# Long-Term Environmental Management Plan

S1 and S2 Warehouses, Moorebank Precinct West

400 Moorebank Avenue, Moorebank, NSW

Prepared for: Logos Property Group c/o Tactical Group Pty Ltd

EP1489.020_v0 18 March 2024

APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

APPROVED COMPANY ISO 45001 Occupational Health & Safety Management Systems QMS Certification Services

APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services

EP RISK

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Logos Property Group c/o Tactical Group Pty Ltd
Via email: [redacted]

18 March 2024

Our Ref: EP1489.020_v0

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| **Abbreviations and Terminology** | | |
|---|---|---|
| **Abbreviations** | **Term** | **Definition** |
| AF | Asbestos Fines | AF includes free fibres, small fibre bundles and small fragments of bonded ACM that pass through a 7 mm x 7mm sieve. Equivalent to "friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2022). |
| AHD | - | Australian Height Datum |
| Ammunition | Ammunition | A device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological, or chemical material for use in connection with defence or offence including demolitions. Certain ammunition can be used for training, ceremonial, or other non-operational purposes. |
| AMP | Asbestos Management Plan | See **(Golder 2016b).** |
| AOC | Area of Concern | An area identified as containing potential contamination. Can also be referred to as Quarantined Area. |
| As | - | Arsenic |
| BGS | - | Below Ground Surface |
| BioBanking Agreement Area | See also Offset Area | Vegetated areas which are to be conserved and no construction to occur. |
| Bonded ACM | Bonded Asbestos Containing Materials | Bonded ACM comprises ACM, which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. This term is restricted to material that cannot pass a 7 mm x 7mm sieve. Equivalent to "non-friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2022). |
| BTEX | - | Benzene, Toluene, Ethylbenzene and Xylenes |
| Cd | - | Cadmium |
| CLM | - | Contaminated Land Management |
| CMP | Contamination Management Plan | EP Risk 2020 |
| CoC | Conditions of Consent | Conditions of Consent SSD 5066 |
| Conservation Area | Same as BioBanking Area | See BioBanking Area |
| Construction Area | - | Extent of construction works, namely areas to be disturbed during the construction of the Site. |
| COPC | - | Contaminants of Potential Concern |
| Cr | - | Chromium |
| CSM | - | Conceptual Site Model |
| Cu | - | Copper |
| DBYD | - | Dial Before You Dig |
| DNAPL | - | Dense Non-Aqueous Phase Hydrocarbons |
| DPI&E | - | NSW Department of Planning, Industry and Environment |
| DQI | - | Data Quality Indicator |
| DQO | - | Data Quality Objective |
| DSI | - | Detailed Site Investigation |
| DUXOP | Defence Unexploded Ordnance Panel | The panel of contractors and consultants from whom the Department of Defence selects remembers for UXO related tasks |

| Abbreviations and Terminology | | |
|---|---|---|
| **Abbreviations** | **Term** | **Definition** |
| EEC | Endangered Ecological Communities | Vegetated areas inaccessible during SSD 5066 development works. Located within both the Construction and Offset Areas. |
| EIL | - | Ecological Investigation Level |
| EO | - | Explosive Ordnance |
| EOW | - | Exploded Ordnance Waste |
| EPA | - | Environment Protection Authority |
| ESL | - | Ecological Screening Level |
| FA | Fibrous Asbestos | FA comprises friable asbestos material and includes severely weather cement sheet, insulation products and woven asbestos material. Defined as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. Equivalent to "friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2022). |
| Ha | - | Hectares |
| HCB | - | Hexachlorobenzene |
| Hg | - | Mercury |
| HIL | - | Health Investigation Level |
| HSL | - | Health Screening Level |
| IMEX | - | Import-Export |
| IMT | - | Intermodal Terminal |
| Induction | Site Specific Induction | The *Work Health and Safety Act 2011* (WHS Act) main objective is to secure the health and safety of workers and workplaces. A site-specific induction is necessary for all workers on the Site to understand the site-specific risks. |
| LGA | - | Local Government Area |
| LNAPL | - | Light Non-Aqueous Phase Hydrocarbons |
| Metallic Debris | Metallic Debris | Debris comprising metal (ferrous) items. May include fragments of former ordnance items. |
| MPE Project | Moorebank Precinct East Project | The MPE Intermodal Terminal Facility, including a rail link and warehouse and distribution facilities at Moorebank (eastern side of Moorebank Avenue) as approved by the Concept Plan Approval (MP10_0913) and the MPE Stage 1 Consent (14_6766). |
| MPE Stage 1 Site | Moorebank Precinct East Stage 1 Site | Moorebank Precinct East Stage 1 Site, including the MPE Stage 1 Site and the Rail Corridor, i.e. the area for which approval (construction and operation) was sought within the MPE Stage 1 Proposal EIS. |
| MPE Stage 2 Site | Moorebank Precinct East Stage 2 Site | Stage 2 of the MPE Concept Plan Approval including the construction and operation of 300,000m$^2$ of warehousing and distribution facilities on the MPE Site and the Moorebank Avenue upgrade within the Moorebank Precinct. |
| MPW Project | Moorebank Precinct West Project | The subject of this LTEMP. The MPW Intermodal Terminal Facility as approved under the MPW Concept and Early Works Consent (SSD_5066), MPW EPBC Approval (No. 2011/6086) and MPW Stage 2 Consent (SSD_7709). |
| MPW Site | Moorebank Precinct West Site | The site which is the subject of the MPW Concept and Early Works (Stage 1) Consent, MPW EPBC Approval and MPW Stage 2 SSD 7709. The MPW Site does not include the rail |

| Abbreviations and Terminology | | |
|---|---|---|
| **Abbreviations** | **Term** | **Definition** |
| | | link as referenced in the MPW Concept Consent or MPE Concept Plan Approval.<br>For the purpose of this LTEMP, this excludes the Site (see **the Site**) |
| Ni | - | Nickel |
| NI | - | National Intermodal Corporation |
| OCP | - | Organochlorine Pesticides |
| Offset Area | BioBanking Agreement Area | Vegetated areas which are to be conserved and no construction to occur. |
| Ordnance | Ordnance | Any item of potential military origin. See Ammunition, Category A and B Ordnance Item and UXO. |
| PAH | - | Polycyclic Aromatic Hydrocarbons |
| Pb | - | Lead |
| PCB | - | Polychlorinated Biphenyls |
| PFAS | Per- and polyfluoroalkyl substances | Per- and polyfluoroalkyl substances are a diverse group of compounds resistant to heat, water, and oil. These chemicals are persistent, and resist degradation in the environment. They also bioaccumulate, meaning their concentration increases over time in blood and organs. |
| PFOS, PFOA and PFHxS | Perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) | Man-made chemicals belonging to the group known as PFAS. See PFAS. |
| PSH | - | Phase Separated Hydrocarbon |
| PSI | - | Preliminary Site Investigation |
| QA/QC | - | Quality Assurance and Quality Control |
| RAE | - | Royal Australian Engineers |
| Rail Corridor | - | Area defined as the 'Rail Corridor' within the MPE Concept Plan Approval. |
| Rail Link | - | The rail link from the South Sydney Freight Line to the MPE IMEX Terminal, including the area on either side to be impacted by the construction works included in MPE Stage 1. |
| RPD | - | Relative Percentage Difference |
| SAQP | - | Sampling Analysis and Quality Plan |
| SIMTA | - | Sydney Intermodal Terminal Alliance - a consortium comprising Qube and Aurizon Holdings. |
| The Site | - | Part of the proposed subdivision of Lot 1 in DP1197707 as parts of proposed Lots 7 and 8 (The Site). |
| SME | - | School of Military Engineering. |
| SMP | - | Site Management Plan. |
| SSD | - | State Significant Development. |
| SSFL | - | South Sydney Freight Line. |
| SVOC | - | Semi Volatile Organic Compounds. |
| Tactical | Tactical Group | Project Managers of the Moorebank Precinct. |
| MAUW | Moorebank Avenue Upgrade Works | The extent of construction works to facilitate the construction of the Moorebank Avenue upgrade. Raising of the vertical alignment of Moorebank Avenue for 1.5 kilometres of its length by approximately two metres, from the northern boundary of the MPE Site to approximately 120 |

| Abbreviations and Terminology | | |
|---|---|---|
| **Abbreviations** | **Term** | **Definition** |
| | | metres south of the MPE Site. The Moorebank Avenue upgrade also includes upgrades to intersections, ancillary works, and the construction of an on-site detention basin to the west of Moorebank Avenue within the MPW Site. |
| The Moorebank Precinct | - | Refers to the whole Moorebank intermodal precinct, i.e. the MPE Site and the MPW Site. |
| TPH | - | Total Petroleum Hydrocarbons |
| TRH | - | Total Recoverable Hydrocarbons |
| UCL | - | Upper Confidence Limit |
| UST | - | Underground Storage Tank |
| UXO | Unexploded Ordnance | Explosive ordnance that has been primed, fused, armed or otherwise prepared for action and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, personnel or material but remains unexploded either by malfunction or design or for any cause. UXO includes items of military ammunition or explosives removed from their original resting place for any reason, including souveniring. |
| Vegetated Areas | EEC | Refers only to those areas inaccessible during SSD 5066 works. |
| VOC | - | Volatile Organic Compounds |
| Zn | - | Zinc |

# 1 Introduction

Logos Property Group (Logos) c/o Tactical Group Pty Ltd (Tactical), engaged EP Risk Management Pty Ltd (EP Risk) to prepare a Long-Term Environmental Management Plan (LTEMP) for the proposed S1 and S2 Warehouses and surrounding proposed roadways following a subdivision, within the Moorebank Precinct West site located at 400 Moorebank Avenue, Moorebank NSW, 2170 (MPW Site).

The LTEMP is specific to the subdivision of lots to form S1 and S2 Warehouses within the MPW Site. The development includes the subdivision of part Lot 1 in DP 1197707 as part of proposed Lots 7 and 8 (the Site). The location of the Site and MPW Site is provided as **Figure 1.**

It is understood the MPW Site has been owned by the Commonwealth Government since 1913, used as a Defence facility since the 1940s, and is approximately 190 hectares (ha) in area. The Site is located in the central southern portion of the MPW Site and is approximately 10.02 hectares (ha).

The MPW Site is currently being redeveloped into the Moorebank Intermodal Terminal Development (MITD) (Proposed Development) and comprises land within a developable area, for construction and operation of the Intermodal Terminal (IMT), and land reserved as an offset and conservation area. These areas are identified as follows:

- **Construction Area**: Encompasses the portion of the MPW Site inside the MPW Stage 2 Construction Boundary, including the Site (ref: **Figure 1**).
- **Offset Area**: Comprises the riparian area adjacent the Georges River which is located outside the MPW Stage 2 Construction Area Boundary to the west of the Site (ref: **Figure 1**).

The Site is within the construction area of the MPW Site and does not include the Offset Area of the MPW Site or areas of endangered ecological communities (EEC) present within the greater MPW Site.

Planning consent for the Proposed Development at the MPW Site included MPW Early Works (Stage 1) under State Significant Development (SSD) (SSD 5066), and the Stage 2 Development (SSD 7099).

In accordance with the conditions of planning consent SSD 5066, remediation of the MPW Site was required in accordance with the approved Remediation Action Plan (RAP) prepared by Golder (2016[1]).

To render the MPW Site suitable for the Proposed Development, remedial works were undertaken in accordance with the requirements of the RAP (Golder 2016), and the outcomes provided in the Remediation Validation Report for Land Preparation Work (JBS&G 2020[2]). In summary, JBS&G (2020) concluded that in some areas of the Site, the scope of the RAP (Golder 2016) was constrained by areas mapped as endangered ecological communities (EECs) which could not be disturbed and are fenced / barricaded to prevent access. Management of these restricted areas during construction was recommended via the implementation of a Contamination Management Plan (CMP) prepared by EP Risk (2020[3]). At the completion of close out of these items and the Supplementary Validation Report

[1] Golder (2016) *Land Preparation Works Stage 1 and Stage 2 – Remediation Action Plan*.
[2] JBS&G (2020) Remediation Validation Report, Land Preparation Work – Demolition and Remediation, Moorebank Intermodal Company Property West, Moorebank NSW, dated 22 July 2020 (ref: 51997-120265/Rev1).
[3] EP Risk (2020) *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW*, 30 July 2020 (ref: EP1489.002_v11.0).

(JBS&G 2020a[4]), a Site Audit Statement A2 and Site Audit Report for the MPW Site was provided by Enviroview (2020)[5] subject to the implementation of a LTEMP for the MPW Site (EP Risk 2020a[6]).

It is understood that upon completion of placement of fill and prior to construction at the Site, a site audit report (SAR) and site audit statement (SAS) for the Site is required to demonstrate the Site is suitable for the intended land use under Condition B171, SSD 7709.

JBS&G was engaged as the Validation Consultant for Stage 1 and 2 at the MPW Site and prepared a MPW S1 and S2 Warehouses Audit Area Summary Report (JBS&G 2024[7]) for the Site. The summary report was intended to summarise the information available to demonstrate the Site is suitable for the proposed land use following importation of fill so a SAR and SAS A could be prepared to satisfy Condition B171 of SSD 7709. The boundary of the JBS&G (2024) Validation Audit Area is provided within **Figure 1** in relation to the Site.

JBS&G (2024) summarised Stage 1 and Stage 2 works, including per- and polyfluoroalkyl substances (PFAS) reuse areas, Unknown Pre-Existing Contamination (UPEC) finds, stockpile assessments, stockpile footprint validation works, materials tracking for placement at the Site and other associated Site works. The Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse and a nominal depth of engineered fill placement across the remainder of the Site, including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a) (JBS&G 2024), in preparation for future permanent built surface works including concrete pavement or building slab. Survey drawings for all reuse and placement areas, including overlying engineered fill thickness prepared by JBS&G (2024), has been provided within **Appendix E** for completeness.

JBS&G (2024) concluded remediation, validation, management and importation works had been completed in accordance with EP Risk 2020a and Golder 2016. Based on the Summary Report (JBS&G 2024), the Site was considered suitable for its intended land use subject to the implementation of an LTEMP.

This LTEMP is a standalone document that provides environmental management framework for the Site and is focused on both short to medium-term management during construction and long-term management of the Proposed Development post construction. Management of areas which also form part of existing LTEMPs have been included within this LTEMP for completeness. The LTEMP was prepared to inform a SAR and SAS A for the Site following placement of fill, consistent with Stage 2 SSD 7709 (Condition B171).

A detailed summary of Site works is provided within the JBS&G summary letter (JBS&G 2024) and pertinent information is summarised within **Appendix A**.

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[4] JBS&G (2020a) MPW Supplementary Validation Report, Moorebank Avenue, Moorebank NSW, dated 23 September 2020 (ref: 58753/132401 (Rev B)).
[5] Enviroview (2020) *Stage 2 Works – Completion of Remediation Pre- Construction (Condition B169 Audit)* Moorebank Precinct West Moorebank Intermodal and Logistics Park (MLP) Moorebank Avenue, Moorebank, NSW, dated 20 November 2020 (ref: 600099_0301-2014)
[6] EP Risk (2020a) *Long-Term Environmental Management Plan*, Moorebank Precinct West (MPW), dated 27 October 2020 (ref: EP1489.001_v12).
[7] JBS&G (2024), *Moorebank Precinct West (MPW) S1 and S2 Warehouses – Audit Area Summary Report, Moorebank Avenue, Moorebank NSW*, dated 21 February 2024 (ref: 587553/155933 (Rev 0)).

## 1.1 Purpose

The LTEMP has been prepared in accordance with the requirements of relevant legislation, regulations, codes of practice, Australian Standards and conditions of consent to address the potential risk to human health and the environment from impacted media during construction and operation of the Proposed Site Development. The objectives of this LTEMP are to:

- Outline the nature and extent of known impacted soils, sediment, surface water and groundwater requiring short to long-term management at the Site identified by JBS&G (2024).
- Develop management measures for the management of impacted materials encountered during construction works and long-term operation of the Site including monitoring and reporting in satisfaction of relevant health and safety and environmental legislation.
- Assign responsibilities for the implementation of management measures.

## 1.2 Parties Responsible for the Implementation and Review / Maintenance

The parties responsible for the implementation and review / maintenance of the LTEMP include:

- Land Owner.
- Land Owner Representative.
- Developer (or their representative)
- Principal Contractor (during construction).
- Operational Managing Entity (post construction).
- Environmental Consultant.
- Construction Worker.
- Operational Worker.

## 1.3 How the LTEMP will be complied with

The LTEMP is prepared in compliance and to satisfy Moorebank Intermodal West Stage 2 Condition B172 and B173 of SSD 7709, which specifies that: '*Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor'.* The LTEMP will inform a statutory SAS to be prepared by the Site Auditor.

As the warehouse will be constructed via Complying Development Consent (CDC), to the LTEMP will be implemented in compliance with Conditions 16(2), Part 2 Complying development certificate conditions of CDC 230736/01. This LTEMP will also be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431).

# 2 Background

## 2.1 Site Identification

The site identification details are presented in **Table 1**.

**Table 1 – Site Identification**

| Item | Description |
|---|---|
| Site Address | MPW Site – 400 Moorebank Avenue, Moorebank, NSW, 2170 (see **Figure 1**)<br>The Site – Portion of the MPW Site, as described below. |
| Legal Description | **The Site:**<br>Proposed subdivision of part Lot 1 in DP 1197707 to:<br>Parts of proposed Lots 7 and 8<br>The Site boundary is provided as **Figure 1**. |
| Approximate Site Area | 10.02 hectares (ha) |
| Site Owner | National Intermodal Corporation (NI) |
| Municipality | Liverpool City Council |
| Site Zoning | IN1 General Industry |

The MPW Site is located approximately 27 km south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany. The MPW Site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West subregion, approximately 2.5 km from the Liverpool City Centre and is located south of the intersection of Moorebank Avenue and the M5 Motorway. The Site is within the central southern portion of the MPW Site. S1 is in the northern portion of the Site, is approximately 180 m from north to south and 230 m from east to west at its widest point and covers an area of 5.5 ha. S2 is located in the southern portion of the Site, is approximately 170 m from north to south and 340 m from east to west at its widest point and is 3.99 ha.

## 2.2 Current Land Use

At the time of writing, bulk earthworks prior to construction of permanent built surface works of the Site have been completed. The Site has been raised to the design levels with PFAS reuse areas (now AEC 3) covered with engineered fill placement in preparation for future permanent built surface works.

## 2.3 Proposed Land Use

The development is to include the construction of S1 and S2 Warehouses and roadway between the warehouses. According to JBS&G (2024) *"The Audit Area will generally include a concrete pavement or building slab consistent with the LTEMP PFAS management measures. Final landscape areas are not currently defined."*

It is understood there is potential for disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed under one of the following scenarios:

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, applicable Development Application (DA) / SSD, Environmental Protection License (EPL) or LTEMP for the land.
- Off-site disposal in accordance with the Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation) and NSW EPA Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014).
- Reuse on-site in accordance with the management measures within this LTEMP.

## 2.4 Surrounding Land Use

The land surrounding the Site comprises:

- **North:** MPW Site including existing warehousing and future warehousing, Bapaume Road, MPW Site, the M5 motorway, small pockets of remnant bushland and further industrial and residential properties beyond. The Georges River meanders to the north east.
- **South:** MPW Site and proposed warehouses, rail corridor, Holsworthy Defence land, and residential properties to the west of the Georges River.
- **East:** MPW Site including existing warehousing (north east), Interstate Terminal, Moorebank Avenue, MPE, general industrial properties and infrastructure (Defence), Liverpool Fire Station (north-east), Anzac Creek, low density and medium density residential properties beyond.
- **West:** MPW Site, Offset Area, The Georges River (which flows north), Glenfield Tip, rail corridor and Casula Station, Leacock Regional Park and low and medium density residential properties beyond.

## 2.5 Topography

The Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse (JBS&G 2024) and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), in preparation for future permanent built surface works including concrete pavement or building slab. Survey drawings for all reuse and placement areas, including overlying engineered fill thickness prepared by JBS&G (2024), has been provided within **Appendix E**.

## 2.6 Hydrology

Drainage at the Site is anticipated to follow the design level contours as overland flow via drainage channels and swales to on-site stormwater detention basins (OSD) west of the Site and within the MPW Site. OSDs discharge to the Georges River, west of the Site and MPW Site.

It is understood temporary erosion and sediment control structures such as swales and basins will be utilised during construction of the warehouses in accordance with the Costin Roe Consulting Pty Ltd (2021[8]) Construction Soil and Water Management Plan (or subsequent version).

The historical drainage system at the Site was replaced by temporary sediment control swales and basins during Stage 1 and Stage 2 Works. This included a PFAS water treatment plant and associated sediment basin, located in the northwest portion of S2. Temporary drainage systems, including former basin 6E and 6F have since been backfilled during importation of Engineered Fill.

Basin 7A remains directly south of the Site. A summary of surface water sampling and basin decommissioning is provided within **Appendix A**.

## 2.7 Geology

Based upon a review of the NSW Government Planning and Environment Resources and Energy Penrith 1:100,000 Geological Map (Sheet 9030, First Edition) (1991), the majority of the Site is underlain by fluvial, clayey quartzose sand and clay from the Tertiary period. The underlying bedrock consists of interbedded Hawkesbury Sandstone and Ashfield Shale (Wianamatta) from the middle Triassic period.

The Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse (JBS&G 2024) and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), in preparation for future permanent built surface works including concrete pavement or building slab. Survey drawings for all reuse and placement areas, including overlying engineered fill thickness prepared by JBS&G (2024), has been provided within **Appendix E** for completeness.

[8] Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan, Moorebank Logistic Park, Precinct West Stage 2, Moorebank Avenue, Moorebank, NSW, dated 30 November 2021, Revision 18 (ref: 13455.07-03_18.rpt).

## 2.8 Hydrogeology

EP Risk (2018[9]) and JBS&G (2020b[10]) reported groundwater flow was towards the west and the nearest surface water body, the Georges River. A total of two (2) groundwater monitoring wells were identified at the Site which have since been decommissioned (JBS&G 2024), namely MW4005A and JBSG_MW08. Historical groundwater levels from previous groundwater gauging events prior to decommissioning (EP Risk 2018 and JBS&G 2020b) ranged from 3.931 m Australian Height Datum (AHD) (MW4005A) and 5.482 m AHD (JBSG_MW08).

EP Risk (2018) reported that groundwater was predominantly fresh to brackish water (relatively low electrical conductivity), with the exception of groundwater monitoring well (GMW) GW6019 in the northern portion of the MPW Site, which indicated an area of high salinity (> 10,000 µS/cm). Dissolved oxygen (DO) measurements indicated generally anaerobic conditions. The oxidation-reduction potential (ORP) indicated reducing conditions and the pH measurements were generally slightly acidic.

Groundwater elevation and gauging information (EP Risk 2018 and JBS&G 2020b) from the on-site groundwater monitoring wells is provided in **Appendix G**.

## 2.9 Acid Sulfate Soil

A review of the Liverpool Local Environmental Plan 2008 indicated the Site is located within a Class 5 acid sulfate soil (ASS) developmental control area. The surrounding MPW Site is partially within a Class 5 and Class 1 ASS area. Development consent is required for works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

Based on the review of available information (PB 2014[11] and Golder 2015[12]) actual and potential acid sulfate soils were identified in shallow soils between 1.0 metres below ground level (mBGL) and 2.0 mBGL in the MPW Site Offset Area along the Georges River to the west of the Site. Golder 2015 concluded the acid generating potential of the soils was not caused by sulfidic material. Both Golder (2015) and PB (2014) recommended an Acid Sulfate Soil Management Plan (ASSMP) was a requirement for future earthworks.

Development consent SSD 7709 Condition B39 for MPW Stage 2, required the preparation of an ASSMP for the MPW Site, which includes the Site. EP Risk (2020c[13]) prepared an ASSMP for inclusion as a sub-plan to the Construction Environmental Management Plan (CEMP)[14] for Stage 2 works at the MPW Site in satisfaction of condition C2 of SSD 7709. The purpose of the ASSMP was to outline management procedures for the unexpected discovery of actual or potential acid sulfate soil. The

[9] EP Risk (2018), *Moorebank Precinct West Site-Wide Per- and Poly- Fluoroalkyl Substances (PFAS) Assessment* (ref: EP0748.008 v1, 22.08.18) EP Risk Management Pty Ltd.
[10] JBS&G (2020b) *Qube Property Management Services, Site Wide Groundwater Assessment Report, Land Preparation Work – Demolition and Remediation, Moorebank Intermodal Company Property West, Moorebank, NSW,* dated 22 July 2020 (ref: L51997-120679 (rev 1)).
[11] PB (2014) *Phase 2 Environmental Site Assessment Moorebank Intermodal Terminal*, dated 28.05.14 (ref: 2103829A-CLM_REP-1 Rev B) Parsons Brinkerhoff Pty Ltd.
[12] Golder (2015) *Post Phase 2 Environmental Site Assessment*. Golder Associates.
[13] EP Risk (2020c), Acid Sulfate Soils Management Plan, Moorebank Precinct West Site, 400 Moorebank Avenue, Moorebank NSW. EP Risk Management Pty Ltd. Dated 30 January 2020. EP1340.001_MPW_ASSMP v5.
[14] SIMTA (2020) Construction Environmental Management Plan, Moorebank Precinct West Stage 2, dated 14 January 2020 (ref: MIC2-QPMS-EN-APP-00001).

ASSMP included procedures for the investigation, handling, treatment and management of such soil and water seepage.

Based upon the separation distance of the Site to the Offset area, the ASSMP does not apply to the Site.

## 2.10 Summary of Site History

Numerous contamination assessments have been undertaken at the Site as part of assessment of the greater MPW Site, the findings of which are summarised in **Appendix A** and various stages of development are summarised by JBS&G (2024).

A summary of the MPW site history is provided in **Table 2**.

**Table 2 – Summary of MPW Site History**

| Year | Summary |
|---|---|
| 1913 | The Site, as part of the MPW Site, was purchased by the Commonwealth Government. |
| 1930 | The Site was predominantly vacant and covered in bushland / grazing land. |
| 1940s | The Site was used by Australian Defence Force (ADF) as a training base for the Army. |
| Prior to 1956 | The Site had had been developed as a Defence base. |
| 1956 to circa 1995 | There was no known fire training activities that occurred within the Site. The MPW Site had undergone various phases of development. A former fire training area (FFTA) approximately 50 m wide and 100 m long was identified close to the Georges River in the southern portion of the MPW Site opposite Jacquinot Road. Fire training involved pouring diesel and other flammable materials into shallow drains, in pans, in above ground storage tanks and car bodies, igniting the fuel and then extinguishing the fire using foam extinguishers. Based upon a review of aerial photographs, it was inferred that fire training activities in this area ceased somewhere between 1991 and 1994. Another fire training area approximately 60 m wide by 160 m long was located in the southern portion of the Dust Bowl. It was understood that fire activities in this area included igniting oil in trays and extinguishing them with foam including AFFF and there was no information available on when fire training activities ceased in this area. Historical excavator training within the Dust Bowl resulted in routine excavation up to depths of 4 m. |
| 2015 | The Site and MPW Site was vacated by Defence, with the relocation of military units to new facilities at the nearby Holsworthy Base. |

# 3 Description of Existing / Residual Contamination

## 3.1 Summary of Impacted Media

### *MPW Site*

Based on the JBS&G (2024) Summary Report, the following remaining areas of environmental concern (AEC) and contaminants of concern for the MPW Site are provided as follows:

- AEC 1 – Chlorinated hydrocarbons impact (Trichloroethylene (TCE) and Cis-1,2-dichlorothene (cis-DCE)) and total recoverable hydrocarbons (TRH) in the north west portion of the MPW Site to the south of the ABB Building.
- AEC 2 – Petroleum hydrocarbon impact including light non-aqueous phase hydrocarbons (LNAPL) in the eastern portion of the MPW Site.
- AEC 3 – PFAS impact associated with residue from historical fire-fighting activities and reuse of excavated PFAS impacted material within the MPW Site.

A LTEMP for the MPW Site (EP Risk 2020a) was prepared for the management of the abovementioned AECs.

### *The Site*

The chlorinated hydrocarbon impacted area (AEC 1) is located approximately 1.3 km north of the Site, south of the ABB building (JBS&G 2024) and AEC 2 is located approximately 280 m east of the Site and is hydraulically up-gradient of the Site.

The historical AEC 3 as described within the MPW LTEMP (EP Risk 2020a) covers the majority of the Site. Site-won PFAS containing soils were placed on-site during filling works as part of Stage 2 in accordance with the LTEMP (EP Risk 2020a) (JBS&G 2024). The PFAS Placement Areas have been included within AEC 3. Site-won low levels of asbestos impacted soil (JBS&G 2024) were placed on-site during filling works as part of Stage 2 in accordance with the LTEMP (EP Risk 2020a). The concentration of asbestos in soil were less than the adopted Health Screening Level for the land use and were sourced from BMD-SP276, which was consolidated within the PFAS placement areas (now AEC 3) as the stockpile also contained PFAS.

The Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse (JBS&G 2024) and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), in preparation for future permanent built surface works including concrete pavement or building slab. Survey drawings for all reuse and placement areas, including overlying engineered fill thickness prepared by JBS&G (2024), has been provided within **Appendix E**.

The location of the AECs at the MPW Site in relation to the Site is provided as **Figure 3**. Further information relating to the AECs is provided in the Conceptual Site Model (CSM) provided as **Appendix A.** A CSM Figure is provided as **Figure 4**.

## 3.2 Source – Pathway – Receptor Linkages Requiring Management

Based on the CSM provided in **Appendix A** for the Site, a summary of impacted media requiring management in this LTEMP is provided in **Table 3**. However, based on the placement of imported Engineered Fill across the Site with approximately 0.3 m across PFAS placement areas (AEC 3) (JBS&G 2024) and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), there is the potential for underlying AEC 3 soils to be disturbed as part of construction of the S1 and S2 Warehouses.

Survey drawings for all reuse and placement areas, including overlying engineered fill thickness prepared by JBS&G (2024), has been provided within **Appendix E**. Management of any unidentified contamination is to be managed in accordance with an unexpected finds protocol provided as **Appendix D**.

**Table 3 – Identified Areas of Environmental Concern and Impacted Media**

| Area of Environmental Concern (AEC) | COPC | Impacted Media | Risk Assessment / Management | Source – pathway receptor linkages requiring management |
|---|---|---|---|---|
| **AEC 3** - PFAS-containing material reused at the Site placed at an average depth of approximately 0.3 m beneath engineered fill and a nominal depth engineered fill placement above existing AEC 3. PFAS sourced from impacted areas at the MPW Site associated with residue from historical fire-fighting training. | PFAS | **Soil** – Exceedances of Tier 1 ecological indirect commercial / industrial criteria (**Appendix A**).<br>**Soil leachate** – Detectable leachable PFOS + PFHxS concentrations reported within historical soil sampling at MPW Site (**Appendix A**).<br>**Sediments** - Detectable PFAS concentrations historically reported within sediment at the MPW Site.<br>**Surface water** - Exceedances of Tier 1 criteria for samples collected within temporary detention basins during Early Works construction, Stage 2 and from the Georges River.<br>**Groundwater** – Exceedances of Tier 1 criteria across the MPW Site (**Appendix A**). | • EnRiskS (2019) [15] undertook a human health risk assessment of the MPW Site and reported the risk to human health at the MPW Site was low and acceptable, but bioaccumulation and the effects on higher order ecological consumers were unable to be excluded.<br>• EnRiskS (2019a) [16] reported a potential health risk to children who consume more than two serves of fish per month sourced from the Georges River and potential adverse effects to the aquatic environment by bioaccumulation and the effects on higher order ecological consumers. | • Leaching and erosion of PFAS from soil to surface water and groundwater associated with soil disturbance during construction and operation.<br>• Recreational fishing resulting in the consumption by children of more than two serves of fish per month.<br>• Bioaccumulation and the effects on higher order ecological consumers. |
| **Additional Areas Requiring Management** | Bonded (non-friable) ACM | **Soil -** Concentrations of asbestos in soils were less than the adopted health screening level (HSL) for a commercial / industrial land use (0.05 % w/w for ACM and 0.001% w/w for AF/FA). | JBS&G (2024) identified site-won asbestos in soil was placed during filling works below the soil surface and engineered fill. The soil was placed within PFAS placement areas (now AEC 3) at an approximate depth of 0.3 m and was sourced from BMD-SP276. The exact location within PFAS reuse areas is unknown | • Inhalation (asbestos) for construction workers during soil disturbance, excavation works beneath the imported fill layer in asbestos placement areas. |

[15] EnRiskS (2019) *Land Human Health and Ecological Risk Assessment (Land HERA)*, dated 6 May 2019 (ref: MICL/19/BIOR001, Revision B – Revised Draft).
[16] EnRiskS (2019a) *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA)*, dated 10 May 2019 (ref: MICL/18/GRR001, Revision E – Revised Draft).

# 4 Management Activities

## 4.1 LTEMP Roles and Responsibilities

This LTEMP has been developed to provide an environmental framework for short to medium term environmental management during construction and operation of the Proposed Development at the Site. The terminology, roles and responsibilities relevant to the LTEMP are provided in **Table 4**.

**Table 4 – Responsibilities for LTEMP Implementation**

| Position | Company/Entity | Responsibilities |
|---|---|---|
| Land Owner | Commonwealth | To consent to the registration of the LTEMP on title. |
| Land Owner Representative | National Intermodal Corporation (NI) | To consent to the registration of the LTEMP on title. |
| Developer (or their representative) | Moorebank Precinct Nominees Pty Ltd | The Developer is responsible for:<br>• The engagement of the Principal Contractor (during construction).<br>• Management of the operation of the Site post construction or engagement of the Operational Managing Entity.<br>• Ensuring that the Principal Contractor or Managing Operational Entity implement the LTEMP. |
| Principal Contractor (during construction) | To be appointed | • Responsible for the implementation of the LTEMP during construction works and has primary control of the Site (Parts of proposed Lots 7 and 8). Responsible for inductions, training, notifying the owner, appropriate consultant or contractor in relation to unexpected finds. Also responsible for quarantining unexpected finds requiring management with suitable barricades and informing other workers of its location.<br>• Persons and/or company appropriately qualified to undertake the required management works and has the appropriate insurances and licences.<br>• Responsible for undertaking works in accordance with this LTEMP. |
| Operational Managing Entity (post construction) | To be appointed | • Responsible for the implementation of the LTEMP at the Proposed Development during long-term operation. |
| Environmental Consultant | To be appointed | • As defined under the NEPM (NEPC 2013) (Schedule B9) the environmental consultant is responsible for the assessment of contaminated sites and preparation of assessment reports and should be able to demonstrate relevant qualifications and experience to a level appropriate to the contamination issues at the site under investigation.<br>• The environmental consultant is to have a Certified Environmental Practitioner (Site Contamination) recognised by one of the certifying bodies recognised by the NSW EPA. Any reports prepared should be written or reviewed by the individual Certified Environmental Practitioner (Site Contamination).<br>• The Environmental Consultant is responsible for the following: |

| Table 4 – Responsibilities for LTEMP Implementation | | |
|---|---|---|
| **Position** | **Company/Entity** | **Responsibilities** |
| | | o Notifying the Client and Principal Contractor of any unexpected finds.<br>o Undertaking the assessment, remediation and validation of an unexpected find.<br>o Engaging the Ordnance Contractor should unexploded ordnance (UXO) or exploded ordnance waste (EOW) be identified as an unexpected find.<br>o Notifying the Principal Contractor once unexpected finds have been validated and can be reoccupied.<br>• Any environmental monitoring required under the LTEMP. |
| Construction Worker | Commercial industrial worker during construction | • Any worker on the Site, including any contractor or sub-contractor, must adhere to the requirements of the LTEMP during short to medium term construction. Responsible for undertaking their tasks in a safe manner and notifying the Principal Contractor if they see any items / conditions which may constitute an unexpected find. |
| Operational worker | Commercial industrial worker during operation | • To adhere to the requirements of the LTEMP during long-term operation of the Proposed Development post construction. |

## 4.2 Approval and Licensing Requirements

SSD 7709 provides specific requirements for the LTEMP which are provided in **Table 5**.

**Table 5 – Planning Conditions Specific to the LTEMP**

| Condition | Requirement |
|---|---|
| SSD 7709 – B171 | Upon Completion of importation and placement of fill and prior to construction of permanent built surface works, the Applicant must submit to the Planning Secretary, a Site Audit Report and a Site Audit Statement A for the whole site, prepared in accordance with the *NSW Contaminated Land Management – Guidelines for the NSW Site Auditor Scheme 2017*, which demonstrates the site is suitable for its intended land uses under MPW Stage 2 SSD 7709. |
| SSD 7709 – B172 | Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor. The plan must:<br>a) be submitted to the Planning Secretary and EPA prior to commencement of construction (other than vegetation clearing); and<br>b) include, but not be limited to:<br>i. a description of the nature and location of any contamination remaining on site,<br>ii. provisions to manage and monitor any remaining contamination, including details of any restrictions placed on the land to prevent development over the containment cell,<br>iii. a description of the procedures for managing any leachate generated from the containment cell, including any requirements for testing, pumping, treatment and/ or disposal,<br>iv. a description of the procedures for monitoring the integrity of the containment cell,<br>v. a surface and groundwater monitoring program,<br>vi. mechanisms to report results to relevant agencies,<br>vii. triggers that would indicate if further remediation is required, and<br>details of any contingency measures that the Applicant is to carry out to address any ongoing contamination. |
| SSD 7709 – B173 | The LTEMP must be registered on the title to the land. |

All planning conditions of consent for the Proposed Development relevant to the LTEMP are shown in **Table 6**. Further details of the condition of consent / approval and mitigation measures and how they relate to the LTEMP are provided as a compliance matrix at **Appendix D**.

| Table 6 – Planning Approval Conditions of Consent | | |
|---|---|---|
| **Planning Approval** | **Condition of Consent** | **Notes** |
| SSD 7709 | B171 | Provision of Site Audit Statements to the Planning Secretary upon completion of importation and placement of fill. |
| | B172 | Requirements for the LTEMP |
| | B173 | Registration of the LTEMP |
| | B180 | The Applicant must assess and classify all liquid and non-liquid wastes to be taken off site in accordance with the latest version of the EPA's *Waste Classification Guidelines Part 1: Classifying Waste* (EPA 2014) and dispose of all wastes to a facility that may lawfully accept the materials. |
| | C1 | Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:<br>(a) detailed baseline data;<br>(b) details of:<br>(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);<br>(ii) any relevant limits or performance measures and criteria; and<br>(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;<br>(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits or performance measures and criteria;<br>(d) a program to monitor and report on the:<br>(i) impacts and environmental performance of the development;<br>(ii) effectiveness of the management measures set out pursuant to paragraph (c) above;<br>(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;<br>(f) a program to investigate and implement ways to improve the environmental performance of the development over time;<br>(g) a protocol for managing reporting any;<br>(i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);<br>(ii) complaint;<br>(iii) failure to comply with statutory requirements;<br>(h) roles and responsibilities for implementing the plan; and<br>(i) a protocol for periodic review of the plan. |

| Table 6 – Planning Approval Conditions of Consent | | |
|---|---|---|
| **Planning Approval** | **Condition of Consent** | **Notes** |
| SSD 7709 | Appendix 2 – Applicants Management and Mitigation Measures | OB, 5A, 5I, 6A, 6B, 6C, 6D, 6E, 6F, 6H, 6I, 6J, 7A, 12A, |
| EPBC 2011/6086 | 8a | MPW Concept EIS, Soil and Contamination PEMF Section 6.2 – Management controls – Early Works and Construction phase |
| | | MPW Concept EIS, Soil and Contamination PEMF Section 6.4– monitoring |
| | | MPW Concept EIS, Soil and Contamination PEMF Section 6.5 – Management response to incidents and non-compliances |
| | 8b) and c) | REMM 7A, REMM 7B, REMM 7C, REMM 7D, REMM 7E, REMM 7F, REMM 7I, REMM 7J, REMM 7K, REMM 8B, REMM 8D, REMM 8E, REMM 8F, REMM 8G, REMM 8H, REMM 8I, REMM 8J, REMM 8K, REMM 8L, REMM 8M, REMM 8N, REMM 8RO, REMM 8P, REMM 8Q, REMM 8R, REMM 8S, REMM 8T, REMM 8U, REMM 8V, REMM 8W, REMM 8X, REMM 8Y, REMM 8Z, REMM 8AA |
| | 8 d) | i), ii), iii), iv), v), vi), vii), |
| SSD 10431 | C39 | The applicant must ensure that the LTEMP prepared under Condition B172 of MPW Stage 2 (SSD 7709) is implemented for the duration of construction and operation of the development. |
| CDC | 16(2) | 16 Earthworks:<br>(2) Excavated soil found to be contaminated, as classified under guidelines made under the Contaminated Land Management Act 1997, must be—<br>(a) removed from the site in accordance with any requirements of the Protection of the Environment Operations Act 1997, or<br>(b) appropriately remediated or managed on site. |

## 4.3 Implementation of the LTEMP

The LTEMP will be implemented by the Developer/Principal Contractor and Operational Managing Entity after provision of a SAS A and SAR and registrations on title to satisfy Condition B171 and B173 of SSD 7709, respectively. Implementation of the LTEMP encompasses the following stages:

- Phase 2 Construction Works.
- Operational Phase.

This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431) and with reference to the CDC (230736/01).

Based upon details of the Proposed Development summarised in **Section 2.3**, the following potential activities are proposed to be carried during construction and operation:

### *Proposed Development Activities*

JBS&G (2024) has identified soil containing asbestos at concentrations less than the HSL within PFAS reuse areas (now AEC 3) present beneath the imported engineered fill layer at the Site. Asbestos, albeit below the HSL, was placed with stockpiles included within AEC 3 (PFAS Reuse Areas). Additionally, existing AEC 3 areas remain outside of PFAS reuse areas which were not considered by JBS&G (2024) and require management.

Based upon the description of the proposed development (JBS&G 2024), the following activities are proposed at the Site which may intersect AEC 3 and asbestos placement areas.

**Phase 2 Construction Works**

- Installation of underground services.
- Construction of building footings.
- Implementation of erosion, sedimentation, and stormwater controls during bulk earthworks and sequencing works to minimise the potential for leaching of PFAS to groundwater and surface water.
- Surface water monitoring (as required).
- Construction of pavements and landscaped areas (if required).

**Operational Phase**

- Sub-surface maintenance works.
- Maintenance of landscaped areas.

## 4.4 LTEMP Environmental Management and Monitoring Procedures

The approach to managing the potential source – pathway – receptors addressed within the LTEMP is provided in the environmental management procedures (EMP) below and is consistent with the RAP (Golder 2016). The EMPs are provided in **Appendix B** and summarised as follows:

- EMP 1 – Land use restrictions.
- EMP 2 – Subsurface works – AEC 3.
- EMP 3 – Materials Tracking.
- EMP 4 – Stockpile Management.
- EMP 5 – Minor Excavation and Sampling.
- EMP 6 – Off-site disposal of excavated / unsuitable material.
- EMP 7 – Subsurface maintenance works.
- EMP 8 – Landscape Management and Maintenance.
- EMP 9 – Unexpected finds.
- EMP 10 – Additional Validation Requirements.

- EMP 11 – Management of groundwater.
- EMP 12 – Management of surface water.
- EMP 13 – Training.
- EMP 14 – Contractor and subcontractor management.
- EMP 15 – Contingency plan.
- EMP 16– Non-compliances with the LTEMP.
- EMP 17 – Record keeping.
- EMP 18 – Audit/review of LTEMP implementation.
- EMP 19 – LTEMP review.
- EMP 20 – Cessation of LTEMP application.

### *Summary of Source – Pathway – Receptor Linkages Requiring Management*

Based upon a review of the source – pathway – receptor linkages reported in **Table 3**, potentially contaminating activities associated with the construction and operation of the Proposed Development which require long term management are provided in **Table 7**.

**Table 7 – Management of Potentially Contaminating Activities associated with the Proposed Development**

| Project Stage | AEC | Activity | Management Procedure |
|---|---|---|---|
| General | - | All activities. | **EMP 1** |
| Phase 2 Construction Works | AEC 3, Asbestos Placement Areas | Installation of underground services | **EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 8, EMP 9, EMP 10, EMP 11, EMP 12** |
| | | Construction of infrastructure, pavement (concrete / asphalt) and landscaped areas (if required) | **EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 8, EMP 9, EMP 10, EMP 12** |
| Operation of Proposed Development | AEC 3, Asbestos Placement Areas | Sub-surface maintenance works | **EMP 7, EMP 8, EMP 9, EMP 11, EMP 12** |

In addition to the EMPs provided within **Table 7**, **EMP 13** to **EMP 20** are required within all construction and operational stages.

## 4.5 Reuse of PFAS Impacted Soil

The Site includes soil reuse Zones 1 to 4 (EP Risk 2020a). However, it is noted Figure 5 within the MPW LTEMP (EP Risk 2020a) depicts zones 3 and 4 off proposed land uses and mapping was indicative only. As reported by JBS&G (2024), the Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), in preparation for future permanent built surface works including concrete pavement or building slab. Survey drawings for all reuse and placement areas, including overlying engineered fill thickness prepared by JBS&G (2024), has been provided within **Appendix E**. JBS&G (2023a[17]) undertook a review of management measures provided within the LTEMP (EP Risk 2020a) and considered zone 2/3/4 reuse of soils could take place with a minimum off-set of 30m from waterbodies, namely:

- Lot 100 wetland;
- Anzac Creek;
- Georges River; and
- OSDs.

The location of AEC 3 in relation to the Site is provided as **Figure 3**, and the surveyed location of the PFAS Placement Area is provided within **Appendix E**.

There is potential for disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as a growing medium in landscaped areas and would likely be managed under one of the following scenarios (JBS&G 2024):

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, applicable DA, EPL, CMP or LTEMP for the land.
- Off-site disposal in accordance with NSW EPA Waste Classification Guidelines.
- Reuse on-site in accordance with the management measures within this LTEMP.

In the event soil is to be reused on-site, reference should be made to previous analytical results provided within **Appendix A**, the MPW LTEMP (EP Risk 2020a), Addendum 01 (EP Risk 2022[18]) and Addendum 02 (EP Risk 2023[19]) to the MPW LTEMP, or applicable LTEMP within the greater MPW Site.

Soil excavated and placed beneath the Engineered Fill layer that has been subject to historical PFAS testing or asbestos testing as outlined in **Appendix A,** or which is sampled and tested in accordance with **EMP 5**, should be assessed by the Environmental Consultant for suitability to remain on-site or classified and disposed off-site.

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[17] JBS&G (2023a), *Assessment of Potential Re-Use of PFAS Impacted Soils in Proximity to Surface Waters, Moorebank Intermodal Precinct*, dated 20 September 2023 (ref: L828 58753|154578 Rev 0).
[18] EP Risk (2022), *Addendum 01 – Moorebank Precinct West (MPW) Long-Term Environmental Management Plan (LTEMP) Version 12 – PFAS Re-use in Warehouse Areas 400 Moorebank Avenue, Moorebank NSW*, dated 1 September 2022 (ref: EP1489.012_LTR01_v1).
[19] EP Risk (2023), *Addendum 02 – Moorebank Precinct West (MPW) Long-Term Environmental Management Plan (LTEMP) Version 12 – Engineered Fill in Warehouse PFAS Re-use Zone 3, 400 Moorebank Avenue, Moorebank NSW*, dated 29 June 2023 (ref: EP1489.019_Addendum 02_v1).

Further details of the derivation of the soil reuse criteria provided are contained in the EnRiskS (2020) and MPW Site LTEMP (EP Risk 2020a) reports, subsequent letter of advice (EnRiskS 2022 [20]), Addendum 01 (EP Risk 2022) and Addendum 02 (EP Risk 2023) to the MPW LTEMP, and PFAS surface water proximity assessment (JBS&G 2023a).

A copy of the Addendum 02 to the MPW LTEMP is provided within **Appendix H** which provides requirements for reuse of PFAS impacted soils on-site, in addition to **EMP 5** (**Appendix B**).

It should be noted that the reuse zones in **Figure 5** have been prepared based upon the Precinct Master Plan (PMP) provided at the time of the MPW LTEMP (EP Risk 2020a).

## 4.6 Compliance Matrix

The Development Consent made under *Section 89E of the Environmental Planning and Assessment Act 1979* has listed the conditions of consent for SSD 7709 in **Appendix C** in relation to the LTEMP.

This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431) and reference to CDC (230736/01).

## 4.7 Adopted Validation Criteria

### *Soil Criteria*

The adopted criteria for the validation of unexpected finds identified during Stage 2 Construction Works and on-going operation of the Site is provided below.

For the purposes of assessing the results of validation analytical testing of soil at the Site, the Environmental Consultant should reference the relevant Guidelines and Standards, including but not limited to the following:

- NSW DEC (2017) Guidelines for the NSW Auditor Scheme (Third Edition).
- National Environment Protection Council (NEPC) 2013, National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), Canberra (ASC NEPM, 2013).
- Friebel, E & Nadebaum, P 2011, Health Screening Levels for Petroleum Hydrocarbons in soil and Groundwater. Part 1: Technical development document, CRC CARE Technical Report no. 10, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.
- Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan*, January 2020 (HEPA NEMP 2020).

### *Asbestos Assessment Criteria*

Asbestos Forms

Asbestos contamination can occur in a range of forms, sizes and degrees of deterioration. ASC NEPM (2013) separates asbestos contamination into the following forms:

[20] EnRiskS (2022), *PFAS at MPW: re-use of soil underneath the warehouse area,* dated 23 August 2022

- Bonded (non-friable) ACM – Asbestos bound in a matrix, and in sound condition e.g. vinyl floor tiles, cement sheeting;
- Fibrous Asbestos (FA) – Friable asbestos material such as weathered ACM and loose fibrous material (insulation products); and
- Asbestos Fines (AF) – Free fibres of asbestos, small fibre bundles and ACM fragments that can pass through a 7 mm x 7 mm sieve.

Asbestos - Health Screening Levels

ASC NEPM (2013) (Schedule B1 *Guideline on the Investigation Levels for Soil and Groundwater*, Section 4.8 and Table 7) provides HSLs for the five exposure settings based on scenario-specific likely exposure levels adopted from the Western Australia Department of Health (WA DoH) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia,* 2021.

A HSL of 0.05 % w/w asbestos for bonded ACM should be adopted as site criteria for bonded ACM validation based on the intended commercial / industrial land use. Additionally, visible asbestos must not be within the top 0.1 m for any land use.

ASC NEPM (2013) states a criterion of 0.001% for FA and AF (< 7 mm) for all site uses to screen the analytical results. It should be noted that in accordance with Australian Standard AS4964-2004 and the laboratories NATA accreditation, the limit of reporting (LOR) for AF/FA in soil is 0.1 g/kg (0.01 % w/w). The risk assessment of FA and AF in soil to 0.001 % for FA and AF for assessment with ASC NEPM 2013 is reported as a non-NATA accredited result.

Consequently, NATA accredited laboratories provide additional commentary on visual observations made during analysis relating to the presence of visible FA and AF (if present). These observations are noteworthy, based on the weight of evidence approach, in accordance with ASC NEPM (2013).

For the purposes of this assessment a qualitative criterion was adopted (i.e. the laboratory's observation of visible FA/AF in the soil samples) to apply professional judgement and a risk-based approach.

## 4.8 Validation Sampling Program

Validation of unexpected finds should be undertaken as directed by the Environmental Consultant in accordance with the applicable Guidelines and Standards at the time of the assessment. Reporting must be undertaken in accordance with the NSW EPA *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land* (NSW EPA 2020).

## 4.9 Waste Classification

Contaminated soils requiring disposal off-site shall be assessed and classified in accordance with **EMP 6**.

## 4.10 Contingency Plan

In accordance with SSD 7709 – B172, the LTEMP must include '*details of any contingency measures that the Applicant is to carry out to address any ongoing contamination'*. Procedures for the management of unexpected finds (**EMP 9**) and a contingency plan (**EMP 15**) are provided within this plan.

# 5 Monitoring and Reporting

## 5.1 Contamination Management Plan Periodic Review

A periodic review of the LTEMP should be undertaken for the following (**EMP 19**, **Appendix B**):

- If there are any regulatory changes relevant to the implementation of the LTEMP.
- If there is any significant change in land use or additional development of the Site.
- Once construction activities have been completed and prior to occupation of the Site (if required).

Any revisions to the LTEMP must be approved by the appointed NSW EPA accredited Site Auditor (**EMP 19**, **Appendix B**). Where the LTEMP is revised, copies should be provided to all current stakeholders, training provided, and induction procedures updated where necessary.

## 5.2 Period of Implementation

The LTEMP is to be implemented during construction and operation of the Proposed Development and will not cease until the conditions detailed in **EMP 20** (**Appendix B**) are met.

## 5.3 Managing and Reporting

### *Incidents and Non-compliances*

The requirement is for the owner of the Site to be compliant with conditions of consent and undertake the development in accordance with all consent and planning documentation. However, in the event of an incident and/or non-compliance with the LTEMP, these will be managed in accordance with **EMP 16** (**Appendix B**). Reporting registers are provided as **Appendix F**.

### *Complaints*

All complaints will be managed in accordance with the CEMP (during construction) and the Environmental Management System (during operation).

### *Continual Improvement*

Continual improvement of this LTEMP will be undertaken in accordance with the **EMP 18** and **EMP 19** in **Appendix B.** Continuous improvement will be achieved by the ongoing evaluation of environmental management performance and effectiveness of this plan against the environmental policies, objectives, and targets.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure.

## 5.4 Record Keeping

All documents in relation to the LTEMP will be managed in accordance with **EMP 17** (**Appendix B**).

## 5.5 Groundwater and Surface Water Monitoring

The requirement for a soil and groundwater monitoring program is provided in the following:

- The Golder (2016) RAP recommended that a routine monitoring regime be established as part of the LTEMP.
- Condition B172 of SSD 7709 requires that the LTEMP must include a surface water and groundwater monitoring program.

Groundwater plumes associated with the following areas at the MPW Site have been identified on-site:

- **AEC 3** – PFAS plume associated with historical firefighting at the Site.

**AEC 3:** Golder (2016) recommended PFAS concentrations be assessed and where required, a routine monitoring regime established as part of the LTEMP. Groundwater and surface water monitoring of PFAS concentrations will be undertaken during and after construction works to assess effects of redevelopment on PFAS mass flux to the Georges River to inform the appropriateness of mitigation measures provided in the MPW LTEMP. Ongoing groundwater and surface water monitoring will be managed under the MPW LTEMP for the MPW Site (EP Risk 2020a).

Surface water and groundwater sampling is to be conducted as required during disturbance of AEC 3 materials at the Site in accordance with the EMPs within **Section 4.4** and **Appendix B**. Additionally, it is understood temporary erosion and sediment control structures such as swales and basins will be utilised during construction of the warehouses in accordance with the Costin Roe Consulting Pty Ltd (2021[21]) Construction Soil and Water Management Plan (or subsequent version).

[21] Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan, Moorebank Logistic Park, Precinct West Stage 2, Moorebank Avenue, Moorebank, NSW, dated 30 November 2021, Revision 18 (ref: 13455.07-03_18.rpt).

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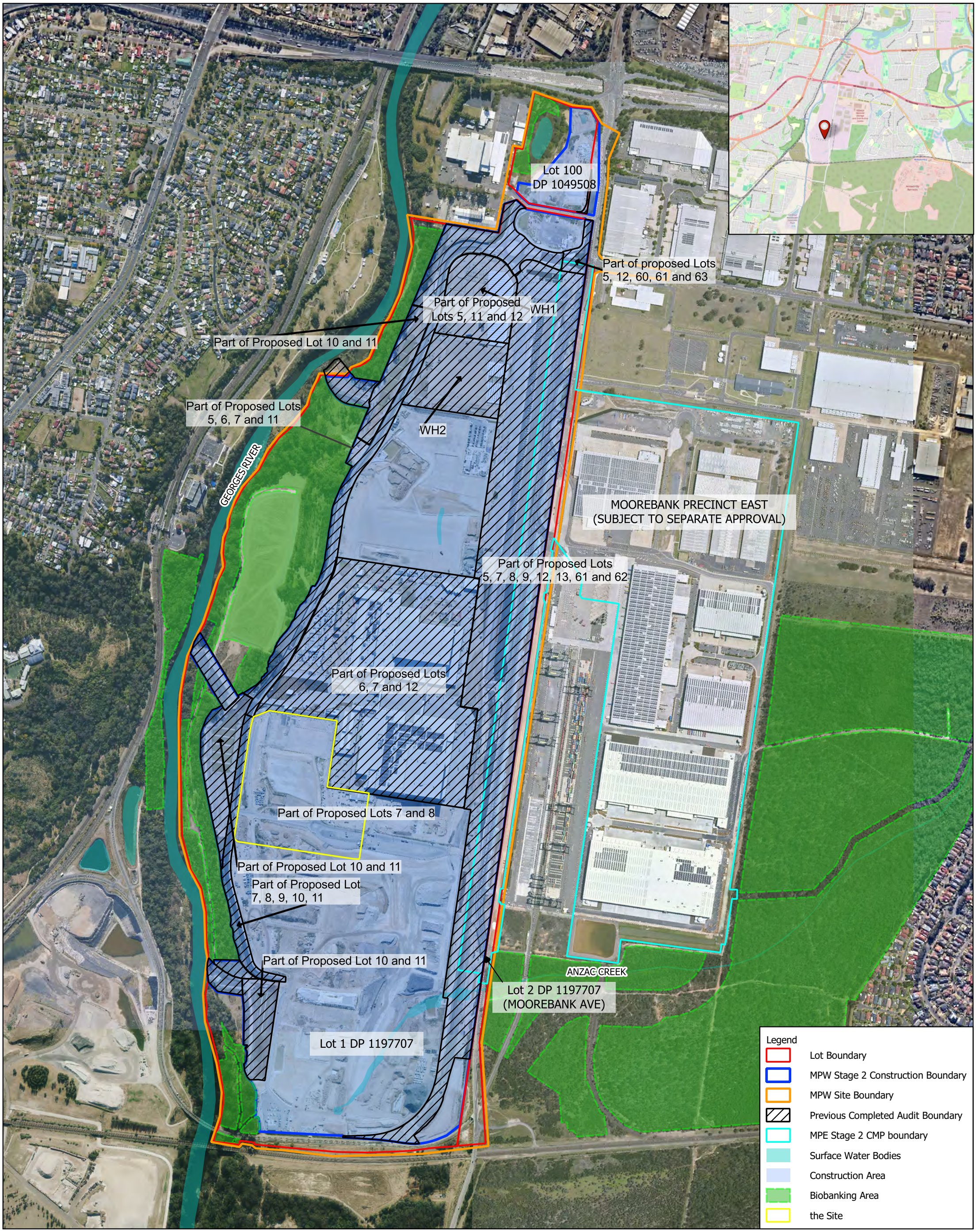
# *Figures*

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# Long Term Environmental Management Plan
# Southern Warehouse Footprints

## Figure 1 - Site Location

**Job No: EP1489**
**Date: 12/03/2024**
**Drawing Ref: Fig 1**
**Version No: v1**

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Approximate Scale Only

**Coordinate System: MGA 56**
**Drawn by: OG Checked by: AT**
**Scale of regional map not shown**
**Source: Near Maps**

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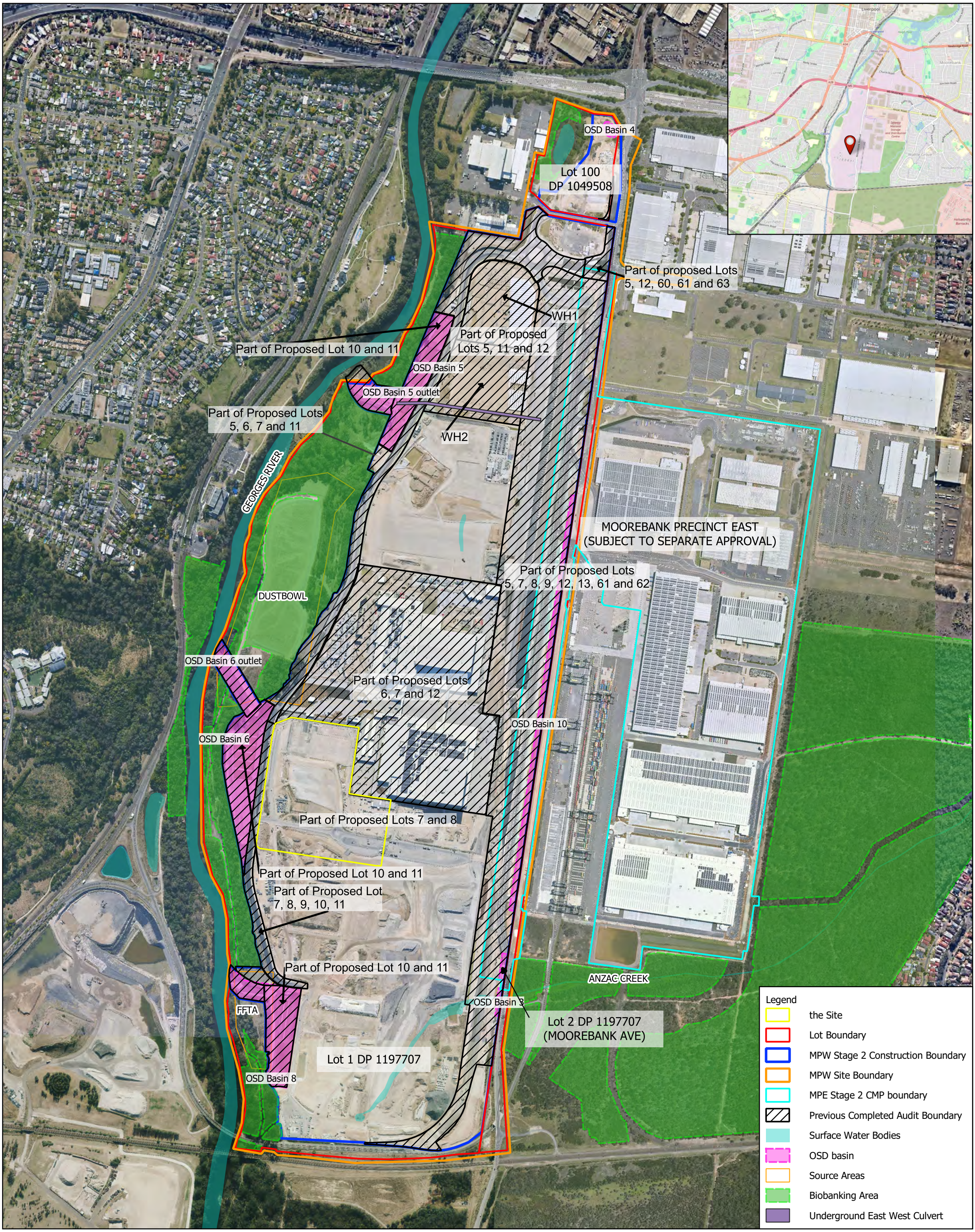
APPROVED COMPANY ISO 45001 QMS Certification Services
APPROVED COMPANY ISO 14001 QMS Certification Services

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# Long Term Environmental Management Plan
# Southern Warehouse Footprints

## Figure 2 - MPW Project Layout and Features

**Job No: EP1489**
**Date: 12/03/2024**
**Drawing Ref: Fig 2**
**Version No: v1**

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Approximate Scale Only

**Coordinate System: MGA 56**
**Drawn by: OG Checked by: AT**
**Scale of regional map not shown**
**Source: Near Maps**

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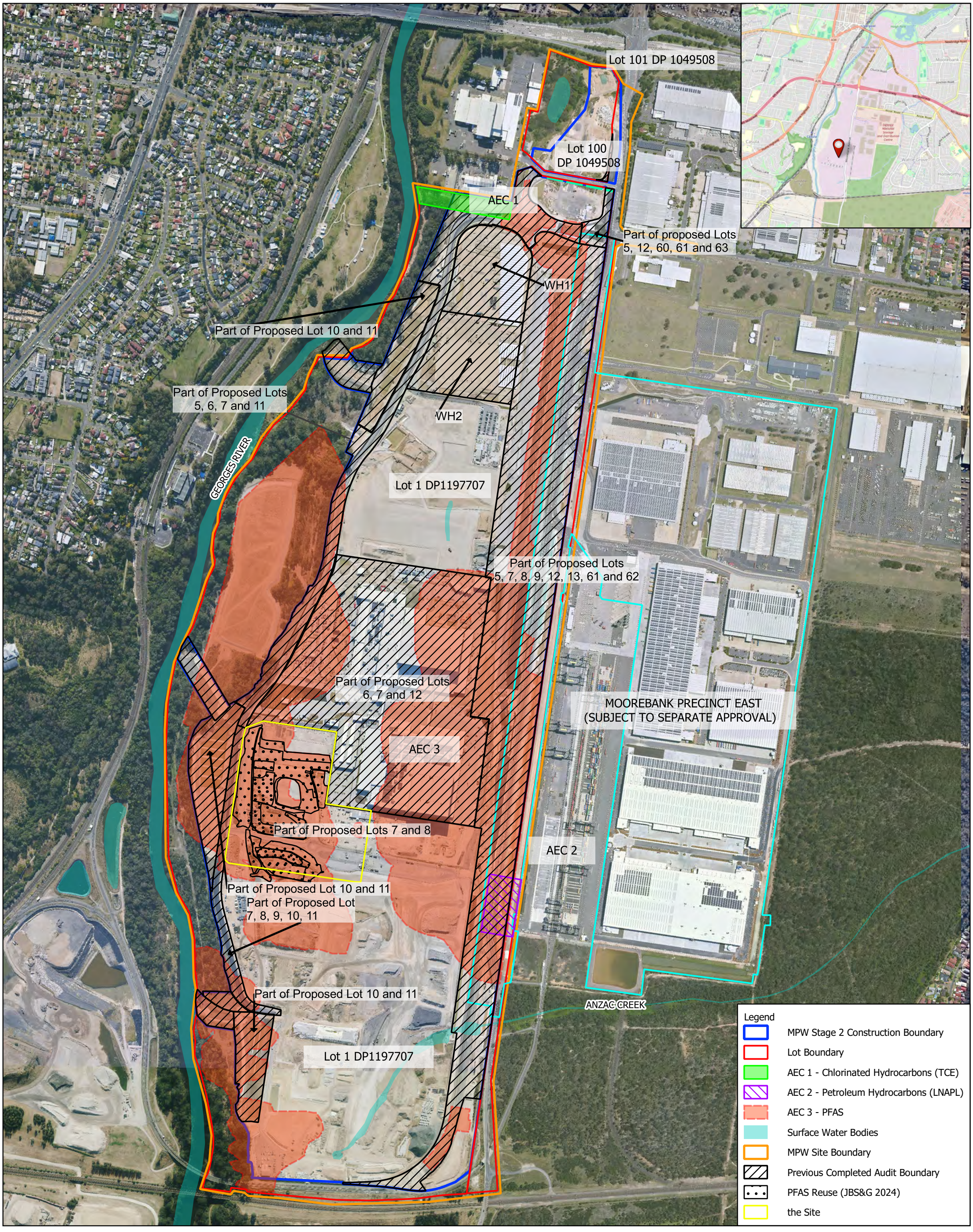


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# Long Term Environmental Management Plan
# Southern Warehouse Footprints

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**Version No: v3**

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Approximate Scale Only

**Coordinate System: MGA 56**
**Drawn by: OG Checked by: AT**
**Scale of regional map not shown**
**Source: Near Maps**

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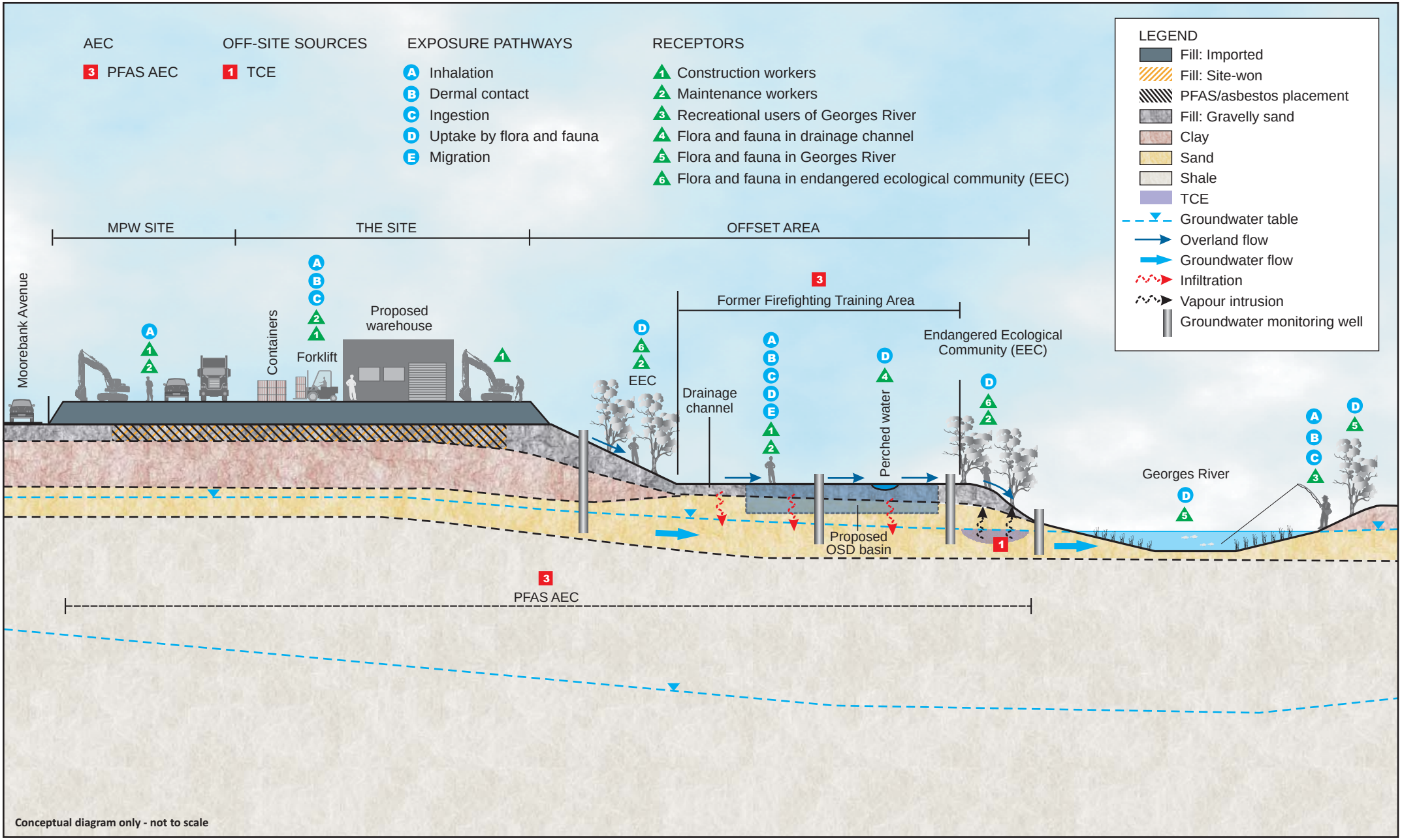
APPROVED COMPANY ISO 14001 QMS Certification Services

# Figure 3 - Areas of Environmental Concern

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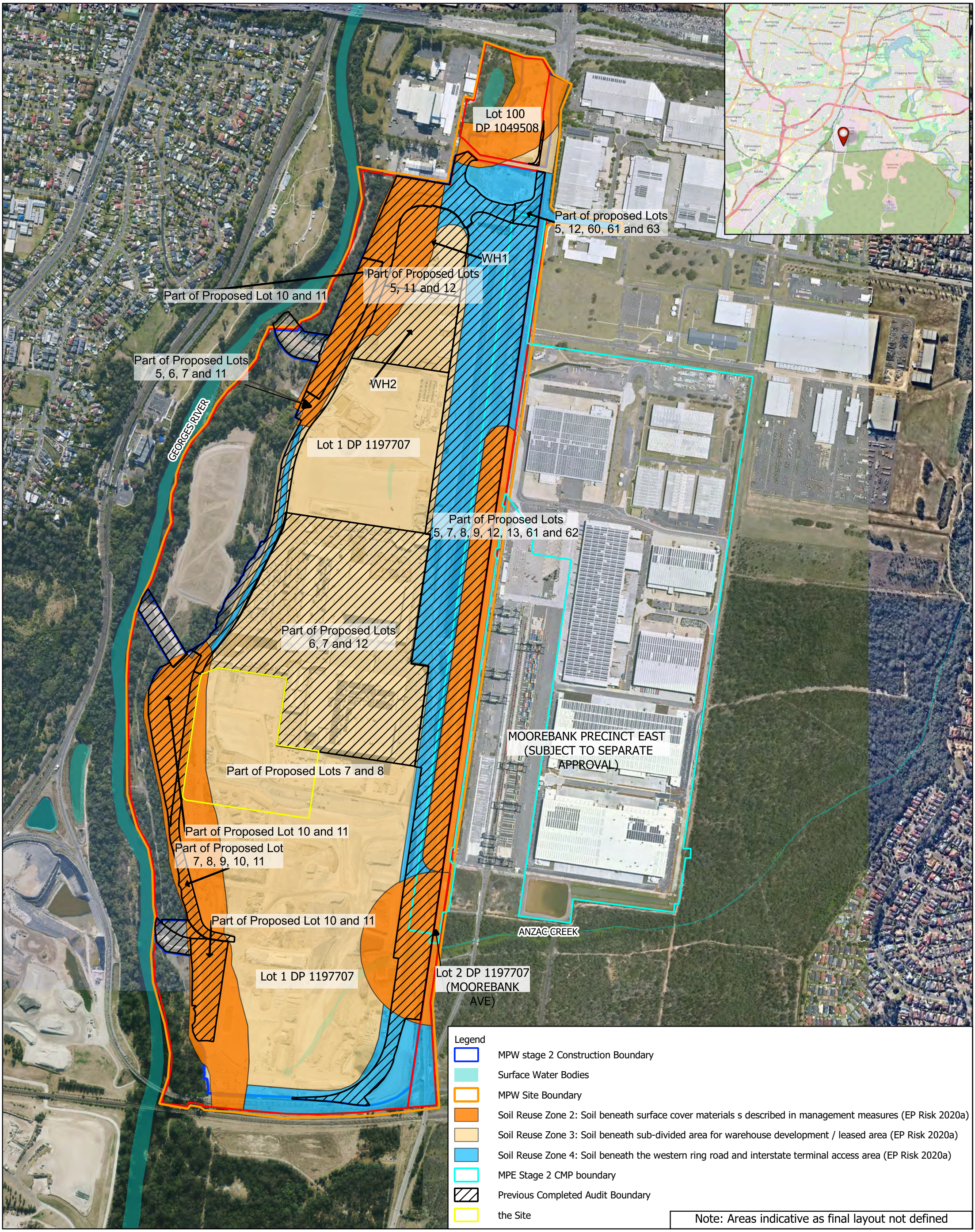
**Long Term Environmental Management Plan**
**S1 and S2 Warehouses**

Job No: EP0489
Date: 21/12/2023
Drawing Ref: EP0489_020.cdr
Version No: v1

## Figure 4 - Conceptual Site Model

Drawn By: B.W.
Checked By: A.T.




# Long Term Environmental Management Plan
# Southern Warehouse Footprints

# Figure 5 - Soil Reuse Zones (MPW LTEMP)

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**Job No: EP1489**
**Date: 12/03/2024**
**Drawing Ref: Fig 5**
**Version No: v1**

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Approximate Scale Only

**Coordinate System: WGS 84**
**Drawn by: OG Checked by: AT**
**Scale of regional map not shown**
**Source: Near Maps**

APPROVED COMPANY ISO 9001 QMS Certification Services
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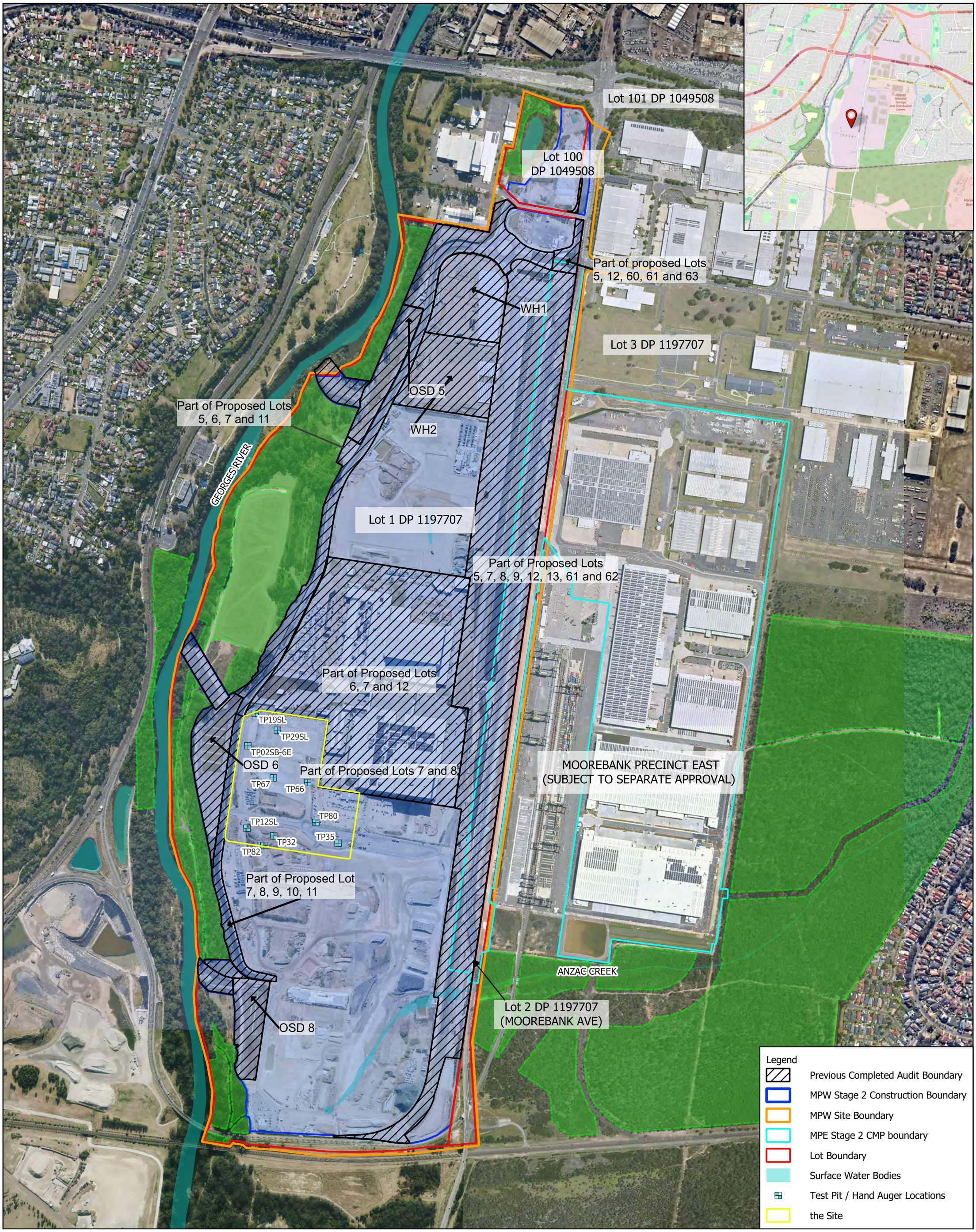


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# Long Term Environmental Management Plan
# Southern Warehouse Footprints

## Figure 6 - Soil and Groundwater Sampling Locations

Job No: EP1489
Date: 06/03/2024
Drawing Ref: Fig 6
Version No: v3

N

0 130 260 390 m

Approximate Scale Only

Coordinate System: MGA 56
Drawn by: OG Checked by: AT
Scale of regional map not shown
Source: Near Maps

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APPROVED COMPANY ISO 14001 QMS Certification Services

# Appendix A
## CONCEPTUAL SITE MODEL

# Conceptual Site Model

The information provided in this section together with the figures included in this report aid in presenting a conceptual site model (CSM) for the Site with respect to PFAS and asbestos based on a review of the validation reports for S1 and S2 Warehouses (JBS&G 2024). Relevant background historical site information and the investigation works undertaken at the MPW Site to date have also been included.

ASC NEPM (2013) identifies a CSM as a representation of site related information regarding contamination sources, receptors, and exposure pathways between those sources and human / ecological receptors. The development of a CSM is an essential part of all site assessments and remediation activities.

ASC NEPM (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination.
- Potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air).
- Human and ecological receptors.
- Potential and complete exposure pathways.
- Potential preferential pathways for vapour migration (if potential for vapours identified).

## Site Description

The Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse (JBS&G 2024) and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), in preparation for future permanent built surface works including concrete pavement or building slab. Survey information for all reuse and AEC 3 areas, including overlying engineered fill thickness, has been provided within **Appendix E** for completeness.

The Site is located in the central southern portion of the MPW Site and is approximately 10.02 ha.

The two PFAS source areas were located in the Offset Area of the MPW Site, known as the Dust Bowl and the FFTA (EP Risk 2018), north west and west of the Site (respectively), and PFAS impacted areas within AEC 3 are located across the majority of the Site. The petroleum hydrocarbon impacted area (AEC 2) is located in the eastern portion of the MPW Site, approximately 280 m east of the Site, and AEC 1 is located approximately 1.3 km north of the Site. JBS&G (2024) have identified soil containing asbestos at concentrations less than the HSL is present beneath the imported engineered fill layer at the Site (within AEC 3 PFAS reuse areas). The location of the Dust Bowl and FFTA, AEC 1, AEC 2 and AEC 3 (including PFAS Placement Areas) in relation to the Site is provided as **Figure 3** and the surveyed location of the PFAS Placement Areas described by JBS&G (2024) and the existing AEC 3 areas is provided in **Appendix E**.

## Proposed Development

The development is believed to include the construction of S1 and S2 Warehouses. It is understood the permanent built surface works will include pavements and landscaped areas (if present). There is potential for disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as a growing medium in landscaped areas and would likely be managed under one of the following scenarios (JBS&G 2024):

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, applicable DA, EPL, CMP or LTEMP for the land.
- Off-site disposal in accordance with NSW EPA Waste Classification Guidelines.

In the event soil is to be reused on-site, reference should be made to previous analytical results provided within **Appendix A,** the MPW LTEMP (EP Risk 2020a), Addendum 01 (EP Risk 2022), Addendum 02 (EP Risk 2023) to the MPW LTEMP, and PFAS surface water proximity assessment (JBS&G 2023a).

## Summary of Environmental Investigations (MPW Site)

### *AEC 3 – Historical PFAS Contamination (MPW Site)*

[redacted] of Enviroview Pty Ltd was engaged in 2016 as the Site Auditor in relation to the Moorebank Intermodal Terminal and reviewed the RAP (Golder 2016) for the MPW Site. [redacted] concluded *'…the RAP provided meets the requirements of the guidelines and it is my opinion that the site can be made suitable with the implementation of the RAP…'* (Enviroview 2016[22]).

The Golder (2016) RAP contained recommendations that PFAS be assessed and where required, a routine monitoring regime be established as part of the LTEMP. Numerous investigations at the MPW Site have been undertaken PFAS (PB 2014[23], Golder 2015b[24], Golder 2016b[25], Golder 2016c[26], Golder 2016d[27], Golder 2016e[28], Golder 2017[29], Coffey 2017[30], EP Risk 2017[31], EP Risk 2017a[32], EP Risk

[22] Enviroview (2016) *Site Audit Interim Advice – Golder Associates, Moorebank Intermodal Terminal Stage Specific Remediation Action Plan*, Letter to Tactical Group dated 22 August 2016 from [redacted]
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[26] Golder (2016c) *Perfluoroalkyl Substances Surface Water and Sediment Investigation Georges River*, dated 22 March 2016 (ref: 147623070-047-R-Rev0).
[27] Golder (2016d) *Moorebank Intermodal Terminal, Per- and Poly-fluoroalkyl Substances Investigation: Stage 2 Onsite Delineation* (ref: 147623070-064-R-Rev1, FINAL, 29.10.2016) Golder Associates Pty Ltd.
[28] Golder (2016e) *Moorebank Intermodal Terminal, Preliminary PFAS in Groundwater Remedial Options Appraisal, Moorebank Intermodal Terminal, Moorebank, NSW* (ref: 147623070-065-R-Rev0, 01.09.16) Golder Associates Pty Ltd (Golder 2016c).
[29] Golder (2017) *Moorebank Intermodal Terminal, Per-fluoroalkyl Substances Surface Water and Sediment Investigation Georges River*, dated 22 March 2017 (ref: 147623070-047-R-Rev0) Golder Associates Pty Ltd.
[30] Coffey (2017) *PFAS Assessment Report – Royal Australian Engineers (RAE) Golf Course*, dated 29 September 2017 (ref: GEOTLCOV24072AF-CD) Coffey.
[31] EP Risk (2017) *Literature Review, Criteria for Assessment of PFAS and Risk Assessment, Moorebank Intermodal Terminal Development* (ref: EP0448.001, v3, 03.10.17) EP Risk Management Pty Ltd.
[32] EP Risk (2017a) *Per- and Poly-fluoroalkyl Substances (PFAS) Data Gap Investigation* (ref: EP00464.002, v2, 20.11.17) EP Risk Management Pty Ltd.

2017b[33], EP Risk 2017c[34], JBS&G 2019[35] and JBS&G 2020). The findings of these reports have identified PFAS concentrations in soil below the human health-based guidelines for commercial / industrial land use but exceeding the indirect ecological criteria. Impacted sediment, groundwater and surface water was reported at the MPW Site sourced from historical firefighting activities undertaken at the former FFTA and Dust Bowl in the western portion of the MPW Site. EP Risk (2017) was engaged to prepare a Tier 2 PFAS human health and ecological risk assessment for the development and identified the potential human health risk to workers through dermal exposure to PFAS impacted water and a potential risk to ecological receptors in the Georges River from PFAS impacted soil, sediments, surface water and groundwater at the MPW Site.

MIC (now NI) engaged EnRiskS (2019[36] and 2019a[37]) to prepare updated human health and ecological risk assessments for the MPW Site and the Georges River. The risk assessments included sampling of biota in the Georges River to assess the risk of PFAS exposure to both on-site and off-site receptors. EnRiskS (2019) reported the risk to human health at the MPW Site was low and acceptable, but bioaccumulation and the effects on higher order ecological consumers were unable to be excluded. EnRiskS (2019a) reported additional unknown sources of PFAS to biota in the Georges River, but the location of these additional sources could not be identified. However, EnRiskS (2019a) reported a potential health risk to children who consume more than two serves of fish per month sourced from the Georges River and potential adverse effects to the aquatic environment by bioaccumulation and the effects on higher order ecological consumers.

MIC (now NI) engaged GHD (2019) [38] to prepare a summary report of historical PFAS investigations for the MPW Site and prepare a conceptual site model. Based upon the findings by EnRiskS (2019 and 2019a) and GHD (2019), MIC (now NI) engaged GHD to prepare a PFAS Management Plan (2019a) to outline the strategy for long term management of the off-site migration of PFAS from the MPW Site to the Georges River. The GHD (2019a) PFAS Management Plan was not implemented and was superseded.

To render the MPW Site suitable for the Proposed Development, remedial works were undertaken in accordance with the requirements of the RAP (Golder 2016), and the outcomes provided in the Remediation Validation Report for Land Preparation Work (JBS&G 2020). In summary, JBS&G (2020) concluded that in some areas of the Site, the scope of the RAP (Golder 2016) was constrained by areas mapped as endangered ecological communities (EECs) which could not be disturbed and are fenced / barricaded to prevent access. Management of these restricted areas during construction was recommended via the implementation of a CMP. JBS&G (2020) concluded that the MPW Site was

[33] EP Risk (2017b) *Per- and Poly-fluoroalkyl Substances (PFAS) Nested Well Investigation* (ref: EP00561.002, v1, 10.07.17) EP Risk Management Pty Ltd.
[34] EP Risk (2018) *Moorebank Precinct West Site-Wide Per- and Poly- Fluoroalkyl Substances (PFAS) Assessment* (ref: EP0748.008 v1, 22.08.18) EP Risk Management Pty Ltd.
[35] JBS&G (2019b) *Moorebank Precinct West, Moorebank Intermodal Terminal, NSW – Dust Bowl Assessment* (ref: JBS&G 51997-125644 L342 (Dust Bowl Assessment) Rev A, dated 8 November 2019).
[36] EnRiskS (2019) *Land Human Health and Ecological Risk Assessment (Land HERA)*, dated 6 May 2019 (ref: MICL/19/BIOR001, Revision B – Revised Draft).
[37] EnRiskS (2019a) *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA)*, dated 10 May 2019 (ref: MICL/18/GRR001, Revision E – Revised Draft).
[38] GHD (2019) *Moorebank Precinct West, Report Summarising PFAS Investigations to February 2019*, dated April 2019 (ref: 2128111).

suitable for the intended Intermodal Terminal subject to the implementation of a CMP for restricted access areas during the construction phase and biobanking areas with restricted access.

Management and close out of remaining contamination within the EECs, as identified in the EP Risk (2020) CMP was completed by JBS&G (2020a) to the extent practicable. However, JBS&G (2020a) identified a number of areas where it was not practicable to complete validation works due to site constraints which required on-going management during construction works.

EnRiskS (2020)[39] prepared a material reuse risk assessment in relation to the presence of PFAS in soil to inform management procedures in the LTEMP, which presents revised criteria for PFAS in soil to be reused in the Construction Area, which can be implemented in conjunction with the management measures within the MPW LTEMP (EP Risk 2020a).

## Summary of Preparatory Works Summary (JBS&G 2024)

The Site works were undertaken by Liberty Industrial until January 2020 and Georgiou thereafter. Civil and remedial works were supervised by JBS&G. Following the B169 Audit (Enviroview 2020), the Site was used for construction support (JBS&G 2024) and included the following uses:

- Client offices and associated car park (northern portion of S1). This area was constructed following sandstone filling works in October 2019 and subsequently relocated in May 2023.
- Truck storage area (southern portion of S1). This area was utilised following sandstone filling works in March 2020 and relocated in May 2023.
- The Synergy Resource Management (Synergy) PFAS water treatment plant and associated sediment basin (northwest portion of S2). The plant was constructed in January 2020 and relocated in August 2023.
- Chatham Avenue redevelopment (southern portion of S2). Chatham Avenue was redeveloped in October 2019 and removed in December 2023.
- Richard Crookes Construction (RCC) storage/stockpiling area and compound (southeast portion of S1 and northeast portion of S2). This area was utilised during construction of warehousing facilities to the north and east of the Site. The area was utilised following sandstone filling in May 2021 and removed in September 2023.

Based on the Validation Report (JBS&G 2024), a number of in-situ and ex-situ assessments were conducted as part of Stage 2 filling works at the Site. The scope of works as part of validation included the following:

- Assessment and management of unexpected finds identified following completion of the works documented in the Remediation Validation Report (JBS&G 2020a) and Supplementary Validation Report (JBS&G 2020a), including:
    - Characterisation of excavated materials and preparation of waste classification reports for off-site disposal where required;
    - Completion of air monitoring during excavation / remediation of asbestos fines / fibrous asbestos (AF/FA) impacted material;

[39] EnRiskS (2020) Moorebank Intermodal Terminal: LTEMP Material Reuse Risk Assessment for PFAS, dated 9 October 2020.

  - Visual inspection and validation of final excavation extents and any associated stockpiles;
  - Review of off-site waste disposal dockets for all material disposed to landfill; and
  - Documentation of the validation process.
- Assessment of stockpile for potential contamination (including PFAS, asbestos and other contaminants) prior to reuse.
- Clearance assessments.
- Review of materials tracking and survey details provided by Georgiou in relation to stockpiling and placement of fill.
- Review of documentation available for unexploded ordnance (UXO) and explosive ordnance waste (EOW), if any, encountered during civil works.
- Review of the documentation provided by Richard Crookes Construction (RCC) for a compound and storage/stockpiling area.
- Review of documentation provided by Construction and Remediation Advisory Services (CARAS) and Georgiou for imported fill material intended to raise the site level.

It was reported by JBS&G (2024) that management of UPECs, soil contamination and sampling was undertaken in accordance with the CMP (EP Risk 2021) and MPW LTEMP (EP Risk 2020a).

During civil works, three (3) unexpected finds (UF) were identified, removed and validated by JBS&G. Unexpected finds were related to the presence of anthropogenic fill or the observation of ACM.

Once all UFs were removed the excavations were validated (JBS&G 2024).

### *In-Situ PFAS Assessments*

No In-situ PFAS Assessments were undertaken at the Site during Stage 2 works by JBS&G.

All soils excavated or stockpiled from AEC 3 within the MPW Site were assessed for PFAS for potential reuse and placement in accordance with the MPW LTEMP (EP Risk 2020a).

### *Soil Placement*

PFAS soil was reused within the Site in accordance with the MPW LTEMP (EP Risk 2020a) and Addendums (EP Risk 2022 and 2023). The locations of placement of these soils have been included within AEC 3. According to the Summary Report (JBS&G 2024) *"The Audit Area will generally include a concrete pavement or building slab consistent with the LTEMP PFAS management measures…. Final landscape areas are not currently defined. Should there be overlap between the final landscape design and areas of PFAS soil reuse, "retrofitting" of the capping for landscape areas as per the LTEMP (EP Risk 2020) will be required during the construction phase. Retrofitting may require the management of surplus PFAS impacted spoil, either within MPW or disposed off-site. Retrofitting will be managed under an area specific LTEMP."*

Stockpile assessment reports were provided within the JBS&G (2024) Summary Report.

The locations of AEC 3 are provided within **Figure 3** and the survey provided within the Summary Report (JBS&G 2024) is provided in **Appendix E**. A statistical summary of PFAS concentrations is provided within **Table A3** within **Appendix A**.

### *UXO Assessment*

Unexploded ordnance (UXO) / explosive ordnance waste (EOW) was previously reported in JBS&G 2020a and 2020a. No UXO/EOW was identified at the Site.

### *Stormwater Structures*

JBS&G prepared a Technical Memo (JBS&G 2021a [40]) clarifying stormwater structures and the placement of PFAS impacted soil for the Site in accordance with EnRiskS (2020[41]) and EP Risk (2020a) and considered that following development of the Site the risk of offsite migration of PFAS to sensitive receptors via the stormwater system is considered negligible. JBS&G (2021a) described the mitigation factors as:

- *The reuse of soil at or near surface are required to meet appropriately protective total soil and leachable PFAS criteria (NEMP 2020). Therefore, runoff into the development's stormwater system is anticipated to be within acceptable PFAS concentrations;*
- *Other PFAS impacted soils proposed to be reused on site will be isolated by pavements and imported fill, and infiltration water would not reach (or would be negligible in) the underlying PFAS contaminated soil. Therefore, there would be no driver for PFAS to be mobilised;*
- *In order that the development is not geotechnically/structurally compromised, the stormwater system is designed to retain water for discharge offsite. Therefore, exfiltration from the network would not be expected to exacerbate leaching to groundwater to any significant extent; and*
- *The stormwater system is above the groundwater table and therefore the system would not be a preferential flow path for impacted groundwater.*

Based on the JBS&G (2021a) Technical Memo *"It is therefore considered that the management measures detailed in the LTEMP are sufficiently protective of the proposed MPW stormwater system and a setback from enclosed stormwater infrastructure is not warranted, nor contemplated by the approved LTEMP* (JBS&G 2021a). Additionally, JBS&G considered the use of asphalt as a suitable cover (**Appendix I**) as referenced by EnRiskS (2020).

### *Surface Water (JBS&G 2024)*

Surface water was managed as per the MPW LTEMP (EP Risk 2020a), the MPE Stage 2 CEMP (SIMTA 2021), and the EPL (EPL 21054) for the MPW Site. The surface water sampling program was subject to routine reporting to the NSW EPA by Aspect Environmental Pty Ltd. Surface water at the Site and within the Georges River is reported on a quarterly basis. As summarised by JBS&G (2024), PFOS

[40] JBS&G (2021a), *Technical Memo, Moorebank Precinct West (MPW) – Stormwater Structures and the Placement of PFAS Impacted Soil, Moorebank Logistics Park, NSW,* dated 19 May 2021 (ref: 51997 – 136836 (rev 2)).
[41] EnRiskS (2020) Moorebank Intermodal Terminal: LTEMP Material Reuse Risk Assessment for PFAS, dated 9 October 2020.

concentrations were generally reported above the EPL criteria in basins and ponded water located within AEC 3. Surface water samples collected from basins within the Site (Basins 6E and 6F) and immediately south of the Site (Basin 7A) generally reported concentrations of PFOS greater than the EPL criteria pf 0.13 µg/L during monitoring rounds in 2022 and 2023 (JBS&G 2024).

It is understood ongoing management of stormwater within basins will be via a CEMP, relevant EPL and LTEMP for the land at the time.

## Summary of Contamination

A summary of remediation works and previous environmental reports at the Site is provided within the JBS&G (2024) Summary Report.

Based on the JBS&G (2024) summary letter, the following remaining areas of environmental concern (AEC) and contaminants of concern for the MPW Site is provided as follows:

- AEC 1 - Chlorinated hydrocarbons impact (Trichloroethylene (TCE) and Cis-1,2-dichlorothene (cis-DCE)) and total recoverable hydrocarbons (TRH) in the north west portion of the MPW Site to the south of the ABB Building.
- AEC 2 - Petroleum hydrocarbon impact including light non-aqueous phase hydrocarbons (LNAPL) in the eastern portion of the MPW Site.
- AEC 3 - PFAS impact associated with residue from historical fire-fighting activities.

The chlorinated hydrocarbon impacted area (AEC 1) is located approximately 1.3 km north of the Site, south of the ABB building (JBS&G 2024). AEC 2 is located approximately 280 m east of the Site.

Therefore the known sources of contamination are PFAS impacts associated with residue from historical fire-fighting activities (AEC 3). Additionally, site-won PFAS containing soils were placed on-site during filling works as part of Stage 2 in accordance with the LTEMP (EP Risk 2020a) (JBS&G 2024).

Asbestos in soil below the adopted health-based criteria was reported below the imported Engineered Fill layer within the Site during filling works. The material was sourced from BMD-SP276, which was placed within AEC 3 due to concentrations of PFAS. The location of PFAS and asbestos placement is provided within the survey as **Appendix E.** All asbestos in soil was considered less than the adopted HSL for a commercial / industrial land use was considered suitable to remain on the Site by JBS&G subject to placement deeper than 0.1 m BGS. As this material was placed with AEC 3 PFAS materials, it was placed at a depth of greater than approximately 0.3 m.

The location of the AECs at the MPW Site in relation to the Site is provided as **Figure 3**. A CSM Figure is provided as **Figure 4**.

The Site has been raised with imported fill to design levels, with PFAS reuse areas (now AEC 3) covered with approximately 0.3 m of engineered fill placement above site-won reuse (JBS&G 2024) and a nominal depth of engineered fill placement across the remainder of the Site (including above existing AEC 3 areas from the MPW LTEMP (EP Risk 2020a)), in preparation for future permanent built surface works including concrete pavement or building slab. Survey information for all reuse and AEC 3 areas, including overlying engineered fill thickness, has been provided within **Appendix E** for completeness.

### *AEC 3 - PFAS Contamination in Affected Media Onsite*

The historical soil and groundwater PFAS analytical results at the Site reported by PB (2014), Golder (2015), Golder (2016b), EP Risk (2017a, 2017b and 2018a) and JBS&G (2019b), as summarised by EP Risk (2018 and 2020) in the Site-Wide PFAS Assessment, are presented in **Table A1,** and **Table A2** respectively. The corresponding sampling locations are provided in **Figure 6**.

Ecological criteria were only compared to the data set from 0 to 2 mBGL in accordance with the requirements of the ASC NEPM (2013) as this horizon corresponds with the root zone and habitation zone of many species. Figures illustrating the locations of PFAS impacts and historical sampling locations are provided at the end of **Appendix A**.

### *PFAS Placement Areas (JBS&G 2024)*

A review of PFAS-containing soils excavated from the greater MPW Site and reused within the Site, as summarised by JBS&G (2024) is provided within **Table A3**. The corresponding PFAS reuse areas provided within the Summary Report (JBS&G 2024) is provided in **Appendix E**.

**Table A1 – Summary of Historical In-Situ Soil PFOS, PFOS + PFHxS and PFOA Concentrations On-site (EP Risk 2018 and 2020)**

| Area | Analyte | No. of samples | Min. Conc. (mg/kg) | Max. Conc. (mg/kg) | Mean Conc. (mg/kg) | Standard Deviation (mg/kg) | No. Samples >LOR | No. Samples > Criteria[42] | No. Samples > 250% Criteria | 95% $UCL_{mean}$[43] (mg/kg) | 95% $UCL_{mean}$ Exceedance of Criteria[44] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| The Site | PFOA | 23 | <0.0001 | 0.0017 | 0.000625 | 0.00072284 | 4 | 0 | 0 | 0.00030341 | N/A |
| | PFOS | 23 | <0.0001 | 0.31 | 0.0283 | 0.0788 | 15 | 1 | 0 | 0.0947 | N/A |
| | PFHxS | 18 | <0.0001 | 0.028 | 0.00475 | 0.00948 | 8 | 0 | 0 | 0.0114 | N/A |
| | PFOS + PFHxS | 23 | <0.0001 | 0.338 | 0.292 | 0.0833 | 16 | 0 | 0 | 0.0459 | N/A |

**Table A2 – Summary of Historical Groundwater PFOS, PFOS + PFHxS and PFOA Concentrations On-site (JBS&G 2024)**

| Area | Analyte | No. of Wells | No. of samples | Reported conc. (µg/L) | No. Samples >LOR | No. Samples > Criteria[45] | 95% $UCL_{mean}$ (µg/L) | 95% $UCL_{mean}$ Exceedance of Criteria |
|---|---|---|---|---|---|---|---|---|
| The Site | PFOA | 1 | 1 | 0.05 | 1 | 0 | N/A | N/A |
| | PFOS | 1 | 1 | 0.56 | 1 | 1[46] | N/A | N/A |
| | PFHxS | 1 | 1 | 2.7 | 1 | 1[47] | N/A | N/A |
| | PFOS + PFHxS | 1 | 1 | 3.26 | 1 | 1[48] | N/A | N/A |

[42] Health based criteria assuming commercial / industrial land use and for soil <2m and >2m. Ecological criteria assuming industrial commercial for soil <2m (PFAS NEMP).
[43] $UCL_{mean}$ – Upper confidence limit of the arithmetic mean.
[44] Standard deviation greater than 50% of the adopted criteria.
[45] Criteria adopted for human health (drinking water and recreational water quality) and ecological (Freshwater 99% species protection) (PFAS NEMP).
[46] The sample (JBSG_MW08, collected 15/1/2019) exceeded the HEPA NEMP 2020 Drinking Water criteria and Freshwater - 99% Species Protection criteria.
[47] The sample (JBSG_MW08, collected 15/1/2019) exceeded the HEPA NEMP 2020 Drinking Water and Recreational Water criteria.
[48] The sample (JBSG_MW08, collected 15/1/2019) exceeded the HEPA NEMP 2020 Drinking Water and Recreational Water criteria.

**Table A3 – Summary Reused Soil PFOS, PFOS + PFHxS and PFOA Concentrations (JBS&G 2024)[49]**

| Area | Analyte | No. of samples | Min. Conc. (mg/kg) | Max. Conc. (mg/kg) | Mean Conc. (mg/kg) | Standard Deviation (mg/kg) | No. Samples >LOR | No. Samples > Criteria[50] | No. Samples > 250% Criteria | 95% $UCL_{mean}$ (mg/kg) | 95% $UCL_{mean}$ Exceedance of Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OS-SP433 | PFOA | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC[51] | NC |
| | PFOS | 10 | 0.0082 | 0.13 | 0.0636 | 0.0413 | 10 | 0 | 0 | 0.0875 | N/A |
| | PFHxS | 10 | <0.005 | 0.014 | 0.0115 | 0.00356 | 3 | 0 | 0 | NC | NC |
| | PFOS + PFHxS | 10 | 0.0082 | 0.13 | 0.0671 | 0.043 | 10 | 0 | 0 | 0.092 | N/A |
| OS-SP440 | PFOA | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFHxS | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS+PFHxS | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| WT-SP446 | PFOA | 15 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS | 15 | <0.005 | 0.011 | 0.00853 | 0.00233 | 4 | 0 | 0 | 0.00561 | N/A |
| | PFHxS | 15 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS+PFHxS | 15 | <0.005 | 0.011 | 0.00853 | 0.00233 | 4 | 0 | 0 | 0.00561 | N/A |
| WT-SP468 | PFOA | 13 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS | 13 | <0.005 | 0.05 | 0.0153 | 0.0139 | 10 | 0 | 0 | 0.019 | N/A |
| | PFHxS | 13 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS+PFHxS | 13 | <0.005 | 0.05 | 0.0153 | 0.0139 | 10 | 0 | 0 | 0.019 | N/A |
| OS-SP477 | PFOA | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS | 10 | <0.005 | 0.011 | 0.00745 | 0.00278 | 6 | 0 | 0 | 0.00745 | N/A |
| | PFHxS | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS+PFHxS | 10 | <0.005 | 0.011 | 0.00745 | 0.00278 | 6 | 0 | 0 | 0.00745 | N/A |

[49] Based off the data presented in the JBS & G Moorebank Precinct West (MPW): Onsite Detention Stockpile Assessment reports
[50] Exceeding PFAS NEMP 2020 Health-based criteria assuming commercial / industrial land use and for soil, PFAS NEMP 2020 Ecological criteria for direct exposure, and/or PFAS NEMP 2020 Ecological criteria value for indirect exposure of 0.14mg/kg, adopted on the basis that the Site has been intensively developed in the past and further intensive development is proposed which will limit the presence of secondary consumers and the potential for indirect ecological exposure.
[51] NC: Not Calculated; insufficient positive detections to enable the calculation of an accurate UCL

**Table A3 – Summary Reused Soil PFOS, PFOS + PFHxS and PFOA Concentrations (JBS&G 2024)[49]**

| Area | Analyte | No. of samples | Min. Conc. (mg/kg) | Max. Conc. (mg/kg) | Mean Conc. (mg/kg) | Standard Deviation (mg/kg) | No. Samples >LOR | No. Samples > Criteria[50] | No. Samples > 250% Criteria | 95% $UCL_{mean}$ (mg/kg) | 95% $UCL_{mean}$ Exceedance of Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WE-SP478 | PFOA | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS | 10 | <0.005 | 0.011 | 0.00847 | 0.0022 | 3 | 0 | 0 | NC | NC |
| | PFHxS | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS+PFHxS | 10 | <0.005 | 0.011 | 0.00847 | 0.0022 | 3 | 0 | 0 | NC | NC |
| OS-SP470B | PFOA | 10 | <0.005 | <0.005 | N/A | N/A | 0 | 0 | 0 | NC | NC |
| | PFOS | 10 | <0.005 | 0.0088 | 0.0073 | 0.00212 | 2 | 0 | 0 | NC | NC |
| | PFHxS | 10 | <0.005 | 0.017 | 0.0101 | 0.00424 | 9 | 0 | 0 | 0.0121 | N/A |
| | PFOS+PFHxS | 10 | <0.005 | 0.0218 | 0.0108 | 0.0066 | 9 | 0 | 0 | 0.0146 | NA |

### *Assessment of Precursors*

EP Risk (2018) reported that total oxidising precursor assay (TOPA) results indicated that total oxidising concentrations of PFOS and PFHxS + PFOS were generally decreasing in concentration post oxidation under laboratory conditions using a strong oxidant. Based on the laboratory results, it was considered unlikely that significant transformation of PFAS precursors would occur under the less oxidising conditions present on-site.

## Sensitive Receptors

Sensitive receptors identified at and near the Site are:

- On-site receptors:
    - Construction and subsurface maintenance workers and future commercial / industrial site users.
    - Future terrestrial flora and fauna in proposed landscaped areas (if present).
- Off-site receptors:
    - Construction, remediation and subsurface maintenance workers and future commercial / industrial site users at the MPW Site.
    - Recreational users of the Georges River.
    - Recreational users who trespass on the Offset Area.
    - Terrestrial flora and fauna including threatened species in the Offset Area.
    - Terrestrial and aquatic flora and fauna dependent upon the Georges River and Anzac Creek.

## Source-Pathway-Receptor Linkages

Based upon the findings of the most recent human health and ecological risk assessments prepared for the Site and the Georges River by EnRiskS (2019 and 2019a), and Golder 2016, GHD 2018 and JBS&G 2020, an analysis of the potential source-pathway-receptor linkages are provided in **Table A4** and illustrated in **Figure 4** in the '**Figures**' section of the report.

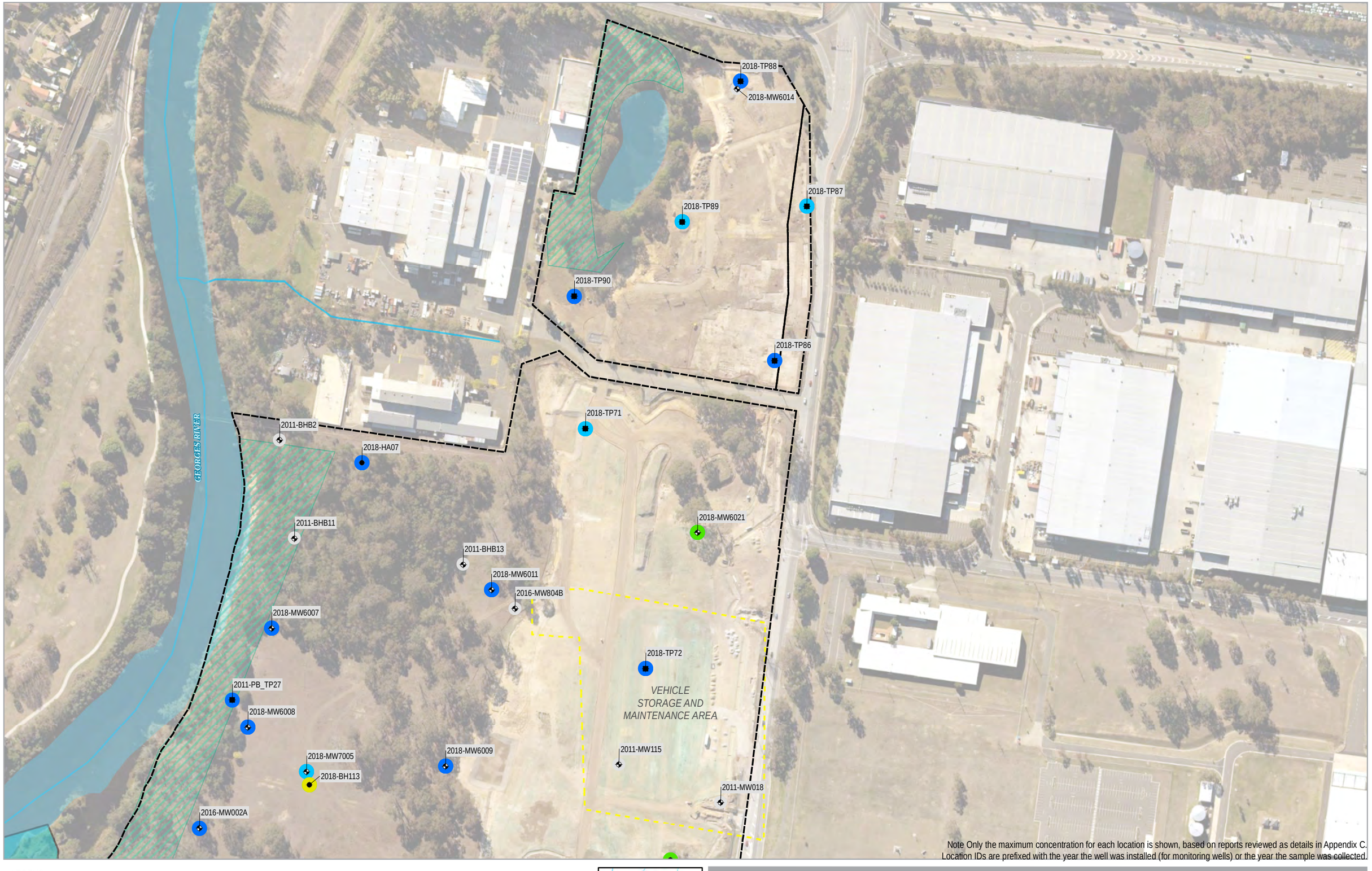
**Table A4 – Source-Pathway-Receptor Linkages**

| Sources | | Pathways | | Receptors | Linkages |
|---|---|---|---|---|---|
| **Primary** | **Secondary** | **Transport Mechanisms** | **Exposure Pathways** | | |
| AEC 3 – PFAS Placement Areas and Existing AEC 3 | | | | | |
| PFAS impact associated with residue from historical fire-fighting training | PFAS impacted soil and sediment within primary source areas and surrounding land. | - Leaching of PFAS through the soil profile to groundwater.<br>- Leaching of PFAS from exposed soil to surface water.<br>- Generation of dust from exposed soil. | Human Health:<br>- Incidental ingestion.<br>- Dermal contact.<br>- Inhalation of dust. | - Construction, remediation, subsurface maintenance workers.<br>- Future commercial / industrial site users. | Incomplete given PFAS concentrations below health-based criteria and assuming appropriate health, safety and environmental controls, and PPE are implemented during construction or sub-surface maintenance works. |
| | | | Ecological (direct):<br>- Direct uptake. | Terrestrial flora and fauna exposed to soil (<2 mBGL). | Potentially complete if appropriate soil management controls are not implemented during excavation works. |
| | | | Ecological (indirect)<br>- Bioaccumulation and biomagnification. | Terrestrial flora and fauna exposed to soil (<2 mBGL). | Potentially complete if appropriate soil management controls are not implemented during excavation works. |
| | PFAS impacted groundwater, surface water. | Groundwater migration, leaching and surface water flow to the OSD basins, temporary basins, Georges River and Anzac Creek. | Human Health:<br>- Incidental ingestion.<br>- Dermal contact. | - Construction, remediation, subsurface maintenance workers.<br>- Future commercial / industrial site users. | Incomplete as it is unlikely that groundwater would be encountered during construction works or extracted for a beneficial use. Surface water incomplete assuming appropriate health, safety and environmental controls, and PPE are implemented during construction or sub-surface maintenance works. |
| | | | Ecological:<br>- Bioaccumulation and biomagnification. | Ecosystems dependent upon the Georges River and Anzac Creek. | Potentially complete if appropriate soil and water management controls are not implemented during construction due to the high leachability of PFAS in soils. Excavation of OSDs will not encounter groundwater due to the reported groundwater depth below design levels. |

**Table A4 – Source-Pathway-Receptor Linkages**

| Sources | | Pathways | | Receptors | Linkages |
|---|---|---|---|---|---|
| **Primary** | **Secondary** | **Transport Mechanisms** | **Exposure Pathways** | | |
| Additional Areas Requiring Management | | | | | |
| Asbestos in soil beneath the Engineered Fill layer | Asbestos in Soil | Wind and Mechanical Disturbance | Human Health:<br>- Inhalation of Dust.<br>Aesthetic:<br>- Visual | - Construction and Maintenance Workers<br>- Future site users | Potentially complete if appropriate soil / asbestos management controls are not implemented. |

# AEC 3



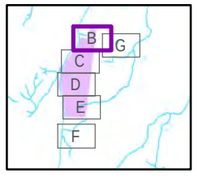

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

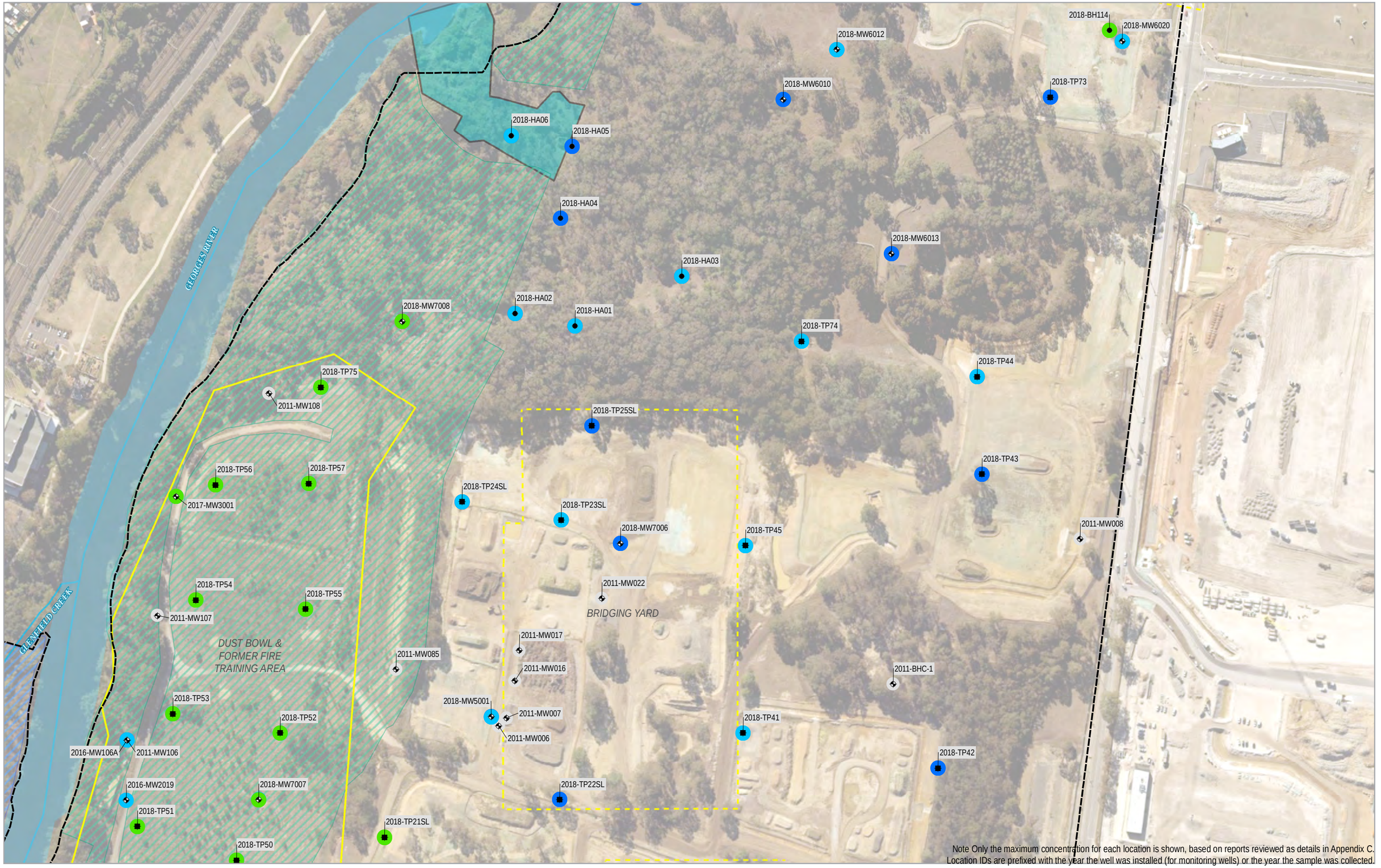
Soil
PFOS + PFHxS Results
Grid 1

| | |
|---|---|
| Project No. | 21-28111 |
| Revision No. | A |
| Date | 12 Apr 2019 |

FIGURE 6B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber

Note: The location of 2018-BH113 has been provided in error in this drawing



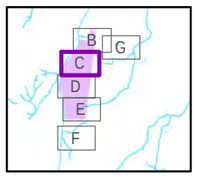

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

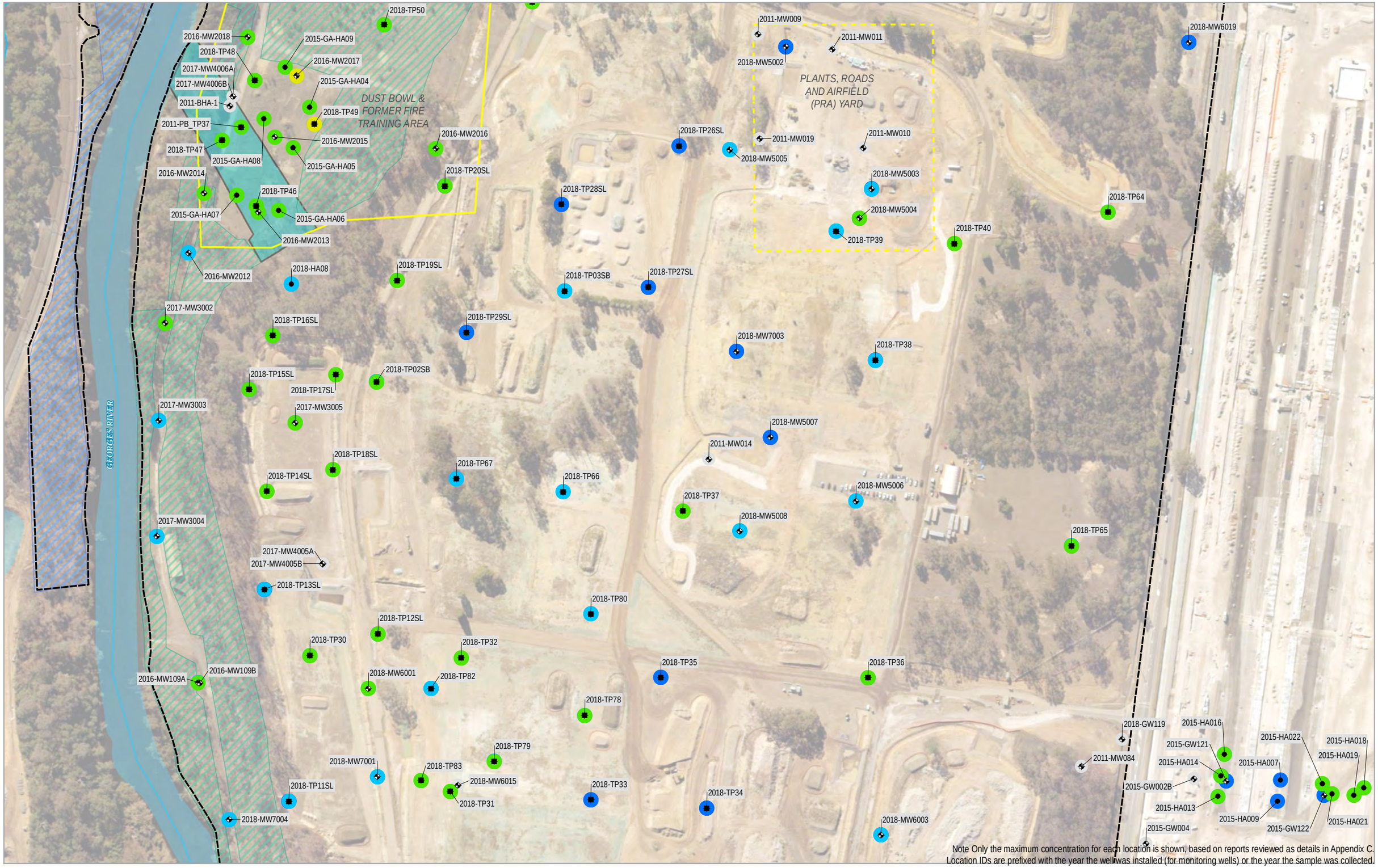
Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Soil
PFOS + PFHxS Results
Grid 2

| | |
|---|---|
| Project No. | 21-28111 |
| Revision No. | A |
| Date | 12 Apr 2019 |

FIGURE 6C

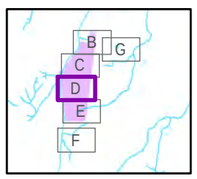
Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber




Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit
- Max PFOS + PFHxS Concentration (mg/kg)
- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

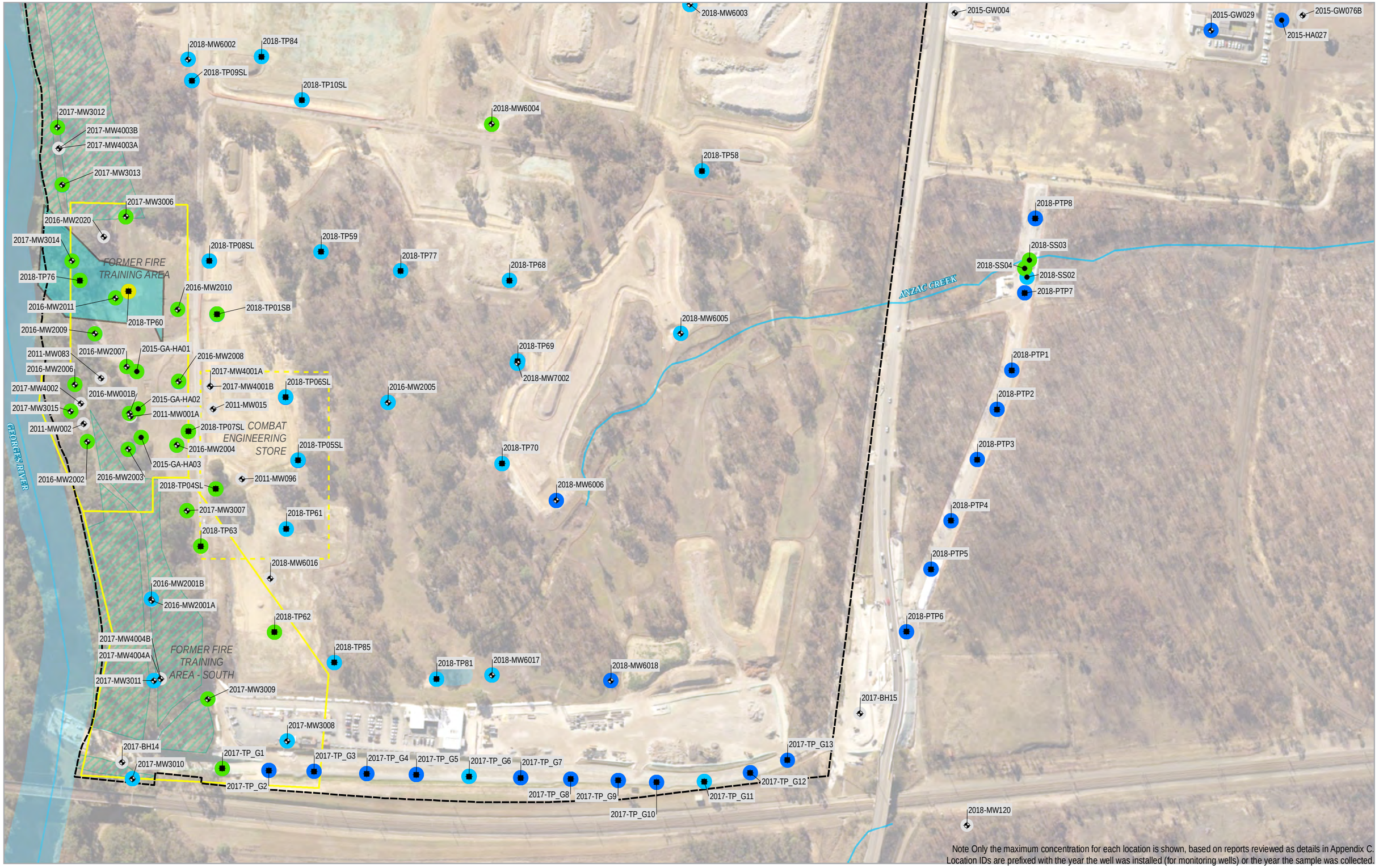
GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Soil
PFOS + PFHxS Results
Grid 3

| | |
|---|---|
| Project No. | 21-28111 |
| Revision No. | A |
| Date | 12 Apr 2019 |

FIGURE 6D



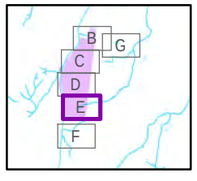

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Soil
PFOS + PFHxS Results
Grid 4

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 6E

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber

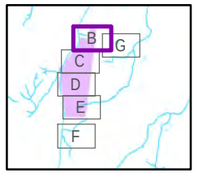

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

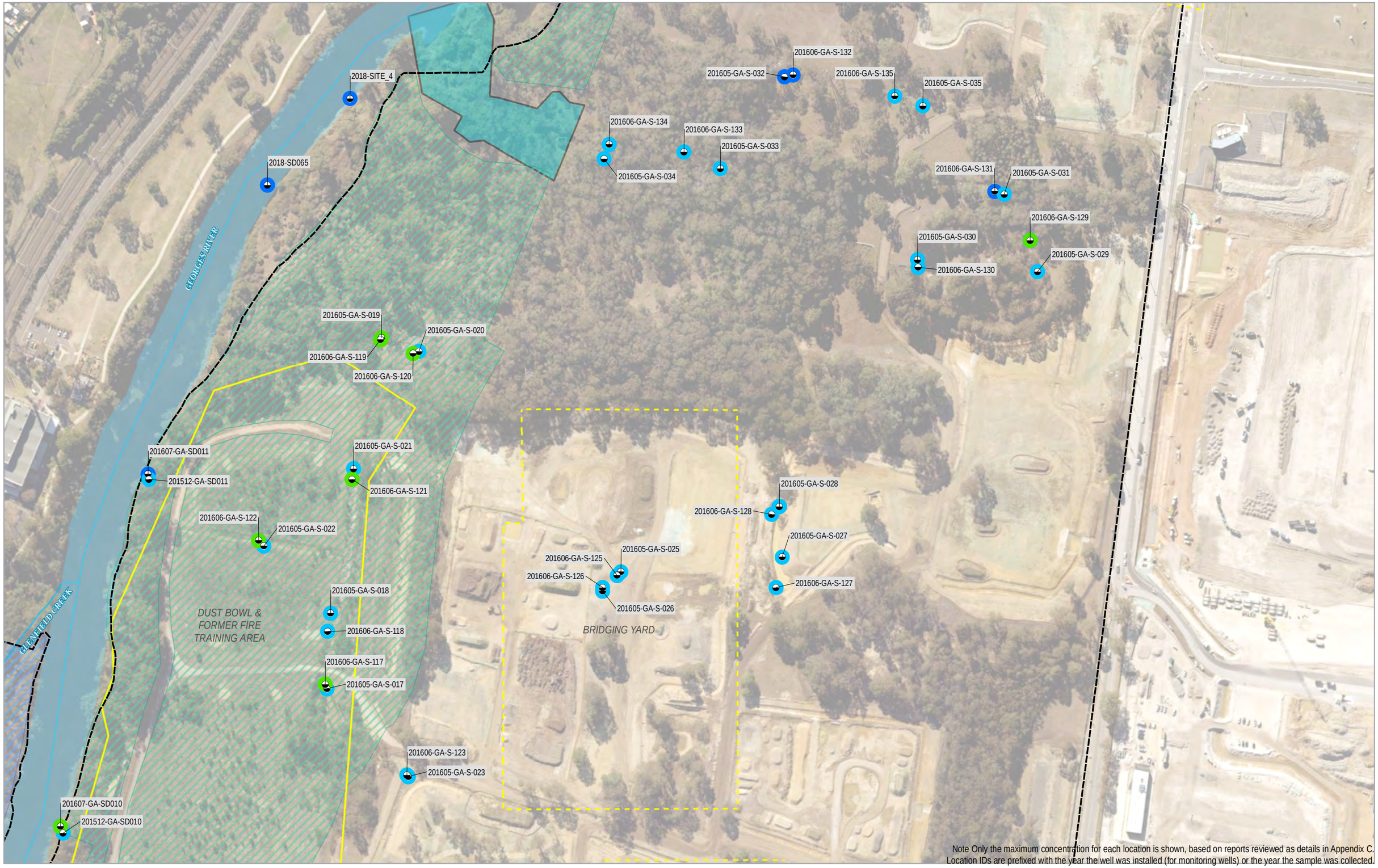
Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Sediment
PFOS + PFHxS Results
Grid 1

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber




Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

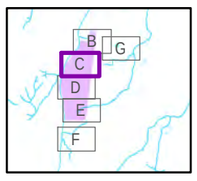
LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)

- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

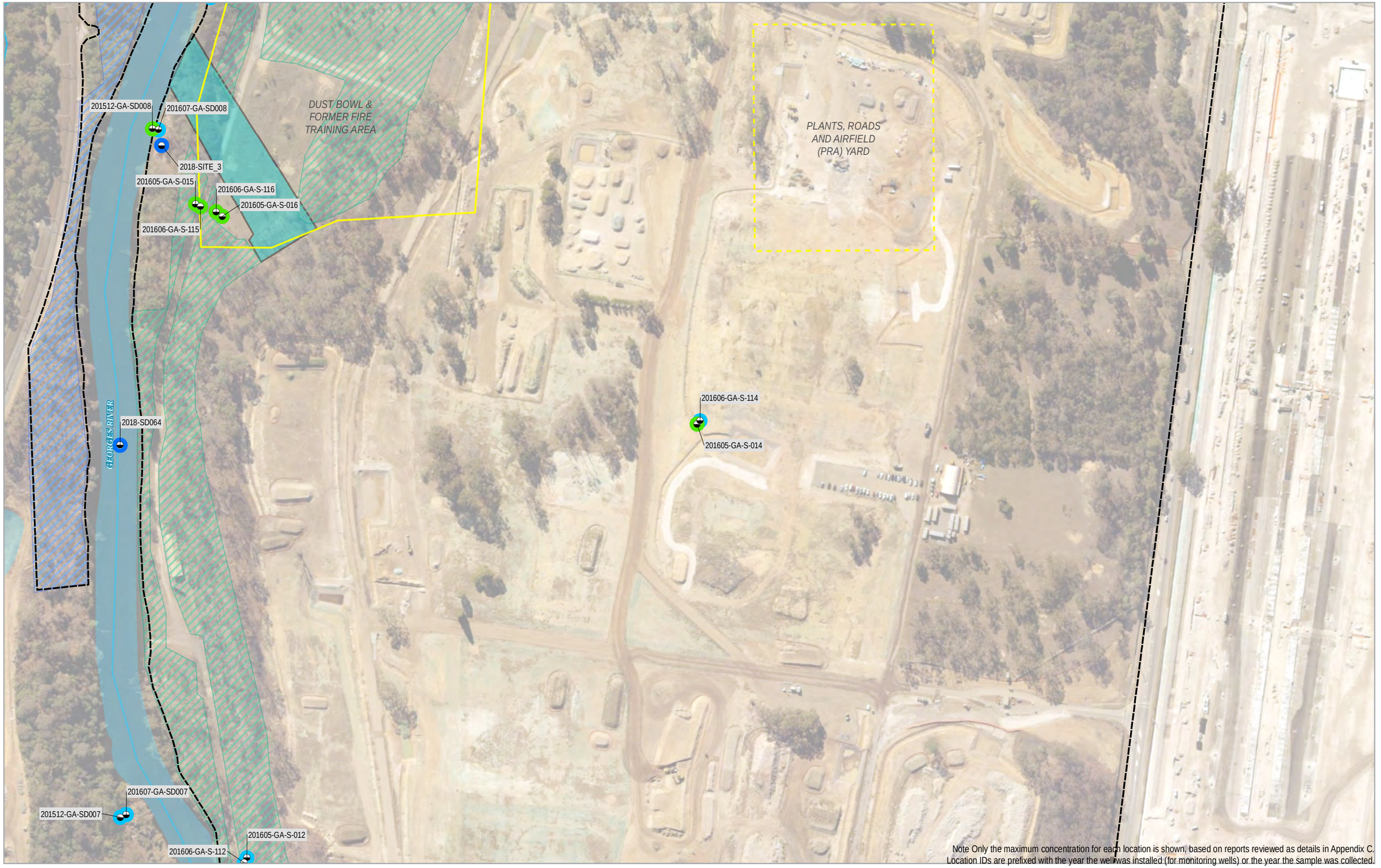
Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Sediment
PFOS + PFHxS Results
Grid 2

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



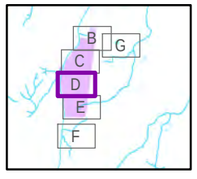

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

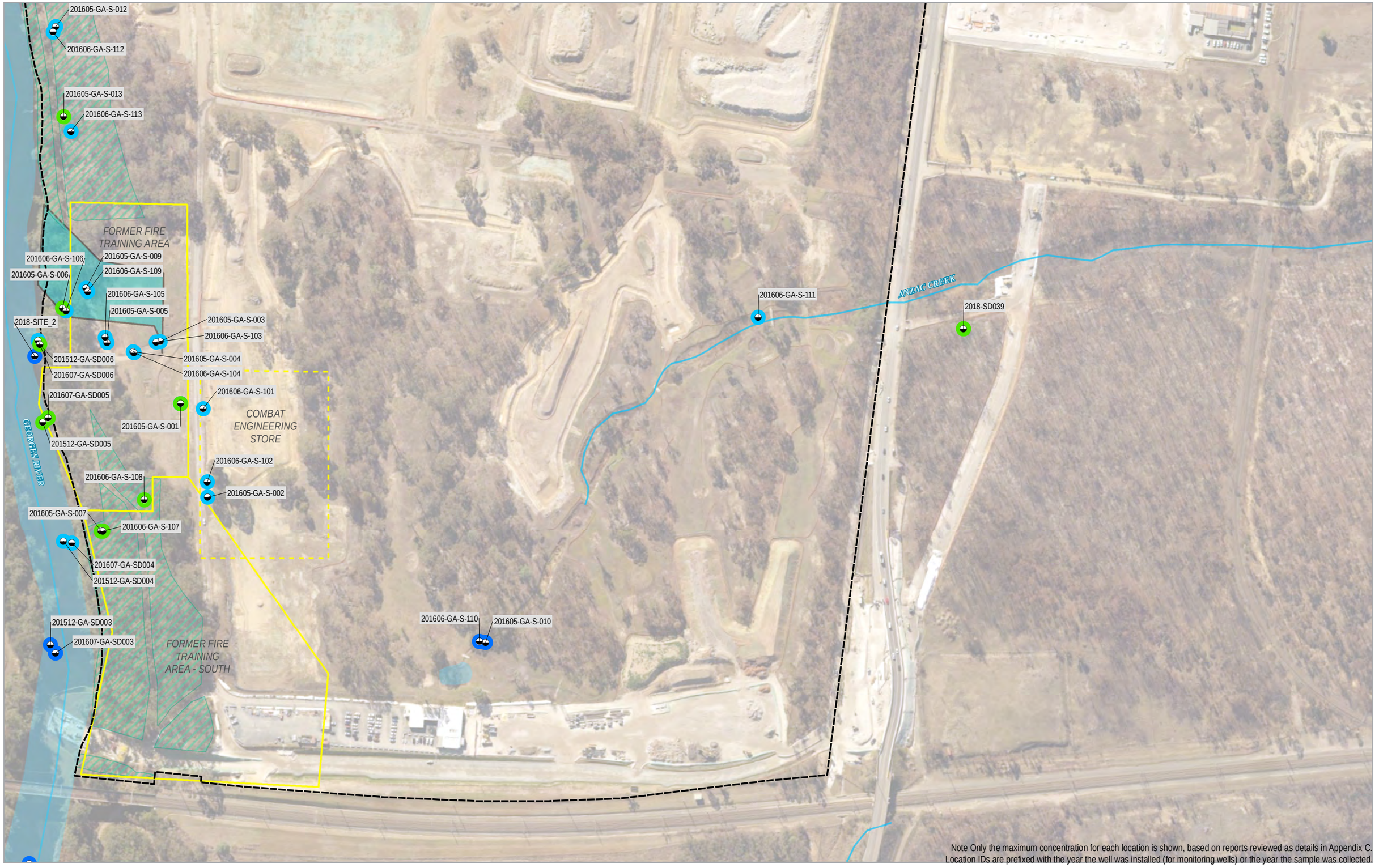
Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Sediment
PFOS + PFHxS Results
Grid 3

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



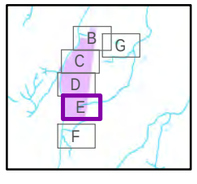

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Sediment
PFOS + PFHxS Results
Grid 4

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7E

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber

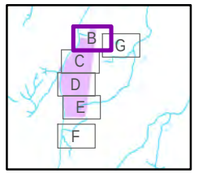

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Surface Water
PFOS + PFHxS Results
Grid 1

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber


Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

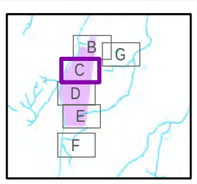
LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)

- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

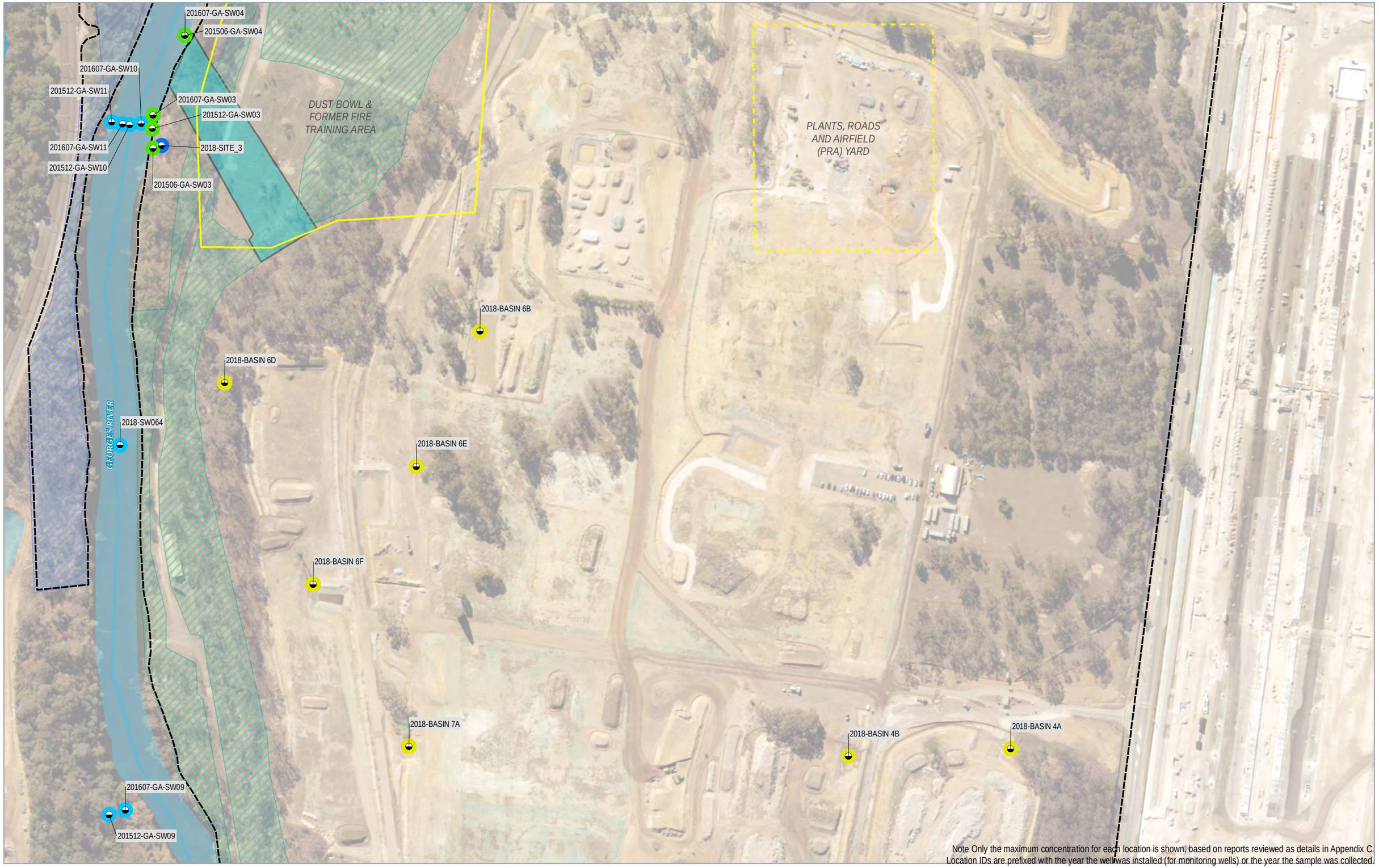
GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Surface Water
PFOS + PFHxS Results
Grid 2

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8C



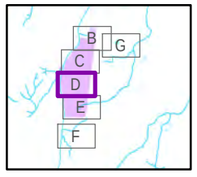

Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data




Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

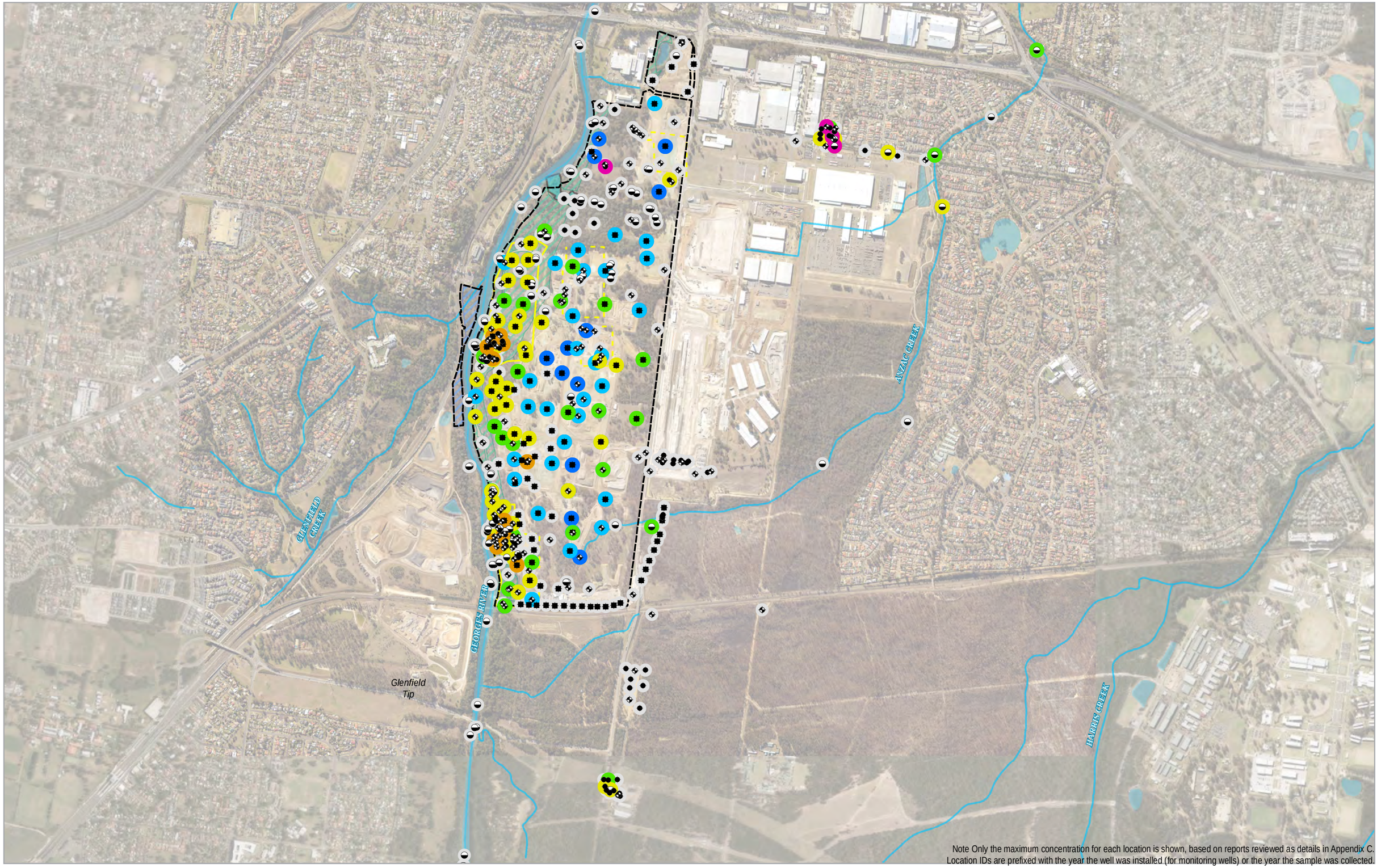
GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

Surface Water
PFOS + PFHxS Results
Grid 3

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8D




Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Liverpool Fire Station
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit
- Sediment Sample

Max PFOS + PFHxS Concentration (µg/L)

- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data

Paper Size ISO A3

0 200 400

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
**Summary Report PFAS Investigations**
**Moorebank Precinct West**

## Soil & Sediment ASLP
PFOS + PFHxS Results
Overview

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 11

# Appendix B
## ENVIRONMENTAL MANAGEMENT PROCEDURES

| **Land use restrictions** | | **EMP 1** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | To manage risk to human health and the environment through land use restrictions | |
| Areas of the Site | AEC 3 | |

***AEC 3 – PFAS***

The construction of the Proposed Development is generally anticipated to provide a reduction in infiltration, leaching and groundwater mass flux of PFAS entering the Georges River resulting is a corresponding reduction in long-term exposure of PFAS to potential sensitive receptors.

The Site is within AEC 3, however, is hydraulically upgradient from the PFAS source areas along the Georges River. Reuse of PFAS impacted soil was in accordance with the MPW LTEMP (JBS&G 2024). Should unexpected finds of additional source areas be encountered which may pose a risk to PFAS infiltration or leaching to surface water, then additional site-specific risk assessment and / or groundwater modelling will be required and may require revision of the LTEMP.

***Beneficial Use of Groundwater***

Groundwater from the Site must not be utilised for any beneficial use.

***Future Excavation***

The management measures for future excavation within AEC 3 and across the Site must be conducted in accordance with **EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 9,** and **EMP 10.**

***Cessation of Land Use Restrictions***

The land use restrictions provided in **EMP 1** can be removed where a site-specific human health and ecological risk assessment concludes that a risk to human health and the environment is no longer present and subject to approval by a NSW EPA accredited Site Auditor and / or the NSW EPA.

***Landscaped Areas***

Reuse of soil should preferentially only occur in areas outside of proposed landscaped areas. However, should soil reuse within landscaped areas by required then the restrictions relating to landscape construction and maintenance within these areas must be undertaken in accordance with **EMP 8.**

| Subsurface Works – AEC 3 | | EMP 2 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Stage 2 Works and Operation | |
| Objective: | To protect human health and the environment | |
| Areas of the Site | AEC 3 underlying the Engineered Fill (**Figure 3**) | |

***Human Health***

Based on the EnRiskS (2019) Land HHERA, the potential risk to human health associated with workers having direct contact with PFAS in soil, sediment and water was low and acceptable on the assumption that typical workplace safety protocols. The HHERA did not consider any reduction in exposure to PFAS due to the use of PPE. In order to manage exposure of PFAS to workers at the Site, the following management controls should be implemented during excavation works within PFAS impacted areas:

- Project inductions to identify areas with high risk of PFAS contamination.
- Prepare SWMS to identify risks associated with PFAS and appropriate control measures.
- Where appropriate, the area of the excavation/disturbance shall be appropriately separated from the balance of the Site to minimise inadvertent traffic and/or worker exposure.
- PPE used in the PFAS impacted areas (AEC 3) is to be assessed by the Environmental Consultant prior to intrusive works and is to include standard construction site PPE, including but not limited to:
  - Long sleeve shirt and trousers.
  - Steel capped boots/gum boots.
  - Gloves for manual handling (waterproof nitrile gloves preferred).
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- Maintain personal hygiene and wash hands prior to breaks. If worker's skin comes into contact with PFAS impacted water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.
- Dewatering of water in excavations impacted with PFAS should be avoided where practicable.

***Ecological***

EnRiskS (2019) reported PFAS impacted soil is leachable and the following control measures should be implemented to minimise the risk to ecological receptors during construction:

- Excavation to be scheduled to minimise the area of PFAS impacted soil exposed at any one time.
- All soils excavated from AEC 3 should be handled in alignment with the requirements for PFAS-Impacted Stockpiles in **EMP 4**.
- Erosion and sediment controls outlined in **EMP 12** to be adopted to minimize the potential for leaching and migration to surface water bodies.
- When PFAS impacted soil is to be temporarily stockpiled, it should be stockpiled on impermeable

| Subsurface Works – AEC 3 | EMP 2 |
|---|---|

surfaces (e.g. hardstand, high density polyethylene (HDPE) plastic or geomembrane) within a designated area.

- Appropriate bunding (e.g. hay bales or silt fences) should be placed around stockpiles.
- Stockpiling areas should not be located near stormwater drains, pits or gutters.
- Water runoff from stockpiling areas should be managed and retained at the Site or under the relevant management plan for the receiving area of the MPW Site and not be allowed to flow into the Offset Area and off-site to surface water bodies (Anzac Creek and Georges River) (refer to **EMP 12** for management of surface water).
- During windy weather conditions, dust control measures should be implemented (e.g. fine water spray or covers).
- Odour suppressant should be applied to the soil where odorous soils are encountered.
- Where practicable, excavated soil should be backfilled in the excavation in the reverse order to which it was excavated.
- Where excavated soil is surplus to requirements, then the soil should be classified in accordance with **EMP 6**.
- Materials tracking, and off-site disposal records and documentation should be retained for all soil that is to be reused on-site or disposed offsite in accordance with **EMP 3** and **EMP 6**.

***Earthworks and Excavation***

Where soil is excavated during earthworks, soil reuse opportunities should be adopted in accordance with **EMP 5**.

| **Materials Tracking** | | **EMP 3** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Stage 2 Construction Works | |
| Objective: | To protect human health and the environment | |
| Areas of the Site | Excavation works | |

Impacted materials generated as part of the construction works will be tracked via a Materials Tracking Plan (MTP) by the Principal Contractor. The aim of the MTP is to identify the source and destination of all materials on the Site at any time and requires the following tasks:

- Establish and maintain a nomenclature system for identification of all source and destination areas for soil both on and off the Site. This includes excavations, stockpiles (both clean and potentially contaminated), soils for treatment or disposal (including destination) and offsite sources of material.
- Use appropriate signage to identify the classification of the material and area number for each excavation prior to soil movement using the project documentation or in consultation with the Contract Administrator, prior to work being undertaken.
- Complete a 'Record of Soil Movement' sheet identifying the source of the materials, classification, volume, and destination area of each load of material moved on or off-site.
- Place the soil in an approved location for the material based on its soil classification.
- Maintain the location of the soil without mixing with other soil classes.
- Educate all operators in the requirements of the system.
- Monitoring and Review.

| **Stockpile Management** | | **EMP 4** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required in the event of the stockpiling of soil | |
| Objective: | To minimise the risk to human health and the environment from the stockpiling of soil. | |
| Areas of the Site | AEC 3 and Unexpected Finds | |

***General Stockpiles***

All stockpiles will be managed in accordance with the CEMP and sub-plans, and in accordance with the EPBC Act conditions of approval for 2011/6086 and maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to mitigate collapse or sliding of the stockpiled materials. Stockpiles are to be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating handling requirements. Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 4. All such preparatory works would be undertaken prior to the placement of material in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil. All stockpiling to be undertaken in accordance with the Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan.

Earthworks undertaken as part of construction and ongoing works within the Site, which are located outside of AEC 3 may temporarily generate excess material which may be stockpiled for re-use subject to assessment by the Environmental Consultant (as required). Unless some event or observation indicates the material excavated and placed into the stockpile is potentially contaminated, no treatment is required other than normal dust suppression, and erosion controls in accordance with relevant CEMP requirements.

Where temporary stockpiling is permitted such stockpiles shall be installed and maintained to eliminate risk to workers and other people due to exposure to contaminants in dust or vapours and risk to the environment as a result of silt or contamination of stormwater in accordance with the any site materials management and tracking plan as part of the CEMP.

If cover is required, they shall extend beyond the footprint of the stockpiles and shall be secured to prevent being blown away by wind. Stockpiles must be placed in a secure location onsite and covered if to remain for more than 24 hours. Stockpiles will be placed at approved locations and located to mitigate environmental impacts while facilitating material handling requirements.

Where the material is suspected to be contaminated then it should be managed in accordance with the Unexpected Finds Protocol provided in **EMP 9.**

***Contaminated Stockpiles***

If assessment by the Environmental Consultant or the Ordnance Contractor identifies contamination in soil excavated from the Site, or a stockpile is observed to be contaminated, then the Environmental Consultant will assess the stockpile in accordance with the unexpected finds protocol (**EMP 9**) to delineate the contamination and assess the extent of management, if required.

Contaminated or potentially contaminated materials would only be stockpiled within areas of the Site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas

| Stockpile Management | EMP 4 |
|---|---|

(e.g. hardstand areas).

***ACM Impacted Fill (PFAS Reuse Areas AEC 3)***

Asbestos in soils should be managed in accordance with **EMP 5**.

***PFAS Impacted Stockpiles***

In addition to the general and contaminated stockpile management controls provided above, the following additional management controls in accordance with the PFAS NEMP provided in **Table 1_EMP 4** should be applied for PFAS impacted soil, which exceeds the adopted site criteria. Historical concentration of PFAS within soil and groundwater are provided within **Appendix A**.

**Table 1_EMP 4 – Temporary PFAS Stockpile Management**

| Stockpile Description | Timeframe | Storage infrastructure for solid wastes and contaminated equipment |
|---|---|---|
| Transient | Less than 48 hours with no rain predicted | Covered stockpile or storage area on impervious bottom liner (e.g. tarp, plastic sheeting, membrane, etc.). |
| Temporary | From 48 hours to 6 months | Managed stockpile, covered, on impervious, bunded hardstand, with effective stormwater controls (e.g. diversion drains, banks, etc.). |
| Short-term | From 6 months to 2 years | Constructed stockpile with robust anchored covers, impervious bottom liner, and effective stormwater controls to ensure that rainwater and sheet flow do not contact impacted solids. |
| Medium-term | From 2 to 5 years | Engineered containment facility, with effective stormwater controls. |
| Long-term<br>• | More than 5 years | Engineered containment facility, with effective stormwater controls. |

| **Excavation and Sampling** | | **EMP 5** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Stage 2 Works and Operation | |
| Objective: | To ensure that risks to human health or the Environment are managed during minor excavation. | |

***Reuse of Soil (on-site)***

There is potential for disturbance of underlying soils during construction works (JBS&G 2024), however, excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be disposed of off-site, reused/managed on-site or transported to other parts of the MPW Site in accordance with the relevant management plan for the land and **EMP 6**. Additional unexpected finds or assessments for reuse (if required) would be subject to reuse requirements below or a separate risk assessment.

Soil can be reused at the Site in accordance with the PFAS trigger values provided in **Table 8** of Addendum 02 (**Appendix H**) within reuse zones provided as **Figure 5** without further assessment of risk, but are subject to the implementation of the following management measures provided by EnRiskS (2020).

When placing soil within the reuse zones, soil must not be placed within 2m of the lateral boundary of the reuse zone, where the adjacent area does not have equivalent management measures in place.

Soil Reuse Zone 3 (beneath sub-divided area for warehouse development / lease area)

Soil that meets the criteria in **Table 8** (**Appendix H)** for Soil Reuse Zone 3 (beneath sub-divided area for warehouse development / lease area) can be used within the areas presented in **Figure 5**, subject to the following management measures:

- Materials must be placed at least 1 m above groundwater (seasonal maximum).
- Materials must be placed beneath Engineered Fill, concrete or a clay liner or equivalent geosynthetic liner.
- Engineered Fill is to conform to one of the following:
    - Sandstone Fill from road header excavation, tunnel boring machine excavation or ripped or rock hammer excavation.
    - Approved imported fill materials.
    - Site won VENM or excavated natural material (ENM).
    - Where the thickness of Engineered Fill is less than that described below, the surface cover must also include concrete pavement or a building slab.
- Engineered Fill acceptance is subject to confirmation testing of permeability by an accredited laboratory and must comply with the following:
    - Shale – one layer of ≥300 mm assuming a permeability of $1x10^{-8}$ m/s;
    - OR
    - Site won Clay and Sandy Clay – two layers of ≥300 mm assuming a permeability of between $1x10^{-8}$ and $5x10^{-8}$ m/s.
    - Sandy site won material is unlikely to be suitable."

| Excavation and Sampling | EMP 5 |
|---|---|

***Assessment of Soil for Reuse***

The result of historical soil and leachate (neutral pH) PFAS testing and reuse material from EP Risk (2018 and 2020) and JBS&G (2024) are provided in **Appendix A**. Prior to breaching of the Engineered Fill layer, the soil and leachate (neutral pH) analytical results summarised in **Appendix A** should be reviewed and assessment should be made by the Environmental Consultant as to whether soil can remain on-site in accordance with the requirements set out within this LTEMP, relevant guidelines and Addendum 02 (**Appendix H**), be transported to the MPW Site in accordance with the LTEMP for the land or whether waste classification is required.

Where additional excavation is required within AEC 3 then additional assessment / delineation may be required where there is insufficient data available. Additional in-situ sampling or stockpiling sampling must be undertaken in accordance with the following as a minimum:

- Sampling should be undertaken by a suitably qualified Environmental Consultant.
- Additional insitu / delineation sampling to be undertaken in accordance with the NSW EPA Contaminated Land Guidelines: Sampling Design Part 1 – Application (2022).
- Samples to be collected from 0-0.2 mBGL, 0.5 mBGL, 1.0 mBGL and every metre thereafter to a maximum depth of 0.5 mBGL beyond the maximum proposed depth of excavation.
- Stockpile sampling to be undertaken in accordance with the sampling methodology provided in **EMP** .

Additional testing of site won stockpiles will be required where:

- Stockpiles have reported detectable PFAS total concentrations above the laboratory limit of reporting, but leachate testing was not undertaken.
- Soil in the stockpile has been excavated from AEC 3 and has not been sampled or tested.
- Soil is excavated from an area where PFAS soils were reused as part of Stage 2 works (JBS&G 2024).
- Soil tracking documentation identifying the source location of the stockpile is not available.

Sampling of stockpiles should be undertaken in accordance with the following:

- One test per 25 $m^3$ for soils assessed for volumes less than 200 $m^3$.
- The use of the statistical assessment of the data set from each stockpile in accordance with the ASC NEPM (2013), with a total number of samples of not less than 10 collected from each stockpile (e.g. for a maximum size stockpile of 2,500 $m^3$, the sampling frequency of one test per 250 $m^3$ will be adopted).

Analytical testing of additional soil sampling for assessment of reuse opportunities at the Site should include the following analytes:

- PFAS suite (28 analytes).
- AUS leaching Procedure (neutral pH) for PFAS.

Soil results should be compared against the relevant standards for site suitability if to remain on-site or requirements for the receiving site's LTEMP.

| Excavation and Sampling | EMP 5 |
|---|---|

***Management of Asbestos in Soils***

During excavation works beneath the imported fill layer at the Site, involving the potential disturbance of asbestos impacted soil, the following should be implemented:

- Historical analytical results should be referenced as reported within **Appendix A** and JBS&G (2024).
- A suitably qualified Environmental Consultant / Occupational Hygienist should be engaged to address the risk to construction workers prior to any excavation works below the imported fill layer.
- Where asbestos in soil is identified:
    - All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).
    - The removal works would be conducted in accordance with the SafeWork NSW Code of Practice – How to Safely Remove Asbestos (SafeWork NSW 2022).
    - Excavated imported fill material that was stockpiled separately after excavation is to be returned to the excavations in the reverse order to which it came out.
    - An appropriate asbestos removal licence issued by SafeWork NSW would be required for the removal of asbestos impacted soil in accordance SafeWork NSW 2022.
    - Environmental management and WH&S procedures (including PPE/RPE) would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment SafeWork NSW 2022.
    - Temporary stockpiles of asbestos in soils would be covered to minimise dust and potential asbestos release.
    - An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples).
    - Asbestos fibre air monitoring would be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with SafeWork NSW 2022.

***Site Specific Risk Assessment***

Future works that require excavation of soil in the reuse zones can only be undertaken in accordance with the management procedures provided as **EMP 5**, unless a further additional site-specific risk assessment is conducted.

| Off-site Disposal of Excavated / Unsuitable Material | | EMP 6 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Continuous | |
| Objective: | To ensure that surplus material is appropriately classified for off-site disposal or reuse and lawfully disposed from the site. | |

***Minimise Waste***

It is recommended that disturbance of soil within AEC 3 should be minimised by incorporating the following into the construction methodology:

- Conventional footings where practical should not penetrate below the imported fill layer, to minimise the requirements for disposal of excavated contaminated material.
- Where pier footings are required, screw piles would be recommended over bored piers.
- Minimise excavation of materials below the imported fill layer to reduce disposal costs of excavated material.
- Reuse and retain material on the Site where lawful and practicable.

Given the nominal thickness of the imported fill layer is approximately 0.3m, it may not be practicable to avoid disturbance of soil during construction works and additional management may be required.

***Stockpile Classification***

Where the Site Owner (or nominated representative) identifies the requirement to remove material from the Site, the material is required to be characterised by an Environmental Consultant to evaluate potential off-site removal options.

The Environmental Consultant shall consider the relevant requirements of NSW legislation, regulations, and guidelines in the identification of appropriate options for off-site disposal / reuse including, but not limited to the following:

- NSW EPA Waste Classification Guidelines (EPA 2014):
    - Part 1: Classifying waste.
    - Part 2: Immobilising Waste.
    - Part 3: Waste containing radioactive material.
    - Part 4: Acid Sulfate Soils.
    - Addendum to Part 1: Classifying Waste.
- Excavated Natural Material Exemption (2014) and Excavated Natural Material Order (2014).
- Relevant resource recovery orders and resource recovery exemptions made by the NSW EPA.

The requirements for use of licensed vehicles, waste tracking, covering of vehicles, etc. as noted in the POEO (Waste) Regulation (2014) will be identified by the Environmental Consultant and documented as part of a waste classification report to facilitate off-site disposal of waste material to a facility with the appropriate NSW EPA EPL to accept the classified material.

Disposal records for all material removed from the site shall be required to be provided to the Site Owner or appointed representative, by the appointed contractor upon completion of the disposal works. These records will be maintained in accordance with **EMP 17**. The records will be made available to the Environmental

| Off-site Disposal of Excavated / Unsuitable Material | EMP 6 |
|---|---|

Consultant engaged to prepare final site condition reports upon request to demonstrate the lawful off-site disposal of material from the Site.

Asbestos or asbestos impacted soils identified as unexpected finds must be disposed offsite as Special Waste (Asbestos) in combination with other classes of waste (if applicable). Asbestos waste is to be tracked in accordance with Clauses 76 and 79 of the POEO (Waste) Regulation 2014.

***Stockpile Classification Testing for Off-site Disposal***

Stockpile classification testing will be undertaken by the Environmental Consultant in accordance with the following:

- All stockpiles must be classified prior to off-site disposal. Stockpiles of general fill (non-soil) may be classified visually based on their waste content and observations. All other stockpiles will be classified based on classification testing, with samples scheduled for laboratory analysis of the contaminants of concern corresponding with the source of the stockpile.
- Classification testing will be undertaken by the Environmental Consultant, and classification samples will be collected from the stockpiled material at the following sampling frequency:
    - One test per 25 $m^3$ for soils assessed for volumes less than 200 $m^3$.
    - The use of the 95% $UCL_{mean}$ value for the data set from each stockpile, with a total number of samples of not less than 10 collected from each stockpile (e.g. for a maximum size stockpile of 2,500 $m^3$, the sampling frequency of one test per 250 $m^3$ will be adopted).
- Sampling densities for resource recovery should be undertaken in accordance with the respective resource recovery order and exemption.

***Liquid Wastes***

All liquid wastes requiring offsite disposal should be classified in accordance with NSW EPA Waste Classification Guidelines or the applicable EPL for the land.

| Subsurface Maintenance Works | | EMP 7 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Operation | |
| Objective: | To ensure that subsurface maintenance works will not result in risk to human health and the environment. | |

The Site has been raised to design levels with imported fill (approximately 0.3 m in PFAS reuse areas and nominal depth in existing AEC 3). Subsurface maintenance activities will likely penetrate depths greater than the capping layer, however, given appropriate controls, the risk to subsurface maintenance contractors undertaking routine subsurface maintenance is considered to be low.

Should subsurface maintenance works exceed the depth of imported fill material and encounter underlying site soil then the following procedure should be followed.

***Work Health and Safety***

All works are to comply with the Work Health and Safety Act (2011). Note any works involving confined spaces should also be carried out in accordance with AS 2865: Safe Working in a Confined Space (2009) and any revisions. Pits or excavations may be considered confined spaces due to the limitations on egress and the potential accumulation of vapours or presence of depleted oxygen within the pits or excavations.

Any subsurface works that penetrate the capping layer shall include the following measures:

- Providing a SWMS, which shall be reviewed and authorised by the Site Owner (or their representative) or any future occupier.
- All upstream stormwater flow to be redirected around the work area.
- All stormwater from the works area to be diverted through sediment controls.
- If encountered, groundwater is always to be kept contained.
- Where asbestos in soil is encountered the UFP (**EMP 9**) must be implemented.
- If any strong odours are present on breaching sealed surfaces, or in an excavation, a precautionary approach shall be applied to consider if additional management measures are required to manage vapour inhalation risk prior to proceeding. The UFP (**EMP 9**) must be implemented.
- Additional controls may include the use of blowers to increase flushing of the trench/excavation with fresh air.
- Respiratory protective equipment (RPE) would also be provided for subsurface works where necessary in confined spaces or for asbestos related works (**EMP 9**).
- Air monitoring would be mandatory for entry into confined space works within excavations or where friable asbestos is identified.

All workers potentially exposed to PFAS impacted materials are required to wear appropriate levels of PPE as assessed by the Environmental Consultant, which shall include but are not limited to:

- Long sleeve shirt and trousers.
- Steel capped boots.
- Gloves for manual handling (waterproof nitrile gloves preferred).

PPE and RPE requirements shall be assessed by the Environmental Consultant prior to intrusive works which

| Subsurface Maintenance Works | EMP 7 |
|---|---|

may breach AEC 3, for unexpected finds or during asbestos related works.

All workers potentially exposed to asbestos impacted materials are required to wear appropriate levels of PPE as assessed by the Environmental Consultant, in accordance with **EMP 5.**

***Ecological***

Excavation and reinstatement of excavations should consider the following general principles:

- Stockpiling of excavated soil to be managed in accordance with **EMP 4**.
- Excavated imported fill material that was stockpiled separately after excavation is to be returned to the excavations in the reverse order to which it came out.
- Reuse of excavated soil to be undertaken in accordance with **EMP 5**.
- Movement of soil should be tracked in accordance with **EMP 3**.
- All surplus soil removed from excavations must be classified in accordance with NSW EPA (2014) Waste Classification Guidelines and NSW EPA (2016) Addendum for PFAS prior to disposal at an appropriately licensed facility in accordance with **EMP 6**.
- Recontoured site surfaces must permit free drainage and not permit ponding of surface water.
- All discharges of water from the site comply with the relevant EPL.

| Landscape Area Management and Maintenance | | EMP 8 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Stage 2 Construction Works and Operation | |
| Objective: | To protect human health and the environment | |
| Areas of the Site | AEC 3 and Unexpected Finds | |

Landscape management and maintenance for areas within and outside PFAS reuse areas and AEC 3 is described below.

***Proposed Landscape Areas Inside AEC 3 (including PFAS reuse areas)***

According to the Validation Report (JBS&G 2024), *"Final landscape areas are not currently defined."*

According to the Summary Report (JBS&G 2024) *"The Audit Area will generally include a concrete pavement or building slab consistent with the LTEMP PFAS management measures…. Final landscape areas are not currently defined. Should there be overlap between the final landscape design and areas of PFAS soil reuse, "retrofitting" of the capping for landscape areas as per the LTEMP (EP Risk 2020) will be required during the construction phase. Retrofitting may require the management of surplus PFAS impacted spoil, either within MPW or disposed off-site. Retrofitting will be managed under an area specific LTEMP."*

AEC 3 areas (**Figure 3**) will require additional management by the landscape contractor during future construction and operation of the Site. The following management measures are proposed during construction and operation of landscaped areas:

**Construction**

Where landscaped areas are required within AEC 3 (including PFAS reuse areas) then the following measures should be adopted:

- Proposed landscape areas should be preferentially placed outside of areas of AEC 3 (**Figure 3**).
- Soil reuse for landscaped areas within the Site must be placed beneath a clay liner/geosynthetic liner of minimum thickness 0.5 m.
    - *The clay liner/geosynthetic liner must comply with the following requirements:*
        - *The clay/geosynthetic liner should meet a maximum permeability of 1x10$^{-9}$ m/s.*
        - *The liners should be monitored via inspection if possible (minimum yearly) or by installation and testing of monitoring well(s) and repaired if damaged or deteriorated.*
- Landscaping works within these areas to be supervised by a suitably qualified Environmental Consultant.
- A clay liner or equivalent geosynthetic liner must be constructed over PFAS reused soil in accordance with **EMP 2, EMP 3, EMP 4, EMP 5**.
- A growth medium of thickness greater than the maximum root depth of vegetation proposed within the landscaped areas should be placed above the Engineered fill / clay liner / equivalent geosynthetic liner.
- Mulching of the surface of the growth medium should be applied and maintained to reduce the risk of erosion and exposure of the cover layer.

| Landscape Area Management and Maintenance | EMP 8 |
|---|---|

- Plants with maximum root depths greater than the depth of growth medium applied are prohibited within these areas.

As the final design of the Proposed Development has not been finalised, the LTEMP is to be revised in accordance with **EMP 19** once construction of landscaped areas is complete with details of soil tracking, survey drawings, capping construction and long term management requirements.

Where capping for landscape areas is not present, 'Retrofitting' will be required to meet the abovementioned requirements and surplus PFAS impacted soil must be managed in accordance with **EMP 2, EMP 3, EMP 4, EMP 5, EMP 6** and **EMP** .

**Operation**

Where landscaped areas have been constructed within AEC 3 or reuse areas then the following management measures are to be implemented during future operation of the Site:

- All landscape staff to undertake a site induction and appropriate training of the management measures provided in the LTEMP in accordance with **EMP 13**.
- Prior to the commencement of operation, a landscape management plan to be prepared, which will include (as a minimum) the following management measures:
    - Identification of AEC 3 and soil reuse areas where additional management is required.
    - Requirements for the replacement of plants and vegetation to only permit species with a maximum root depth less than the depth of growth medium to not penetrate and damage the integrity of the surface cover over reused soil.
    - Should any landscape maintenance works exceed the depth of imported fill material or encounter the clay liner or equivalent geosynthetic liner, then the procedure provided as **EMP 7** must be followed.

Prior to excavation works involving the potential disturbance of AEC 3 and asbestos impacted soil, the following should be undertaken:

- Historical analytical results should be referenced as reported within **Appendix A** and JBS&G (2024).
- A suitably qualified Environmental Consultant / Occupational Hygienist should be engaged to address the risk to construction workers prior to any excavation works below the imported fill layer.

Where landscaping maintenance works damage the surface cover over reused soil, then the surface cover must be repaired in accordance with the specifications provided within this EMP.

***Landscape Maintenance Outside AEC 3***

Given that the Site has been raised to final fill levels and validated by JBS&G (2024), the risk to landscape contractors undertaking routine landscape maintenance is low outside of AEC 3 or where the requirements above have been followed. Intrusive maintenance works must be undertaken in accordance with **EMP 5, EMP 7** and **EMP 9**.

| Unexpected finds | | EMP 9 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Stage 2 Works and Operation | |
| Objective: | To minimise exposure of contractors and site personnel to impacted sub-surface soils during future excavation works beneath the Site. | |

***During Stage 2 Works***

An unexpected finds protocol (UFP) has been prepared by SIMTA (2018)[52] for the Stage 2 works in accordance with SSD 7709. This UFP has been developed to manage the unexpected discovery of contamination within imported spoil, heritage items, threatened flora and fauna, and onsite contamination during the construction phase of Stage 2 Works. A copy of the SIMTA 2018 UFP is provided as **Appendix D** and has been incorporated into the CEMP for Stage 2 Works. An unexploded ordnance (UXO) Risk Review and Management Plan has been prepared by Gtek (2019)[53] to inform management of any unexpected finds involving UXO.

***During Operation***

During subsurface maintenance works post construction, there is a possibility some hazards within the Site have not been identified to date. The nature of hazards which may be present, and which may be discovered are expected to generally be detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable or non-friable asbestos materials (visible) including redundant services conduits.
- Excessive quantities of Construction/Demolition Waste (visible).
- Hydrocarbon impacted materials (visible/odorous).
- Drums or underground storage tanks (USTs) (visible).
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous).

As a precautionary measure to ensure the protection of the workforce, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be uncovered during ground disturbance activities, then the following should be immediately implemented:

- Stop work within the area. Isolate the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration.
- an Environmental Consultant should be immediately contacted to determine an appropriate course of action regarding the assessment and/or management of the “Unexpected Find”.

It is envisaged the assessment strategy will be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The Environmental Consultant will also be responsible for any reporting necessary to document the details of the Unexpected Find and the results of the validation sampling and will be responsible for providing

[52] SIMTA (2018) Unexpected Finds Protocol, Moorebank Precinct West Stage 2, dated 26 October 2018 (ref: MIC2-QPMS-EN-APP-00022).
[53] Gtek (2019) Unexploded Ordnance (UXO) Risk Review and Management Plan, Moorebank Precinct West Stage 2 (MPW2) Incorporating Moorebank Avenue Upgrade Works (MAUW) Moorebank, NSW, dated 9 October 2019 (ref: 17114EPR1, version 1.01).

| Unexpected finds | EMP 9 |
|---|---|

clearance certificates stating it is suitable to resume works at the remediated Unexpected Find area.

The UFP for the operational facility post construction should be developed at the completion of Stage 2 works when the LTEMP is updated.

***Management of Unexpected Asbestos Finds***

Should asbestos be identified as an unexpected find during soil disturbance works, the following procedures for the safe removal of asbestos must be adopted:

- All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).
- The removal works would be conducted in accordance with the SafeWork NSW 2022.
- An appropriate asbestos removal licence issued by SafeWork NSW would be required for the removal of asbestos impacted soil.
- Environmental management and WH&S procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.
- Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release.
- An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples).
- Asbestos fibre air monitoring should be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with SafeWork 2022.

| Additional Validation Requirements | | EMP 10 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | To ensure contamination management activities and unexpected finds have been appropriately characterised and validation for the intended land use. | |

Unexpected Finds requiring remediation or soil reuse will require validation which should be undertaken in accordance with the methodology and criteria provided in Section 7 of the Golder (2016) RAP. Additional information relating to validation relevant to the LTEMP is provided below.

***AEC 3***

The following information to verify that appropriate reuse or off-site disposal of surplus material is to be undertaken:

- Soil tracking data to confirm the source and final location of PFAS impacted soil reused at the Site in accordance with **EMP 3**.
- Soil sampling and analytical results to confirm that the soil meets the requirements for reuse outlined in **EMP 5** and the receiving LTEMP.
- Survey data to confirm the location and depth of PFAS impacted soil reused at the Site under the conditions of reuse provided in **EMP 5**.
- Soil classification data and landfill receipts for soil disposed off-site.

***Unexpected Finds***

Validation of Unexpected Finds will be undertaken as per Section 8 of the RAP (Golder 2016). The usability of the data collected during the validation program will be assessed in accordance with Section 8.7 of the RAP (Golder 2016).

***Validation reporting***

Validation reporting should be prepared in accordance with the NSW EPA (2020) *Guidelines for Consultants Reporting on Contaminated Land*.

| **Management of Groundwater** | | **EMP 11** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | To ensure that groundwater is managed so as not to present a risk to human health or the environment. | |

Based upon previous assessments undertaken at the MPW Site, elevated levels of PFAS in groundwater samples collected have been reported. Further discussion of groundwater management is provided below.

***Groundwater Extraction***

Groundwater extraction during and post construction is not permitted at the Site for any beneficial use in accordance with **EMP 1**. Based upon the proposed commercial / industrial land use of the Proposed Development and the availability of a reticulated water supply, it is considered the requirement for the beneficial use of groundwater at the Site is low.

It is not anticipated that groundwater will be encountered during construction of the Proposed Development and construction dewatering of contaminated groundwater should be avoided where practicable. However, should construction dewatering be unavoidable then a Dewatering Management Plan must be prepared which details appropriate control measures to manage and treat contaminated groundwater which is generated from dewatering. An extraction licence should be sought from the appropriate regulatory authority prior to commencing dewatering in accordance with the relevant legislation (if required).

***Worker Health and Safety***

In order to manage workers exposure to contaminated groundwater the following should be implemented for works where groundwater is expected to be encountered:

- Project inductions should be undertaken to identify areas with high risk of groundwater contamination.
- SWMS and job safety Analysis (JSA) to identify hazards associated with contaminated groundwater and detail appropriate control measures.
- PPE used in high-risk areas including:
  - Disposable overall suits including boots.
  - Disposable waterproof nitrite gloves in addition to standard glove requirements.
  - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- If worker's skin comes into contact with contaminated water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.

***Groundwater Monitoring***

Groundwater monitoring is not required for the Site unless required to address unexpected finds or if groundwater is expected to be encountered during construction / operation. Ongoing groundwater monitoring is for the MPW Site is described within the MPW LTEMP (2020a).

| Management of Surface Water | | EMP 12 |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | To ensure that surface water is managed so as not to present a risk to human health or the environment. | |

Based upon previous assessments undertaken, disturbance of soil in AEC 3 has the potential to leach PFAS to stormwater during future excavation works. Further discussion of surface water management is provided below. Additionally, based on the placement of PFAS impacted soils at the Site, there is also the potential to leach PFAS to stormwater during excavation in these areas.

***Management of On-site Surface Water***

Use of contaminated surface water at the Site is not permitted for any beneficial use.

During construction / maintenance works below the layer of Engineered Fill and within AEC 3, the following precautions should be implemented:

- Excavation to be scheduled to minimise the area of soil exposed at any one time.
- To reduce PFAS impacted sediment, stormwater controls should be designed to limit infiltration of run-off into areas where PFAS impacted soils are located.
- Excavated soil should be removed from Site or returned to the excavation as soon as reasonably practicable to prevent leaching of PFAS to stormwater.
- The UFP (**EMP 9**) must be implemented.
- Stormwater in any sediment basins (if required through construction) should be tested prior to being discharged. PFAS impacted stormwater must be managed in accordance with the PFAS NEMP, the EPL, and the requirements within the relevant PFAS LTEMP for the applicable area of the MPW Site.

As the depth and permeability of cover over remaining existing AEC 3 areas is not known, the requirement for immediate surface water management must be assessed by the Environmental Consultant with consideration for historical data provided within **Appendix A**.

***Water Treatment***

If water treatment is required, it should be undertaken in accordance with the relevant standard, EPL and LTEMP.

***Worker Health and Safety***

If encountered, in order to manage workers exposure to contaminated surface water the following should be implemented for works where groundwater is expected to be encountered:

- Project inductions should be undertaken to identify areas with high risk of surface water contamination.
- SWMS and JSAs to identify hazards associated with contaminated surface water and detail appropriate control measures.
- PPE used in high risk areas including:
    - Disposable overall suits including boots.
    - Disposable waterproof nitrite gloves in addition to standard glove requirements.

| Management of Surface Water | EMP 12 |
|---|---|

- All other standard PPE required for works on Site.

- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- If worker's skin comes into contact with contaminated water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.

***Surface Water Monitoring***

In the event contaminated water is encountered, surface water must be sampled in accordance with the relevant LTEMP, EPL and HEPA NEMP or applicable regulations at the time of the assessment by the Environmental Consultant.

Fieldwork must be undertaken in accordance with Table A1 of the Western Australia Department of Environment Regulation (WA DER), Interim Guideline on the Assessment and Management of PFAS, 2016 (WA DER 2016), and the PFAS NEMP.

Given that the PFAS Placement Areas (AEC 3) is covered with approximately 0.3 m there may be no direct surface water monitoring requirement prior to excavation works, subject to the ongoing integrity of this layer during construction works and after storm events. However, as the depth and permeability of cover over remaining existing AEC 3 areas is not known, the requirement for immediate surface water management must be assessed by the Environmental Consultant with consideration for historical data provided within **Appendix A**.

***Onsite Surface Water Sampling During Construction within AEC 3***

To confirm and maintain the effectiveness of the PFAS stormwater preventative measures outlined in **EMP 2**, the following should be undertaken during construction works:

- Sample stormwater from lined basins after rain events to test the effectiveness of capping in reducing PFAS concentrations.
- Inspect capping layers after storm events to ensure the integrity of the capping layer and liners. Undertake repairs / upgrades to capping layers and liners where required.
- Where new temporary stormwater basins are constructed, or significant soil disturbance occurs to existing catchments, additional testing of stormwater should be undertaken to determine if additional preventative measures require implementation.
- Stormwater in basins and swales must be sampled and the results must be below the discharge criteria provided in the EPL prior to discharge.

| **Training** | | **EMP 13** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | Suitably trained personnel will be available to implement the requirements of the LTEMP. | |

The Site owner or nominated responsible party, shall ensure that any personnel engaged in the implementation of nominated tasks for which the Site Occupant is responsible, have been provided with adequate training to manage the site contamination and hazardous materials conditions which may be encountered during site ground disturbance activities.

Personnel conducting sampling, measuring, monitoring and reporting activities are to be suitably trained or experienced in the activity. Records of all training are to be filed in accordance with the project filing system.

As a minimum the induction will include the following:

- Existence and requirements of this LTEMP.
- Relevant legislation, penalties, fines.
- Roles and responsibilities for Contamination Management.
- Landscape management measures.
- Asbestos identification and management requirements.
- Stockpile management measures.
- Material movement and tracking measures.
- Unexpected finds.
- Toolbox meetings will also be undertaken, as and when required.

The Site Occupant shall maintain records of personnel engaged in the nominated tasks and their relevant training/qualifications for the period of implementation of the LTEMP in accordance with **EMP 17** and with the document control system outlined in the CEMP.

Works involving contractors and subcontractors will be managed in accordance with **EMP 14**.

| **Contractor and Subcontractor Management** | | **EMP 14** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | Ensure that all persons who may be exposed to contaminated material are suitably aware of conditions and requirements of this LTEMP. | |

The Site Owner (or nominated representative) is required to ensure that Contractors and Sub-contractors are advised of potential safety and environmental issues on site during site-specific induction training. This induction shall include the occupational health and safety responsibilities, requirements and controls for all (sub)contractors working on site. In addition, all site workers, including contractors and subcontractors shall be made aware that they are required to implement the provisions of this LTEMP.

All subcontractor activities will be monitored by the Site Owner, or a nominated representative, to ensure compliance with the requirements of this LTEMP.

They shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. All contractors and subcontractors are responsible for:

1. Providing their own personal protective equipment.
2. Training their employees in accordance with applicable laws.
3. Providing medical surveillance and obtaining medical approvals for their employees.
4. Ensuring their employees are advised of and meet the minimum requirements of this LTEMP and any other additional measures required by their site activities.
5. Designating their own site safety officer.

All contractors/subcontractors must sign an acceptance form prior to commencing work on site.

Part 6.5 of the *Work Health and Safety Regulation 2011* required that an employer of employees undertaking construction work must ensure that the employees have completed induction training as specified by the Regulation. In addition, the Principal Contractor (if required) must not allow any person to carry out construction work unless he/she is satisfied that the person has undergone work health and safety induction training, including:

- General occupational health and safety training for construction work.
- Work activity-based health and safety training (job specific training).
- Site specific health and safety induction training.

The Site Owner (or nominated representative) shall require all contractors completing such works to maintain, for each person carrying out construction/maintenance works, for a period of three years:

- A copy of relevant statements of OHS induction training, or a statement indicating that the Principal Contractor is satisfied that the relevant OHS induction training has been undertaken; and
- A brief description of the site-specific training undertaken by the person.

| **Contingency Plan** | | **EMP 15** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | Ensure that in the event of unplanned exposure of impacted materials all appropriate measures are implemented to minimise the risk to on-site personnel and the environment. | |

In the event site operations or conditions result in the disturbance of significant impacted material without the prior preparation of specific works/management procedures and implementation of appropriate exposure minimisation measures, or alternatively an environmental incident occurs (contaminant leak/spill, identification of asbestos in imported material, etc.), the following shall be implemented:

- Isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration; and
- Implementation of applicable EMPs with respect to personnel and site management, or where appropriate the Unexpected Finds Protocol included in this LTEMP (**EMP 9**), and subsequent appropriate removal/management of the identified impacted material via excavation and off-site removal or otherwise containment/treatment as applicable.

Where considered appropriate by the Site Owner (or its nominated representative), an appointed Environmental Consultant shall undertake an assessment of the impacted area such it can be confirmed the disturbance of material has not resulted in conditions with unacceptable risks to site users or the environment. This may include inspections, and or soil/water sampling within the site and subsequent analysis of samples for identified contaminants of concern at the site.

Following implementation of these procedures to ensure there are no further unacceptable exposures to site workers and/or environmental emissions, consideration shall be given to the requirements of **EMP 16** to **EMP 18** inclusive, in relation to documentation and renewal of the LTEMP to minimise the potential for future exposure of impacted material. This should include a formal review of the incident by an appropriately qualified person appointed by the Site Owner (or nominated representative) with the objective of identifying the cause of the incident and providing recommendations on alternative procedures or systems to be implemented at the site and/or within the LTEMP to prevent/minimise the likelihood of the incident reoccurring.

The incident shall be documented within the activity register as outlined in **EMP 17** and where appropriate, amendment(s) to the LTEMP will be undertaken as outlined in **EMP 19**.

| **Non-compliance with LTEMP** | | **EMP 16** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | To ensure the LTEMP is implemented as intended. | |

Non-compliances with the intent and procedures of the LTEMP may occur during the implementation of the LTEMP.

Where a non-compliance is identified by a responsible organisation, they shall inform the affected organisations of the non-compliance in writing. Where a non-compliance with the LTEMP is identified by another organisation (in the activities of an alternate organisation), then they shall have the responsibility of informing the non-complying party in writing of the non-compliance. The non-complying party will be required to rectify the non-conformity as soon as possible, as per the requirements of the relevant procedure(s) where non-compliance has occurred.

Detail of the action taken to rectify the non-compliance shall be provided to each of the affected organisations in writing. Where a non-compliance cannot be rectified, then the LTEMP will require to be reviewed as per the requirements of **EMP 19** LTEMP Review.

Where contaminated soil/spoil, water and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal / discharge) this will constitute a non-conformance to be managed under the CEMP or Environmental Management System.

Where contaminated soil/spoil, water and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal / discharge) the following will be undertaken:

- Where required, isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc) to prevent exposure to site personnel and/or off-site airborne dust migration.
- Implementation the Unexpected Finds Protocol included in this LTEMP, and subsequent appropriate removal/management of the identified impacted material via excavation and off-site removal or otherwise containment/treatment as applicable.
- Fill out incident response form and raise a non-conformance for improvement.
- Where required, notify regulatory authorities.

| **Record Keeping** | | **EMP 17** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | Records of the implementation of the LTEMP require to be retained. | |

The Site Owner (or nominated representative) shall be responsible for the maintenance of all documents relating to the implementation of the LTEMP. This shall include any contamination assessments and validation undertaken, registers for the maintenance of the LTEMP (site inspection forms, works approval checklists, revised plans, *etc.*) and any relevant correspondence between the Site Owner (or nominated representative), Contractors and/or any other party.

All records shall be retained by the Site Owner (or nominated representative) throughout the time of implementation of the LTEMP. In the event that the role of the Site Owner (or nominated representative) is transferred from one organisation to another, control of all relevant (historical and current) documents will be transferred for safe keeping to the current Site Owner (or nominated representative).

| **Audit / Review of LTEMP Implementation** | | **EMP 18** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | Once every 12 months | |
| Objective: | The implementation of the LTEMP requires to be audited in accordance with EPA guidance publications to identify areas of non-compliance or partial compliance with relevant legislation/regulations and/or the requirements of this plan. | |

An environmental audit shall be undertaken annually from implementation of this LTEMP to ensure ongoing compliance with the LTEMP requirements. The audit shall be undertaken by an Environmental Consultant in general compliance with the DEC '*Compliance Audit Handbook*' (DEC, Feb 2006) and identify areas of non-compliance or partial compliance with the requirements of:

- Relevant legislation / regulations; and
- This plan.

The findings of the audit should be documented and form the basis of the subsequent management review process as outlined following.

Specific tasks that will be undertaken as part of the audit include:

- Review of records generated by the Site Owner, and their respective contractors to ensure they meet the intended scope of the LTEMP.
- Review of the works register documenting ground disturbance activities completed at the site and associated work method statements, monitoring/validation activities to ensure that the management activities undertaken have met the intended scope of the LTEMP.
- Periodic review and inspection of the Site condition, including annual inspection of liners within the OSDs and overflow drainage channels.

Where a non-compliance is detected during the audit process, then the non-compliance shall be informed as per the requirements of **EMP 16**: Non-Compliances with LTEMP.

The Site Owner (or nominated representative) is required to maintain records of the audit review. Records will require to be maintained on site and made available to relevant authorities in the event of a site inspection.

The results of the audit will be considered as part of a broader review of the LTEMP to be undertaken on an annual basis by an Environmental Consultant in conjunction with the Site Owner. This review shall consider:

- The results of the LTEMP Audit as outlined above.
- Any non-compliances with the LTEMP that have been unable to be resolved.
- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the LTEMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

| Audit / Review of LTEMP Implementation | EMP 18 |
|---|---|
| Where a review identifies items, which are required to be modified, or added to the LTEMP, then a revision of the LTEMP shall be prepared by a Suitably Qualified Person. The revised LTEMP will require approval by relevant stakeholders prior to implementation of the revised plan. | |

| **LTEMP Review** | | **EMP 19** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | The LTEMP requires review to ensure its continued appropriateness to be used on the Site. | |

A review of the LTEMP shall be undertaken as required by an Environmental Consultant in conjunction with the Site Owner (or nominated representative). This review shall consider:

- The results of the LTEMP Audit as outlined in **EMP 18**.
- Any non-compliances with the LTEMP that have been unable to be resolved.
- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the LTEMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

If the Site Owner ceases to be recognised as the Site Manager, a review of the LTEMP document and compliance measures will be necessary to identify suitable replacement LTEMP compliance mechanisms.

In addition, where a review identifies items which are required to be modified, or added to the LTEMP, then a revision of the LTEMP shall be prepared by a suitably qualified person.

Any revisions to the LTEMP must be approved by the by the NSW EPA or appointed NSW EPA accredited Site Auditor.

| **Cessation of LTEMP Application** | | **EMP 20** |
|---|---|---|
| Responsibility: | Entity responsible for implementation of LTEMP (as per **Table 4**) | |
| Frequency: | As required | |
| Objective: | To ensure impacts associated with residual issues requiring management at the Site during construction and operation of the Proposed Development been appropriately resolved to ensure the ongoing suitability of the site for the proposed land use. | |
| To address potential residual soil and groundwater issues after the scope of the remediation is completed, the Golder (2016) RAP envisaged implementation of a LTEMP to provide a management, monitoring and review framework.<br><br>Cessation of the application of the LTEMP will be dependent upon the results of additional assessment and will require a revised site-specific human health and ecological risk assessment.<br><br>Once the Environmental Consultant is satisfied that the residual contamination at the Site does not present a risk of harm to human health and the environment, then the final site-specific human health and ecological risk assessment will include recommendations for cessation of the LTEMP for approval by the NSW EPA or appointed NSW EPA accredited Site Auditor. | | |