

<b>SCOTTISH ENVIRONMENT PROTECTION AGENCY</b>	<b>Guidance No:</b> IED TG02
<b>POLLUTION PREVENTION AND CONTROL (SCOTLAND)</b>	<b>Page no:</b> 1 of 67
<b>REGULATIONS 2012</b>	<b>Issue No:</b> 1
<b>PPC Technical Guidance Note 2 (Site Reports)</b>	<b>Issue date:</b> 06/12/2013
	<b>Owner:</b> Irene Anders
	<b>Authorised by:</b> Ian Conroy

## **PPC TECHNICAL GUIDANCE NOTE**

### **CONTENT AND SCOPE OF SITE REPORTS**

Issued: November 2013

#### **IMPORTANT NOTES – PLEASE READ**

This guidance sets out SEPA's expectations for the site report, baseline report and closure report section of PPC applications. It is intended to assist operators and SEPA staff in preparing and assessing applications. This guidance may be subject to change in the light of regulatory changes, future government guidance, regulations or experience in its use. It has no legal status other than guidance to staff and operators.

Landfill operators undertaking a Hydrogeological Risk Assessment for the purposes of making a PPC application should refer to the specific guidance for landfills which can be found in the [landfill section](#) of SEPA's website.

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## 1. INTRODUCTION

This guidance note is relevant to applications for a permit made after 7<sup>th</sup> January 2013 or for permit variation after 7<sup>th</sup> January 2014. The Pollution Prevention and Control (Scotland) Regulations 2012 ('the regulations') replace the 2000 regulations of the same name. The regulations still require operators of Part A installations to include a site report describing the condition of the installation as part of the application for a permit. However, one significant change is that, where a site will use, produce or release relevant hazardous substances the application must also include a baseline report providing soil and groundwater measurements for those substances.

For the purpose of this guidance note the site report and baseline report are referred to collectively as the Initial Site Condition Reports.

Whilst the regulations refer to the site report and baseline report as discrete reports there is no reason why the information cannot be incorporated into a single report to avoid duplication of information.

The reports are required to be updated during the life of the installation where a change in operation results in: additional land being included in the site; the first use of a substance on a site or; the use production or release of a relevant hazardous substance.

At surrender, the application to surrender a Part A permit must include a closure report describing the condition of the site and identifying any changes in condition when compared to the site report and, where applicable, the baseline report.

The relevant sections of the regulations are summarized in section 3 and appendix 1 below for information. The reader is directed to the regulations for the full text, interpretation and context.

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## **2. PURPOSE AND SCOPE OF THIS GUIDANCE**

### **2.1. Purpose of this Guidance**

- Assist operators in preparing a site report and, where required, a baseline report
- Assist SEPA staff in assessing the site report and baseline report
- Assist operators in preparing a closure report
- Assist SEPA staff in assessing the closure report
- Provide guidance to the operator on information which could be collected during operation of the site under the PPC permit in order to assist in demonstrating no pollution risk and a satisfactory state

### **2.2. Scope of this Guidance**

- Provides the legislative background to the requirement for site reports, baseline reports and closure reports
- Provides interpretation of the legislation
- Based on this interpretation provides a suggested report structure, a discussion of the likely content and suggests how the data may be presented

It should be noted that this guidance is not prescriptive and has no legal status. Separate guidance is available in England, Wales and Northern Ireland.

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### 3. REGULATIONS

The parts of the regulations describing the requirements for the site reports are set out below. Other associated sections of the regulations are noted in Appendix 1.

#### 3.1. At Application for a Permit (Initial Site Conditional Reports)

Schedule 4, Part 1, paragraph 1 (1) requires applicants to provide -

- “(e) in the case of a permit to operate a Part A installation (as defined for the purposes of regulation 48) –
- (i) a site report,
  - (ii) where the permit will authorise an activity that involves the use, production or release of a relevant hazardous substance, a baseline report, ...”

The information required in a site report and baseline report is set out in Schedule 4, Part 1, paragraphs (2) and (3) respectively, as follows:

- (2) A site report must describe the condition of the site of the installation, and in particular it must –
  - (a) describe any soil and groundwater contamination at the site,
  - (b) identify any pollutants in or on the land other than as described in paragraph (a),
  - (c) provide information on the present use of the site, and
  - (d) provide any available information on past uses of the site,
- (3) A baseline report must provide soil and groundwater measurements for the site –
  - (a) based on previously existing information if using that information provides an accurate description of the state of the site at the time of the report, or
  - (b) based on new information,

having regard for that purpose to the possibility of soil and groundwater contamination by any hazardous substance to be used, produced or released by the installation concerned.

#### 3.2. At Application for a Variation to a Permit

Schedule 7, Part 1, paragraph 2 (1) in respect of an application for a variation states:

- (1) This paragraph applies where an application relates to a change in operation of a Part A installation that will if approved: -
  - (a) result in additional land being included in the site,
  - (b) result in the first use of a substance on the site, or
  - (c) result in the use, production or release of a relevant hazardous substance on the site (including any such additional land).

Sub paragraphs (3) to (5) further clarify these requirements as:

- (3) An application to which sub-paragraph (1)(a) or (b) applies must include a site report.

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- (4) An application to which sub-paragraph (1)(c) applies must include a baseline report. –
- (5) An existing site report or baseline report may be amended to take account of any substance or relevant hazardous substance for the purposes of paragraph (1).

### 3.3. At Surrender of a Permit (Closure Report)

Regulation 48(3) (c) and (d) states that an application for surrender of a permit to operate a Part A installation must provide -

- (c) a report describing the condition of the site affected by the surrender (the “closure report”), identifying in particular any changes from the condition of the site as described in the –
- (i) site report, and
  - (ii) where applicable, the baseline report,
- (d) a description of the steps that have been taken to avoid pollution risks from the site, including any steps that have been taken to –
- (i) return the site to a satisfactory state, and
  - (ii) remove, control, contain or reduce any relevant hazardous substance in soil and groundwater.

### 3.4. Definition of Terms in the Legislation

Regulation 2(1) provides the following definition of terms:

“**Emission**” means – in relation to

“(a) Part A installations, the direct or indirect release of a substance, a vibration, heat or noise from individual or diffuse sources in an installation into air, water or land;”

“**Hazardous Substance**” means substances or mixtures as defined in Article 3 of the Hazardous Substances Regulation. (REGULATION (EC) No 1272/2008, 16 December 2008, on classification, labelling and packaging of substances and mixtures) at

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:en:PDF>

See Appendix 2 for a summary.

These hazardous substances should not be confused with the priority hazardous substances of the Environmental Quality Standards Directive (2008/105/EC) or the hazardous substances under DIRECTIVE 2006/118/EC (THE Groundwater Daughter Directive). The latest list of Groundwater Daughter Directive hazardous substances can be found on the SEPA website at:

[http://www.sepa.org.uk/water/water\\_regulation/regimes/groundwater/discharges.aspx](http://www.sepa.org.uk/water/water_regulation/regimes/groundwater/discharges.aspx)

“**Installation**” means –

“(a) a stationary technical unit where one or more activities listed in Schedules 1 or 2 are carried out; and

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(b) any other location on the same site where any other directly associated activities are carried out and, references to an installation include references to part of an installation;”

“**Substance**” “includes any chemical element and its compounds and any biological entity or micro-organism, with the exception of –

- (a) radioactive substances within the meaning of Council Directive 96/29/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation (b),
- (b) genetically modified organisms within the meaning of Directive 2001/18/EC on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC(c), and
- (c) genetically modified micro-organisms within the meaning of Directive 2009/41/EC of the European Parliament and of the Council on the contained use of genetically modified micro-organisms (recast) (d),

“**Pollution**” means “emissions as a result of human activity which may –

- (a) be harmful to human health or the quality of the environment,
- (b) cause offence to any human sense,
- (c) result in damage to material property, or
- (d) impair or interfere with amenities and other legitimate uses of the environment;” and

“**Pollutant**” means “any substance, vibration, heat or noise released as a result of such an emission which may have such an effect”

**Satisfactory State:** The regulations do not define satisfactory state.

### 3.5. Interpretation of the Legislation

“**Identify any pollutants**”: the purpose of PPC is to prevent or, where that is not possible, control pollution arising from installations during their operation under a PPC permit. Therefore “any pollutants”, in terms of initial site report requirements, is interpreted to refer only to those substances or hazardous substances to be handled at the installation under a PPC permit.

In addition, for a substance to require to be identified in the initial site report it:

- i. must fit the definition of substance or hazardous substance given in Regulation 2(1) (see s.3.4 above)
- ii. must be “in or on the land” (see below)

Any other substances present which do not fit these criteria e.g. substances present in the ground as a result of the previous use of the site but which will not be used under the PPC Permit, do not need to be considered in terms of the site report.

“**in or on the land**” this is a very broad term and includes anything with a potential to cause pollution such as above ground storage, stockpiles of materials, substances in



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below ground pipes, tanks etc as well as contamination already present in the ground, groundwaters and perched waters.

**“pollutant”**: any substance or hazardous substance which, given the circumstances present on site, has the potential to cause pollution, should be considered. Pollution does not have to have occurred, for example, prior to permit surrender where a site is to be vacated chemicals should be removed from a tank to prevent possible pollution risk resulting from their accidental release to the environment.

**“satisfactory state”**: the regulations do not provide a definition of satisfactory state however, as it is used in addition to the term “pollution risk” it suggests that it is intended to cover something other than this. The general principle of PPC is to prevent deterioration in site condition. Deterioration in the condition of the soil and groundwater during the lifetime of the Installation could be considered to be unsatisfactory. The following are possible situations where an inability to demonstrate satisfactory state may be used to require action:

to require remediation of the ground where an emission has occurred and caused a deterioration in ground condition but the change itself does not represent a risk to an identifiable receptor;

to require removal of NAPL (non aqueous phase liquid) from groundwater where dissolution of the product is so slow as to not directly affect the water quality,

to address general housekeeping issues, for example, to require removal of accumulated sludge from within bunds.

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#### **4. RELATIONSHIP BETWEEN SITE REPORT, BASELINE REPORT AND CLOSURE REPORT**

The site report provides a factual statement of the current condition of the site in respect of those substances which are to be handled at the site under the PPC permit at the time of application for a permit to operate under PPC. In particular it describes the nature and distribution of contamination in the soil and groundwater at the site, identifies pollutants in or on the land, and provides information on past and present use of the site.

The baseline report provides soil and groundwater measurements for relevant hazardous substances, representative of the site at the time of application for a permit or variation of a permit.

It can also be used to assist in determining suitable locations for periodic monitoring of soils and groundwater during the life of the permit in accordance with Schedule 1 Regulation 23(2)(f) (see section 7 for further details of monitoring requirements).

The site report and, in the case of relevant hazardous substances, the baseline report are required to be updated during the life of the operation under a permit where additional land is included in the site; where a substance is to be used for the first time; or where a relevant hazardous substance is to be used, produced or released at the site for the first time.

The closure report provides a factual statement of the condition of the site at the time of application to surrender the permit. In particular it identifies any change to the site condition described by the site report and baseline report, describes any steps taken to avoid pollution risk, return the site to a satisfactory state and remove, control, contain or reduce any relevant hazardous substances in soil and groundwater that have resulted from the permitted activities (Reg. 48(8)(c)), i.e. identifies whether the operation under PPC has resulted in a deterioration in soil or groundwater at the site, and if so, what steps have been taken to clean it up.

When considering an application for surrender of a permit, Regulation 48(8) requires SEPA to consider whether there is any pollution risk arising from the operation of the installation and whether the site has been returned to a satisfactory state, taking into account the technical feasibility of the measures and to ensure that all appropriate measures have been taken to remove, control, contain or reduce any relevant hazardous substances in soil or groundwater so that the site does not pose a significant risk to human health or the environment.

In doing so SEPA will have regard to the condition described in the site report and baseline report, and any deviation from them identified by the closure report, but will not make a decision based solely on a comparison of them.

This is because it recognises that changes to the operations may occur during the operation of the site under PPC. However, the regulations do not require amendments or addition to the site report or baseline report during the life of the PPC permit except where additional land is being included in the site of the installation or where new substances are to be used or new relevant hazardous substances are to be used, produced or released at the site.

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The site report, baseline report and closure report will be used together with other available data relating to the operation of the activity under the PPC permit in order to produce as full a picture as possible on the likely condition of the site and to establish whether the installation has been operated to avoid pollution risk, the site returned to a satisfactory state, and appropriate measures taken to remove, control, contain or reduce any relevant hazardous substances in soil or groundwater so that they cease to pose significant risk to human health and the environment. Other available data could include SEPA inspection reports, site management techniques, records of accidents and incidents, results of periodic soil and groundwater monitoring, remedial works undertaken, notifications of changes in operation, variation notices etc.

It is in the applicant's interest to determine the site condition and baseline as fully as possible at the time of application for a permit and to keep detailed records of operational practice such as inspections, maintenance, incidents, accidents and remediation under PPC since, at surrender the applicant will need to demonstrate that operation of the installation under the PPC permit has not resulted in a pollution risk, that the site has been returned to a satisfactory and that appropriate measures have been taken to remove, control, contain or reduce relevant hazardous substances such that they cease to pose a significant risk to human health and the environment. If this is not demonstrated to SEPA's satisfaction, SEPA may refuse the application for surrender and require the operator to undertake appropriate remediation as a pre-requisite to acceptance of the application for surrender.

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## **5. OUTLINE OF BASIC REQUIREMENTS OF INITIAL SITE CONDITION REPORT**

The purpose of the initial site condition reports is to provide a factual statement of the condition of the site at the time that the application for a permit to operate under PPC is made. To comply with the requirements of the PPC 2012 Regulations all Part A applications need to include a site report that “describe any soil and groundwater contamination at the site” and to “identify any pollutants in, or on the land...”. In addition, where the site will use, produce or release relevant hazardous substances the application must include a baseline report providing soil and groundwater measurements for those substances.

As described in section 4, the initial site condition reports will not be used in isolation to set a baseline to remediate back to at surrender of the permit, as SEPA will not independently verify the accuracy of the information provided regarding the state of the site at the time of submission of the reports.

Table 5.1 provides a summary of the main stages which need to be undertaken to produce the initial site condition reports. Further details of the information required by each stage are included in section 6 together with suggested sources for the information and examples of how it may be presented.

The information collected for Stages 1 and 2 will determine whether there is a requirement for the applicant to provide a baseline report.

Additional guidance is provided in Appendix 3 for operators who have a direct discharge to ground or groundwater and for operators of landfill sites.

Note, where there is more than one operator at an installation the regulations require each operator to apply for a PPC permit in respect of the relevant part of the installation. In this respect it is necessary for each operator to make a statement of site condition for their part of the site. This could either be a separate initial site condition report relating to the area of the site occupied by their part of the installation or, a single initial site condition report in respect of the whole installation, however in the latter case it must be clear which data/information applies to which part of the installation.

Some of the information required for an initial site condition report is likely to have already been provided in other sections of the PPC application. It is not necessary to reproduce this information in the initial site condition report, however clear reference must be made to exactly where the information can be found. Table 5.1 below shows the sections of the regulations and the overlap with initial site condition report requirements.

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**Table 5.1 Main Stages of Initial Site Condition Reports**

<b>Stage</b>	<b>Activity</b>	<b>Objectives and Relevant Section of the Regulations</b>
1.	Identify what substances are currently used at the installation (Raw materials, products, by-products, intermediaries, wastes, auxiliaries)	Produce a list of all materials handled at the site  (Sch 4 Part 1, 1(1), (g) to the Regs)
2.	Identify which of the substances in Stage 1 are relevant hazardous substances. Are any of the remaining substances a theoretical pollution risk based on consideration of the chemical and physical constituents. Discard those substances which are not relevant hazardous substances or do not represent a theoretical pollution risk. Justify your decisions.	To reduce the list such that only those substances which have the potential to cause pollution are considered further  (Sch 4 Part 1, 1(1),(g), and (e)(ii) to the Regs)
3.	In respect of each of those substances brought forward from Stage 2, identify the actual pollution potential at the installation, including the probability of release and the consequences of release, taking account in particular of: <ul style="list-style-type: none"> <li>• The quantity of each substance handled</li> <li>• How and where they are delivered and stored</li> <li>• How they are transported around the installation</li> <li>• How they are used</li> <li>• Measures that have been and will be adopted to prevent emission to soil and associated groundwaters</li> <li>• The mobility, persistence and potential effect</li> </ul>	To identify which of the substances from stage 2 represent a potential pollution risk at the site based on the likelihood of emissions occurring during handling, storage or use.  <b>These are the substances for which a statement of site condition should be made</b>  (Sch 4 Part 1, 1(1), (g),(h) and (i))
4.	Provide site history. Consider both:- i) History of operation of existing installation (as in Stage 3 to identify any emissions which have occurred which may give rise to pollution. In particular, consider: accidents or incidents, drips or spills from routine operations, changes in operational practice, site surfacing, chemicals used, etc. Any changes in chemicals used) ("existing" used in widest sense to mean any installation which is already in operation at the site) and ii) Previous uses of the site - are substances likely to be similar to those to be used under PPC (as identified in stage 3) and if so are emissions likely to have occurred?  If emissions are likely, identify indicative areas	Identify potential sources which may have resulted in the substances identified in stage 3 being present on site prior to operation under PPC  (Sch 4 Part 1, 1(2))

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<b>Stage</b>	<b>Activity</b>	<b>Objectives and Relevant Section of the Regulations</b>
	for those actual or likely emissions and relate back to potential emission points identified at Stage 3 to identify coincident areas.  Previous site investigation reports may assist in compiling this data.	
5.	Identify the site's environmental setting, including: <ul style="list-style-type: none"> <li>• Topography</li> <li>• Geology and hydrogeology</li> <li>• Direction of groundwater flow</li> <li>• Other potential migration pathways such as drains, services, airborne emissions</li> <li>• Nearby industries</li> <li>• Surrounding land use</li> </ul>	Determine where emissions may go once emitted and where to look for them. Also identifies what environmental media and receptors are potentially at risk and whether there are other activities in the area which may release the same substances and cause them to migrate onto the site.  <i>(Sch 4 Part 1, 1(1) (h) of the Regs)</i>
6.	Using (3) to (5) to demonstrate the location of historic and potential future emissions and the strata and groundwater bodies likely to be affected by those emissions. i.e develop a series of conceptual site models which describe the site.	Identify whether existing pollution may already be present at areas of potential future release.  <i>(As 3-5 above)</i>
7.	If there is sufficient information to describe the site on the basis of (1) – (6) go directly to stage 8. If not, consider intrusive investigation or other means to provide details of initial site condition	Collect additional data as necessary to allow a statement of site condition to be made.  <i>Sch 4 Part 1 1(2) and (3) of the Regs)</i>
8.	Describe site condition for the substances identified in stage 3 on basis of (1) – (7) <b>NOTE: for those sites using, producing or releasing relevant hazardous substances soil and groundwater measurements are required.</b>	Provide a statement of site condition  <i>Sch 4 Part 1 1(2) and (3) of the Regs)</i>

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## 6. DETAILED CONTENT OF INITIAL SITE CONDITION REPORTS

The following section provides an indication of the type of detail required in each of the above stages, indicates possible sources for that information and suggests methods of presenting the data, which could be used along with relevant text.

Applicants may wish to contact SEPA, after consideration of this guidance, to discuss the site and the requirements for the initial site condition reports prior to commencing any works and also at the end of Stages 6 and 8 to ensure there are no obvious omissions which SEPA would require to be addressed.

Some pointers for a good site report:

- Keep it simple
- Make it relevant
- Use diagrams, tables etc where appropriate rather than dense text
- Focus on the substances associated with the PPC installation
- Report on the actual condition, even if nothing is detected
- Provide justification for your assumptions, decisions etc
- Provide a clear statement of site condition not a risk assessment or an assessment of whether the site is “suitable for use”

A checklist of issues to be included in the report is included in Appendix 4, SEPA will use this checklist when assessing the report.

### 6.1 Stage 1: Identify the Substances Used at the Installation

#### 6.1.1 INFORMATION REQUIRED

As indicated by the title of the regulations, PPC is concerned with preventing pollution and therefore the initial site condition reports relate only to those substances which may be released from the permitted activity. Before you can describe the condition of the site in respect of “any soil and groundwater contamination” and those “pollutants in or on the land” you need to know what substances are handled at the site and which of these have the potential to cause a pollution risk.

The first stage therefore is to produce a list of all substances handled within the installation boundary (raw materials, products, intermediaries, by-products, wastes and auxiliaries). This should include all substances associated with listed activities and directly associated activities which have a technical connection to the activities carried out and which could have an effect on pollution.

Where substances are listed under trade names the chemical constituents should also be identified. For mixtures or compounds the relative proportion of the main chemicals should be provided.

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## 6.1.2 SOURCES OF INFORMATION

- Site records,
- Suppliers material safety data sheets

## 6.1.3 EXAMPLE OF DATA PRESENTATION

An example of how the data may be presented is included in Table 6.1 at the end of stage 3.

## 6.2 Stage 2: Identify those Substances which are Relevant Hazardous Substances or which Represent a Theoretical Pollution Risk

### 6.2.1 INFORMATION REQUIRED

From the list produced in Stage 1 determine which of the substances are relevant hazardous substances and whether any of the remaining substances represent a theoretical pollution risk in respect of its chemical and physical constituents such as: composition, state (solid, liquid, gas), solubility, mobility, persistence, etc. This information should be used to determine whether or not the substance has the potential to cause pollution. The data considered together with the rationale used to interpret it should be presented so it is clear to the assessor why substances have been dismissed or included.

Where a group of substances display similar characteristics they may be considered together provided that justification for the grouping is provided.

All relevant hazardous substances and any other substances identified as being a theoretical pollution risk should be taken forward to Stage 3 for further consideration as described below.

### 6.2.2 SOURCES OF INFORMATION

- Article 3 of the Hazardous Substances Regulations
- Material safety data sheets (for basic information)

For more detailed information (if required):

- Croner Substances Hazardous to the Environment
- Croner Substances Hazardous to Health
- The Merck Index
- The CRC Handbook of Chemical and Physics
- Fate and Transport of Organic Chemicals in the Environment (NEY)

(see List of References for full details)

### 6.2.3 EXAMPLE OF DATA PRESENTATION

An example of how the data may be presented is included in Table 6.1 at the end of stage 3.



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### 6.3 Stage 3: Assessment of Site Specific Pollution Risk

#### 6.3.1 INFORMATION REQUIRED

Each substance brought forward from Stage 2 should be considered in the context of the site to determine whether circumstances exist on site which may result in the release of the substance in sufficient quantities to represent a pollution risk, either as a result of a single emission or as a result of accumulation from multiple emissions. See examples below.

#### **Examples of Possible Interpretation of Data**

A substance may be considered to be of concern where:

- The substance is a relevant hazardous substance
- The substance is highly toxic and persistent and if released, even in small quantities, could result in a pollution risk and / or an unsatisfactory state
- The substance is relatively benign, but the quantity handled is such that the effect of a catastrophic leak could result in a pollution risk or an unsatisfactory state
- Many small seemingly insignificant drips have occurred over a long period of time and may have resulted in an accumulation of the substance in the environment
- There is insufficient information on which to determine the potential risks

A substance may not be considered to be of concern where:

- The substance is highly toxic and persistent but used in such small quantities that it could never enter the environment (even on a cumulative basis) at levels which could result in a pollution risk or an unsatisfactory state
- The substance is highly toxic and a pollution risk if released, however the operator has sufficient measures in place to ensure it could never be released
- Large quantities of a non hazardous substance are used, but even if there were a catastrophic leak it could not result in a pollution risk or the site being in an unsatisfactory state

NOTE: If the substance is a relevant hazardous substance and no measured data is to be provided in the baseline report the operator must apply to SEPA for a waiver (Sch 4 Part 1, Para 1(4))

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Specific issues to be considered include:

- i. Is the substance classified as a hazardous substance under Article 3 of Regulation (EC) No 1272/2008.
- ii. The amount of substance handled per year relative to its toxicity (Table 6.1).
- iii. The location of each substance on site e.g where it is delivered, stored, used, moved around the site. etc. (Figure 1)
- iv. At each of the above locations identify the method of storage, handling and use of raw materials, products, wastes etc and whether or not there are any containment mechanisms in place to prevent emissions occurring; e.g. bunds, hardstanding, handling procedures, (and/or procedures etc. (Figure 1 and Table 6.1).

Consider the degree of containment present and potential release mechanisms and determine the likelihood of emissions to soil and groundwater occurring.

- v. Undertake a detailed physical inspection of the site to determine integrity of containment mechanisms, nature and condition of site surfacing, location of drains, services or other potential conduits for migration. Examples of the types of information which could be gathered are:
  - are bunds appropriately sized
  - are structures cracked or damaged?
  - are there signs of chemical attack to concrete surfaces?
  - is brickwork and pointing intact?
  - are process drains in good condition? Where safe to do so, manholes, gullies and open drains should be inspected and where possible a CCTV survey would be beneficial
  - identify drainage routes, service corridors etc and locate outfalls (figure 2)
  - identify signs of emissions already having been made and their visible nature and extent. Could the emission reoccur in future?
  - what is the nature and integrity of the site surfacing? (concrete, tarmac, gravel, open ground etc). Are joints or cracks present in the vicinity of potential emission points?
  - identify whether any direct or indirect emissions of hazardous substances to soil or groundwater occur on site (where a direct discharge is to be made or the site is a landfill see additional information in Appendix 3)

Where some form of emission may occur either directly or due to an inadequacy or deterioration in a particular containment mechanism or procedure determine the likelihood of emissions being made or having already been made to soil or groundwater.

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Based on the above describe the circumstances under which an emission to the environment may occur during operation under PPC e.g.

Accidents/Incidents	e.g. tanker overturning on site road; vessel rupturing; leaking underground tank, seal breaking; accidental discharge; leaks from drain ruptures
Routine operations	e.g. drips during delivery or from pipe joints, small spills during decanting/transfer of product, leaks from blocked or broken drains, cracks in concrete hardstanding
Planned emissions	e.g. discharges to soil or groundwater;

and identify which substances may be emitted to the environment and result in a potential pollution risk

**These are the substances for which the initial site condition will need to be stated. Note, measured soil and groundwater data will generally be required for relevant hazardous substances.**

### 6.3.2 SOURCES OF INFORMATION

- Site records, e.g. building/drainage/utility plans, maintenance records, incident records, site reports/audits
- Management procedures,
- Site walk over/Visual site inspection

### 6.3.3 EXAMPLE OF DATA PRESENTATION

An example of how the information collected from Stages 1 – 3 could be presented is included in Table 6.1 and Figure 1. Where appropriate these tables and figures should be supported by accompanying text and documents to provide any necessary explanation of the conclusions e.g. operating procedures.

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**Table 6.1 Determining substances which may represent a pollution risk**

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity						Stage 3 Site Specific Characteristics			Stage 4 Site specific Risk
Substance	State S-Solid L-Liquid G-Gas	CAS No.	Risk Phrases (CHIP) N/A	Hazard Substance under Stage 2 Yes/No	Environmental fate and behaviour	Potential Pollution Risk	Quantity	Storage Arrangements	Delivery, storage and use details	Comments/ Chemical of Concern?
Plastic sheeting	S	N/A	N/A	No	Essentially inert	N	N/A	N/A (no further information required)	N/A (no further information required)	None
Charcoal	S		-	No	Material is solid, low solubility and unlikely to have significant effect.	N	1 tonne	Bags inside warehouse	N/A (no further information required)	Spillages could be easily swept up therefore not considered to be a potential risk.
Hexane	L		R11, 62, 65, 48/20, 38, 67, 51, 53	Yes	Low solubility, floats on water. Moderate to high toxic effects and bioaccumulation potential.	Y	1000000 litres	above ground steel tank, installed 1980,	Delivery by tanker, fill point within bund. Brick bund (110% capacity), constructed 1985. Direct feed above ground pipeline to plant	Site containment and handling procedures good but bund is brick and shows signs of wear. Large volume handled makes this a potential risk.
Methanol	L		R11, 23/24/25, 39/23/24/25	Yes	Miscible with water, high toxicity	Y	90,000 litres	Above ground steel tank installed 1995. Overfill alarm fitted	Delivery by flexible pipeline from tanker over gravel area, fill point within bund. Bund (110% capacity), constructed 1995, Direct feed above ground pipeline to plant	Delivery system and permeable gravel surfacing make this a potential chemical of concern.
Bromine	L			Yes	Denser than water (DNAPL), high toxicity and solubility therefore is a potential risk,	Y	4,000 Litres	IBCs in warehouse	Delivery by lorry, IBCs stored on large drip trays, separate from other chems in warehouse (concrete floor, no surface water drains). Delivery to production building by forklift	Emissions unlikely while stored, but potential for spills if IBC dropped during unloading or delivery to production building, so potential chemical of concern.

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## 6.4 Stage 4: Site History

### 6.4.1 INFORMATION REQUIRED

Schedule 4 Part 1 1(2) to the regulations states that in describing the condition of the site, the site report must "...provide information on the present use of the site, and provide any available information on past uses of the site..." The purpose of this section is to determine which of the substances identified by stage 3 have the potential to be present on site already as a result of activities to date and to determine whether they are coincident with potential future emission points.

The site history should consider both (i) the history of the site prior to development of the current/ proposed installation and (ii) the operational history of the current/ proposed installation as follows:

- i. List the former uses of the site from green field to development of the proposed installation. Identify whether these uses are likely to have handled any of the substances identified in Stage 3. If so, where were they likely to have been handled, what is the likelihood of emissions having occurred, what remediation, if any, has been undertaken? Where available site specific data should be used, however, where this is not available for a previous activity a subjective assessment should be made and the response qualified accordingly.
- ii. For an installation which is already operational at the time of the application for a PPC permit what is the likelihood of emissions having occurred during the history of operations at the site? Specific points worth considering are:
  - Location, nature and extent of accidents, incidents, or direct discharges made historically (authorised or otherwise) which might have caused a release of substances to the soil or groundwater
  - What changes or improvements have been made to the process, chemicals handled, storage locations, disposal methods etc. and why? For example were they as a result of a previous incident, accident, near miss etc, were they made to reduce the risk of emissions, to comply with new legislation, to improve efficiency, reduce waste etc. Do they indicate emissions may have occurred?
  - Maintenance records – do these show good integrity for drains, tanks, bunds, pipelines etc? Have they been kept since the start of the activity or were they introduced recently?
  - Details of site investigations undertaken previously and remedial works carried out.
  - Site walkover data gathered during Stage 3 may also provide information on the presence of staining, evidence of corrosion, presence of new surfacing, etc.

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#### **6.4.2 SOURCES OF INFORMATION**

- OS maps
- Planning applications
- Site investigation reports (divestiture, audit, site condition, incident investigation etc)
- Visual Site inspection
- Site records
- Anecdotal information
- SEPA/Local Authority records

#### **6.4.3 EXAMPLE OF DATA PRESENTATION**

An example of how the information collected from Stage 4 could be presented is included in Table 6.2 below and figure 2.

Where appropriate copies of the relevant historic maps may be included to identify the specific location/layout of a former use or changes in use. However inclusion of all historic maps is not necessary if they do not demonstrate relevant information or changes.

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**Table 6.2 Summary of Site History**

<b>Date</b>	<b>Use</b>	<b>Comment</b>
Pre 1965	Agricultural land	Possible residual levels of nitrates, ammonia and phosphates all of which coincide with chemicals handled on site. Pesticides and herbicides may be present but are not similar to materials handled on site so are not of interest.
Approx 1965	-	River valley in filled. Source of fill not known. Potential for contamination to be associated with this.
1975 to date	Chemical works	<p>The current site was developed in the mid 1970's. Although some changes in layout and process materials have occurred the materials handled are largely the same as present and therefore overlaps between historic and future pollution are likely.</p> <p>Specific incidents known to have resulted in the release of chemicals are as follows:</p> <p>1982 Heating Oil spill to south east of boiler house. Remediation undertaken at time, residual levels as indicated in remediation report (reference the report and include relevant sections in an appendix).</p> <p>1990 Caustic leak from drain at SW of site (indicate on diagram). Drain repaired but no soil or groundwater remediation undertaken. Further information on this area likely to be necessary.</p> <p>Other issues:</p> <p>1994 Bunding installed around all storage tanks to reduce potential environmental liability. Prior to this reliance on concrete hardstanding preventing emissions entering ground some pollution may have occurred at joints in concrete. Potential for emissions to have occurred at tank fill points, tank valves etc – which are outside of the bunds and at pipe joints as indicated on figure 2.</p> <p>Bund inspection and integrity testing undertaken annually. No issues noted.</p>

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## 6.5 Stage 5: Environmental Setting

In Stages 1 - 4 the locations on the site where emissions could occur in future and those locations where emissions may already have occurred were identified. The aims of Stage 5 are to determine the fate of any such emissions, the strata and groundwater bodies which may be affected and to establish the extent and depth to which the land needs to be characterised. This requires an understanding of the characteristics of the ground and groundwater in the vicinity of the site. The types of information likely to be required are considered below.

Where available site specific data should be used, however where this is not available the applicant could use reference data, qualitative/subjective assessment, inferred or extrapolated data. In each case the source of the data should be identified, and where this is not site specific justification for the use of the selected data and details of any margins of error which apply should be included.

In considering the site characteristics the following data should be collated:

### 6.5.1 TOPOGRAPHY

Local topography and type of ground surface (concrete, open ground etc) in the vicinity of each emission point will dictate the immediate effect of any emissions, as will the location of the emission in relation to the ground surface (e.g. ground level, above ground, overhead pipe work, below ground level etc).

The type and slope of the ground surface etc can be shown on a site plan. In addition, the base of bunded compounds, pits etc relative to the surrounding ground level should be clearly identified, particularly where they are below ground level (either in part or in full).

### 6.5.2 SOURCES OF INFORMATION

- Visual site inspection
- Site survey data
- Construction drawings.
- Maintenance records
- Ordnance Survey maps

### 6.5.3 EXAMPLE OF DATA PRESENTATION

See Figure 2

### 6.5.4 GEOLOGY AND HYDROGEOLOGY

Provide a description of the soil and rock strata beneath the site and the physico-chemical properties of each strata which may influence the movement of substances through the ground.

Identify whether groundwaters (including perched waters) are present, or are likely to be present, in each of the strata and, where known, indicate the groundwater flow direction and hydraulic gradient.

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Provide an indication of what the soil and groundwater properties mean in terms of the movement of substances through the ground.

A simple summary of the data, rather than a full geohydrological description, is sufficient in the report, further details can be provided as an appendix or made available for future reference as required.

In addition, this should draw together all available information to present the conditions present at the site, rather than separating out published geology and hydrogeology from previous investigation findings and current investigation findings.

### **6.5.5 SOURCES OF INFORMATION**

- Site investigation data, particularly any borehole logs (trial pit logs may also have some limited use).
- BGS records (logs, geological sheets and memoirs)
- Geotechnical test results or references for physico-chemical parameters
- Groundwater vulnerability maps

### **6.5.6 EXAMPLE OF DATA PRESENTATION**

Table 6.3 indicates how the data may be summarised and figure 3 presents typical cross sections which may be used to show the variation in geology across the site.

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**Table 6.3 Geological and Hydro-geological Summary**

Typical Depth	Strata	Physico – Chemical Properties and Comment	Comment
0 – 0.2m	<b>Made Ground</b> Concrete or gravel chippings Grass to edges of site (see fig 1)	Local slope to concrete (see figure 3). Grass and gravel roughly level.	
0.2 – 1.2m	<b>Made Ground</b> Red brown sandy gravel with clay lenses. (reworked natural)  Shallow Groundwater at 0.8m	Permeability likely to be high. Likely to have low organic matter content and low sorption and cation exchange capacity. Hydraulic gradient: Initial measurements indicate slight fall to SE, however water is discontinuous in NE of site.	Based on the available information it is likely that chemicals will migrate through this horizon fairly rapidly. Some retardation may occur in clay lenses.
1.2 – 13.3m	<b>Red brown sandy, silty CLAY</b> Soft sandy, slightly silty clay with many sand lenses becoming more firm and less sandy with depth (below 5 m approx)	Permeability: Mod – low, (approx $7 \times 10^{-4}$ , to $3 \times 10^{-6}$ cm/sec, pH: 7.2 – 7.9) Noted to have some organic matter present in the upper 3-5 m. No free water present but upper 2-3 m quite moist.	(Permeability data from previous SI.) The upper layers of sandy clay are likely to permit migration of chemicals down to the firmer clays. Some adsorption and retardation would be expected, this would most likely increase with depth. The thickness and firmness of clays should provide protection to the sandstone aquifer below.
13.3 – 16.8m	<b>Yellow SANDSTONE</b> Weathered at surface, heavily fissured.  Groundwater at 13.7m (major aquifer)	Fault line trending W - E in the vicinity of building 5 Hydraulic gradient: 1:18 east to west	Any chemicals entering this horizon are likely to migrate via fissures in the sandstone. Light oils, solvents, etc would float on the water table. More dense substances may migrate to considerable depth.

### 6.5.7 HYDROLOGY

Indicate the presence of surface water features, their direction of flow, quality/classification and location of bed depth relative to the site surface. Provide an indication of how each water body identified might be affected by emissions from the site.

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### 6.5.8 SOURCES OF INFORMATION

- OS maps
- Water Quality Data may be requested from SEPA.
- Classification information for water bodies under the River Basin Management Planning process is available on SEPA's website.
- Site inspection
- Groundwater Levels survey data obtained from groundwater monitoring boreholes.
- Topographic survey e.g. to relate riverbed to site surface and geology.

### 6.5.9 EXAMPLE OF PRESENTATION OF DATA

An example of how the data may be presented is included on Figures 1 and 2.

### 6.5.10 MANMADE PATHWAYS

Identify manmade pathways, e.g. service corridors, and drains, including surrounding pipe bedding/service trench backfilling, mines etc, which may act as migration routes and identify the likely migration direction remembering that this may be against the natural topographic or hydraulic gradient.

### 6.5.11 SOURCES OF INFORMATION

- Site records,
- Construction drawings (Planning and site)
- Mining reports
- Service authorities

NB: Commercial database searches such as "Envirocheck™" can be useful in obtaining environmental setting information, but SEPA does not expect the full reports to be provided in the Site Report.

### 6.5.12 EXAMPLE OF PRESENTATION OF DATA

Figure 1 or text

### 6.5.13 SURROUNDING LAND USE

Identify surrounding land use to determine industries/activities, especially those upgradient, that may handle the same substance, and may cause pollution to migrate onto the site. This includes sub-surface migration not readily visible during a walk-over survey. In terms of pollution migration on to the site at the time of surrender of the permit it is for the applicant to demonstrate that they have not caused pollution whilst operating under the Permit. It is therefore important to know if adjacent properties could be a source of similar pollutants, especially since they maybe long gone and forgotten by the time the permit is surrendered.

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#### **6.5.14 SOURCES OF INFORMATION:**

- Visit to area
- OS plans
- Trade directories
- Aerial maps available online

#### **6.5.15 EXAMPLE OF PRESENTATION OF DATA**

Figure 1 or text

### **6.6 Stage 6: Conceptual Site Model (CSM)**

Rather than provide a single general model of the site, either as a drawing, or text, it is preferable to produce more detailed individual models for each area of concern at the installation. For example, a conceptual model of the area around a tank farm, which could indicate the construction of the bund, the direction of slope of the ground, whether fill points are inside or outside the bund, the type of surfacing around the area, and the underlying geology and water table. This information would then be used to suggest where any chemicals may end up, if spilled.

#### **6.6.1 INFORMATION REQUIRED**

Information obtained in Stages 3-5 should be used to produce conceptual models of the site, identifying existing and potential sources, their migration, pathways and likely destination. The purpose of this stage is to determine the nature and extent of the strata and groundwater bodies which require characterising in order to describe the initial site condition.

#### **6.6.2 SOURCES OF INFORMATION**

Stages 3 – 5

#### **6.6.3 EXAMPLE DATA PRESENTATION**

Example of CSM's is provided in figure 3.

### **6.7 Stage 7: Site Investigation**

Consider the information from stages 1 – 6 above. If there is sufficient information to characterise the site both laterally and vertically and to allow the statement of site condition to be made without further works and none of the substances are classified as hazardous substances, the applicant may go directly to stage 8. If however relevant hazardous substances are used, produced or released or if only part of the site can be characterised or there is insufficient information on which to make a statement of site condition then additional information should be obtained by site investigation or other means.

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### 6.7.1 THE NEED FOR AN INVESTIGATION

It is not possible to provide prescriptive guidance for when site investigations will be necessary or what their content should be as this will need to be determined on a site specific basis, however some general points for consideration are provided below.

A site investigation is always necessary where:

- a baseline report is required to satisfy the requirements of Schedule 4, Part 1, Paragraph 1(3) in respect of relevant hazardous substances; and
- existing soil and groundwater measurements are not available, and,
- no waiver from the requirement has been agreed by SEPA.

In considering an application for a waiver SEPA must have regard to the possibility of soil and groundwater contamination from relevant hazardous substances. Where it can be clearly demonstrated that pollution of the soil and/or groundwater has not occurred and is very unlikely to occur during the life of the permit, SEPA may, in accordance with Schedule 4, pt 1, 1 (4) agree to waive the requirement for baseline report. Examples of possible situations where this may arise are provided in section 6.3.1

A site investigation is likely to be necessary where:

- the desk study has produced insufficient information to satisfy the requirements of Schedule 4, Part 1, paragraph (2) to describe the site condition
- the desk study has produced insufficient information to satisfy the requirements of Schedule 4, Part 1, paragraph (3) to provide soil and groundwater measurements for hazardous substances
- there is a direct discharge to ground or groundwater (see also Appendix 3)
- site specific data is required to enable SEPA to determine the permit and/or set permit conditions
- historic and potential future emission points for a particular substance are coincident

A site investigation may not be necessary where:

- SEPA has agreed to a waiver in accordance with Schedule 4, Part 1, paragraph 1(4)
- there is sufficient data from the desk study to satisfy the requirements of Schedule 4, Part 1, paragraphs (2) to describe the site condition and paragraph (3) to provide soil and groundwater measurements for hazardous substances and no further data is required to enable SEPA to determine the permit and/or to set permit conditions
- the installation is a greenfield development and the substances to be handled are not likely to be naturally occurring or otherwise present at the site
- historic contamination or naturally occurring substances differ from substances (and their degradation products) to be handled at the installation
- historic contamination is the same as substances to be handled but historic and potential future emission points are not coincident and migration paths do not cross.

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Where an application has been received for a site that will not use, produce or release relevant hazardous substances and includes a site report, but SEPA considers that a site investigation is required to provide information necessary for the purposes of determining whether or not to grant the permit application and/or the conditions to be included in the permit, SEPA may serve a notice under Schedule 4, Part 1, paragraph 7 requiring that information to be obtained and submitted prior to determining the application.

Where an application has been received for a site that will use, produce or release relevant hazardous substances but no baseline report is provided and no waiver has been agreed, SEPA will refuse the application as not being duly made.

In the case where a baseline report is provided but is considered to be insufficient to comply with the requirements of Schedule 4, Part 1, Paragraph 1, SEPA will serve a notice under Schedule 4, part 1, Paragraph 7 requiring that information be obtained and submitted prior to determination of the application.

## 6.7.2 REQUIREMENTS OF AN INVESTIGATION

The specific requirements of an investigation should follow on logically from the desk study information collected in stages 1 to 6. ***It is important to recognise that the site investigation differs in purpose to an assessment of historically contaminated land in that it seeks to characterise the soil and groundwater only for those substances associated with the PPC installation, it is not a risk assessment nor is it an assessment of whether the site is “suitable for use”.***

The nature, extent and purpose of the site investigation should be planned prior to being undertaken, and this should be reviewed and amended, as necessary, as the investigation proceeds, this is particularly important where conditions encountered differ from those anticipated. The intrusive investigation must be carried out by a suitably competent and experienced contractors. Investigation design, logging and sampling techniques should be carried out in accordance with current codes of practice (e.g. BS: 10175:2011).

Every exploratory hole and sample should have a purpose and the depth, strata and groundwater bodies to be investigated should reflect both the ground conditions at the site and the migration characteristics of the substances of interest as described by Stage 6, e.g. there is no point stopping at the groundwater surface if the substances are heavier than water (DNAPLs (Dense Non-Aqueous Phase Liquids)) and the strata very sandy.

To ensure the investigation delivers the information required it is good practice to develop of schedule of investigation requirements and have a copy on site during the works to ensure the objectives are being met. An example of the type of information which might be included in this schedule is shown in Table 6.4 below. Note from this table a large number of samples are being taken whilst the excavation is open but not all will be tested.

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Typical exploratory hole locations may be: at known potential emission points, especially where these coincide with potential historic emissions; down gradient of historic emission points to check for migration and; confirmatory samples in suspected "clean" areas to confirm assumptions.

It is not always necessary to investigate every potential emission point. Where appropriate, the site could be zoned into areas of like characteristics and an investigation undertaken to represent the conditions of the zone. For example, at a chemical plant there may be a number of banded compounds containing sulphuric acid tanks, if there is no reason to believe the conditions at each of these banded compounds should differ it may be sufficient to investigate one or two thoroughly and use this data as indicative of the conditions at the others. If however it was known that one of the compounds had previously had an incident which may have resulted in emissions to ground or groundwater this should be investigated separately to the rest of the compounds to determine the specific conditions present.

Where investigation is not practical at a particular emission point consideration should be given to obtaining samples in the general vicinity to provide an indication of the condition near the emission point or down gradient of the emission point to assess migration. Examples of such instances may be where investigation would: breach the integrity of containment measures, damage underground services, be a health and safety risk, cause unnecessary disruption to the safe operation of the installation. Consideration should also be given to obtaining additional data during plant maintenance, shut down periods etc, further guidance on this is provided in section 7.0.

Effects of emissions to drains, water courses, ponds etc should also be considered, however before sampling is undertaken the value of this information in terms of establishing the initial site condition should be assessed.

In the case of drains consideration should be given to the need for a CCTV survey, as the integrity is particularly important where the drains are stated to be a defence against substances entering the ground or groundwater. If breaches in the drains are found intrusive investigation should be considered in the vicinity of the breach alternatively samples of surrounding soil could be taken during repair of the system.

For water courses a single water sample up and down stream of an emission point is fairly meaningless in terms of determining the initial site condition, however if regular monitoring is to be undertaken throughout the life of the installation it is more appropriate. If regular water monitoring is not to be undertaken then a better measure of the potential for emissions to have occurred may be obtained from sampling bed sediment or sediment within discharge pipes. The value of this information will however depend on a number of factors including the substance of interest, how regularly the discharge pipe is cleaned, whether bed sediment is excavated periodically to maintain flow, the flow rate and energy of the water course etc.

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Ponds being more static are likely to give more reliable data both in terms of water quality and sediment quality however these too can be very variable depending on where and how the substance may have entered, careful consideration should therefore be given to the type of samples required and the interpretation of the data produced.



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### 6.7.3 CHEMICAL ANALYSIS

In terms of chemical analysis, the only substances of interest are those which may be emitted by the installation during its operation under the PPC permit and, where appropriate, any daughter products. Other substances which may be present as a result of historic activities but will not be used at the installation are not relevant to the baseline report, even though they may be of interest to the applicant. By restricting analysis to only those substances of interest rather than the usual generic "land contamination" suites only relevant information is provided therefore saving unnecessary cost. In addition, the substances of interest may vary from sampling point to sampling point, therefore it may be more cost effective to vary the analytical suite accordingly rather than applying a single analytical suite to all samples.

Where a large number of similar substances are used, screening analysis for specific chemical groups or marker substances may be more appropriate than analysis for every individual substance. Where screening identifies positive results, substance specific testing may then be appropriate. Similarly for complex mixtures, marker substances may be more appropriate than analysing all individual components.

However careful consideration should be given to the selection of screening techniques or marker substances and in particular, the value of the results produced in terms of establishing the initial site condition e.g. a solvent extractable matter result is unlikely to be specific enough to adequately quantify the site condition in terms of organic contamination but may be useful to indicate where more specific analysis should be undertaken.

Where these approaches are adopted the site report should clearly state the logic for the choice of chemical group or marker substance, justify that selection and provide an interpretation of the results in the context of the site.

Guidance on the selection of appropriate investigation techniques, single or multiphase investigations, sampling and chemical analysis and the level of confidence achieved by these is beyond the scope of this guidance however appropriate references are included in the reference section at the end of this document.

It will be important to ensure that appropriate limits of detection are employed in the laboratory analysis to allow accurate determination of the levels of substances present and subsequent assessment at surrender (see sections 8 and 9) where demonstration of "no significant risk" to human health or the environment will be required (Regulation 48(8)).

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#### 6.7.4 EXAMPLE DATA PRESENTATION

- Stages 1 – 6
- See also references

#### 6.7.5 EXAMPLE DATA PRESENTATION

**Table 6.4 Planning the Investigation**

<b>EH No</b>	<b>Reason</b>	<b>Depth</b>	<b>Samples</b>	<b>Analysis</b>
BH 1	Historically unbunded diesel tank with known leak. Investigating to see if residual contamination present. Hexane tank 20 m upgradient no recorded emissions, but check for hexane. Also use to obtain background for other substances, e.g., methanol	Approx 3m (boulder clay should be encountered at approx 2.5m – if not extend BH accordingly).	0.2m (below concrete), 0.5, 1.0, 1.5, 2.0 and 3.0m Or as dictated by soils, visual evidence of contamination or odours. Water if present. Note: - determine samples to be analysed once logs for this and adjacent exploratory holes reviewed.	3 soil samples 1 water sample Petroleum hydrocarbons, VOCs (volatile organic compounds, to include BTEX and PAH individually)...
Notes: EH = Exploratory hole BH = Borehole				
BTEX – Benzene, toluene, ethylbenzene, xylene. PAH – polyaromatic hydrocarbons				

Investigation and sampling methodologies, exploratory hole logs, results of chemical analyses, laboratory methods and detection limits should all be included as appendices so that comparable methods can be employed at permit surrender to ensure consistency between data sets.

Examples of presentation of the results of the investigation are included under Stage 8 below.

#### 6.8 Stage 8: Statement of Site Condition

The purpose of this stage is to draw together (not reproduce) all of the information collected in Stages 1 – 7 to produce a **simple** statement or statements of the site condition which describes any soil and groundwater contamination at the site and identifies any pollutants in, or on the land” (Sch 4, Part 1, paragraph 1(2) (a) (b)). Where potentially polluting substances are likely to be present the statement of site condition should identify which strata or groundwater body they are associated with and describe their concentration, nature and extent. Providing a clear statement of which substances are not present is just as important as identifying those which are.

For relevant hazardous substances, Schedule 4, Part 1, Paragraph 1(3) requires measured data to be provided to describe the actual site conditions, however it is recognised that full characterisation of sites may be impractical due to physical constraints and even where there are no constraints full characterisation may be prohibitively expensive. The statement of site condition is therefore more likely to represent a combination of measured data and inferred/extrapolated data. Where

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the site is not fully characterised by chemical analysis it is important to explain what the test results mean in terms of the site i.e. do they represent a hot spot level at an emission point, the general ground condition in the vicinity of emissions or background levels on the site. In addition, interpretive and extrapolated text should expand on the data to indicate, for example, whether more elevated conditions may be anticipated closer to the source, whether a plume would be expected to extend downgradient of a specific result etc. Any such interpretation should be justified and should always be site specific.

To convey the data in its simplest form it is likely that the “statement of site condition” will comprise a mixture of annotated site plans, tables and relevant supporting text. A statement that relies on pointing to raw data in an appendix, with little or no explanation in the text of the report, would be considered inadequate.

In all cases the statement of site condition should be clear, any assumptions made should be justified and the degree of confidence in the statement should be expressed.

Statistical interpretation of the data set should only be undertaken where the data set is sufficiently large and was collected in a manner which is suitable to interpretation in this manner. Targeted “hotspot” investigations should not be interpreted statistically.

**Note it is a statement of site condition which is required and not a risk assessment or an assessment of whether the site is “suitable for use”, these are not of concern in respect of the requirements of the initial site condition report.**

### **6.8.1 SOURCES OF INFORMATION**

Stages 1 – 7

### **6.8.2 EXAMPLE DATA PRESENTATION**

Figure 4 together with supporting text.

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## 7. AFTER INITIAL SITE CONDITION REPORTS AND DURING OPERATION

Land and groundwater should be protected at all times through the life of a permit. Emissions of pollutants to soil and groundwater are prohibited under PPC unless the emission has been specifically permitted under the Regulations (see Appendix A1.3 and Appendix 3).

### **Operators should prevent pollution, clean up any releases at the time and keep accurate records.**

The PPC 2012 Regulations require certain conditions to be included in permits to assist in demonstrating that pollution is not being caused for example, Regulation 23 requires permits to include conditions that, amongst other things:

- ensure protection of soil and groundwater,
- require periodic monitoring of soil and groundwater for relevant hazardous substances<sup>1</sup>, and
- require regular maintenance and surveillance of measures in place to prevent emissions.

If relevant hazardous substances are used, produced or released at the site Regulation 23 requires soils to be analysed at least every 10 years and groundwaters to be analysed at least every 5 years in order to demonstrate that pollution is not being caused. It is possible that boreholes installed to collect information during the baseline report may be suitable for groundwater sampling under the permit.

Operators must have a management system, including inspection and maintenance of all measures on site to prevent emissions e.g. tanks, bunds, procedures etc, that provides adequate records of how the land and groundwater have been protected from the date the permit was issued (or when operations started), until the end of operations under the permit. These records will form the basis of a surrender application.

Whilst these will assist in demonstrating that pollution is not being caused and that the installation is in a satisfactory state, there is other information which could be collected during the life of the permit which may be used at surrender (see also section 8.0 below for information likely to be included in the closure report). Note some of the data suggested below may be required by the Regulations or the permit, others will be purely voluntary.

The types of activities which may provide useful information/data are:

- During any works which require the ground to be excavated and/or exposed e.g. construction of new buildings or extensions, replacing drains, repairing hardstanding, repairing machine pits etc, take the opportunity to obtain samples of the ground below the structures and have them analysed for the relevant substances to determine chemical content.

<sup>1</sup> See References for advice on designing, implementing and reporting on monitoring  
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- If there are spills, leaks, drips, incidents etc keep a record of what was spilled, how much, where the spill extended to on the site surface, whether the substance entered the drains or is likely to have entered the ground, what immediate containment measures were put in place, what subsequent remediation was undertaken, how much was recovered and an indication of residual risk. If necessary long term monitoring should be undertaken to demonstrate the conditions present.
- Where materials are excavated to remove spills etc take samples of the sides and base of the excavation prior to backfilling to demonstrate the residual concentrations of the substances present or confirm that it has all been removed.
- Where on site treatment of materials is undertaken the remediated material should be proof tested upon completion of remedial works to demonstrate the residual concentrations.
- Where a change in substance is planned the Regulations require an assessment of the new material to determine the likely pollution potential and also assess the likelihood of the substance already being present on the site. The site report, and in the case of relevant hazardous substances, the baseline report, are required to be updated to record the current condition prior to introduction of the substances to avoid ambiguity at the surrender stage.
- Keep records of any changes to the process, materials handled, incidents etc
- Keep records of adjacent land uses which may handle the same substances especially where they may migrate onto the installation. This is especially important where a land use comes and goes within the life of the permit since there would be no recollection of it at surrender and no mention of it at the original application.

With the exception of incident/accident investigation, samples taken early on in the life of the PPC permit are likely to represent initial conditions. Successive samples taken later may be used along with site records to confirm no emissions have occurred, or may demonstrate emissions are occurring from the installation. In the latter case the applicant should review the site practices to ensure continued pollution does not arise and may consider remediation if appropriate.

Operators may find it useful to build up copies of such records, drawings, reports in a separate file during the lifetime of the permit, and summarise them periodically, so that they are then readily available for production of the closure report (See Sections 8 and 9).

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## 8. OUTLINE OF BASIC REQUIREMENTS OF “THE CLOSURE REPORT”

The purpose of the closure report is to demonstrate that the site has been operated in accordance with the general principles set out in Regulation 21 and, that, in particular, no significant pollution has been caused and the site is in a satisfactory state. In this respect, Regulation 48 requires the operator to provide a report describing the condition of the site affected by the surrender (the “closure report”), identifying in particular any changes from the condition of the site as described in the (i) site report and (ii) where applicable, the baseline report and a “description of the steps that have been taken to avoid pollution risks from the site, including any steps that have been taken to (i) return the site to a satisfactory state, and (ii) to remove, control, contain or reduce any relevant hazardous substance in soil and groundwater.”<sup>2</sup>

Table 8.1 provides a summary of the main stages to be undertaken to produce a closure report. Further details of the information required by each stage are included in section 9 together with suggested sources for the information and examples of how it may be presented.

Following consideration of this guidance, applicants are advised to contact SEPA to discuss the site and the requirements for the closure report prior to commencing any works (end of stage 2), and to discuss the nature and extent of any remedial works proposed. Discussion may also be helpful at the end of stage 4 to ensure there are no issues omitted which SEPA would require to be addressed.

See Appendix A1.2 for information on the interaction between PPC, the contaminated land and planning regimes.

<sup>2</sup> This includes consideration of any steps taken to comply with the requirements of the Groundwater Daughter Directive to prevent the entry of hazardous substances and limit pollution to groundwater.

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**Table 8.1 Main Stages of the Final Site Condition Report**

<b>Stage</b>	<b>ACTIVITY</b>	<b>OBJECTIVES AND RELEVANT SECTION OF LEGISLATION</b>
1.	Identify changes to the site since the initial site condition reports which may have resulted in a change in the pollution risk e.g. changes to the process, substances handled etc Note changes in substances handled and the use, production or release of relevant hazardous substances should have been notified to SEPA under Schedule 7 Paragraph 2(1).	Determine whether there are additional potential pollution risks to those identified in the initial site condition report  <i>Regulations 45, 46 and 48 (3)(c)</i>
2.	Review site records etc and undertake site inspection to demonstrate integrity of containment systems and identify locations where emissions have/may have occurred <i>Undertake remedial works (if required)</i>	Identify potential emission points  <i>Regulation 48(3)(c) and (d)</i>
3.	For each emission identify what investigation and remedial action has been undertaken	Demonstrate emissions have been remediated  <i>Regulation 48(3)(d)</i>
4.	Identify the current (post remediation) condition of the site. Demonstrate there is no pollution risk attributable to the permitted activity, that the site is in a satisfactory state and that relevant hazardous substances cease to pose a significant risk to human health or the environment.	Statement of site condition  <i>Regulation 48(3), (8), (12) and (13)</i>

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## 9. DETAILED CONTENT OF CLOSURE REPORT

Some pointers for a good closure report:

- Keep it simple
- Make it relevant
- Focus on the substances associated with the installation
- Provided justification for your assumptions, decisions etc
- Undertake remediation PRIOR to applying to surrender permit
- Provide a clear statement of site condition

The following section provides an indication of the type of detail required in each of the stages described in Table 8.1, indicates possible sources for that information and suggests methods of presenting the data.

### 9.1. Stage 1: Identify Changes to the Process, Substances Handled etc Under PPC, and Confirm Emission Point locations

#### 9.1.1. INFORMATION REQUIRED

The site report provided at the time of application and updated during variations, will have identified potential pollution risks at the installation (see Section 6, Stage 3) and in the case of the baseline report will have provided soil and groundwater measurements in respect of relevant hazardous substances. The first stage of the closure report is to determine whether these are still correct or whether changes to the process, substances handled, their storage, use, disposal, etc, may have introduced new pollution risks or removed previously identified risks.

To identify any changes:

- compare the details of substances handled at surrender with those handled at the time of application to operate under PPC, this should include: substances handled, volume, storage, containment, usage and abatement methods etc.
- compare the current process to the initial process to determine whether there have been any changes to it or to the operational practices and
- consider general changes to the installation such as replacement of drains, installation of hardstandings, bunds, etc. In each case consider why the change was made (i.e. following an incident or to prevent an incident required by permit, etc...) and the potential effect of it in terms of pollution risk.
- Consideration should also be given to any changes (substances, processes, etc) which may have been made since granting of the permit but are no longer present at the time of surrender.

It is likely that any changes will already have been notified to the regulator as a change in operation or variation under Regulations 45 or 46 or as a result of site specific permit conditions.



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Examples of the types of things which should be considered are:

- Changes in substances handled
- Significant changes in the quantity of substances handled
- Changes in the method or location of substance storage, containment, handling or use
- Changes to the process, addition of new processes or extension to the plant
- Changes to drainage system, effluent treatment plant etc
- Changes to ground surfacing

Note: as described in section 7.0 it is easier to collect and collate this information as an on going exercise during the operation of the site rather than trying to recall the details at the time of permit surrender.

### **9.1.2 SOURCES OF INFORMATION**

- site report and baseline report and any updates required at variation
- change notices under Regulation 45
- variation applications under Regulation 46
- site records
- visual site inspection

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**Table 9.1 Changes and potential risks**

Note: PPR = Potential Pollution Risk; ISCR = Initial Site Condition Report

<b>Substance / Process</b>	<b>Changes During Operation</b>	<b>Comments</b>	<b>PPR ISCRS</b>	<b>PPR Prior to surrender</b>
Heavy Fuel Oil	<p><b>Change:</b> Bund constructed around fuel oil tank and fill point in January 2004</p> <p><b>Reason:</b> Required by improvement notice to comply with BAT</p> <p><b>Risk:</b> Potential drips prior to bund installation particularly at fill point, but should not differ from initial site condition since bund constructed within 4 months.</p> <p><b>Change:</b> Sealed inside of bund March 2013</p> <p><b>Reason:</b> Reduce the risk of seepages through bund walls and floor.</p> <p><b>Risk:</b> Low as no visible emissions were identified during inspections.</p>	<p>Used throughout Permit period.</p> <p>Some minor drips may have occurred prior to Jan 2004, insufficient to represent pollution risk.</p> <p>Bund constructed to current BS and annual maintenance check undertaken, records inspected, no reason to suspect emissions.</p> <p>No known spills, incidents, accidents during operation under PPC</p>	Yes	No
Methanol	<p><b>Change:</b> Doubled quantity of methanol handled, May 2010</p> <p><b>Reason:</b> Increase in production</p> <p><b>Risk:</b> No change to pollution risk since materials stored, handled and contained in same manner.</p>	<p>Used throughout Permit period, Quantity doubled, Risk unchanged from initial site condition report.</p> <p>One small incident in 2008, when a burst pipe resulted in a release to the bund, some overspraying of methanol may have occurred, but should have evaporated. Area investigated to confirm current condition (see results to SI)</p>	Yes	Yes
Effluent (various substances)	<p><b>Change:</b> Replace section of drain between manhole s7 and s10, February 2006.</p> <p><b>Reason:</b> General maintenance following blockage and discovery of crack in pipe</p>	<p>Potential for effluent to have entered ground in 3 months since previous inspection. Once repairs effected no further pollution risk.</p> <p>Area investigated to confirm current condition (see results to SI)</p>	No	Yes

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## **9.2. Stage 2: Demonstrate Integrity of Containment and Identify Emissions**

### **9.2.1 INFORMATION REQUIRED**

For each relevant hazardous substance or any other substance which has a potential pollution risk produce a list of the potential emission points and determine the likelihood of emissions having occurred during operation under PPC.

Emissions may have occurred in a number of ways:

- Major incidents, accidents or events which cause a large release of substances e.g. rupture of a tank or pipeline
- Smaller incidents, accidents or events releasing small amounts or substances e.g. a burst drum, spillages during transfer or decanting of substances
- Regular, seemingly insignificant, emissions which accumulate over time to form a significant pollution event e.g. a few drips of a substance at a delivery point during each delivery.

In determining whether or not an emission has occurred reference should be made to the site records e.g. records of surveillance and maintenance of soil and groundwater protection measures required under the permit or other maintenance documents, records of plant and equipment testing, results of periodic soil and groundwater monitoring required by the permit, etc, These should assist in demonstrating the integrity of the systems in place to prevent emissions during the operational life of the site. Where the records demonstrate maintenance was required a description of what was undertaken, when and what potential there was for an emission to occur both during maintenance and prior to the defect being identified should be provided.

In addition, the general operational practices at the site should be considered to determine whether other emissions may have occurred at points not previously identified e.g. a drum falling off a fork lift truck during transportation around the site.

Anecdotal information from employees on potential for routine emissions or incidents and accidents can also be valuable in determining the potential for emissions to have occurred during the life of the permit.

### **9.2.2. SOURCES OF INFORMATION**

- Site walk over
- Site records – accident book, integrity testing, pressure tests, inspection and maintenance records etc
- Soil and groundwater monitoring data
- Anecdotal information
- Long term monitoring data
- Records of emissions and remedial work already undertaken during the life of the plant

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### 9.2.3 EXAMPLE DATA PRESENTATION

This information can be included in the comments section of Table 9.1 in Stage 1 or a separate table, columns added to record specific details such as volume spilled, amount recovered etc. In addition, the location of any spills, etc should be recorded on a site plan.

Before proceeding to Stage 3 the applicant may wish to speak to SEPA to discuss the findings and the proposed further works and to check there are no specific issues not identified which SEPA would wish to see covered.

## 9.3. Stage 3: Site Investigation and Remedial Actions Undertaken

### 9.3.1 INFORMATION REQUIRED

Stages 1 and 2 identify what emissions have occurred under the permit and where. Stage 3 is concerned with demonstrating that they have been removed, controlled, contained or reduced so that they pose no significant risk to human health or the environment. As such Stage 3 of the closure report should provide details of what has been done to determine what pollution is present what action has been taken to address it and proof testing results to demonstrate that it complies with the surrender requirements.

Any remediation necessary to remove, control, contain or reduce pollution risk and return the site to a satisfactory state must be undertaken prior to submission of the application to surrender.

The closure report should include a brief resume of any site investigation works undertaken, of the areas where pollution was identified and the remedial measures undertaken. Full details should be provided of the proof testing undertaken and final site condition following remediation.

It is recognised that in practice operators are likely to consult the guidance at the time they are preparing their application to surrender a permit and therefore, some general guidance on the requirements for site investigation are provided below. It is stressed however that this investigation and any remedial works must be complete before the application for surrender is submitted.

Where an emission is known to have, or is likely to have, occurred it is likely that a site investigation will be necessary to determine the nature and extent of the emission and to establish whether it represents a pollution risk or would result in the site not being in a satisfactory state. If a change in condition is confirmed then remediation and confirmatory testing will need to be undertaken to demonstrate that any pollution risk has been avoided and any relevant hazardous substances have been removed, controlled, contained or reduced so that the site, taking account of its current or approved future use does not pose a significant risk to human health or the environment and the site is in a satisfactory state.

If an emission occurred during operation and was remediated at that time documentary evidence of the remedial work undertaken and confirmation of the residual levels of the substance will be required to demonstrate that any pollution risk

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has been removed and the site is in a satisfactory state. The same applies to any remedial works that may have been undertaken to address actions resulting from the periodic soil and groundwater monitoring required by Regulation 23 paragraph (3) (b).

Any site investigation should be properly planned prior to implementation; it is unlikely to be simply a repeat of the works undertaken for the initial site condition report. The investigation should seek to identify pollution, determine its nature and extent and provide sufficient information to allow any remediation necessary to be designed. It may also be prudent to investigate areas expected to be “clean” to confirm these expectations. The site investigation design should be prescriptive in that it should specify where exploratory holes should be located, which horizons need to be sampled and what testing needs to be undertaken, but at the same time it should be flexible in that if actual condition encountered on site differ from those anticipated the investigation can be amended.

As described in section 6, Stage 7 where a number of similar operations have been undertaken and the same conditions are anticipated for each it may not be necessary to investigate every potential emission point. The site could be zoned according to like characteristics and one or two of the operations investigated thoroughly and the conditions applied to the remainder of the zone. If however it was known that one of the operations had previously had an incident making it different to the rest of the zone this should be investigated separately to determine the specific conditions present.

On sites where the drains are identified as being one of the mechanisms preventing effluents, spillages etc entering the ground the integrity of the drains should be confirmed to demonstrate they have provided adequate containment.

In all cases chemical analysis should concentrate only on substances and possible daughter products associated with the operation of the installation under the permit. Where a large number of similar substances are used screening analysis for chemical groups or marker substances may be more appropriate than analysis for every individual substance. Where positive results are identified substance specific testing may then be appropriate. Similarly for complex mixtures marker substances may be more appropriate than analysing all individual components. Where these approaches are adopted the site condition report should clearly state the logic for the choice of chemical group or marker substance and justify that selection.

Remediation technology is beyond the scope of this guidance however references are provided at the end of this document. You should also be aware that remediation may itself be subject to control under other legislation and may require licensing prior to being undertaken. Further guidance can be found in the SEPA publication Land Remediation and Waste Management Guidelines available on SEPA’s website.

### **9.3.2 SOURCES OF INFORMATION**

- Site Investigation and Remediation reports
- Site records
- Waste transfer notes / duty of care records
- Anecdotal information

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### 9.3.3 EXAMPLE OF DATA PRESENTATION

Data will be presented on a site specific basis and may comprise a mixture of tables, diagrams and text.

## 9.4. Stage 4: Statement of Site Condition

### 9.4.1 INFORMATION REQUIRED

This stage should draw together the information collated for Stages 1–3 and should provide a clear statement that demonstrates that there is no pollution risk resulting from the operation of the permitted installation, or that any such risk has been remediated and that the site is in a satisfactory state.

If a change in condition is identified which is not remediated then justification for leaving the pollution in situ must be provided. An example of where this may arise is where pollution can be clearly demonstrated to have entered the site from an off site source and has not resulted from the operation of the installation.

Regulation 48 (8) states that “SEPA must approve an application if it is satisfied that all appropriate measures have been taken to:-

- (a) avoid pollution risk resulting from the operation of the installation
- (b) return the site to a satisfactory state, taking into account the technical feasibility of the measures
- (c) remove, control, contain or reduce any relevant hazardous substances in soil or groundwater so that the site, taking into account its current or approved future use, ceases to pose a significant risk to human health or the environment.

### 9.4.2 SOURCES OF INFORMATION

Stages 1 – 3

### 9.4.3 EXAMPLE DATA PRESENTATION

Data presentation is likely to comprise a combination of:

- A written statement of final site condition;
- Plan(s) showing final site condition in terms of chemical test data etc
- and relevant information to support or justify the statement that there is no pollution risk and the site is in a satisfactory state.

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## 10.0 GLOSSARY

### Acronyms and Abbreviations

BGS	British Geological Survey
BH	Borehole
CCTV	Closed Circuit Television
DNAPLs	Dense Non Aqueous Phase Liquids
PPC	Pollution Prevention and Control
PPR	Potential Pollution Risk
Reg(s)	Regulation(s)
SEPA	Scottish Environment Protection Agency
Sch	Schedule

### Terms

Listed Activity	Activities as described in Schedule 1 to the PPC 2012 Regulations
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### Regulation

Emission	<p>“emission” means in relation to</p> <p>(a) Part A installations, the direct or indirect release of a substance, a vibration, heat or noise from individual or diffuse sources in an installation into the air, water or land;</p> <p>(b) Part B installations, the direct release of a substance or heat from individual or diffuse sources in an installation into the air;</p> <p>(c) mobile plant, the direct release of a substance or heat from the plant into the air;</p> <p>(d) a solvent emission activity – (i) the direct release of a substance in waste gases into the air from individual or diffuse sources forming part of that activity, and (ii) the direct or indirect release of fugitive emissions</p>
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installation	<p>“installation” means</p> <p>(a) a stationary technical unit where one or more activities listed in Schedules 1 or 2 are carried out; and</p> <p>(b) any other location on the same site where any other directly associated activities are carried out</p>
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pollution	<p>and references to an installation include references to part of an installation, “pollution” means emissions as a result of human activity which may-</p> <ul style="list-style-type: none"> <li>(a) be harmful to human health or the quality of the environment</li> <li>(b) cause offence to any human senses</li> <li>(c) result in damage to material property, or</li> <li>(d) impair or interfere with amenities and other legitimate uses of the environment; and</li> </ul> <p>“pollutant” means any substance, vibration, heat or noise released as a result of such an emission which may have such an effect;</p>
specified waste management activity	<p>“specified waste management activity” means an activity comprising:-</p> <ul style="list-style-type: none"> <li>(a) the disposal of waste in a landfill, whether or not the disposal falls within Section 5.2 of Part 1 of Schedule 1;</li> <li>(b) the disposal or recovery of waste falling within Sections 5.3, 5.4 or 5.6 of that Part of that Schedule; or</li> <li>(c) the disposal or recovery of waste in a waste incineration installation</li> </ul>
Substance	<p>“substance” includes any chemical element and its compounds and any biological entity or micro-organism, with the exception of</p> <ul style="list-style-type: none"> <li>(a) radioactive substances within the meaning of Council Directive 96/29/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation</li> <li>(b) genetically modified micro-organisms within the meaning of Council Directive 2001/18/EC on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC and</li> <li>(c) genetically modified organisms within the meaning of Council Directive 2009/41/EC of the European Parliament and the Council on the contained use of genetically modified micro-organisms (recast)</li> </ul>



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## 11.0 LIST OF REFERENCES

<b>TECHNICAL REFERENCE</b>	<b>REFERENCE SUBJECT</b>
<b>Desk Study:</b>	
Environment Agency Technical Guidance Note IPPC H7: Application Site Report & Site Protection and Monitoring programme	Useful technical guidance, but note that not all sections applicable to installations in Scotland: SEPA expect all information to be included in the application, not a phased SI after application submission
DoE: Trade Industry Profiles (set of 47, various dates)	Provides useful information on the typical range of contaminants which could be anticipated from a range of past industrial uses.
DETR: Guidance on Preliminary Site Inspection of Contaminated Land (CLR No.2, 1994)	Provides information on a range of features indicative of contamination which should be considered during a walkover survey.
BGS Hydrogeology of Scotland (1990) and associated Hydrogeology of Scotland map (1988)	Provides a useful guide to aquifers and general hydrogeological conditions in Scotland.
BGS Groundwater Vulnerability, Drift Deposit and Solid Geology maps	Provides an indication of geological conditions.
DETR: Documentary Research on Industrial Sites (CLR. No. 3, 1994)	Provides guidance on desk study research of industrial sites.
Croner Substances Hazardous to the Environment	Provides details of chemical characteristics and toxicology.
Croner Substances Hazardous to Health	Provides details of chemical characteristics and toxicology.
The CRC Handbook of Chemical and Physics (CRC Press)	Provides details of chemical characteristics and toxicology.
Merck Research Labs: The Merck Index – An Encyclopedia of Chemicals, Drugs, and Biologicals 12 <sup>th</sup> Ed (1996)	Provides details of chemical characteristics and toxicology.
NEY R.E. Fate and Transport of Organic Chemicals in the Environment: A Practical Guide. (Gov Institutes, Maryland 3 <sup>rd</sup> Ed 1998)	
<b>Site Investigation:</b>	
DETR: Sampling Strategies for Contaminated Land	Discusses the strengths and limitations of a number of sampling strategies.
Environment Agency: Development of Appropriate Soil Sampling Strategies for Land Contamination (2001)	Provides guidance on soil sampling strategies
Scottish Enterprise: How to Investigate Contaminated Land (1994, 1998 reprint)	Provides a good general guide to the assessment of contaminated land.

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<b>TECHNICAL REFERENCE</b>	<b>REFERENCE SUBJECT</b>
CIRIA: A Guide to Safe Working on Contaminated Sites (1996)	Provides useful background to key health and safety issues.
BS 5930 (1999), Code of Practice for Site Investigations	Guidance on intrusive site investigation work including standard soil descriptions.
BS 10175 (2011), Code of Practice for the Investigation of Potentially Contaminated Sites	A useful guide to the selection of appropriate sampling techniques.
<b>Analytical Work:</b>	
Scottish Enterprise: How to Investigate Contaminated Land (1994, 1998 reprint)	Includes guidance on laboratory sample handling and quality assurance procedures.
<b>Appointment of Contractors:</b>	
Scottish Enterprise: How to Approach Contaminated Land (1988)	Provides guidance on the appointment and management of contractors/consultants.
DETR: A Quality Approach to Contaminated Land Consultancy (1997)	Guidance on quality issues and procurement of consultants.
<b>Site Closure:</b>	
Environment Agency Technical Guidance Note IPPC H8: Surrender Site Report	Useful technical guidance, but note that not all sections applicable to installations in Scotland
Department of the Environment Waste Management Papers	Guidance on landfill completion and monitoring.
Remedial Treatment for Contaminated Land, Volume II: Decommissioning, decontamination and demolition. CIRIA SP102, 1995	Guidance on pollution risk on closure, decommissioning and decontamination, post closure site survey procedures
Environment Agency: Remedial Treatment Datasheets (2002)	Technical information on remedial options and techniques
Licensing the Remediation of Contaminated Land – SEPA	Regulatory controls applicable to remediation activities
<b>Future Use:</b>	
Planning Advice Note PAN33: Development of Contaminated Land (October 2000) – Scottish Government	Advice on the development on contaminated land, approach to contaminated land in development plans and implications of the contaminated land regime for the planning system.

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## **APPENDIX 1: LEGISLATIVE ISSUES AND INTERACTION BETWEEN LEGISLATION**

### **A1.1 Relevant Clauses of the PPC 2012 Regulations**

Regulation 2 – Definitions

Regulations 6, 13 and Schedule 4, Part 1 – Application for a permit

Regulation 21 – General Principles

Regulations 48 and 49 – Permit Surrender

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## **A1.2 Relationship Between PPC and Part IIA of EPA 1990**

The relationship between the PPC regime and the Contaminated Land regime (Section 78YB of Part IIA of the Environmental Protection Act 1990 as amended by Schedule 11, paragraph 1(5) and paragraph 10 of the PPC Regulations) should be noted. If contamination is due to a breach of permit conditions and SEPA can take enforcement action under the permit, then a remediation notice under Part IIA can not be served.

However, if, upon application for surrender, it appears that there is contamination which was not attributable to breach of conditions, or that there is contamination which was not as a result of the PPC activity, a contaminated land remediation notice could be served if the contamination fits the definition of Contaminated land prescribed in s.78 YB of Part IIA of the Environmental Protection Act 1990 (As Amended). Land affected by such contamination would require to be formally identified as contaminated land in accordance with the relevant sections of Part IIA prior to any remediation notice being served.

It should be noted that where the PPC activity is the deposit of controlled waste in or on land, Part IIA will not apply at all where the contamination is attributable to that activity and enforcement action may be taken. The difference between waste disposal activities and other activities is therefore that in respect of the latter, the land could potentially be formally identified as contaminated, but a remediation notice could not be served, whereas in the former, the land could not even be formally identified as contaminated. In practice this difference is unlikely to have great significance.

Where a site is closing and could be used for a different future use, any contamination not attributable to a breach in PPC conditions may be dealt with through the planning and development control regime rather than Part IIA. Planning Advice Note PAN33: Development of Contaminated Land (2000) provides guidance in this respect. Dealing with land contamination through this route requires that 'land is made suitable for any new use, as planning permission is given for that new use'.

When dealing with contamination through planning, PAN 33 states that 'it is in the developers interests to ensure that development of the site will not result in designation as contaminated land under Part IIA'. In this way the planning regime links with and incorporates principles outlined in the Part IIA Contaminated land Regime.

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### **A1.3 Relationship Between PPC and The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (“CAR”)**

The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended (CAR) require authorisation for all discharges to groundwater and, surface waters and disposals to land. The requirements of the Water Framework Directive (2000/60/EC) and the Groundwater Daughter Directive (2006/118/EC) are fulfilled by CAR.

Paragraph 18(c)(iii) of Schedule 10 of CAR allow for a permit issued under PPC to be equivalent to an authorisation issued under CAR, i.e. if discharges and disposals to land are covered by a PPC permit, then there is no requirement for a separate authorisation under CAR.

PPC permits must include such conditions as are necessary to ensure compliance with the Water Framework Directive and the Groundwater Daughter Directive. Existing PPC permits will be reviewed, and if necessary, revised to incorporate such conditions.

If however, other activities such as water abstractions, impoundments (dams and weirs) or engineering works in inland waters and wetlands are associated with a PPC installation, then a separate CAR authorisation will be needed.

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#### **A1.4 Relationship Between PPC and The Landfill Regulations**

The Landfill (Scotland) Regulations 2003 implement the requirements of the Landfill Directive in Scotland.

Certain landfilling activities (as defined in the Landfill Regulations) also fall within the scope of the PPC Regulations (Schedule I, Chapter 5, Section 5.2, Part A). These installations are required to produce a hydrogeological risk assessment. This hydrogeological assessment is required to demonstrate compliance with the Landfill Directive and the Groundwater Directive, and it effectively includes all of the information required in by the initial site condition reports. It must include a conceptual site model and a hydrogeological risk assessment, and propose control and trigger levels for groundwater quality. There is separate guidance (see the SEPA website) available for operators undertaking this assessment.

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## **APPENDIX 2: RELEVANT HAZARDOUS SUBSTANCES FOR THE PURPOSE OF PPC 2012**

Classification, Labelling and Packaging of Substances and Mixtures  
 EC N° 1272/2008  
 Summary of Annex 1 Parts 2 to 5

The PPC Regulations refer to “Relevant Hazardous Substances” and defines Hazardous Substances as substances or mixtures as defined in Article 3 of the Hazardous Substances Regulation. REGULATION (EC) No 1272/2008, 16 December 2008, on classification, labelling and packaging of substances and mixtures)

Article 3 refers the reader to Annex 1 Parts 2 to 5. The following provides a summary of the main classes of substances and mixtures which are referred to in Parts 2 to 5 of Annex 1. The reader is directed to the full text of the EC Regulations for a full explanation of the classes.

### Part 2 – Physical Hazards

- 2.1 Explosives
- 2.2 Flammable gases
- 2.3 Flammable aerosols
- 2.4 Oxidising gases
- 2.5 Gases under pressure
- 2.6 Flammable liquids
- 2.7 Flammable solids
- 2.8 Self-reactive substances and mixtures
- 2.9 Pyrophoric liquids
- 2.10 Self-heating substances and mixtures
- 2.11 Substances and mixtures which in contact with water emit flammable gases
- 2.12 Oxidising liquids
- 2.13 Oxidising solids
- 2.14 Organic peroxides
- 2.15 Corrosive to metals

### Part 3 – Health Hazards

- 3.1 Acute toxicity
- 3.2 Skin corrosion/irritation
- 3.3 Serious eye damage/eye irritation
- 3.4 Respiratory or skin sensitisation
- 3.5 Germ cell mutagenicity
- 3.6 Carcinogenicity
- 3.7 Reproductive toxicity
- 3.8 Specific target organ toxicity – single exposure
- 3.9 Specific target organ toxicity – repeated exposure
- 3.10 Aspiration hazard

### Part 4 – Environmental Hazards

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4.1 Hazardous to the aquatic environment

Part 5 – Additional EU Hazard Class

5.1 Hazardous to the ozone layer



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### **APPENDIX 3: ADDITIONAL REQUIREMENTS FOR SITES WITH A DISCHARGE TO GROUND AND GROUNDWATER, INCLUDING LANDFILL OPERATORS**

Where emissions at a Part A installation constitute an input of pollutants into the groundwater the requirements of the EC Groundwater Daughter Directive (2006/118/EC) and the Water Framework Directive (2000/60/EC) apply.

A permit including point source discharges issued under PPC for the operation of a Part A installation or the Waste Management Licensing Regulations is deemed to be an authorisation for discharges under the Controlled Activities Regulations. CAR requires that, amongst other things, the applicants must assess the risks to the water environment from the activity.

Where emissions at a Part A installation constitute a discharge, disposal or tipping for the purposes of disposal, of matter containing listed substances which might lead to a direct or indirect discharge into the groundwater the requirements of the EC Groundwater Directive (80/68/EEC) (the Groundwater Directive), and the Groundwater Daughter Directive (2006/118/EC), as implemented by the Water Environment (Controlled Activities) (Scotland) Regulations 2011 apply.

A permit including point source discharges issued under PPC for the operation of a Part A installation or the Waste Management Licensing Regulations is deemed to be an authorisation for discharges under the Controlled Activities Regulations.

The requirements of the Groundwater Directive apply to all landfill sites and any Part A installation where the discharge, disposal or tipping for the purposes of disposal, of matter containing listed substances takes place which might lead to a direct or indirect discharge into groundwater. These are additional requirements to those arising from PPC. One of the requirements of the Groundwater Directive is that a prior investigation must be undertaken to demonstrate that there will be no entry of List I substances into groundwater and no pollution of groundwater by List II substances. The prior investigation is the responsibility of the applicant and must be carried out before an application for a permit is made.

In terms of PPC requirements, all applications to operate a Part A installations must include a site report and, where necessary, a baseline report but must also provide additional information necessary to demonstrate that all appropriate preventative measures are taken against pollution of land and any associated waters.

(Note: Part A installations include landfill and disposal to land as described by Sch 1 Part 1 section 5.2 of the Regs.)

The Landfill (Scotland) Regulations 2003 require the operator to demonstrate that the landfill is sited and designed so as to provide conditions for the prevention of pollution of the soil, groundwater and surface water. This usually entails a risk assessment which examines:

- the type and quantity of waste deposited;
- the volume and composition of any leachate generated;
- the management of leachate levels;
- the geological and hydrogeological conditions in the area;

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- the construction of the landfill liner;
- the leaching potential of the liner system;
- possible effects on groundwater and surface water receptors

Where possible measured data, rather than default values or inferred data, should be used for modelling predicted flow – all data used should be fully justified.

The Operator should consider the initial site condition for any identified substances and conduct testing up-stream and down-stream of site at appropriate locations. It is also necessary to consider other potential sources for these materials such as adjacent closed landfills or industrial sites.

Consideration should be given to rising groundwater levels, particularly where current groundwater levels are depressed due to dewatering activities in the general vicinity

Tables of leachate composition from different types of landfill can be found in Appendix 1 of WMP 26B “Landfill Design, Construction and Operational Practice”

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## APPENDIX 4: CHECKLISTS

### A4.1 Checklist for Initial Site Condition Reports

Item	Y/N	Comment
<b>Stage 1: Identification of Substances Used at the Installation</b>		
1		
2		
<b>Stage 2: Identification of Relevant Hazardous Substances and which have a theoretical pollution potential</b>		
3		
<b>Stage 3: Assessment of site specific pollution potential</b>		
4		
5		
6		
<b>Stage 4: Site History</b>		
7		
8		
<b>Stage 5: Site Environmental Setting</b>		
9		

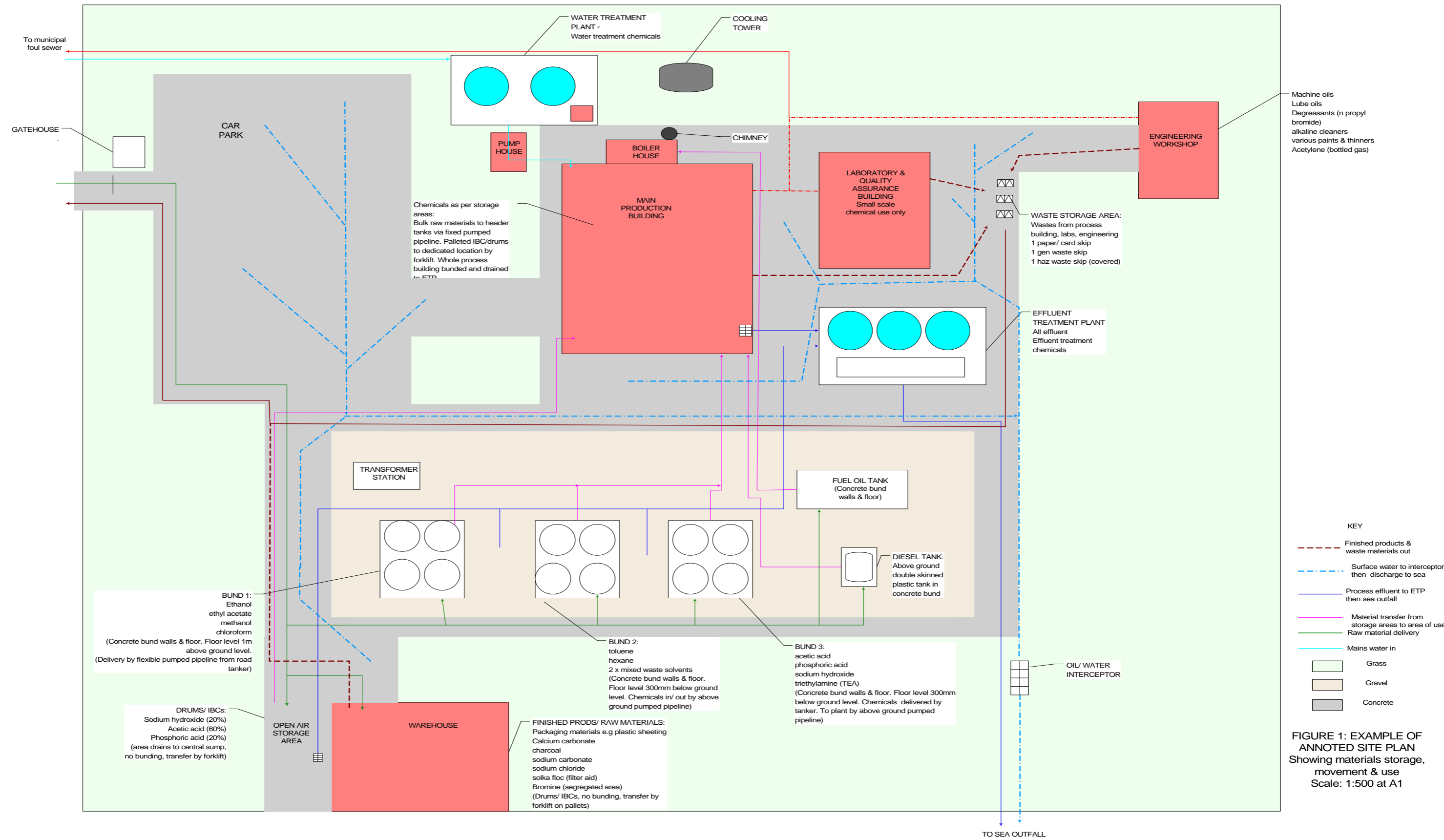
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<b>Item</b>		<b>Y/N</b>	<b>Comment</b>
10	Have potential flow paths through the sub surface been considered? e.g. drains, services, faults, mines.		
<b>Stage 6: Conceptual Site Models</b>			
11	Has a cross section or conceptual site model been developed identifying emission points and the extent to which these may impact on the surface, sub-surface and groundwaters?		
<b>Stage 7: Site Investigation (Required for Baseline Report)</b>			
12	Can the site be adequately characterised without a site investigation? (if yes go to item 18 – Note: Measured soil and groundwater data is required for relevant hazardous substances)		
13	Has a site investigation been undertaken? (either specifically for PPC or has old data been used)		
14	Were samples obtained at appropriate depths in strata and groundwaters likely to be impacted by potential emissions / historic contamination?		
15	Has analysis been undertaken for appropriate substances?		
16	Where screening or marker substances have been used are these considered appropriate?		
17	Were the samples taken and analysed using appropriate quality assured methods, acceptable limits of detection, accuracy and precision?		
<b>Stage 8: Statement of Site Condition</b>			
18	Is a clear statement on site condition presented?		
19	Does it cover all substances which have a pollution potential?		
20	Has groundwater quality been used as an indicator of ground / soil quality and is it an appropriate indicator?		
21	Have soil and groundwater measurements been provided for relevant hazardous substances?		
22	Has the statement on site condition been fully justified?		
23	Is it considered to be representative of the actual site condition?		

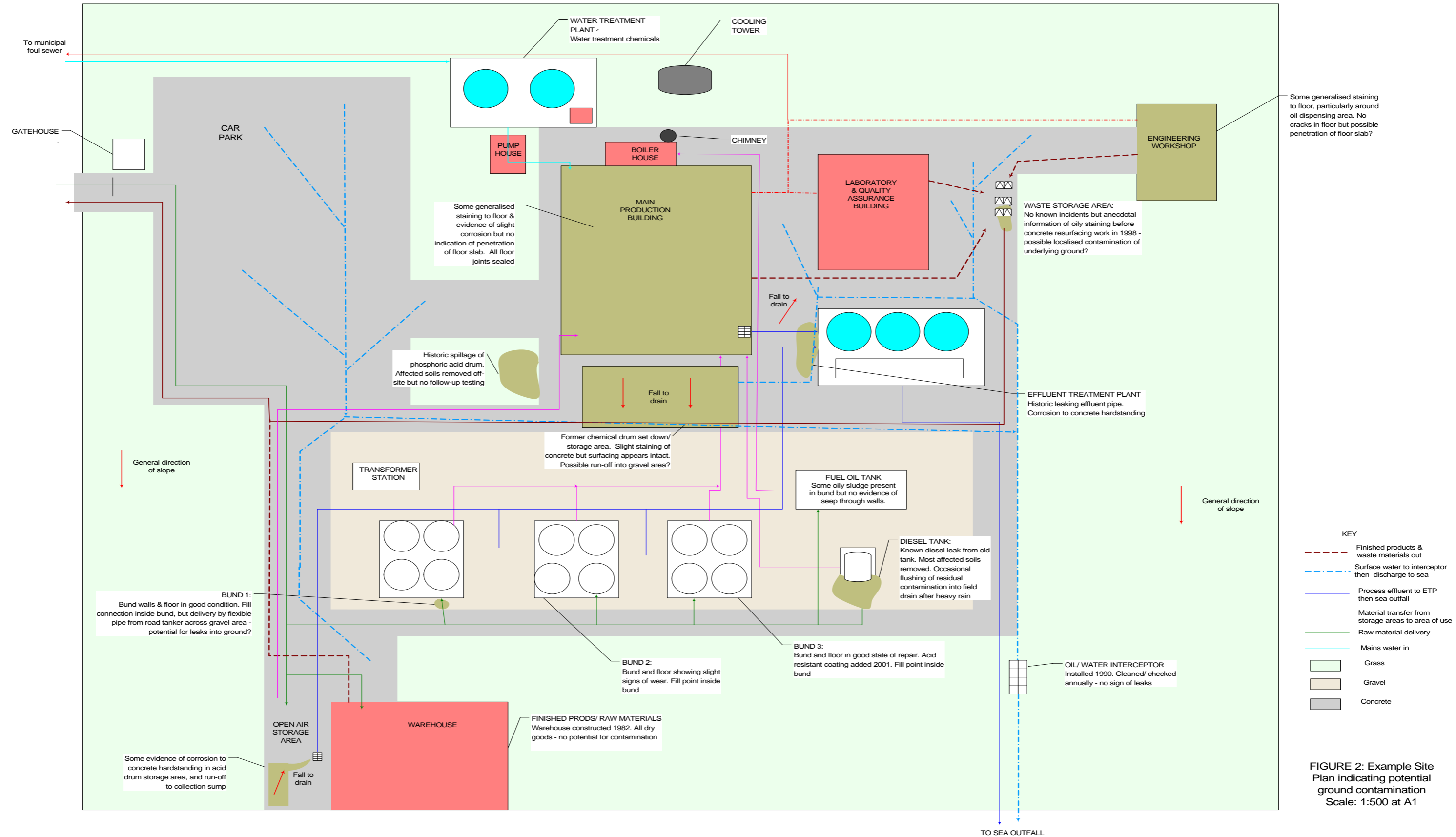
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#### A4.2 Checklist for Final Site Condition Report

Item	Y/N	Comment
<b>Stage 1: Identification of Changes under PPC and Confirmation of Emission Points</b>		
1		Have potential emission points during operation under PPC been confirmed?
2		Have changes to the process, substances handled, site layout, etc been identified and the pollution risk assessed?
<b>Stage 2: Demonstrate Integrity of Containment and Identify Emissions</b>		
3		Is adequate information available to demonstrate containment of substances with the potential to cause pollution? This may include soil and groundwater monitoring required under the permit as well as data collected specifically for surrender.
4		Have accidents, incidents or routine operations which may give rise to pollution been identified?
5		Are SEPA aware of accidents, incidents or routine operations which may give rise to pollution but are not considered by the applicant.
<b>Stage 3: Investigation and Remediation</b>		
6		Have areas where emissions may have occurred been investigated?
7		Where pollution during operation under PPC has been identified has any pollution risk been avoided and have any hazardous substances been removed, controlled, contained or reduced sufficient to cease to pose a significant risk to human health or the environment and the site returned to a satisfactory state, and a summary of the works undertaken included in the report?
8		Has proof testing been undertaken to demonstrate that the pollution has been remediated.
<b>Stage 4: Statement of Site Condition</b>		
9		Is a clear statement on site condition presented?
10		Does it cover all substances which have a pollution potential?
11		Has groundwater quality been used as an indicator of ground/soil quality and is it an appropriate indicator?
12		Has the statement on site condition been fully justified?
13		Is it considered to be representative of the actual site condition?
14		Are additional works required to remove pollution risk and return the site to a satisfactory state or to remove, control, contain or reduce hazardous substances or to demonstrate that this has been achieved (specify)?



**FIGURE 1: EXAMPLE OF ANNOTED SITE PLAN**  
Showing materials storage, movement & use  
Scale: 1:500 at A1



**FIGURE 2: Example Site Plan indicating potential ground contamination**  
**Scale: 1:500 at A1**

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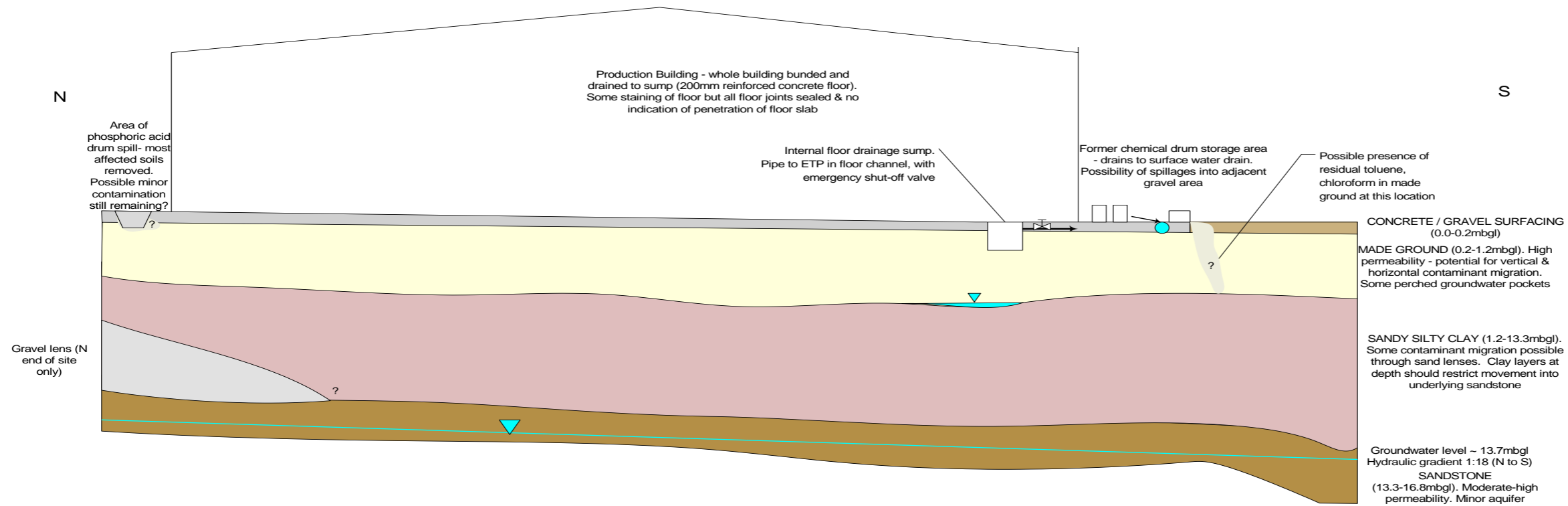


FIGURE 3(a)  
CROSS SECTION & CONCEPTUAL SITE  
FOR PRODUCTION BUILDING AREA  
(Not to Scale)

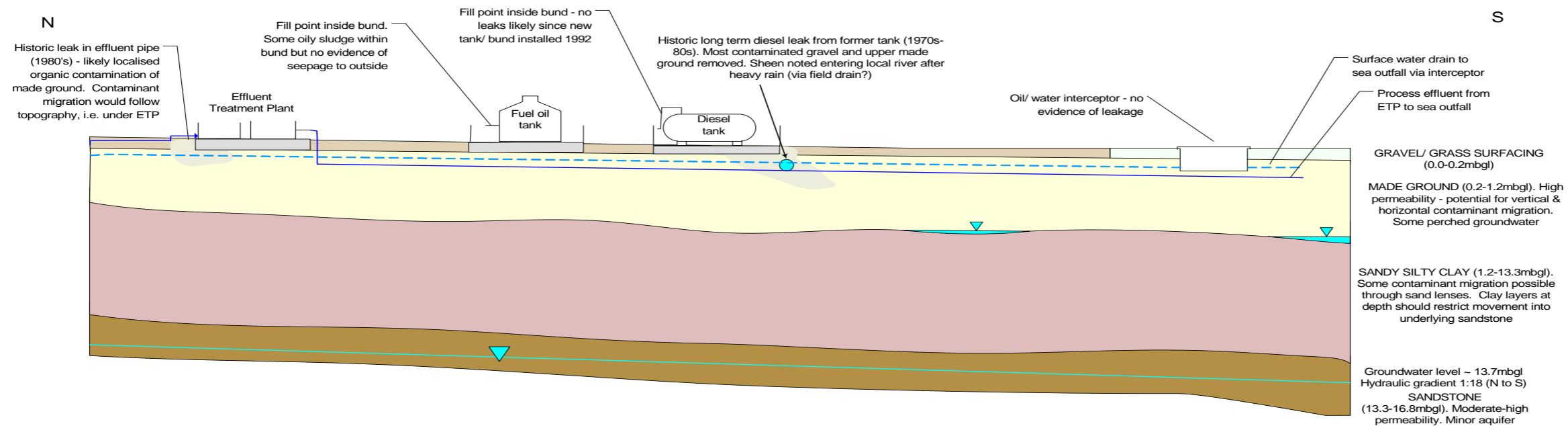


FIGURE 3(b)  
CROSS SECTION & CONCEPTUAL SITE  
FOR ETP & FUEL TANKS AREA  
(Not to Scale)



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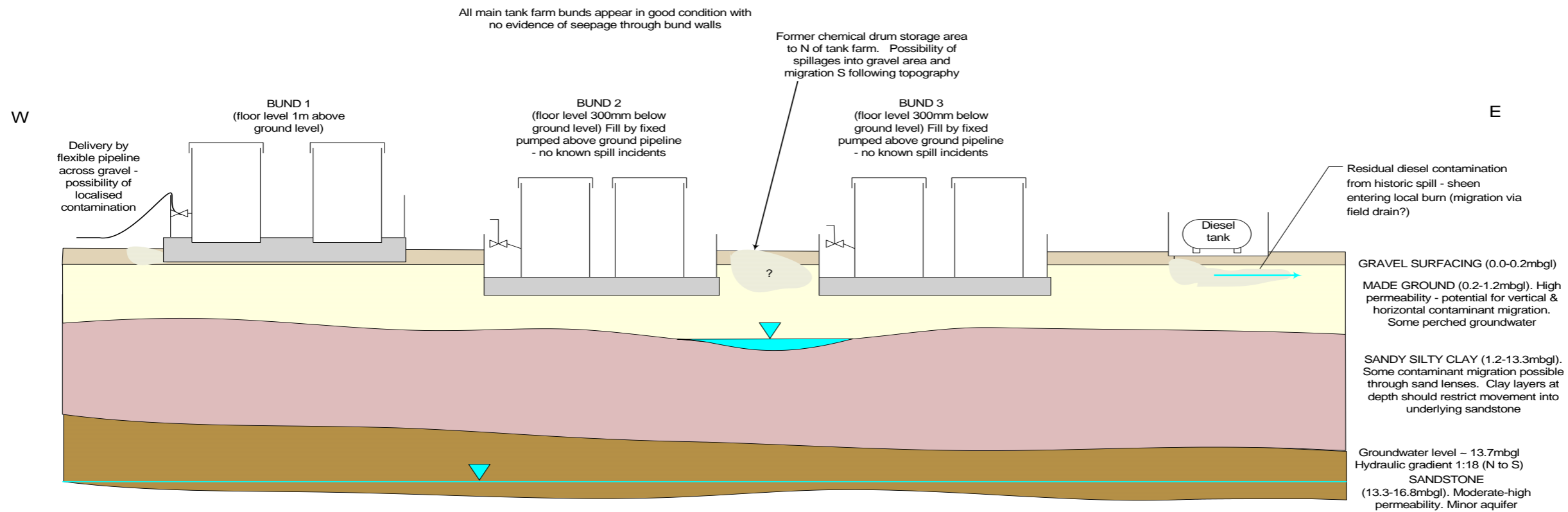


FIGURE 3(c)  
CROSS SECTION & CONCEPTUAL SITE MODEL  
W-E ACROSS TANK FARM AREA  
(Not to Scale)

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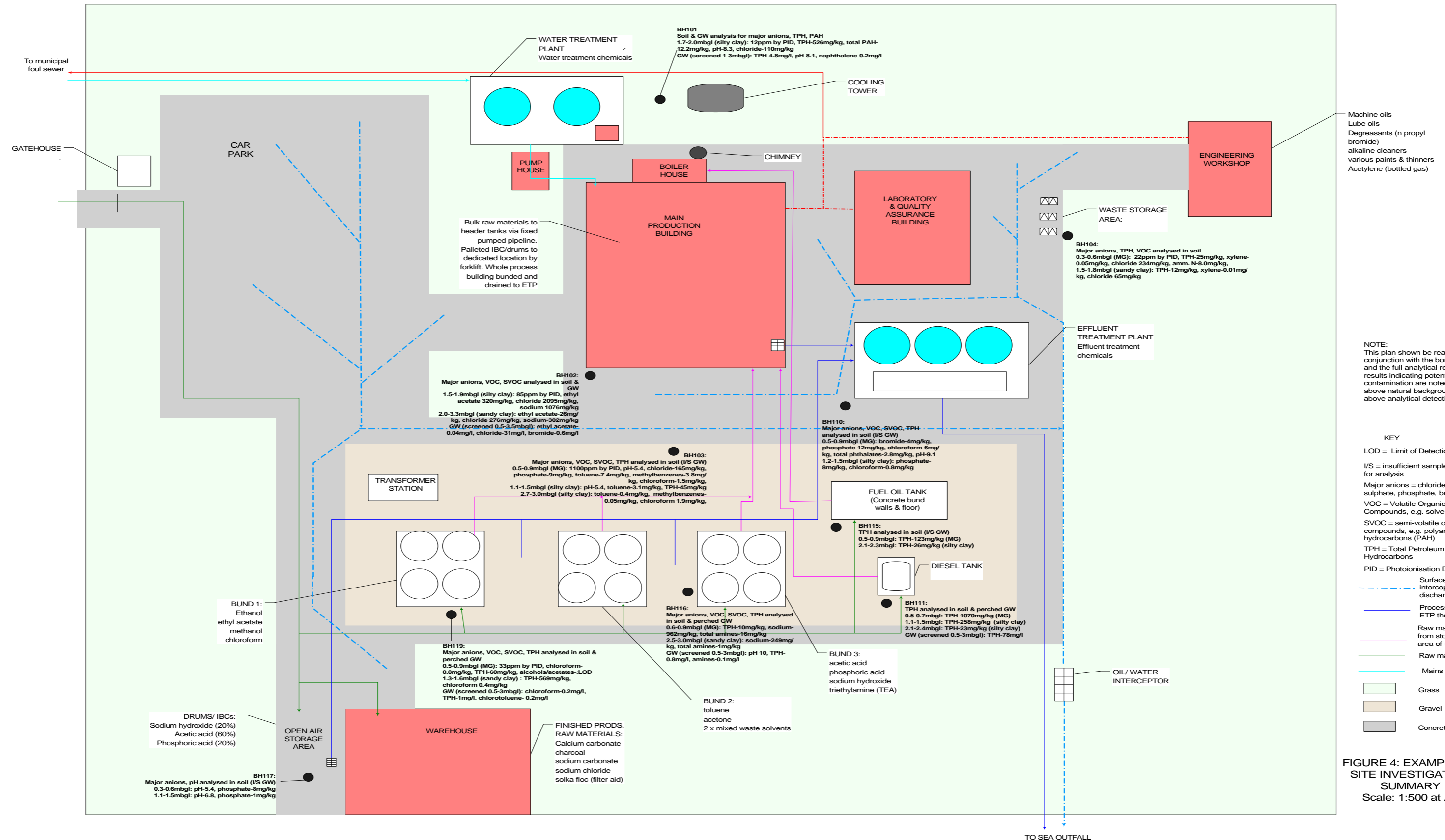


FIGURE 4: EXAMPLE OF SITE INVESTIGATION SUMMARY  
Scale: 1:500 at A1

<p align="center"><b>SCOTTISH ENVIRONMENT PROTECTION AGENCY</b>  <b>POLLUTION PREVENTION AND CONTROL (SCOTLAND)</b>  <b>REGULATIONS 2012</b>  <b>PPC Technical Guidance Note 2 (Site Reports)</b></p>	Guidance No:	IED TG02
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## FLOWCHART 1 SITE CONDITION REPORTS DECISION TREE

