Clause 6(5) of the TBM regulations requires that EPA ensures commercially sensitive information in an EMP is not published without consent. MBC has not consented to publishing the redacted material on the basis that it is commercially sensitive under the regulations. In the interests of transparent decision making, EPA will again seek consent to publish this material at the conclusion of the competitive process to select a site.
Date: 31 August 2020

Attention: Richard Marks
Director - Development & Infrastructure
Regulatory Standards, Assessments & Permissioning
Environment Protection Authority Victoria

RE Declaration of Accuracy and clarification of applicant (Western Soil Treatment Pty Ltd)

I, Donald Calleja (Chief Executive Officer of Maddingley Brown Coal Pty Ltd and Western Soil Treatment Pty Ltd), have reviewed this Tunnel Boring Machine Spoil Containment Environmental Management Plan (EMP) related to the proposed operation of the Maddingley Spoil Processing Facility (reference MSPF TBM Spoil Containment EMP_v5.1) and declare that all information contained in the document is, to the best of my knowledge, accurate.

I confirm that the operating entity responsible for the operation of the Facility and on whose behalf the EMP was lodged is Western Soil Treatment Pty Ltd, an entity related to Maddingley Brown Coal Pty Ltd.

Yours sincerely,

[Signature]

Donald Calleja
Chief Executive Officer, Maddingley Brown Coal Pty Ltd and Western Soil Treatment Pty Ltd
### ABBREVIATIONS

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<td>AAQMS</td>
<td>Ambient air quality monitoring station</td>
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<td>BCM</td>
<td>Bank cubic metres</td>
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<td>EMS</td>
<td>Environmental management system</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment Protection Authority of Victoria</td>
</tr>
<tr>
<td>ERA</td>
<td>Environmental risk assessment</td>
</tr>
<tr>
<td>GDE</td>
<td>Groundwater dependent ecosystems</td>
</tr>
<tr>
<td>GITA</td>
<td>Geotechnical inspection and testing authority</td>
</tr>
<tr>
<td>GCL</td>
<td>Geosynthetic clay liner</td>
</tr>
<tr>
<td>HELP</td>
<td>Hydrologic evaluation of landfill performance</td>
</tr>
<tr>
<td>HHERA</td>
<td>Human health and ecological risk assessment</td>
</tr>
<tr>
<td>IWRG</td>
<td>Industrial waste resource guideline</td>
</tr>
<tr>
<td>JV</td>
<td>CPB - John Holland Joint Venture</td>
</tr>
<tr>
<td>MBC</td>
<td>Maddingley brown coal</td>
</tr>
<tr>
<td>MSPF</td>
<td>Maddingley Brown Coal spoil processing facility</td>
</tr>
<tr>
<td>PFAS</td>
<td>Per- and poly-fluoroalkyl substances</td>
</tr>
<tr>
<td>PFOS</td>
<td>Perfluorooctane sulphonate</td>
</tr>
<tr>
<td>PFOA</td>
<td>Perfluorooctanoic acid sulphonate</td>
</tr>
<tr>
<td>PFHxS</td>
<td>Perfluorohexane sulphonate</td>
</tr>
<tr>
<td>PIW</td>
<td>Prescribed Industrial Waste</td>
</tr>
<tr>
<td>SAQP</td>
<td>Sampling and analysis quality plan</td>
</tr>
<tr>
<td>SEPP</td>
<td>State environment protection policy</td>
</tr>
<tr>
<td>TBMSC-EMP</td>
<td>Tunnel boring machine spoil environmental management plan</td>
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<td>TBM Spoil</td>
<td>Tunnel boring machine spoil</td>
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<tr>
<td>TBM Spoil Regulations</td>
<td>Environment protection (management of tunnel boring machine spoil) regulations 2020</td>
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<tr>
<td>WGTP</td>
<td>West gate tunnel project</td>
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# Glossary

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<tr>
<td>Amenity</td>
<td>Attractiveness or overall quality of a geographic location. For the purposes of this document, amenity includes visual amenity, noise levels and air quality.</td>
</tr>
<tr>
<td>Approval</td>
<td>Any licence, permit, consent, or other authorisation required under any environmental law for the development of the project.</td>
</tr>
<tr>
<td>Alluvial</td>
<td>Sediments deposited by flowing water.</td>
</tr>
<tr>
<td>Aquifer</td>
<td>Rock or sediment in a formation, group of formations or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.</td>
</tr>
<tr>
<td>Aquitard</td>
<td>Saturated geological unit with a relatively low permeability that can store large volumes of water but does not readily transmit or yield significant quantities of water to bores or springs. An aquitard can sometimes, if completely impermeable, be called an aquiclude.</td>
</tr>
<tr>
<td>A-weighting</td>
<td>A frequency weighting devised to attempt to take into account the fact that human response to sound is not equally sensitive to all frequencies; it consists of an electronic filter in a sound level meter, which attempts to build in this variability into the indicated noise level reading so that it will correlate, approximately, with human response.</td>
</tr>
<tr>
<td>Background noise level</td>
<td>Total silence does not exist in the natural or built environment, only varying degrees of noise. The Background Noise Level is the typical minimum level of noise measured in the absence of the noise under investigation and excluding other short-term noises such as those caused by all forms of traffic, industry, lawnmowers, wind in foliage, insects, animals, etc. It is generally quantified by the noise level that is exceeded for 90% of the measurement period ‘T’ (LA90, T).</td>
</tr>
<tr>
<td>Baseline</td>
<td>A basic standard or level, usually regarded as a reference point for comparison.</td>
</tr>
<tr>
<td>Bore</td>
<td>Artificially constructed or improved groundwater cavity used for the purpose of accessing or recharging water from an aquifer. Interchangeable with borehole, piezometer.</td>
</tr>
<tr>
<td>Bund</td>
<td>A retaining wall constructed around a defined area. Used to protect locations where hazardous or potentially polluting substances are handled, processed or stored.</td>
</tr>
<tr>
<td>Clay</td>
<td>Deposit of particles with a diameter less than 0.002 mm, typically contain variable amounts of water within the mineral structure and exhibit high plasticity.</td>
</tr>
<tr>
<td>Containment system</td>
<td>As per the TBM Spoil Regulations, a “containment systems” means a system used for the containment of tunnel boring spoil.</td>
</tr>
<tr>
<td>Containment Cell</td>
<td>As per the PFAS NEMP, a Containment Cell is an engineered containment facility with appropriate lining, cap, or other barrier (and a common technique for remediation of contaminated sites). This also includes a “containment system” as defined in the TBM Spoil Regulations.</td>
</tr>
<tr>
<td>Contamination</td>
<td>The condition of land or water where any chemical substance or waste has been added as a direct or indirect result of human activity at above background level and represents, or potentially represents, an adverse health or environmental impact</td>
</tr>
<tr>
<td>Decibel</td>
<td>The decibel (dB) is a logarithmic scale that allows a wide range of values to be compressed into a more comprehensible range, typically 0 dB to 120 dB. Noise levels in decibels cannot be added arithmetically because they are logarithmic numbers. The human ear has a vast sound-sensitivity range of over a thousand billion to one, so the logarithmic decibel scale is useful for acoustical assessments.</td>
</tr>
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<td>Definition</td>
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<tr>
<td>Ecological community</td>
<td>An assemblage of species occupying a particular area.</td>
</tr>
<tr>
<td>Environmental Management Plan</td>
<td>Means a plan submitted to the Authority for approval under Regulation 6.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Water found in the subsurface in the saturated zone below the water table or piezometric surface i.e. the water table marks the upper surface of groundwater systems.</td>
</tr>
<tr>
<td>Habitat</td>
<td>An area or areas occupied, or periodically or occasionally occupied, by a species, population, or ecological community, including any biotic or abiotic components.</td>
</tr>
<tr>
<td>Hydraulic conductivity</td>
<td>Measure of the ease with which water will pass through earth material; defined as the rate of flow through a cross-Section of one square metre under a unit hydraulic gradient at right angles to the direction of flow (metres per day).</td>
</tr>
<tr>
<td>Hydrogeology</td>
<td>The study of the interrelationships of geological materials and processes with water, especially groundwater.</td>
</tr>
<tr>
<td>Investigation levels and screening levels</td>
<td>Concentrations of a contaminant above which further appropriate investigation and evaluation will be required. Investigation and screening levels provide the basis of Tier 1 risk assessment.</td>
</tr>
<tr>
<td>$L_{Aeq}$</td>
<td>The $A$-weighted sound pressure level in decibels of a continuous steady sound that has, within a specified time interval, $T$, the same energy as the sound being measured. It can be considered the ‘average’ noise over time interval, $T$.</td>
</tr>
<tr>
<td>$L_{A10}$</td>
<td>The $A$-weighted sound pressure level in decibels exceeded for 10% of the measurement period, $T$.</td>
</tr>
<tr>
<td>$L_{A90}$</td>
<td>The $A$-weighted sound pressure level in decibels exceeded for 90% of a given time interval, $T$. $L_{A90}$ is typically considered to be representative of background noise.</td>
</tr>
<tr>
<td>Likely</td>
<td>Taken to be a real chance or possibility.</td>
</tr>
<tr>
<td>Management measure</td>
<td>A design refinement or process undertaken to ensure that project-related activities are managed appropriately and in accordance with relevant regulations, standards, policies, and guidelines.</td>
</tr>
<tr>
<td>Modelling</td>
<td>The creation of a computerised model that simulates natural environment, allows simulations to project future outcomes.</td>
</tr>
<tr>
<td>Monitoring bore</td>
<td>A bore used to monitor groundwater levels or quality.</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>‘Coarse particles’ are those between 10 and 2.5 micrometres ($\mu$m) in diameter.</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>‘Fine particles’ are those with a diameter of 2.5$\mu$m (PM2.5) or less. Particles that are smaller than 0.1$\mu$m are called ultrafine particles. Being smaller, PM2.5 particles can be transported further and persist for longer in the atmosphere.</td>
</tr>
<tr>
<td>Processing area</td>
<td>As per the TBM Spoil Regulations, a processing area is an impervious surface for the receipt, consolidation, and dewatering of tunnel boring machine spoil.</td>
</tr>
<tr>
<td>Receptor</td>
<td>A place, location or point at which exposure to particular effects (such as noise, vibration or airborne pollutants) is measured. ‘Sensitive receptors’ are those that are identified as likely to be more susceptible to adverse effects, such as schools, hospitals, day care facilities and residences.</td>
</tr>
<tr>
<td>Risk Register</td>
<td>A full list of all risks identified for the project.</td>
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<tr>
<td>Term</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Sampling and Analysis Quality Plan</td>
<td>As per NEPM 2013 Schedule B2, a sampling and analysis quality plan (SAQP) defines the systematic planning process for defining the objectives of a site assessment and process for collecting and evaluating representative data to achieve those objectives.</td>
</tr>
<tr>
<td>Specifications for containment of tunnel boring machine spoil</td>
<td>Means specifications set out in an environmental management plan as to the qualities and characteristics of tunnel boring machine spoil suitable for containment in a containment system.</td>
</tr>
<tr>
<td>Spoil</td>
<td>Spoil includes soil, rock, sludge, and water.</td>
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<tr>
<td>Swales</td>
<td>Swales are linear, depressed channels that collect and transfer stormwater. They can be lined with grass or more densely vegetated and landscaped.</td>
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<tr>
<td>Tunnel boring machine spoil</td>
<td>Means spoil generated by the operation of a tunnel boring machine used for the purposes of developing transport infrastructure.</td>
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Tunnel Boring Machine Spoil Containment Environmental Management Plan
Maddingley Brown Coal Soil Processing Facility
East Maddingley Road, Bacchus Marsh, VIC 3340

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APPENDICES

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APPENDIX B  GEOTECHNICAL AND PERMEABILITY INVESTIGATIONS
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APPENDIX D  REVISED CONCEPT DESIGN REPORT
APPENDIX E  DESIGN REPORTS AND TECHNICAL SPECIFICATIONS
APPENDIX F  ENVIRONMENTAL RISK REGISTER
APPENDIX G  PFAS LEACHATE SEEPAGE ESTIMATES AND ASSESSMENT OF RISKS TO GROUNDWATER
APPENDIX H  EPA SPOIL CLASSIFICATION
1 Introduction

This Tunnel Boring Machine Spoil Containment Environmental Management Plan (TBMSC-EMP) has been prepared by the Proponent, Maddingly Brown Coal (MBC), to support an application to the Environment Protection Authority of Victoria (EPA) for approval to receive tunnel boring machine spoil (TBM Spoil) from West Gate Tunnel Project (WGTP) operations at the proposed Maddingly Brown Coal Spoil Processing Facility, located in East Maddingley Road, Bacchus Marsh, VIC (“MSPF”, or “the site”).

1.1 Background

The TBM Spoil from the WGTP may be subject to several on-site processes at the MSPF, including receipt, storage, handling, treatment, reprocessing, containment, or disposal to an off-site licensed landfill.

The WGTP is being constructed on behalf of the WGTP project owner, Transurban. The contractor responsible for construction of the WGTP and generation of TBM Spoil is the CPB - John Holland Joint Venture (JV).

The TBMSC-EMP has been prepared in accordance with the requirements in Environment Protection (Management of Tunnel Boring Machine Spoil) Regulations 2020 (TBM Spoil Regulations). A summary of the TBM Spoil Regulations requirements and where they have been addressed in the TBMSC-EMP is included in Section 1.6.

1.2 Site setting and features

The MSPF is located in Maddingley, approximately 3.5 km south of the Bacchus Marsh Township in Victoria, 60 km north-west of the Melbourne CBD (Figure 1-1).
The MSPF is located south of Kerrs Road and east of Gullines Road and is approximately 70 hectares in size. The MSPF is bounded by Kerrs Road to the north and Parwan Creek to the south. The western portion of the MSPF extends approximately 500 m to the west of Gullines Road.

The MSPF site boundary is shown in Figure 1-2.
The proposed MSPF is located within the existing EPA-licenced MBC Landfill (EPA licence NO. 45288). MBC has made an application to EPA to excise a portion of land from the adjacent MBC Landfill to enable the MSPF to be developed and operated.

In brief, the MSPF when constructed will comprise areas for receiving and classifying TBM Spoil for either placement in a Containment Cell or disposal offsite to a licenced landfill. The main MSPF infrastructure elements includes: Holding Bays; Drying Bays; Contingency Drying Bays; a Construction Materials Stockpiling Area; Leachate Sedimentation Pond; and a Containment Cell. More detailed information on the layout and operations of the MSPF is presented in Section 4.
1.3 Planning scheme amendment

The majority of the MSPF is zoned as Special Use Zone Schedule 1 under the Moorabool Planning Scheme. The provisions of Special Use Zone Schedule 1 cover the regulation of mining operations, land management practices, mining rehabilitation and control of development. A small portion of the south-western portion of the MSPF is zoned Farming Zone.

The Moorabool Planning Scheme identifies the Maddingley Waste and Resource Recovery Hub (including the coal mine, landfill, and associated activities) as an existing strategically important land use, which it seeks to protect.

In addition to the approval being sought from EPA, MBC has also requested that a planning scheme amendment be undertaken by the Minister for Planning to facilitate the MSPF development. It is noted that the purpose of the TBMSC-EMP is not to address the planning scheme amendment application – as this is addressed under a separate cover).

1.4 Objectives of the TBM Spoil Regulations

The main objectives of the TBM Spoil Regulations are to provide a mechanism for management and disposal of TBM Spoil and to make a consequential amendment to the Environment Protection (Scheduled Premises) Regulation 2017.

It is also stated in the TBM Spoil Regulations that:

- Sections 19A and 20(1) of the Environment Protection Act 1970 (in relation to Works Approvals) do not apply to the occupier of scheduled premises in respect of the receipt, storage, treatment, reprocessing, containment, handling, or discharge or deposit of TBM Spoil onto land, if an EMP is provided and approved by the Authority (i.e. EPA).

- Section 27A(2) of the Environment Protection Act 1970 (in relation to offences for depositing waste) does not apply, if a permit is held for the deposition of TBM Spoil at a premise which has an EMP approved by the Authority.

To comply with the TBM Spoil Regulations the TBMSC-EMP must include an assessment the risk of adverse impacts from the receipt, storage, treatment, reprocessing, containment, handling, or discharge or deposit onto the premises of the TBM Spoil. Management arrangements and operating conditions are required to be designed to minimise the risk of adverse impacts.

1.5 Purpose and objective of the TBMSC-EMP

The purpose of this TBMSC-EMP is to address Regulation 6 of the EPA requirements, as provided in the TBM Spoil Regulations.

The objective of this TBMSC-EMP is to provide a framework to manage any potential risk of harm to human health (including project workers) and the environment and impacts from the construction, operation and closure phases of the MSPF project.

The TBMSC-EMP falls under MBC’s Environmental Management System (EMS) for site activities.
1.6 Scope of the TBMSC-EMP

The scope of the TBMSC-EMP is defined in the TBM Spoil Regulations, and in particular, the requirements specified in the TBM Spoil Regulations checklist. The checklist and relevant Sections where these requirements have been addressed in the TBMSC-EMP are summarised in Table 1-1.

<table>
<thead>
<tr>
<th>EPA Regulation 6 (2) - S.R. No. 62/2020</th>
<th>TBMSC-EMP Section</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) a description and map of the location of the premises at which tunnel boring machine spoil is to be received</td>
<td>Section 1 and 1.2, Section 4, Figure 1-1, Figure 1-2</td>
<td>Yes</td>
</tr>
<tr>
<td>(b) a plan of the premises identifying the location of the processing area for the purposes of receipt, consolidation and dewatering of the tunnel boring machine spoil and the location of the containment system</td>
<td>Section 1 and 4, Figure 1-2</td>
<td>Yes</td>
</tr>
<tr>
<td>(c) a description of the physical characteristics of the premises and elements or segments of the environment adjacent to the premises</td>
<td>Section 2</td>
<td>yes</td>
</tr>
<tr>
<td>(d) the existing and proposed uses of the premises and elements or segments of the environment adjacent to the premises</td>
<td>Section 2.3 and 2.4</td>
<td>yes</td>
</tr>
<tr>
<td>(e) a description of the activities to be undertaken at the premises</td>
<td>Section 4</td>
<td>yes</td>
</tr>
<tr>
<td>(f) a description of the tunnel boring machine spoil to be received at the site</td>
<td>Sections 3.1, 3.1.2, 3.1.3, 3.2, 3.3 and 3.4</td>
<td>yes</td>
</tr>
<tr>
<td>(g) the specifications for containment of tunnel boring machine spoil at the premises</td>
<td>Section 3.3</td>
<td></td>
</tr>
<tr>
<td>(h) the methodology for determining if tunnel boring machine spoil meets the specifications for containment of tunnel boring machine spoil</td>
<td>Section 3.4</td>
<td>Yes</td>
</tr>
<tr>
<td>(i) an assessment of the risk of adverse impacts from the receipt, storage, treatment, reprocessing, containment, handling or discharge or deposit onto the premises of tunnel boring machine spoil (&quot;the Activities&quot;) on any beneficial uses of the environment</td>
<td>Section 5</td>
<td>Yes</td>
</tr>
<tr>
<td>(j) management arrangements and operating conditions designed to minimise the risk of adverse impacts from the Activities on any beneficial uses of the environment</td>
<td>Section 6</td>
<td>yes</td>
</tr>
<tr>
<td>(k) detailed designs and technical specifications of the processing area for the purposes of regulation 5(b) and the containment system at the premises, including features intended to minimise the risk of adverse impacts from the Activities on any beneficial uses of the environment</td>
<td>Section 4, Appendix D and E</td>
<td>yes</td>
</tr>
<tr>
<td>(l) a construction quality assurance plan for the containment system at the premises</td>
<td>Section 6.6</td>
<td>yes</td>
</tr>
<tr>
<td>(m) requirements for leachate sampling and analysis</td>
<td>Section 7.1</td>
<td>yes</td>
</tr>
</tbody>
</table>
1.7 Legislative framework

Development of this TBMSC-EMP is primarily guided by the TBM Spoil Regulations. Where appropriate and consistent with the intent of the TBM Spoil Regulations reference is made to the following additional relevant legislation, policy, and guidelines:

- Catchment and Land Protection Act 1994
- Environment Protection Act 1970
- Environment Protection Act 2017
- Planning and Environment Act 1987
- National Environment Management (Assessment of Site Contamination) Measure 1999 (amended 2013) (NEPM)
- Heads of Environmental Protection Authorities (January 2020) PFAS National Environmental Management Plan, Version 2.0 (PFAS NEMP)
- State Environment Protection Policy (Air Quality Management), 21 December 2001 (SEPP [AQM])
- State Environment Protection Policy (Ambient Air Quality), 10 February 1999
- State Environment Protection Policy (Control of noise from commerce, industry and trade) No. N-1, 31 October 2011
• **EPA Environment Protection (Residential Noise) Regulations 2018**
• **EPA Scheduled Premises Regulations – Environment Protection (Scheduled Premises) Regulations 2017**
• **Environment Protection (Industrial Waste Resource) Regulations 2009**
• **EPA (July 2009) Publication IWRG655.1 Acid Sulfate Soil and Rock (IWRG655)**
• **EPA (June 2009) Publication IWRG701 Sampling and Analysis of Waters, Wastewaters, Soils and Wastes (IWRG701)**
• **EPA (28 October 2011) Publication 1411: Noise from Industry in regional Victoria (EPA Publication 1411)**
• **EPA (6 February 1996) Publication 480: Environmental guidelines for major construction-sites**
• **EPA (October 2019) Publication 1669.3 Interim Position Statement of PFAS**
• **EPA (3 May 2018) Contaminated Soil Management and Reuse on Major Infrastructure Projects**

### 1.8 Supporting technical study documents

The development of this TBMSC-EMP has been informed by the specialist supporting studies, summarised in **Table 1-2**.

<table>
<thead>
<tr>
<th>Technical Area</th>
<th>Document title (Document Reference)</th>
<th>Author company</th>
<th>Appended?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>Human Health and Environmental Risk Assessment: Re-Use of Spoil with PFAS at MBC (HHERA) (MBC/19.MBCR001 Revision F)</td>
<td>EnRiskS</td>
<td>Appendix A</td>
</tr>
<tr>
<td></td>
<td>PFAS Leachate Estimates and Assessment of Risk to Groundwater (640.12131-L01-R05)</td>
<td>SLR</td>
<td>Appendix G</td>
</tr>
<tr>
<td>Groundwater, Surface Water and Sediment</td>
<td>PFAS Baseline Assessment (Surface Water, Groundwater and Sediment) (640.12121-R05-v3.0)</td>
<td>SLR</td>
<td>-</td>
</tr>
<tr>
<td>Geotechnical and permeability investigation</td>
<td>Undisturbed Permeability Tests from the Storage Bays Imported PFAS from WGTP (1012657.000.L4)</td>
<td>Chadwick Geotechnics</td>
<td>Appendix B</td>
</tr>
<tr>
<td></td>
<td>Undisturbed and Disturbed Permeability Tests from the Storage Bays and Soil Containment Cell Imported PFAS from WGTP (1012657.000.L5)</td>
<td>Chadwick Geotechnics</td>
<td>Appendix B</td>
</tr>
<tr>
<td></td>
<td>Geotechnical Review of Westgate Tunnel Spoil Handling Facility at Maddingley Coal Site (19136175-005-L-Rev0)</td>
<td>Golder</td>
<td>Appendix C</td>
</tr>
<tr>
<td>Air quality</td>
<td>Air quality impact assessment (640.12131-R01-v6.0)</td>
<td>SLR</td>
<td>-</td>
</tr>
<tr>
<td>Technical Area</td>
<td>Document title (Document Reference)</td>
<td>Author company</td>
<td>Appendix?</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise impact assessment &amp; management (640.12131-R02-v5.0)</td>
<td>SLR</td>
<td>-</td>
</tr>
<tr>
<td>Traffic</td>
<td>Traffic Impact Assessment (G27822R-01iG)</td>
<td>Traffic Group</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Revised Concept Design (191042_026_L_Rev0)</td>
<td>Mackenzie Environmental</td>
<td>Appendix D</td>
</tr>
</tbody>
</table>

**Construction and Audit Staging Documents:**
- WGTSPF construction staging concept_V3
- Proposed Scope of Design Assessment and Construction Audit (191042_025_L_Rev2)

**Containment Cell Documents:**
- 191042_002_R_Rev3_Containment Cell Design Report
- 191042_001_R_Rev4_Containment Cell Technical Specification
- 191042 - 100 Maddingley Spoil Processing Facility Containment Cell Rev E

**Containment Cell Cap Documents:**
- 191042_011_R_Rev1_Containment Cell Cap Design Report
- 191042_010_R_Rev1_Containment Cell Cap Technical Specification

**Leachate Sedimentation Pond Documents:**
- 191042_008_R_Rev3_Leachate Sedimentation Pond Design Report
- 191042_007_R_Rev3_Leachate Sedimentation Pond Technical Specification
- 191042 - 200 Maddingley Spoil Processing Facility Leachate Sedimentation Pond Rev D

**Holding and Drying Bays Documents:**
- 191042_005_R_Rev4_Holding and Drying Bays Design Report
- 191042_004_R_Rev6_Holding and Drying Bays Technical Specification

**Contingency Drying Bays Documents:**
- 191042 - 500 Maddingley Spoil Processing Facility Contingency Drying Bays Rev B
2 Environmental Setting

2.1 Site ownership

The majority of the MSPF is owned by MBC. The portion of the MSPF west of Gullines Road is owned by JBD Industrial Park Pty Ltd.

2.2 Historical site use

Vines (2009) reports from the mid to late 1940s, at a time of fuel shortages in Victoria, several companies commenced open cut mining operations in the Bacchus Marsh area south of the Werribee River, south and east of the VR Railway, where the overburden is free of basalt.

The Maddingley Open Cut Number Two mine (located within the current MBC Landfill) was commenced in March 1948. The operating company was Maddingley Brown Coal Pty Ltd, largely (or totally) owned by Australian Paper Manufacturers Limited. Uncrushed coal was delivered from the mines to the Maddingley Mine rail siding. By 1950, the mine had reached an output of over 4,000 tonnes per week, mainly supplying coal by rail direct to the APM mill in Fairfield, Melbourne.

Figure 2-1 shows the Star No. 1 (circa 1950) and Lucifer open cuts in the northern part of the current MBC Landfill, and the Maddingley No. 2 open cut in the centre of the current MBC Landfill. Parwan Creek ran through the MSPF. The Star No 1 and Lucifer open cuts were subsequently filled with overburden from Maddingley No. 2.

![Image of map showing locations of open cut mines in 1950](image-url)

**Figure 2-1** Locations of open cut mines in 1950 (extracted from Vines (2009) Dwg 8.4/1)
Two other former open cut mines; Boxlea adjacent to the north east corner of the current MBC Landfill; and the Star Open Cut No.2 south of the current MBC Landfill, are both now water filled.

Nolan (2019) states “The Star Dam, also known as the No 2 (Colliery Dam) was an open cut coal mine that was filled with water in the late 1950s following a fire.” The source for this statement is not reported. Vines (2009) notes the last reported output from the Star Open Cut No.2 was in 1978. URS (2014) infers the base of the pit would be similar to the Maddingley No.2, i.e. at elevation of approximately 55 mAHD.

The Maddingley No. 2 open cut extent expanded to the east (Parwan Creek was relocated), south to Parwan Creek and to the north east.

Coal extraction is currently occurring in the north central part of the MBC Landfill.

2.3 Existing site use

The northern and western part of the proposed MSPF is currently used by MBC for soil product blending as part of its recycling activities. This material will be removed by MBC as part of the development of the MSPF. The eastern and western parts of the proposed MSPF are currently used for cropping. The central-southern portion is an undeveloped grassed and treed paddock.

The proposed MSPF has four groundwater monitoring wells within its boundary, three in the Fyansford Formation and one in the Lower Werribee Formation. The monitoring wells and current site condition are shown on Figure 2-2.
2.4 Proposed future use

The following provides a summary of the proposed future land use:

- The MSPF will receive TBM Spoil from the WGTP for processing and either on-site containment within a Containment Cell, or disposal to an off-site licensed landfill/facility.

- TBM Spoil Drying Bays to the west of Gullines Road are to be located on land currently used for cropping. (see Figure 2-2). This land will be returned to agricultural use at the conclusion of the Project (subject to assessment of its suitability for this land use and regulatory approval).

- TBM Spoil Holding Bays and drying bays to the east of Gullines Road are to be located on land currently used for cropping in the south and waste recovery work in the north (See Figure 2-2). This land will be returned to its current uses at the conclusion of the project, subject to an assessment of suitability for the proposed use and regulatory approval.

- The WGTP will produce approximately 1.2 million BCM of TBM Spoil, originating from Zone 302 of the WGTP (i.e. the tunnel section). The total potential capacity of the Containment Cell is [TOTAL CAPACITY] of TBM Spoil (which allows for bulking). An additional 700,000 tonnes of non-TBM Spoil from other zones of exception at the WGTP may be brought to the MSPF if it is deemed acceptable from both a contamination perspective (refer to Section 3 for detail on acceptance criteria) and is suitable for use as structural fill in the Containment Cell or for reclamation works. It should be noted that the MSPF may not receive the total amount of spoil generated from the tunnelling operations.

- The TBM Spoil will be placed in the Containment Cell in a fashion that utilises the geotechnical characteristics of the TBM Spoil in an appropriate manner. Where practicable, the gravel and cobble material will be placed on the steeper sections of the existing gully slopes and outward facing edges of the newly formed face of the filled area. This placement will provide a landform that, while steeper than the existing gully, will be stable during construction and in the long term. Where practicable, the clays and soils will be placed and compacted into the core of the constructed landform.

- In the future following capping and rehabilitation, it is proposed that the Containment Cell land area will be used for waste hub activities (organics, construction, and demolition waste processing), potentially a solar farm or agricultural activities. This is subject to assessment of the suitability of the land for these uses and regulatory approval. It is to be noted that the immediately abutting acreage to the west and south of the gully land is currently already used by the Calleja Group for agricultural purposes.

Details of the proposed operations are further detailed in Section 4.

2.4.1 Surrounding land uses

The land uses surrounding the MSPF are indicated below:

- Landfill to east and north east owned and operated by MBC or related entities.

- Farming to west, south west, and south across Parwan Creek (much of the land to the west is owned by MBC related entities).

- Rural residential properties directly to the north.

- Residential properties in the southern part of Bacchus Marsh (north west of the rural residential area).
2.5 Potential sensitive receptors

2.5.1 Sensitive human receptors

Sensitive off-site human receptors include occupants of houses, caretakers’ cottages, hospitals, hotels, and residences (as defined in EPA Publication 1411, Schedule C of the SEPP (AQM) and 5(f) of the TBM Spoil Regulations). A total of 30 nearby rural residences and the Bacchus Marsh Grammar School have been identified as sensitive receptors (as listed in Table 2-1).

Table 2-1 Nearest sensitive receptors

<table>
<thead>
<tr>
<th>ID</th>
<th>Address</th>
<th>UTM co-ordinates (Zone 55: mE, mS)</th>
<th>Approximate distance from dwelling to nearest site border (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-01</td>
<td>Cummings Road, Parwan 3340</td>
<td>274789, 5822858</td>
<td>1285</td>
</tr>
<tr>
<td>R-02</td>
<td>4164 Geelong-Bacchus Marsh Road, Parwan 3340</td>
<td>275442, 5822402</td>
<td>2065</td>
</tr>
<tr>
<td>R-03</td>
<td>6 Smiths Road, Parwan 3340</td>
<td>275244, 5822337</td>
<td>1921</td>
</tr>
<tr>
<td>R-04</td>
<td>4115 Geelong-Bacchus Marsh Road, Parwan 3340</td>
<td>275126, 5821986</td>
<td>2028</td>
</tr>
<tr>
<td>R-05</td>
<td>135 Smiths Road, Parwan 3340</td>
<td>274236, 5822030</td>
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<td>R-06</td>
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<td>179 Smiths Road, Parwan 3340</td>
<td>273620, 5822078</td>
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<td>210 Smiths Road, Parwan 3340</td>
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<td>R-09</td>
<td>227 Smiths Road, Parwan 3340</td>
<td>273160, 5822160</td>
<td>1179</td>
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<td>229 Smiths Road, Parwan 3340 (Lot 1)</td>
<td>272449, 5822171</td>
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<td>R-11</td>
<td>229 Smiths Road, Parwan 3340 (Lot 2)</td>
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<td>R-12</td>
<td>Bacchus Marsh-Balliang Road, Maddingley 3340</td>
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<td>R-13</td>
<td>5 Tenth Mews, Maddingley 3340</td>
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<td>R-14</td>
<td>141 Osborne Street, Maddingley 3340</td>
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<td>R-17</td>
<td>144 South Maddingley Road, Maddingley 3340</td>
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<tr>
<td>R-21</td>
<td>51 Geelong-Bacchus Marsh Road, Maddingley 3340</td>
<td>274476, 5825156</td>
<td>1360</td>
</tr>
<tr>
<td>R-22</td>
<td>9 Vallence Road, Maddingley 3340</td>
<td>274789, 5825054</td>
<td>1486</td>
</tr>
<tr>
<td>R-23</td>
<td>137 Woolpack Road, Maddingley 3340</td>
<td>275922, 5824713</td>
<td>2316</td>
</tr>
<tr>
<td>R-24</td>
<td>90 Parwan-Exford Road, Parwan 3340</td>
<td>276844, 5823616</td>
<td>3160</td>
</tr>
<tr>
<td>R-25</td>
<td>46 Parwan-Exford Road, Parwan 3340</td>
<td>276368, 5823627</td>
<td>2684</td>
</tr>
</tbody>
</table>
These nearby sensitive human receptors are also shown on Figure 2-3.
In addition, on-site workers at MSPF during construction, operation and closure were identified as potential receptors in the HHERA (refer to Appendix A). The HHERA indicates that all personnel on-site will be covered by workplace health and safety management systems and practices (including normal hygiene practices of washing hands prior to eating, drinking, smoking or toileting). Workers will be required to change into work clothes prior to undertaking site work to ensure no material adheres to clothing that would be worn off-site. In addition, consideration will be given to the need for personal protective equipment, subject to the laboratory test results of received TBM Spoil.

The HHERA also considered the risk posed by Per- and poly-fluoroalkyl substances (PFAS) to humans in the following exposure scenarios to Parwan Creek water downstream of the MSPF:

- human consumption of cattle accessing and drinking water from Parwan Creek.
- human consumption of fish species in Parwan Creek.
- public could come into incidental direct contact with Parwan Creek water.

The HHERA concluded that these exposure pathways are very unlikely to be complete or relevant.

In summary, the proposed design for the MSPF described in Section 4 and management and control measures indicated in Section 5 are considered appropriate to mitigate potential risks.

### 2.6 Sensitive ecological receptors

As indicated in the HHERA (Appendix A), there are no on-site terrestrial or aquatic ecological receptors present at the MSPF. There are no natural water bodies with aquatic ecosystems that require protection. In addition, no terrestrial flora or fauna that require protection were identified. Further, it is not expected that new fauna would visit the MSPF during the proposed activities.

Potential off-site ecological receptors are located in the ephemeral Parwan Creek, immediately downstream of the MSPF, which include aquatic and riparian plants and invertebrates (aquatic insects, crustaceans and macro-invertebrates). The proposed design for the MSPF indicated in Section 4 and management and control measures indicated in Section 5 are considered appropriate to mitigate potential risks.

Following completion of activities, the MSPF site will be rehabilitated. This will involve removal of the infrastructure and any impacted soil and replacement with previously stockpiled sub-soil and topsoil, and placement of a cap over the Containment Cell and the planting of grasses. These procedures will prevent direct exposure to terrestrial vertebrates and invertebrates that may occupy the MSPF site. Any flora with shallow root systems will not come into direct contact with the contained TBM Spoil and the geotextile separation layer will prevent exposure to soil dwelling invertebrates. Additional discussion of closure strategies is included in Section 4.10 and Section 8.

### 2.7 Segment and elements of the environment

Section 4 of the Environment Protection Act 1970 defines “Segment” as any portion or portions of the environment expressed in terms of volume, space area, quantity, quality, or time or any combination thereof. In addition, an “element” means any of the principal constituent parts of the environment.

For the purposes of the project, the segment of the environment is defined as the boundary of the MSPF and sensitive human receptors that could potentially be impacted by MSPF activities (as shown in Figure 2-3).
The elements of the environment considered relevant to beneficial uses and receptors that could be impacted by the project are:

- Waters (groundwater, leachate and surface water).
- Land (soil).
- Atmosphere (air quality).
- Noise.

Issues relating to flora and fauna, weeds, pests and pathogens, traffic, aboriginal and historical heritage, social environment, visual, public safety and visual impacts, have been addressed in the Environmental Management Plan prepared to support a Moorabool Planning Scheme amendment application currently under consideration by Minister for Planning. These will not be considered in the TBMSC-EMP.

2.8  Meteorology

EPA operates an ambient air quality monitoring station (AAQMS) in Melton, located approximately 14 km east of the MSPF. In addition to air quality parameters, the AAQMS also monitors temperature (°C), wind speed (m/s) and wind direction (°), discussed further below. Given the proximity and lack of significant terrain features between Melton and the MSPF, it is likely that weather at the Melton would be similar to that experienced at the MSPF.

2.8.1  Temperature

Temperature statistics for Melton AAQMS between 2014 and 2018 are summarised in Figure 2-4. Mean maximum temperatures range from 18.4°C in winter to 42.0°C in summer, while mean minimum temperatures range from 0.2°C in winter to 10.5°C in summer. Longer periods of higher temperatures can dry out soil resulting in both higher background dust and on-site dust emissions.
2.8.2 Wind

Annual and seasonal wind roses for Melton AAQMS for the years 2014 to 2018 are presented in Figure 2-5. The wind roses show that overall, winds from the north-western quadrant are predominant, with very few winds from the east. Winter sees this pattern strengthen, with a higher proportion of winds from the north-western quadrant. Spring and autumn winds are similar to the overall distribution, while summer sees more winds from the southern quadrant.
Figure 2-5 Annual and seasonal wind roses – Melton AAQMS (2014 – 2018)
2.8.3 Rainfall

Rainfall at the site is considered relative to measuring conducted at Melbourne Airport, approximately 35 km east of the MSPF. Rainfall statistics for Melbourne Airport for the years 2014 to 2018 are summarised in Figure 2-6. In summary, the mean annual rainfall is 499 mm. The average monthly rainfall is relatively high in late spring and early summer with the highest average monthly rainfall of 81 mm/month in December and an average of 11.2 rain days recorded in this month. The lowest average of 18.4 mm/month, and 5.8 days of rain occurs in February. The highest monthly rainfall recorded over the time period examined was 124.4 mm recorded in December 2017. The maximum daily rainfall of 62.8 mm was recorded on 30 December 2016.

![Figure 2-6 Long term monthly rainfall data for Melbourne airport](image)

2.8.4 Humidity

Humidity statistics (9 am and 3 pm monthly averages) for Melbourne Airport (2014 – 2018) are summarised in Figure 2-7. In summary, morning humidity levels range from an average of around 80 % in winter to around 55 % in summer. Afternoon humidity levels are lower, at around 65 % in winter dropping to around 40 % in summer.
2.9 Geology

The regional geological setting is shown in Figure 2-8 and summarised in Table 2-2. The MBC Landfill is constructed in the void created by a currently operational coal mine. The mine and landfill are below the regional water table which is within the Fyansford Formation Aquifer. The base of the landfill is close to the base of the Maddingley Coal Seam. The MSPF is located upslope from the MBC Landfill.
The Fyansford Formation outcrops over undisturbed areas of the MSPF and comprises a highly variable sedimentary unit of laterally discontinuous gravels, silts, sands, and clays which are commonly calcareous. The Werribee Formation consists of non-marine silty sands, sands, and sandy clays with minor gravels. Deposited in terrestrial estuarine, fluvial and some paludal environments. The Maddingley Coal Seam is the uppermost member of the Werribee Formation. The Werribee Formation unit is thought to extend up to 200 m below the MSPF.

### Table 2-2  Description of the geological units

<table>
<thead>
<tr>
<th>Geological units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvial Deposits (Quaternary)</td>
<td>Low level river terraces associated with the present-day Werribee River, Lederberg River and Parwan Creek and also high-level terraces 10 m to 40 m above current drainage. Comprise dark red brown to yellow-brown clay, silt, sand, and gravel. Up to 8.0 m thick.</td>
</tr>
<tr>
<td>Newer Volcanic Basalt (Quaternary)</td>
<td>Olivine basalt, dark to light grey, coarsely vesicular and interbedded with minor silty sands and baked soils outcrop west of the MSPF, and in the walls of the Parwan Creek valley. The thickness of the Newer Volcanics beneath the southern part of the MSPF is not known. The geological map and bore log from Parwan 57 (north west corner of MSPF) and at the leachate ponds (BH19, BH28) suggest Newer Volcanics is absent in the northern half of the MSPF.</td>
</tr>
<tr>
<td>Fyansford Formation (Tertiary)</td>
<td>Predominantly brown-orange, brown to grey marine silt, sand, and clay. May interfinger with the Maddingley Coal Seam / Upper Werribee Formation. Nolan (2019) reports drilling in the vicinity of the leachate ponds (adjacent the MSPF) indicates the Fyansford Formation is mainly clay and silty clay with infrequent clayey sand lenses up to 1.5 m thick. This formation is approximately 40 m thick beneath the MSPF.</td>
</tr>
<tr>
<td>Maddingley Coal Seam (Tertiary)</td>
<td>Predominantly dark brown lignite, with abundant plant remains, and may be locally pyritic and clayey, with minor gravel and sand interbeds. This unit is approximately 60 m thick beneath the MSPF.</td>
</tr>
<tr>
<td>Lower Werribee Formation (Tertiary)</td>
<td>Near the MSPF, predominantly silty and clayey quartz sand, and sandy gravel, clay, and silty sand, fine to medium grained sand and minor sandy gravel. Overall, fine grained with layers of coarser sand and sandy gravel less than 2.0 m thick. An extensive unit, the base has not been intercepted at the MSPF.</td>
</tr>
</tbody>
</table>

### 2.10 Hydrogeology

The Fyansford Formation Aquifer is an unconfined water table aquifer and could receive recharge from rainfall in wet years. Nolan (2019) suggests a hydraulic conductivity of up to 0.009 m/day. URS (2014) reports a wide range of estimates of hydraulic conductivity for the Fyansford Formation Aquifer from 0.001 m/day to 1.0 m/day.

The groundwater elevation and inferred groundwater flow direction in the Fyansford Formation Aquifer are shown in Figure 2-9. Water table elevation is 104.6 mAHĐ on the western boundary of the MSPF and 102.8 mAHĐ east of the south leachate storage pond, indicating the overall groundwater flow direction is towards the east.
Figure 2-9 Groundwater flow direction in the Fyansford Formation

The Lower Werribee Formation aquifer is a confined to semi-confined aquifer which occurs 100 m beneath the MSPF and potentially extends to more than 200 m below the MSPF. The Lower Werribee Formation Aquifer is separated from the Fyansford Formation Aquifer by the confining layer of the 60 m thick Maddingley Coal Seam.

The groundwater potentiometric level and inferred groundwater flow direction in the Lower Werribee Formation Aquifer are shown in Figure 2-10. This suggests overall groundwater flow direction beneath the site is toward the east, into the area where there is extraction of groundwater from the Lower Werribee Formation Aquifer at the mine and the MBC Landfill.
Pumping of groundwater from bores and sumps in the floor of the coal mine has resulted in dewatering of the Fyansford Formation Aquifer to some extent and the Lower Werribee Formation Aquifer is depressurised adjacent to the coal mine and MBC Landfill. This has accentuated the inward flow of groundwater to the mine. In future, when the mine and MBC Landfill are closed and pumping of groundwater ceases, there will be some recovery (rise) of these water levels. The recovery of the water table in the Fyansford Formation Aquifer would be appreciable although, based on first principles of groundwater hydraulics in unconfined aquifers, this recovery is expected to be not much above the 105 mAHDel 8. As the Lower Werribee Formation Aquifer is confined by 60 m of the MBC Landfill and effectively hydraulically disconnected from the Fyansford Formation Aquifer, any recovery in pressure level in the Lower Werribee Formation Aquifer would not affect the water table level appreciably in the Fyansford Formation Aquifer at the MSPF.

### 2.11 Topography and drainage

The northern half of the MSPF east of Gullines Road is relatively flat with a gentle slope from west to east, from approximately 148 mAHDel 8 to 142 mAHDel 8. The western side of the southern part of the MSPF is a similar elevation, also sloping to the east. The land in the south east part of the MSPF has been eroded, and the south eastern edge of the MSPF is approximately 110 mAHDel 8. To the south and south east of the Containment Cell the land surface slopes toward Parwan Creek.
Parwan Creek, south of the MSPF, flows north east and then north along the eastern side of the MBC Landfill and open cut mine. Parwan Creek is a tributary of the Werribee River, discharging to the river approximately 4.0 km north east of the MSPF. The bed elevation of Parwan Creek south and south east of the MSPF is approximately 105 mAHD to 100 mAHD.

2.11.1 Surface water drainage

Surface water runoff would be from west to east, and in the southern part of the MSPF toward an unnamed drainage line located in the incised area. This catchment area drains towards the south western corner of the former coal mine.

2.11.2 MSPF stormwater drainage

The MSPF stormwater drainage system is designed to prevent runoff to Parwan Creek and retain all flows on-site. All runoff from the proposed MSPF flows in an easterly direction towards the MBC Landfill site where it is conveyed to a number of water storages and contained within the MBC Landfill, as shown in Figure 2-11 and Figure 2-12.

Stormwater runoff from the north-western portion of the MSPF drains in the general direction of the pit (as shown on Figure 2-13) and is collected by a drain and diverted to Dam D2 located west of the Stage 1 MBC Landfill. This dam also receives pumped groundwater from GWR3. Water is pumped from D2 to the Fire Service Dam D5. This water storage is used for dust suppression activities. Dam D2 in the base of the former mine can be used as a contingency storage for any excess stormwater runoff from the catchments between TBM Spoil handling facilities in the MSPF.

MBC transfers water between water storages as required and to the Irrigation Dam when all water storages are approaching being full.
Figure 2-11  Surface water infrastructure
Figure 2-12   Existing surface water management system
2.12 Background air quality

An air quality assessment was conducted to establish background air quality conditions at the MSPF (SLR, 2020). EPA conducts long term ambient air quality monitoring at AAQMS to meet its obligations under the Ambient Air NEPM. The results are compared with SEPP (AAQ) Environmental Quality Objectives (Table 2-3).

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>24-hour averaging period</th>
<th>Annual averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$</td>
<td>25 μg/cubic metres</td>
<td>8 μg/cubic metres</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>50 μg/cubic metres</td>
<td>20 μg/cubic metres</td>
</tr>
</tbody>
</table>

In general, air quality at all of AAQMS has been in the ‘good’ to ‘very good’ air quality categories at least 75 % of the time, meaning air quality in Victoria is typically good (EPA, 2018).
Air quality in rural areas is generally less impacted by anthropogenic sources such as traffic emissions and industrial emissions, however it may be impacted on occasion by bushfires and prescribed planned fuel reduction burns that have the potential to result in elevated concentrations of PM$_{2.5}$, while windblown dust may lead to elevated PM$_{10}$ concentrations. Domestic wood burning heaters are commonly used all over Victoria and are another source of PM$_{2.5}$.

The relatively low population density and light industry in the surrounding area suggests the MSPF air quality would not be significantly impacted by vehicular traffic emissions, domestic wood burning emissions or industrial emissions.

Due to the limited nearby ambient air quality monitoring data with which to describe the MBC Landfill, data from EPA’s Footscray AAQMS and Alphington AAQMS, approximately 40 km and 55 km east of the MBC Landfill, located in urban residential environments, are presented here to characterise the potential PM$_{10}$ and PM$_{2.5}$ concentrations that, conservatively, may be experienced at the MSPF.

An overview of the Footscray and Alphington AAQMS is provided in Table 2-4, which also indicates the AAQMS datasets that have been used to conservatively represent the MBC Landfill background air quality, in consultation with EPA$^{1,2}$.

<table>
<thead>
<tr>
<th>EPA AAQMS</th>
<th>Description</th>
<th>Location Relative to MBC Landfill</th>
<th>Key Relevant Pollutants Monitored</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphington</td>
<td>Performance monitoring station classified as “residential/light industrial”</td>
<td>55 km east</td>
<td>PM$_{10}$</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PM$_{2.5}$</td>
<td>The PM$<em>{2.5}$ results for Alphington show that there were several instances when the 24-hour average exceeded the SEPP(AAQ) EQO. Annual average PM$</em>{2.5}$ concentrations demonstrate three non-compliances with the SEPP(AAQ) EQO for 2014 to 2018.</td>
</tr>
<tr>
<td>Footscray</td>
<td>Performance monitoring station classified as “industrial/residential”</td>
<td>42 km east-southeast</td>
<td>PM$_{10}$</td>
<td>The PM$<em>{10}$ results for Footscray show that there were several instances when the 24-hour average exceeded the SEPP(AAQ) EQO. EPA attribute the February 2014 results to bushfires that occurred in many parts of Victoria. Annual average PM$</em>{10}$ concentrations demonstrate compliance with the SEPP(AAQ) EQO for 2014 to 2018.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PM$_{2.5}$</td>
<td>The PM$<em>{2.5}$ results for Footscray show that there were several instances when the 24-hour average exceeded the SEPP(AAQ) EQO. Annual average PM$</em>{2.5}$ concentrations demonstrate compliance with the SEPP(AAQ) EQO for 2014 to 2018.</td>
</tr>
</tbody>
</table>

$^{1}$ Q. Cooke, Team Leader – Approvals, Development Assessments (personal communication, 4 September 2019)

$^{2}$ J. Choi, Specialist Applied Scientist - Air & Odour (personal communication, 1 October 2019)
2.13 Background noise

Baseline noise monitoring (unattended monitoring) was conducted to establish existing background noise levels at a representative noise-sensitive receptor (SLR, 2019) to characterise the noise environment in the vicinity of the MSPF. The monitoring locations are shown in Figure 2-14 and results are presented in Table 2-5.

The monitoring locations were selected such that they were representative of the background noise experienced by the group of residents in the immediate vicinity. A selection of monitoring positions was ultimately decided in the field, considering all relevant circumstances, including permission from the resident and availability of a secure location for the noise loggers.

![Figure 2-14 Noise monitoring locations](image-url)
Table 2-5 Summary of measured background noise levels

<table>
<thead>
<tr>
<th>Monitoring location</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Period</th>
<th>Long-term, 60-minute measured background noise levels (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>106 S Maddingley Road, Parwan (M01)</td>
<td>37°43'14&quot; S</td>
<td>144°26'5&quot; E</td>
<td>Daytime</td>
<td>38 dBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evening</td>
<td>33 dBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Night</td>
<td>30 dBA</td>
</tr>
<tr>
<td>163 Smiths Road, Maddingley (M02)</td>
<td>37°41'45&quot; S</td>
<td>144°25'42&quot; E</td>
<td>Daytime</td>
<td>38 dBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evening</td>
<td>35 dBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Night</td>
<td>29 dBA</td>
</tr>
<tr>
<td>37 Rowsley Station Road West (M03)</td>
<td>37°42'33&quot; S</td>
<td>144°23'59&quot; E</td>
<td>Daytime</td>
<td>40 dBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evening</td>
<td>37 dBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Night</td>
<td>33 dBA</td>
</tr>
</tbody>
</table>

Operator-attended noise measurements were also undertaken in order to qualify the results obtained with the unattended noise loggers and to identify the likely sources of noise emission in the area. During the attended noise measurements, observations were made as to the acoustically significant ambient noise sources, which are detailed in Table 2-6.

Modelling was used to provide an indication of potential noise impacts on receptors from the proposed activities. The assessment indicates that noise from the MSPF will comply with the EPA Publication 1411 criteria.

Table 2-6 Summary of operator attended measurements

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>LAeq</th>
<th>LA1</th>
<th>LA10</th>
<th>LA90</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/12/2019 12:45 pm</td>
<td>53.5</td>
<td>53.7</td>
<td>49.2</td>
<td>39.8</td>
<td>Monitoring location: end of driveway on East Maddingly Road. Dominant traffic noise: distant environmental noise and wind. Bird noise intermittent constant Gentle to moderate* wind at the monitoring location.</td>
</tr>
<tr>
<td>13/12/2019 1:30 pm</td>
<td>48.3</td>
<td>56.7</td>
<td>50.6</td>
<td>38.2</td>
<td>Monitoring location: end of driveway on Smiths Road. Dominant traffic noise from dogs in adjacent property and wind. Gentle to moderate* wind at the monitoring location.</td>
</tr>
</tbody>
</table>

*As defined by the Beaufort Wind Scale
2.14 Soil geotechnical investigations

Geotechnical and permeability investigations were undertaken by Chadwicks (included in Appendix B). The investigations included the excavation of 14 test pits in the Holding Bays and Drying Bays area and nine test pits in the vicinity of the containment cell. Representative samples of the clay from varying depths (maximum depth of 1.5 m-1.9 m) in the test pits were collected for geotechnical classification testing (Atterberg Limits, Particle size distribution and moisture content), compaction testing (maximum dry density and optimum moisture content) and cation exchange. The laboratory test results indicated that compaction of the clay to MDD at OMC resulted in permeabilities ranging from $5 \times 10^{-9}$ m/sec to $9 \times 10^{-11}$ m/sec in the storage bay area and $3 \times 10^{-9}$ m/sec to $2 \times 10^{-10}$ m/sec in the Containment Cell area. Moisture content ranged from 16.3 % to 33.7 %.

The investigations also included the drilling of five boreholes to collect undisturbed samples from the design floor level of the Holding Bay and Drying Bay areas. An undisturbed sample was obtained from the base of three boreholes (at 2.5 m, 2.5 m, and 3.5 m depth). The boreholes were advance to refusal of the augers which occurred at depths ranging from 2.25 m to 3.75 m depth. The material encountered in all boreholes comprised a 0.1 m thick topsoil layer overlying high plasticity grey-brown and brown clay with traces of sand and gravel size particles. No groundwater was encountered in any of the boreholes. The laboratory testing indicated the undisturbed clay has a permeability ranging from $3 \times 10^{-10}$ m/sec to $5 \times 10^{-11}$ m/sec.

2.15 Baseline PFAS contamination status of the MSPF

A factual baseline assessment of the PFAS condition of groundwater, surface water and sediment condition of the MSPF and the nearby surface water was completed (SLR, 2020) and the following reported:

- 19 groundwater monitoring bores across the MBC Landfill were monitored and PFAS was reported at the majority of locations. The levels were highest at BH11 in a shallow perched aquifer adjacent to the northern leachate pond.

- Surface water was sampled at three locations in on-site dams, two locations in Parwan Creek and two locations in Werribee River. PFAS was reported in every location and highest in the on-site dam D5.

- Sediment sampling of five on-site surface water bodies and two locations in Werribee River. PFAS was reported in every location. The highest levels were reported in Werribee River.

Further assessment of the baseline contamination status of the MSPF will be completed. Details of the assessment to be completed is outlined in the environmental monitoring program in Section 7.
3 Tunnel Spoil Management and Disposal

This Section presents a summary of relevant information pertaining to the nature of the spoil generated by the project including that which is TBM derived spoil and non-TBM spoil. It sets out the criteria for acceptance of TBM spoil at the MSPF containment and the methodology to be followed to ensure these criteria are properly applied both at the site and when spoil needs to be exported from the MSPF site due to its unsuitability for the Containment Cell.

This information is provided in the context of the current arrangements or agreements between MBC and the JV, in which the responsibility for obtaining or assigning waste classification for TBM Spoil taken to MSPF is the responsibility of the JV. Nevertheless, the TBMSC-EMP provides guidance for sampling, testing and classification of TBM Spoil at the MSPF by MBC which is to occur by agreement with the JV or EPA requirements, made subsequent to the first issue of this TBMSC-EMP.

Section 3.4 sets out the specification for containment of TBM Spoil at the MSPF and the methodology to determine if TBM Spoil meets the specification for containment. This includes the site-specific criteria for PFAS in TBM Spoil to be accepted into the Containment Cell.

3.1 Description of the WGTP spoil

3.1.1 Spoil origin and quantity

The spoil material that originates from the WGTP is a waste produced by the JV. Section 3 of the Agon (2020) WGTP Sampling and Analysis Quality Plan (SAQP) prepared for the JV provides details on quantities and characteristics of the prospective spoil. The spoil includes TBM-derived spoil and non-TBM spoil, namely:

- TBM Spoil is defined as originating from Zone 302 of the WGTP, being the tunnel section, which comprises some 1.2 million BCM. It is estimated that an average of 2,500 BCM of TBM Spoil per day will be transported to the MSPF (if the MSPF accepts 100 % of TBM Spoil generated and the duration of the project is 16 months).
- In addition, 700,000 tonnes of non-TBM Spoil from other zones of the WGTP (i.e. the portal area) will be brought to the MSPF if categorised as suitable from a contamination perspective and for structural fill for the Containment Cell and reclamation works.

Additional fill may be imported from the adjacent MBC landfill or other sites if it is deemed suitable from a contamination or structural perspective.

3.1.2 Components of TBM Spoil

The TBM Spoil will be a mixture of:

- Mechanically disturbed rock fragments and soil - The particle size distribution in the produced TBM Spoil will differ from that of the insitu ground and may contain a greater proportion of smaller particles by virtue of the action of the tunnel boring machines. The particle size distribution will also vary with the geology of the tunnelled ground and will variably comprise sandy silty clay, clayey silty sand, gravelly silty sand and sandy silty gravel, depending on where along the tunnel alignment it has come from.
• Groundwater that was contained in the insitu soil and rock before tunnelling. It is noted that the tunnelling process is pressurised so that minimal groundwater will enter the tunnelling face from outside the tunnelled volume.

• Water that is added by the tunnelling process.

• Polymer foaming agents added in the tunnelling process (non-PFAS).

Some of the water in the produced TBM Spoil will drain out before TBM Spoil is loaded out for transport to the MSPF. The rate at which water will drain out will vary with the physical composition of TBM Spoil, i.e. it will be faster in coarse grained spoil containing more gravel and sand and slower in spoil with a greater clay content.

3.1.3 TBM Spoil characteristics

A contamination assessment of the Spoil was completed by Golder and AJJV, which was based on multiple phases of investigations. The assessment developed a Conceptual Site Model including Domains based on the geology along the tunnel alignment. The reports reviewed indicate that investigations were undertaken in accordance with relevant guidelines and regulations including NEPM, PFAS NEMP, AS4482.1, relevant SEPP and IWRG.

The contamination assessment concluded that all domains are potentially contaminated with PFAS dissolved in groundwater, with the soil and rock in Domains 8 and 9 contaminated with adsorbed phase PFAS.

Apart from Domain 2 (where the tunnel alignment intersects the original North Yara Main Sewer), none of the Domains are potentially contaminated with other anthropogenic chemicals. Where metals concentrations exceeded the limiting criteria for IWRG621 “Fill Material” classification, it was concluded that these were due to the natural geochemistry of the soil/rock.

Potential acid sulfate soils could be intersected in a small portion of the tunnel face that intersects the Newport Formation (in Domains 7 and 8). The contamination assessment concluded that there was sufficient capacity in other soils to neutralise the acidity potential.

The Conceptual Site Model for the WGTP suggests that volatile organic compounds and hydrocarbon chemical are not present in the tunnel alignment at levels that represent contamination. As the tunnelling process aerates TBM Spoil with added water and foaming agents and raises the temperature towards 50 °C it is expected that concentrations of volatile organic compounds and hydrocarbons, if present would be greatly reduced in produced TBM Spoil.

The investigations indicate the absence of dense non-aqueous phase liquid in groundwater in the tunnel alignment.

The conclusion from the contamination assessment is that apart from TBM Spoil in Domain 2, the disposal classification is determined by the total and leachable PFAS concentrations in groundwater in the tunnel alignment. TBM Spoil classifies as “Not Potentially Contaminated – Except for PFAS”.
3.1.4 TBM Spoil foaming agent

TBM Spoil will also contain polymer foaming additives diluted in water and supplementary water (Tamsoil). The Tamsoil products are all reported to be readily biodegradable. The assessment by the JV indicated Tamsoil products could have the least impact on the environmental quality of the water phase in TBM Spoil. The Tamsoil products do not contain (in the mix of constituent polymers) surfactants listed in the Australian and New Zealand Guidelines for Fresh & Marine Water Quality – Aquatic Ecosystems (ANZG 2018). The JV is continuing to evaluate candidate foaming agents to identify others that, like the Tamsoil products, will not affect TBM Spoil’s disposal classification.

3.2 PFAS in groundwater near WGTP

The investigations to date show that PFAS is present in the groundwater on or near the alignment of the WGTP and inferred to be present in some of the TBM Spoil to be produced (Agon, 2020).

Of the approximately 104 groundwater bores identified for investigation, only three contained PFAS greater than 0.07 µg/L in groundwater. Given the nature of the tunnel boring machinery used (pressurised ground), it was concluded that there is unlikely to be any appreciable drawdown of groundwater levels or consequent inflow to the tunnel of contaminated groundwater from the vicinity of the alignment.

The assessment of risk to groundwater from TBM spoil received at MSPF found that the PFAS in spoil could be sources from contaminated groundwater in parts of the tunnel alignment but that the observed concentrations would be unlikely to generate measurable concentrations of PFAS in most spoil (SLR, 2020).

3.3 Waste soil categorisation criteria

This Section provides an overview of the regulatory framework for waste soil/spoil classification that is generally applicable in Victoria and could be applied to TBM Spoil generated by the WGTP.

3.3.1 Industrial Waste Resource Guidelines

Waste soil or spoil produced in Victoria must be classified in accordance with IWRG in order to meet EPA requirements and to assist in selecting the appropriate management option for spoil to be received at the MSPF. PFAS is not included as a chemical group in IWRG621 and therefore cannot be included in categorisation using that framework. Classification of spoil containing PFAS is discussed separately in Section 3.3.2.

The main waste soil categories under IWRG are Fill Material and Prescribed Industrial Waste (PIW), which are divided into Categories A, B and C contaminated soil, depending on their hazard level. The soil hazard categories are:

- **Fill Material** – concentrations less than the upper limits specified for ‘Fill Material’. EPA does not regulate the use of Fill Material and re-use of this soil does not require EPA approval. However, other authorities such as local councils, may have individual requirements. Use of Fill Material on any site must consider general obligations (under the Environment Protection Act 1970 or the General Environmental Duty of the new Environment Protection Act commencing 2021) to prevent adverse impacts on the environment and human health. Natural geologic materials not suspected of being impaired by a potentially contaminating activity and demonstrated to be uncontaminated, and potentially containing natural constituents exceeding the Fill Material criteria, can be deemed Fill Material without need for the sampling frequency required of PIW waste soil. IWRG state:
any elevated level of metals (such as arsenic) or other constituents can be demonstrated to be of natural origin. Where it can be demonstrated that the constituents of concern are naturally elevated, EPA does not consider these soils to be ‘contaminated’ and therefore can be classified as fill material”. Such material must also be managed in a manner to avoid adverse environment impacts at the place of use.

- **Category C** – contaminated soil with concentrations exceeding the upper limits for ‘Fill Material’ but not exceeding the upper limits for ‘Category C’ classification. This is the lower level of PIW contaminated soil classification for disposal and is accepted at several EPA licensed landfills in Victoria, subject to satisfying proper categorisation and transport requirements in accordance with IWRG:

- **Category B** – contaminated soil with concentrations exceeding the upper limits set out for ‘Category C’ but not exceeding the upper limits for ‘Category B’. This is the higher level of PIW contaminated soil classification for disposal and is accepted at only one licensed landfill and/or a limited number of treatment facilities in Victoria. Category B contaminated soil is regulated by EPA and is subject to the same categorisation, transport, and landfill acceptance requirements as Category C contaminated soil.

- **Category A** – contaminated soil with concentrations exceeding the upper limits set out for ‘Category B’. Category A contaminated soils are regulated by EPA are subject to the same categorisation and transport regulations as Category B or Category C contaminated soils, however soils with this higher level of contamination cannot be disposed of to landfill. The soils must be treated either on or off-site or stored pending availability of an appropriate treatment technology. Once treated (or partially treated) the soils may be reclassified and, if appropriate, retained on-site or disposed of to a licensed facility.

The upper limits for general contaminants in IWRG621 are listed below in **Table 3-1**.

The Agon (2020) SAQP indicates that select metals may be at concentrations that exceed the upper limit for IWRG621 Fill Material classification in some samples as a result of natural geochemistry of the soil/rock along the alignment of the WGTP. It is understood that the upper limit for some metals may differ to those shown in **Table 3-1** (please refer to the Agon (2020) SAQP for more information). On this basis, TBM Spoil with naturally elevated concentrations of select metals may not be considered “contaminated” and may classified as Fill Material (and can be reused on the MSPF, subject to PFAS meeting the required acceptance criteria).
### Table 3-1 IWRG621 waste soil classification criteria

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Fill Material upper limits</th>
<th>Category C upper limits</th>
<th>Category B upper limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TCO (mg/kg)</td>
<td>ASLP₁ (mg/L)</td>
<td>TCI (mg/kg)</td>
</tr>
<tr>
<td>Inorganic species</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>20</td>
<td>0.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Cadmium</td>
<td>3</td>
<td>0.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Chromium (VI)</td>
<td>1</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Copper</td>
<td>100</td>
<td>200</td>
<td>800</td>
</tr>
<tr>
<td>Lead</td>
<td>300</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>1</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>40</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Nickel</td>
<td>60</td>
<td>3000</td>
<td></td>
</tr>
<tr>
<td>Tin</td>
<td>50</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>Selenium</td>
<td>10</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Silver</td>
<td>10</td>
<td>180</td>
<td>40</td>
</tr>
<tr>
<td>Zinc</td>
<td>200</td>
<td>35000</td>
<td></td>
</tr>
<tr>
<td>Anions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyanide</td>
<td>50</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>Fluoride</td>
<td>450</td>
<td>150</td>
<td>600</td>
</tr>
<tr>
<td>Organic species</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenols (halogenated)</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Phenols (non-halogenated)</td>
<td>60</td>
<td>14</td>
<td>560</td>
</tr>
<tr>
<td>Monocyclic aromatic hydrocarbons</td>
<td>7</td>
<td>70</td>
<td>240</td>
</tr>
<tr>
<td>Benzene</td>
<td>1</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Polycyclic aromatic hydrocarbons</td>
<td>20</td>
<td>100</td>
<td>400</td>
</tr>
<tr>
<td>Benz(a)pyrene</td>
<td>1</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>C6-C9 petroleum hydrocarbons</td>
<td>100</td>
<td>650</td>
<td>2600</td>
</tr>
<tr>
<td>C10-C36 petroleum hydrocarbons</td>
<td>1000</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>Polychlorinated biphenyls</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorinated hydrocarbons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexachlorobutadiene</td>
<td>0.07</td>
<td>2.8</td>
<td>0.28</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>0.03</td>
<td>1.2</td>
<td>0.12</td>
</tr>
<tr>
<td>Other chlorinated hydrocarbons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pesticides</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organochlorine pesticides</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aldrin + dieldrin</td>
<td>0.03</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>DDT + DDD + DDE</td>
<td>0.03</td>
<td>1.2</td>
<td>0.12</td>
</tr>
<tr>
<td>Chlordane</td>
<td>0.1</td>
<td>4</td>
<td>0.4</td>
</tr>
<tr>
<td>Heptachlor</td>
<td>0.03</td>
<td>1.2</td>
<td>0.12</td>
</tr>
<tr>
<td>Other organochlorine pesticides</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.3.2 Criteria for PFAS in waste soil

The IWRG621 do not provide criteria for PFAS, and the following guidance has been relied upon, to inform waste management options:

- \textit{EPA (October 2019) Publication 1669.3 Interim Position Statement on PFAS (EPA Publication 1669).}
- PFAS NEMP.

EPA Publication 1669 provides interim criteria for reuse of PFAS-impacted soils on-site of less than 0.004 mg/kg for three compounds, PFOS, PFHxS and PFOA. It is understood from discussions with EPA that the guidance in EPA Publication 1669 provides criteria for unregulated use. However, it is also understood that EPA Publication 1669 does not necessarily allow for totally unrestricted off-site use as leachate criteria are not provided, and there is the general requirement to consider the risk posed by contaminants in TBM Spoil to the receiving environment.

Table 3-2 presents the waste soil classification criteria from the PFAS NEMP in addition to those from the EPA Interim Position on PFAS in Publication 1669.3. It includes a column indicating the landfill considered in the NEMP as suitable for each class of waste.

<table>
<thead>
<tr>
<th>Table 3-2 Waste soil classification criteria for PFAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit of reporting</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>EPA Publication 1669.3</td>
</tr>
<tr>
<td>PFAS NEMP</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

3.3.3 WGT Project-specific EPA Waste Classification for PFAS

EPA issued project-specific waste classifications to CPB Contractors (a member of the JV) including leachable PFAS criteria for “classification of soil as prescribed industrial waste” and “classification of soil as non-prescribed industrial waste” (Appendix H). EPA has issued three waste classification specific to the generation of spoil (not limited to TBM Spoil) for the WGTP, for management at any unlined and EPA-licenced lined landfills as opposed to containments with site-specific risk-based criteria such as at MSPF. These criteria are not intended for use in classifying TBM spoil for acceptance at the MSPF Containment Cell but can be used to inform management options for spoil that is rejected as unsuitable for acceptance at MSPF on the basis of IWRG constituents. These classifications are:
• Classification number 2019/404 for non-PIW containing leachable PFAS (0.07 µg/L PFOS+PFHxS).
• Classification number 2019/405 for Category C PIW containing leachable PFAS (0.7 µg/L PFOS+PFHxS).
• Classification number 2019/406 for Category B PIW containing leachable PFAS (7 µg/L PFOS+PFHxS).

These classifications which reflect the leachable limits proposed by the PFAS NEMP, also refer to the relevant limits for non-PFAS contaminants listed in IWRG621. These classifications make it permissible for TBM Spoil not acceptable in the MSPF Containment Cell to be taken to a suitably licenced landfill or treatment facility in the case of Category B and C waste or fill containment site (including the MSPF or MBC Landfill) where such leachable PFAS would not cause an adverse effect, consistent with the general environmental duty.

3.4 TBM Spoil containment acceptance criteria at MSPF

3.4.1 Fill Material criteria for TBM Spoil

TBM Spoil that has concentrations of compounds that meets the criteria for Fill Material classification as defined in the IWRG621 (refer to Table 3-1) and PFAS levels that are less than the limits for PFAS species nominated in EPA Publication 1669 will be classified as Fill Material and could be accepted into the containment cell (refer to Table 3-2).

The 700,000 tonnes of spoil from the portal areas (non-TBM Spoil) which is anticipated to classify as Fill Material, will be sampled at the WGTP and will only be transported to the MSPF for restoration or use as structural fill in the Containment Cell if classified as Fill Material as defined in Table 3-1 and Table 3-2.

3.4.2 EnRiskS risk-based PFAS criteria

Risk-based criteria were derived for the MSPF by the consultant Environmental Risk Sciences (EnRiskS) in the HHERA (refer to Appendix A). These criteria are the upper limits of PFAS in TBM spoil for acceptance and placement in the Containment Cell (refer to Table 3-3). These are also referred to as the MSPF spoil containment acceptance criteria. These criteria may appear high however they are based on a site-specific assessment of risk and are not generic criteria such as those for landfill disposal prosed by the PFAS NEMP which must be much more conservative.

It is noted above that, the TBM spoil is considered to be very unlikely to have PFAS concentrations approaching these criteria. This assessment has been made on the basis of the data available for PFAS concentrations in groundwater which are low within or proximal to the WGTP as no data is available from investigations of the in-situ rock in the alignment (that is available to MBC) likely to be excavated by the TBM.

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Risk-based criteria adopted as MSPF spoil containment acceptance criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFOS + PFHxS</td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td></td>
</tr>
<tr>
<td>Soil Leachability</td>
<td></td>
</tr>
<tr>
<td>PFOA</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-3 Overall risk-based criteria for soil and leachate (EnRiskS 2020)
3.4.3 Final adopted acceptance criteria

Following a review of the EnRiskS risk-based criteria, technical feedback from EPA identified that the acceptance criteria could be based on EPA Publication 631 for a containment cell with a clay liner (which applies drinking water criteria x 50). This results in the following acceptance criteria adopted for the MSPF shown in Table 3-4.

<table>
<thead>
<tr>
<th>ASLP leachable concentration</th>
<th>PFOS + PFHxS</th>
<th>PFOA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.5 µg/L</td>
<td>28 µg/L</td>
</tr>
</tbody>
</table>

The single clay liner design proposed herein is equivalent to a Landfill BPEM Type 3 specification. In the event that the containment design is upgraded to equivalent to a Landfill BPEM Type 2 liner and cap specification, and applying the same principle as set out in EPA Publication 631, then the acceptance criteria could logically increase, subject to EPA approval.

3.5 Anomalous TBM Spoil

3.5.1 Anomalous TBM Spoil – IWRG or PFAS

TBM Spoil that does not satisfy the criteria for acceptance at the MSPF Containment Cell would be managed in accordance with IWRG and the Project-specific EPA waste classifications as follows:

- If PFAS levels comply with EPA Publication 1669 and concentrations of other contaminants exceed the Fill Material upper limits, then concentrations would be compared to the IWRG621 Category C criteria and the Project-specific EPA waste classifications for Category C. If below the Category C upper limits, it could then be classified and disposed of at the adjacent MBC Landfill or other suitably licenced off-site landfill.
- If the concentrations exceed the IWRG621 Category C criteria or the Project-specific EPA waste classification upper limits for Category C, the material would be classified and transported as either Category A or Category B to an appropriately EPA licensed treatment facility, subject to availability for treatment and available storage space.
- If TBM Spoil exceeds the MSPF containment acceptance criteria for PFAS then TBM Spoil could not be accepted at any EPA licenced landfill in Victoria and must be diverted under waste transport certificates to a suitably licence waste treatment facility. This is due to the criteria for acceptance at the MSPF containment exceeding the upper limit for Category B in the Project-specific EPA waste classifications, classifying it as Category A PIW.

3.5.2 Anomalous TBM Spoil – acid sulfate soil

The criteria for determining whether TBM Spoil from the WGTP is actual acid sulfate soil, potential acid sulfate soil or non-acid forming will be based on undertaking field pH tests and generally in correlation with the criteria in Table 3-5. If potential acid sulfate soil or waste acid sulfate soil is identified by the JV and classification provided that it is acceptable for placement in the Containment Cell, then it would be subject to a defined lime treatment (with the rate determined based on results) as part of placement in the Containment Cell. Further assessment is not possible in Holding Bays given time constraints.
Table 3-5  Acid sulfate soil and rock criteria

<table>
<thead>
<tr>
<th>pHf</th>
<th>pHfox</th>
<th>Delta pH</th>
<th>Reaction rate</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 5.0</td>
<td>≤ 5.0</td>
<td>≤ 2.0</td>
<td>1 - 2</td>
<td>If no other field indicators or acid sulfate soil risk indicators are present, no further action is required.</td>
</tr>
<tr>
<td>&gt; 4.0 and &lt; 5.0</td>
<td>&gt; 3.0 and &lt; 5.0</td>
<td>&gt; 2.0</td>
<td>≥ 2.0</td>
<td>PASS may be present, further assessment is required (or defined lime treatment at a rate determined based on the results received).</td>
</tr>
<tr>
<td>≤ 4.0</td>
<td>≤ 3.0</td>
<td>&gt; 2.0</td>
<td>≥ 2.0</td>
<td>AASS or PASS are likely to be present, further assessment is required (or defined lime treatment at a rate determined based on the results received).</td>
</tr>
</tbody>
</table>

3.6  Reuse of water from Leachate Storage Pond

Dust suppression may be required at the MSPF during operation.

- Leachate may only be used in this manner if PFAS concentrations meets drinking water quality guideline levels (Table 3-5)\(^3\).
- Leachate may be treated to achieve drinking water quality only if proposed to be reused for dust suppression.
- Leachate suitable for such reuse may only be used on the active Cell 6 or Cell 7 when constructed and approved by EPA to receive waste; the Holding Bays and Containment Cell in the MSPF or internal trafficked areas\(^5\) such as roads within the MSPF.
- Leachate from TBM Spoil containing contaminant levels in excess of IWRG621 Fill Material ASLP upper limits will be tested for these contaminants prior to reuse.

The Holding Bays and Containment Cell area will be developed in stages to fit in with TBM Spoil generation rates from the WGTP. Therefore, establishment of the basal clay lining systems for the Holding Bays and Containment Cell will also be developed in stages. If the concentration of PFAS in the leachate is less than drinking water upper threshold it is proposed to utilise water from the leachate storage pond to condition the clay soil prior to compaction.

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3 Addition of PFAS to land/soil that do not contain PFAS is inconsistent with SEPP Land (and PFAS NEMP) therefore dust suppression should be limited to specified areas. Trafficked surfaces within the MSPF are considered built environments and will be removed upon closure thus preserving the intent to policy.

5 The drinking water level was adopted as the applicable (lowest) environmental target in the HHERA in derivation of risk-based criteria. Given that the applicable aquatic ecological protection criteria for PFAS is 95 % species protection (0.13 ppb for PFOS) which is greater than the drinking water criterion, PFAS in any unplanned release of handled water from the leachate storage pond that meets the drinking water criteria for PFAS would not cause harm to Parwan Creek.

5 Upon closure of the MSPF these areas will be stripped of road base material and disposed of in the Containment Cell.
### Table 3-6  Health based drinking water quality guideline for PFAS

<table>
<thead>
<tr>
<th>Health based guidance value</th>
<th>Total PFOS + PFHxS (µg/L)</th>
<th>PFOA (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking water quality guideline value</td>
<td>0.07</td>
<td>0.56</td>
</tr>
</tbody>
</table>

### 3.7  Sampling and analysis methodology

In summary:

- Sampling, analysis and waste categorisation of TBM Spoil is the responsibility of the JV.
- The sampling, analysis and waste categorisation must comply with the requirements of the EPA Classification issued to the JV prior to transport of TBM Spoil to the MSPF.
- The EPA Classification will specify that the sampling and analysis protocols and the SAQP (i.e. the Agon [2020] SAQP) and the EPA Classification would be aligned in this regard.
- MBC is permitted to sample and arrange for testing of the TBM Spoil in certain and select circumstances only, where categorisation of the TBM Spoil and soil in the Holding Bays are not available or is incomplete (for example, should there be missing tracking documentation or sample analysis data is lost). The categorisation of waste spoil still remains the responsibility of the JV.

The sub-sections below present a high-level summary of the sampling and analysis of the TBM Spoil by the JV. It is noted that where any discrepancy exists, the EPA Classification issued by EPA and the Agon (2020) SAQP takes precedence over sampling and analysis methodology summarised in this TBMSC-EMP.

#### 3.7.1  Non-TBM Spoil from zones of exception and anomalous TBM Spoil

As indicated previously, approximately 700,000 cubic metres of non-TBM Spoil from the tunnel portal and zones of exception (zone 1, zone 2, zone 3 and zone 4) will be generated as part of the WGTP. Non-TBM Spoil from these other parts of the WGTP can only be received at the MSPF if it meets Fill Material criteria.

The criteria and management of each type of waste in the zones of exception are as follows. Consideration of best practice for industrial waste management as per EPA (May 2016) Publication 1624 Industrial Waste will be made in managing materials:

- **Zone 1 (North Yarra Main Sewer):** This comprises IWRG621 classified PIW and Solid Inert Material (bricks, timber material etc.). This would be required to be disposed to landfill subject to classification.
- **Zone 2:** This comprises grout block (i.e. construction and demolition waste). This would be required to be disposed to landfill subject to classification.
- **Zone 3:** This comprises acid sulfate soil (potential or waste). Placement in the Containment Cell would be subject to lime dosing. The lime dosage rate will be based on the criteria and results of theJV’s classification, with dosage to occur in the Containment Cell. No further assessment is required (in addition to meeting Fill Material criteria as noted above) but evidence of application required and grid location within Containment Cell.
- **Zone 4:** This comprises construction and demolition waste. This would be required to go to landfill subject to classification.
This non-TBM Spoil from the zones of exception and anomalous TBM Spoil is required to be sampled and tested at the source.

Transport to the MSPF would only occur with prior approval by MBC of the waste categorisation report provided by the JV.

TBM Spoil from the identified zones of exception or TBM Spoil with visual/odour indicators of contamination observed during loading or delivery will be managed in accordance with the SAQP and EPA Classification.

### 3.7.2 TBM Spoil water sampling

Water derived from TBM Spoil will be also sampled and analysed.

The sampling procedures (in terms of QA/QC and compliance with regulatory guidelines) will be consistent with the approach outlined in the SAQP and EPA Classification.

### 3.7.3 Laboratory analysis

TBM Spoil will be analysed only for total and leachable concentrations of PFAS (PFOS, PFHxS and PFOA) in accordance with the classification to be issued by EPA to the JV.

Spoil as defined in Section 3.7.1 will be analysed as per Table 3-1 and Table 3-2.

Spoil from areas where acid sulfate soils may be present will be tested and assessed against the criteria listed in EPA Publication 655.1.

### 3.8 Specification for containment and methodology to meet specifications

The TBM Spoil Regulations require the TBMSC-EMP to include a specification for containment of TBM Spoil (TBM Spoil Regulations r.62)(g)); and a methodology to determine if TBM Spoil meets the specification for containment (TBM Spoil Regulations r.6(2)(h)). This Section addresses this requirement.

#### 3.8.1 Specification for containment

The specification for containment of TBM Spoil is understood to mean the specification and design of the MSPF proposed for that purpose. These details are set out in Section 4.

The methodology for determining if the TBM Spoil meet the specification for containment is understood to mean that the contamination levels in TBM Spoil comply with the criteria for TBM Spoil acceptance at the Containment Cell proposed as part of the MSPF. This also include the decision rules and TBM Spoil management process to be adopted at the MSPF to ensure the only suitable TBM Spoil is placed in the Containment Cell or is diverted to alternate appropriately licenced waste facilities.

#### 3.8.2 Methodology for application of waste criteria

Spoil produced by the TBM operations will conveyed to the former Pivot site and sampled by the JV prior to loading into trucks and transportation to the MSPF (Agon, 2020).
Following receipt of weighbridge data the trucks from Pivot at the MSPF, the TBM Spoil will be placed in the Holding Bays. On the basis of a waste spoil classification/categorisation provided by the JV, TBM Spoil that satisfies the MSPF acceptance criteria (see Section 3.4) for PFAS and where applicable the IWRG621 Fill Material classification criteria, will be directed for placement in the Containment Cell.

Spoil that is classified by the JV as IWRG621 Classified Category C Contaminated Soil and has PFAS levels less than the upper limits for leachable PFAS in the EPA site-specific waste classification for Category C can be disposed at the MBC licensed landfill or other EPA landfill licensed to receive such category of waste soil. TBM Spoil that has PFAS levels exceeding the TBM Spoil Containment Cell acceptance criteria must be transported off-site under waste transport certificates to a suitably EPA licensed treatment facility. Table 3-7 summarises the management options for TBM spoil containing IWRG, PFAS and waste acid sulfate soil.

**Table 3-7 Spoil management options for PFAS with IWRG and /or waste acid sulfate soil**

<table>
<thead>
<tr>
<th>IWRG Classification</th>
<th>PFAS</th>
<th>WASS</th>
<th>Spoil Management Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A</td>
<td>NL¹</td>
<td>NL</td>
<td>Must be sent to a Category A licenced waste treater</td>
</tr>
<tr>
<td>Category B</td>
<td>EPA Project-specific Category B or C</td>
<td>NL</td>
<td>Must be sent to a Category B licenced landfill</td>
</tr>
<tr>
<td>Category C</td>
<td>EPA Project-specific Category B or C</td>
<td>NL</td>
<td>Must be sent to a suitably licenced (Category B or C) landfill</td>
</tr>
<tr>
<td>Fill Material</td>
<td>Less than MSPF spoil acceptance criteria</td>
<td>Non-WASS</td>
<td>Accepted at MSPF Containment Cell</td>
</tr>
<tr>
<td>Fill Material</td>
<td>Less than MSPF spoil acceptance criteria</td>
<td>WASS</td>
<td>Accepted at MSPF Containment Cell after WASS treatment</td>
</tr>
</tbody>
</table>

1. NL = Not Limiting parameter – see other parameters.

A summary of the SAQP TBM Spoil sampling methodology and laboratory analysis to be undertaken by the JV are included in Section 3.7.
4 Description of the MSPF

The design and operation information described in this Section has been developed as required to satisfy the objectives of the TBM Spoil Regulations to ensure the protection of human health and the environment while facilitating the management and disposal of TBM spoil.

The main infrastructure of the MSPF is presented in Figure 4-1.

![Figure 4-1 Site boundary and layout of the MSPF](image)

The design of the MSPF proposed herein provides for management of all spoil received, stormwater runoff from the facility as well as deemed contaminated leachate water in contact with spoil. The facilities proposed are designed to prevent contaminated water and sediment from impacting the external environment including Parwan Creek and Werribee River. The design is also protective of the underlying groundwater.
4.1 MSPF design revisions and completeness

A full list of the reports produced that outline the design of the MSPF are presented in Table 1-2. These reports are included in Appendix D and Appendix E. Design Report, Technical Specifications and layout plans for each of the main infrastructure components of the MSPF in Appendix E. A Revised Design Concept Report for the liner and cap of the Containment Cell and the liner of the Leachate Sedimentation Pond is presented in Appendix D. Therefore, to the extent there are any inconsistencies between the design drawings or technical specifications in Appendix D and those in Appendix E, the Revised Concept Design Report in Appendix D takes precedence.

The design of the MPSF has evolved during the process of preparing the TBMSC-EMP, in response to the regulatory framework and the indicated assessment process and criteria to be used by EPA in their assessment of the EMP. The design proposed in the TBMSC-EMP has been revised since issue of the Technical Specifications and Design Reports in Appendix E, to make the key protection measures in the Containment Cell Cap and liner as well as the base of the Leachate Sedimentation Pond comparable with a number of the design criteria set out in the EPA (2015) Publication 788.3 Siting, Design, Operation and Rehabilitation of Landfills Best Practice Environmental Management (Landfill BPEM). These key changes are outlined in the Revised Concept Design Report in Appendix D.

Furthermore, the design proposed herein remains preliminary and for the purposes of the EPA assessment of the TBMSC-EMP (i.e. not for construction). The design will be finalised following EPA assessment and any directions provided in their formal instrument of determination. The final design is also required to be independently audited prior to final acceptance by EPA.

4.2 Main MSPF infrastructure

The following are the main infrastructure components of the MSPF:

- Containment Cell with leachate pump sump
- Holding Bays
- Drying Bays
- Contingency Drying Bays
- Leachate Sedimentation Pond
- Construction Materials Stockpile Area.

In addition to the main infrastructure components, the following additional infrastructure will form part of the MSPF:

- Driver Control station and Dallas tag reader
- Site hut, offices, and amenities
- Light vehicle car park

6 The Southern Leachate Storage Pond which has already been constructed forms part of the related infrastructure not included within the MSPF site but located within the adjacent MBC Landfill.
• Receival truck short term park  
• Offices and amenities  
• Lighting  
• Signage  
• RFID scanner and automated weighbridge  
• Wheel wash  
• Cyclone fencing along Kerrs Road and Gullines Road boundaries to address Regulation 5 (e) restricting public access.

4.3 Overview of MSPF infrastructure and operations

The MSPF operations and infrastructure are detailed further in Table 4-1.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSPF entrance and exit</td>
<td>The main access road to the MSPF is via the Geelong-Bacchus Marsh Road to Kerrs Road, at the intersection with East Maddingley Road. The MSPF exit is on Gullines Road near the intersection with Rowley Station Road.</td>
</tr>
<tr>
<td>Driver control station</td>
<td>Located in the northern part of the site near the site entrance.</td>
</tr>
<tr>
<td>Car parking/site compound</td>
<td>Located in the northern part of the site near the site entrance adjacent to Kerrs Road. This will also include a site compound for non-conforming loads.</td>
</tr>
<tr>
<td>Holding Bays and Drying Bays</td>
<td>TBM Spoil will be received and temporarily contained in Holding Bays while awaiting testing and classification of the TBM Spoil. The primary Holding Bays are located at the north-western corner of Kerrs and Gullines Road (273388 m E, 5823443 m S). Contingency Drying Bays for either storage or drying are located west of Gullines Road and would be used if necessary.</td>
</tr>
<tr>
<td>Containment Cell</td>
<td>Subject to EPA classification to the contrary, TBM Spoil shall be subject to placement in the Containment Cell or off-site disposal at a licenced landfill. The Containment Cell (273827 mE, 5823000 mS), has capacity of approximately, 2,197,000 cubic metres.</td>
</tr>
<tr>
<td>Leachate Sedimentation Pond and Southern and Northern Leachate Ponds</td>
<td>A pond to dropout sediment from leachate drained from the Holding Bays and/or Drying Bays and the Containment Cell prior to pumping into the leachate ponds (the Northern Leachate Pond and Southern Leachate Ponds).</td>
</tr>
</tbody>
</table>

The Agon (2020) SAQP describes the transportation of TBM Spoil from the WGTP in Yarraville to the MSPF in Bacchus Marsh.

The WGTP is responsible for complying with the EPA Vehicle Safety Standards for Prescribed Industrial Waste Transportation from the WGTP site to the MSPF.
Transport of prescribed industrial waste from the MSPF to an off-site licenced landfill/facility, will comply with the provisions in EPA (April 2018) Publication IWRG814.2 Vehicle guidance: Non-tanker vehicles/trailers. Transport to the adjacent MBC Landfill via internal roads will be undertaken in accordance with a methodology agreed with EPA.

Sampling of TBM Spoil is to be undertaken as indicated in Section 3.3.

The trucks will enter the MSPF via a gate located at the corner of East Maddingley and Kerrs Roads; then proceed west to the drive control station equipped with Dallas tag reader, RFID scanner and automated weighbridge. It is expected that the loads information, e.g. truck registration number, load ID or source, weight and pre-classification details will be provided to MSPF prior to the trucks leaving the Pivot site. In response, MSPF will also confirm the availability of the Holding Bays prior to TBM Spoil arriving at the facility.

Any trucks arriving at MSPF without the necessary information or non-conforming loads will be diverted to the car parking/site compound/non-conforming area. The trucks will be stationed here until all the information has been received and verified, otherwise it will be diverted back to its origin.

Trucks with conforming loads information will proceed to the designated Holding Bays. After unloading the truck will leave the facility using the Gullines Road exit.

Upon receiving TBM Spoil categorisation reports and definition of TBM Spoil category, MSPF will transport the TBM Spoil to either the Containment Cell, Cell 6 in the adjacent MBC Landfill (licenced to receive Category C contaminated soil) or other suitably licensed off-site facility.

In the event that TBM Spoil is extremely wet and takes longer to dry, it will be spread out onto the Drying Bays to allow drying from sun and wind and drainage of free water released from TBM Spoil through the designed leachate containment system. A series of Contingency Drying Bays are proposed west of Gullines Road. Additional drying would also occur as a result of placement and spreading of TBM Spoil received in the Containment Cell.

The receiving and processing operations flow chart is illustrated in Figure 4-2.
Figure 4-2 Flowchart of receiving and processing operations
4.3.1 Holding Bay and Drying Bay preparation

The footprint for the Holding Bays and Drying Bays will be stripped of all vegetation and topsoil to the satisfaction of the Geotechnical Inspection and Testing Authority (GITA). Stockpiled topsoil will be used to construct temporary bunding around the MSPF for reuse in the reinstatement of TBM Spoil bay footprint on closure of the project.

On completion of stripping, the in-situ clay surface will be cut to the approximate design floor relative levels.

4.3.2 Finished Holding Bay and Drying Bay floor

The trafficking layer will be maintained and topped up/replaced as required throughout the duration of the project.

GPS tracking of the ablation of the wearing layer in TBM Spoil holding and Drying Bays will be undertaken on a monthly basis and restoration undertaken as required.

4.3.3 Holding Bay filling protocol

Unloading of trucks will occur under the supervision of the bay operator. The bay operator will be present 24 hours a day during unloading operations and instruct drivers to unload via a UHF radio. The bay operator will direct the truck to deposit TBM Spoil in the Holding Bays such that TBM Spoil is not trafficked out onto the internal haul roads. Incoming TBM Spoil trucks will reverse over the wheel stop bund and into the unloading zone for tipping. The loader will push the TBM Spoil up filling the bay opposite the deposition point.

The bay operator will regularly assess the capacity of the bay during filling operations. Each bay will continue to be filled until full. Once a bay is deemed full, brigade tape will be used to close the bay.

4.3.4 Holding Bay load out protocols

Removal of classified TBM Spoil from Holding Bays will occur using an excavator located along the loading bund. Dump trucks will utilise the loading waiting bay zone once directed by the Radio Frequency Identification scanner. Loaded trucks will exit via the automated weighbridge. Spilled TBM Spoil from the loading activities will be cleaned to the extent practicable and loaded onto the trucks and the residual will be washed and diverted into the leachate sediment pond. The loading bund is designed to capture TBM Spoil water run-off.

TBM Spoil will be unloaded from the Holding Bays by an

TBM Spoil loading point is on a 1:3 batter and as such free draining water will drain away from the loading point to the base of the Holding Bay. This will ensure that TBM Spoil excavated from the Holding Bays does not contain free draining water and run-off will not discharge into the stormwater. After TBM Spoil has been removed from the Holding Bays the water retained in the bays will be removed utilising a hydro excavation truck and transported to the Leachate Sedimentation Pond.
Trucks will be loaded with TBM Spoil and will not enter the bays to avoid the trafficking of TBM Spoil onto internal roadways. There will be continuous monitoring of all internal roads to ensure the prompt removal of any spillage.

Subject to an assessment of traffic interaction with TBM Spoil receival operations, a contingency load-out point will be located at the tipping zone entrance of the bay. Loaders will be used for TBM Spoil removal operations when loading out from the bay entrance, should trucks be required to enter the Holding Bay for contingency load out, TBM Spoil will be removed from areas required for trafficking prior to commencement.

4.3.5 TBM Spoil placement in Containment Cell

The objective of TBM Spoil placement process in the Containment Cell is to create a landform that is stable in the short and long term where all potential environmental impacts are minimised. Procedures for management of impacts to surface water, air quality and other receptors are detailed in Section 6 but critical elements relating to the Containment Cell include:

- All surface water is diverted from running into the Containment Cell by perimeter bunding and diversion drains.
- All leachate runoff from TBM Spoil is directed into the leachate sump by internal bunds that prevent runoff from the Containment Cell area until after placement of the final cap.
- Use of water carts as required to eliminate dust generation potential within the Containment Cell and internal access roads. All vehicle movements in the Containment Cell will be minimised to reduce dust generation.

While the TBM Spoil transported to the Containment Cell will not contain free water, TBM Spoil may have a moisture content above that would be desirable for long term Containment Cell stability.

The water content of TBM Spoil produced by the TBM is stated in the Agon (2020) SAQP as varying between a low of 24.5 % for course grained Newport Formation to a high of 56 % for extremely weathered Older Volcanics. The volume of water added to the formation being excavated varies between 5 % to 17.5 %. It is expected that TBM Spoil will behave as a saturated soil/rock mix rather than a wet clay slurry with saturation above the clay liquid limit. WGTP has advised that TBM Spoil received at the MSPF may still have entrained water held in suspension within TBM Spoil matrix by the drilling foam additives used by the WGTP. This foam agent will break down within a few days of arrival at the MSPF potentially releasing water entrained within the soil matrix into the Holding Bay drainage system. Holding Bays are designed to grade to a drainage point to encourage the runoff of free water released from TBM Spoil enabling its removal from TBM Spoil Holding Bays as leachate. Free water will not be transported from the Holding Bays to the Containment Cell.

The degree of saturation and amount of effort required to dry TBM Spoil at the MSPF will vary considerably. Some TBM Spoil will be relatively free draining and will not require any mechanical assistance to dry to the point where it can be placed in the Containment Cell with no further work required. TBM Spoil with a higher clay and water content mixed with larger particles will require mechanical assistance to dry.
The TBM Spoil surface in the Containment Cell will only work until it has a moisture content that allows for another layer to be placed above. This moisture content would be above that where dust generation is likely to occur.

If required, additional drying would also occur as a result of placement and spreading of TBM Spoil received in the Containment Cell.

The goal of the drying activities is to create TBM Spoil dried to the point such that it is mechanically stable and trafficable with earthmoving equipment.

Golder was commissioned by MBC to undertake a review of the proposed design aspects relating to TBM Spoil handling and storage/disposal in the Containment Cell (Appendix C). Golder indicated that it is of importance to note that the material produced by a TBM are ideally suited to soft cohesive ground types (relatively weak clays or silts) where TBM Spoil is conditioned to a firm consistency. Hence the ideal TBM Spoil consistency is a paste and is not a slurry (i.e. TBM Spoil has some inherent strength and is not a liquid).

In assessing the types of materials that would be produced by the WGTP, Golder indicated that it was likely that TBM Spoil would consist of a “rubble” of chunks of intact stronger clayey material within a matrix of wetter softened soil. The geotechnical condition of TBM Spoil would assist with handling and drying of TBM Spoil. In its assessment Golder concluded that a significant proportion of TBM Spoil would be derived from the less weathered rocky Older Volcanics and Newer Volcanics and therefore would have better TBM Spoil handling and placement characteristics.
Golder concluded that the design generally has significant contingency capacity if the peak of TBM Spoil production occurs in the drier months. The short-term processing capacity of the MSPF was unlikely to be critically impacted by wet weather delays and therefore the design was considered adequate.

Golder indicated additional controls that could be implemented to reduce operational delays:

- Accelerating laboratory turn-around times to free-up Holding Bays sooner than the design
- Using some of the Drying Bays as temporary stockpile areas
- Using the contingency Drying Bays west of Gullines Road
- Making use of the Containment Cell surface area as an additional drying area provided that no free draining liquid is transported with TBM Spoil into the Containment Cell
- Accelerating TBM Spoil drying by lime treatment to TBM Spoil in the Drying Bays.

Details of the rectification procedures for the holding and Drying Bays is provide in Section 4.3.6.

4.3.6 Integrity assessment and rectification

On completion of load out operations, TBM Spoil Holding Bay and adjoining access roads will be assessed by suitably trained personnel using a checklist procedure to determine required maintenance measures. The procedure will include an assessment of:

- Depression or soft spots on the surface of the holding and Drying Bays and internal roads
- Trafficability
- Bund integrity
- Unloading zone and wheel bund surfaces
- Leachate and stormwater management infrastructure
- Residual TBM Spoil requiring removal.
A work order for construction maintenance of the holding and Drying Bays and road design elements will be issued for immediate rectification if the assessment determines that the minimum standard defined in the design documentation has not been met. Road aggregate and recycled crushed concrete will be stockpiled on-site for use on as required basis. It is anticipated that the integrity assessment and rectification process will take not more than two days.

All damage and rectification works will be tracked in the Workflow database system that will not release Holding Bays for refilling until any rectification works have been completed and verified.

4.3.7 Management of anomalous TBM Spoil

Anomalous TBM Spoil will be segregated and managed separately. The anomalous TBM Spoil initially will be assessed if the materials originated from the pre-identified zones of exception in the WGTP alignment.

The anomalous TBM Spoil will then be further characterised, which may include additional laboratory analysis and assessment against the spoil acceptance criteria to inform whether the material is suitable for placement in the Containment Cell or alternatively disposed of off-site to a suitably licensed landfill or treatment facility or WASS facility. As noted previously, characterisation is the responsibility of the JV (refer to Section 3.7 for further information).

4.4 Design and construction of Holding Bays and Drying Bays

A total of [TBM Spoil Holding Bays, covering an area of approximately [square metres, is proposed. The TBM Spoil Holding Bays are located to the east of Gullines Road and are arranged into three rows in a north-south orientation on the site.

Each Holding Bay is designed with capacity between [freeboard, subject to free water content of the TBM Spoil. The capacity of the Holding Bay will be in part determined by the physical characteristics of TBM Spoil. High moisture content slurry material will not be able to be pushed up into a mound and as such will require more storage area than lower moisture granular material. Unsaturated soil will be stockpiled at the angle of repose with a height not exceeding [square metres, is proposed.

A total of [Drying Bays with total area of approximately [square metres, are also located to north, south, and west of the primary Holding Bays. These Drying Bays will used to accommodate sloppy loads, in the event that all the Holding Bays are fully utilised. The construction of the Drying Bays will be similar to the primary Holding Bays but with larger dimensions.

The Holding Bays and Drying Bays will be constructed with [square metres, is proposed. The design and construction would result in a low permeability barrier and a performance standard that would prevent any risk of harm to the beneficial use of land, groundwater, or surface water.
All construction works related to the construction of the clay layer for the Holding Bays and Drying Bays and associated infrastructure (excluding excavation of the Holding Bays and Drying Bays) will be completed under full time supervision (Level 1) of a GITA. Following completion of each of the above components the GITA will provide and assessment of compliance of the as built works against the requirements of the Technical Specification.

4.5 Design and construction of the Containment Cell

The Containment Cell will be located to the south-east of the Holding Bays and has an approximate footprint of 19 hectares. The Containment Cell design optimises on the existing landform and drainage providing a TBM Spoil disposal capability of approximately 19 hectares.

The proposed revised design of the Containment Cell liner profile comprises the following (described from top down):

- .
- .
- .
- .
- .
- .
- .
- .
- .
- .
- .
- .
- .
- .
- .

Further calculations and an assessment of risk to groundwater has shown that the seepage from the liner would be much less than their estimates and the potential impact on groundwater quality would be negligible (Appendix G; PFAS Leachate Estimates and Assessment of Risk to Groundwater, SLR August 2020).

Construction of the Containment Cell will be carried out under fulltime supervision of the Level 1 GITA and CQA Inspector where applicable and will be subject to independent audit of construction.

The Containment Cell has bunds which wrap around the western, northern, and eastern boundaries to ensure long-term stability of the Containment Cell.
Initial tipping and spreading of TBM Spoil within the Containment Cell will occur from the upgradient perimeters of the cell footprint including the top of the northern, western, and southern batters. Batter grades will be utilised to spread and dry TBM Spoil in lifts, subject to the trafficability of the Containment Cell. When TBM Spoil lifts have filled to the top of the batters, all weather access roads will be constructed within the Containment Cell to allow tipping and spreading of TBM Spoil at multiple locations. This will allow the maximum time available for TBM Spoil lifts to dry before the next lift of TBM Spoil is placed. Care will be taken to ensure there is no damage to the underlying liner and leachate collection system.

4.6 Design and construction of leachate infrastructure

MBC currently use leachate as a means of dust suppression on the MBC Landfill in certain circumstances in accordance with the Landfill BPEM requirements and only within the landfill cells, to ensure it does not contaminate stormwater runoff. TBM Spoil derived leachate could be used for this purpose to benefit storage capacities and promote evaporation, where deemed suitable for reuse for this purpose (as per the criteria specified in Section 3.6).

Leachate is extracted from the MBC Landfill and pumped to the Northern Leachate Pond. From the Northern Leachate Pond, leachate is pumped into a leachate cart and used for dust suppression only on the MBC Landfill. Stormwater is collected in Dam D2 and pumped to Dam D5 for freshwater dust suppression in non-landfill areas.

The MSPF will maintain the same system of segregation of leachate and stormwater; leachate will be pumped from the Containment Cell and the Holding Bays into the Southern Leachate Pond via the Leachate Sedimentation Pond. This leachate (subject to analysis and comparison against the reuse acceptance criteria outlined in Section Error! Reference source not found. 3.6) will be used for dust suppression within the landfill cells only on the adjacent MBC Landfill. The stormwater regime operating at the adjacent MBC Landfill will continue under the current landfill management system, with the exception that there will be additional stormwater infrastructure to collect runoff from areas of the MSPF that will tap into existing network.

A leachate water balance was undertaken to assess the leachate generation across the entire MSPF (Holding Bays, Drying Bays and Containment Cell) and the capacity of the system to manage the expected volume of leachate.

The model was a spreadsheet-based model that was simulated on a monthly time step period of two years. Median Rainfall Data from the Merrimu Reservoir BOM weather station (Station No. 087161) between years 1974 to 2019 was used. Evaporation data from the Melbourne Airport BOM Weather Station (Station No. 086282) between the years 1970 to 2020 was used.

The total capacity of the southern leachate pond is [ ], with an operational capacity of [ ] (allowing for a freeboard). The leachate water balance indicates a maximum volume of leachate of approximately 5 ML, which is less than the operational capacity of the Southern Leachate Pond.

In addition, an assessment was undertaken of the impact of extreme rainfall events, taking into consideration the 1 in 10 year, 1 in 20 year and 1 in 100-year, 24-hour rainfall events. Design rainfall depths for the MSPF were obtained from the BOM Meteorology Rainfall Intensity Frequency Duration Data System. It was assumed that 50% of the incident rainfall event was collected as leachate.

The modelled volumes of leachate for significant rainfall events are:

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Modelled Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 10 year, 24-hour</td>
<td>5 ML</td>
</tr>
<tr>
<td>1 in 20 year, 24-hour</td>
<td>5 ML</td>
</tr>
<tr>
<td>1 in 100 year, 24-hour</td>
<td>5 ML</td>
</tr>
</tbody>
</table>
Mackenzie Environmental concluded that at all times (in the modelled period), the Southern Leachate Pond would have sufficient capacity to manage leachate generation during the modelled rainfall events.

In addition, the Holding Bays and Drying Bays are designed with a [redacted] freeboard for the modelled rainfall events. If the leachate generation exceeds the storage capacity of the leachate ponds, the excess volume would be transported to Cell 6 in the adjacent landfill using an overflow pipe system. Cell 6 has the capacity to temporarily hold leachate generated during any conceivable rainfall event, maintaining a closed system.

4.6.1 Holding Bay leachate collection and transfer infrastructure

Leachate extracted from the processing area will not be deposited as a liquid waste in the Containment Cell.

Leachate (with or without sediment), comprising water from within TBM Spoil and from incident rainfall falling in the Holding Bays and Drying Bays, will drain to leachate collection trenches which enable flow to leachate sumps located at low points. The trenches will be 300 mm deep and constructed with a perforated leachate collection pipe and backfilled with aggregate. A layer of separation geotextile will be placed across the surface of the trench and covered by 100 mm thick aggregate layer to enable trafficking of plant and vehicles. The leachate collection trenches will have a 1% grade to the sumps.

Leachate that collects in the sumps will be pumped via polyethylene pipes to the Leachate Sedimentation Pond. Where necessary the pipes will be installed beneath the haul roads and Holding Bays so as not to be compromised by the truck movements on the surface above.

Inspection and clean-out points will be installed at regular intervals along the leachate conveyance pipes.

During periods of high rainfall or during storage of saturated TBM Spoil, the Holding Bays will be used to store leachate.

Seepage calculations and an assessment of risk to groundwater has shown that the seepage from the base of the Holding Bays would be minimal and the potential impact on groundwater quality would be negligible (Appendix G; PFAS Leachate Estimates and Assessment of Risk to Groundwater, SLR August 2020).

4.6.2 Containment Cell leachate collection and transfer infrastructure

The leachate collection system will be constructed following installation of the first layer of separation geotextile. Construction of the leachate collection system shall comprise installation of the leachate collection pipes (with a maximum spacing of 25 m), leachate collection sump riser pipe and placement and spreading of the leachate collection aggregate layer over the pipes.
The leachate collection pipes will be installed in accordance with the alignment and grades shown in the Design Report to enable them to be inspected and cleaned out. The pipes will be joined by butt fusion welding or electrofusion couplers; and installed so that the alignment of the drilled holes is aligned at the 45-degree angle.

The leachate collection sump riser pipe will be installed carefully on the inclined sidewall of the Containment Cell to avoid damaging the riser pipe. The riser pipe is specified to have the strength to resist the crushing force of emplaced spoil and provide clear passage of the sump pump for maintenance purposes. The riser pipe will be supported at the crest of the slope as shown on the drawings with two-star pickets installed either side of the pipe or using an approved alternative. The pipe will be securely tied to the star pickets using UV resistant rope.

The leachate sump pump discharge and conveyance pipes will be installed in the alignment shown in the Design Report. The leachate conveyance pipes will be installed above ground, except for crossing access roads where the pipes will be installed in culverts. Prior to placement of the leachate conveyance pipes, the ground surface will be flat and free of materials that could damage the pipes, such as large rocks. A non-return valve will be installed at the connection to the leachate sump pump.

The leachate pump will be installed in the leachate collection sump riser pipe and connected to the leachate conveyance pipe. The leachate pump will be installed to maintain leachate at a maximum depth of 200 mm above the lowest point of the liner outside the leachate collection sump (i.e. 117.2 m AHD).

Analysis by Mackenzie Environmental has demonstrated that with the proposed 25 m spacing of the leachate collection pipes on the base of the Containment Cell the leachate head on the liner will be less than

4.6.3 Leachate Sedimentation Pond

The revised design of the Leachate Sedimentation Pond liner comprises the following (described from top down):

- [Description of each component of the pond]

- [Description of each component of the pond]

- [Description of each component of the pond]
The Leachate Sediment Pond will be located to the east of the Holding Bays, south of the existing landfill Southern Leachate Pond.

The Leachate Sedimentation Pond has segments to promote removal of sediment from the leachate. Leachate will flow from west to east through the pond with internal spillways between each of the pond segments. The total depth of the Leachate Sedimentation Pond is freeboard to prevent overtopping.

The ponds have been sized to provide adequate retention times. The retention time will vary according to the intensity of a given rainfall event. Sediment retention relates to the head above the liner, and since the Leachate Sedimentation Pond requires a membrane liner, the retention time is not as relevant as an indicator of infrastructure performance. The head above the liner is stated in the flow calculations.

The purpose of the two parallel ponds for the first settling pond is to allow for coarse sediments to drop out in the first pond and periodically take one pond out of service to allow for sediment removal. The second and third ponds allow for additional sediment removal prior to pumping to the main leachate pond. The normal sequencing will be water flow into pond 1a, then to pond 2 and pond 3 with pond 1b not in service. When pond 1a requires desludging, sequencing will be water flow into pond 1b, then to pond 2 and pond 3, while pond 1a is being de-sludged. It is however unlikely that the ponds 2 and pond 3 will require cleaning over the period of operation of the MSPF.

Leachate will be pumped from the eastern end of the Leachate Sedimentation Pond to the existing southern leachate pond. The pump will be fitted with a float switch to control leachate levels in the Leachate Sedimentation Pond.

4.6.4 Existing leachate ponds at adjacent MBC Landfill

The existing Northern Leachate Pond and Southern Leachate Pond in the adjacent MBC Landfill were designed, constructed, and now operate as EPA-approved in accordance with the Landfill BPEM compliant leachate storage ponds. The typical profile of the pond incorporates (from bottom up) subgrade, one metre compacted clay liner and 2.0 mm thick HDPE liner.

The design of the ponds and the construction QA documents were assessed and verified by an EPA-accredited environmental auditor. The construction was also audited as detailed in the Section 53V environmental audit report entitled Paul Fridell of ERM (12 September 2019) S53V Audit of Landfill Cell Construction - Landfill Cell 6, Stage 2 – East Maddingley Road Landfill, Bacchus Marsh. A copy of the report can be found on the EPA website.

4.6.5 Water treatment

In the event that the concentrations of PFAS in leachate exceed existing regulatory levels for drinking water (Section 3.6) and thereby not suitable for re-use for dust suppression there will be a need to undertake specific treatment. An investigation of potential treatment options demonstrated that was the preferred option. The following Section discusses the treatment process, should it be required. A process layout diagram for the water treatment plant is presented as Figure 4-3 (2D model) and Figure 4-4 (3D model).
Figure 4-3  Wastewater treatment plant 2D process layout

Figure 4-4  Wastewater treatment plant 3D process layout
4.6.5.1 Preferred treatment option

The preferred treatment option would be an approach to treat leachate at the MSPF. The system will be assembled in two main sections: pre-treatment system (skid) which includes a chemical storage and dosage system; and a PFAS treatment module (containerised). Overall specifications of the wastewater treatment plant include a maximum design flow rate of . All pipe work will be uPVC. The system design also incorporates a treated water monitoring station to confirm the treated water meets drinking water criteria for reuse for dust suppression.

It is proposed that flow balance will be contained within the existing leachate holding dam on-site. The wastewater treatment plant will incorporate pH correction and chemical precipitation of dissolved metals and a multi-media filtration system.

Based on anticipated analytical results for wastewater produced from a typical site the following discharge criterion can be expected from the wastewater treatment plant (Table 4-2).

<table>
<thead>
<tr>
<th>Analyte (µg/L)</th>
<th>Raw/Feed Water (µg/L)</th>
<th>Treated/discharge water (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of PFHxS and PFOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PFOA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Establishment of the wastewater treatment plant will be carried out in two phases:

- Engineering and design.
- Construction, installation, commissioning, and testing.

The commissioning phase will involve dry testing of all valves and instruments for correct functionality and initial wet commissioning of the system using clean/potable water. This will be followed by process proving involving the treatment of three batches of wastewater (each of 20 kL). One raw/feed water sample and one treated water sample will be collected from each wastewater test batch and analysed at a NATA accredited laboratory. If analytical results indicate treated water from all batches consistently meet the treated discharge criteria indicated in Table 4-2 (health based drinking water quality for PFAS) the wastewater treatment plant will be commissioned for operational purposes.
4.7 Design and construction of stormwater detention, processing, and disposal systems

The proposed stormwater management system comprises a network of swale drains along the haul roads. The haul roads will be constructed with cross fall away from TBM Spoil storage/Holding Bays and soil Drying Bays to assist in segregating stormwater from leachate and to direct stormwater to the swale drains.

The stormwater swale drains will connect to pipes to convey stormwater by gravity in an easterly direction beneath TBM Spoil Holding Bays. Stormwater pits will be installed at the junction between the swale drains and pipes.

The stormwater swale drains and pipes will connect into the existing adjacent MBC Landfill wide stormwater management system, which comprises a series of dams (which are shown on Figure 2-12). Stormwater from the dams is re-used on the MBC Landfill for a range of purposes.

4.8 Internal traffic routes within MSPF

Haul roads will be established from the site entrance and around/within the operation area of the site to manage the movement of TBM Spoil delivery trucks and haulage into/from TBM Spoil Holding Bays and Drying Bays and to the Containment Cell. Details of the truck movements at the MSPF are indicated in Figure 4-5.

Trucks will enter the MSPF from East Maddingley Road. Trucks which are found to have non-complying loads or documentation will be directed along a separate access road to the car/truck parking area. Trucks will then travel to the Holding Bay area via the internal access roads with unloading occurring on the western side of the Holding Bays. Following unloading the trucks will proceed south along the internal access roads to a wheel wash facility prior to exiting at the Gullines Road exit.

In the event that conditions in the Containment Cell are deemed too wet, the classified TBM Spoil from Holding Bays will be loaded into articulated dump trucks on the eastern side of the Holding Bay. The dump trucks will transport TBM Spoil to specified Drying Bay utilising the internal access roads and unload accordingly.

Spoil that will be placed in the Containment Cell will be loaded into articulated dump trucks from the eastern side of the Holding Bay. The loaded trucks will traverse a weighbridge before unloading in the Containment Cell.

The trafficking layer on the haul road will comprise a 100 mm thick layer of cement stabilised crushed concrete material overlain by a further 130 mm thick layer of recycled crushed concrete material.

The trafficking layers within the Holding Bays and Drying Bays will comprise a nominal 100 mm thick layer of cement stabilised recycled crushed concrete material. The recycled crushed concrete will be cement stabilised prior to placement and compaction to increase durability of the layer. The trafficking layer will be maintained and topped up/replaced as required throughout the duration of the project. The trafficking layer in the Holding Bays and Drying Bays may comprise alternative material such as steel furnace slag aggregate.

4.9 Surveys

As-built surveys will be completed using drones to confirm CQAP requirements and for the evaluation of as-built surveys against design documents.
Figure 4-5 Truck routes within the MSPF
4.10 MSPF closure

The following outlines the process for rehabilitating the MSPF at closure.

4.10.1 Holding Bays and Drying Bays

At completion of the project, the Holding Bays and Drying Bays lining systems and leachate sediment pond will be removed and disposed of within the Containment Cell subject to confirmatory laboratory testing. Samples will be collected below the design stripping profile, at the frequency prescribed in IWRG702 and analysed for PFOS/PFHxS and PFOA and leachability for PFAS compounds. The analytical method will be similar or compatible with those used by WGT owner (or an agreed third party) for the sampling and testing of TBM Spoil.

In the event Holding Bay and Drying Bay samples exceed the risk-based criteria for a given bay, corrective actions shall be developed under a Clean Up Plan, to the extent practicable, in order to define and delineate impacted areas. Further sampling, analysis, classification, and appropriate disposal thereof, under guidance/verification of the EPA-appointed environmental auditor engaged by MSPF shall be warranted. All laboratory analysis of samples will be undertaken by a NATA accredited laboratory.

TBM Spoil Holding Bays and Drying Bays will be cut and filled to blend in with the natural topographic features.

The voids will be backfilled using either soils from the amenity bund (previously stockpiled subsoil and topsoil) or from borrow areas, which have been confirmed as clean fill. The completed surface will be seeded with grasses.

4.10.2 Containment Cell capping

Upon closure of the MSPF the Containment Cell will be closed with an engineered cap comprising the following from top down:

- Hydrologic Evaluation of Landfill Performance (HELP) modelling was undertaken by the designers for the purpose of assessing leachate generation rates in the Containment Cell after closure and relative to the estimated seepage rates for the base liner (and is appended to the Revised Concept Design Report in Appendix D). The results indicate leachate generation rates and peak daily seepage rate through the cap is less than 75% of the calculated design seepage rate through the cell liner.
The Containment Cell pre-capping pre-settlement design contours and filling sequence has been designed to accommodate minimum and maximum TBM Spoil volumes classified for placement in the Containment Cell (Figure 4-6). Minimum TBM Spoil volumes will result in lower final Relative Levels and a larger graded plateau compared with maximum design contours. MBC commits to a 20 % grade on the sides and cap grades are 5.0 % on the top at this stage until there is evidence in the Detailed Design stage of the project that a commitment to a lesser grade can be made. Mackenzie Environmental has noted that differential settlement of the essentially soil/rock fill is not an issue for the Containment Cell as opposed to landfills receiving domestic/putrescible waste, where much greater settlement typically occurs. Regular settlement monitoring and maintenance of the cap will be completed to ensure ponding does not occur.

The cap will have a network of stormwater swales to manage rainfall runoff which will be directed to swale drains at the toe of the Containment Cell and conveyed to the adjacent landfill stormwater management system.

The cap for the Containment Cell will be installed progressively to reduce the area of TBM Spoil that is exposed to incident rainfall and subsequently collects in the leachate drainage system.

Disposal of TBM Spoil into the Containment Cell will be focussed on filling from the lowest eastern-most point around the leachate collection sump. When TBM Spoil reaches final design contours the area will be progressively capped to reduce the infiltration of stormwater into the leachate drainage system.

The construction of the cap will be completed under Level 2 GITA supervision and independent audit. The topsoil layer will be established by MSPF.

The completed surface will be seeded with grasses.

Regular monitoring of the final cap and vegetation will be incorporated into an aftercare management plan, which will be developed to the satisfaction of EPA. This will include inspection of the surface for depressions or cracks caused by settlement or drying of the cap which may allow for infiltration of surface water; visual evidence of instability; and success of revegetation with grasses. If required appropriate remediation will be conducted.
Figure 4-6 Containment Cell – completion contours
4.10.3 Slope stability

A long-term stability assessment was undertaken and is reported in the Containment Cell Design Report (Appendix E). The assessment considered two leachate level scenarios, at the top of the leachate collection drain, and at the crest of the toe bund. The analysis demonstrated a minimum factor of 1.5 for the proposed layout and material properties, with seepage at the crest of the bund.

A review by Golder (Appendix C) indicated:

- The effective stress spoil parameters adopted for TBM Spoil appear reasonably conservative for the long-term slope stability condition, assuming pore pressures are equalised, and TBM Spoil contains a significant proportion of rocky material.
- As TBM Spoil contains high plasticity clay and silt material care in placement will be required to manage the build-up of excess pore pressures within the fine-grained TBM Spoil.
- The Mackenzie analysis did not consider undrained conditions and the effect of excessive pore pressures.

Golder recommended that consideration be given to sequencing of TBM Spoil placement. The more rocky, free draining TBM Spoil should be ideally placed towards the centre of the Containment Cell, thereby forming a surrounding buttress to the more clayey TBM Spoil. Golder also indicated it would be prudent for the fine-grained TBM Spoil to be:

- Placed near the centre of the cell where their strength has a lesser effect on the stability of the final landform.
- Dried to the extent practical before being placed in the central part of the Containment Cell, away from the other edges.

Additional slope stability assessment should be undertaken to address undrained conditions and excess pore pressure in the central part of the Containment Cell. The recommendations will be considered and discussed with the Auditor engaged to assess the detailed design and it is likely that additional stability analysis will be undertaken.

4.10.4 Infrastructure decommissioning

Infrastructure not required for long term monitoring and management of the Containment Cell will be decommissioned and demobilised from site. This infrastructure includes:

- The Driver Control Station, RFID scanner and automated weighbridge
- Lighting and signage
- Offices and amenities.

The final surface will be covered with subsoil and/or topsoil as appropriate and establishment with grasses.
4.10.5 Ongoing leachate management

On completion of the Containment Cell Cap, the infiltration of stormwater is greatly reduced, thereby reducing the volume of leachate production. Monitoring of leachate levels via the pipe extraction riser will provide an indication of the volumes generated which would then inform the requirement to extract leachate. Regular monitoring of leachate levels and extraction requirements and monitoring of leachate quality will be incorporated into an aftercare management plan.
5 Environmental Risk Assessment

A qualitative environmental risk assessment (ERA) has been undertaken for the MSPF (and is included in Appendix F). The ERA enables identification of potential risk of adverse impacts of construction, operation, and closure activities (including from the receipt, storage, treatment, reprocessing, containment, handling or discharge onto the MSPF of TBM Spoil). This enables development of appropriate mitigation measures to minimise and control those impacts.

The ERA process was based on the approach in ISO 31000:2018 Risk Management – Principles and Guidelines.

The obligations under this TBMSC-EMP are set out in the body of this document. The specialist environmental supporting studies in Table 1-2 have informed the TBMSC-EMP, but do not form part of the TBMSC-EMP. Further, the control and management strategies set out in the Environmental Risk Register (Appendix F) are provided for guidance purposes only and do not form part of the obligations under the TBMSC-EMP.

5.1 Environmental risk assessment approach

5.1.1 Definitions

The project defines impact and risk as:

- Environmental impact is described as any change to the environment as a result of project activities.
- Environmental risk reflects the potential for negative change, injury, or loss with respect to environmental assets. This is consistent with ISO 31000: 2018, which defines risk as “the effect of uncertainty of [environmental] objectives”. Both definitions reflect the fact that risk is normally expressed in terms of the likelihood of a change occurring and the consequence of that change.

5.1.2 Project phases considered

The project phases which are considered in the ERA process include the construction, operation and closure phases, detailed in Table 5-1.
### 5.1.3 Environmental elements/values considered

For the purpose of the assessment of environmental impacts, the meaning of ‘environment’ can include physical, biological, heritage, cultural, social, health, and safety aspects.

The environmental elements/values which were considered that are relevant to this TBMSC-EMP include:

- Groundwater and leachate.
- Surface water.
- Land/soil.
- Air.
- Noise.

It is noted that flora and fauna, weeds, pests and pathogens, greenhouse gases, traffic, aboriginal and historical heritage, public safety, social environment and visual aspects were also considered as relevant to the MSPF project and therefore form part of the ERA included in Appendix F. These aspects are however addressed to meet regulatory requirements to inform the EMP developed in support of a Moorabool Planning Scheme amendment currently under consideration by Minister for Planning. These aspects have not been considered further herein.
5.1.4 Project inputs considered

The project inputs that have informed the ERA are:

- The proposed footprint for TBM Spoil receival, processing and Containment Cell
- Construction management procedures
- Environmental protection measures for construction
- Reports on existing environmental conditions
- Reports prepared to support the application for EPA approval.

5.2 Information on the likely characteristics of TBM Spoil

5.2.1 Source, pathway and receptors

In the ERA potential impact events need to be considered, and these are those events that may be caused by the proposed operations and may result in an adverse impact to an environmental receptor.

A potential impact event is the combination of a source, pathway, and receptor, outlined below:

- Source of the potential impact event means a source which has the potential to cause harm to the environment.
- Pathway describes the means or route by which an identified environmental receptor can be exposed to or may reasonably be expected to be impacted by the identified source.
- Receptor is an environmental value that may reasonably be expected to be adversely impacted by the source.

An impact event can only occur if a source, pathway, and receptor are all present. Potential impact events are not considered further if the assessment demonstrates that an environmental receptor could not reasonably be expected to be adversely affected by the source.

5.2.2 Primary risk level

The primary risk level of the identified value was considered without considering any management and mitigation measures that will be employed on the project. The ERA considers impacts during all stages of the MSPF project (i.e. construction, operations, and closure). Identification of the potential impacts is based on knowledge of the existing environment, experience with similar operations elsewhere and issues of concern to key stakeholders.

5.2.3 Control and management measures

In undertaking the ERA, consideration has been given to avoidance, mitigation and/or management strategies that are technically and economically feasible and reflect a commitment to minimising environmental impact and adopting an approach to the project that demonstrates best practice environmental management.
5.2.4 Residual risk level

The final component of the assessment process involves describing the residual risk level associated with each of the identified values. The residual risk level is developed in the same way as the primary risk level by examining the potential consequences (measure of severity of environmental impact and the likelihood that those impacts will occur).

5.2.5 Risk assessment methodology

The risk assessment criteria used for determining the significance of risks of the project are a product of the likelihood and consequences factors for project-related environmental risks.

Likelihood rating

The likelihood of each event occurring is determined, based on information such as past experience, known meteorological data/site conditions as well as the effectiveness of proposed control measures. The likelihood of the event is categorised as presented in Table 5-2.

<table>
<thead>
<tr>
<th>Category</th>
<th>Likelihood</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Rare</td>
<td>The event may occur only in exceptional circumstances</td>
</tr>
<tr>
<td>D</td>
<td>Unlikely</td>
<td>The event could occur but is not expected</td>
</tr>
<tr>
<td>C</td>
<td>Possible</td>
<td>The event could occur</td>
</tr>
<tr>
<td>B</td>
<td>Likely</td>
<td>The event will probably occur in most circumstances</td>
</tr>
<tr>
<td>A</td>
<td>Almost Certain</td>
<td>The event is expected to occur in most circumstances</td>
</tr>
</tbody>
</table>

Severity/consequence rating

The severity of each event occurring is determined, based on information such as the potential scale of the event, the range of stakeholders who may be affected, the duration of the event, the difficulty in remediating the impact. The severity/consequence of the event is categorised as presented in Table 5-3.
Table 5-3 Severity/consequences

<table>
<thead>
<tr>
<th>Category</th>
<th>Severity</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Catastrophic</td>
<td>Extreme permanent changes to the social or natural environment (not able to be practically or significantly rehabilitated or alleviated); deaths or widespread health and economic effects on public, major public outrage or the consequences are unknown.</td>
</tr>
<tr>
<td>2</td>
<td>Major</td>
<td>Substantial and significant changes; will attract significant public concern; only partially able to be rehabilitated or alleviated. May be doubtful that can be successfully rehabilitated; major costs involved. Changes will be substantial if cumulative effects are considered.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Significant local changes, but these can be rehabilitated or alleviated with difficulty at significant cost and with outside assistance.</td>
</tr>
<tr>
<td>4</td>
<td>Minor</td>
<td>Very local consequence with no significant long-term changes; may be simply rehabilitated or alleviated at some cost without assistance; not significant concern to the community.</td>
</tr>
<tr>
<td>5</td>
<td>Insignificant</td>
<td>Possible impacts but without noticeable consequence.</td>
</tr>
</tbody>
</table>

Risk determination and categories

The risk associated with each event is determined using the matrix presented Table 5-4.

Table 5-4 Risk determination and categories

<table>
<thead>
<tr>
<th>Risk categories</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk category</td>
<td>Rare</td>
</tr>
<tr>
<td>Catastrophic</td>
<td>Medium</td>
</tr>
<tr>
<td>Major</td>
<td>Medium</td>
</tr>
<tr>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Minor</td>
<td>Negligible</td>
</tr>
<tr>
<td>Insignificant</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

5.3 Groundwater and leachate risk assessment

A groundwater risk assessment was completed, which is included in Appendix G. A summary on the findings is presented below.

5.3.1 Groundwater quality objective

The objective is to ensure that there is minimal impact to groundwater from construction, operation and post closure, in particular relating to the management of leachate.
5.3.2 Site-specific groundwater risk assessment

Groundwater risk assessment approach

Estimates of leachate generation and potential rates for leachate seepage through base liners have been assessed and modelled at the various TBM Spoil handling and containment facilities (and is included in Appendix G). The leachate generation estimation was made using the HELP\(^7\) model for the purpose of ensuring TBM Spoil Containment Cell (Mackenzie, 2020) was designed to handle the expected leachate volumes, especially the size of leachate holding ponds and transfer sumps and pumps. The purpose of estimating hypothetical seepage rates of leachate through the base of each facility is as input to an assessment of impact to the quality of groundwater underlying the site (Appendix G). These seepage estimates are largely theoretical as they assume that a continuous supply of leachate is available at the base of the liner – whereas the leachate generation estimates show this to be minimal and discontinuous.

The leachate generation estimates for the Containment Cell made with HELP use climate data to estimate the excess soil moisture following rainfall and after evapotranspiration, a condition that only occurs at Maddingley in the wettest years. This moisture is assumed to percolate down through the contained TBM Spoil and then to accumulate on the base liner and to flow to the leachate sump for extraction to the Leachate Storage Pond. This model has shown that there is minimal opportunity for accumulation of large quantities of leachate on the liner as it is drained laterally by the leachate collection layer and pipes conducing it to the sump.

Given that these calculations were extremely conservative and some attenuation factors in some scenarios indicated a potential to exceed criteria, additional risk characterisation or “reality checks” were undertaken to consider the potential for PFAS to be attenuated in the vadose zone and given the short duration of the MSPF (2 years), the unreality of leachate continuing to be generated and sustain downward seepage of sufficient time to enable PFAS (or another contaminants in leachate) from reaching the water table in the underlying Pyansford Formation Aquifer.

Findings of the groundwater risk assessment

This assessment sets out to address the following objectives:

- **Estimate potential rates of leachate leakage** from the base of the longest-term spoil operating facilities, the Spoil Containment Cell and Leachate Storage Pond, and also the short-term spoil Holding Bays.

- **Estimate the potential for impacts on groundwater** quality by PFAS from leachate from these potential sources.

- **Comment on potential consequent risk of harm** posed by PFAS reaching groundwater beneath the MSPF facilities based on these seepage estimates and also the dilution factors proposed by EnRiskS.

The assessment has found in relation to **rates of leachate leakage**:

- Estimates of leachate generation based on climatic data and modelling (using HELP model) soil moisture storage and percolation after evapotranspiration loses had been calculated by the facility designers Makenzie Environmental. These provide a constraint (or reality check) on the maximum quantity of leachate available to leak through liners of these facilities.

- Calculation of potential scenarios of leachate seepage through the base of the spoil and leachate handling facilities have been undertaken using an analytical Darcian flow model, and the HELP model and Darcian flow results by facility designers Mackenzie Environmental. SLR made independent check calculations of leachate seepage by Darcian flow.

- The assumptions made for modelling were highly conservative and addressed leakage scenarios of “as designed”, “high” and extreme” considered relevant based on a range of values for hydraulic conductivity through liners and leachate heads.

- The estimated seepage from the ‘as designed’ HB, LP, LSP, SCC Sump and the whole SCC (when closed) for saturated flow was [Insert value here].

- The estimated seepage from the ‘as designed’ HB, LP, SCC Sump and whole SCC (prior to closure) for unsaturated flow was [Insert value here].

- The Drying Bays are considered to present a minimal opportunity for leachate seepage, given their relatively likely intermittent use.

The groundwater risk assessment has found in relation to potential impacts on groundwater:

- One key assumption which may not be realistic and ultra conservative is that seepage below sources would immediately transfer to the underlying aquifer (saturated flow assumption above), whereas in reality it would be attenuated by the 40m thick unsaturated zone of clayey Fyansford Formation at the Leachate Sedimentation Pond and Holding Bays and average 27 m beneath the Containment Cell and 14m at the Containment Cell Sump (unsaturated flow assumptions).
• A reality check calculation of the volume of water needed to have percolated from the sources to provide for the commencement of mixing of leachate with groundwater indicates that at least 52 months of infiltration of PFAS contaminated water would extend only 1 m below the Holding Bays, where the greatest annual volumes of seepage was estimated, before the groundwater would be impacted by PFAS. As the facility is planned to operate for only 2 years, this further indicates the low likelihood of PFAS impacting the underlying Fyansford Formation Aquifer.

• The Lower Werribee Formation Aquifer which occurs at 100m below ground at the MSPF, on the basis of hydrogeological first principles, is much less vulnerable to contamination impact than the Fyansford Formation Aquifer. The potential for movement of PFAS contaminated leachate seepage from the Containment Cell, Leachate Sedimentation Pond or Holding Bay, across an approximately 100m thickness of low permeability Fyansford Formation and Maddingley Coal Seam, and then into the more transmissive Lower Werribee Formation Aquifer, is considered non-existent for all practical purposes and therefore was not assessed further.

• Given the calculated leachate seepage rates and the dilution rates by lateral groundwater through flow in the Fyansford Formation Aquifer, PFAS concentration in spoil leachate would need to be orders of magnitude greater than that indicated from data available in the SAQP by the JV’s consultant Agon in order to be detected in seepage water. Indeed, leachate at the risk-based criteria concentration of 9 µg/L, which is vastly greater than expected from the tunnel spoil, would be adequately attenuated using these seepage estimates with further attenuation of PFAS by adsorption in the vadose zone.

• The assessment was conducted without allowance for retardation or attenuation of PFAS movement relative to water movement in the vadose zone. Recent literature shows that PFAS compounds of interest (PFOS, PFHxS and PFOA) can attenuate strongly by adsorption variously by interaction with ionic charges on surfaces on soil; organic content of soil; or more particularly at the air-water interface in soil moisture; and preferentially retained by residual water below field capacity. Retardation factors of approximately 187 could apply to PFOS for water-soil partitioning due to organic carbon content of soil, whereas a factor of up to 2500 could apply due to the air-water interfacial area effect.

• The attenuation factors determined in this report, based on seepage estimates, and assessment of partitioning retardation effects support the conservativeness of Dilution Factors used by EnRiskS (2020) in derivation of Risk Based Criteria for the Containment Cell.

The groundwater risk assessment has found in relation to potential consequent risk of harm from PFAS:

• The risk from PFAS entering groundwater, migrating to surface water, and then people or ecological receptors being exposed is negligible.
• It is considered highly unlikely that leachate concentrations would reach the risk-based criteria derived by EnRiskS, although such high values provide a useful upper limit for short term “spikes” in leachate data should they occur.

5.3.3 Potential construction, operation, and closure groundwater impacts

Potential groundwater impact events during construction, operation and closure include the following:

• Contamination of groundwater by leachate as a result of seepage from the leachate containment system at the Holding Bays, Leachate Sediment Pond and Leachate Storage Ponds and Containment Cell, impacting groundwater dependent ecosystems
• Contamination of groundwater by leachate as a result of seepage from the leachate containment system at the Holding Bays, Leachate Sediment Pond and Containment Cell, impacting down-gradient bore users.
• Contamination of groundwater and impact on groundwater users due to the storage and use of fuels, oils, and chemicals.
• Contamination of groundwater and impact on groundwater dependent ecosystems due to the storage and use of fuels, oils, and chemicals.

5.3.4 Groundwater impacts control and management strategies

The underlying groundwater in the Lower Werribee Formation is protected by approximately 40 m of low permeability Fyansford Formation Aquifer and 60 m of Maddingley Coal Seam which include low permeability geologic materials. The risk of adverse impacts to groundwater, particularly by PFAS has been assessed by SLR (included in Appendix G) and is summarised in Section 5.3.2. This found there was negligible risk of harm to groundwater users or related groundwater dependent ecosystems.

The following additional control and management strategies are proposed:

**Holding Bays and Drying Bays**

• TBM Spoil Holding Bays will contain a leachate collection trenches which enable flow to sumps at several low points.
• Leachate that collects in the sumps will be pumped via polyethylene pipes to the Leachate Sedimentation Pond. Where necessary the pipes will be installed beneath the haul roads and TBM Spoil storage bays.
• Leachate will then be pumped to the Southern Leachate Pond.

**Leachate Sedimentation Pond**
Containment Cell

- Installation of a leachate collection system comprising slotted leachate collection pipes within the aggregate. Leachate will be extracted from the leachate sump using a submersible pump installed down a leachate sump riser pipe. The extracted leachate will be pumped via an above ground leachate conveyance pipe to the Southern Leachate Pond.

Other controls

- Any liquid wastes, fuels and oils stored on-site will be sufficiently bunded to contain any potential spills. Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents and other chemicals during the construction phase will be controlled through spill management actions (including the availability of spill kits) to prevent water quality and ecological impacts and no further mitigation measures are considered necessary. Captured liquid wastes, fuels and oils should be pumped out by a liquid waste contractor and disposed of at an appropriately licenced facility.

- Implementing an effective monitoring and maintenance program for the MSPF.

Closure

- Final capping will be installed on areas of the Containment Cell that have reached final levels to reduce the area that receives rainfall, thereby reducing the amount that infiltrates into the soil mass and reports to the leachate drainage system.

- The surface of the completed Containment Cell will be convex to discharge stormwater, thereby preventing excessive infiltration of incident rainfall.

- All holding bay and Drying Bay infrastructure will be removed, and the site restored with previously stockpile subsoil and topsoil. Prior to restoration a soil sampling program will be implemented to determine whether the operations have resulted in contamination of the liner and subgrade.
5.3.5 Potential residual groundwater impacts and risks

A summary of the identified residual impacts and risks associated with MSPF impacting groundwater is shown in Table 5-5.

<table>
<thead>
<tr>
<th>Impact event</th>
<th>Level of impact</th>
<th>Level of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contamination of groundwater by leachate as a result of seepage from the leachate containment system at receival bays, leachate sediment pond and Containment Cell impacting groundwater users.</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Contamination of groundwater by leachate as a result of seepage from the leachate containment system at receival bays, leachate sediment pond and Containment Cell impacting groundwater dependent ecosystems.</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Contamination of groundwater and impact on groundwater users due to the storage and use of fuels, oils, and chemicals.</td>
<td>Insignificant</td>
<td>Low</td>
</tr>
<tr>
<td>Contamination of groundwater and impact on GDE due to the storage and use of fuels, oils, and chemicals.</td>
<td>Insignificant</td>
<td>Low</td>
</tr>
</tbody>
</table>

5.4 Surface water risk assessment

5.4.1 Surface water quality objective

The objective is to ensure that the proposed project as far as practicable maintains existing water flows and minimises the potential for impact on surface water quality and surface water dependent ecosystems during operation, operation and closure (including from the receipt, storage, treatment, reprocessing, containment, handling or discharge onto the MSPF of TBM Spoil) at the MSPF.

5.4.2 Potential construction, operation, and closure surface water impacts

Potential impact events associated with construction and operation of the project that could affect surface water include:

- Alteration of existing stormwater flow regimes.
- Increase water flows in existing drainage lines.
- Sediment in surface water runoff from the site following rainfall events results in a reduction in water quality of Parwan Creek (and ultimately Werribee River).
- Contamination of surface water from spills leaks from storage and use of fuels, oils, and chemicals.
- Contamination of soil by contaminated runoff.

5.4.3 Surface water impacts control and management strategies

The following control and management measures are proposed:

- Conducting best practice land clearing procedures for all proposed disturbance areas. Land to be cleared progressively as required.
• Undertake disturbance works, as much as is practically possible, during periods when good weather is forecast.

• Minimising the disturbance footprint

• Stabilised rock pads (vibration grid) and/or wheel wash facilities will be installed at all site entry / exit points.

• Installation of swales, bunds, and water management measures to divert clean water around TBM Spoil receival and drying areas into the existing surface water management infrastructure.

• Separation/diversion of ‘clean’ water catchment runoff from disturbed areas (where practical) to minimise sediment-laden runoff volumes requiring treatment.

• Stormwater runoff from the Containment Cell (during operation and post-closure) to be collected in swale drains at the toe of the landform and conveyed into the existing stormwater management system.

• Undertake regular inspection program to audit and monitor sediment control structures such as swales, bunds, and ponds.

• The storage of fuels, oils in accordance with EPA guidelines and AS1940-2004, including appropriate bunding.

• Maintain appropriate spill/kit/clean-up material. Captured liquid wastes, fuels and oils should be pumped out by a liquid waste contractor and disposed of at an appropriately licenced facility.

• Undertake regular inspection program to audit and monitor fuel, oils, and chemical storage areas to ensure integrity, housekeeping, and correct use.

• Progressive rehabilitation and revegetation of Containment Cell and areas of the site no longer required for operations.

• Implementing an effective monitoring and maintenance program for the site.

• Sampling and analysis of soil if impacted by contaminated runoff.

5.4.4 Potential residual surface water impacts and risks

A summary of the identified residual surface water impacts and risks associated with MSPF are shown in Table 5-6.

<table>
<thead>
<tr>
<th>Impact event</th>
<th>Level of impact</th>
<th>Level of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alteration of existing stormwater flow regimes</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Increase water flows in existing drainage lines</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Sediment in surface water runoff from the site following rainfall events results in a reduction in water quality of Parwan Creek (and ultimately Werribee River).</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Contamination of surface water from spills and leaks from storage and use of fuels, oils, and chemicals</td>
<td>Minor</td>
<td>Low</td>
</tr>
</tbody>
</table>
5.5  Land/soil risk assessment

5.5.1  Land/soil quality objective

The objective is to ensure that the proposed project as far as practicable maintains existing land/soil quality and there are no adverse impacts due to construction, operation and closure (including from the receipt, storage, treatment, reprocessing, containment, handling or discharge onto the MSPF of TBM Spoil) at the MSPF.

5.5.2  Potential construction, operation, and closure land/soil impacts

Potential impact events associated with construction and operation of the project that could affect land include:

- Natural soils impacted from potential acid sulfate soils and other contaminants in TBM Spoil material.
- Natural soils impacted by leachate during operation and closure.
- Natural soils impacted from spills leaks from storage and use of fuels, oils, and chemicals.

5.5.3  Land/soil impacts control and management strategies

The following control and management measures are proposed:

- Establishment lining and leachate management systems in the Holding Bays, Drying Bays, and Containment Cell (refer to Section 4.4 and Section 4.5).
- Establish acid sulfate soil management practices to be employed should significant volumes be present in TBM Spoil material.
- The storage of fuels, oils in accordance with EPA guidelines and AS1940-2004, including appropriate bunding.
- Maintain appropriate spill/kit/clean-up material. Captured liquid wastes, fuels and oils should be pumped out by a liquid waste contractor and disposed of at an appropriately licenced facility.
- Undertake regular inspection program to audit and monitor fuel, oils, and chemical storage areas to ensure integrity, housekeeping, and correct use.
- Progressive rehabilitation and revegetation of Containment Cell and areas of the site no longer required for operations.
- Pre and post MSPF sampling and analysis program.

5.5.4  Potential residual land/soil impacts and risks

A summary of the identified residual impacts and risks associated with the MSPF impacting surface water is shown in Table 5-7.
### Table 5-7 Potential residual land/soil impacts and risks

<table>
<thead>
<tr>
<th>Impact event</th>
<th>Level of impact</th>
<th>Level of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural soil impacted due to presence of acid sulfate soil</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Natural soils impacted by leachate during operation and closure</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Natural soil impacted by spills and leaks from storage and use of fuels, oils, and chemicals</td>
<td>Minor</td>
<td>Low</td>
</tr>
</tbody>
</table>

#### 5.6 Air quality risk assessment

##### 5.6.1 Air quality protection objective

The objectives of air quality management are to:
- Comply with statutory requirements
- Avoid or minimise adverse impacts to sensitive receptors through appropriate management measures

##### 5.6.2 Potential construction, operation, and closure air quality impacts

SLR conducted an Air Quality Impact Assessment for the proposed MSPF. The proposed activities and environmental impacts identified for air are summarised in **Table 5-8**.

### Table 5-8 Air quality source and impacts

<table>
<thead>
<tr>
<th>Key activities</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust generation from truck haulage, e.g. between truck entry and exit, TBM Spoil storage and Drying Bays, and Containment Cell.</td>
<td>Nuisance and reduced air quality at the Project boundary and/or at nearby sensitive receptors, with impacts to human health.</td>
</tr>
<tr>
<td>Dust generation from loading and unloading at TBM Spoil storage and Drying Bays and Containment Cell.</td>
<td>Nuisance and reduced air quality at the Project boundary and/or at nearby sensitive receptors, with impacts to human health.</td>
</tr>
<tr>
<td>Dust generation from clearing, grading, compacting, and bulldozing.</td>
<td>Nuisance and reduced air quality at the Project boundary and/or at nearby sensitive receptors, with impacts to human health.</td>
</tr>
<tr>
<td>Wind erosion mobilising dusts from TBM Spoil storage and Drying Bays, and Containment Cell.</td>
<td>Nuisance and reduced air quality at the Project boundary and/or at nearby sensitive receptors, with impacts to human health.</td>
</tr>
<tr>
<td>Combustion emissions from plant and equipment.</td>
<td>Increase in regional greenhouse gas emissions</td>
</tr>
<tr>
<td>Use of diesel fuel, on-site toilets, and waste generated from site offices and lunchrooms.</td>
<td>Nuisance odours</td>
</tr>
</tbody>
</table>

A total of 31 sensitive receptors are present near the site (between 210 and 3,160 m from the site boundary) were modelled.
The maximum predicted incremental deposition rates indicated an exceedance of the dust deposition criterion at one sensitive receptor located on the Geelong-Bacchus Marsh Road at Parwan, which is approximately 1,280 m south-east of MSPF. Further analysis of the data indicates that there is only one month for which the predicted deposition rate exceeds the criterion out of the 60 months (five years) assessed.

5.6.3 Air quality control and management strategies

The following control measures (Table 5-9) have been developed to minimise potential impacts to air quality at the MSPF.

Table 5-9 Control measures for air quality management

<table>
<thead>
<tr>
<th>Potential issues / impacts</th>
<th>Control measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust generation from site operations</td>
<td>Water carts will operate across the site and will spray any exposed dry surfaces, unsealed roads, or any other areas where deemed necessary. Visual dust inspection of work areas to determine if additional dust suppression measures are required. Monthly review of Air Quality and Dust Management Plan performance. Register of complaints relating to dust discharging off-site and records of response actions.</td>
</tr>
<tr>
<td>Wind erosion</td>
<td>Visual dust inspection of work areas to determine if additional dust suppression measures are required. Deployment of depositional dust gauges collection, replacement, and laboratory assessment (NATA accredited) if necessary. Assessment of dust mitigation measures and laboratory data. Monthly review of Air Quality and Dust Management Plan performance.</td>
</tr>
<tr>
<td>Emissions from plant, trucks and vehicles cause environmental nuisance</td>
<td>Comustion equipment meets EPA requirements and are serviced in accordance with manufacturers requirements.</td>
</tr>
<tr>
<td>Odour from food waste and portable toilets</td>
<td>Waste from crib rooms, offices, weighbridge to be segregated and stored in lidded receptacles. Regular collection of waste from portable toilets.</td>
</tr>
</tbody>
</table>

5.6.4 Potential residual air quality impacts and risks

A summary of the identified residual impacts and risks associated with air quality is shown in Table 5-10. Following closure, cessation of operations and successful rehabilitation of the site there would be no adverse impacts relating to air quality from the MSPF site.

Table 5-10 Potential residual air quality impacts and risks

<table>
<thead>
<tr>
<th>Impact event</th>
<th>Level of impact</th>
<th>Level of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust impacts in the surrounding area from construction, operations and closure activities impacting amenity and health of the community.</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Combustion emissions from trucks, vehicles, plant, and equipment.</td>
<td>Insignificant</td>
<td>Negligible</td>
</tr>
<tr>
<td>Odours from inappropriately stored waste.</td>
<td>Insignificant</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
5.7 Noise risk assessment

5.7.1 Noise Objective

The objectives are to:

- Comply with statutory requirements.
- Avoid or minimise adverse noise impacts to receptors through appropriate management measures.

5.7.2 Potential construction, operation, and closure noise impacts

SLR conducted a Noise Assessment for the proposed MSPF. A baseline noise monitoring assessment was undertaken to establish background noise levels at representative noise-sensitive receptors. Modelling was used to provide an indication of potential noise impacts on receptors from the proposed activities. A summary of the source and potential impacts identified is summarised in Table 5-11.

<table>
<thead>
<tr>
<th>Key activities</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise generation from clearance, construction, operation, and closure of MSPF.</td>
<td>Disturbance to sensitive receptors due to noise from vehicles, equipment, and plant operation</td>
</tr>
</tbody>
</table>

5.7.3 Noise control and management strategies

The assessment indicates that noise from the MSPF will comply with the EPA Publication 1411 criteria, based on the variety of assumptions detailed in the noise report. Notwithstanding the predicted compliance, the following broad management measures would be implemented if EPA Publication 1141 levels are not achieved and where feasible and practicable. The implementation would be based on a risk assessment using EPA Publication 1413. The following noise control and management strategies will be undertaken:

- An amenity bund will be installed around operational areas.
- The use of shipping containers as localised barriers may be considered for specific operations.
- Use the lowest-noise work practices and equipment that meet the requirements of the job, particularly when working to the north of the site (nearest the residences).
- If feasible, loading and unloading of TBM Spoil should be planned to minimise the need for reversing of vehicles. Occupational health and safety requirements for the use of warning systems must be followed.
- All mechanical plant is to be silenced by the best practical means using current technology. Mechanical plant, including noise-suppression or hush-kits devices, including devices such as engine enclosures, fan louvres and high-performance mufflers will be required to selected mobile plant and should be maintained to the manufacturer’s specifications.
- Turn off or throttle down the plant and trucks and when not being used.
- Where it is feasible, plant working on the holding bays should operate towards the southern portion of the holding cells, during the late evening and night-time periods.
- If feasible, the scheduling and delivery of TBM Spoil, should minimise unnecessary night-time operations in the north of the site.
• Restrict truck speeds on haul roads to minimise the potential for excessive noise levels.
• Consider using “light-only” reversing alarm or alternative measures; such as a broadband alarm which produces noise across a range of frequencies, smart alarms which can be set to operate at ~5dB above the ambient level and, combination alarms that incorporate both the broadband function and are also self-adjusting.

5.7.4 Potential residual noise impacts and risks

A summary of the identified residual impacts and risks associated with noise emissions is shown in Table 5-12. With careful selection of the plant and equipment and the scheduling of operations (during the evening and night) there should be no adverse impacts relating to noise from the MSPF.

<table>
<thead>
<tr>
<th>Impacts</th>
<th>Level of impact</th>
<th>Level of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disturbance to sensitive receptors due to noise from vehicles, equipment, and plant operation during the operational phase</td>
<td>Minor</td>
<td>Low</td>
</tr>
<tr>
<td>Construction works during the night-time period</td>
<td>Minor</td>
<td>Low</td>
</tr>
</tbody>
</table>
6 Environmental Management Program

6.1 Environmental management system

This Section provides details of the environment management program as required by the TBM Spoil Regulations to mitigate the risk of adverse impacts from the MSPF project.

An Environmental Management System Manual (EMS) is being developed for the proposed operations at the MSPF.

6.2 Sustainable development management approach

MBC is committed to managing the impacts of its activities on the environment, including the local community by adopting the following approach:

- A target of zero harm to the environment
- A commitment to meet all legislative requirements and seek to continuously improve
- A management of environmental risks
- The setting and achievement of targets and the efficient use of resources including the reduction and prevention of pollution
- Respect for the traditional rights of indigenous people and value of cultural heritage
- Development of relationships that foster the sustainable development of our local communities.

Beyond the statements within the Sustainable Development Policy, MPS management provides support for the effective management of environmental issues by:

- Providing adequate resources for the management of environmental aspects
- Ensuring integration of environmental management requirements throughout business processes, e.g. risk assessment, procurement, and acquisition, use of natural resources
- Communication of environmental performance and conformance with environmental requirements, e.g. Quarterly HSE Board Reports, CGLT presentations & Business-wide Communication
- Ensuring that environmental management is reflected across business and departmental objectives, through the development of objectives and targets during the annual business planning process.

6.3 Roles and responsibilities for the TBMSC-EMP

The WGTP is responsible for management of the loading and transport of TBM Spoil from the WGT site to the MSPF. As indicated in Section 3, WGTP personnel will be responsible for sampling and analysis to characterise TBM Spoil and MSPF will be responsible for sampling and analysis for QC (including duplicate samples, etc). The MSPF requirements for receival, documentation and management of TBM Spoil once received and analysed have been documented in Section 4.

The roles and responsibilities of key MSPF personnel are indicated below:

- Overall implementation of the TBMSC-EMP – MSPF Project Manager and operational personnel
• Implement management measures – MSPF Project Manager and operational personnel
• Maintenance of environmental management mitigation measures (stormwater, wastewater and leachate management controls, air quality, noise and potential impacts on flora and fauna, and impact on the amenity of local residents and the public – MSPF Project Manager and operational personnel
• Undertake inspection of stormwater, wastewater, and leachate management controls – MSPF Project Manager or Environmental Officer or nominee
• Facilitate training programs – MSPF Project Manager or MBC Environmental Officer or nominee
• Identify non-conformances and notify MSPF Manager/ Safety Health Environment Quality (SHEQ) Representative – MSPF Environmental Officer or nominee
• Authorise and confirm the implementation of mitigation measures – MSPF Project Manager or MSPF Environmental Officer or nominee
• Coordinate monitoring and compile reports – MSPF Environmental Officer or nominee
• Maintain internal records of monitoring – MSPF Environmental Officer or nominee
• Collate and maintain records of complaints, respond to complainants – MSPF Environmental Officer or nominee
• Overseeing on-site construction activities – Project Construction Manager
• Ensuring compliance of construction activities with conditions of approval, licences, permits and environmental requirement during construction – Project Construction Manager.

6.4 Environmental training and awareness

All personnel, contractors, sub-contractors, consultants working on the project will be assessed for competency in the tasks they will be required to undertake.

Prior to the start of construction and operations all personnel involved on-site at the MSPF project will be required to undertake an environmental induction to ensure they understand their role in protecting and minimising impacts to the environment and the local community. This induction will be part of the general induction process and will also include safety procedures. The induction will include education of environmental objectives and environmental requirements and include details of any site-specific environmental material. A record of induction and attendees will be maintained.

It will be the responsibility of the MSPF Project Manager or Environmental Officer to provide the induction and environmental training to MSPF staff and contractors on stormwater, wastewater, and leachate management issues at the MSPF. The training would include, toolbox talks and presentation of this management plan. Specific training should be provided to operators and site contractors prior to site works and TBM Spoil stockpiling to ensure effective management procedures are implemented. Any environmental issues discovered as part of the monitoring program, should be raised at the toolbox talks.

Specifically, the training will address:
• Background to the project
• Approval conditions, and the role of the TBMSC-EMP
• Legislative requirements of MSPF and individuals
- Key personnel and roles
- Environmental issue at the site and relevant management plans and procedures
- The hygiene and applicable personal protective required for the project
- Community issues related to the project
- Penalties for non-compliance
- Hazard and incident reporting and mitigation measures.

Environmental training of personnel that are involved in off-site activities will not be the responsibility of the MSPF operator.

### 6.5 Material tracking and record keeping procedures

Cradle to Grave Spoil tracking data systems will be implemented to ensure individual loads of unclassified TBM Spoil can be reconciled against individual loads of classified TBM Spoil and their corresponding containment or disposal locations. Data management personnel will be allocated defined and restricted user privileges to update fields in the weighbridge data management system.

The information obtained will be retained in a digital format for a period of at least two years.

#### 6.5.1 Driver control station

The DCS is operated by trained personnel 24 hours a day. On entry, trucks’ radio frequency identification (FRID) tag will be scanned to retrieve the following fields:

- Outgoing Gross and tare weights
- Date and time of weighbridge recording
- TBM ID (TBC)
- Domain (TBC).

The DCS operator will ensure the following fields are assigned during registration:

- Pre-registered Holding Bay ID for the load, including a unique ID to specify the number of times a given Holding Bay has been filled
- Date and time of registration
- Classification of TBM Spoil (unclassified).

Designation of the Holding Bay ID will be determined by the TMB ID and associated domains. Holding Bay IDs will be categorised as:

- Empty - available
- Filling - operational
- Full - unavailable
- Emptying - loading out (post classification).
Holding Bay IDs will be assigned geographical co-ordinates that will be fixed for the duration of the project.

The DCS operator will print a thermal paper docket with the Holding Bay ID no. and provide the driver with instructions to proceed to the unloading zone. All Data will be stored electronically and backed up daily. Incoming weighbridge data will be checked against chain of responsibility requirements and Dallas tag ID attributes, non-compliant loads will be required to park in the waiting zone for further instruction.

6.5.2 Holding Bay classification data management

Sampling of TBM Spoil (primary samples) will be undertaken at the MSPF by WGTP personnel/consultants to achieve 1:350 cubic metres sampling density) with field duplicate and triplicate samples to achieve 1:250 cubic metres sampling density undertaken by MSPF personnel in accordance with the Agon (2020) SAQP.

Laboratory certificates, ESdat data comparison tables, 95 % UCL calculations and Holding Bay classification documentation will be reviewed by suitably qualified personnel and assessed against the acceptance criteria in Tables 3-1 and 3-2. The compliance assessment officer will update the classification field in the weighbridge data management system and issue a work order to TBM Spoil Removal Operations Manager.

6.5.3 Classified TBM Spoil dispatch data management

Prior to load out operations of classified TBM Spoil destined for placement in the Containment Cell or off-site disposal to a licensed landfill, dump truck RFIDs will be allocated to the classified TBM Spoil bay by TBM Spoil Removal Operations Manager. Dump Trucks will enter the MSPF via the RFID scanner to obtain instruction on TBM Spoil Holding Bay number via a display mounted in the truck cabin. On exiting the MSPF the driver will stop at the automated weighbridge for data capture of recorded weight, date, and time. TBM Spoil bay classification and destination will be assigned to the load in the system and the driver will receive instruction on the location of unloading. The driver will be required to acknowledge TBM Spoil load classification and destination prior to exiting the weighbridge.

6.5.4 Spoil classified as prescribed industrial waste

Prior to load out operations of TBM Spoil that has been classified as prescribed industrial waste, PART A and PART B of Electronic Waste Transport Certificates will be completed for the calculated number of loads required to be removed from the Holding Bay.

Category C PIW destined for off-site disposal in a licensed landfill cell will include completion of PART C of the transport certificate. Upon completion of TBM Spoil removal, automated weighbridge data will be used to reconcile generated WTC and excess electronic WTCs will be cancelled in the online system. Transportation of Category A or B PIW destined for off-site treatment and/or disposal will be completed using EPA licensed trucks and require WTC completion of PART A & B only. PART C will be completed by the off-site licensed facility. Electronic weighbridge dockets will be completed prior to trucks leaving site to ensure chain of responsibility requirements are complied with. Weighbridge dockets will be obtained from the off-site licensed facility for reconciliation against on-site weighbridge data.

To facilitate the off-site treatment and/or disposal of TBM Spoil, the project construction company, as the waste producer, will provide waste categorisation reports while MSPF will arrange for transport of the material to the off-site licensed facility.
6.5.5 Leachate extraction, treatment, and reuse

The following record keeping provisions will be included for the leachate extraction, treatment, and reuse:

- Installation of telemetry meters
- Meters to record volume of leachate extracted from:
  - the processing area;
  - the Containment Cell leachate sump;
  - leachate pond for leachate treatment;
  - leachate pond for leachate dust suppression (reuse);
  - treated water for dust suppression (reuse); and
  - If required volumes of leachate disposed as trade waste to sewer.

6.6 Construction quality assurance plan

Construction of the Holding Bays, Drying Bays, Containment Cell, leachate collection systems will be carried out under the full-time supervision of the GITA.

Supervision of the construction and leachate collection system and haul roads shall be carried out at Level 1 Responsibility (full time supervision) by the GITA in accordance with Section 8 of AS3798-2007 Guidelines on Earthworks for Commercial and Residential Development. This is the highest level of earthworks control and provides for the number and type of geotechnical tests required during construction. The GITA will be independent of the Contractor.

Following completion of each component, the GITA as applicable will provide an assessment of compliance of the as-built works against the requirements of the Technical Specifications (Appendix E).

The GITA report will include the following minimum information:

- Results of pre-construction compliance testing of the construction materials.
- Results of construction testing.
- Details of failed tests, including description of rectification procedures and results of tests.
- Review and assessment of the properties of materials for construction of the leachate collection system.
- Review and assessment of the properties of materials for construction of the stormwater management system.
- Description of construction methodologies used by the contractor.
- As built surveys of all components. And an assessment of whether the geometry and grades meet the requirements of the Technical specifications.
- Sufficient detail to demonstrate that all works completed meet the requirements of the design documents.
- GITA opinion on compliance of the works with the requirements of the design documents.
The following Sections provide a brief summary of some of the key testing requirements for pre-construction and construction testing. Further details are included in the Mackenzie Environmental (2020) Specification documents for the Holding Bays and Drying Bays, Sedimentation Pond, Containment Cell (Appendix E).

Pre-construction testing will include:

- 
- 
- 

During construction, the following testing will be undertaken:

- 
- 
- 

The GITA report as detailed above will be reviewed by Mackenzie Environmental.

### 6.7 Pollution incident plan

This Section provides information on the project pollution incident assessment and management.

#### 6.7.1 Incident management, recording and corrective actions

##### 6.7.1.1 Pollution incident

Pollution incidents are defined for the purposes of this plan, consistent with the Environment Protection Act 1970, as incidents that involve the emission, release or deposition of waste, liquids, solids or gaseous substances to the extent that they potentially cause detrimental effects or changes in any elements of the environment (air, surface water, groundwater or land) or emission of noise which cause any of the following effects beyond the boundary of the MSPF will be deemed to be pollution incidents and managed accordingly.

Those detrimental effects or changes make or be reasonably expected to make those environmental elements:

- noxious or poisonous or offensive to the senses of human beings
- harmful or potentially harmful to the health, welfare, safety, or property of human beings
c. poisonous, harmful, or potentially harmful to animals, birds, wildlife, fish, or other aquatic life

d. poisonous, harmful, or potentially harmful to plants or other vegetation

e. detrimental to any beneficial use, protected by policy and relevant to the receptor location, that is made of those environmental elements.

The Manager – HSE will have the authority to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and to direct that relevant actions be ceased immediately should an adverse impact on the environment is likely to occur.

MSPF and its contractors will have a system in place to record environmental incidents, near misses and hazards, to track the implementation and close out of corrective actions and allow analysis of such incidents to identify areas requiring improvement.

If corrective actions are identified as a result of monitoring activities, audit and inspection results, compliance tracking, community complaints the Manager – HSE will determine appropriate management strategies and implementation of contingency measures.

6.7.1.2 Mitigation and response

Upon detecting an exceedance or incident of the limits/performance criteria for surface water, groundwater or leachate, or the occurrence of an incident that causes (or may cause) harm to the environment, the Manager will notify the EPA in writing as soon as practicable thereafter of the exceedance/incident. Within six days of notifying the EPA of an exceedance/incident, the Manager will provide EPA with a written report that:

- Describes the time, date, and location of the incident.
- The nature of the incident.
- The circumstances in which the incident occurred (including the cause of the incident if know).
- The name of the person reporting the incident.

Monitoring results, including any actual or potential significant off-site impacts on people or the environment will be included within the written report.

Depending on the nature of the exceedance and potential contamination the following mitigation (Table 6-1) may be implemented.
### Table 6-1 Mitigation and response measures

<table>
<thead>
<tr>
<th>Element</th>
<th>Triggers</th>
<th>Response measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Groundwater</strong></td>
<td>Monitoring results exceeding the baseline PFAS water quality concentrations in groundwater.</td>
<td>Check level of leachate in the sumps, the Leachate Sediment Pond and the North and South Leachate Pond; resample groundwater bores; investigate potential sources of the contamination; and to develop management strategy in consultation with EPA and the Auditor.</td>
</tr>
<tr>
<td><strong>Leachate</strong></td>
<td>Leachate concentration exceeds the risk-based criteria (Section 3.6).</td>
<td>Treatment of leachate using on-site treatment plant to meet drinking water concentration or concentration for reuse in liner construction.</td>
</tr>
<tr>
<td></td>
<td>Exceedance of allowable leachate level in containment cells</td>
<td>Extract leachate from cells and transfer to the leachate pond for storage, provided the leachate storage pond’s freeboard is not exceeded.</td>
</tr>
<tr>
<td></td>
<td>Exceedance of allowable leachate level in leachate pond (less than 0.5m freeboard)</td>
<td>If the leachate levels in the Southern Leachate Pond exceed that which provide less than 0.5m freeboard, daily monitoring of the level in the leachate pond to confirm capacity is below the pond’s freeboard</td>
</tr>
<tr>
<td></td>
<td>Excessive leachate generation in TBM Spoil bays</td>
<td>Check stormwater control measures and amend as appropriate.</td>
</tr>
<tr>
<td></td>
<td>Uncontrolled seepage from leachate ponds due to damage</td>
<td>Repair leachate pond liner.</td>
</tr>
<tr>
<td></td>
<td>Rupture of leachate transfer pipelines</td>
<td>Regular inspections of the leachate transfer pipelines examining for leaks.</td>
</tr>
<tr>
<td></td>
<td>Cell void contains stormwater</td>
<td>Extract stormwater from cell when below grade and manage as either stormwater or leachate depending on water quality.</td>
</tr>
<tr>
<td><strong>Surface water</strong></td>
<td>PFAS increasing levels over time.</td>
<td>TriPLICATE samples of surface water, sediment, leachate and groundwater should be collected to confirm the results. If the levels are still elevated, biota samples should be collected from both Parwan Creek and Werribee monitoring locations to investigate the risks to the surrounding environment. Develop management strategy in consultation with EPA and the Auditor.</td>
</tr>
<tr>
<td></td>
<td>Leachate spills and loss of containment discharge to surface water drainage. Mixing of leachate with clean surface water.</td>
<td>Install earth bund downstream of spill to contain spill. Pump leachate to Leachate Sediment Pond. Assess storage capacity of leachate holding areas. Increase freeboard if necessary and feasible. Inspect bunds and leachate storage ponds to confirm integrity and repair required.</td>
</tr>
<tr>
<td><strong>Land/soil</strong></td>
<td>Samples exceeds the adopted TBM Spoil acceptance criteria in the stripped areas.</td>
<td>Corrective actions and a Clean Up Plan implemented to define, delineate and validate impact.</td>
</tr>
<tr>
<td></td>
<td>Uncontrolled discharge of TBM Spoil outside storage and processing area or from Containment Cell.</td>
<td>Investigate causes, collect TBM Spoil and return to storage and processing rea and Containment Cell.</td>
</tr>
<tr>
<td>Element</td>
<td>Triggers</td>
<td>Response measures</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Air quality</strong></td>
<td>Site visual inspection indicates uncontrolled discharge of dust from MSPF. Dust deposition rate exceeds the criterion of 4 g/m²/month (or 2 g/m²/month over background).</td>
<td>Review on-site processes and amend as required to minimise potential for future incidents. Investigate whether contamination has occurred, and clean-up as required.</td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td>Exceedance of the regulatory levels (EPA Publication 1411 criteria) or a complaint is received</td>
<td>Assess which processes have caused the emission and develop and implement improvements. Inspect adjacent roads and residences to see if dust deposition has occurred and clean-up as required. Dust controls implemented to reduce dust levels to within this guideline.</td>
</tr>
</tbody>
</table>

The proposed measures for any exceedance event will be described in written report to be provided to EPA in accordance with the TBMSC-EMP.

### 6.7.2 Environmental complaints

MSPF will adopt a complaints policy to:
- Enable MSPF to respond to issues raised by the community and stakeholders in a timely manner
- Ensure public confidence in the project
- Provide information that can be used by MSPF to deliver improvements.

The complaints policy provides guidance to MSPF staff and contractors on the key principles and concepts of our complaint management system. All complaints are recorded on the complaints register.

Upon receipt of a complaint MSPF will undertake the following:
- Within two working days of complaint been registered provide an initial response to the complainant
- Assess and prioritise complaints in accordance with the urgency and/or seriousness of the issues raised
- If a matter concerns an immediate risk to safety or security the response will be immediate and will be escalated appropriately.

The outcome of the complaint is recorded in the complaints register, including:
- Including action taken
- If no action taken, the reason why.

MSPF is committed to managing stakeholder expectations, and will inform them as soon as possible, of the following:
- Expected time frames for actions
- Progress of the complaint
• Possible or likely outcome of the complaint.

MSPF will advise people as soon as possible when unable to deal with any part of their complaint if the complaint is not related to MSPF activities and indicate where such issues and/or complaints may be directed (if known and appropriate).

MSPF will also advise people as soon as possible when unable to meet time frames for responding to their complaint and the reason for delay.

MSPF will record complaints received and responses provided for reporting and transparency purposes.

6.7.3 Contingency planning

During normal operations, there is always the potential for environmental incidents and accidents to occur. To manage these incidents, contingency plans will be developed to guide actions to be taken to minimise the impacts of accidents and incidents. The contingency plans will be reviewed and updated on a regular basis to incorporate new information arising from any incidents, near misses and hazards, and incident response simulation training sessions. These plans will also include the facilitation of fire danger season restrictions and requirements.

Incident response drills will also be undertaken at regular intervals to ensure that personnel are familiar with the plans and the types of incidents that could occur so that there will be a rapid and effective response in the event of a real incident occurring.

6.8 TBM Spoil regulation audit requirements

6.8.1 Auditing regulatory requirements

The TBM Spoil Regulations includes two requirements for audit of the TBM Spoil management process, namely that the TBMSC-EMP must include:

• r.6(2)(q) requirements for an environmental auditor to audit the risk of harm actually or potentially arising from the Activities at the frequency specified in the environment management plan.

• r.6(2)(s) a report prepared by an environmental auditor assessing the suitability of the detailed designs, technical specifications, construction quality assurance plan, monitoring program and pollution incident plan in achieving the requirements and objectives of these Regulations.

In discussions with EPA prior to submission of this TBMSC-EMP some key aspects of this regulation were clarified, namely:

• The audit of risk of harm which, in EPA remedial notices, is often a requirement to undertake a statutory audit under s53V of the Environment Protection Act 1970. A statutory audit is not required to comply with this regulation.

• The frequency of the audits (the audit program) is for the proponent to nominate in the TBMSC-EMP but should include an audit at completion of the activities to manage TBM Spoil at the MSPF.
• The audit of the suitability of the detailed design, technical specification, construction quality assurance plan, monitoring program and pollution incident plan was not intended to be a statutory construction audit such as required for a landfill cell but was intended to be an independent review of each of the documents prior to operation of the relevant part of the facility.

• The auditor must be a suitably qualified person with experience in the development, operation and closure of containment facilities including landfill cells. This must be a person accredited as an EPA environmental auditor.

6.8.2 TBM Spoil audit program

An auditor will be appointed to undertake the following audit program:

• **Initial audit of the design and plans** – an audit the detailed design, technical specification, construction quality assurance plan, monitoring program and pollution incident plan prior to the commencement of TBM Spoil acceptance at the site.

• **Staged construction audits** – an audit of a construction activity or a stage of construction at its completion.

• **Periodic performance audits** – an audit the performance of the MSPF and its operational compliance with the TBMSC-EMP, on a quarterly basis and at MSPF project completion.

• **Final Audit of risk of harm** - an audit of the risk of harm due to the manner in which the MSPF was constructed, operated and closed.

6.8.3 Audit scope and criteria

**Initial audit of design and plans**

The initial audit the detailed design, technical specification, construction quality assurance plan, monitoring program and pollution incident plan will involve the following components of scope and criteria:

1. Undertake an initial site inspection of the MSPF to become familiar with the site conditions and how the proposed facility will be configured on the land.

2. Review the detailed design comprising the drawings, design reports and the technical specification against the design objectives and for compliance with the objectives of the TBM Spoil Regulations to protect the environment and human health.

3. Review the CQAP proposed for use in delivering the Containment Cell as designed and assess it adequacy in accordance with design objectives and those of the TBM Spoil Regulations.

4. Review the monitoring program against the risk assessment provided in the TBMSC-EMP and assess its adequacy to allow the proponent to demonstrate compliance with the plan and protection of the environment.

5. Review the pollution incident plan including its response and contingency plan and assess its adequacy to prevent and mitigate pollution potentially arising from the operation of the facility.

6. Prepare an audit report to document the findings of the initial audit prior to commencement of TBM Spoil acceptance at the site.
Construction staging and audits

While the design is based on the receipt of all TBM Spoil generated from the WGTP at this time, a decision has not been made on the final volume of TBM Spoil that will be received at the MSPF. On this basis total construction of the MSPF project elements will not occur initially and construction will be undertaken in stages to fit in with the allocated TBM Spoil volumes. Therefore, the construction audits will be undertaken for each completed stage to confirm that each component has been constructed in accordance with the approved design and specifications.

Based on an assumed schedule of receipt of TBM Spoil, Table 6-2 outlines the construction stages and associated construction audits that will be required (documentation of this is included in Appendix E). It is noted here that the capping has been included here (however it would be completed after the periodic performance auditing and prior to the final audit).

<table>
<thead>
<tr>
<th>Construction Stage</th>
<th>MSPF Component Construction Audit</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

Table 6-2  Construction staging and audits
**Figure 6-1** shows the proposed staging for construction and auditing.

The construction audits will review the consolidated as built reports to confirm that there has been compliance with the approved design and specifications. For each MSPF component listed in Table 6-2, the auditor will provide a succinct summary construction audit report. The auditor will also undertake selected visual inspections of the separable items, where applicable, including, but not limited to:

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10.
Periodic performance audits

Periodic auditing of the performance of the MSPF and its operational compliance with the TBMSC-EMP will be completed. The periodic performance audits will include:

1. Quarterly site inspections
   
   Inspect the MSPF site and operations on a quarterly basis (as well as at MSPF closure).
   
   The inspections will be completed to observe the implementation of each aspect of the TBMSC-EMP, gather data and evaluate compliance with the environmental protection aspects of the TBMSC-EMP.

2. Quarterly data review

   Review the MSPF site and operations data on a quarterly basis (as well as at project closure).
   
   The data review will comprise obtaining and reviewing data on TBM Spoil, leachate and the environmental monitoring data collected and reported, including:
   
   a. TBM Spoil volumes received and classified.
   b. TBM Spoil volumes placed in the Containment Cell.
   c. TBM Spoil volumes diverted to an EPA licenced waste facility.
   d. Leachate volumes collected in the leachate storage dam.
   e. Quality of leachate in the leachate storage dam.
   f. Volume of leachate treated and reused.
   g. Quality of treated leachate.
   h. groundwater, leachate, surface water (including depth and monitoring data), land/soil, air quality (dust) and noise monitoring results and quality (including leachate level).
   i. Complaints register.

3. Biannual summary audit report

   Provide a summary audit report each six months following first acceptance of TBM Spoil at the MSPF.
   
   The Biannual summary audit report will be in a succinct tabulated form of the key findings against each of the key criteria, including:
   
   a. Compliance with monitoring program (groundwater, leachate, surface water, land/soil, air quality [dust] and noise).
   b. Instances of monitoring results exceeding triggers for contingency actions.
   c. Recommended improvements to operations or monitoring.
Final audit of risk of harm

The final audit will be of the risk of harm to the environment and human health due to the way the MSPF was constructed, operated, and closed. The audit will be performed upon closure of the MSPF, at the completion of TBM Spoil placement and decommissioning of the MSPF. The scope and criteria of the final audit will include:

1. A final site inspection when TBM Spoil Holding Bays and ancillary facilities are decommissioned and demolished and the Containment Cell is closed and capped (refer to cap construction audit reports).

2. Review all environmental monitoring data gathered during the life of the MSPF; review the periodic performance audits and assess or evidence of environmental impacts.

3. Assess the risks of harm to each element of the environment from PFAS in the TBM Spoil received, handled, stored, and contained at the MSPF at the completion of site works.

4. Prepare a final audit report making conclusions on risk of harm.

6.9 Reporting (non-compliance, pollution incidents, audits)

The proponent (MBC) will notify EPA as soon as reasonably practicable after any non-compliance with the TBMSC-EMP that has a potential to cause an impact on the environment to the extent of being a pollution incident.

The proponent (MBC) will provide all audit reports to EPA within seven days of receipt of these reports from the auditor.
7 Environmental Monitoring Program

This Section provides information on the required monitoring for the defined elements of the environment to assess risks of adverse impacts. Additional information on closure and post closure management is included in Section 8. It is noted that the monitoring program details are intentionally high-level only herein, and a more detailed monitoring plan will be prepared for Auditor review prior to commencement of construction. The monitoring plan will consider SAQP requirements specified in NEPM and outline the baseline monitoring required prior to construction, as well as ongoing monitoring program during operation and post-closure.

7.1 Groundwater monitoring program

The groundwater monitoring well network to be monitored at the MSPF is shown on Figure 7-1 Error! Reference source not found..

![Figure 7-1 Groundwater monitoring well network](image)

The groundwater monitoring well network details and location rationale are detailed in Table 7-1.
<table>
<thead>
<tr>
<th>Bore ID</th>
<th>Depth of Bore (mBGL)</th>
<th>Depth of Bore (mAHD)</th>
<th>Aquifer Monitored</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH2</td>
<td>61.5</td>
<td>37.6</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH4</td>
<td>83.5</td>
<td>29.0</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH6</td>
<td>78.0</td>
<td>23.1</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH7</td>
<td>7.0</td>
<td>92.7</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH8</td>
<td>59.0</td>
<td>40.1</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH11</td>
<td>12.2</td>
<td>127.2</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH12</td>
<td>100.5</td>
<td>10.8</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH15</td>
<td>8.2</td>
<td>91.7</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH16</td>
<td>65.2</td>
<td>39.4</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH17</td>
<td>41.0</td>
<td>97.6</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH18</td>
<td>71.0</td>
<td>44.7</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH19</td>
<td>108.5</td>
<td>35.5</td>
<td>Lower Werribee Formation Aquifer</td>
<td>To be decommissioned and replaced with hydraulically upgradient and downgradient bore of the Containment Cell.</td>
</tr>
<tr>
<td>BH20</td>
<td>75.5</td>
<td>33.1</td>
<td>Lower Werribee Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH23</td>
<td>47.0</td>
<td>99.4</td>
<td>Fyansford Formation Aquifer</td>
<td>To be decommissioned and replaced with hydraulically upgradient and downgradient bore of the Containment Cell.</td>
</tr>
<tr>
<td>BH24</td>
<td>9.5</td>
<td>89.8</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH25</td>
<td>11.0</td>
<td>91.4</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH26</td>
<td>10.0</td>
<td>94.6</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH27</td>
<td>10.0</td>
<td>91.5</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>BH28</td>
<td>42.0</td>
<td>97.8</td>
<td>Fyansford Formation Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>GW1</td>
<td>17.3</td>
<td>51.0</td>
<td>Maddingley Coal Seam Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
<tr>
<td>GW2</td>
<td>73.0</td>
<td>44.0</td>
<td>Maddingley Coal Seam Aquifer</td>
<td>Existing downgradient location.</td>
</tr>
</tbody>
</table>

**Proposed Groundwater Monitoring Wells**

<table>
<thead>
<tr>
<th>Bore ID</th>
<th>Aquifer Monitored</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fyansford Formation Aquifer</td>
<td>North west corner of the MSPF.</td>
</tr>
<tr>
<td>Bore ID</td>
<td>Depth of Bore (mBGL)</td>
<td>Depth of Bore (mAHD)</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td></td>
<td></td>
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<tr>
<td>B2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
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</tr>
<tr>
<td>D1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
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<td>E</td>
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<td>G</td>
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<td>H</td>
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</tr>
</tbody>
</table>

Prior to acceptance of TBM Spoil at the MSPF, groundwater will be monitored monthly until two consecutive months of monitoring with reproducible results are reported. During operation and for a period of five years after closure, groundwater will be monitored quarterly (with results and consideration of whether monitoring can cease be made by an Auditor at that time).

Groundwater will be sampled and analysed for water quality parameters (pH, EC, DO and TDS), standing water levels and PFAS (PFOS, PFOA and PFHxS) at a NATA accredited laboratory for the analysis requested. Other testing may be required depending on the results of TBM Spoil testing.
The sampling will be conducted by a suitably qualified person in accordance with the EPA Publication 669, IWRG701 and AS5667.11 and the PFAS NEMP.

The laboratory analytical data will be reviewed, assessed, and reported biannually an experienced hydrogeologist. Additional groundwater monitoring bores may be required depending on the findings.

The trigger level will be monitoring results exceeding the baseline water quality concentrations. The contingency plan would be to: check level of leachate in the sumps, sediment ponds and leachate ponds; resample groundwater bores; investigate potential sources of the contamination; and to develop a management strategy in consultation with EPA and the Auditor.

7.2 Leachate monitoring program

Leachate sampling will be completed in the Leachate Sedimentation Pond (one location), the Northern Leachate Pond (one location), the Southern Leachate Pond (one location) and the leachate collection sumps (four locations).

Leachate samples will be analysed for PFAS (PFOS, PFOA and PFHxS) at a NATA accredited laboratory for the analysis requested. Other testing may be required depending on the results of TBM Spoil testing.

Leachate levels in the containment cell sump will be continuously monitored using a pressure transducer or air bubbler. MBC will check and record the leachate levels on a daily basis.

The leachate quality will be assessed at the following frequency:

- Initially during filling.
- At time of leachate removal
- Before reuse following an accumulation of 5 megalitres of leachate.
- A weekly basis for the first three months of operation.
- Three-monthly during operation and following closure for a period of five years (with results and consideration of whether monitoring can cease be made by an Auditor at that time).

The sampling will be conducted by a suitably qualified person in accordance with the EPA Publication 669, IWRG701, AS5667.11 and the PFAS NEMP.

The monitoring results will be reviewed, assessed, and reported by an experienced hydrogeologist to assess if there is a change in quality. This will enable establishment of an algorithm to enable assessment of the leachate quality.

If the drinking water guidelines for PFAS are exceeded, then treatment of PFAS would be required. Reuse of PFAS for dust suppression will only occur if levels are below drinking water guidelines for PFAS.

Trigger levels for additional management measures for leachate will be not more than 300mm in the containment cell sump and not less than 500 mm freeboard in the leachate pond. If the leachate levels reach these triggers then actions will be undertaken by MBC to monitor and manage to ensure levels are reduced to the acceptable level, including consideration of whether upgrades to infrastructure are required to deal with additional volumes being generated.
## 7.3 Surface water monitoring program

The pink crosses in **Figure 7-2** represent the surface water monitoring well network that has been monitored at the MSPF as part of the Factual PFAS Baseline Assessment.

![Surface water monitoring network](image)

**Figure 7-2** Surface water monitoring network

As part of ongoing monitoring at the MSPF, a summary of the locations to be monitored and the rationale is presented in **Table 7-2**.

<table>
<thead>
<tr>
<th>Surface water monitoring location</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam D1</td>
<td>Onsite surface water condition</td>
</tr>
<tr>
<td>Dam D2</td>
<td>Onsite surface water condition</td>
</tr>
<tr>
<td>Dam D5 (Fire Dam)</td>
<td>Onsite surface water condition</td>
</tr>
<tr>
<td>Dam D6</td>
<td>Onsite surface water condition</td>
</tr>
<tr>
<td>Dam GWR3</td>
<td>Onsite surface water condition</td>
</tr>
<tr>
<td>Irrigation Dam</td>
<td>Discharge point to Parwan Creek</td>
</tr>
<tr>
<td>North Boundary Parwan Creek</td>
<td>Downgradient of site in Parwan Creek</td>
</tr>
<tr>
<td>South Upstream Parwan Creek</td>
<td>Upgradient of site in Parwan Creek</td>
</tr>
</tbody>
</table>

**Table 7-2** Surface water monitoring network and rationale
As indicated in **Section 7.1**, it is proposed to install a groundwater bore down hydraulic gradient of the Containment Cell. This is effectively a sentinel bore which will provide an early detection of the potential for contamination of Parwan Creek. The data from this bore will also be considered in surface water monitoring results that will be reported to the Auditor for consideration as part of the periodic performance auditing program.

The surface water monitoring program will comprise biannual monitoring during construction, operation and post closure for a period of five years for water quality parameters (pH, EC, DO and TDS) and PFAS (PFOS, PFOA and PFHxS) and potentially other testing as required depending on the TBM Spoil analytical results, at a NATA accredited laboratory. Water levels in onsite dams will also be monitored following heavy rainfall events.

Sampling will be conducted by a suitably qualified person in accordance with the IWRG701, AS5667.11, EPA Publication 669 and the PFAS NEMP.

If concentrations of PFAS levels show a demonstrated trend of increasing levels over time, triplicate samples of surface water, sediment, leachate and groundwater should be collected to confirm the results. If the levels are still elevated, biota samples should be collected from both Parwan Creek and Werribee monitoring locations to investigate the risks to the surrounding environment.

### 7.4 Land/soil monitoring program

**Prior to and as part of construction:**

- Prior to the preparation of the Holding Bays and Drying Bay footprints, test pits are to be excavated and samples collected from within 300 mm of the design surface of the compacted clay floor of the Holding Bays and Drying Bays. Test pits will be excavated on an approximate grid of 100 m x 100 m.
- Samples will be analysed for PFAS (PFOS, PFHxS and PFOA) and IWRG621 suite at a NATA accredited laboratory.
- Sampling will be conducted by a suitably qualified third party in accordance with IWRG701, the AS5667.11 and the PFAS NEMP.

Given that migration pathways to the underlying in-situ soil will be restricted by installation of compacted clay liners and leachate collection systems, soil monitoring does not form part of the monitoring program for the operational activities.

**On completion of the project:**

- the Holding Bays and Drying Bay liners and other temporary infrastructure such as the Leachate Sediment Pond will be stripped and disposed of within the Containment Cell.
- Samples will be collected below the 250 mm stripping profile, at the frequency prescribed in IWRG702.
- Samples will be and analysed for IWRG621, PFAS (PFOS/PFHxS and PFOA) and leachability for PFAS compounds.
• The analytical method will be similar or compatible with those used by the JV (or an agreed third party) for the sampling and testing of TBM Spoil.

• This material is deemed to be residual waste from the TBM Spoil and therefore as discussed with EPA would not require additional approval for placement in the Containment Cell. Sampling and analysis would be undertaken to confirm the material met the criteria for placement in the Containment Cell.

In the event TBM Spoil Holding Bay samples exceed the project classification criteria for a given bay, corrective actions shall be developed under a Clean Up Plan, to the extent practicable, in order to define and delineate impacted areas. Further sampling, analysis, classification, and appropriate disposal thereof, under guidance/verification by the EPA-appointed environmental auditor engaged by MSPF may be warranted.

### 7.5 Air quality (dust) monitoring program

The air quality impact assessment predicted a minor exceedance of the dust deposition rates criterion at one sensitive receptor located on Cummings Road at Parwan, which is approximately 1,280 m south-east of MSPF. Further analysis of the data indicates that there is only one month for which the predicted deposition rate exceeds the criterion out of the 60 months (five years) assessed. This receptor is owned by MBC and has been vacant for many as the building is derelict.

#### 7.5.1 Dust deposition monitoring

Dust deposition monitoring will be conducted to indicate the effectiveness of site management practices and the potential for off-site nuisance. Monitoring will be conducted at the locations shown in Figure 7-3.
Monitoring will be conducted as follows:

- at site boundary locations at which the potential for off-site dust emissions (i.e. dust crossing the site boundary) has been identified.
- at locations on the site boundary conservatively representative of sensitive receptors near to the site boundary (e.g. residences)\(^8\).
- at sites conservatively representative of sensitive receptors (e.g. residences) near to unsealed public roads along which site haulage traffic is to use.

Proposed monitoring locations informed by prevailing wind conditions (primarily northerlies, southerlies and westerlies), haulage routes and site activities are provided in **Table 7-3** and **Figure 7-3**.

\(^8\) In general, access to third party sensitive receptors near to the site boundary is unavailable.
Table 7-3  Air quality monitoring location rationale

<table>
<thead>
<tr>
<th>DDG ID</th>
<th>Description</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDG_1</td>
<td>Kerrs Road (north site boundary)</td>
<td>Downwind location during southerly winds. Monitoring impacts from</td>
</tr>
<tr>
<td></td>
<td></td>
<td>holding bay area activity and from haulage along unsealed public roads.</td>
</tr>
<tr>
<td>DDG_2</td>
<td>West site boundary</td>
<td>Background during westerly and northerly winds. Monitoring drying bay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>bay area activity during southerlies.</td>
</tr>
<tr>
<td>DDG_3</td>
<td>South site boundary</td>
<td>Downwind location during northerly winds, <em>background</em> location during</td>
</tr>
<tr>
<td></td>
<td></td>
<td>southerly winds</td>
</tr>
<tr>
<td>DDG_4</td>
<td>Cummings Road</td>
<td>Downwind location during westerly winds – cumulative impacts from site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and neighbouring landfill.</td>
</tr>
<tr>
<td>DDG_5</td>
<td>Tilleys Road</td>
<td>Downwind location during southerly winds – cumulative impacts from site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and neighbouring landfill. Monitoring impacts from haulage along unsealed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>public roads.</td>
</tr>
<tr>
<td>DDG_6</td>
<td>Background</td>
<td>Background location but also conservatively representative of impacts in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bacchus Marsh including at Bacchus Marsh Grammar.</td>
</tr>
</tbody>
</table>


Sample collection will be conducted by suitably qualified person(s) holding NATA accreditation for the monitoring method (*AS/NZS 3580.10.1*), generally on a three-monthly basis.

Sample analysis will be conducted by a NATA accredited laboratory for reporting total insoluble solids and ash content.

The total insoluble solids deposition rate will be assessed against a criterion of 4 g/m$^2$/month (or 2 g/m$^2$/month over background)*. If the dust deposition rate exceeds this value, site management practices will be reviewed and dust controls implemented to reduce dust levels to within this guideline.

**7.5.2  Visual monitoring**

Daily visual monitoring of dust generation will be conducted at the site and appropriate mitigation measures taken (e.g. increased haul road watering and reduced speed limits for site vehicles on unsealed public and site roads). The dust inspection checklist and meteorological information will be recorded daily.

Dust deposition and visual monitoring results will be reported quarterly during construction and operation.

**7.6  Noise monitoring program**

The noise monitoring locations are shown in *Figure 7-4*.

---

The monitoring network will comprise attended and unattended noise monitoring at two locations, north and south of the MSPF (to assess impacts to sensitive receptors) as well as a third location within the MSPF likely around the Holding Bays (to assess the MSPF operations).

The noise monitoring programme will be a staged undertaking:

- Permanent noise loggers will be deployed in the initial phase of the works to monitor the noise level so that an assessment can be made to confirm that the measured noise levels should be attributable to the MSPF works.

- Noise monitoring will be conducted for the whole duration of the construction works. The monitoring can be in the form of attended or un-attended monitoring (using loggers). The type of monitoring will depend on the outcomes of the monitoring during the initial phase of works, during peak operations and during wind-down operations.

- Daily observations of the noise level will be monitored during operation.
• Noise levels during night works as part of construction or operation (which will only occur when unavoidable as per EPA Publication 1254) will also be monitored to evaluate the impacts on the sensitive receptors.

This monitoring of the construction and operation activities will allow verification that the levels are within regulatory levels (EPA Publication 1411 criteria). Where an exceedance of the regulatory levels (EPA Publication 1411 criteria) or a complaint is received, an assessment of whether MSPF is the source of the noise issue will be undertaken. Should exceedances be recorded, a review of operations will be conducted, and reasonable and feasible mitigation measures will be implemented.

7.7 Records of monitoring

Copies of all monitoring reports will be kept by MSPF throughout the duration of the project. The above monitoring reports should be reviewed monthly by MSPF and/or its consultants to ensure that any adverse impacts on the environment are proactively manage and that there are continuous efforts to improve environmental management of the site.

The MSPF will maintain records and undertake reporting in accordance with the requirements of the Environment Protection, and reporting of pollution incidents outside the processing area in accordance with the provisions in the TBM Spoil Regulations.

7.8 Summary of monitoring and reporting

Table 7-4 summarises the inspection and monitoring requirements during construction and operation of the project. Additional triggers and actions are summarised in Table 6-1.

<table>
<thead>
<tr>
<th>Type of monitoring</th>
<th>Monitoring details</th>
<th>Frequency and stage</th>
<th>Triggers and Actions</th>
<th>Responsible person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater</td>
<td>Water levels pH, EC, DO and TDS. PFAS Other testing as required depending on the TBM Spoil results.</td>
<td>Monthly prior to commencement of construction and acceptance of TBM Spoil until such time as there are two consecutive months of reproducible results. Three-monthly during operation and thereafter for a period of five years after closure. To be reviewed after five years.</td>
<td>The trigger level will be monitoring results exceeding the baseline water quality concentrations.</td>
<td>MSPF and its consultant</td>
</tr>
<tr>
<td>Type of monitoring</td>
<td>Monitoring details</td>
<td>Frequency and stage</td>
<td>Triggers and Actions</td>
<td>Responsible person</td>
</tr>
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<td>--------------------</td>
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</tr>
<tr>
<td>Leachate</td>
<td>PFAS. Other testing as required depending on the TBM Spoil results. Water level. The quantity of leachate removed from the MSPF.</td>
<td>Sample during initial filling. Before reuse, following accumulation of 5 ML. Weekly during first three months of operation. At time of leachate removal. Three-monthly during operation and thereafter for a period of five years after closure. To be reviewed after five years.</td>
<td>The contingency plane would be to: check level of leachate in the sumps, the Leachate Sediment Pond and the North and South Leachate Pond; resample groundwater bores; investigate potential sources of the contamination; and to develop management strategy in consultation with EPA and the Auditor.</td>
<td>MSPF and its consultant</td>
</tr>
<tr>
<td>Type of monitoring</td>
<td>Monitoring details</td>
<td>Frequency and stage</td>
<td>Triggers and Actions</td>
<td>Responsible person</td>
</tr>
<tr>
<td>-------------------</td>
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</tr>
<tr>
<td>Surface water</td>
<td>pH, EC, TDS. PFAS. Other testing as required depending on the TBM Spoil results. Water level.</td>
<td>Biannual during operation and for a period of five years after closure. Water level only following heavy rainfall (i.e. more than 20 mm of rainfall in a 24-hour period).</td>
<td>PFAS increasing levels over time, triplicate samples of surface water, sediment, leachate and groundwater should be collected to confirm the results. If the levels are still elevated, biota samples should be collected from both Parwan Creek and Werribee monitoring locations to investigate the risks to the surrounding environment.</td>
<td>MSPF and its consultant</td>
</tr>
<tr>
<td>Land/soil</td>
<td>PFAS IWRG621 Suite</td>
<td>Prior to construction At completion of project following stripping and placement in Containment Cell.</td>
<td>If the sample analysis exceeds the adopted acceptance criteria in the stripped areas, corrective actions and a Clean Up Plan implemented to define, delineate and validate impact.</td>
<td>MSPF and its consultant</td>
</tr>
<tr>
<td>TBM Spoil</td>
<td>The quantity of TBM Spoil received at the processing area and the date.</td>
<td>As received.</td>
<td>-</td>
<td>MSPF</td>
</tr>
<tr>
<td></td>
<td>The quantity of TBM Spoil removed from the processing area for deposit in the containment system.</td>
<td>At time of transfer to Containment Cell.</td>
<td>-</td>
<td>MSPF</td>
</tr>
<tr>
<td></td>
<td>The quantity of TBM Spoil removed from the processing area for deposit at a licensed facility.</td>
<td>At time of transfer.</td>
<td>-</td>
<td>MSPF</td>
</tr>
<tr>
<td>Type of monitoring</td>
<td>Monitoring details</td>
<td>Frequency and stage</td>
<td>Triggers and Actions</td>
<td>Responsible person</td>
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<tr>
<td>--------------------</td>
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</tr>
<tr>
<td>Dust</td>
<td>Visual observations.</td>
<td>Daily during construction and operation.</td>
<td>Increased visible dust then implement mitigation measures (e.g. increased haul road watering and reduced speed limits on unsealed public roads and site roads).</td>
<td>MSPF</td>
</tr>
<tr>
<td></td>
<td>Total insoluble solids and ash content.</td>
<td>3-monthly during construction and operation.</td>
<td>If dust deposition rate exceeds the criterion of 4 g/m²/month (or 2 g/m²/month over background), site management practices will be reviewed and dust controls implemented to reduce dust levels to within this guideline.</td>
<td>MSPF and its consultant</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise loggers will be deployed in the initial phase of the works to monitor the noise level so that an assessment can be made to confirm that the measured noise levels should be attributable to the MSPF works. Noise monitoring will be conducted for the whole duration of the construction works. The monitoring can be in the form of attended or unattended monitoring (using loggers). Daily observations of the noise level will be monitored during operation.</td>
<td>Prior to construction, during construction and operation and during night works. Daily monitoring during operation.</td>
<td>Where an exceedance of the regulatory levels (EPA Publication 1411 criteria) or a complaint is received, an assessment of whether MSPF is the source of the noise issue will be undertaken. Should exceedances be recorded, a review of operations will be conducted, and reasonable and feasible mitigation measures will be implemented.</td>
<td>MSPF and its consultant</td>
</tr>
<tr>
<td>Type of monitoring</td>
<td>Monitoring details</td>
<td>Frequency and stage</td>
<td>Triggers and Actions</td>
<td>Responsible person</td>
</tr>
<tr>
<td>--------------------</td>
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<td>--------------------</td>
</tr>
<tr>
<td>Noise levels</td>
<td>Noise levels during night works as part of construction or operation (which will only occur when unavoidable as per EPA Publication 1254) will also be monitored to evaluate the impacts on the sensitive receptors.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8 Closure and Post-closure Management and Monitoring

This Section provides information on the closure and post-closure provisions as required by the TBM Spoil Regulations in order to mitigate the risk of adverse impacts.

8.1 MSPF closure environmental site assessment and management

On completion of the project, the TBM Spoil holding/storage bay area and Drying Bay area will be stripped and disposed of within the Containment Cell. Samples taken below the 300 mm stripping profile will be collected and analysed for IWRG621 and PFOS/PFhS and PFOA.

In the event that samples from either bay exceed the project classification criteria for a given bay, corrective actions shall be developed under a Clean Up Plan, to the extent practicable, in order to define and delineate impacted areas. Further sampling, analysis, classification, and appropriate disposal thereof, under guidance/verification of the EPA-appointed environmental auditor engaged by MSPF may be warranted.

All laboratory analysis of samples will be completed by a NATA accredited laboratory.

Following sampling an analysis the voids will be backfilled using either soils from the amenity bund, previously stockpiled subsoil, and topsoil or from borrow areas, which have been confirmed as acceptable. The completed surface will be seeded with grasses.

8.2 MSPF closure infrastructure decommissioning

Infrastructure not required for long term monitoring and management of the Containment Cell will be decommissioned and demobilised from site. This infrastructure includes:

- The driver control station, RFID scanner and automated weighbridge
- Lighting and signage
- Offices and amenities.

8.3 MSPF closure surface reinstatement and revegetation

Spoil storage/Holding Bays and TBM Spoil Drying Bays will be cut and filled to blend in with the natural topographic features.

The Containment Cell will be capped and graded to enable control of runoff to perimeter swales located at the toe. The final surface will be covered with topsoil and vegetated with grasses.

8.4 Additional monitoring of infrastructure

Additional groundwater and surface water monitoring infrastructure will be installed as may reasonably be required by EPA.
8.5 Containment Cell aftercare cap monitoring and maintenance

Regular monitoring of the final cap and cap vegetation will be incorporated into an aftercare management plan and remediated as required.

8.6 Containment Cell aftercare ongoing leachate management

On completion of the Containment Cell Cap, the infiltration of stormwater is greatly reduced, thereby reducing the volume of leachate production. Monitoring of leachate levels via the pipe extraction riser will provide an indication of the volumes generated which would then inform the requirement to extract leachate. Regular monitoring of leachate levels and extraction requirements shall be incorporated into an aftercare management plan.

8.7 Containment Cell aftercare environmental management

An aftercare environmental management plan will be developed at the relevant time, to the satisfaction of EPA.
9 TBMSC-EMP Review

9.1 Frequency

The TBMSC-EMP is a dynamic document that will be subject to regular review and continuous improvement. Review of the TBMSC-EMP will include a process of adaptive management, where the effectiveness of environmental controls and procedures is continually assessed to ensure best practice environmental management. The reviews would occur on an ongoing basis. A formal review process will be developed as the project progresses. The following circumstances may also trigger a review:

- Changes in the scope and design of the project
- Changes in regulatory standards
- Following environmental incidents, reported non-compliance or in response to complaints
- Subsequent to project environmental audits where outcomes require improvement.

9.2 Document distribution and approval

In accordance with the EMS, records will be kept of monitoring results to assess the environmental performance of the project. The following document controls will be implemented:

- Documents are reviewed, revised as necessary and approved for adequacy by authorized personnel
- The current version of relevant documents shall be available at all locations where operations essential to the effective functioning of the environmental management plan
- Documents of external origin determined to be necessary for the planning and operation of the TBMSC-EMP are identified and their distribution controlled
- Obsolete documents shall be promptly removed from all points of issue and use, or are otherwise assured against unintended use
- Any obsolete documents retained for legal and / or knowledge preservation purposes shall be suitably identified.

All documentation shall be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner, and retained for a specified period. MBC shall establish, implement and maintain a procedure for the creation and modification of the various types of documents and the respective responsibilities for such creation and modifications.

10 References

10.1 Legislation, regulations and guidelines

- Australian and New Zealand Guidelines for Fresh & Marine Water Quality – Aquatic Ecosystems
- Catchment and Land Protection Act 1994
- Environment Protection (Management of Tunnel Boring Machine Spoil) Regulations 2020
- Environment Protection (Scheduled Premises) Regulation 2017
- Environment Protection Act 1970
- Environment Protection Act 2017
- EPA (6 February 1996) Publication 480: Environmental guidelines for major construction-sites
- EPA (28 October 2011) Publication 1411: Noise from Industry in regional Victoria
- EPA (May 2016) Publication 1624 Industrial Waste
- EPA (3 May 2018) Contaminated Soil Management and Reuse on Major Infrastructure Projects
- EPA (October 2019) Publication 1669.3 Interim Position Statement on PFAS.
- EPA (1 August 2018) Soil Management Plan
- EPA (October 2019) Publication 1669.3 Interim Position Statement on PFAS
- EPA (April 2018) Publication IWRG814.2 Vehicle guidance: Non-tanker vehicles/trailers
- Heads of Environmental Protection Authorities (January 2020) PFAS National Environmental Management Plan, Version 2.0
- ISO 31000:2018 Risk Management – Principles and Guidelines
- National Environment Management (Assessment of Site Contamination) Measure 1999 (amended 2013)
10.2 Site specific references

- Agon (2020) WGTP Sampling and Analysis Quality Plan prepared for the JV
- Chadwick Geotechnics (May 2020) Undisturbed Permeability Tests from the Storage Bays Imported PFAS from WGTP
- Chadwicks Geotechnics (May 2020) Undisturbed and Disturbed Permeability Tests from the Storage Bays and Soil Containment Cell Imported PFAS from WGTP
- EnRiskS (June 2020) Human Health and Ecological Risk Assessment: Re-Use of Spoil with PFAS at MBC
- Paul Fridell of ERM (12 September 2019) S53V Audit of Landfill Cell Construction - Landfill Cell 6, Stage 2 – East Maddingley Road Landfill, Bacchus Marsh
- SLR (2020) PFAS Leachate Seepage Estimates and Assessment of Risks to Groundwater
- SLR (2020) PFAS Leachate Estimates and Assessment of Risk to Groundwater (640.12131-L01-R05)
- SLR (2020) PFAS Baseline Assessment (Surface Water, Groundwater and Sediment) (640.12121-R05-v3.0)
- Chadwicks (2020) Geotechnical and permeability investigation Undisturbed Permeability Tests from the Storage Bays Imported PFAS from WGTP (1012657.000.L4)
- Chadwicks (2020) Undisturbed and Disturbed Permeability Tests from the Storage Bays and Soil Containment Cell Imported PFAS from WGTP (1012657.000.L5)
- Golder (30 March 2020) Geotechnical Review of Westgate Tunnel Spoil Handling Facility at Maddingley Coal Site (19136175-005-L-Rev0)
- SLR (2020) Air quality impact assessment (640.12131-R01-v6.0)
- SLR (2020) Noise impact assessment & management (640.12131-R02-v5.0)
- Traffix Group (2020) Traffic Impact Assessment (G27822R-01iG)
- Mackenzie Environmental (2020) Revised Concept Design (191042_026_L_Rev0)
- Mackenzie Environmental (2020) WGTSPF construction staging concept_V3
- Mackenzie Environmental (2020) Proposed Scope of Design Assessment and Construction Audit (191042_025_L_Rev2)
• Mackenzie Environmental (2020) 191042 - 100 Maddingley Spoil Processing Facility Containment Cell Rev E
• Mackenzie Environmental (2020) 191042_011_R_Rev1_Containment Cell Cap Design Report
• Mackenzie Environmental (2020) 191042_010_R_Rev1_Containment Cell Cap Technical Specification
• Mackenzie Environmental (2020) 191042_008_R_Rev3_Leachate Sedimentation Pond Design Report
• Mackenzie Environmental (2020) 191042_007_R_Rev3_Leachate Sedimentation Pond Technical Specification
• Mackenzie Environmental (2020) 191042 - 200 Maddingley Spoil Processing Facility Leachate Sedimentation Pond Rev D
• Mackenzie Environmental (2020) 191042_005_R_Rev4_Holding and Drying Bays Design Report
• Mackenzie Environmental (2020) 191042_004_R_Rev6_Holding and Drying Bays Technical Specification
• Mackenzie Environmental (2020) 191042 - 500 Maddingley Spoil Processing Facility Contingency Drying Bays Rev B
APPENDIX A – HEALTH AND ECOLOGICAL RISK ASSESSMENT
APPENDIX B – GEOTECHNICAL AND PERMEABILITY INVESTIGATIONS
APPENDIX C – GEOTECHNICAL REVIEW
APPENDIX D – REVISED CONCEPT DESIGN REPORT
APPENDIX E – DESIGN REPORTS AND TECHNICAL SPECIFICATION REPORTS
APPENDIX F – ENVIRONMENTAL RISK REGISTER
APPENDIX G – PFAS LEACHATE SEEPAGE ESTIMATES AND ASSESSMENT OF RISK TO GROUNDWATER
APPENDIX H – EPA SPOIL CLASSIFICATION
TUNNEL BORING MACHINE SPOIL CONTAINMENT

ENVIRONMENTAL MANAGEMENT PLAN

Maddingley Brown Coal Soil Processing Facility

East Maddingley Road, Bacchus Marsh, VIC 3340

August 2020