

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY

August 1, 2019

DESIGN BULLETIN No. 19-01

SUBJECT: Soil Sampling Plan Requirements

The 2019 Illinois Tollway Environmental Studies Manual has been revised to require a soil sampling plan in advance of characterizing material for disposal, reuse and construction worker precaution. The sampling plan shall follow the new guidelines for sampling frequency and chemical analysis.

for Charita R. Lao
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8/1/19
Date

Revisions:

Replace Sections 6.6.7 and 6.6.8 of the 2019 Illinois Tollway Environmental Studies Manual with the following:

6.6.7 Submittals and Timing

The identification of excavated soil and the potential for said soil to be impacted shall be addressed at the earliest possible point in project development. The objective is to evaluate soils for three purposes:

- Disposal
- Reuse
- Construction Worker Precaution

For excavated soil volumes of less than 300 cubic yards, the savings associated with CCDD disposal are not offset by the sampling costs. Therefore, any projects with less than 300 cubic yards of earth excavation shall not be evaluated for CCDD disposal but rather all excavated soil shall either be beneficially reused as part of the project or considered non-special waste and disposed of off-site.

The identification of RECs, or PIPs as the term is used in the uncontaminated soils regulations (35 IAC Part 1100)¹, shall occur during the planning stage as part of the ESIS Part I submittal, rather than the design stage. The Phase I ESA or Transaction Screen shall be submitted as part of the 30% design submittal. Based on the findings of the Phase I ESA or Transaction Screen and the locations of planned earth excavation, a sampling plan shall be prepared and submitted as part of the 60% design submittal. The Illinois Tollway sampling protocol, including chemical analysis and boring frequency, is presented below in Section 6.6.8. At the 95% design submittal, the DSE shall include a copy of the Phase II ESA, the LPC-662 and/or LPC-663 form with supporting information, and show waste disposal type, reuse options, and construction worker precaution areas in the cross-sections and grading plans. Waste disposal type and reuse options shall also be included in earthwork schedule. If the project includes a borrow site, it shall be included in the sampling plan, but only evaluated for reuse options and construction worker precaution.

Table 6-2 provides guidance on identification of PIPs. Table 6-3 outlines the soils sampling and testing protocol.

6.6.8 Methodology

For projects involving Illinois Tollway right-of-way, the methodology is described herein. For projects that include construction on the rights-of-way of others, the methodology shall be in accordance with the applicable agency's policies and procedures where such procedures exist (e.g. IDOT Bureau of Design and Environment Manual).

Database Search and Site Reconnaissance

For projects with an estimated 300 cubic yards or more of earth excavation, the material shall be assessed for disposal, reuse, and construction worker precaution areas. While the volume of earth excavation is typically not calculated until 60%, projects with a large earth work

¹ For the Illinois Tollway's purposes RECs and PIPs are the same thing. PIPs will be used throughout the remainder of this document.

component shall identify PIPs at 30%. If this work is not completed at 30% the DSE shall submit at 60% along with the sampling plan.

A database search shall be conducted as the first step, followed by a site reconnaissance. At the time of the site reconnaissance, special note shall be made to identify any indications of PIPs. This could include signs of contamination (either within the right-of-way or adjacent to it) or adjacent property uses that could cause contamination. Particular attention shall be paid to properties and issues identified by the database search noting the following:

- Actual separation distances from the project to each of the record search items
- Ground slopes between each identified area and the Illinois Tollway project
- Current use of the properties if different than listed in the database search
- Presence of groundwater monitoring wells
- Location of dumpsters or solid waste storage areas
- Condition of pavement
- Condition of buildings on site

30% Design Submittal

For projects which will occur entirely within existing Illinois Tollway right-of-way and for which there are no indications of PIPs in the database search and site reconnaissance, the ES is to complete a Transaction Screen in accordance with the latest ASTM standard.

For full or partial property acquisitions, the ES is to complete a Phase I ESA in accordance with the latest ASTM standard for Phase I ESAs. If the acquisition is less than 0.4 acres of farmland, however, a Transaction Screen in accordance with the latest ASTM standard shall be completed, with records search, in lieu of the Phase I ESA.

At a minimum, a review of the following is required to identify PIPs:

- A database search as outlined in the ASTM Standard
- Historical aerial photographs
- Sanborn maps (if they exist at that location)
- Historical USGS topographic maps
- The IEPA document explorer (<https://external.epa.illinois.gov/DocumentExplorer/>)
- City directories

Based on the findings, FOIA requests to the USEPA, IEPA, OSFM, or local municipalities may be warranted.

While the location, regulatory history, and professional judgement will determine PIPs, the following guidance shall be consulted to provide consistency throughout the Illinois Tollway. If a Phase I ESA or Transaction Screen deviates from this guidance, the ES shall document the reasoning behind the determination.

Table 6-2 PIP Identification Guidance

Site Type	PIP Determination
Leaking Underground Storage Tank (LUST)	PIP unless No Further Remediation (NFR) letter documents all contamination removed in accordance with current SROs/MACs.
Gas Station	PIP
Dry Cleaner	PIP, exceptions include storefront dry cleaners where all cleaning is shipped off-site.
RCRA Generator	Consider sites with violations PIPs. Sites without violations are not considered PIPs unless other sources of contamination or potential contamination are observed.
Industrial Properties	Assess if the site is a PIP based on the specific site use.
Railroads	PIP
Auto body	PIP
Site Remediation Program (SRP)	PIP unless NFR letter documents all contamination removed in accordance with current SROs/MACs.
Transformers	Generally considered <i>de minimis</i> . Transformers with evidence of leaking, staining, or stressed vegetation considered a PIP.

The outline for a Phase I ESA shall include the following:

- Title
- Overview of Assessment or Executive Summary
- Site Location, including:
 - Location Map
 - Vicinity Description
 - Hydrologic, Geologic, and Topographic Description of Property and Surroundings
- Findings, including:
 - Property Use History
 - Site Investigation Observations
 - Review of Database Search
 - Review of Environmental Risks from Off-site Facilities
- Conclusions

The DSE shall submit a copy of the Phase I ESA or Transaction Screen as part of the 30% DMR submittal and complete and submit the ESIS Part I on the WBPM system. The ESIS submittal provides a foundation to assess the potential for environmental concerns on the project. It is to initiate an awareness of any environmental issues present.

60% Design Submittal

At this point, the DSE is to complete the initial assessment of where cuts will be necessary, where soil fill will be necessary, and the overall soil balance. For projects within a larger corridor the DSE shall coordinate with the DCM. A copy of this assessment shall be provided to the DCM, with mile posts indicated, depths provided for each area, and estimated volume in each area. For system-wide projects, DSEs shall strive to balance the individual projects. If it is determined that the material does not balance, the DSE shall contact the Illinois Tollway PM and the GEC Systemwide Corridor Manager for in system material management options.

Once the above tasks are completed, if the earth excavation quantity is over 300 cubic yards, then soil sampling shall be undertaken to investigate all soils for disposal locations, reuse options, and construction worker precaution. Any borrow locations shall be sampled to determine if they meet the Illinois Tollway reuse requirements and if construction worker precaution is warranted. Illinois Tollway is aware of potential soil management and disposal concerns that may be unrelated to identified PIPs. These additional Illinois Tollway-specific considerations are:

- Fill Soils at Ramps or Elevated Roadways
- Roadway ditches associated with drainage of greater than one square mile of roadway
- Bridges constructed prior to 1988

The Illinois Tollway, with consultation from CCDD and uncontaminated soil fill operations (USFO) facilities, has established the minimum number of soil borings to characterize soils based on several general site types. These minimum numbers are displayed in Table 6-3. As appropriate, soil boring locations shall be chosen based on proximity to specific environmental concern and preferentially placed in proximity of individual PIPs. For example, soil borings conducted to characterize a gas station shall be placed based on the location of the UST(s). For large PIPs, such as railroad tracks running parallel to a roadway or an adjacent golf course, samples are to be collected at the lowest points near drainage paths.

Minimum sampling parameters shall be determined by the nature of incidents at the identified sites. Illinois Tollway understands that assessment of select metals may be considered sufficient to address concerns associated with certain PIPs; however, with the exception of lead sampling at bridges, the ES shall test for all eight of the Resource Conservation and Recovery Act (RCRA) metals where any of the eight RCRA metals are considered to be a concern. The Illinois Tollway's guideline is to initially analyze for TOTAL METALS, with the one exception being chromium, where toxicity characteristic leaching procedure (TCLP) chromium shall be run instead of total chromium. If samples fail to achieve the MACs for only total metals, those samples shall be re-analyzed via the TCLP or synthetic precipitation leaching procedure (SPLP) method² for just the metal(s) that fail to achieve the total MAC, with the exception of arsenic, which should not be analyzed with the TCLP or SPLP method.

The sampling protocol for common PIP sites and the Illinois Tollway-specific considerations are displayed in Table 6-3. Additional concerns requiring sampling may be identified, requiring further review on a case-by-case basis.

² Either the SPLP or TCLP tests are suitable for achieving the MAC if total fails; however, landfills typically ask for TCLP metal results, so TCLP testing should be preferred as it may be required for landfill disposal if the sample does not achieve the MAC via total or TCLP testing.

Table 6-3 Soil Sampling Plan Boring Frequency and Analysis

Site Type	Minimum Number of Borings	Analysis
Leaking Underground Storage Tank (LUST)	Gasoline (2 borings) Diesel (2 borings) Fuel Oil / Heating Oil (1 boring) Used Oil (2 borings) Other Petroleum (2 borings)	BTEX ¹ +MTBE ² , PNAs ³ , RCRA Metals ⁴ , pH BTEX, PNAs, pH BTEX, PNAs, pH VOCs ⁵ , SVOCs ⁶ , RCRA Metals, PCBs ⁷ , pH VOCs, SVOCs, RCRA Metals, PCBs, pH
Gas Station	2 borings	BTEX+MTBE, PNAs, RCRA Metals, pH
Dry Cleaner	1 boring per 200 feet	VOCs, pH
RCRA Generator (with Violations) / Industrial Property	1 boring per 200 feet	VOCs, SVOCs, RCRA Metals, pH or <u>site specific</u> ⁸
Railroads	2 borings (one each side) ⁹	BTEX, PNAs, RCRA Metals, Pesticides, Herbicides, pH
Auto body	1 boring per 200 feet	VOCs, SVOCs, RCRA Metals, pH
SRP	1 boring per 200 feet	VOCs, SVOCs, RCRA Metals, pH or <u>site specific</u> ⁸
Pad Mounted Transformer (with release)	1 boring	PCBs, pH
Other Sites (Buildings or dumping areas)	1 boring per 200 feet*	<u>Site specific</u> ⁸
Fill Soils at Ramps and Elevated Roadways	1 sample per 2,000 cy spoil	VOCs, SVOCs, RCRA Metals, PCBs, pH
Roadway Ditches Draining > 1 sq mi	1 sample per 500 linear feet with a minimum of two samples from centerline for the final 1,000 feet of drainage area.	PNAs, RCRA Metals, PCBs, pH
Bridges Constructed Before 1988	1 sample each side of roadway	Lead, pH
Borrow Sites	1 sample per 2,000 cy spoil	VOCs, SVOCs, RCRA Metals, PCBs, pH

¹ BTEX: Benzene, Toluene, Ethylbenzene, and Xylenes; a subset of VOCs.² MTBE: Methyl tert-butyl ether (not required for LUST incidents prior to 1979).³ PNA: Polynuclear Aromatic hydrocarbons (also referred to as PAHs – polycyclic aromatic hydrocarbons), a subset of SVOCs.⁴ The eight RCRA metals include: arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver. With exception of chromium, metals analyses shall be performed first using totals analyses, then leaching procedures as appropriate. Chromium analyses shall first be performed using TCLP leaching procedures.⁵ VOCs: Volatile Organic Compounds⁶ SVOCs: Semi-Volatile Organic Compounds⁷ PCBs: Polychlorinated Biphenyls⁸ Site specific chemicals associated with site or SRP listing⁹ Adjacent railroad tracks running parallel to Illinois Tollway ROW require 1 boring per 500 linear feet.

Illinois Tollway projects generating greater than 2,000 cubic yards of spoil require a minimum of at least one sample per 2,000 cubic yards. Soils shall be screened from near the ground surface to the overall anticipated depth of excavation. Samples selected for laboratory analysis shall be chosen based on field observations and consideration of type of PIP or Illinois Tollway-specific consideration.

Regardless of PIP status and/or identification of Illinois Tollway-specific considerations, pH sampling is necessary along the Project Corridor. The minimum sampling frequency for pH is one soil pH sample per every 1,000 linear feet (urban areas) or one sample per mile (in rural areas). Each sample shall be representative and taken to the depth of the project excavation limits. Soil samples shall not be collected near the gravel/soil interface as the limestone fines can result in soil pH values above the acceptable soil pH. This practice is consistent with ASTM Phase II protocols (E1903). Additionally, spoil volume must be considered, with a minimum of one pH sample collected per 2,000 cubic yards of spoil. Otherwise, sampling conducted at identified PIPs for CCDD purposes shall also include pH sampling.

Minimum vertical sampling frequency is one sample for every five feet of boring depth. The boring terminal depth shall be consistent with the proposed depth of improvements at a given location.

As part of the 60% DMR submittal, the ES shall prepare and submit a sampling plan for Illinois Tollway approval. The sampling plan shall identify the horizontal and vertical extents of the planned excavation areas, estimated volume of spoil resulting from the planned improvements, proposed boring locations, number of samples per boring, and parameters to be tested in each sample. Based on the nature of the sites identified by the Phase I ESA, additional Illinois Tollway-specific considerations, and any proposed borrow locations, the number and locations of soil borings shall be determined. Illinois Tollway can also assist with sites that may require additional review or site-specific testing.

After Illinois Tollway or designated representative has reviewed the plan to confirm it meets the minimum requirements outlined above, and any unique situations have been addressed, the Illinois Tollway will provide approval of the sampling plan.

95% Design Submittal

Once sampling has taken place and analytical results have been received, the ES shall prepare a Phase II ESA report and an LPC-662 and/or LPC-663 form.

The outline of the Phase II ESA report shall include the following:

- Title Page
- Introduction
 - Project Location, Description, with stations and/or mile posts
- Anticipated soil balance for project
- Summary of Phase I ESA with PIPs and Tollway-Specific considerations identified
- Subsurface findings. Include table with the following information:
 - Hazardous Waste Areas, by station and/or mile post and depth
 - Soils identified through testing as solid waste for landfill, with stations and/or mile posts and depths
 - Uncontaminated Soil certified with LPC-662 (no PIPs identified) for disposal at CCDD or USFO, by station and/or mile post and depths

- Uncontaminated Soil certified with LPC-663 (PIPs identified but soil achieves MACs for the contaminants of concern) for disposal at CCDD or USFO, by mile post and depths
- Soils for reuse on the project, with stations and/or mile posts and depths, including borrow sites if applicable
- Construction worker precaution area(s) with stations and/or mileposts and depths, including borrow sites if applicable
- Conclusions
- Figures showing boring locations and location of soils by waste disposal type, reuse options, and construction worker precaution areas
- Summary tables comparing the analytical results to the appropriate MAC and SRO values
- Laboratory analytical reports

The LPC form shall including the following supporting information:

- A cover letter summarizing the findings
- Narrative discussing due diligence
- Identification of PIPs/RECs (LPC-663 only)
- Narrative summary of results with comparison to appropriate MAC value
- Identification of exclusion area(s)
- Figures showing boring locations and exclusion area(s)
- Summary tables comparing the analytical results to the appropriate MAC values
- Laboratory analytical report(s)

The DSE shall submit a copy of the Phase II ESA and LPC Form(s) with supporting information as part of the 95% DMR submittal, complete the ESIS Part II, and submit the ESIS Part II on the WBPM system. The ES shall sign and seal LPC-663 forms, and the Illinois Tollway shall sign LPC-662 forms. After approval and signature, the DSE shall provide a copy of the LPC-662 and/or LPC-663 form to the CM and upload a copy of the Phase II ESA to the online plan room.

In addition, waste disposal type, reuse options, and construction worker precaution areas shall be included in the cross-sections and grading plans. Waste disposal type and reuse options shall also be included in earthwork schedule. If areas excluded from CCDD disposal are identified and time and budget allow, additional sampling can be conducted to minimize these areas and maximize eligibility for CCDD disposal.