

## Document No. PAPL-ENV-GDL-006

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### AUTHORITY TABLE

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Commencement Date –	01/06/2018

### REVISION INDEX

Revision number	Date	Revised or reviewed by (Position title)	Revisions approved by (Position title)	Reasons & details of changes	Next review date
1.0				Initial Document	
2.0	24/05/2017	JBS&G - consultants		Updated Guidance Available	
3.0	1/6/2018	Environment & Sustainability Coordinator	Environment & Sustainability Manager	Minor Revisions including PFAS updates, dieback updates and Document Control	June 2019

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## Disclaimer

*The Organisation acknowledges that this document is general information only and does not constitute specific advice regarding the Organisation's legal obligations, including under any contract between PAPL and the Organisation or arising under the Airports Act 1996 (Cth) and the Airports (Environment Protection) Regulations 1997 (Cth). The Organisation must make its own independent assessment of its legal obligations and will rely solely on its own investigations and analysis.*

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## 1 Purpose

This purpose of this document is to describe the requirements for importing, exporting and transferring fill material on the Perth Airport Estate to reduce the risk of cross-contamination of soil material during construction and operations.

## 2 Scope & Objectives

The document applies to any party that requires the movement of fill material on, off or within the Perth Airport Estate ('the Estate') and applies to all Perth Airport personnel, Tenants, Contractors and Sub-contractors (the 'Organisation') involved in construction or ongoing operation works on the Estate. This guideline will apply to movements of fill material of **greater than 5 m<sup>3</sup>**, or for any volume where there is a risk of contamination by chemicals of potential concern, acid sulfate soils or *Phytophthora cinnamomi* (dieback).

The objective of this guideline is to ensure that the use and movement of fill material onto, off and within the Estate is managed appropriately to minimise the risk of contamination or spread of pathogens into the wider environment.

## 3 Definitions & Acronyms

Definitions specific to this document have been included in Table 1 below to assist readers in understanding this document. For the purposes of this document, the following verbal forms are used:

“Shall” or “Must” indicates a requirement, “Should” indicates a recommendation, “May” indicates a permission and “Can” indicates a possibility or a capability.

**Table 1: Definitions**

Term	Definition
<b>Actual Acid Sulfate Soils</b>	Soils or sediments which contain iron sulfides and/or other sulfidic minerals that have previously undergone some oxidation to produce sulfuric acid. This results in existing acidity (pH <4) and often a yellow and/or red mottling (jarosite/iron oxide) in the soil profile. AASS commonly also contain residual un-oxidised iron sulfides, or potential acidity, as well as existing acidity.
<b>Areas of the Airport Generally</b>	Areas of the airport not considered environmentally important, including general airport areas used or designated for airport operations, industrial and commercial use.
<b>Areas of Environmental Significance</b>	Environmentally important areas within the Estate which require a high level of protection.
<b>Clean Fill</b>	Raw excavated natural material such clay, gravel, sand, soil or rock fines that has been excavated or removed from the earth in areas that have not been subject to potentially contaminating land uses including industrial, commercial, mining or agricultural activities and has not been processed except for the purposes of achieving desired particle size distribution or removal of roots or naturally occurring organic materials and does not contain any acid sulfate soil and does not contain any other type of waste.
<b><i>Phytophthora cinnamomi</i> (Dieback)</b>	Plant disease caused by the soil fungus <i>Phytophthora cinnamomi</i> . The fungus resides in soil and plant tissue and grows throughout the root system of susceptible plants; preventing the uptake of water and nutrients and eventually resulting in their death.
<b>Potential Acid Sulfate Soils</b>	Other sulfidic minerals that have not been oxidised by exposure to air. The field pH of these soils in their undisturbed state is more than pH 4 and is commonly neutral to alkaline (pH 7 to pH 9). These soils or sediments are invariably saturated with water in their natural state. The waterlogged layer may be peat, clay, loam, silt, or sand and is usually dark grey and soft but may also be dark brown, or medium to pale grey to white.
<b>Uncontaminated Fill</b>	Means inert waste type 1 (excluding asphalt and biosolids) that meets the requirements set out in Table 6 of the DWER document “ <i>Landfill Waste Classification and Waste Definitions (April 2018)</i> ” as determined by relevant sampling and testing carried out in accordance with the requirements set out Table 7 of the document and includes neutralised acid sulfate soil that meets the requirements for relevant metals, metalloids and sulfates set out Table 6, as determined by relevant sampling and testing carried out

Term	Definition
	in accordance with the requirements of Table 7 of the document (see Appendix 1).

**Table 2: Acronyms**

Acronym	Description
<b>AASS</b>	Actual Acid Sulfate Soils
<b>AEO</b>	Airport Environmental Officer
<b>AER</b>	Annual Environmental Report
<b>ASS</b>	Acid Sulfate Soils
<b>COPC</b>	Contaminant of Potential Concern
<b>CTH</b>	Commonwealth
<b>DIRDC</b>	Department of Infrastructure, Regional Development & Cities (Cth)
<b>DOEE</b>	Department of Environment and Energy (Cth)
<b>DWER</b>	Department of Water and Environment Regulation (WA)
<b>EMP</b>	Environmental Management Plan
<b>GIS</b>	Geographic Information System
<b>HEPA</b>	Heads of Environmental Protection Authorities of Australia & New Zealand
<b>NATA</b>	National Association of Testing Authorities
<b>NEPC</b>	National Environment Protection Council
<b>NEPM</b>	National Environment Protection Measure
<b>PAPL</b>	Perth Airport Pty Ltd
<b>PASS</b>	Potential Acid Sulfate Soils
<b>PFAS</b>	Per- and Poly-fluoro Alkyl Substances
<b>PFOA</b>	Perfluorooctanoic Acid
<b>PFOS</b>	Perfluorooctane Sulfonate
<b>PFAS NEMP</b>	PFAS National Environmental Management Plan

## 4 Legislation, Standards & Guidelines

This document has been developed in accordance with the following legislation:

- *Airports Act 1996* (Cth).
- *Airports (Environment Protection) Regulations 1997* (Cth).

Division 3 of the *Airports Act 1996* requires that Perth Airport does not cause environmental harm from its operations. The *Airports (Environmental Protection) Regulations 1997* ('the Regulations') regulate against the cause of soil and groundwater pollution. Schedule 3 of these Regulations outlines the acceptable limits of contaminants in soil at the Perth Airport.

Table 1 of Schedule 3 of the Regulations outlines the acceptable limits for 'areas of the airport generally', and Table 2 outlines the acceptable limits for 'areas of environmental significance'. Accordingly, fill being **imported to** or **transferred within** the Airport Estate must meet these limits, depending on the destination of the fill.

In addition to the legislation, there are guidance documents issued by regulators or developed for PAPL, which provide concentration limits for various contaminants under certain land uses and environmental conditions. Where Schedule 3 of the Regulations does not provide a guideline value for a specific contaminant of potential concern (COPC), the following guidance should also be referred to<sup>1</sup>:

- Environmental Risk Sciences Pty Ltd (EnRiskS), *Risk Based Criteria (RBC) for Soil and Dewater Re-Use: Perth Airport*, 13 December 2016 (currently being revised).
- Department of Water and Environment Regulation, *Assessment and management of contaminated sites*, December 2014.
- Department of Water and Environment Regulation, *Landfill Waste Classification and Waste Definitions*, April 2018.
- Department of Water and Environment Regulation, *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*, Contaminated Sites Guidelines, January 2017.
- Department of Health (DoH), *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia*, 2009.
- Heads of Environmental Protection Authorities Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan*, January 2018.
- National Environment Protection Council (NEPC), *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)*, 2013.

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<sup>1</sup> Many of the guidelines listed here are related specifically to PFAS compounds, which are a large group of persistent organic pollutants, currently classed as 'Chemicals of Emerging Concern'. PFAS compounds, including PFOS and PFOA have been detected at elevated concentrations at the Perth Airport Estate and should be considered as a COPC when testing soils from the Site.

- Department of Defence (DoD), *Defence Contamination Directive #8 (Amendment 1) - Interim Screening Criteria, Defence Project Guidelines for PFAS*, September 2016.
- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), *Technical Report No 38 – Assessment, management and remediation for PFOS and PFOA*, January 2017.
- DoH, Food Standards Australia New Zealand (FSANZ) – *Health Based Guidance Values for PFAS*, April 2017.
- Department of Conservation and Land Management - *Phytophthora cinnamomi and disease caused by it. Volume I - Management Guideline* (2003).
- Department of Conservation and Land Management - *Phytophthora cinnamomi and disease caused by it. Volume II –Guidelines for Detection, Diagnosis and Mapping of Disease* (2003). Department of the Environment and Heritage - *Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia: Part 1 – A Review of Current Management.* (2005)

## 5 Roles and Responsibilities

Project Managers are responsible for:

- Consulting with the Perth Airport Environment and Sustainability Department prior to any undertaking any movement of fill.
- Ensuring a suitable risk assessment is completed prior to importing, transferring within site or exporting off-site any fill material (Perth Airport's Risk Assessment Framework should be used to document the risk assessment process).
- Ensuring that clean or uncontaminated fill imported to Perth Airport is accompanied by a certificate from the supplier, which satisfies the requirements of DWER's Material Guideline for Clean Fill, specifically, it must provide the following information:
  - the source site of the material;
  - the previous use of the source site;
  - whether the source site has been reported to DWER as a known or suspected contaminated site;
  - whether the source site is in an acid sulfate soil (ASS) risk area and/or contains potential acid sulfate soil (PASS).
- Facilitating detailed investigation and assessment of contaminated sites where required.



- Ensuring a PFAS Risk Assessment Form (PAPL-ENV-FOR-005) is also completed where the risk of PFAS contamination applies or could apply.

The Perth Airport Environment and Sustainability Department is responsible for:

- Maintenance and management of all records pertaining to this document, including completed Fill Material Use (formerly Clean Fill Use) forms and supplier certification records.
- Assessing potential site contamination, determining the level of ASS and PFAS risk to sites based on provided documentation, and mapping and determining dieback infected areas.
- Reviewing this guideline annually.

## 6 Management of Fill Materials

### 6.1 General Principles for Fill Management

Where an activity requires fill material or has excess fill material, the following objectives shall be met ***where practical and environmentally acceptable***:

- Excess fill is reused (if suitable) on the Estate for other works.
- Fill material on the Estate proposed for future use is stored in an area where environmental risks (e.g. dust emissions, contamination, vegetation impact, and amenity impacts) are prevented or minimised.
- Fill imported onto the Estate does not cause, or have the potential to cause, contamination.
- Excess fill removed from the Estate is disposed of in accordance with legislative and other requirements.

Under no circumstances shall fill material originating from the Estate be removed and used for financial gain without written permission from the Commonwealth Government.

When fill material is imported to the site, written certification must be obtained from the proposed supplier and should include, as a minimum, the following information:

- Full company details of supplier.
- The source site of the material.
- The previous use of the source site.

- Whether the source site has been reported to DER as a known or suspected contaminated site.
- Whether the source site is in an acid sulfate soil risk area or contains potential acid sulfate soil.
- Any licence details regarding the source of material (e.g. DWER licence).
- Confirmation that material meets the DWER definition for Clean Fill or Uncontaminated Fill.
- Signature and date of signature by authorised person of the clean or uncontaminated fill supplier.

As referenced above, a site specific Human Health and Ecological Risk Assessment has been completed by EnRisks, which provides site specific screening criteria for soil reuse and waste disposal for Perth Airport.

These criteria and those of the HEPA *PFAS National Environmental Management Plan* (PFAS NEMP, Jan 2018) shall take precedence in assessments of soils from the site containing PFAS, to determine suitability to be re-used on Perth Airport Estate and any PFAS related activities shall be in keeping with the PFAS NEMP requirements. Additionally, fill cannot be used or sold for commercial gain off the Airport Estate grounds without approval from the Commonwealth Government.

### **6.1.1 Clean or Uncontaminated Fill Definitions**

In April 2018, an amendment was made to the DWER *Landfill Waste Classification and Waste Definitions*, and the *Environmental Protection Regulations 1997 (WA)* which updated the “Clean Fill” definition to:

*‘Raw excavated natural material such as clay, gravel, sand, soil or rock fines that:*

*(a) has been excavated or removed from the earth in areas that have not been subject to potentially contaminating land uses including industrial, commercial, mining or agricultural activities; and*

*(b) has not been processed except for the purposes of:*

*i. achieving desired particle size distribution; and/or*

*ii. removing naturally occurring organic materials such as roots; and*

*(c) does not contain any acid sulfate soil; and*

*(d) does not contain any other type of waste’.*

The amendments now also include the addition of a definition for “Uncontaminated Fill” which is described as:

- ‘(a) inert waste type 1 (excluding asphalt and biosolids) that meets the requirements set out in Table 6, as determined by relevant sampling and testing carried out in accordance with the requirements set out in Table 7; and*
- (b) neutralised acid sulfate soil that meets the requirements for relevant metals, metalloids and sulfate set out in Table 6, as determined by relevant sampling and testing carried out in accordance with the requirements of Table 7.’*

(Appendix 1 of this document contains an extract of the information in Table 6 and Table 7 referred to above).

### **6.1.2 Acceptable Quality**

The acceptable quality of fill is dependent on its destination within the Estate. The Estate contains some environmentally sensitive areas which require a high level of protection, as well as general airport areas used or designated for airport operations, industrial and commercial use.

The Airport Estate also has significant areas that are infected by *Phytophthora* dieback (as shown in Appendix 2). Movement of soil and equipment into and out of these areas requires additional management to prevent the spread of dieback, and any projects relating to movement of fill to and from dieback infected areas needs to be addressed in discussion with the Environment and Sustainability team.

The delivery and placement of soil shall always be subject to an approved PAPL Consent, and where applicable a Permit issued by the Airport Building Controller.

#### **Environmentally sensitive areas**

The following parts of the Estate are considered environmentally sensitive areas. Import, transfer and use of soil is prohibited in these areas (see Appendix 3):

- The Infrastructure Only Conservation Zone (IOCZ) at the south-western site boundary.
- Munday Swamp at the north-eastern area of the site.
- Aboriginal heritage sites.
- Some Wetlands.
- Other areas as advised by PAPL.

## General airport areas used or designated for airport operations, industrial and commercial use

The remaining area of the Estate is classified as being 'areas of the airport generally'. Fill material destined for these areas must contain pollutant levels below the limits prescribed in Appendix 1 (or other guidelines as appropriate), and will be subject to an environmental risk assessment.

## 6.2 Guidelines

### 6.2.1 Fill Material Use Form

- The Fill Material Use Form **PER-ENV-FOR-001** (formerly the Clean Fill Form PAPL-EH-043) must be completed whenever volumes greater than 5 m<sup>3</sup> of fill material are to be imported, exported or transferred on, off or around the Estate.
- The PFAS Risk Assessment Form (**PER-ENV-FOR-005**) must also be completed. This form identifies known or suspected PFAS (per- and poly-fluoroalkyl substances) locations within the Estate and the associated PFAS Risk Assessment Guideline (**PER-ENV-GDL-005**) outlines the requirements that must be followed to mitigate potential contamination risks due to PFAS.

Perth Airport has site-specific Risk Based Criteria (RBC) for PFAS in soil proposed to be re-used on the Estate. The criteria were developed by EnRisks (2013) and must be considered during any soil contamination assessment, along with the criteria in the PFAS National Environmental Management Plan (HEPA, January 2018).

- The Project Manager responsible for the works is responsible for completing all forms and obtaining supplier certification and test results.
- The form and supporting information (including supplier certification and test results) must be submitted by the Project Manager to the Perth Airport Environment and Sustainability Department for review as early as possible to prevent delays.
- The Project Manager must consult with the Perth Airport Environment and Sustainability Department prior to importing, exporting or transferring material to ensure this guideline is understood and adhered to.
- The Perth Airport Environment and Sustainability Department shall be responsible for recording and management of the completed forms, including copies of the test results, supplier written certification and other supporting information.

## **6.2.2 Importing Fill Material**

The requirements for the importing of fill material onto the Perth Airport Estate are:

- The Project Manager shall ensure a copy of the site assessment demonstrating the material is clean or uncontaminated is received. The assessment shall include details of the parties involved, volume of the material, origin of the soil, sampling data, and any knowledge regarding potential contamination.
- No fill material shall be accepted by Perth Airport onto the Estate until sufficient evidence is provided demonstrating the material meets the definition of “Clean Fill” or “Uncontaminated Fill” (refer to Section 6.1.1).
- Receivers of the fill material on the Estate shall inspect the fill before accepting it to visually assess for contamination (e.g. odour, wastes present).
- The Project Manager shall ensure the risks associated with contamination by PFAS or other contaminants and dieback have been considered and addressed prior to importing fill material.

## **6.2.3 Written Confirmation**

Written certification must be obtained from the proposed supplier in all occasions of fill importation.

Where sampling and testing is required, it is the responsibility of the supplier to carry out sampling and testing in accordance with appropriate standards and guidelines, and by a competent person with appropriate qualifications/experience.

Results must be interpreted by the supplier or its representative and compared to the guideline values within Schedule 3 of the Regulations prior to submission to Perth Airport.

## **6.2.4 Exporting Fill**

Fill material exported off the Estate is to be reused appropriately, or disposed of to an approved landfill facility. The material cannot be sold for financial gain without the written approval of the Commonwealth Government. The process for exporting of fill shall be in accordance with the flowchart described in Figure 1 below.

The general requirements for exporting of fill from the Estate are as follows.

- The Project Manager shall organise for an assessment of the material. The level of assessment undertaken will depend on the site’s past use and potential for contamination, which can be determined through consultation with the Perth Airport

Environment and Sustainability Department and access to PAPL's iMaps GIS system. An external consultant may be engaged to conduct the assessment.

- If the site assessment reveals contamination, or potential for contamination, then the site shall be treated as contaminated and material will be sampled and managed in accordance with the DWER '*Landfill Waste Classification and Waste Definitions 1996 (as amended April 2018)*'.

- The Project Manager shall ensure the risks associated with contamination by PFAS or other contaminants and dieback have been considered and addressed prior to exporting fill material.

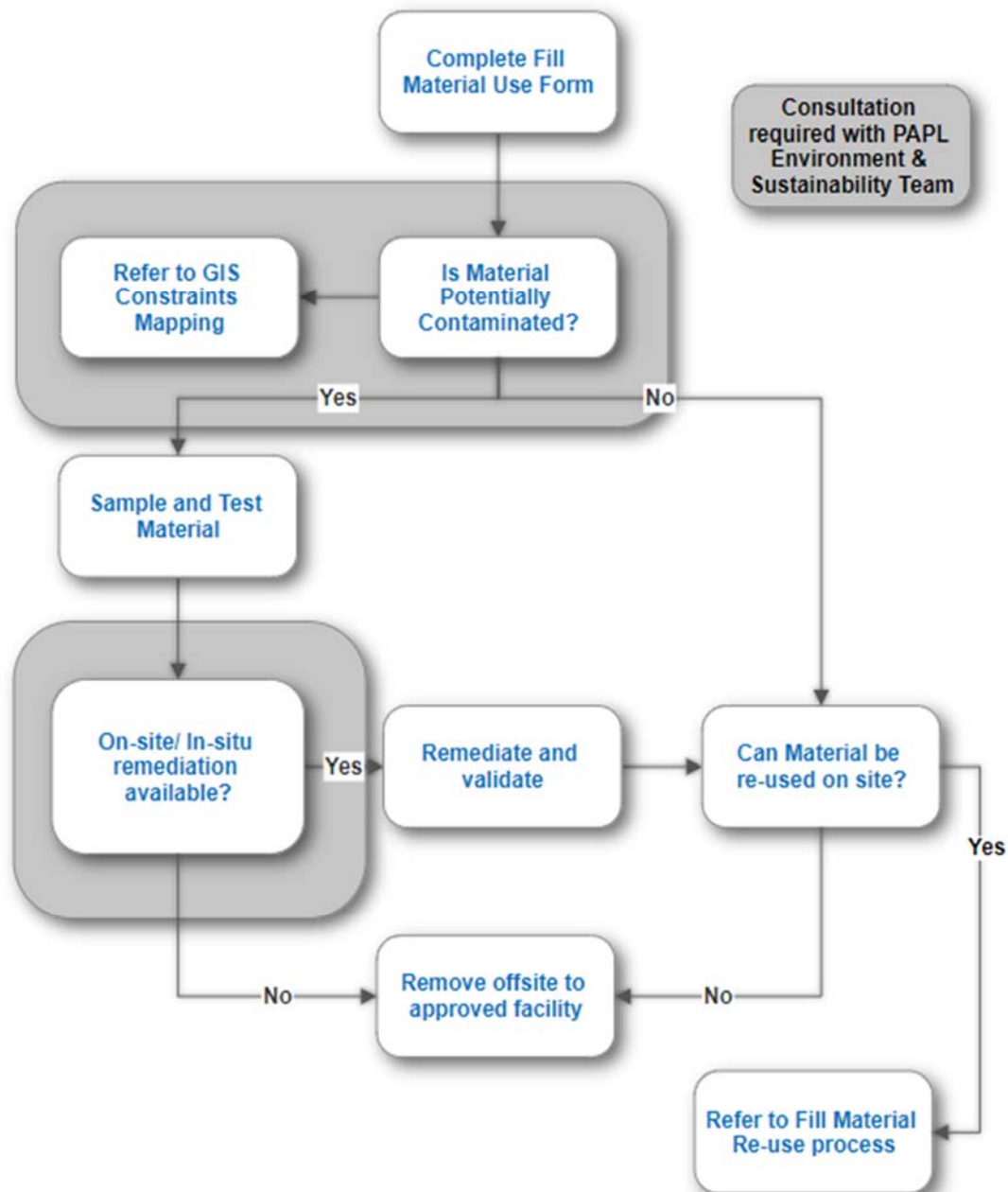


Figure 1: Process for exporting fill from the Perth Airport Estate

## 6.2.5 Contaminated Fill Material

Fill material shall be classified as potentially contaminated if the material is taken from either of:

- A known contaminated site within the Estate.
- An area of known Acid Sulfate Soil (ASS) risk or an area identified as moderate to high ASS risk on published DWER ASS risk maps (available online).
- An area of known PFAS risk or an area identified as potential for PFAS risk based on PAPL PFAS monitoring program.
- An area of known *Phytophthora cinnamomi* (dieback) infection or an area identified as potentially infected based on the PAPL dieback GIS mapping system.

The Project/Site Manager shall consult with the Perth Airport Environment and Sustainability Department to determine whether fill material is contaminated or dieback infected. The Perth Airport Environment and Sustainability Department shall use the iMaps GIS system to determine whether the fill material lies within a contaminated site and to assess the level of ASS and dieback risk of the area.

If the material is contaminated, it shall be managed in accordance with the DWER *Contaminated Sites Guidelines* or other such appropriate guidance to address the level of risk.

Contaminated material shall not be moved to an area of the Estate for remediation. Remediation of existing contaminated sites shall only occur in-situ, and shall only be permitted after detailed investigation and assessment has been undertaken in consultation with the Perth Airport Environment and Sustainability Department.

If soil remediation is considered viable, a separate environmental assessment is required in consultation with the Perth Airport Environment and Sustainability Department.

## 6.2.6 Transfer and Reuse of Fill Material

The transferring of fill material within the Estate shall be undertaken in accordance with the process described below and illustrated in the flowchart in Figure 2.

Material may be reused on site when:

- An assessment demonstrates the material is not contaminated (including infection by *Phytophthora cinnamomi* (dieback));
- Contaminant levels in the material are below the applicable assessment levels prescribed in the *Airports (Environment Protection) Regulations 1997 (Cth)* Schedule



3, or other appropriate guidance (e.g. DWER *Landfill Waste Classification and Waste Definitions* or the HEPA *PFAS National Environmental Management Plan* criteria); or

- The elevated contaminated levels are demonstrated to be of natural origin (excluding dieback) and the receiving environment will not be adversely impacted.
- The material must meet an acceptable quality as described in Section 6.1.2.

### 6.2.7 Sampling and Testing

Sampling of stockpiled fill material must be conducted in accordance with Schedule B2 of NEPM (NEPC, 2013) to ensure representative samples are collected for analysis. Analysis of samples must be conducted by a NATA accredited laboratory for the analysis specified. The collection of samples and assessment of results shall be undertaken by a qualified Environmental Consultant, who will identify appropriate COPCs based on the history of the site. Table 1 below describes the minimum sampling density requirements.

Site assessment shall be undertaken in accordance with DWER 2014. Test parameters must be comparable to those detailed in Schedule 3 of the Regulations or other appropriate guidance. In addition, where sampling for PFAS is required, testing shall include soil concentrations and assessment of leachability using Australian Standard Leachability Procedure (ASLP – AS4439) and shall be in keeping with the HEPA *PFAS National Environmental Management Plan* (Jan 2018) requirements. For dieback affected areas, sampling for dieback shall be undertaken in keeping with the dieback management guidelines referred to in section 4.

**Table 3: Minimum Stockpile Sampling Density for Material Reuse Assessment**

Stockpile Volume (m <sup>3</sup> )	Number of Samples
5 to 100	2
100 to 200	4
200 to 500	6
500 to 1,000	8
1,000 to 2,000	11
2,000 to 3,000	15
3,000 to 4,000	18
4,000 to 5,000	20
5,000 to 10,000	24
> 10,000	24 plus 4 for each additional 10,000 m <sup>3</sup>

If there is visual evidence of potential contamination, then sampling locations shall be biased towards these points. Collection of samples from the exterior 300mm of the stockpile should be avoided due to the higher risk of weathering and grain size grading errors. Additional guidance for the sampling of stockpiles of potentially contaminated material is provided in the NEPM (NEPC, 2013).

### **6.2.8 Acceptability Review**

On collection and assessment of sample data, the proposal shall be reviewed considering the source material, and planned end use and destination. Where the proposed soil movement meets the requirements of this guideline, works can be authorised to commence.

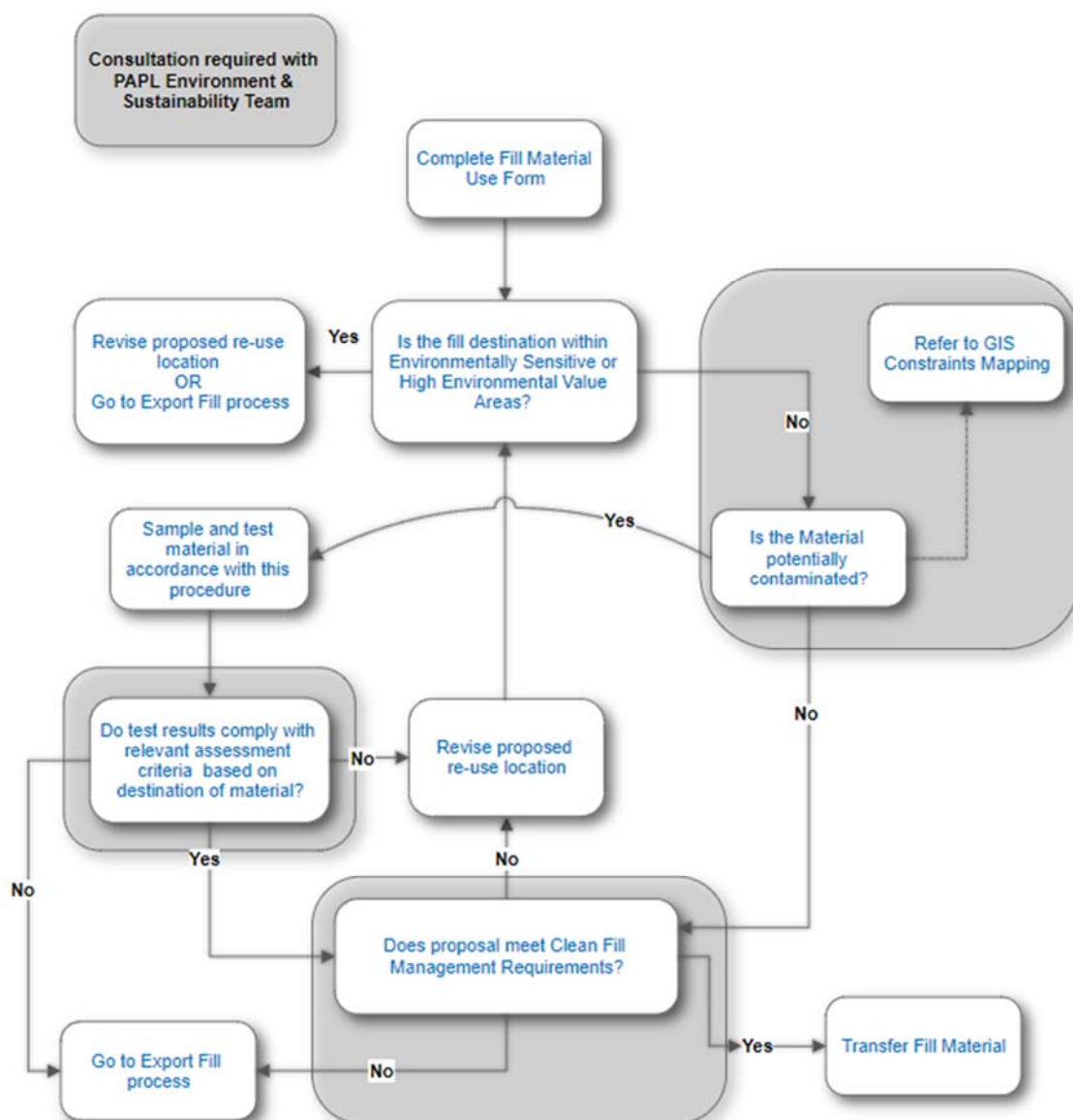


Figure 2: Process for assessing reuse of fill material on the Perth Airport Estate

## 7 Reporting Requirements & Review

The Perth Airport Environment and Sustainability team shall ensure all records relating to the management of fill material on the Estate are appropriately maintained and managed. This shall include, but not be limited to, Fill Material Use Forms, supplier certification, and analytical results.

This document shall be reviewed annually in accordance with legislative and other requirements.

## 8 Related Documents & References

Australian Government, *Airports Act 1996*.

Australian Government, *Airport (Environmental Protection) Regulations 1997*.

Environmental Risk Sciences Pty Ltd (EnRiskS), *Human Health and Ecological Risk Assessment: Perth Airport*, 13 December 2016.

Department of Conservation and Land Management - *Phytophthora cinnamomi and disease caused by it. Volume I - Management Guideline* (2003).

Department of Conservation and Land Management - *Phytophthora cinnamomi and disease caused by it. Volume II –Guidelines for Detection, Diagnosis and Mapping of Disease* (2003).

DWER, *Acid Sulfate Soil Risk Map*, available online at: <https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/65-ass-risk-maps>

DWER WA, *Landfill Waste Classification and Waste Definitions 1996* (as amended April 2018).

DWER WA, *Assessment and Management of Contaminated Sites*, December 2014.

DWER WA, *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS), Contaminated Sites Guidelines*, January 2017.

DoD, *Defence Contamination Directive #8 (Amendment 1) - Interim Screening Criteria, Defence Project Guidelines for PFAS*, September 2016.

DoH, *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia*, 2009.

E O’Gara, K Howard, B Wilson and GESTJ Hardy (2005) *Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia: Part 1 – A Review of Current Management. A report funded by the Commonwealth Government Department of the Environment and Heritage by the Centre for Phytophthora Science and Management, Murdoch University, Western Australia*

Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan*, January 2018.

NEPC, *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)*, 2013.

Perth Airport – Fill Material Use Form (PER-ENV-FOR-001).

Perth Airport - PFAS Risk Assessment Form (PER-ENV-FOR-005).

Perth Airport - PFAS Risk Assessment Guideline (PER-ENV-GDL-005).

## 9 Appendices

## Appendix 1 – Uncontaminated Fill

Extract from Landfill Waste Classification and Waste Definitions (April 2018)

Landfill waste classification and waste definitions (April 2018)

### 5 Uncontaminated fill

**Table 6 Maximum concentrations (thresholds) of relevant chemical substances and limits of relevant physical attributes for uncontaminated fill**

Parameter	Maximum Concentration <sup>1</sup> mg/kg, dry weight	Leaching test <sup>1</sup> ASLP, µg/L
<b>Metals and metalloids</b>		
Antimony	20	3
Arsenic	20	10
Barium	200	-
Beryllium	2	-
Cadmium	1	0.2
Chromium III	30	10
Chromium VI	1	1
Cobalt	15	1
Copper	50	1
Lead	110	3
Manganese	500	500
Mercury (inorganic)	0.5	0.05
Molybdenum	40	35
Nickel	10	10
Selenium	1	5
Silver	20	0.05
Thallium	1	0.8
Tin (inorganic)	50	-
Uranium	25	0.5
Vanadium	25	-
Zinc	50	10
<b>Other inorganics</b>		
Asbestos <sup>2</sup>	Note <sup>2</sup>	-
Sulfate	2,500	-
Cyanides	50 complexed 10 free	5 as CN
Ammonia as N	-	400
Fluoride	400	120
Total nitrogen	-	2000
Total phosphorus	-	200

Landfill waste classification and waste definitions (April 2018)

Parameter	Maximum Concentration <sup>1</sup> mg/kg, dry weight	Leaching test <sup>1</sup> ASLP, µg/L
<b>Organic compounds</b>		
Benzene	0.5	1
Toluene	10	180
Ethyl benzene	2	5
Xylene (total)	2	600 sum
Total recoverable hydrocarbons (C <sub>6</sub> -C <sub>10</sub> )	45	-
Total recoverable hydrocarbons (>C <sub>10</sub> -C <sub>16</sub> )	25	-
Total recoverable hydrocarbons (>C <sub>16</sub> -C <sub>34</sub> )	300	-
Total recoverable hydrocarbons (>C <sub>34</sub> -C <sub>40</sub> )	2800	-
Naphthalene	3	15
Benzo[a]pyrene	1	0.01
Carcinogenic polycyclic aromatic hydrocarbons (PAHs) as B(a)P TEQ (8 species)	3	-
Total PAHs <sup>3</sup> (16 species)	300	-
Phenol	1	320
Cresols	-	2 (sum)
PCBs	1	-
<b>Pesticides</b>		
Aldrin	-	0.001
Dieldrin	-	0.01
DDT+DDD+DDE	3	0.006 DDT 0.03 DDE
Other pesticides	-	< ADWG <sup>4</sup>
<b>Physical attributes</b>		
pH (pH units)	5.5 – 8.5	-

Notes:

1. Refer AS 4439 using reagent water. Both total concentration and leaching analyses are required to assess the quality of the fill material unless no value is included in Table 6 (indicated by '-').
2. Inspection, sampling and testing for asbestos is to be carried out in accordance with Section 4.3 of *Guidelines for managing asbestos at construction and demolition waste recycling facilities* (DEC 2012 and as updated from time to time); using the specified weight of evidence approach to assess whether the product specification is met.

<sup>2</sup> <https://www.der.wa.gov.au/images/documents/our-services/approvals-and-licences/final-guidelines-asbestos-in-cd-recycling--version-1.pdf>

3. Carcinogenic PAHs (as B(a)P TEQ): is based on the eight carcinogenic polycyclic aromatic hydrocarbons (PAHs) listed below and their potency relative to benzo(a)pyrene. The B(a)P toxicity equivalence quotient (TEQ) is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P Total Equivalent Factor (TEF), given below, and summing these products.

PAH species	TEF	PAH species	TEF
Benzo(a)anthracene	0.1	Benzo(g,h,i)perylene	0.01
Benzo(a)pyrene	1	Chrysene	0.01
Benzo(b+j)fluoranthene	0.1	Dibenz(a,h)anthracene	1
Benzo(k)fluoranthene	0.1	Indeno(1,2,3-c,d)pyrene	0.1

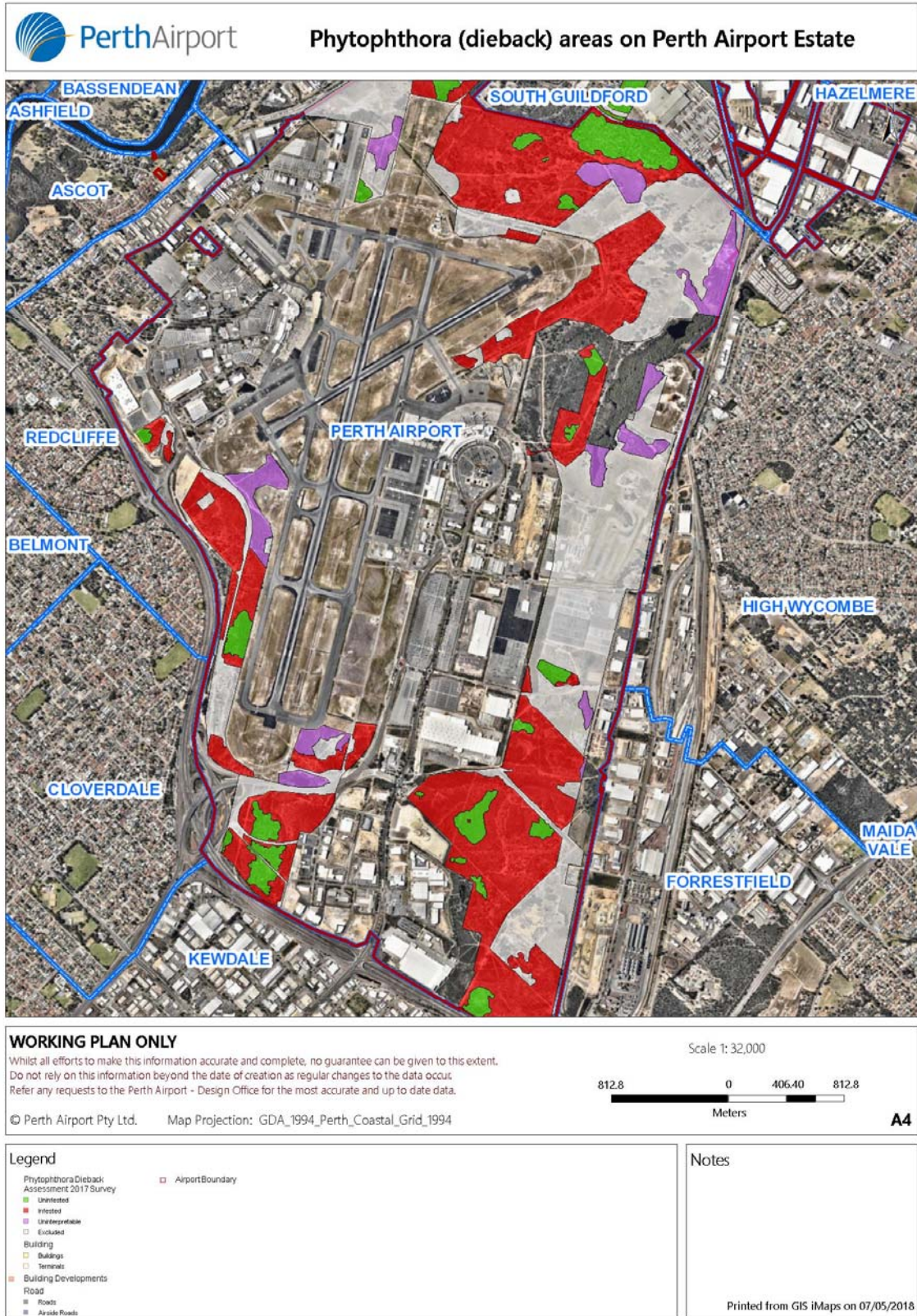
4. Australian Drinking Water Guidelines (2011 as updated). The relevant compounds to be tested should be guided by the source of the fill material (site history).

**Table 7 The minimum sampling and testing standards for uncontaminated fill**

Activity	Minimum requirements
Sampling	<p>Method 3.1 or Method 3.2 in the Australian Standard 1141 Methods for sampling and testing aggregates.</p> <p>Sampling of soil stockpiles should be consistent with the methodology described in Section 7.5 of Schedule B2 (Guideline on Site Characterisation) of the <i>National Environment Protection (Assessment of Site Contamination) Measure</i> (ASC NEPM). Depending on the source of the material being characterised, it may be possible to use relevant site characterisation data for <i>in situ</i> soils (such as in a detailed site investigation report) provided that this was carried out in accordance with the ASC NEPM and that, since sampling, the characterised material has not been subject to any potentially contaminating land uses including industrial, commercial, mining or agricultural activities.</p> <p>Further information on characterisation of soils based on the 95% Upper Confidence Limit (average) [95%UCL<sub>avg</sub>] for the soil (including worked examples) is provided in "<i>Industrial Waste Resource Guidelines (7), Sampling and Analysis; Soil Sampling</i>", EPA Victoria, 2010. <a href="http://www.epa.vic.gov.au/business-and-industry/guidelines/waste-guidance/industrial-waste-resource-guidelines">http://www.epa.vic.gov.au/business-and-industry/guidelines/waste-guidance/industrial-waste-resource-guidelines</a>.</p>
Testing	<p>The laboratory should hold National Association of Testing Authorities, Australia (NATA) accreditation for the testing undertaken.</p> <p>Substances to be tested should be determined based on land use history of the site of origin. Refer to Appendix B (Potentially contaminating industries, activities and land uses) in the <i>Assessment and management of contaminated sites</i> (DER, 2014 and as updated from time to time)<sup>3</sup>. If no value for a potential contaminant is included in Table 6, and the substance is indicated for testing on consideration of the site history, then it is not appropriate to consider material from the site for classification as uncontaminated fill.</p>



Appendix 2 – Phytophthora (dieback) areas



Appendix 3 – Conservation significant areas

