastes including hazardous waste. CERCLA establishes liability that forces cleanup costs of contaminated sites to responsible parties. SARA modified CERCLA to provide defenses to the liability provisions for contaminated sites.

The three defenses to CERCLA liability include an act of God, an act of war, and an act or omission of a third party. The "third party defense" is supported by establishing that "... the defendant (a) exercised due care with respect to the hazardous substance concerned, taking into consideration the characteristics of such hazardous substance, in light of all relevant facts and circumstances, and (b) took precautions against foreseeable acts or omissions of any such third party and the consequences that could foreseeably result from such acts or omissions." These two defenses are commonly referred to as "due care" and "due diligence", respectively. In addition, SARA provides government agencies an additional defense known as "eminent domain". Case law defines "sovereign immunity" which provides another layer of defense for government agencies. However, while government can consider these defenses, the "due care" issue must still be satisfied.

In establishing due diligence, an ESA must clearly show that the Ohio Department of Transportation (ODOT) "did not know and had no reason to know that any hazardous substance was disposed of on, in or at the facility". To demonstrate that ODOT had "no reason to know" that any hazardous substances are present on a property, an ESA must establish that "all appropriate inquiry" was undertaken on a property prior to land acquisition. Care should be taken not to overlook potential environmental concerns during this early level of research since a hazardous release during construction of a project could

cause a negative impact on public health and cause the Department a great deal of liability if the "due care" issue is not addressed. To ensure the appropriate level of inquiry is undertaken, consultants performing ESAs for ODOT must be prequalified with the Office of Contracts (see Appendix A). In addition, the consultants should be familiar with implementing regulatory agency policies, rules and regulations concerning all appropriate legislation including, but not limited to, SARA, CERCLA, RCRA and applicable state environmental regulations.

The ESA process is comprised of several levels of investigation that include historical/environmental research, visual assessments and sampling and testing. Subsequently, documentation of ESA activities are generally presented in the form of an ESA Screening, Phase I ESA or a Phase II ESA. However, there can be some projects that may require other ESA studies (i.e. ESA Literature Search, Phase II ESA Work Plan, etc.) depending on the nature and complexity of the project.

The ESA Literature Search is conducted for EA/EIS (Environmental Assessment/Environmental Impact Statement) projects under ODOT's PDP (Preliminary Development Process). The ESA Literature Search contains ESA information obtained from environmental databases and files maintained by the United States Environmental Protection Agency (USEPA) and the Ohio Environmental Protection Agency (OEPA) as well as from local and state agencies such as the health department and the Bureau of Underground Storage Tank Regulations (BUSTR). The goal of the ESA Literature Search is to identify and locate properties with known or suspected environmental contamination which could control or influence project corridor locations.

The ESA Screening is used to identify suspect parcels very early in project development. All properties within the project study area or corridor are screened at this level. The purpose of the ESA Screening is to provide a method for ODOT to investigate projects and to identify suspect parcels requiring Phase I ESA investigation without obtaining large amounts of parcel specific information. The properties/parcels identified in the screening as potential environmental concerns are advanced for further investigation.

The Phase I ESA is a more detailed investigation based on the accumulation and review of parcel- specific information. This includes investigation of the historic ownership of a property, current and former land uses, physical characteristics of the surrounding area and a photographic log to document the present conditions. In addition to historic and present land uses of a parcel, the Phase I ESA identifies potential sources of contamination and other environmental concerns associated with parcels requiring further investigation. Based on the findings of the Phase I ESA, the proposed right-of-way (ROW) and proposed construction activities, Phase II ESA sampling and testing recommendations may be warranted.

If the Phase I ESA indicates that there is a reasonable likelihood that contamination is present on a specific parcel, then a Phase II ESA consisting of a sampling and testing program is implemented. The Phase II ESA includes field sampling and laboratory analyses to verify the presence or absence of contaminants. This process ordinarily would provide adequate information to aid in the further development of the project. If avoidance of a parcel is not possible, then a study of remediation alternatives may follow the Phase II ESA and is specifically concerned with methodology for the development of the project in a compliant manner.

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THE RELATIONSHIP BETWEEN ENVIRONMENTAL SITE ASSESSMENT AND THE PRELIMINARY DEVELOPMENT PROCESS

Planning and developing transportation projects includes complying with many legislative requirements set forth by the state and federal government. One of the primary laws which govern the planning and development process for federally funded transportation projects is the National Environmental Policy Act (NEPA) of 1969. NEPA requires the consideration of environmental impacts caused by a transportation project using interdisciplinary studies. Once environmental studies have been completed, the findings are compiled into an environmental document which identifies the impacts associated with the transportation project as well as what steps will be taken to mitigate the impacts. In addition to NEPA, many other laws have been established to protect human health and the environment which are considered during the project planning and development stage. Laws such as CERCLA and RCRA must be addressed regardless of the funding source.

In order to satisfy NEPA and other regulatory requirements, the Preliminary Development Process (PDP) was established by ODOT and consists of nine steps (see Appendix B). As part of this process, projects are categorized in the Preliminary Development Phase for environmental considerations and evaluation. This will result in the preparation of one of the following types of environmental documents: a Categorical Exclusion (CE), an Environmental Assessment (EA), or an Environmental Impact Statement (EIS).

There are four (4) levels of review and approval for Categorical Exclusion projects: CE Levels 1, 2, 3, and 4. CE Level 1 projects are standard stand alone maintenance functions that will not result in any significant impacts to the human or natural environment. These projects involve little or no right-of-way acquisitions and generally require no further environmental processing. The lack of new right of way acquisition also means these projects are unlikely to have significant risk from a hazardous substance standpoint and therefore do not require investigation to satisfy the "due diligence" aspect of CERCLA. In some instances, however, the type of work involved during project construction may increase the potential risk of encountering hazardous substances from adjacent,

contaminated properties. If conditions such as these exist, an ESA Screening is warranted to address "due care" issues under CERCLA and management of this material under RCRA. For example, reconstruction/widening projects involving little or no new ROW should undergo some level of ESA documentation (see Appendix C). The installation of a new storm sewer entirely within existing right of way could create a route or pathway for release of contaminants from an adjacent property such as a former gasoline station. The storm sewer or the porous backfill could serve as a pathway for contaminants to migrate from the gasoline station onto existing right of way and into our drainage system. Where a suspect property exists adjacent to a project with work of this nature, it should be identified in the ESA screening process.

CE Level 2 projects involve minor right of way acquisitions of up to a maximum of 10 acres or two relocations. CE Level 3 projects involve right of way acquisitions of up to a maximum of 20 acres or eight relocations. CE Level 4 projects contain impacts greater than a CE Level 3 and satisfy the criteria for CE Classification. Some level of ESA documentation will be required to assess potential environmental impacts to all of these CE Level projects to satisfy both the "due diligence" and "due care" issues of CERCLA. At a minimum, these projects will require an ESA Screening and may be advanced for additional ESA studies. This process begins when the project is field checked prior to programming. Persons conducting the ESA Screening should note all commercial/industrial properties, dumps (legal or illegal), obvious evidence of potential contamination, regulated sites, or other suspect land uses that are located on potential new right of way. Projects situated entirely in rural or residential areas with no commercial or industrial land use history may generally be cleared at this stage through an ESA Screening Checklist Form.

In urban areas where commercial or industrial properties may be involved, CE Levels 2 and 3 projects will likely require Phase I ESA activities including, but not limited to, a review of aerial photographs, historic maps, business directories, and interviews to determine the need for further studies. For ODOT's purposes, gasoline service stations will likely be the most common suspect parcel. Other suspect commercial land uses include dry cleaners, automobile and metal painting facilities, automobile repair shops, metal fabricators, junk

yards and other similar kinds of establishments. In general, industrial property should be considered suspect and will require further ESA studies.

EA/EIS projects range from upgrading existing facilities to constructing facilities situated on entirely new locations. The findings of the ESA investigations are included in the EA/EIS documentation and are used to help assess the project's potential environmental impacts. Both the EA and EIS document the purpose and need for the project, the alternatives considered, and the potential impacts which may be caused by the project. An EA is prepared when the project type is not defined under the CE process and the significance of the impacts has not been determined. If the EA determines that the impacts from the project are not significant, Federal Highway Administration (FHWA) issues a Finding of No Significant Impact (FONSI) for the project. If the impacts are significant, then an EIS is prepared. The EIS documents the significant impacts for the project's alternatives, the avoidance of these impacts and the mitigation of these impacts when they are unavoidable.

In general, the following guidance describes how the ESA process concurrently and harmoniously meshes with the PDP (nine step process):

- The ESA Literature Search is conducted in Step 3.
- The ESA Screening is conducted late in Step 3 or early in Step 4.
- The Phase I ESA is conducted late in Step 4 or early in Step 5.
- The Phase II ESA is conducted in Step 6.

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ENVIRONMENTAL SITE ASSESSMENT LITERATURE SEARCH

An Environmental Site Assessment Literature Search is typically performed during Step 3 of the PDP for projects with defined study areas. The purpose of the ESA Literature Search is to identify and locate major areas of known environmental concern within the study area that may influence or control the development of the corridors (i.e. through avoidance, minimization, or remedial activities). Data is gathered from existing databases and files maintained by regulatory agencies and ground-truthed to confirm the sites are within the study area. Each site is then identified and located on a map of the study area.

Databases maintained by USEPA, OEPA and health agencies must be researched. Environmental database companies are typically contracted to conduct this research. Sites which are of concern include Superfund sites, sites on the National Priority List and CERCLIS list, sites on the Ohio Master Sites List, former or current landfills, sites undergoing RCRA closure, sites with RCRA violations, RCRA large quantity generators, RCRA transportation, storage, and disposal facilities (TSDs) and large industrial sites. Consideration of active oil and gas wells within the study area may also be necessary. Information regarding the locations of oil and gas wells is available from the Ohio Department of Natural Resources (ODNR), Division of Oil and Gas (see Appendix A) and should be identified within the project study area. Keep in mind that the potential acquisition of oil and gas wells may be more of an economic concern than an environmental one.

The database information obtained during the ESA Literature Search can be used for the ESA process (i.e. in the ESA Screening). However, keep in mind that the ESA Screening will involve other activities in addition to obtaining database information.

Mapping of all identified sites on study area base mapping and identification of each site with the source of the regulatory listing must be provided. A discussion of sites that can potentially influence or control the development of the corridors should be included and provided with the study area exhibit.

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ENVIRONMENTAL SITE ASSESSMENT SCREENING

The Environmental Site Assessment Screening is typically the first step in determining the presence of hazardous substances within a project study area or corridor. The intent of the ESA Screening is to identify all parcels within a study area and provide sufficient investigation to develop a list of suspect properties which require Phase I ESA. Gathering and reviewing present day and some historic land use information, as well as regulatory databases, is the primary focus of the ESA Screening. Other information such as significant physical characteristics of the study area and project history should also be included in the ESA Screening. All properties within the project study area are screened at this level.

Although an ESA Screening does not imply a need to enter a property which may be contaminated with hazardous substances, some level of field reconnaissance will be necessary to verify the database information and note potential sources of contamination. This visual inspection should be conducted from existing public rights of way or through normal project field reviews conducted at this stage of project development.

The following outline identifies the elements of the ESA Screening report along with several sources of information which should be reviewed, however, it does not preclude the use of other pertinent information. In general, CE Level 1, 2, and 3 projects may be processed appropriately through ESA Screening Checklists and supportive information such as historical aerial photographs, project plan sheets, copies of regulatory records, and/or photographic logs. More complex projects will require the following report format.

A. ELEMENTS OF THE ESA SCREENING

1. Executive Summary

The executive summary is a portion of the report which provides a description of the transportation project and the findings of the ESA Screening. The executive summary is generally one page in length.

2. Introduction

An introduction should be provided which discusses the proposed transportation project and other relevant information such as the physical setting of the project and overall land use of the area. It is not necessary to provide more than a brief discussion of the physical setting and general geological features of the area.

3. Mapping

Mapping must be included which clearly delineates the project study area or corridor and specifically identifies commercial, industrial, or any other properties or activities which may pose an environmental concern. The following maps must be included in the report as a minimum:

United States. Geological Services (USGS) Topographic Quadrangle Maps - These maps are published by the USGS which provide information such as local topography, drainage, roads and other land uses which were active at the time of mapping. These maps are available for sale in 7.5 minute quadrangle at several organizations including ODNR and ODOT-Office of Aerial Engineering (see Appendix A).

County and/or City Road Maps - These maps include roads, municipalities and other features in the study area.

Aerial Photography - Aerial photographs provide information about land uses and potential sources of contamination. Aerial photographs for several different periods should be obtained and reviewed to identify land use changes. At a minimum, a cursory review and discussion is required. Aerial photographs are available through ODOT, ODNR, Natural Resources Conservation Service (NRCS), USGS, County Engineer's Office, and local planning organizations. Aerials must be at an interpretable scale (1"=1000' or less) for reviewing individual properties or small project areas. Larger scales may be acceptable when reviewing large project study

areas or corridors. A reviewable aerial photo copy must be provided. Unclear aerial photos will not be acceptable. Suspect parcels and the project area must be clearly marked on the aerial photos.

Preliminary Project Mapping and/or Plans - Available project maps and/or preliminary project plan sheets must be included in the report. These materials can be obtained from the ODOT District Offices (see Appendix A)

Oil and Gas Well Mapping - When oil and gas wells are located within the project study area or corridor, then mapping must be included indicating the locations of these wells. These maps are available through ODNR, Division of Oil and Gas.

Fire Insurance Maps - Although obtaining and reviewing fire insurance maps is not required in this step, ODOT recognizes that this type of review may be an appropriate and prudent investigative tool for some projects or properties.

4. Regulatory Database Review

A review of regulatory database information should be conducted to identify environmental concerns within one quarter mile of the project study area or corridor. Several lists are available through the USEPA, OEPA, and BUSTR that provide database information related to hazardous substances. Several national database research service firms provide comprehensive environmental database searches which generally include mapping of the identified sites with respect to the project study area or corridor. The amount of database research may vary based on the complexity of the project, however, at a minimum, the screening should include the following:

USEPA CERCLIS/NPL List
Ohio EPA Master Sites List
Ohio RCRA Notifier's List
BUSTR Registered/Leaking UST List

5. Visual Inspection

A visual inspection of the project area must be conducted for land use features that indicate the potential for contamination by hazardous substances. This level of inspection does not require the investigator to enter onto a property and may be done from the existing ROW. Items of particular interest are evidence of staining, USTs, soil disturbance (for suspected buried waste), drums, surface lagoons, distressed vegetation, or other features indicative of hazardous material handling, storage, or disposal. Photographic logs of the inspection are helpful and should be included in the appendices of the report. At a minimum, sites recommended for Phase I ESA must be photographed.

Parcels identified as current or historic gasoline service stations or other parcels which contain petroleum USTs will typically be advanced for Phase I ESA. However, further investigation is generally not warranted when no new ROW acquisition is proposed and minimal construction involving earth disturbing activities (i.e. new driveway, curb, sidewalk, etc.) is planned adjacent to the gasoline service station or parcel with a petroleum UST system (see Appendix C).

Featureless and open railroad trackage generally does not warrant more than an ESA Screening. However, where features are indicative of environmental concerns such as reported spills or releases, USTs, spurs, sidings, loading/unloading areas, buried cars and railroad yards along railroad right-of-way, Phase I and/or Phase II ESA may be warranted to determine potential impacts to the project (see Appendix D).

Electrical equipment (i.e. transformers, capacitors, etc.) often contain polychlorinated biphenols (PCBs). PCBs are compounds that are injurious to living organisms and have been used as lubricants, heat transfer fluids, and dielectric fluids. Electrical transformers (pole mounted or ground situated) owned by a utility company are not an environmental concern unless there is visual evidence of a release since the utility company will be responsible for the relocation of their transformers. Transformers associated with a private owner are more of an environmental concern and will require a detailed investigation if acquisition is proposed.

While it is not necessary at this stage to conduct interviews with individual property owners, local officials from the fire department, health department or other emergency response agencies, these interviews may be conducted at this level to acquire information regarding spills or releases of hazardous substances in the project study area.

6. Conclusions and Recommendations

The conclusions and recommendations section must include a discussion of the findings of the investigation and recommendations of parcels that should be advanced for Phase I ESA. Phase I ESA recommendations should be on a parcel-specific basis and describe the potential environmental concerns associated with the parcel. If a large number of parcels is included in the ESA screening, this information may be provided in tabular format.

B. ESA SCREENING CHECKLIST FORM

An ESA Screening Checklist Form for screening projects is available (see appendix E) and can be used as either supportive information in or used in place of the ESA Screening report dependent upon the complexity of the project. A screening checklist form should be completed for each commercial and/or industrial parcel investigated. One form may address a group of residences and/or agricultural fields. Screening checklist forms should be included in the appendices of the ESA Screening report or have adequate mapping and supportive information when used in place of an ESA Screening report. Supportive information can be in the form of historical aerial photographs, project plan sheets, copies of regulatory records, and/or photographic logs.

The Environmental Records section of the screening checklist form should be completed. At a minimum, environmental databases including USEPA CERCLIS/NPL List, Ohio EPA Master Sites List, Ohio RCRA Notifier's List, and BUSTR Registered/Leaking UST List should be researched.

C. REPORTING REQUIREMENTS

The title page must include ODOT's project identification which contains the county, route, section, and PID for the project. Information obtained for the ESA Screening such as regulatory database records, mapping and visual observations should be summarized and the relevant information included and discussed in the report. Clear and concise conclusions must be provided which are supported by the data included. Recommendations for further investigation should be based on the conclusions of the ESA Screening and should be parcel-specific. Typically, the Office of Environmental Services, ESA Section and the District Office's Environmental Department each requires one copy of the report. The following is the preferred format of the ESA Screening report.

- Executive Summary
- Introduction
- Aerial Photo Cursory Review
- Regulatory Database Review
- Visual Inspection
- Conclusions and Recommendations
- Appendices
    - ESA Screening Checklist Forms
    - Mapping identifying suspect properties
    - Aerial photographs
    - Regulatory Database Information
    - Project plans (if applicable)
    - Photographic Logs

PHASE I ENVIRONMENTAL SITE ASSESSMENT

The Phase I Environmental Site Assessment is typically the second step in determining the presence of hazardous substances within a project study area. In general, parcels which require Phase I ESA have been identified in the ESA Screening. The intent of the Phase I ESA is to determine the potential of encountering hazardous substances from a specific parcel prior to land acquisition and/or construction activities. The Phase I ESA involves researching and reviewing parcel-specific information in order to determine a list of suspect parcels which require Phase II ESA. In general, the Phase I ESA should not be conducted without having performed some level of an ESA Screening. The ESA Screening deals with all parcels within a project area. The Phase I ESA involves only the suspect parcels. The following outline documents the elements of a Phase I ESA. This outline is not intended to preclude the use of any available information which could aid in assessing a parcel for potential contamination.

A. Elements of the Phase I Environmental Site Assessment

1. Executive Summary

This section should include a brief general description of the project location and type of transportation improvement. In addition, a discussion of activities conducted and general conclusions and recommendations for further environmental site assessment should be included.

2. Introduction

A discussion of the project location, the nature and purpose of the transportation improvement, and description of the proposed ROW acquisition should be provided in this section. While some of this information may be limited or not available, this information should be provided and used to assess the potential environmental impacts to the transportation project. In addition, a summary of any previous environmental site

assessments of this project should be included in this section. This section should also include a list of parcels requiring Phase I ESAs and the rationale. For projects with a large number of parcels, this list may be tabularized and should indicate the address, parcel number, and stationing, if available.

3. Geographical/Geological Setting of the Project Study Area

Information regarding the physical setting of the project study area or corridor should be included in this section. The report should include information about geographical and general geological features. This information is meant to be general and not parcel-specific, however, should there be local deviations in the geology for the project area, this information should be documented. Information such as soil type, regional bedrock, surface drainage, topography, ground water usage, etc., should be included in the report. In addition, the report should include a USGS 7.5 minute topographic map with the quadrangle name and the project limits indicated.

4. Parcel-Specific Information

a. Parcel History

Historical land use information must be reviewed for each parcel and documented in the report to assess the potential for the presence of regulated materials on a parcel. A chronology should be provided for each parcel indicating the address, owner and/or lessee, the use or business, and a date or date range of the usage. Historical land use research should be traced for at least 50 years or until the earliest date of commercial or industrial development. Information gathered from this research should be examined in order to draw clear conclusions and recommendations about the historical land use for each parcel. The following sources, at a minimum, must be reviewed:

Aerial Photographs - Aerial photographs may indicate land use activities which could contribute hazardous substances to the parcel. Aerial photos for several

periods should be obtained and reviewed to identify land use changes. Newer aerial photos are useful, however, older material is of particular interest. A parcel-specific review and discussion is required. Aerial photos may be obtained from ODOT, NRCS, ODNR, County Engineer's Office, USGS, environmental database companies, and local land use planning agencies. The aerial photos must be at an interpretable scale (1"=1000' or less) for identifying potential parcel-specific sources of contamination. A reviewable aerial photo copy must be provided. Unclear aerial photos will not be acceptable. Suspect parcels and the project area must be clearly marked on the aerial photos.

Fire Insurance Maps - These maps were developed for insurance purposes detailing past industrial and commercial land uses and are available for many areas in Ohio. These maps can help identify potential sources of contamination, specific activities which took place on a property, and areas where these activities took place. These items are essential in the Phase I ESA. Parcels identified on fire insurance mapping as having the potential of impacting the transportation project should be indicated on this mapping. Companies such as Sanborn, Hopkins, and Chadwick are producers of these maps. Fire insurance mapping may be obtained from local libraries, historical societies, college or university libraries, or from environmental database companies.

City/County Business Directories - These directories are published by private or government sources and show ownership and/or use of parcels by reference to street addresses. Often, these directories are available at local libraries, college or university libraries, or historical societies.

Supplemental Sources

The following are also excellent sources of historical land use information and should be consulted if the previous sources do not provide sufficient information:

Property Deeds - Property deeds research is conducted to determine past owners and, if possible, past land use at a parcel. The deed search should establish parcel ownership and may reveal an environmental lien on a parcel and/or if a parcel was leased to another individual or entity. Although property deeds research is not required, ODOT acknowledges that this type of research may be an appropriate and prudent investigative tool for some properties.

County Atlases or Plat Maps - Counties may have maintained atlases of ownership and property boundaries which sometimes contained drawings of the exterior of manufacturing facilities. Plat maps may include data about the historic location of landfills and manufacturing and commercial activities.

Property Tax Files - These files are maintained by the local jurisdiction where the property is located and may include records of past ownership, appraisals, maps, sketches, photos, or other information pertaining to the property.

Building Permits - The local government agency in charge of building permits maintains records of buildings and/or demolition on the property.

b. Regulatory Records Review

The activities involved in this section include further research of a parcel's regulatory history. This research involves completing a regulatory agency file review for each parcel identified in the regulatory database search and summarizing relevant information. For single alternative projects, a regulatory agency file review must be conducted for sites adjacent to the project. For multiple corridor/multiple alternative projects, a regulatory agency file review must be conducted for sites that fall within the corridor. For example, if a parcel was identified on a USEPA, OEPA, and/or BUSTR database during the ESA Screening, then a regulatory agency file review must be conducted. Any pertinent registration, closure, corrective action, and/or

release notification information should be reviewed, summarized, and documented in the report. The raw data should be included in an appendices to the report. If a regulatory database review was not conducted during the ESA Screening process, then both the regulatory database review and the regulatory records review should be conducted as part of the Phase I ESA.

c. Interviews

The parcel owner and/or tenant must be interviewed regarding any commercial and industrial operations involving hazardous materials on the parcel. For commercial or industrial properties being studied, key employees (managers, supervisors, foremen, etc.) should be interviewed since they are likely to be able to provide information about past and/or present on-site hazardous material practices. Interviews with neighbors or former employees may also provide valuable information. In addition, interviews with local officials from the fire department, health department or other emergency response agencies should be conducted at this level to acquire information regarding spills or releases of hazardous substances in the project study area. We recognize that some interviews and inquiries about availability of files are effectively conducted by telephone. All persons interviewed should be identified by their name, title, and length of association with the parcel.

d. Parcel Reconnaissance

This consists of a detailed visual inspection of the parcel for evidence of contamination or potential contamination by hazardous substances. Prior to entering the property to conduct the reconnaissance, it is necessary to provide the property owners with notification. Typically, the ODOT Districts provide this notification. Where proposed ROW acquisition from a parcel is a strip take and does not include the building, it will not be necessary to investigate the interior of the building. While conducting the reconnaissance, items of particular interest are evidence of surface contamination, distressed vegetation, underground and

aboveground storage tanks, soil disturbance (suspected buried waste), drums, surface lagoons, or other features indicative of hazardous material handling, storage, or disposal. Where proposed ROW acquisition includes buildings, it will be necessary to investigate the interior of the building and note potential environmental concerns such as floor drains and sumps. The use of chemicals and generation of waste products should be identified and the information reflected in the recommended analytical parameters for the Phase II ESA, if applicable.

When a gasoline service station or other parcel containing a petroleum UST is advanced for Phase I ESA, several areas of concern must be addressed. The reconnaisance must document the locations of all portions of the UST system including the vent pipes, fill caps, and the UST cavity. It must also document other areas of concern on the parcel such as vehicle maintenance activities, storage areas for drums and/or batteries, etc. It should also determine any discrepancies between the number of registered USTs and the actual number of USTs noted on the parcel. ODOT understands that all pertinent UST information is not always available. If certain information is not known and all resources were checked, then these findings should be documented.

In many cases, petroleum UST sites are being monitored under the direction of BUSTR via ground water monitoring wells (GWMW). If GWMWs are identified within proposed or existing ROW and/or construction limits, then this information must be provided since ODOT will need to coordinate the abandonment or maintenance of these GWMWs with BUSTR and the property owner prior to construction of the project.

Electrical equipment (i.e. transformers, capacitors, etc.) may contain PCBs. PCBs are compounds that are injurious to living organisms and have been used as lubricants, heat transfer fluids, and dielectric fluids. Electrical transformers (pole mounted or ground situated) owned by a utility company are not an environmental concern unless there is visual evidence of a release since the utility company will be responsible for the relocation of their transformers. Transformers associated

with a private owner are more of an environmental concern and will require a detailed investigation if acquisition is proposed.

Buildings and some structures may contain asbestos-containing materials (ACMs). ACMs improperly disposed of on a parcel is an issue that should be addressed in the report, however, asbestos in buildings is handled as part of the real estate acquisition process and, as such, will not require assessment in the Phase I ESA. Bridge structures may contain ACMs and should be inspected by a certified asbestos inspector prior to demolition and/or renovation, however, a bridge inspection for asbestos is a separate and distinct activity and is not a part of the Phase I ESA. Bridge structures may contain Lead paint. Lead paint materials improperly disposed of on a parcel is an issue that should be addressed in the report, however, Lead paint on bridges will not require assessment in the Phase I ESA. Lead paint is an issue on bridge painting projects, however, is not an issue for bridge demolition projects.

e. Proposed Right-of-Way and Construction Activities

A discussion of the proposed ROW and construction activities for each parcel must be included. This involves providing the magnitude of the proposed ROW acquisition (i.e. 10' strip or whole take) and the proposed work involving earth-disturbing activities (i.e. installation of storm/sanitary sewers, signal pole foundations, catch basins, cuts for new ditchlines, etc.).

f. Diagram

A diagram for each parcel investigated must be included in the report which delineates the location of potential contamination sources (USTs, drums, surface staining, stressed vegetation, etc.) in relation to the proposed and existing ROW limits and proposed work involving earth-disturbing activities (see Appendix E). For whole parcel acquisitions, the diagram must indicate building items such as floor drains and sumps. Diagrams are not required to be drawn to scale, however,

approximate distances of potential contamination sources to the transportation project should be provided.

g. Conclusions/Recommendations

Based on the data collected, clear conclusions must be drawn for each parcel investigated. If a Phase II ESA is warranted for a parcel, then specific recommendations for a Phase II ESA should include a discussion of the potential contaminants as well as proposed testing and analyses which include field-screening, sampling methods, analytical parameters including EPA method numbers as stated in USEPA publication SW-846, terminal depth of borings, and soil sampling interval. In the event proposed test methods are other than USEPA SW-846 standards, the ODOT ESA Section must be notified. In addition, a parcel-specific diagram indicating proposed locations of soil borings and/or ground-water monitoring wells in relation to the proposed and/or existing ROW, proposed work, and potential sources of contamination, must be provided. If a Phase II ESA is not warranted for a parcel, then a discussion should be provided to substantiate that conclusion.

If a geophysical survey is recommended on a specific parcel, then a discussion should be provided to substantiate this claim and specific recommendations should be included such as the proposed investigative technique and equipment, limitations, and a parcel diagram indicating the proposed area of survey in relation to the transportation project.

All recommended soil and/or ground water sampling must be within the proposed ROW (due to the legalities involving trespassing). In the event there is no proposed ROW, sampling must be within the existing ROW. In general, sampling locations and depth of soil borings are dependent upon the potential sources of contamination and, if available, upon the proposed depth of construction. In some instances, proposed depth of borings may be in accordance with or based on regulations from BUSTR or OEPA.

In the preliminary development process where multiple corridors or alternative alignments are being investigated and a preferred alternative has not been selected, general Phase II ESA recommendations should be provided such as the locations of problem areas, types of potential contaminants, presence of any ground water problems, etc. Once the preferred alternative is selected, a Phase II ESA Work Plan consisting of parcel-specific Phase II ESA recommendations should be prepared for that alternative. Hence, the Phase II ESA should be conducted after the preferred alternative has been selected and the Phase II ESA Work Plan is accepted. However, it should be recognized that in some cases, the Phase II ESA may be performed on multiple alternatives to aid in selecting the preferred alternative.

B. Reporting Requirements

The title page of the report must contain ODOT's project identification including the county, route, section, and PID for the project. The introduction should include all background information, including the project information and summary of previous investigations.

The body of the report should include a discussion of each parcel including the address, history, regulatory records review, interview information, reconnaissance, proposed ROW and construction activities, and conclusions and recommendations. The body should describe the methodology, including all sources consulted. If a source is consulted but information not available, this should also be noted in the report.

All available and relevant data on the parcel should be summarized and documented within each parcel's discussion, however, the raw data should be included in the appendices. This may include copies of relevant information from environmental reports, fire insurance maps, aerial photos, photo logs, diagrams, newspaper articles, interviews, records of enforcement actions, and other environmental investigations to document the parcel as completely as possible. Construction plan sheets should be provided which may include ROW plans, cross-sections, and/or plan and profile sheets. If construction plan sheets have not been developed, then this information should be documented. Typically, the

Office of Environmental Services, ESA Section and the District Office's Environmental Department each requires one copy of the report.

The results of the research should be clearly presented with respect to their bearing on the potential for contamination being encountered within the project study area. Discussion in the report must clearly relate problem areas (potential areas of contamination) to the project. The following is the preferred format of the Phase I ESA report:

- Executive Summary
- Introduction
- Geography/Geology for the Project Study Area
- Environmental Information For Each Parcel
  - History
  - Regulatory Records Review
  - Interviews
  - Parcel Reconnaissance
  - Proposed Right-of-Way and Construction Activities
  - Conclusions and Specific Phase II ESA Recommendations
- Appendices
  - Project location maps (including topographic and county maps)
  - Aerial Photographs/Fire Insurance Maps/Directories
  - Regulatory Records Information
  - Parcel Diagrams
  - Photographs
  - Preliminary Project Plan Sheets

PHASE II ENVIRONMENTAL SITE ASSESSMENT WORK PLAN

In general, Phase II ESA Work Plans are only developed for transportation projects which have several alternatives under consideration or which have a particular type of site which requires special attention (i.e. requires agency coordination and/or permitting). Hence, the Phase II ESA Work Plan will not be necessary for the majority of ODOT projects since, for most projects, the Phase II ESA recommendations in the Phase I ESA are effectively the work plan for the Phase II ESA. Projects involving Phase II ESA Work Plans do not have site-specific Phase II ESA recommendations in the Phase I ESA. The purpose of the Phase II Environmental Site Assessment Work Plan is to state the proposed Phase II ESA activities. The Phase II ESA Work Plan is a separate submission which is developed prior to any Phase II ESA field activities. Typically, once the preferred alternative is selected, a Phase II ESA Work Plan should be prepared for that alternative. Once the Phase II ESA Work Plan is accepted by ODOT, then Phase II ESA field activities can commence. However, it should be recognized that in some cases, the Phase II ESA Work Plan may be prepared and the Phase II ESA performed on multiple alternatives to aid in selecting the preferred alternative.

A. ELEMENTS OF THE PHASE II ESA WORK PLAN

1. Introduction

A discussion of the project location, the nature and purpose of the transportation improvement, and description of the proposed ROW acquisition should be provided in this section. While some of this information may not be available or limited, all available information should be provided and used to assess the potential environmental impacts to the transportation project. In addition, a summary of any previous environmental site assessments of this project (i.e. ESA Screening, Phase I ESA) should be included in this section. This section should also include a brief discussion of parcels requiring Phase II ESAs, the rationale, and potential compounds of concern.

2. Field Activities and Sampling Procedures

a. Sampling Methods

A discussion of the proposed method to be conducted for soil borings and/or installation of ground water monitoring wells must be included. In addition, the proposed number and terminal depth of soil borings must be included. If applicable, methodologies for collecting samples other than soil or ground water (i.e. surface water, near surface, sediment, etc.) must also be included.

In general, earth probe technology is the preferred method of soil sampling and should be utilized to minimize or eliminate the generation of investigation-derived waste. Proper management and subsequent disposal of investigation-derived waste shall be the responsibility of the consultant (see Appendix F). Investigation-derived waste shall not be placed back into the bore hole.

In the event conventional soil boring and monitoring well installation are proposed in lieu of earth probe technology, then these activities should be conducted in a manner consistent with OEPA's Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring Programs and the Technical Guidelines For Well Construction and Ground Water Protection prepared by the State Coordinating Committee on Ground Water. Soil sampling should be conducted in a manner consistent with ASTM D 1586-84. In addition, the abandonment of soil borings and monitoring wells must be conducted in accordance with ODNR's Technical Guidelines For Sealing Unused Wells (Appendix 4, Sealing Monitoring Wells and Boreholes).

b. Field Screening and Sample Selection Methods

A discussion of proposed field screening and sample selection methods must be included. In general, soil borings should be sampled continuously and one sample from each soil boring sent to a laboratory for chemical analysis. Selection of samples for analysis can be based on several factors. All soils being analyzed for Volatile Organic Compounds (VOCs) and/or Semi-VOCs should be field screened

using an organic vapor analyzer (OVA). The sample with the highest OVA reading should be sent for analysis. If the OVA readings are inconclusive, then the sample exhibiting the highest amount of visual, or other signs of contamination is sent for analysis. If this information is inconclusive, then the sample obtained at the soil/water interface should be sent for analysis. If groundwater is not encountered, then the sample from the terminal depth of boring for that parcel should be sent for analysis.

It should be noted that there may be cases where multiple samples per boring are analyzed, i.e., the sample which shows the most contamination (i.e., the highest field screening value, the most staining, the highest amount of olfactory evidence) and the sample collected at the bottom of the boring may be sent to the analytical laboratory for analysis.

c. Analytical Methods

Analytical methods for environmental samples must be provided. These parameters must be in accordance with Test Methods for Evaluating Solid Waste (SW-846) prepared by the USEPA. In the event other test methods are proposed, the ODOT ESA Section must be contacted prior to sampling.

d. Quality Assurance/Quality Control

Proposed quality assurance/quality control (QA/QC) procedures should be included to allow for assessment of the quality of the data collected. QA/QC measures may include written decontamination procedures, instrument calibration, the preparation and analysis of trip blanks, equipment blanks, duplicate samples, or other types of QA/QC samples.

e. Geophysical Survey Discussion

A geophysical survey may be conducted on parcels that are suspected of having

buried concerns such as USTs and drums of which their locations are not known. A geophysical survey utilizes non-intrusive techniques to delineate these subsurface objects. In some instances, it may be used to delineate subsurface features such as contaminant plumes. Geophysical methods that may be employed include ground penetrating radar, electromagnetic conductivity testing, and magnetometer surveys. The results of the geophysical survey can be used to help develop Phase II ESA recommendations. In general, the geophysical survey is conducted prior to Phase II ESA field activities and may be included in the Phase II ESA report or presented as a separate submission.

If a geophysical survey is proposed on a parcel, then this section should include a detailed discussion of the investigative technique and its limitations, equipment description, and potential interferences. In addition, mapping must be provided which delineates the area of the geophysical survey, the proposed ROW, any structures on the parcel, and any features which may be related to the use, storage, and disposal of hazardous substances, i.e. underground storage tanks, drums, etc.

3. Parcel Diagrams

A diagram for each parcel proposed for investigation should be included which indicates the sampling locations and delineates the location of potential contamination sources (USTs, drums, sumps, lagoons, etc.) and proposed geophysical area (if applicable) in relation to the proposed and/or existing ROW limits and proposed work involving earth disturbing activities (installation of storm/sanitary sewers, foundations for signal poles, catch basins, etc.). Diagrams are not required to be drawn to scale, however, approximate distances of proposed sampling locations and potential contamination sources in relation to the transportation project should be provided.

4. Project Management Plan

A Project Management Plan should be prepared including a listing of all key administrative and technical personnel to be used during the investigation including their duties.

B. REPORTING REQUIREMENTS

The title page of the report must contain ODOT's project identification including the county, route, section, and PID for the project. Typically, the Office of Environmental Services, ESA Section and the District Office's Environmental Department each requires one copy of the report. The following is the preferred format of the Phase II ESA Work Plan:

- Introduction
- Field Activities/Sampling Procedures
  - Sampling Method
  - Field-Screening and Sample Selection Method
  - Analytical Methods
  - Quality Assurance/Quality Control
  - Geophysical Survey Discussion (if applicable)
- Parcel Diagrams
- Project Management Plan

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PHASE II ENVIRONMENTAL SITE ASSESSMENT

The Phase II Environmental Site Assessment is used to determine the presence or absence of hazardous substances and/or petroleum products on suspect parcels identified in the Phase I ESA. Where contamination is known to exist on a parcel, the Phase II ESA can also serve to identify the nature and extent of contamination. This is determined through intrusive sampling and testing of soils and/or ground water.

The Phase II ESA provides a higher level of confidence about the degree of environmental risk associated with a specific parcel and is based on the parcel's current and historical land uses that were identified in the Phase I ESA. The Phase II ESA will rarely be conducted without having completed a Phase I ESA, since the selection of sampling locations and analytical test methods are based on the findings of the Phase I ESA.

A. ELEMENTS OF THE PHASE II ENVIRONMENTAL SITE ASSESSMENT

1. Executive Summary

This section must include a brief general description of the project location and type of transportation improvement. This section should also include a brief discussion of the data evaluation and regulatory interpretation. A brief discussion of the conclusions and recommendations for further work (if applicable) should also be included.

2. Introduction

A discussion of the project location, the nature and purpose of the transportation improvement, and description of the proposed ROW acquisition and construction activities should be provided in this section. While some of this information may be limited, applicable and reasonably ascertainable information should be provided and used to assess the potential environmental impacts to the transportation project.

This section should also include a brief discussion of parcels requiring Phase II ESAs, the rationale, and compounds of concern.

3. Background Information

This section should include information of the transportation project area such as the physical setting, general land use, and general geological and regional hydrogeological information.

4. Field Activities and Sampling Procedures

a. Sampling Methods

A discussion of the methodologies used for conducting soil borings and/or installing ground water monitoring wells must be included. In addition, the proposed number and terminal depth of soil borings must be included. If applicable, methodologies for collecting samples other than soil or ground water (i.e. water, near surface, sediment, etc.) must also be included.

For most ODOT projects, earth probe technology is the preferred method of soil sampling and should be utilized to minimize or eliminate the generation of investigation-derived waste. Proper management and subsequent disposal of investigation-derived waste shall be the responsibility of the consultant (See Appendix F). Investigation-derived waste shall not placed back into the bore hole.

In the event conventional soil boring and monitoring well installation is proposed in lieu of earth probe technology, then these activities should be conducted in a manner consistent with OEPA's Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring Programs and the Technical Guidelines For Well Construction and Ground Water Protection prepared by the State Coordinating Committee on Ground Water. Soil sampling should be conducted in a manner consistent with ASTM D 1586-84. In addition, the abandonment of soil

borings and monitoring wells must be conducted in accordance with ODNR's Technical Guidelines For Sealing Unused Wells (Appendix 4, Sealing Monitoring Wells and Boreholes).

b. Field Screening and Sample Selection Methods

A discussion of field screening and sample selection methods must be included. In general, soil borings should be sampled continuously and one sample from each soil boring sent to a laboratory for chemical analysis. Selection of samples for analysis can be based on several factors. All soils being analyzed for VOCs and/or Semi-VOCs should be field screened using an OVA. The sample with the highest OVA reading should be sent for analysis. If the OVA readings are inconclusive, then the sample exhibiting the highest amount of visual, olfactory or other signs of contamination is sent for analysis. If this information is inconclusive, then the sample obtained at the soil/water interface should be sent for analysis. If groundwater is not encountered, then the sample from the terminal depth for that boring should be sent for analysis.

It should be noted that there may be unique cases where multiple samples per boring are analyzed, i.e., the sample which shows the most contamination (i.e., the highest field screening value, the most staining) and the sample collected at the bottom of the boring may be sent to the analytical laboratory for analysis.

1. Soil Gas Surveys

Soil gas surveys may occasionally be utilized, where site-specific conditions warrant, to more accurately determine sampling locations if VOC contamination is suspected. Also, soil gas surveys may be utilized to help delineate a potential contaminant plume if field screening results indicate elevated levels of VOCs. Soil gas surveys must not be utilized as the sole means of determining VOC contamination and must necessarily be supported with analytical test results.

c. Analytical Methods

Analytical methods for environmental samples must be provided and in accordance with Test Methods for Evaluating Solid Waste (SW-846) prepared by the USEPA. In general, test methods for USTs follow BUSTR guidelines. In the event test methods other than SW-846 are proposed, then the ODOT ESA Section must be contacted.

d. Quality Assurance/Quality Control

QA/QC procedures should be included to allow for an overview of the quality of the data collected. QA/QC measures should include written decontamination procedures, instrument calibration, the preparation and analysis of trip blanks, equipment blanks, duplicate samples, or other types of QA/QC samples. The QA/QC program conducted by the chemical laboratory should be included in the report. Phase II ESA investigations which involve a limited number of samples may only warrant standard laboratory QA/QC. More involved Phase II ESA investigations may warrant a more extensive QA/QC program. In general, the number of QA/QC samples is 10% of the total number of primary samples submitted for analysis.

e. Geophysical Survey Discussion

A geophysical survey may be conducted on parcels that are suspected of having buried concerns such as USTs and drums of which their locations are not known. A geophysical survey utilizes non-intrusive techniques to delineate these subsurface objects. In some instances, it may be used to delineate subsurface features such as contaminant plumes. Geophysical methods that may be employed include ground penetrating radar, electromagnetic conductivity testing, and magnetometer surveys. The geophysical survey must be conducted prior to any Phase II ESA field activities and may be included in the report or presented as a separate submission. If a geophysical survey is conducted on a parcel as part of the Phase II ESA, then

this section should include a detailed discussion of the investigative technique, equipment, limitations of the investigative method, and potential interferences.

5. Phase II ESA Findings; Data Evaluation; Regulatory Interpretation

a. Field Screening Results

A discussion of field screening results and apparent trends should be included. In addition, all field-screening data should be tabularized and included in the soil boring logs. As an option to using tables, a parcel diagram may be used to show the results associated with the soil boring and/or monitoring well location.

b. Boring Log Descriptions

A discussion of the geology and hydrology (if applicable) for each parcel based on the soil boring logs should be included. This discussion should be used to assess likely routes of contaminant transport. Soil boring logs should be completed and indicate information such as soil characteristics (i.e., texture, color, moisture content, etc.), terminal depth, samples submitted for analysis, and where the saturated zones were encountered. If a groundwater monitoring well is installed, then the boring log should indicate the static water level measured prior to ground water sampling.

For some parcels where the level of concern is great and a whole ROW take is anticipated, the direction of ground water flow and the hydraulic gradient should be determined. Where strip right-of-way is required from a parcel, determining the direction of ground water flow and the hydraulic gradient is generally not necessary.

c. Analytical Test Results

A discussion of the analytical test results and apparent trends must be included. In addition, all analytical test data should be tabularized. As an option to using

tables, a parcel diagram may be used to show the analytical test results associated with the soil boring and/or monitoring well location.

d. Quality Assurance/Quality Control Results

A discussion of the QA/QC results as they relate to the primary analytical test results should be provided. In addition, results of decontamination procedures should be included. If the QA/QC results are used to support conclusions and recommendations, then this must be documented.

All laboratory analytical detection limits should be at or below the practical quantitation limits or within acceptable ranges as stated in US EPA SW-846. Analytical limits which do not meet SW-846 should be justified and a discussion included in the report by the laboratory.

e. Data Evaluation Criteria/Regulatory Discussion

A discussion of the analytical test results in relation to ARARS (applicable or relevant and appropriate requirements set by federal or state authorities) or risk-based values (such as OEPA Voluntary Action Plan) must be included. For UST sites, BUSTR standards are preferred. Applicable standards will involve BUSTR and/or OEPA VAP for a majority of sites investigated, however, ODOT would expect the consultant to determine applicable standards. If a standard does not exist for a chemical in a particular medium, the consultant should use criteria or guidelines to determine whether the chemical could potentially threaten human health or the environment.

f. Geophysical Survey Results

A discussion of the geophysical survey results including conclusions must be provided. In addition, mapping should be provided which delineates the area of the geophysical survey, the proposed ROW, any structures on the parcel, and any

features which may be related to the use, storage, and disposal of hazardous substances, i.e. underground storage tanks, drums, suspicious areas detected by the survey, etc.

g. Conclusions and Recommendations

Conclusions and recommendations should be based on the data evaluation and interpretation and details of the proposed transportation improvement. If the analytical test results identify hazardous substances, then the potential risks associated with the proposed ROW and construction involving earth-disturbing activities must be discussed. Conclusions and recommendations may involve no further work, additional sampling and testing, or the development of remedial alternatives.

If additional sampling and testing is required, then specific recommendations must be provided such as sampling and field-screening methods, proposed number and locations of environmental samples, analytical parameters for chemical analysis, and terminal depth of soil borings.

6. Parcel Diagrams

A diagram for each parcel investigated should be included which indicates the sampling locations and delineates the location of potential contamination sources (USTs, drums, sumps, lagoons, etc.) in relation to the proposed and/or existing ROW limits and proposed work involving earth disturbing activities (installation of storm/sanitary sewers, foundations for signal poles, catch basins, etc.). Diagrams are not required to be drawn to scale, however, approximate distances of sampling locations and potential contamination sources in relation to the transportation project should be provided.

There will be rare situations where a whole take of a site is involved and regulatory agency coordination is necessary. If this is the case and if applicable, a separate map should be included which indicates well elevations, ground water elevations, bench marks, and, if

calculated, the groundwater flow and potentiometric lines of the ground water. If soil and/or ground water contamination is identified, mapping should be provided which indicates the area and extent of known contamination, direction of contaminant and/or ground water flow (if calculated), and the media effected based on the data obtained.

7. Site Specific Health and Safety Plan

It is the consultant's responsibility to determine if a Site Specific Health and Safety Plan (SSHSP) for Phase II ESA field activities as per 29 CFR 1910.120 is required. The SSHSP is not a requirement of the Phase II ESA report.

8. Environmental Plan Notes

If the Phase II ESA has determined that hazardous substances will be encountered during construction, then a Phase II ESA recommendation may be to develop an environmental plan note describing the management of these materials during construction for incorporation into the construction contract. The ODOT ESA Section can be contacted for guidance on developing these plan notes. In most cases, environmental plan notes will not be developed as part of the Phase II ESA activities and will be developed at a later date (i.e. once detailed design information is available).

9. Remedial Design

If the Phase II ESA determines that acquisition of a contaminated parcel of land is necessary for highway development, then a Phase II ESA recommendation may be to prepare a remedial design to ensure that contaminated media is remediated and/or managed in a manner which is consistent with the appropriate environmental regulations. In short, remedial design will consist of a set of instructional statements, including any applicable drawings both of which should be prepared in standard ODOT construction contract format instructing a contractor on how to execute the remedial effort. A remedial design may involve developing a stand-alone contract that is separate from a roadway construction contract. Remedial design can range from a typical underground storage tank

removal to a situation as complex as a large scale remediation plan (i.e., ground water treatment system). A consultant involved with remedial design must be prequalified with ODOT's Office of Contracts.

B. REPORTING REQUIREMENTS

The title page of the Phase II ESA report must contain ODOT's project identification including the county, route, and section as well as the PID for the project. The introduction of the report should include all background information, including project information and a summary of previous environmental site assessments.

The body of the report should include a discussion of the field activities/sampling procedures used for conducting the Phase II ESA, the results of the geophysical survey (if applicable), the Phase II ESA findings, evaluation and regulatory interpretation of the field screening and analytical test results, and conclusions and recommendations.

All available relevant data on a parcel should be documented and the raw data included in an appendices to the report. This may include copies of reports, project location maps (including topographic and county maps), parcel diagrams indicating sampling locations, soil boring logs, laboratory analytical reports, chain of custody forms, geophysical survey report (if applicable), and other environmental investigations to document a parcel as completely as possible. If available, relevant construction plan sheets should be provided which may include ROW plans, cross-sections, and/or plan and profile sheets. If plan sheets are not available, then this information should be documented. Typically, the Office of Environmental Services, ESA Section and the District Office's Environmental Department each requires one copy of the report.

The results of the research should be clearly presented with respect to their bearing on the potential for contamination being encountered within the project area and the potential for ODOT to purchase contaminated property which may result in liability. Discussion in the report should clearly relate problem areas and potential areas of contamination to the

project and the proposed construction. The following is the preferred format of the Phase II ESA report:

- Executive Summary
- Introduction
- Background Information; Geological Information; Physical Setting; Regional Hydrogeology;
- Field Activities and Sampling Procedures
  - Sampling Method
  - Field-Screening and Sample Selection Method
  - Analytical Methods
  - Quality Assurance/Quality Control
  - Geophysical Survey Discussion
- Phase II ESA Findings; Data Evaluation; Regulatory Interpretation
  - Field Screening Results
  - Boring Log Descriptions
  - Analytical Test Results
  - Quality Assurance/Quality Control
  - Data Evaluation Criteria; Regulatory Discussion
  - Geophysical Survey Results
  - Conclusions and Recommendations
- Appendices
  - Project Location Maps (including topographic and county maps)
  - Preliminary Construction Plan Sheets
  - Parcel Diagrams Indicating Sampling Locations
  - Geophysical Survey Report (if applicable)
  - Soil Boring Logs
  - Laboratory Analytical Reports
  - Chain of Custody
  - Photographs
  - Other Regulatory Reports and/or Data