

ASSOCIATION OF PROFESSIONAL GEOSCIENTISTS OF ONTARIO

**REPORT TEMPLATE FOR PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
CONDUCTED IN ACCORDANCE WITH ONTARIO REGULATION 153/04, AS AMENDED**

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Special thanks to Mahmood Hasan, P.Geo., for his contribution

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1.0 INTRODUCTION

The purpose of this APGO “Phase Two Environmental Site Assessment Reporting Template” is to provide step-by-step guidance on completing a phase two environmental site assessment (ESA) report in accordance with Ontario Regulation 153/04 as amended, (“the Regulation”), for filing the Record of Site Condition (RSC). The amendments came into effect on July 1, 2011. There are prescriptive requirements for completion of the phase two ESA in support of the filing of the RSC in the Regulation

The rules for conducting ESAs are found in Parts VI, VII and VIII (sections 22 to 33.8) and Schedules D and E of the Regulation. Other sections relevant to ESAs include Part I; sections 16, 17, 18 and 55; and Schedule F of the Regulation. Phase two ESA rules are mainly found in Parts VI and VIII (sections 22, 32 to 33.8) and Part XII (Schedules A, E and F). The regulatory requirements are referenced in this reporting template, but users should familiarize themselves with the Regulation in its entirety, as it is structured such that there is an inter-relationship between requirements specified under the different parts and sections of the Regulation that may not be specifically referred to in this template. The applicable requirements of the Regulation are to be followed notwithstanding any guidance that may be provided in this template or other APGO guidance documents. Where any discrepancy may be noted, the requirements of the Regulation take precedence.

The reporting template is intended as guidance only to demonstrate how to meet the spirit/intent of the Regulation. It does not restrict the ability of a practitioner (“qualified person”) to exercise professional judgment in completing any aspect of the phase two ESA where, for example, site-specific conditions either preclude following the guidance or where equivalent or superior methods are used, and defended, to meet the requirements in the Regulation.

The following key aspects should be noted when completing a phase two ESA report:

- The phase two ESA report is a stand-alone document that describes all aspects of the phase two ESA program. The author(s) of the report should provide documentation of the completed work, present and interpret the findings, and provide conclusions and recommendations that are drawn from those results.
- The report should reference any previous investigations performed (e.g., phase one ESA, initial or previous phase two ESAs, or other reports) and relied upon to support the conclusions of the phase two ESA. All findings resulting from the investigation performed, including nil findings, should be included in the report.
- It should be noted that remediation forms a part of the phase two ESA. A description of the remediation, if undertaken, should be included in an appendix of the phase two ESA report. In addition, a sampling and analysis plan with all its components as required by Subsection 3 (2) of Schedule E should be included in an appendix.
- A phase two conceptual site model (CSM) is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The CSM should provide a pictorial and narrative description of site conditions. Although a phase two ESA report may be completed for a larger property, all requirements of the phase two ESA should be met for the RSC property if

the RSC only applies to a portion of the larger property. A separate phase two ESA may not be required for the RSC portion of the property as long as the phase two ESA meets the requirements for the RSC portion of the property.

- The phase two ESA report should cover all sections, subsections and paragraphs of Schedule E, including Table 1. If any part/section of Schedule E is not relevant, it should be mentioned in the report and rationale should be provided. For example if groundwater was not part of the assessment, this should be mentioned in the report with rationale and an explanation that sections pertaining to the ground water requirements are not relevant.
- All aspects of the phase two ESA should be completed within 18 months of the date of submitting the RSC. If data prior to this date are used to complete the phase two ESA, the qualified person (QP) should ensure that any new circumstance that may affect the conclusions of the phase two ESA is investigated and documented, and the data remain valid to support the conclusions of the phase two ESA. In such case an update to the phase two ESA is required.
- If a phase two ESA report prepared by another QP is used to submit the RSC for filing, the QP responsible for filing the RSC should ensure that report meets all aspects of the Regulation, or it is updated accordingly to satisfy the regulatory requirements.

2.0 TEMPLATE STRUCTURE

This reporting template follows the structure of the phase two ESA report that should be prepared in accordance with Schedule E, Table 1 of the Regulation – “Mandatory Requirements for Phase Two Environmental Site Assessment Reports”. The template does not cover the additional requirements for phase two ESA reports prepared for Modified Generic Risk Assessments (MGRAs) provided in Schedule E, Table 4.

The template is structured in a tabular format as follows:

- Column 1 provides the Report Heading and Sub-Heading, and includes references to the applicable section of the Regulation;
- Column 2 lists the Minimum Requirements to be followed;
- Column 3 provides Guidance on the Content of the Report Text and Other Requirements of the Phase Two ESA; and
- Column 4 includes Additional Remarks for the QP’s consideration.

Additional context for the explanatory notes in Columns 3 and 4 is provided through selective reference to the following guidance documents:

- APGO Guidance for Environmental Site Assessments Under Ontario Regulation 153/04 (as amended), April 2011 (available on the APGO website at www.apgo.net, referred to in this template as the “APGO ESA Guidance”); and
- Ministry of the Environment Guide for Completing Phase One Environmental Site Assessments Under Ontario Regulation 153/04 and Guide for Completing Phase Two Environmental Site Assessments Under Ontario Regulation 153/04, June 2011 (available on the MOE website at www.ene.gov.on.ca, referred to in this template as “MOE Phase One ESA Guide” and “MOE Phase Two ESA Guide”, respectively).

It should be noted that the Regulation is structured such that certain requirements are repeated throughout various sections. The template follows the format of the Regulation to ensure that the applicable regulatory requirements are covered. In completing the phase two ESA report, the QP should ensure that there is a logical flow of information in the report that addresses the relevant aspects of the Regulation while avoiding unnecessary repetition. The QP should note that not all the report sections and sub-sections indicated in the template may be applicable depending on the scope of the phase two ESA undertaken.

3.0 REPORT STRUCTURE

1.0 EXECUTIVE SUMMARY

2.0 INTRODUCTION

- 2.1 Site Description
- 2.2 Property Ownership
- 2.3 Current and Proposed Future Uses
- 2.4 Applicable Site Condition Standards
- 2.5 General Objectives

3.0 BACKGROUND INFORMATION

- 3.1 Physical Setting
- 3.2 Past Investigations

4.0 SCOPE OF THE INVESTIGATION

- 4.1 Overview of the Site Investigation
- 4.2 Media Investigated
- 4.3 Phase One Conceptual Site Model
- 4.4 Deviations From Sampling and Analysis Plan
- 4.5 Impediments

5.0 INVESTIGATION METHOD

- 5.1 General
- 5.2 Drilling and Excavating
- 5.3 Soil: Sampling

- 5.4 Field Screening Measurements
- 5.5 Groundwater: Monitoring Well Installation
- 5.6 Groundwater: Field Measurement of Water Quality Parameters
- 5.7 Groundwater: Sampling
- 5.8 Sediment: Sampling
- 5.9 Analytical Testing
- 5.10 Residue Management Procedure
- 5.11 Elevation Surveying
- 5.12 Quality Assurance and Quality Control Measures

6.0 REVIEW AND EVALUATION

- 6.1 Geology
- 6.2 Groundwater: Elevations and Flow
- 6.3 Groundwater: Hydraulic Gradients
- 6.4 Fine-Medium Soil Texture
- 6.5 Soil: Field Screening
- 6.6 Soil Quality
- 6.7 Groundwater Quality
- 6.8 Sediment Quality
- 6.9 Quality Assurance and Quality Control
- 6.10 Phase Two Conceptual Site Model (*note: this information is contained in previous sections of the report but should be briefly summarized here in the suggested format below, as this information is required to be uploaded onto the RSC form*)
 - 6.10.1** Areas of Potentially Contaminating Activities
 - 6.10.2 Areas of Potential Environmental Concern
 - 6.10.3 Subsurface Structures and Utilities
 - 6.10.4 Stratigraphy (*including depth to bedrock, and water table*)
 - 6.10.5 Applicable Site Condition Standards (*sensitive site, shallow bedrock etc.*)
 - 6.10.6 Location of Buildings (*including proposed buildings, if known*) and Structures
 - 6.10.7 Areas of Contamination on the Property (*illustrate on a plan map*)

- 6.10.8 Contaminants on the Property (*can be combined with above plan map or provided in tables*)
- 6.10.9 Contaminated Media (*i.e., soil, sediment or groundwater*)
- 6.10.10 Description of Areas of Contamination
- 6.10.11 Distribution of Contaminants
- 6.10.12 Mechanism of Discharge of Contaminants
- 6.10.13 Migration of Contaminants
- 6.10.14 Climatic and Meteorological Conditions Affecting Contaminant Migration
- 6.10.15 Soil Vapour Intrusion (if applicable)
- 6.10.16 Figures that illustrate the stratigraphy, contaminant release mechanisms, contaminant transport pathways, human and ecological receptors, receptor exposure points, and routes of exposure.

7.0 CONCLUSIONS

- 7.1 Summary of site conditions (stratigraphy)
- 7.2 Environmental conditions (soil, sediment and groundwater quality)
- 7.3 Whether site condition standards, including risk assessment standards (if risk assessment was undertaken) were met as of the certification date.

8.0 REFERENCES

9.0 FIGURES AND TABLES

Tables should include:

- Sampling locations and rationale
- Elevations of boreholes and monitoring wells, and x,y coordinates
- Soil (and sediment) analytical data
- Groundwater analytical data

Figures should illustrate:

- General location map

- Site plan
- Phase one conceptual site model
- Sampling locations
- Soil quality
- Groundwater quality
- Cross-sections
- Other figures illustrating phase two conceptual site model

10.0 APPENDICES

1. Sampling and Analysis Plan
2. Finalized Field Logs
3. Certificates of Analysis
4. Residue Management
5. Survey of Phase Two Property
6. Remediation
7. Confirmation Sampling and Analysis
8. Soil Excavated or Brought to a Phase Two Property

4.0 PHASE TWO ESA REPORTING TEMPLATE

Report Heading and Sub-Heading/ Applicable O.Reg. 153/04 Section	Minimum Requirements	Guidance on Content of the Report Text and Other Requirements of the Phase Two ESA	Additional Remarks
1. Executive Summary	Provide a brief summary of the report.	The Executive Summary should be prepared after the other sections, tables, figures, and appendices of the report are completed and should include a brief overall description of each section of the report. It should be a stand-alone document sufficient in content to provide an overall understanding of all aspects of the phase two ESA. Typically, the length of the Executive Summary would not be more than 10% of the full text of the report (not including data, appendices and figures).	The executive summary should be applicable to the RSC portion of the site. If the phase two covers an area greater than the RSC property, make sure that this is clarified in the executive summary and include the aspects of the phase two ESA relevant to the RSC portion (e.g., number and locations of boreholes, monitoring wells, soil and groundwater samples, etc.).
2. Introduction	Provide the following:		

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(i) Site Description	i. municipal address and property identifier number if any, of the phase two property.	Provide Municipal address, legal description, legal survey and other property information of the RSC property as described in the letter prepared by the lawyer. A plan of survey as defined in S. 4.1, paragraph 7 of Schedule A must be attached as an appendix	<p>Note that the regulatory requirements apply to the RSC property. If it is not the same as phase two property and is a part it, the data for the sampled media that pertain to the RSC property should be identified in the RSC. Data from outside the RSC portion may be used in developing the overall conceptual site model, but sufficient data should be available within the RSC portion to support the characterization of sub-surface conditions in the RSC portion.</p> <p>(Note: If groundwater investigation is undertaken, there should be a minimum of three monitoring wells in each RSC portion, regardless of its size).</p>
	ii. size and boundaries of the phase two property.	Describe the size (in hectares) and boundaries of the phase two property. If the dimensions of the phase two property are not the same as the RSC property, the dimensions of the RSC property should be described. Include a	Provide a plan map of suitable scale to identify the RSC property and its geographical setting.

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		<p>plan map showing the dimensions of the phase two and RSC properties.</p>	
<p>(ii) Property Ownership</p>	<p>Provide the name and address and other contact information for the owner of the phase two property and the name, status and other contact information for any other person who has engaged the qualified person to conduct the phase two environmental site assessment.</p>	<p>Provide relevant details from the lawyer's letter describing the owner's interest in the RSC property (e.g. registered owner, beneficial, partnership etc.).</p>	<p>Note: only the site owner can complete the "Owner's Certification" on the RSC form. However, an owner may designate (i.e., authorize) an "agent" who may include any person including a lessee. The agent's authorization must be on a form approved by the Director. The agent may then complete and sign the certification statement on behalf of the owner for the purpose of filing the RSC.</p>
<p>(iii) Current and Proposed Future Uses</p>	<p>Provide the identification of the current and proposed uses of the phase two property.</p>	<p>Describe past (current) and intended use of the RSC property and comment on whether it requires mandatory submission of RSC for filing (i.e., a change from a less sensitive to a more sensitive land use). Section 168.3.1 of the Act prohibits the proposed new use to a more sensitive use unless an RSC is filed.</p>	<p>Refer to definitions provided in Part I of the Regulation for the applicable land uses, and use these specific definitions to describe the current and proposed land uses.</p>

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(iv) Applicable Site Condition Standards	<p>Provide the rationale for the choice of the applicable site condition standard for the phase two property, based on consideration of matters relevant to the choice, including:</p> <ul style="list-style-type: none"> • “area of natural significance”; • Proximity to a water body; • Potable or non-potable groundwater conditions; • Soil texture and soil pH; • Full-depth or stratified approach; • Soil (overburden) thickness 	<p>Refer to O. Reg. 153/04 Part I, sections 1 – 9, and sections 34 to 41 and 43.1 for details. List the regulatory conditions, and state why the relevant conditions are or are not applicable.</p> <p>For additional guidance, refer to:</p> <ul style="list-style-type: none"> • <i>Notes</i> and <i>Additional Notes</i> provided with the “Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the <i>Environmental Protection Act</i>” to further assess whether the selected site condition standards are applicable given the site-specific hydrogeological conditions of the phase two property (special considerations may apply in selecting the appropriate standards if the water table is << 1.5m deep). • Soil texture: refer to Section 6.3.10.4 of the APGO ESA Guidance for guidance on selection of soil texture based on the dominant soil texture, including the presence of preferential contaminant pathways. 	<p>If the nonpotable condition applies, make sure the nonpotable notification to lower/single tier and upper tier municipality is given within six (6) months prior to submitting RSC. A written response from the municipality is required if the RSC is submitted within 30 days of the submission of the notice to the municipality. Include the notice to the municipality and response, if available, in an appendix. Provide evaluation of sections 41 and 43.1 and comment whether it is applicable to the RSC property.</p>

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		<ul style="list-style-type: none"> • Ensure that soil pH of a representative number of soil samples is measured. (Note: even a single soil sample outside the acceptable pH range may result in a “sensitive site” classification). If averaging of pH is considered, refer to the MOE Technical Update (2007) - Environmentally Sensitive Areas: pH levels 	
v. General Objectives Section 33.1, O. Reg. 153/04	<ol style="list-style-type: none"> 1. To determine the location and concentration of contaminants in the land or water on, in or under the phase two property. 2. To obtain information about environmental conditions in the land or water on, in or under the phase two property necessary to undertake a risk assessment, in accordance with this Regulation, with respect to one or more contaminants of concern. 3. To determine if applicable site condition standards and standards specified in a risk assessment for contaminants on, in or under the phase two property were met as of 	Describe how the general objectives as outlined in the sub-sections in Column 1 were met in completing the phase two ESA.	Refer to the sampling and analysis plan to demonstrate how this objective was met. Seasonal fluctuations of the water table when determining groundwater flow directions should be accounted for by seasonal groundwater level measurements. If the annual variation in groundwater flow direction from an APEC is not relevant, e.g., for GW2 considerations, then indirect methods of estimating the expected seasonal water table fluctuation at the site may be

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	<p>the certification date.</p> <p>(2) The qualified person shall ensure that the general objectives of a phase two environmental site assessment are achieved by,</p> <p>(a) developing an understanding of the geological and hydrogeological conditions at the phase two property; and</p> <p>(b) conducting one or more rounds of field sampling for all contaminants associated with any area of potential environmental concern identified in the phase two sampling and analysis plan and for any such contaminants identified during subsequent phase two activities and analyses of environmental conditions at the phase two property. O. Reg. 511/09, s. 14.</p>		<p>acceptable if sufficiently conservative.</p>
<p>3. Background Information</p> <p>(i) Physical Setting</p>	<p>Provide a description of the general physical setting of the phase two property including,</p>	<p>Describe the physiography of the RSC property as extracted from Ontario base maps, published reports, site visit, previous reports, other documents or published reports. Describe land uses</p>	<p>For a general description of overall physiography, Quaternary and/or Paleozoic records, refer to Ontario Geological Survey reports, available through the Geology Ontario website. Particularly useful sources include The Physiography of Southern Ontario (Chapman & Putnam,</p>

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		surrounding the property.	1984) and Index to Maps, Surficial Geology, 1891-1991 (Ministry of Northern Development and Mines, 1991).
	i. water bodies and areas of natural significance within the phase one study area, and	<p>Refer to the phase one ESA. Ensure that the description of water bodies and areas of natural significance are consistent with the definitions in O. Reg. 153/04, Part I, Section 1. Refer to the municipality's Official Plan to confirm the environmental designation of the site and land within 30 metres of the site.</p> <p>A natural stream or watercourse that is seasonally dry and is within 30 metres of the site may not be considered as a "permanent water body" for the purpose of classifying the site as sensitive. However, it is recommended that the QP confirm this with the appropriate municipality or conservation authority.</p>	Even if this section does not apply to the RSC property, provide your evaluation and comment why it is not applicable.

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	ii. the topography and surface water drainage features on the phase two property.	Describe the surface topography and state how the presence of natural surface water bodies or man-made features such as sewers, drainage ditches, flood control measures, ponds, berms, paving etc. may affect surface drainage at the phase two property and potentially influence the local groundwater flow.	Include a topographic map to illustrate the general topography of the area, a sewer utility map showing the depths of the trenches which potentially surround the brownfield property, and any other feature(s) although technically off- site may still be relevant with respect to groundwater flow direction. Drainage features may include water bodies and other surface water features that do not meet the definition of a (permanent) water body (e.g., intermittent or ephemeral drainage features).
(ii) Past Investigations	Provide,		
	i. a summary of any relevant past investigations of the phase two property, and	Provide a summary text of each report reviewed describing the relevant environmental findings in the report and comment how the information in the report was used to complete the phase two ESA. (E.g., geotechnical reports may provide information on soil type and depth to bedrock; this information can be used to guide the phase two	Provide a list of the reports that were reviewed.

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		ESA and develop the phase two CSM).	
	ii. documentation of the steps taken to confirm that information or data which are to be used from previous investigations are of adequate quality such that it can be relied upon.	Describe the sampling methodology, QA/QC procedures etc., that were used in the previous investigations to confirm the adequacy of the data, if the data from previous reports are used to support the conclusions of the phase two ESA; describe briefly how the data being used are relied on.	If data older than 18 months are used, the QP must demonstrate that the data are valid to support the conclusions of the current phase two ESA(e.g., no additional APECs are identified) so that all data can be considered valid for the period up to 18 months before submitting the RSC. An update to the phase two ESA is required in such cases.
4. Scope of the Investigation (i) Overview of Site Investigation	Provide an overview of the site investigation conducted with respect to the phase property.	Describe the objectives of the investigation, as described in O. Reg. 153/04 subsection 33.1, as they pertain to the specific property. Summarize all tasks that are to be undertaken in completion of this report. This includes description of: health and safety plan; utility clearance; selection of drilling equipment; all field tasks, including equipment used, methods of sample collection, when work was performed, field observations, summary of samples collected, and analyses performed, and laboratory used.	A sampling and analysis plan incorporating site-specific considerations should be prepared and included as part of the appendix containing the standard operating procedure (SOP), a quality assurance and quality control program, data quality objectives, procedures and a description of any physical impediments that interfere with or limit the ability to conduct sampling and analysis. Note: deviations from

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		<p>Document impediments or access limitations for drilling and how this may affect the conclusions of the Phase II ESA. If there were no impediments or access limitations to the planned drilling locations, then include a statement in the report stating this.</p> <p>Refer to Section 5 of the APGO ESA Guidance and Section 4 of the MOE Phase Two ESA Guide for further guidance.</p>	<p>the sampling and analysis plan may be justified depending on specific conditions encountered in the field.</p> <p>The sampling and analysis plan should be a straightforward and simple set of instructions that field personnel should follow in completing the site investigation.</p> <p><i>(sampling and analysis plan and SOPs are beyond the scope of this template).</i></p>
(ii) Media Investigated	Provide,		
	i. the rationale for whether to include in the field investigation sampling and analysis of each of ground water and sediment on, in or under the phase two property, and	<p>Groundwater sampling is mandatory at a phase two property under certain conditions. Refer to O.Reg. 153/04, Schedule E, Part III, Section 6 for mandatory groundwater sampling requirements .</p> <p>Groundwater sampling is not mandatory if the QP can justify why it is not necessary. Refer to Section 6.2 of the</p>	<p>Groundwater sampling in a phase two ESA is mandatory under the Regulation when the property is an “enhanced investigation property” (i.e., it is or was used as a garage, a bulk dispensing facility, including a gasoline outlet, or for the operation of dry cleaning</p>

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		<p>APGO ESA Guidance for further guidance on this matter.</p> <p>Comment on selection of media to be tested in the field. Provide justification for selection of media to be sampled. For example if only soil sampling is undertaken, then rationale for not including ground water investigation should be provided.</p> <p>Sampling of sediments is required if sediments are present at a site.(Note: "sediment" means the soil, to a maximum depth of 0.15 metres, located at the base of a water body)</p>	<p>equipment).Groundwater sampling is also mandatory when there is no soil on, in or under the RSC property At other properties, the QP may exercise discretion on the need for groundwater assessment, based on factors such as the mobility of the contaminant. This would typically only apply at sites where metals are the only contaminants.</p> <p>Notwithstanding the above consideration, it is considered good practice to routinely conduct groundwater assessment to establish the baseline groundwater conditions at a site and provide confirmation of the potential inter-relationship between soil and groundwater contamination.</p>

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	ii. an overview of the field investigation of each medium for which sampling and analysis were done.	<p>Provide a summary of the investigation of the selected media (number of boreholes/monitoring wells, number of soil/ground water sample etc.), a detailed site plan, indicating all known (former and current) sampling locations, and existing buildings and structures at the site.</p> <p>Include data tables, figures showing the sampling locations borehole logs. In case where any medium (example: groundwater or sediment) is not sampled, provide rationale with a brief explanation.</p>	<p>The borehole and monitoring well logs should indicate: soil sampling intervals; visual and olfactory observations; parameters analyzed in each soil and groundwater sample; well screens; water levels</p> <p>Stratigraphic description, including geotechnical description, if available, such as blow counts and RQD that would be helpful in assessing the contaminant transport potential of the formation.</p>
(iii) Phase One Conceptual Site Model	<p>Provide a description of the phase one conceptual site model prepared as part of the phase one environmental site assessment report and of relevant subsequently acquired information.</p>	<p>Essentially copy and paste the phase one CSM here. Note the CSM narrative and accompanying figures should be a part of the text of the report and not attached as appendix. In addition, discuss PCAs in the phase one study area and APEC(s) in, on or under the RSC property.</p> <p>Note: the phase two sampling and analysis plan should be based on the PCAs and APECs identified in the phase one CSM, and additional site information or judgment of the QP.</p>	<p>The phase one CSM consists of a site plan illustrating the location of APECs at the phase one property and relevant PCAs etc. and a description as outlined in table 1 of schedule D. Where additional information is available, such as soil type, depth to groundwater, groundwater flow direction, presence of utilities that may influence the flow of groundwater etc., the phase one CSM should incorporate</p>

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		<p>If any new APEC is discovered during the phase two site investigation, it should be recorded in the APEC table (Example: a previously unidentified buried UST may be discovered during field investigation)</p>	<p>this data to provide a pictorial (2-D i.e., cross-section or 3-D) representation of the site conditions. This will assist in planning the locations and depths of boreholes and monitoring wells in the phase two ESA. Refer to Section 3.4.1 of the MOE Phase One ESA Guide</p>
<p>(iv) Deviations From Sampling and Analysis Plan</p>	<p>Provide a description of any deviations from the sampling and analysis plan.</p>	<p>Provide a rationale table for the sampling locations, number of samples, sampling method, and analytical suite for each sampling location, based on the findings of the phase one ESA, the preliminary phase two CSM, and field observations. Provide a description of QA/QC protocol followed for sampling and handling soil during the program.</p> <p>Refer to Section 6.7 of the APGO ESA Guidance describing QA/QC protocols.</p>	<p>This should also be documented in the sampling and analysis plan prepared for the phase two property and attached in the appendix. If there was no deviation from the sampling and analysis plan, say so.</p>

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(v) Impediments	Provide a description of any physical impediments and documentation of any denial of access.	<p>Describe any physical obstacles or particular safety considerations that prevented the implementation of the sampling program as planned, and how this deviation may affect the conclusion of the phase two ESA.</p> <p>(Note: safety considerations are paramount and should not be compromised under any circumstances).</p>	<p>The sampling and analysis plan should be flexible enough to address obstacles or deviations that are typically encountered in the field. The planning of the phase two ESA program should address the need for additional sampling that is typically required following the results of the initial sampling. Thus, strict adherence to the sampling plan should not be regarded as mandatory but rather it should be used as a framework for the phase two ESA so that deviations from it, as long as they are justified and documented, would enhance rather than invalidate the conclusions of the phase two ESA. (Section 5.4 of the APGO ESA Guidance).</p>
5. Investigation Method: Soil (i) General	Provide a brief description of all methods as specified in the following sections. Where the method differs from the associated standard operating procedure (SOP), provide a detailed description of the method	Refer to the SOP and document any deviations from it, and the rationale for the deviation.	Refer to Section 6.0 (pages 21 - 56) of the APGO ESA Guidance for more detailed guidance on investigation methods for assessing soil and groundwater quality.

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	used, and a rationale for the change in method.		
(ii) Drilling and Excavating	Provide for each borehole drilled or test pit excavated,	Provide details of each phase of the work, if there were more than one episodes of drilling and sampling.	
	i. the name of the contractor,		Ontario-licensed well contractors should be used for drilling and installing monitoring wells.
	ii. a description of the equipment used,	Back-hoe, excavator, drilling and sampling equipment should be described.	Refer to Section 6.0 of the APGO ESA Guidance for a description of commonly-used drilling and sampling equipment.
	iii. a description of the measures taken to minimize the potential for cross-contamination, and	For test-pits, describe the procedure for segregating visually impacted soil from non-impacted soil, and sequence of backfilling the test-pit. Describe the drilling procedure used to ensure that the potential for cross-contamination between separate groundwater bearing units is minimized. This would include procedures such as grouting or cementing well casing at the overburden-bedrock interface; use of telescoped boreholes for investigating separate groundwater units in fractured	It should be part of field QA/QC and details of precaution taken in sample collection (dedicated sampling bottles, cleaning procedures etc.) and sample preservation.

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		bedrock; and avoiding drilling through highly contaminated zones or zones where free-phase liquids (DNAPLs) are observed.	
	iv. the frequency of sample collection.	Describe if continuous soil cores or split spoon samples were taken and the rationale for the frequency of sample collection for laboratory analysis (e.g., visual observations, field screening etc.).	This is best described by means of a table indicating the location of the soil sample in the borehole, the analytical parameters and field screening results. The location of the soil samples should also be identified on the borehole log.
(iii) Soil: Sampling	Provide,		
	i. a description of all equipment used to collect soil samples, and	Describe the equipment used to collect the soil sample: split-spoon sampler, continuous tube, trowel, putty knife etc., and sample containers (glass jars, plastic bags etc.). For soil samples from test pits, describe whether the samples were collected from the floor or walls of the test-pit or from the back-hoe or excavator bucket.	Split-spoon or direct-push soil sampling of boreholes is preferred. However, the presence of cobbles or glacial till may make it difficult or impossible to drive the sampler. Under these conditions, the QP may consider collecting soil samples directly from the

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			auger flights.
	ii. a geological description of soil and sediment cores and samples, based on the finalized field logs for each monitoring well, test hole or intrusive investigation point.	Record: soil texture, compactness and consistency, geological description, odour, visual staining, moisture content (saturated or not saturated). The description should be transcribed on the borehole or monitoring well log.	
(iv) Field Screening Measurements	Provide a description of any equipment used to perform field screening measurements including,	Describe the rationale used to select soil samples for analysis based on field screening instruments.	Section 6.3.10.2 of the APGO Guidance Document provides additional details on the selection and use of screening instruments.
	i. make and model number,	Provide a summary of make, model, accuracy, range etc. of the equipment used.	
	ii. chemicals the equipment can detect and associated detection limits,	Field screening instrument detection limits, if available, are meant for qualitative purposes only.	
	iii. precision of the measurements,	See above.	
	iv. accuracy of the measurements,	See above.	
	v. calibration reference standards such as span gas, and	Refer to manufacturer's data.	
	vi. procedures for checking calibration of the equipment.	See above.	

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	Provide a description of how field screening measurements were used to select samples for laboratory analysis, if applicable.	State if other physical evidence (odour, colour, staining etc.,) in addition to field screening was used to select soil samples for analysis.	Refer to Section 6.3.10.2 of the APGO ESA Guidance
	Where a field screening method was different from what was proposed as a standard operating procedure in the sampling and analysis plan, provide a description of, and rationale for, the difference.	If you have changed the screening equipment and /or screening method described in SOP, provide details here	Comment on any new procedure if used and not mentioned in the sampling and analysis plan. Note that the field screening methods are meant to aid in selecting soil samples for chemical analysis. The field screening data should not be used to compare with generic standards or standards identified in a risk assessment
5. Investigation Method: Soil (continued) Soil samples, requirements: Section 17, Schedule E	The qualified person shall ensure that the following requirements concerning soil sampling are met: 1. Soil samples for characterization or delineation shall be collected from undisturbed soils on, in or under the phase two property and not from soil which has been excavated, unless delineation is being undertaken after completion of actions to reduce the concentration of contaminants in which case soil samples shall be collected both from undisturbed soils	The requirements in sections 17, 18 and 21 of Schedule E should be followed in preparing sampling and analysis plan. In, addition these should be included in brief at appropriate place in the text of the report. Note that for vertical and horizontal delineation of soil contamination, the soil is considered to be contaminated until the next "clean" vertical and horizontal sampling location.	

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	<p>on, in or under the phase two property and from stockpiles of soil which is intended to remain on the property permanently.</p>		
	<p>2. Soil samples shall be collected using professionally acceptable soil collection methods.</p>	<p>Ensure that the soil collection method is a professionally accepted method. For example by drilling or test pitting and using standard collection methods. Refer to the MOE 2011 Analytical Protocol document for collection of soil samples for VOC analysis.</p>	<p>Refer to Section 6.0 of the APGO ESA Guidance.</p>
	<p>3. Precautions shall be taken to minimize the potential for cross-contamination or contamination through preferential pathways.</p>	<p>Precautions to minimize the potential for cross-contamination should include the use of dedicated gloves and sample bottles, and proper cleaning of sampling equipment between drilling locations.</p>	

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	<p>4. Grain size analysis shall be undertaken by a laboratory whenever a standard for fine-medium textured soil is to be applied.</p> <p>Grain-size analysis is not required if a coarse-grained soil texture will be used.</p>	<p>Ensure that a representative number of soil samples are taken to determine the soil texture.</p> <p>The QP should consider the likely contaminant transport or exposure scenario in selecting the soil texture.</p> <p>The use of (the more conservative) coarse-grained texture is warranted if a preferential pathway of coarse-grained texture is present, even though the grain size analyses may indicate an overall medium-fine grained texture.</p> <p>Supporting rationale should be provided.</p>	<p>(Refer to Section 6.3.10.4 of the APGO ESA Guidance)</p> <p>Grain size analysis should be conducted by a laboratory in accordance with the ASTM Standard # D24587.</p>
<p>Section 18, Schedule E</p>	<p>The qualified person shall ensure that the number of samples of soil collected and analyzed is sufficient to determine the subsurface stratigraphy at or under the phase two property and the location of contaminants in soil, on, in or under the phase two property.</p>	<p>Note Part II Delineation, Section 7(c) of O. Reg. 153/04. In addition to the minimum sampling requirements in Table 2 and Table 3 of Schedule E, the maximum contaminant concentration present in the sampled medium should be determined. The influence of a "dirty" sample will extend up to the next "clean" sampling location (not half way).</p> <p>Describe the sampling method used, e.g: Judgment or focused sampling – focus on identified APECs and visual observations;</p>	<p>The soil samples should be taken to delineate a contaminated soil horizon both laterally and vertically. The soil samples should be collected by appropriately selecting sampling locations in plan as well as collecting one or more samples at depth.</p> <p>Refer to Section 6.3.1 of the APGO ESA Guidance</p>

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		Random sampling – no obvious sources of contamination; Systematic or grid sampling – may be used where widespread contamination (e.g., fill of unknown quality) may be expected,	
Selecting soil sample for analysis: Section 21, Schedule E	The qualified person shall ensure the following are considered when soil samples to be analyzed are being selected in order to ensure the samples analyzed are representative of the maximum concentration of a contaminant in each area of the phase two property to be investigated: 1. Any evidence of the presence of a contaminant. 2. The maximum concentrations of a contaminant, i. measured using field screening equipment, and ii. any other field screening means which may be necessary to ensure the analysis includes such maximum concentrations.	In addition to the field equipment measurements, one should consider physical evidence including visual and olfactory evidence in the selection of samples for analysis. The sample density (frequency) should be designed to locate the maximum concentration (both vertical and horizontal near the source) in delineating the extent of contamination.	Refer to Section 5(iii) above for guidance on collecting samples from test-pits. To facilitate vertical delineation, the QP may consider collecting soil samples at regular intervals and based on screening observations etc., throughout the borehole to its maximum depth; submitting selected samples for laboratory analysis; retaining the others in case further vertical delineation is required; and then submitting the additional samples for analysis provided that hold times are met.

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5. Investigation Method: Groundwater (v) Ground Water: Monitoring Well Installation	For each monitoring well installed provide,		(Refer to Section 6.4 of the APGO ESA Guidance)
	i. the name of the contractor,		
	ii. a description of the equipment used,	Specify the type of rig (auger or probe) and describe the auger size and type (solid vs hollow).	
	iii. a description of the measures taken to minimize the potential for cross-contamination, and iv. the frequency of sample collection	Describe in detail all field precautions taken to minimize cross contamination of samples including use to disposable nitrile gloves, cleaning and rinsing of non-dedicated sampling equipment,	

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	<p>during drilling, if any</p>	<p>using laboratory supplied sample bottles etc.</p> <p>To prevent cross-contamination of the subsurface, drilling through highly contaminated zones, including DNAPLs, should be avoided. The overburden-bedrock interface should be sealed if drilling extends into the bedrock.</p> <p>Where LNAPL is expected to be present (e.g., at sites with PHC impacts), the well screens should be positioned such that LNAPL floating on the water table is likely to be intersected. The seasonal fluctuation of the water table should be considered in selecting the positioning and length of the well screen. (Refer to Part III, Section 8 of the Regulation).</p> <p>Note: The Regulation precludes visible sheen or free-phase product and the PHC standards are not considered to be met if sheen or free-phase product is observed on/in groundwater. Refer to Section 23.1, Schedule E of the Regulation requiring the use of an oil-water interface probe to detect</p>	<p>Telescoped boreholes should be considered for investigating separate groundwater units in fractured bedrock;</p> <p>The monitoring wells should be located within the APEC (e.g., former UST tank nest) and down-gradient of the APEC at a suitable spacing to assess the potential existence of a PHC plume down-gradient of the APEC.</p> <p>The use of a transparent bailer is recommended in addition to an oil-water interface probe to allow for the visual observation for sheen or free-phase product, as the oil-water interface probe may not be</p>

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		floating LNAPL.. Visible sheen and measurable floating product are separate features and both are not allowed.	sensitive enough to detect an LNAPL layer less than about 2mm thick.
	Provide a description of the methods used to develop monitoring wells.	This should be described in the SOP. Provide here a summary from text in the SOP and include any deviations from the SOP	Refer to Section 6.0 of the APGO ESA Guidance.
(vi) Ground Water: Field Measurement of Water Quality Parameters	Provide a description of the methods used to measure water quality parameters such as pH, specific conductance and temperature.	<p>The QP may consider measuring additional parameters such as turbidity and redox potential depending on site-specific conditions.</p> <p>Field parameters are subject to fluctuation and it may be difficult to determine when they have stabilized. The SOP should account for this so that site-specific decisions may be made regarding the frequency and duration of field measurements in order to determine when conditions may have stabilized prior to sampling.</p>	Normally, purging of 3-5 volumes of water in the well bore should be sufficient to permit groundwater sampling in a well.
(vii) Ground Water: Sampling	Provide a description of the methods used to collect ground water samples.	The SOP should describe the sampling methods that will be used to collect the groundwater samples. Note that the	Refer to Section 6.4 of the APGO Guidance for a description of groundwater

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		collection of groundwater sample at the base of an excavation pit is not considered an accepted practice and therefore should not be used.	sampling methods. Low-flow sampling is preferred for sampling of organic parameters including PHCs and VOCs. Shorter well screens spanning the saturated formation are preferred as more representative groundwater samples may be obtained due to reduced dilution in the well bore. Low-flow sampling combined with observation of the water column in a transparent bailer to test for visible sheen and an oil/water interface probe to determine the thickness of any product should be used to assess the presence of LNAPL sheen or thickness, respectively. For field filtering requirements refer to the MOE analytical protocol
(viii) Sediment: Sampling	Provide a description of the methods used to collect sediment samples.	Describe where applicable. Refer to the MOE document "Guidelines for Identifying Assessing and Managing Contaminated Sediments in Ontario: An Integrated Approach, May 2008" for	Note the regulatory definition of "sediment". If sediment is not present at a site, say so.

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		sediment sampling techniques and analysis.	
(ix) Analytical Testing	Provide the names of all laboratories used for analysis of soil, sediment or ground water samples.	<p>Ensure that the selected analytical laboratories are accredited to perform chemical analyses under O. Reg. 153/04, and inform the laboratories that the analyses are required under the protocols specified under the regulation.</p> <p>Review the analytical results to ensure that the required method detection limits (MDLs) for individual parameters are met; or the laboratory provides an explanation why the MDLs cannot be met and how this may affect the interpretation of results.</p> <p>The lab should strive to meet the MDLs, as an MDL above the applicable generic standard may be considered as being indicative of exceedance of the standard for the particular parameter.</p>	<p>The analytical requirements are described in the MOE document "<i>Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, July 1, 2011</i>" ("analytical protocol"). The laboratory is required to analyze in parameter groups defined in the analytical protocol (example: PHC Fractions F1 to F4 should be analyzed even though one parameter e.g., F4 may not be required)</p>
(x) Residue Management Procedures	Provide detailed documentation of procedures used for the management of residues from the field investigation including management of ,	<p>This should have been described in the sampling and analysis plan and repeated here.</p> <p>Soil cuttings and purge water should be</p>	<p>Refer to Section 6.9 of the APGO ESA Guidance.</p> <p>TCLP analysis may be required for disposal of the soil</p>

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		<p>drummed on-site pending chemical analysis to evaluate disposal options.</p> <p>Soil cuttings may be managed on-site if the soil meets the applicable generic standards for the site and there is no evidence of NAPL and odours.</p> <p>Purge water may be discharged on-site on the ground if there is no NAPL, sheen or odour and it meets the applicable generic standards. .</p>	<p>at a landfill site.</p> <p>It is always a good field practice to collect purge water, equipment wash water etc. in a drum and discard only after receiving analytical results.</p>
	i. soil cuttings from drilling and excavations,	See above	
	ii. water from well development and purging, and	See above	
	iii. fluids from equipment cleaning.	See above	
(xi) Elevation Surveying	Provide an accurate specification of the location of any benchmark used in surveying of elevations.	Elevations of boreholes and monitoring wells should be referenced to a permanent bench mark and not an assumed elevation. Refer to S.23 (f), Schedule E of the Regulation.	The elevations should be referenced to a geodetic reference point or to a permanent bench mark. It is up to the QP to determine and locate a convenient permanent bench mark/geodetic point. It is suggested that the surveys be completed by an Ontario land surveyor, and geographical co-ordinates be

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			provided for the boreholes and monitoring wells in addition to the elevations. The use of a hand-held GPS device is not recommended for providing the co-ordinates of the monitoring wells. The hand held device however may be used to estimate centroid of the RSC property.
(xii) Quality Assurance and Quality Control Measures	Provide,	This should have been described in the sampling and analysis plan and repeated here.	
	i. a description of sample containers, preservation, labelling, handling and custody for samples submitted for laboratory analysis, including any deviations from the sampling and analysis plan,	Provide a detailed text explaining type of sample containers, type and amount of preservative if used, sample handling, labeling, chain-of-custody protocol, shipment procedures etc.	The accredited laboratory should provide appropriate sampling containers for use in accordance with the analytical protocol.
	ii. a description of equipment cleaning procedures followed during all sampling,	See above.	
	iii. a description of how the field quality control measures referred to in subsection 3(3) were carried out, and	This should be taken from the analysis and sampling plan already prepared for the site.	
	iv. a description of, and rationale for, any deviations from the procedures	Describe the deviations, if any, from the sampling and analysis plan, the	

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	set out in the quality assurance and quality control program set out in the sampling and analysis plan.	rationale for the deviations and whether the deviations may affect the data quality objectives. .	
<p>5. Investigation Method: Groundwater (continued)</p> <p>Variation in ground water level: Section 22, Schedule E</p>	<p>(1) The qualified person shall ensure that measuring ground water levels and determining ground water flow direction is undertaken during the site investigation and that this includes consideration of,</p> <p>(a) temporal ground water level variations on, in or under the phase two property; and</p> <p>(b) whether and how such variations may affect the distribution and concentration of contaminants in the ground water.</p> <p>(2) The measurement and determination referred to in subsection (1) shall be carried out at the times and places needed, but shall be included whenever ground water sampling is undertaken.</p>	<p>Ensure that each of the requirements in sections 22, 23, 24, 25 and 28 of Schedule E are followed. In preparing the sampling and analysis plan, and described in brief at appropriate place in the text of the report.</p>	<p>Refer to Section 6.4.3 of the APGO Guidance.</p> <p>The QP should account for fluctuations of the water table either through seasonal water level measurements if the scope of the phase two ESA permits, or other information (such as typical water level fluctuations in similar hydrogeological settings).</p>
Ground water flow directions			

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Section 23, Schedule E	<p>(1) When ground water flow directions are being determined pursuant to section 22, the qualified person shall ensure this is done through an assessment that includes,</p> <ul style="list-style-type: none"> (a) measuring water levels to interpret ground water flow directions in any aquifer that is on, in or under a phase two property and in which a contaminant may be present at a concentration above the applicable site condition standard for the contaminant; (b) using water level measurements that are representative of static and actual conditions; (c) taking into account all water level measurements made when ground water samples have been collected; (d) determining the direction of interpreted ground water flow in each aquifer investigated; (e) assessing the potential for temporal variability in ground water flow direction; (f) determining a reference elevation for each monitoring well reported to 	<p>Ensure that groundwater levels measured in wells screened over the same depth intervals or within the same groundwater unit are used to draw the groundwater contours. (Do not mix groundwater elevations from wells screened over different depth intervals).</p> <p>The groundwater–head contours should be based on recorded groundwater elevations in wells within the phase two/RSC property. The values (concentrations) at each sample point (exceeding or meeting the standards) should be shown on the contour plots. If it is required to illustrate groundwater flow outside the RSC property where groundwater elevation data may not be available, interpretative contours (shown as dashed lines) may be drawn outside the area of data coverage consistent with the overall hydrogeological conceptual site model and supported by other data such as surface topography and the elevation of surface water where the groundwater may be expected to discharge.</p>	<p>The monitoring data for groundwater contouring should be collected same day as to avoid fluctuations due to atmospheric pressure, precipitations etc.</p> <p>If phase two property is to be divided to more than one RSC property, make sure requirements meet for all individual RSCs.</p>

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	<p>the nearest centimetre relative to a geodetic or permanent and recoverable benchmark;</p>		
	<p>(g) measuring water levels in a monitoring well at least 24 hours after the development of the well; (h) determining the ground water elevation of each aquifer in which water level measurements were taken; (i) installing a minimum of three monitoring wells, not placed in a straight line, in each aquifer to be investigated, at locations and in a manner appropriate to interpret horizontal flow directions;</p>	<p>Note - A minimum of three monitoring wells is required where ground water sampling has been conducted, regardless of whether or not any parameter exceeds applicable site condition standard or standards identified in a RA.</p> <p>(Note: the requirement for a minimum of three monitoring wells is based on ideal, homogeneous hydrogeological conditions wherein only one flow direction occurs. In reality, groundwater</p>	<p>Pay particular attention where the phase two property is being split into more than one RSC property. The requirements for a minimum of three monitoring wells will apply to each RSC property.</p>

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	<p>(j) determining horizontal hydraulic gradients for each aquifer; and (k) taking water level measurements whenever ground water samples are collected from a monitoring well, and at such other times as may be necessary to determine ground water flow direction and temporal ground water level variations.</p>	<p>flow direction is most likely curvilinear due to presence of discharge zones, units of differing permeability, and spatially-differing recharge rates that may cause significant annual variation in the direction of groundwater flow. As a result, in practice, more than three wells are typically required to determine groundwater flow directions, especially at brownfield sites where preferential pathways such as buried utilities may further influence the direction of dissolved contaminants travelling with the groundwater).</p>	
	<p>(2) The qualified person shall ensure that the following measures are undertaken where a phase two property is one at which petroleum hydrocarbons, light non-aqueous phase liquids, volatile contaminants, including volatile organic compounds, or dense non-aqueous phase liquids may be present on, in or under the property:</p> <ol style="list-style-type: none"> 1. Testing each monitoring well with an interface probe to determine if light or dense non-aqueous phase liquids are present in the well. 2. Where light or dense non- 	<p>“A property does not meet an applicable site condition standard in relation to a petroleum hydrocarbon unless the qualified person has determined that there is no evidence of free product, including but not limited to, any visible petroleum hydrocarbon film or sheen present in the ground water or surface water or in any ground water or surface water samples. O. Reg. 153/04, s. 49 (1).”</p> <p>To ensure that the absence of sheen or free phase LNAPL at a site is adequately demonstrated (e.g., at a</p>	<p>Although the Regulation is not specific on the application of the generic standards when non-petroleum hydrocarbon free phase liquids may be present in groundwater, it is good practice to ensure that all free-phase liquids are absent at a site to apply the generic standards, as these standards apply only to dissolved-phase contaminants.</p>

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	<p>aqueous liquids are present, measuring the thickness of such free product and including the measurement in determining water levels and measuring and interpreting ground water flow directions.</p>	<p>former gas station site where tanks and piping have been removed), a sufficient number of wells, with well-screens straddling the water table, should be installed at the APEC locations (including on the down-gradient sides of the APECs) to observe for the likely presence of LNAPL.</p>	
<p>Finalized field logs</p>			

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Section 24, Schedule E	<p>(1) The qualified person shall ensure that field logs are recorded and finalized for all intrusive investigation points and test holes in the field investigation to document the soil conditions on, in or under the phase two property.</p> <p>(2) A finalized field log shall include,</p> <ul style="list-style-type: none"> (a) a unique identification number; (b) the date; (c) a description of type and condition of geologic material encountered; (d) a description of type and condition of other material encountered; (e) the soil colour; (f) the soil vapour measurement from field screening for volatile contaminants, including volatile organic compounds; (g) the soil moisture content, using a qualitative description; (h) the observations concerning the soil; <ul style="list-style-type: none"> (i) the identification of soil samples sent for laboratory analysis; (j) the soil sample depths; (k) the soil sampling methods; 	<p>All field observation data should be consolidated and recorded for each borehole and pits using the requirements in this section.</p>	

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	(l) evidence of free flowing product; (m) the total depth drilled; and (n) any drilling refusal.		
Monitoring wells and test holes, finalized field logs			

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Section 25, Schedule E	<p>(1) The qualified person shall ensure that field logs are recorded and finalized for all monitoring wells and test holes constructed during the field investigation to document the ground water conditions on, in or under the phase two property.</p> <p>(2) A finalized field log for a monitoring well shall include,</p> <p>(a) the surveyed location and elevation of the well;</p> <p>(b) the monitoring well identification number;</p> <p>(c) the details of the well construction, including screened interval, sand pack, seal location and thickness, well diameter and screen slot size;</p> <p>(d) the date;</p> <p>(e) the total depth drilled; and</p> <p>(f) any drilling refusal.</p>	<p>All field observation data should be consolidated and recorded for each monitoring well using requirements in this section.</p>	
Section 28, Schedule E	<p>Measurements taken by field screening equipment shall not be used to determine the soil vapour concentration of a contaminant on, in or under the phase two property.</p>	<p>The purpose of the field screening measurements is only to guide the selection of soil samples for laboratory analysis and not to provide a quantitative definition of the level of contamination.</p> <p>If soil vapour measurements are</p>	<p>The following documents describe acceptable, standard methods that should be followed when conducting soil vapour measurements:</p> <p><i>“Final Scoping Assessment of Soil Vapour: Monitoring Protocols for Evaluating Subsurface Subsurface Vapour Intrusion into</i></p>

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		required, soil vapour probes should be installed in accordance with acceptable protocols. (Refer to Schedule E, Section 4 of the Regulation)	<i>Indoor Air. CCME, July 8, 2008.</i> <i>"Draft Technical Guidance: Soil Vapour Intrusion Assessment" MOE, September, 2013.</i>
Requirements for soil to be brought to phase two property			
Section 32, Schedule E	The qualified person shall ensure that where soil that does not originate at the phase two property but is to be brought from another property to a phase two property and remain at the phase two property after the filing of a record of site condition, the following requirements are met:	Sections 32 and 33, Schedule E relates to cases where soil is brought to the phase two property. In order to comply with these sections you should ensure that the RSC property meets all requirements of S. 55 (1) of The Regulation. If conditions in S. 55 are not satisfied then soil meeting Table 1 generic standards should be brought to the RSC property. The description meeting requirements in of S. 55, of O. Reg. 153/04 and a description of procedures to comply with S. 32 and 33, Schedule E should be documented in the report at the appropriate place.	

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	<p>1. Subject to paragraph 2, the concentration of each contaminant in the soil must be equal to or lesser than the standard that would be the applicable site condition standards for the contaminant assuming it was already in, on or under the phase two property.</p>		
	<p>2. Where there has been a risk assessment with respect to one or more contaminants in, on or under the phase two property that included a soil management plan and the risk assessment has been accepted by the Director, the concentration of a contaminant in the soil may be equal to or lesser than a standard specified in the risk assessment for the contaminant.</p>		
	<p>3. Samples shall be collected from the soil to be brought to the phase two property and shall be analyzed and the concentrations of contaminants known, before any soil is brought to the phase two property in order to determine what contaminants are in the soil, and whether the standards for each such contaminant referred to in paragraph</p>		

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	<p>1, and any standard for a contaminant which may have been specified pursuant to paragraph 2 are met.</p>		
	<p>4. The samples collected and analyzed under paragraph 3 must be,</p> <ul style="list-style-type: none"> i. representative samples collected for the purpose of determining the concentration of any contaminant in the soil to be brought to the phase two property and at locations and frequencies which will be adequate to allow the concentrations of any contaminants in the soil to be known, ii. collected by or under the supervision of a qualified person by an individual qualified to take samples for such purpose following a plan determined by the qualified person to collect samples at locations and frequencies which will be adequate to allow the concentrations of any contaminants in the soil to be known, and iii. collected for the purpose of 		

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	<p>determining if contaminants are present in the soil as a result of any potentially contaminating activity or other environmental condition,</p> <p>A. at the property from which the soil originated while the soil was there,</p> <p>B. at any property at which the soil has subsequently been stored while the soil was being stored at that property, and</p> <p>C. while the soil was being handled, stored or transported at any time before its final placement on, in or under the phase two property.</p>		
<p>Analysis of soil to be brought to the phase two property</p>			

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Section 33, Schedule E	<p>The samples referred to in section 32 shall be analyzed for contaminants that may reasonably be expected to be present in the soil, having regard to,</p> <p>(a) the property from which the soil was taken before being brought to the phase two property;</p> <p>(b) the handling of the soil, including its storage and transport, following its original excavation; and</p> <p>(c) any other relevant factors, including potentially contaminating activity.</p>	<p>The phase one ESA or other environmental reports for the source site should be reviewed to assess the likely contaminants.</p>	<p>Additionally, as mentioned above the parameter groups as outlined in the analytical protocol should be selected for analysis.</p>
Sampling of soil to be brought to the phase two property			
Section 34, Schedule E	<p>(1) Samples of the soil referred to in section 32 shall be collected and selected for analysis so as to obtain representative results that locate any areas in the soil being sampled where a contaminant may be present at concentrations greater than the applicable site condition standard for the contaminant.</p> <p>(2) At least one soil sample shall be analyzed for each 160 cubic metres</p>		

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	<p>of soil for the first 5,000 cubic metres to be assessed at each source from which soil is being brought to the phase two property, following which at least one sample for each additional 300 cubic metres of soil which is to remain on, in or under the phase two property shall be analyzed.</p>		
<p>Segregation of soil excavated from or under the phase two property</p>			

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Section 35, Schedule E	<p>(1) The qualified person shall ensure that soil excavated from or under the phase two property during the phase two field investigation or in the course of remediation, and not removed from the phase two property as part of the excavating but placed in stockpiles for possible reuse on, in or under the phase two property, shall be segregated in separate stockpiles on or above the phase two property according to contaminant and concentration of contaminant.</p> <p>(2) Decisions on how to segregate excavated soil referred to in subsection (1) shall be based on the results of any one or more of,</p> <ul style="list-style-type: none"> (a) in situ characterization; (b) field screening; (c) sample collection and analysis; and (d) indications of contamination. 	If applicable this should be described in the report and should meet requirement of this section.	
Sampling and analysis of soil in stockpiles			

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Section 36, Schedule E	<p>The qualified person shall ensure that were excavated soil referred to in subsection 35 (1) is intended for reuse on, in or under the property, the soil shall be sampled and analyzed as follows, before it is reused:</p> <ol style="list-style-type: none"> 1. Samples of the excavated soil from each stockpile to be reused shall be collected and analyzed so as to characterize the contaminants present in the excavated soil. 2. Samples must be selected for analysis and contaminants chosen for analysis on the basis of all available information, including the phase one environmental site assessment and subsequently obtained information and must include analysis for any contaminants which may have been introduced to, brought onto, released to or created in land and water on, in or under the phase two property during actions taken to reduce the concentration of contaminants. 3. Sampling locations must be chosen so as to ensure uniformly distributed and representative 	<p>If applicable this should be described in the report and should meet requirement of this section. The minimum sampling frequency requirement is in Table 2 of Schedule E.</p>	

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	<p>sampling collection throughout the stockpile.</p> <p>4. Samples must not be collected from the surface of a stockpile.</p> <p>5. Samples of soil from stockpiles must be collected and analyzed by an accredited laboratory, at or above the applicable minimum frequencies set out in Table 2 of this Schedule.</p>		
<p>Section 38, Schedule E.</p>	<p>The qualified person shall ensure that the volume of any free flowing product removed from ground water on, in or under the phase two property is monitored and recorded.</p>	<p>If applicable this should be described in the report and should meet the requirement of this section.</p>	
<p>Requirements for confirmation sampling and analysis</p>			

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Section 40, Schedule E.	The following requirements apply to confirmation sampling and analysis:	If applicable this should be described in the report and should meet requirement of this section. Minimum confirmatory sampling requirement for excavation is given in Table 3 of Schedule E.	
	1. Confirmation sampling and analysis shall be undertaken during and following actions taken to reduce the concentration of contaminants on, in or under the phase two property.		
	2. The requirements of this Schedule and sections 47 and 48 of the regulation applicable to the collection and recording of samples of soil, ground water or sediment and the methods of sampling, analysis of samples and reporting of analytical results apply to confirmation samples.		

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	<p>3. When actions intended to reduce the concentration of contaminants on, in or under the phase two property are to be taken, the qualified person shall,</p> <ul style="list-style-type: none"> i. design and implement a sampling and analysis program to collect samples and analyze them from all locations where remediation was undertaken, ii. ensure samples are collected and analyzed for each contaminant in any area and medium where the contaminant was present at a concentration greater than the applicable site condition standard or standard specified in a risk assessment for the contaminant before remediation, where the soil, ground water or sediment remains on, in or under the phase two property after remediation, and iii. ensure samples are collected and analyzed for each contaminant where soil, ground water or sediment has been returned to the phase two property after remediation at a location away from the phase two property. 	<p>Should collect samples from areas of highest concentrations; the lateral and vertical delineation should extend to the next sample point meeting the applicable site condition standard or standards identified in a RA and the lateral and vertical delineation could occur during the characterization of contaminants or during the actions taken to reduce the concentrations (Remediation)</p>	

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	<p>4. The confirmation sampling and analysis program shall be designed and conducted so as to demonstrate whether the phase two property and any property under it meets or does not meet the applicable site condition standards or any standard specified in a risk assessment for all contaminants of concern.</p>		
	<p>5. Confirmation sampling shall be conducted at locations and depths which include those areas on, in or under the phase two property, where a contaminant was present, before remediation, at a concentration greater than the applicable site condition standard or any standard specified in a risk assessment for the contaminant and the maximum concentration of the contaminant in the area was located.</p>		
	<p>6. Samples taken from monitoring wells into which material was introduced into the monitoring well for purposes of remediation shall not be used to meet the objectives of confirmation sampling, including being used as evidence to demonstrate that the phase two</p>	<p>This refers to injection wells and should not be used for monitoring remediation and confirmatory sampling.</p>	<p>A description of selection of injection wells and monitoring wells would be helpful to clarify that the injection wells are not used for monitoring and sampling of ground water.</p>

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	<p>property meets the applicable site condition standard or any standard specified in a risk assessment for a contaminant.</p>		
	<p>7. Where part of the soil on, in or under a phase two property has been excavated the qualified person shall ensure that,</p> <ul style="list-style-type: none"> i. confirmation samples of soil are collected from each wall and floor of the excavation and analyzed in order to demonstrate that the limits of the excavation are appropriate and that the excavation has included all areas where a contaminant may be present at a concentration greater than the applicable site condition standard or any standard specified in a risk assessment, and ii. the number and location of samples at each excavation is equal to or greater than the minimum requirements set out in Table 3 of this Schedule or, where the floor area of the excavation is greater than 1,000 square metres, is adequate to meet the requirements of subparagraph i, is greater than 	<p>If applicable this should be described in the report and should meet requirement of this section. Minimum confirmatory sampling requirement for excavation is given in Table 3 of Schedule E.</p>	

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	<p>the number and location requirements in Table 3 for a floor area of between 750 to 1,000 square metres, and follows the guidance in Note 1 to Table 3.</p>		

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	<p>8. Where a contaminant is present in ground water on, in or under a phase two property at a concentration greater than the applicable site condition standard for the contaminant or any standard specified in a risk assessment for the contaminant which has been accepted under clause 168.5 (1) (a) of the Act, and actions have been taken on, in or under the phase two property to reduce the concentration of the contaminant to meet the standard which applies to the contaminant in the circumstances, the qualified person shall ensure that,</p> <p>i. confirmation sampling of ground water is conducted, in each area where the actions occurred or to which material was returned following remediation at a location away from the property as follows:</p> <p>A. where the remediation is in situ remediation, until the results from analysis of samples collected from four consecutive quarterly sampling events, the first of which is conducted a minimum of 90 days</p>	<p>This Subsection requires at least two rounds of groundwater sampling at 90 days interval, where there was no in-situ remediation of ground water and QP considers that the applicable site condition standards are met by removing impacted soil and groundwater from the source area. The first sampling should be done at least 90 days after source removal followed by another round of sampling after at least 90 days. Where in-situ groundwater remediation was applied, the QP should conduct four rounds of sampling at minimum 90-day intervals (a total of 1 year).</p>	

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	<p>after the last remedial action, are for all contaminants analyzed below the applicable site condition standards or, where applicable, any standards specified in a risk assessment, and B. where the remediation is not remediation described in sub-subparagraph A but is excavation on, in or under the phase two property, until the results from analysis of samples collected from two consecutive quarterly sampling events, the first of which is conducted a minimum of 90 days after the last remedial action, are for all contaminants analyzed below the applicable site condition standards or, where applicable, any standards specified in a risk assessment, and ii. the contaminants sampled and analyzed include all contaminants for which remediation was undertaken and any contaminants which may have been introduced to, created in or brought onto the land or water in, on or under the phase two property or released during remediation.</p>		

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	<p>9. Where confirmation sampling is being undertaken pursuant to paragraph 8, the qualified person shall ensure that water level measurements are also taken in the monitoring wells from which the confirmation samples are being taken.</p>	<p>Each round of sampling should include groundwater level measurements and purging of the required number of well volumes.</p>	
<p>6. Review and Evaluation (i) Geology</p>	<p>Provide a description and analysis of each aquifer and aquitard investigated pursuant to section 12 including,</p>	<p>Describe each water bearing horizon (“aquifer”) investigated. If there is only one ground water horizon , make clear in the text that the investigation was restricted to such depth and only one aquifer was included in the investigation or investigation beyond a certain depth was not relevant for the assessment as the vertical delineation of groundwater is achieved.</p> <p>Note: the term “aquifer” in the Regulation is used to generically describe the saturated zone, and does not require an aquifer to be “capable of yielding a significant quantity of water to a well installed in the aquifer.</p>	<p>Since groundwater flow in an aquifer is predominantly lateral and in an aquitard is mostly vertical, and since monitoring the most-likely locations of transport of contaminants of concern is key to site characterisation, then the conceptual site model needs an understanding of where lateral and vertical flow is occurring. The following generalities may be useful in assessing whether a hydrogeologic unit at the site is an aquifer or an aquitard:</p> <ul style="list-style-type: none"> • Fracturing or weathering in the upper active flow zone can transform the upper zone of an aquitard into

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			<p>an aquifer;</p> <ul style="list-style-type: none"> • K_{aquifer} is at least 100 times $>K_{\text{aquitard}}$; • K_{aquitard} is $<10^{-6}$ cm/s; • an aquifer is coarse-grained; • an aquitard is fine grained and densely compacted; • If the monitoring well is screened across both an aquifer and an aquitard then, assuming adequate well development, the majority of the groundwater in the well will be from the aquifer because of its greater K; • relative drilling “blow counts” or RQD are a useful guide in distinguishing between aquifer(s) and an aquitard at a site.

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	i. estimated thickness of each geologic unit,	The estimated thickness of each geologic unit should be provided from the borehole logs and illustrated by means of intersecting cross-sections..	
	ii. elevations, relative to a geodetic benchmark or other permanent and recoverable benchmark, of the top and bottom of each geologic unit,	See Section 5 (xi) above.	
	iii. geological and other material in each geological unit,	Describe the material as recorded on the borehole logs.	
	iv. the properties of each aquifer and aquitard, and	<p>Briefly describe aquifer stratigraphy including texture, estimates of porosity and permeability etc.</p> <p>Field measurements of hydraulic conductivity may be obtained using standard methods, including single well response tests, multi-well pumping tests, and field parameters. As it is rarely possible to obtain representative hydraulic conductivity values from single well response tests, the QP should reconcile the measured values with literature-derived values based on the overall stratigraphy of the site</p>	Refer to Section 6.4.4 of the APGO ESA Guidance

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	v. the rationale for the choice of aquifers and aquitard investigated as it relates to identification of the location, presence, release, concentration, migration or retention of a contaminant.	Assess the likely characteristics of the contaminant (e.g., solubility, mobility, density i.e., LNAPL or DNAPL, etc.), to support the rationale for the investigation. Multi-level monitoring wells may be required.	The potential for off-site migration of contaminants should be assessed. Refer to Section 6.4.2.3 of the APGO ESA Guidance.
(ii) Ground Water: Elevations and Flow Direction	Provide,	Groundwater flow contours for separate aquifers – confined/unconfined	Show groundwater elevation at each monitoring well and groundwater flow direction. Attention should be given that the groundwater contouring data should be derived from within the phase two/RSC property
	i. a discussion of, and rationale for, locations and screened intervals of monitoring wells used for interpretations of ground water flow direction,	Provide details of screen depth and rationale selection of screen depth. Make sure that the screen in the monitoring well straddle ground water table.	Note that maximum screen length should not exceed 3.1 metres.
	ii. results of any measurements taken using an interface probe during water level measurements, and	This may be supported by observations using a transparent bailer with a bottom-valve.	
	iii. measurements of the thickness of any free flowing product present in monitoring wells.	See above.	

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	A description of the method used to calculate ground water elevation in the monitoring well,	Make sure that all monitoring well elevations are tied up to an established (permanent) bench mark. Describe here how collar elevation was calculated. For example if it is not flush mounted where was your measurement points and how you calculated the collar elevation.	The Regulation requires that each monitoring well collar be tied to a geodetic reference point or to a permanent bench mark. It is up to the QP to determine appropriate reference point which would meet the requirement.
	i. a description of the ground water elevations from all monitoring events in any aquifer investigated,	Record the dates and times of the measurements so that seasonal and barometric influence on groundwater elevation may be addressed.	Ensure that the groundwater elevation measurements in all wells at a site are taken on the same day.
	ii. a description of the interpreted direction of ground water flow at the phase two property,	It should be based on a minimum of three monitoring well data not in a straight line on the RSC property.	The requirement for a minimum of three wells is based on ideal, homogeneous hydrogeological conditions. This is rarely the case in practice and therefore more than three wells are typically required to determine groundwater flow directions.
	iii. assessment of the potential for temporal variability in ground water flow direction, and	Comment whether variation of seasonal temperature (i.e., weather conditions) had any effect on ground water elevation fluctuations.	

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	iv. an evaluation and description of the potential interaction between any buried utilities in or under the phase two property and the water table.	Provide assessment and evaluation of possible/observed and or estimated effect of buried utility on movement, distribution (if applicable) and influence on contaminated plume under the RSC property.	
(iii) Ground Water: Hydraulic Gradients	Provide,		
	i. a description of the horizontal hydraulic gradient for each aquifer investigated, including minimum, maximum and average horizontal hydraulic gradients, and	It is important to estimate both of these parameters where groundwater is contaminated (exceeding applicable site condition standards or standards identified in a risk assessment).	Note estimation of horizontal hydraulic gradient is required even if groundwater is not contaminated, but groundwater samples were collected and analyzed.
	ii. a description of vertical hydraulic gradients in aquifers where a contaminant is present at a concentration greater than the applicable site condition standard for the contaminant, including minimum, maximum and average vertical hydraulic gradients.	It is important in cases where ground water is contaminated.	
(iv) Fine-Medium Soil Texture	Where fine-medium soil texture is to be used in determining the applicable site condition standards provide,	Where fine-medium soil texture is used grain size analysis is mandatory. Select soil samples from the horizons most likely to be affected by soil and ground water contamination.	Note that the grain size analysis should be conducted by a laboratory in accordance the ASTM standard #.

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	i. a rationale for the use of the fine-medium soil texture category,	The coarse-grained texture should be used if representative grain size analyses were not conducted, or the QP considers that the dominant contaminant transport in soil vapour or groundwater is likely to be influenced by the presence of coarse-grained lenses.	Refer to Section 6.3.10.4 of the APGO ESA Guidance.
	ii. a description of the results of the required grain size analysis, and		
	iii. a description and rationale for the number of samples collected and analyzed.	Samples for grain size analysis should represent soil horizons that are affected by contamination and should be representative of contaminated horizon across the RSC property.	
(v) Soil: Field Screening	Provide a discussion of soil field screening results.	Summarize results of the grain size analyses. Field screening of soil is typically conducted to provide only a semi-quantitative assessment of volatile parameters (PHCs, VOCs) in soil. The field screening results alone should not be used to define the extent of soil contamination. Screening with the methane detection mode of the instrument switched on should also be conducted to assess the presence of methane at a site.	

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(vi) Soil Quality	Provide a discussion and analysis of the laboratory analytical results for all soil samples analysed including,	The following requirements may be presented in a table but you should provide a description of sample depth range, description of analytical results and finally evaluation of in comparison to the applicable site condition standards.	
	i. locations and depths of samples,		
	ii. comparison of analytical results to applicable site conditions standards,		
	iii. contaminants of concern,	“contaminant” means <i>any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that causes or may cause an adverse effect (EPA, Section 1).</i>	Naturally-occurring chemical parameters at a site that may have the potential to cause an adverse impact should also be assessed (e.g., lead, arsenic, etc.).
	iv. contaminants related to chemical and biological transformations that have or may have occurred,	In some circumstance by products from chemox or bio-remediation may lead to the production of harmful parameters which should be addressed and discussed here. (e.g., potassium permanganate or hydrogen peroxide oxidants may result in the release of metals such as manganese and iron or increased chloride levels).	Ensure that the conditions of the environmental compliance approval (ECA) for the technology are observed. Assess the likelihood of the off-site migration of the oxidants or the by-products.

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	v. whether the results indicate soil serves as a source of contaminant mass contributing to ground water or sediment, and	Assess the vertical profile of the soil contamination to assist in this determination.	Provide a short explanation even if it is not applicable in your situation
	vi. whether the results indicate the presence of light or dense non-aqueous phase liquids	Assess the concentration of the LNAPL or DNAPL in relation to its solubility to assist in this determination. Concentrations as low as 5 – 10% of the NAPL solubility may be indicative of the presence of NAPL elsewhere at the site. The QP should therefore ensure that there is adequate upgradient monitoring well coverage to confirm the absence of NAPL.	Provide a short explanation even if it is not applicable in your situation
(vii) Ground Water Quality	Provide a discussion and analysis of the laboratory analytical results for all ground water samples analyzed including,	The following requirements may be presented in a table but you should provide a description of sample depth range, description of analytical results and finally evaluation of in comparison to the applicable site condition standards.	
	i. locations and sample depth interval of samples,		
	ii. documentation of any field filtering,	Field-filtering for metals is required, but not for organic parameters with the exception of benzo(a)pyrene.	Refer to the MOE analytical protocol.
	iii. comparison of analytical results to applicable site conditions standards,		
	iv. contaminants of concern,	See above.	

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	v. contaminants related to chemical and biological transformations that have or may have occurred,	"	
	vi. whether the results indicate soil serves as a source of contaminant mass contributing to ground water or sediment, and	"	
	vii. whether the results indicate the presence of light or dense non-aqueous phase liquids.	"	
(viii) Sediment Quality	Provide a discussion and analysis of the laboratory analytical results for any sediment samples analyzed including,	Use same format as in soil as applicable for each of the requirements. Where sediment sampling was not conducted, indicate clearly in the text.	
	i. locations and depths of samples,		
	ii. comparison of analytical results to applicable site conditions standards,		
	iii. contaminants of concern,		
	iv. contaminants related to chemical and biological transformations that have or may have occurred, and		
	v. whether the results indicate the presence of light or dense non-aqueous phase liquids.		
(ix) Quality Assurance and Quality Control Results	Provide,		

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	i. a description of the types of quality control samples collected and results of any other quality assurance and quality control measures taken during the field investigation, including the types of quality control sample, the media sampled, and the importance of the results with respect to ensuring the data are useful, appropriate and accurate in the determination of whether the phase two property, or any RSC property within it, meets the applicable site condition standards and any standards specified in a risk assessment,	This should have already been described in sufficient detail in the sampling and analysis plan. Do not simply refer to the sampling and analysis plan. Provide here all elements as required in the following sub-headings with a brief discussion.	
	ii. a description of each instance where a sample was not handled in accordance with the analytical protocol with respect to,	Despite the statement in Column 1, ii, it is recommended that the samples should always be handled in accordance with the analytical protocol in order to ensure sample integrity, so that conditions A - D below would not be applicable.	
	A. holding time,		
	B. preservation method		
	C. storage requirement; or		
	D. container type,		
	iii. a statement, with respect to subsection 47 (3) of the regulation		

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	that,		
	A. all certificates of analysis or analytical reports received pursuant to clause 47 (2) (b) of the regulation comply with subsection 47(3),		
	B. a certificate of analysis or analytical report has been received for each sample submitted for analysis, and		
	C. all certificates of analysis or analytical reports received have been included in full in an appendix to the phase two environmental site assessment report,		
	iv. a description of each instance where a laboratory qualified any results or made remarks in a certificate of analysis or analytical report about a sample, including, a discussion of the validity of any results qualified, and	The QP should inform the laboratory that all analyses should be in accordance with the analytical protocol, and all reported results should have the appropriate validity.	
	v. a discussion of the overall quality of the field data from the investigation with respect to the data quality objectives, to demonstrate that,	As part of the QA/QC, the QP should assess that the reported results are within the margin of accuracy as defined in the analytical protocol.	
	A. decision-making was not affected, and		
	B. the overall objectives of the		

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	investigation and the assessment were met.		
(x) Phase Two Conceptual Site Model	Provide,	Elements of the phase two ESA have already been covered in various sections of the report. All relevant information should be presented in this section, using the following sub-headings indicated below to complete the CSM. Make sure that the requirements under these sub-headings are described in the CSM. This includes narrative descriptions as well as diagrams and figures. Make sure that the CSM includes both plan and sections with an accurate scale. Approximate scale is not allowed. (Refer to Subsection 47 (15) , Schedule E). Ensure that the CSM is applicable to the RSC property if there is more than one RSC within the phase two property.	Subsection 47(15) of Schedule E - Figures, maps, site plans and cross-sections are required to contain a scale, north arrow and a title block that includes a descriptive title, the address of the phase two property, if any, the name of the qualified person's firm, company or partnership, if any; and the date the figure, map, site plan or cross-section was created. Note that use of approximate scale is not allowed. If in doubt of accuracy please qualify scale by adding note such as "accurate on 11" x 17" paper"
	i. a description and assessment of,		
	A. areas where potentially contaminating activity has occurred,	Provide a description of PCA in, on or under the RSC property and in the phase one Study area. Specify whether any PCA in the Study area is likely to cause an APEC on the RSC property.	Ensure that all PCAs causing or likely to cause an APEC in, on or under the RSC property should be covered in the description. If phase two ESA property is being split into more than one RSC, ensure that the

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			APEC table and description here pertains to the RSC property and not to the larger phase two property
	B. areas of potential environmental concern, and	See above.	
	C. any subsurface structures and utilities on, in or under the phase two property that may affect contaminant distribution and transport, or offsite, but too important to overlook e.g., sewer trench along city street or pumping well next door.	Provide the relevant information listed in Column 1 for the RSC property.	As mentioned earlier, note that reference to phase two property is applicable to the RSC property if phase two property is larger than the RSC property and more than one RSC will be submitted based on the one phase two ESA. The phase two ESA report should be modified to fit requirements for each RSC.
	ii. a description of and, as appropriate, figures illustrating, the physical setting of the phase two property and any areas under it including,		
	A. stratigraphy from ground surface to the deepest aquifer or aquitard investigated,		
	B. hydrogeological characteristics, including aquifers, aquitard and, in each hydrostratigraphic unit where		An estimation of horizontal hydraulic gradient is required even if ground\water is not

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	one or more contaminants is present at concentrations above the applicable site condition standards, lateral and vertical gradients,		contaminated. Where groundwater is contaminated estimation of both horizontal and vertical hydraulic gradients are required.
	C. approximate depth to bedrock,		This should be documented document even if bedrock was not encountered in the drilling/pitting (i.e., identify as deeper than maximum drilling depth, below ground surface).
	D. approximate depth to water table,		
	E. any respect in which section 41 or 43.1 of the regulation applies to the property,	Should be mentioned, even if not applicable.	
	F. areas where soil has been brought from another property and placed on, in or under the phase two property, and	Identify how and where the soil has been placed to confirm compliance with the requirements of Section 55.	
	G. approximate locations, if known, of any proposed buildings and other structures,	The QP should provide this information, if known.	
	iii. where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable site condition standard, identification of,		If contaminants in each analyzed medium meet the applicable site condition standards, then the conditions A – H, below (in Column 1) are not applicable. This should be stated in the report.

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	A. each area where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable site condition standard,	Identify on plan map.	
	B. the contaminants associated with each of the areas referred to in subparagraph A,	List the contaminants in a table, and, if possible, also on the plan map.	
	C. each medium in which a contaminant associated with an area referred to in subparagraph is present,	See above.	
	D. a description and assessment of What is known about each of the areas referred to in subparagraph A,	Describe why the areas are contaminated (reference the phase one and two CSMs).	
	E. the distribution, in each of the areas referred to in subparagraph A, of each contaminant present in the area at a concentration greater than the applicable site condition standard, for each medium in which the contaminant is present, together with figures showing the distribution,	Summarize the data in tables, and construct figures showing the horizontal and vertical distribution of the contaminants. (Several figures may be required depending on the range, depth and extent of the contaminants).	
	F. anything known about the reason for the discharge of the contaminants present on, in or under the phase two property at a concentration greater than the applicable site condition standard	See above (Condition D).	

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	into the natural environment,		
	G. anything known about migration of the contaminants present on, in or under the phase two property at a concentration greater than the applicable site condition standard away from any area of potential environmental concern, including the identification of any preferential pathways,	Should already be described in Section 6. Identify potential preferential pathways (e.g., sewer conduits) and likelihood of off-site impacts.	
	H. climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in ground water levels, and	Consider typical water table fluctuations in this assessment.	
	I. if applicable, information concerning soil vapour intrusion of the contaminants into buildings including,	Review the soil vapour guidance documents referenced earlier in this template for guidance in addressing this issue.	<i>Guidance on soil vapour intrusion issues is beyond the scope of this template.</i>
	1. relevant construction features of a building, such as a basement or crawl space,	-	-
	2. building heating, ventilating and air conditioning design and operation, and	-	-

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	3. subsurface utilities,	See above	
	iv. where contaminants on, in or under the phase two property are present at concentrations greater than the applicable site condition standard, one or more cross-sections showing,	Cross-sections are an important component of a phase two ESA report to show the vertical distribution of contaminants and that the contaminant behaviour is correctly portrayed by the current CSM. The QP should construct the cross-sections so that they provide an aesthetically-pleasing, easily legible and stand-alone pictorial representation of the site conditions.	Intersecting cross-sections should be provided that present the data from the boreholes and monitoring wells at the site. Several cross-sections may be required.
	A. the lateral and vertical distribution of a contaminant in each area where the contaminants is present at concentrations greater than the applicable site condition standard in soil, ground water and sediment,		Must provide at least one cross section even if all soil and ground water analysis met applicable site condition standards. The lateral and vertical delineation in case of contamination should follow delineation requirements as described in above section
	B. approximate depth to water table in each area referred to in subparagraph A,		
	C. stratigraphy from ground surface to the deepest aquifer or aquitard investigated, and		

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	D. any subsurface structures and utilities that may affect contaminant distribution and transport in each area referred to in subparagraph A, and		
	v. for each areas where a contaminant is present on, in or under the property at a concentration greater than the applicable site condition standard for the contaminant, a diagram identifying, with narrative explanatory notes,	Conditions A – E, below (in Column 1) are best illustrated by means of a schematic or “cartoon” drawing with an explanatory text describing the conditions.	
	A. the release mechanisms,		
	B. contaminant transport pathway,		
	C. the human and ecological receptors located on, in or under the phase two property,		

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	D. receptor exposure points, and		
	E. routes of exposure.		
7.Conclusions	Provide a summary of the information about the following:		
	i. the location and concentration of contaminants in the land or water on, in or under the phase two property,	Even if there are no exceedances from the applicable site condition standards, provide a brief description of location and types of samples collected and analysed for each medium.	Remarks made above with reference to Phase two and RSC property applies throughout the text as well as here.
	ii. environmental conditions in the land or water on, in or under the phase two property where it is necessary to undertake a risk assessment with respect to one or more contaminants of concern, and		
	iii. whether applicable site condition standards and standards specified in a risk assessment for contaminants on, in or under the phase two property were met as of the certification date.	Refer to Section 17 of the Regulation for the definition of “certification date”.	

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(i) Signatures	Provide,		
	i. original signatures of the qualified person who conducted or supervised the phase two environmental site assessment, and	Provide the signatures on a final report, not a draft report.	
	ii. a statement by the qualified person confirming the carrying out of the phase two environmental site assessment and the findings and conclusions of the report.	Note that it is not the statement of limitation. Provide a brief statement by QP fulfilling this requirement.	
8. References	Ensure that the phase two environmental site assessment report includes a list of all documents or data cited in the report.		
9. Figures and Tables (i) Monitoring Well Installation	Provide a table showing construction details and elevations for all monitoring wells installed during the field investigation.	Provide all relevant tables and figures referred to in Column 1, below where applicable. At a minimum provide all appropriate tables and figures as required, but additional figures and tables may be included depending on the complexity of the phase two ESA.	Note that all tables and figures are minimum requirements and therefore must accompany the phase two ESA report. In case where there are more than one RSC these are required for each RSC property.
(ii) Water Levels	Provide a table showing all water level measurements for all monitoring events at or under the phase two property, including depth to water reported as elevations to the nearest centimetre relative to a geodetic or permanent and		

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	recoverable benchmark and reference elevations.		
(iii) LNAPLs and DNAPLs	Provide a table showing all light or dense non-aqueous phase liquid measurements at or under the phase two property, reported as elevations to the nearest centimetre relative to a geodetic or permanent and recoverable benchmark and reference elevations.		
(iv) Soil Data	Provide one or more tables that,		
	i. show soil quality data contained in laboratory certificates of analysis of samples taken at or under the phase two property,		
	ii. include the borehole, test hole, test pit or monitoring well identification number, sample depths, sample identification number, date of sample collection, date of analysis and laboratory certificate of analysis or analytical report reference number, and		
	iii. include a comparison of the data to applicable site condition standards.		

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(v) Ground Water Data	Provide one or more tables that,		
	i. show any ground water quality data contained in laboratory certificates of analysis of samples taken at or under the phase two property,		
	ii. include the test hole or monitoring well identification number, sample identification number, sampling depth intervals, date of sample collection, date of analysis and laboratory certificate of analysis or analytical report reference number, and		
	iii. include a comparison of the data to applicable site condition standards.		
(vi) Sediment Data	Provide one or more tables that,	Applicable only if sediment assessment was undertaken.	
	i. summarize all sediment quality data contained in laboratory certificates of analysis of samples taken at or under the phase two property,		
	ii. include the sample identification number, sampling depths, date of sample collection, date of analysis and laboratory certificate of analysis		

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	or analytical report reference number, and		
	iii. include a comparison of the data to applicable site condition standards.		
(vii) Ground Water, Sediment and Soil Maximum Concentration Data	Provide a table showing, for each contaminant for which sampling and analysis has been performed, the maximum known concentration of each contaminant on, in or under the phase two property as of the certification date including,		
	i. the location and unique identification number of each borehole, test pit, test hole or monitoring well from which the sample showing the maximum concentration was collected, and	Provide this information in tables.	
	ii. the relevant soil sampling depths, sediment sampling depths, and ground water sampling depth intervals.		
(i) Areas of Natural Significance and Water Bodies	Provide a figure that illustrates the location of any,	Identify areas of natural significance and water bodies on the phase two property or within 30metres of it on a map showing the geographical setting of the site.	

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	i. area of natural significance that includes the phase two property, that is adjacent to the phase two property or that is located, wholly or partly, on the phase two property or within 30 metres of the phase two property or part of the phase two property, and		
	ii. water body located adjacent to the phase two property or, wholly or partly, on the phase two property or within 30 metres of the phase two property or part of the phase two property.		
(ii) Property Before Actions Taken to Reduce the Concentration of Contaminants	Provide a figure showing, in a plan view, all features relevant to the phase two environmental site assessment prior to any actions being taken to reduce the concentration of contaminants including,	This is important, as the phase two CSM that is included in the Record of Site Conditions requires the CSM before remediation efforts to reduce concentrations were taken.	
	i. areas where a contaminant is present at a concentrations greater than the applicable site condition standards for the contaminant, and		
	ii. the locations of buildings, storage tanks, drainage features and fill areas on or under the phase two property.		

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(iii) Interpreted Contours of Ground Water Elevations	Provide a figure showing the phase two property that shows interpreted contours of the ground water elevations for each hydrostratigraphic unit where at least three monitoring wells have been installed to permit contouring and includes,	As noted elsewhere in this template, unless the area in question is small enough changes in flow direction, three wells are never sufficient to assess the groundwater flow direction and enable groundwater contours to be drawn. (The QP should consider a performance standard rather than strict adherence to the minimum three-well requirement).	
	i. monitoring well identification numbers,		
	ii. water elevation at each monitoring well used for contouring,		
	iii. labelling of the elevation contour,		
	iv. ground water elevations contoured, which shall obey and not extend outside the dataset, and	The contouring should be supported by the groundwater elevation data, however if the QP wishes to provide an interpretation of the likely groundwater elevation outside the dataset to provide a comprehensive hydrogeological interpretation, this should be indicated (e.g., by using dashed contour lines).	
	v. arrows indicating the qualified person's interpretation of lateral ground water flow direction at the phase two property.		

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(iv) Contaminants in Soil Before Actions Taken to Reduce the Concentration of Contaminants	Where one or more contaminants in soil at or under the phase two property are present at a concentration greater than the applicable site condition standard for the contaminant prior to any actions taken to reduce concentration of contaminants, provide one or more figures in plan view of the phase two property that show the concentration of contaminants as analyzed in an accredited laboratory, in all boreholes, test holes, test pits and any other soil sampling locations.	See above.	
(v) Contaminants in Ground Water Before Actions Taken to Reduce the Concentration of Contaminants	Where one or more contaminants in ground water at or under the phase two property are greater than the applicable site condition standard prior to any actions taken to reduce concentration of contaminants, provide one or more figures in plan view of the phase two property that show the concentration of contaminants, as analyzed in an accredited laboratory, in all monitoring wells and test holes.	"	

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(vi) Contaminants in Sediment Before Actions Taken to Reduce the Concentration of Contaminants	Where one or more contaminants in sediment at or under the phase two property are greater than the applicable site condition standard prior to any actions taken to reduce concentration of contaminants, provide one or more figures in plan view of the phase two property that show the concentration of contaminants, as analyzed in an accredited laboratory, in all sediment sample locations.	"	
(vii) Delineation	Provide figures showing the phase two property in a plan view and illustrating the delineation of the lateral and vertical extent of contaminants of concern in soil, ground water or sediment for each area contaminants of concern including,	See comments above.	
	i. sampling locations,		
	ii. sample identification number,		
	iii. sampling point,		
	iv. sampling depths,		
	v. sampling depth intervals,		
	vi. concentrations of contaminants as analyzed in an accredited laboratory, and		

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	vii. the applicable site condition standard or standard specified in a risk assessment for each contaminant analyzed.		
(viii) Contaminants of Concern in Areas of Potential Environmental Concern	Provide cross-sections that are oriented parallel and perpendicular to the direction of ground water flow at the phase two property illustrating,		
	i. the delineation of the lateral and vertical extent of contaminants of concern in soil, ground water or sediment for each area of potential environmental concern and showing sample locations, sampling identification numbers, sampling points and sampling depths,		
	ii. concentration of contaminants analyzed in an accredited laboratory,		
	iii. in highlighting, all concentrations of contaminants in excess of the applicable site condition standard or standard specified in a risk assessment, and		
	iv. the stratigraphy from ground surface to the deepest aquifer or aquitard investigated.		

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10.Appendices (i) Sampling and Analysis Plan	Provide the sampling and analysis plan for the site investigation. As referred to in section 3(2) to (7) of Schedule E	This is an important document and should be prepared at the planning stage	The qualified person shall ensure that there is a sampling and analysis plan that includes a 1. quality assurance and quality control program, 2. data quality objectives, 3. standard operating procedures and 4. a description of any physical impediments that interfere with or limit the ability to conduct sampling and analysis. Note that all appendices are minimum requirements and therefore must accompany the phase two ESA report. In case where there are more than one RSC these are required for each RSC property.
Subsection 3 (2), Schedule E	The qualified person shall ensure that there is a sampling and analysis plan that includes a quality assurance and quality control program, data quality objectives, standard operating procedures and a description of any physical impediments that interfere with or limit the ability to conduct sampling and analysis.	The following conditions are essential in writing a sampling and analysis plan. It should as a minimum include requirements of Subsection 3 (2), Schedule E	

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Subsection 3 (3), Schedule E	The quality assurance and quality control program shall include the following requirements:	<p>Collecting quality control/quality assurance samples is a requirement regardless whether soil and /or ground water samples exceed applicable site condition standards or standards identified in a risk assessment (RA). The quality assurance and quality control program shall include:</p> <p>All non-dedicated sampling and monitoring equipment should be cleaned following each use.</p> <p>Minimum number of soil duplicates should be collected and analyzed</p> <p>Minimum number of ground water trip blanks and field duplicate should be collected and analyzed</p> <p>Sufficient field duplicate samples shall be collected in each medium being sampled, so that at least one field duplicate sample can be submitted for laboratory analysis for every ten samples submitted for laboratory analysis</p> <p>Calibration checks should be performed on all field equipment and should be documented</p> <p>Where ground water samples are to be analyzed for volatile organic compounds, one trip blank sample shall</p>	

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		be submitted for laboratory analysis with each laboratory submission	
	1. All non-dedicated sampling and monitoring equipment must be cleaned following each use.	Follow requirements of these paragraphs as described under each.	
	2. Where ground water samples are to be analyzed for volatile organic compounds, one trip blank sample shall be submitted for laboratory analysis with each laboratory submission.	Follow requirements of these paragraphs as described under each.	

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	3. Specification of the minimum requirements for the number, type and frequency of field quality control measures including, i. trip blanks, ii. field duplicates, and iii. calibration checks on field instruments.	Follow requirements of these paragraphs as described under each.	
	4. Sufficient field duplicate samples shall be collected in each medium being sampled, so that at least one field duplicate sample can be submitted for laboratory analysis for every ten samples submitted for laboratory analysis.	Follow requirements of these paragraphs as described under each.	
	5. At least one field duplicate sample shall be submitted for laboratory analysis for every ten samples submitted for laboratory analysis.	Follow requirements of these paragraphs as described under each.	

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Subsection 3 (4), Schedule E	<p>The data quality objectives for all types of field data collected during the phase two environmental site assessment field investigation that set the level of uncertainty in environmental data shall be such that,</p> <p>(a) the decision-making is not affected; and</p> <p>(b) the overall objectives of the investigation are met.</p>	<p>The data quality objectives for all types of field data collected during the phase two environmental site assessment field investigation that set the level of uncertainty in environmental data shall be such that, a) the decision-making is not affected; and (b) the overall objectives of the investigation are met.</p> <p>Data quality objectives are qualitative and quantitative statements that define the type, quality, and quantity of data necessary to support the phase two ESA</p> <p>This should be completed at the planning stage and should be part of the sampling and analysis plan. It should include:</p> <ul style="list-style-type: none"> a description of the objective of the data collection a description of the most appropriate type of data to collect a description of acceptable levels of decision errors a description of the quantity and quality of data to be collected 	

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Subsection 3 (5), Schedule E	<p>Standard operating procedures shall be developed for all of the following field investigation methods used in the field investigation,</p> <ul style="list-style-type: none"> (a) borehole drilling; (b) excavating; (c) soil sampling; (d) field screening measurements, including calibration procedures; (e) monitoring well installation; (f) monitoring well development; (g) field measurement of water quality indicators, including calibration procedures; (h) sediment sampling; and (i) ground water sampling. 	<p>Standard operating procedures (SOP) shall be developed for all of the following field investigation methods used in the field investigation,</p> <ul style="list-style-type: none"> (a) borehole drilling; excavating; soil; ground water sampling; (d) field screening measurements, including calibration procedures; (e) monitoring well installation and development; (g) field measurement of water quality indicators, including calibration procedures. <p>Summarize all tasks that are to be under taken in completion of the phase two ESA work and the report. This includes description of health and safety plan; utility clearance; selection of drilling equipment; all field tasks, including equipment used, methods of sample collection etc. A SOP incorporating site-specific consideration should be prepared</p>	

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Subsection 3 (6), Schedule E	<p>The sampling and analysis plan shall include identification of and rationale and procedures for,</p> <ul style="list-style-type: none"> (a) the choice of sampling system, such as a judgmental, random or grid sampling system; (b) the sampling media; (c) the number of samples; (d) sampling frequency; (e) sampling points; (f) sampling depth intervals, including the screened intervals of the monitoring wells; (g) other field information to be obtained, including water levels, field measurements and elevation surveying; and (h) samples to be submitted for laboratory analysis. 	<p>The sampling and analysis plan shall include identification of and rationale and procedures for, (a) the choice of sampling system, such as a judgmental, random or grid sampling system; (b) the sampling media; (c) the number of samples; (d) sampling frequency; (e) sampling points; (f) sampling depth intervals, including the screened intervals of the monitoring wells; (g) other field information to be obtained, including water levels, field measurements and elevation surveying; and (h) samples to be submitted for laboratory analysis.</p>	

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Subsection 3 (7), Schedule E	<p>The sampling and analysis plan shall meet the following criteria:</p> <ol style="list-style-type: none"> 1. The qualified person shall consider, <ol style="list-style-type: none"> i. findings as to potentially contaminating activity, ii. all contaminants of potential concern or appropriate subsets of such contaminants, and iii. any other information and matters relating to the environmental condition of the property which are relevant to an informed professional judgment. 2. After considering the matters referred to in paragraph 1, the qualified person shall determine, <ol style="list-style-type: none"> i. sampling and analysis for all contaminants of potential concern, or appropriate subsets of such contaminants, and ii. appropriate sampling and analysis for any other relevant contaminants. 	<p>The sampling and analysis plan shall meet the following criteria:</p> <ol style="list-style-type: none"> i. findings as to potentially contaminating activity, ii. all contaminants of potential concern or appropriate subsets of such contaminants, and iii. any other information and matters relating to the environmental condition of the property which are relevant to an informed professional judgment. <p>After considering the matters referred to above the qualified person shall determine,</p> <ol style="list-style-type: none"> i. sampling and analysis for all contaminants of potential concern, or appropriate subsets of such contaminants, and ii. appropriate sampling and analysis for any other relevant contaminants. <p>Refer to the Analytical Protocol. The analysis should be conducted in parameter groups. Individual analysis of some parameter may not be allowed in the revised analytical protocol</p>	
(ii) Finalized Field Logs	<p>Provide all finalized field logs. As referred to in sections 24(general soil), 25(ground water) and 26(sediment)</p>		

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(iii) Certificates of Analysis or Analytical Reports from Laboratories	Provide laboratory certificates of analysis or analytical reports for all samples analyzed.		
(iv) Residue Management	Provide copies of all permits, approvals and the like obtained from municipal, provincial or federal governments or agencies for handling, treating, discharging and disposing of soil, sediment and ground water.	Permits and approvals may include applicable provincial environmental compliance approvals (ECAs), permits-to-take-water (PTTW), hazardous waste manifests, municipal sewer discharge permits, etc.	
(v) Survey of Phase Two Property	Provide a survey of the phase two property which has been prepared, signed and sealed by a surveyor or, where the phase two property consists of land that is administered by the Ministry of Natural Resources under the Public Lands Act, a description of the phase two property approved by the Surveyor General.		
(i) Where any Action has been Taken to Reduce the Concentration of Contaminants on, in or under a	Provide a remediation appendix that includes the following sections,	All remediation work should be included in the phase two ESA report appendix and where applicable referred in the text. The remediation appendix where applicable as a minimum should include descriptions under the following sub-headings listed in Column 2, below.	

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Phase Two Property			
	i. remedial actions,		
	ii. free flowing product,		
	iii. results of confirmation sampling and analysis, and		
	iv. conclusions.		
(ii) Remedial Actions	Provide,	All of the requirements specified in Column 2, below should be provided in a comprehensive remediation report and included in an appendix. -	
	i. a description of any soil excavation and soil treatment activities at the phase two property that includes,		
	A. the rationale for each method used,		
	B. the quantities and types of compounds used to treat contaminants of concern, and		

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	C. the location of the remedial action,		
	ii. an estimate of the quantity of soil treated on the property and removed from the property, in tonnes,		
	iii. a description of any ground water removal or ground water treatment activities at the phase two property, including,		
	A. the rationale for each method used,		
	B. the quantities and types of compounds used to treat contaminants of concern, and		
	C. the location of the remedial action,		

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	iv. an estimate, in litres, of the volume of any ground water removed from the phase two property,		
	v. a description of any actions taken to reduce contaminant concentrations in sediment at the phase two property, including,		
	A. the rationale for each method used,		
	B. the quantities and types of compounds used to treat contaminants of concern, and		
	C. the location of the remedial action in relation to any areas of potential environmental concern,		
	vi. an estimate of the quantity of sediment treated or removed from the property,		

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	vii. copies of all permits from local, provincial and federal agencies for handling, treating, discharging and disposing of soil, ground water or sediment,		
	viii. a description of the steps taken to ensure that contaminants created or introduced to the property during remediation do not exceed the applicable site condition standard, if the remediation method involved the creation or introduction of contaminants or substances to the subsurface of the property,		
	ix. a description of the steps taken to establish baseline and background conditions relevant to the proposed remediation method to a degree adequate to detect any increases of contaminants on, in or under the phase two property following remediation, including contaminants created or introduced to the property during remediation, and		

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	x. a rationale for the selection of monitoring wells and contaminants to be analyzed for the purpose of monitoring concentrations of contaminants in, on or under the phase two property, including contaminants created or introduced to the property during remediation.		
(iii) Free Flowing Product	Provide,		
	i. a discussion of the types and quantities of any free flowing product observed during remediation,	This should include measured in-situ thicknesses of the free product and estimates of free product that has been removed.	
	ii. an estimate of the volume of free flowing product, in litres, removed from ground water on, in or under the phase two property, where free flowing product is present, and	See above.	
	iii. a description of any free flowing product recovery system or other activity undertaken to remove the free flowing product.	Provide details of the system (e.g., manual recovery, automated systems, duration of operation etc.).	
(iv) Confirmation Sampling and Analysis	Provide,	Refer to Schedule E, Sections 39 and 40 for a description of confirmation and sampling requirements, including the frequency of sampling from the floors and sides of excavations.	

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	i. a description of all confirmation sampling activities conducted during and after remedial actions for the purpose of demonstrating that the phase two property meets the applicable site condition standards and any standards specified in a risk assessment,	Confirmation sampling is conducted to confirm the extent of remediation. The sampling locations should be selected to provide confirmation that the previously-existing contamination is no longer present following the remediation.	
	ii. a description and rationale for all confirmation sampling locations, depths and contaminants analyzed,	The rationale for the sampling locations should follow a similar logic as provided in the Sampling and Analysis Plan.	
	iii. a description of the lateral and vertical dimensions of the excavations and the number and types of confirmation samples taken at each excavation, where part or all of the land on, in or under a phase two property has been excavated,	Samples should be taken from the floor and sides of the excavations. Refer to Schedule E, Table 2 for the sampling requirements for excavations.	These should be regarded as minimum requirements. Additional confirmatory sampling may be required depending on the site-specific conditions.
	iv. one or more figures of the phase two property, identifying the locations and dimensions of any excavations on, in or under the phase two property,		
	v. one or more cross-sections that show the vertical dimensions of any excavations on, in or under the phase two property,		

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	vi. one or more figures of the phase two property, identifying the locations of any ground water removal or treatment activities, including the locations of any injection wells and extraction wells,		
	vii. one or more figures of the phase two property, identifying the locations of any sediment removal or treatment activities,		
	viii. a description of the results of quarterly sampling events, including water level measurements and ground water sampling and analysis, where in situ treatment has been undertaken on, in or under the phase two property,		
	ix. a description of the results of quarterly sampling events, including water level measurements and ground water sampling and analysis, where excavation has been undertaken on, in or under the phase two property,		
	x. tables showing all soil, ground water and sediment quality data contained in laboratory certificates of analysis or analytical reports for confirmation samples, including,		

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	A. comparison of the data to applicable site condition standards or standards specified in a risk assessment as the case may be for each contaminant analyzed,		
	B. the borehole, test hole, test pit or monitoring well identification number,		
	C. the sample identification number,		
	D. soil or sediment sample depth,		
	E. ground water sampling depth interval,		
	F. date of sample collection,		
	G. date of sample analysis, and		
	H. laboratory certificate of analysis or analytical report reference number,		
	xi. provide one or more figures that show the results of analyses for all confirmation samples of soil, ground water and sediment, including the delineation of the lateral and vertical extent of contaminants in soil, ground water or sediment following actions taken to reduce the concentration of contaminants, and illustrating,		
	A. sampling points,		

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	B. sample identification number,		
	C. sampling depth intervals, and		
	D. concentrations of contaminants as analyzed in an accredited laboratory,		
	xii. provide cross-sections that are oriented parallel and perpendicular to the direction of ground water flow that show the results of analyses for all confirmation samples of soil, ground water and sediment, including the delineation of the lateral and vertical extent of contaminants in soil, ground water or sediment following actions taken to reduce the concentration of contaminants, and illustrating,		
	A. sampling points,		
	B. sample identification number,		
	C. sampling depth intervals,		
	D. concentrations of contaminants as analyzed in an accredited laboratory, and		
	E. the stratigraphy from ground surface to the deepest aquifer or aquitard where actions were taken to reduce the concentration of contaminants,		

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	xiii. a table showing construction details and elevations for all monitoring wells used in demonstrating that contaminant concentrations in ground water are below the applicable site condition standards following actions taken to reduce concentration of contaminants, and		
	xiv. a table showing all water level measurements for all monitoring events used in demonstrating that contaminant concentrations in ground water are below the applicable site condition standards following actions taken to reduce concentration of contaminants, including depth to water reported as elevations to the nearest centimetre relative to a geodetic or permanent and recoverable benchmark and reference elevations.		
(i) Soil Brought to the Phase Two Property	Provide,	“Soil that did not originate at a RSC property and that is brought from another property to a RSC property to remain at the RSC property following the filing of a record of site condition shall be used at the RSC property solely to backfill an excavation or for final grading. O. Reg. 511/09, s. 27.”	Make sure that all requirements of the Regulation regarding importation of soil to a RSC property are met (Schedule E, Section 55); otherwise you can only bring soil meeting Table 1

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			standards.
	i. a rationale for the selection of chemical parameters analyzed by a laboratory in accordance with section 32 of this Schedule,	The selection of chemical parameters for analysis should be based on type of PCAs identified in, on or under the property from soil is being excavated and brought to the phase two property. A short description of rationale should be provided here to justify parameter selection for chemical analysis. Note that the parameter group selection should be based on MOE's analytical protocol	
	ii. a description of the soil sampling activities conducted, including,	Refer to Schedule E, Table 3 for the mandatory frequency of soil sampling.	These should be regarded as minimum requirements. Additional confirmatory sampling may be required depending on the site-specific conditions.
	A. the number of samples analyzed,	See above.	
	B. the soil sampling program, including methods used to ensure that the samples are representative of any areas where a contaminant may be present at a concentration greater than the applicable site	See above.	

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	condition standard for the contaminant,		
	C. the address of the source property and any property where the soil was stored prior to being deposited on, in or under the phase two property,		
	D. the former and current uses of the source property, including identification of any potentially contaminating activity,	The QP should review available environmental information, including phase one and phase two ESAs, to confirm that the soil quality would be acceptable.	
	E. total volume of soil brought to the phase two property,	Self-explanatory	
	F. the results of analyses of soil samples, including a comparison of the results to the applicable site condition standard for each contaminant analyzed,		
	G. a figure showing the locations on the phase two property where soil was deposited,	This is important as it would serve to confirm the requirement for the soil. (See iii, below).	
	H. tables,		
	1. showing all soil quality data contained in laboratory certificates of analysis of soil, samples analyzed, and		

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	2. comparing the analytical results to the applicable site condition standard for each contaminant analyzed, and	See iv, below.	
	iii. a description of the purposes for which the soil was brought to the phase two property.	The soil importation should be compatible with the site use and required for backfilling or grading.	
(ii) Segregation of Soil	Provide,		
	i. a rationale for the choice of contaminants to be analyzed,	Review historical information to identify the origin and likely contaminants present.	
	ii. a description of the methods used to ensure uniform and representative sample collection,	See iii, below.	
	iii. the number of soil samples collected and the volume of each stockpile, and	Provide an explanation on how the volume of the stockpile was estimated.	
	iv. a comparison of the results of analysis to the applicable site condition standards and standards specified in a risk assessment for all contaminants analyzed.	Coarse-grained soil texture would likely be applicable, unless medium-fine grained texture is definitively demonstrated.	
(iii) Stockpiles	Provide,		
	i. a rationale for the choice,		
	ii. a description of the stockpile sampling program, including methods used to ensure uniform and representative sample collection, the	Describe how the locations and depths of the samples in the stockpile were chosen to ensure representativeness.	

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	number of soil samples collected and the volume of each stockpile, and		
	iii. a table showing all soil quality data contained in certificates of analysis or analytical reports for stockpiled soil samples analyzed and a comparison of the analytical results to the applicable site condition standards and standards specified in a risk assessment.		In addition to including copies of the certificate of analysis, prepare a table of showing analytical results of all parameters analysed.
Phase two environmental site assessment report, general requirements			
Section 47.	(1) The phase two environmental site assessment report shall, (a) be divided into the report sections as specified in Table 1 of this Schedule; and (b) include the headings and sub-headings set out in Table 1.		All headings and sub-headings should be included from Table 1, even if they may not be applicable/relevant with a qualifying sentence stating the reasons.
	(14) The phase two environmental site assessment report must have the appendices, references and figures specified in Table 1 of this Schedule attached to the report.	Suggested figures and content: <ul style="list-style-type: none"> • geographical setting of the site; • key site features; • locations of boreholes and monitoring wells; 	

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		<ul style="list-style-type: none"> • delineation of lateral extent of soil and groundwater contamination; • delineation of vertical extent of soil and groundwater contamination; 	
	<p>(15) Figures, maps, site plans and cross-sections in the phase two environmental site assessment report shall contain a scale, north arrow and a title block that includes,</p> <p>(a) a descriptive title;</p> <p>(b) the address, if any, of the phase two property;</p> <p>(c) the name of the qualified person's firm, company or partnership, if any; and</p> <p>(d) the date the figure, map, site plan or cross-section was created.</p>		<p>The scale should be exact, and do not use words like "Approximate". The section should have both horizontal as well as vertical scale. A north arrow should clearly be marked on the plan.</p>