



Contamination Management Plan

Moorebank Precinct East Site

400 Moorebank Avenue, Moorebank NSW

Prepared for: Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd

EP1280.001_MPE_CMP_v11 22 February 2022



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Moorebank Precinct East Site, 400 Moorebank Avenue, Moorebank NSW

22 February 2022

Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd

Via email: mhowley@tacticalgroup.com.au

Ref: EP1280.001_MPE_CMP_v11

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QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1.0	Kellie Guenther	15.01.18	Paul Simpson	15.01.18	Paul Simpson	15.01.18
v2.0	Kellie Guenther	15.02.18	Paul Simpson	15.02.18	Paul Simpson	15.02.18
v3.0	Kellie Guenther	26.02.18	Paul Simpson	26.02.18	Paul Simpson	26.02.18
v4.0	Kellie Guenther	01.03.18	Paul Simpson	01.03.18	Paul Simpson	01.03.18
v5.0	Kellie Guenther	23.05.18	Paul Simpson	23.05.18	Paul Simpson	23.05.18
v6.0	Kellie Guenther	26.09.20	Paul Simpson	26.09.20	Paul Simpson	26.09.19
v7.0	Kellie Guenther	13.08.20	Paul Simpson	13.08.20	Paul Simpson	13.08.20
v8.0	Retracted					
v9.0	Kellie Guenther	20.07.21	Paul Simpson	20.07.21	Alex Thomson	20.07.21
v10.0	Alex Thomson	22.09.21	Paul Simpson	22.09.21	Kellie Guenther	22.09.21
v11.0	Alex Thomson	22.02.22	Paul Simpson	22.02.22	Paul Simpson	22.02.22

DOCUMENT CONTROL

Version	Date	Reference	Submitted to
V11	22.02.2022	EP1280.001_MPE_CMP_v11	Qube c/o Tactical

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Abbreviations and Terminology		
Abbreviations	Term	Definition
ACM Bonded	Asbestos Containing Materials Bonded	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 <i>Model Code of Practice: How to Manage and control asbestos in the workplace</i> (Safe Work Australia 2018).
AF	Asbestos Fines	AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7mm sieve. Equivalent to “friable” asbestos in <i>Model Code of Practice: How to Manage and control asbestos in the workplace</i> (Safe Work Australia 2018).
AFFF	-	Aqueous Film Forming Foam
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 Section 10 .
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
BTEX	-	Benzene, Toluene, Ethylbenzene and Xylenes
Butchers Knife	-	Portion of land located to the south of the DNSDC (Figure 2, Attached Figures)
Cd	-	Cadmium
CLM	-	Contaminated Land Management
CMP	Contamination Management Plan	This Plan.
CoC	Conditions of Consent	Conditions of Consent SSD 7628 and MOD 2 – SSD-7628 approved 31 January 2020
Construction Area	-	Extent of construction works, namely areas to be disturbed during the construction of the Site.
COPC	-	Contaminants of Potential Concern
Cr	-	Chromium

Abbreviations and Terminology		
Abbreviations	Term	Definition
CSM	-	Conceptual Site Model
Cu	-	Copper
DBYD	-	Dial Before You Dig
DNAPL	-	Dense Non-Aqueous Phase Hydrocarbons
DNSDC	-	Defence National Storage and Distribution Centre
DP&E	-	NSW Department of Planning 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.
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 <i>How to Manage and control asbestos in the workplace</i> (Safe Work Australia 2018).
Ha	-	Hectares
HCB	-	Hexachlorobenzene
Hg	-	Mercury
HIL	-	Health Investigation Level
HSL	-	Health Screening Level
IMEX	-	Import-Export
IMT	-	Intermodal Terminal

Abbreviations and Terminology		
Abbreviations	Term	Definition
Induction	Site Specific Induction	The <i>Work Health and Safety Act 2011</i> (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 Central Precinct to understand the site specific risks.
LGA	-	Local Government Area or Agency
LNAPL	-	Light Non-Aqueous Phase Hydrocarbons
Metallic Debris	Metallic Debris	Debris comprising metal (ferrous) items. May include fragments of former ordnance items.
MIC	-	Moorebank Intermodal Company
MPE Concept Plan Approval	Moorebank Precinct East Concept Plan Approval	Formerly the SIMTA Concept Plan Approval. MPE Concept Plan Approval (SSD_0193) granted by the NSW Department of Planning and Environment on 29 September 2014 for the development of former defence land at Moorebank to be developed in three stages; a rail link connecting the site to the Southern Sydney Freight Line, an intermodal terminal, warehousing and distribution facilities and a freight village.
MPE Project	Moorebank Precinct East Project	Formerly the SIMTA 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 Approval (14_6766).
MPE Site	Moorebank Precinct East Site	Subject of this CMP – Formerly the SIMTA Site. Including the former DSND site and the land owned by SIMTA which is subject to the Concept Plan Approval. The MPE Site does not include the rail corridor, which relates to the land on which the rail link is to be constructed.
MPE Stage 1	Moorebank Precinct East Stage 1	Stage 1 (14-6766) of the MPE Concept Plan Approval for the development of the MPE Intermodal Terminal Facility, including the rail link at Moorebank. This reference also includes associated conditions of approval and environmental management measures which form part of the documentation for the approval.
MPE Stage 1 Site	Moorebank Precinct East Stage 1 Site	Includes 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 Project	Moorebank Precinct East Stage 2 Project	Stage 2 of the MPE Concept Plan Approval including the construction and operation of 300,000m ² of

Abbreviations and Terminology		
Abbreviations	Term	Definition
		warehousing and distribution facilities on the MPE Site and the Moorebank Avenue upgrade within the Moorebank Precinct.
MPE Stage 2 Site	Moorebank Precinct East Stage 2 Site	The area within the MPE Site which would be disturbed by the MPE Stage 2 Proposal (including the operational area and construction area) and MOD 2. The MPE Stage 2 site includes the former DSND site and the land owned by SIMTA which is subject to the MPE Concept Plan Approval. The MPE Site does not include the rail corridor, which relates to the land on which the rail link is to be constructed.
MPW Project	Moorebank Precinct West Project	Formerly the MIC Project. The MPW Intermodal Terminal Facility as approved under the MPW Concept Plan Approval (SSD_5066) and the MPW EPBC Approval (No. 2011/6086).
MPW Site	Moorebank Precinct West Site	Formerly the MIC Site. The site which is the subject of the MPW Concept Plan Approval, MPW EPBC Approval and MPW Planning Proposal. The MPW Site does not include the rail link as referenced in the MPW Concept Plan Approval or MPE Concept Plan Approval.
Ni	-	Nickel
NWLW Stage	North West Limited Works Stage	North west corner of the former DNSDC Site subject of SAS (Enviroview 2019).
OCP	-	Organochlorine Pesticides
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

Abbreviations and Terminology		
Abbreviations	Term	Definition
PSI	-	Preliminary Site Investigation
QA/QC	-	Quality Assurance and Quality Control
Quarantined Area	Quarantined Area	Area removed from development activities due to potential contamination. Also see AOC.
QUBE	QUBE Holdings Ltd	Joint owners of the Moorebank Precinct
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
Refuelling Area		Former DNSDC Refuelling Area located within Stage 1 MPE (Figure 1, Attached Figures)
SAQP	-	Sampling Analysis and Quality Plan
SIMTA	-	Sydney Intermodal Terminal Alliance - a consortium comprising Qube and Aurizon Holdings.
Site	Site	MPE Site, excludes the Rail Corridor
SME	-	School of Military Engineering
SMP	-	Site Management Plan
SSD	-	State Significant Development
SSFL	-	South Sydney Freight Line
SVOC	-	Semi Volatile Organic Compounds
T&P Area	-	Treatment and Preservation Area
Tactical	Tactical Group	Project Managers of the Moorebank Precinct for Qube
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 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.

Abbreviations and Terminology		
Abbreviations	Term	Definition
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.
VOC	-	Volatile Organic Compounds
Zn	-	Zinc

1 Introduction

EP Risk Management Pty Ltd (EP Risk) was engaged by Qube (Qube) Property Management Services Pty Ltd c/o Tactical Group Pty Ltd (Tactical), to prepare the Contamination Management Plan (CMP) for the Moorebank Precinct East (MPE) Site located at 400 Moorebank Avenue, Moorebank NSW (the Site) **Figure 1 (Attached Figures)**.

The Site is approximately 16 hectares in area and comprises the following Lots (**Figure 1, Attached Figures**):

- Part Lot 27 DP 1253673 (Proposed Lot 21 DP 1197707) Existing Warehouses part of the Former Defence National Storage and Distribution Centre (DNSDC)).
- Part Lot 4 DP 1197707 Portion of Butchers Knife.

This CMP is limited to the abovementioned remaining portions of the MPE Site which have not yet been developed or subdivided.

1.1 Background

The MPE Project

The MPE Project involves the development of an intermodal terminal (IMT), including a rail link to the Southern Sydney Freight Line (SSFL) within the Rail Corridor, warehouse and distribution facilities with ancillary offices, a freight village (ancillary site and operational services), stormwater, landscaping, servicing, associated works on the eastern side of Moorebank Avenue, Moorebank, NSW.

The development of the Stage 2 portion of the MPE Project involved the construction and operation of warehousing and distribution facilities on the Site (Arcadis 2016¹). Key components of the MPE Project development included:

- Warehousing comprising approximately 300,000m² gross floor area (GFA), additional ancillary offices and the ancillary freight village;
- Establishment of an internal road network, and connection of the Site to the surrounding public road network;
- Ancillary supporting infrastructure within the site, including stormwater and drainage infrastructure, utilities relocation, vegetation clearing, remediation, earthworks, signage and landscaping; and
- Subdivision of the Site.

The Stage 2 MPE Project is predominately located on the former DNSDC (**Figure 1, Attached Figures**) and the Site forms a small portion of the MPE Project Site located in the north eastern and southern portions.

¹ Moorebank Precinct East – Stage 2 Proposal Contamination Summary Report, JBS&G Australia Pty Ltd c/o Arcadis, December 2016 (Arcadis 2016).

The Stage 2 MPE MOD 2 – SSD-7628 was approved on 31 January 2020 and included changes to the design of three onsite stormwater detention (OSD) basins, notably one located in the southern portion of the Site which extends further into the Butchers Knife land.

Construction Activities at the Site

Whilst the majority of construction works are complete for the Stage 2 portion of the MPE Project, the following construction activities are likely to be carried out at the Site in the future:

- Demolition of existing buildings and infrastructure on the Site;
- Drainage and utilities installation;
- Establishment of hardstand across the Site, including the terminal hardstand;
- Construction of a roads and carparks;
- Construction of warehouses;
- Construction works associated with signage, landscaping, stormwater and drainage works; and
- Construction of OSD2 within the Butchers Knife portion of the Site.

Summary of Previous Investigations

A number of previous environmental investigations have been undertaken involving the former DNSDC and associated areas dating back to at least 1980, with more recent investigations and summary documents prepared between 2000 and 2016. A non-statutory SAS and Site Audit Report (SAR) was completed in 2002, for the Sydney Intermodal Terminal Alliance (SIMTA) site, with the Site Auditor certifying the SIMTA site as suitable for ongoing commercial/industrial use subject to implementation of a Site Management Plan (SMP), which was to include a range of actions relating to further investigation, remediation, groundwater monitoring and management controls. It is not known whether a SMP was prepared or implemented, or whether any recommended actions were undertaken.

Subsequent to the above and at the request of the Department of Defence, the following non-statutory site audits were completed within the following portions of the MPE Project:

- DNSDC (JBS&G 2016a²), excluding the former DNSDC Refuelling Area. The Site Auditor certified the former DNSDC as suitable for commercial / industrial use subject to compliance with the Environmental Management Plan (EMP) prepared for the Site in July 2016 (GHD 2016³) and updated in 2018 (EP Risk 2018a⁴).

² Site Audit Statement and Report 0503-1611 Part Lot 1 in DP 1048263 Former Defence National Storage and Distribution Centre (DNSDC), Moorebank Avenue Moorebank NSW, JBS&G Australia Pty Ltd, 12 October 2016 (JBS&G 2016a).

³ Department of Defence Former DNSDC, Moorebank, NSW Environmental Management Plan, GHD, September 2016 (GHD 2018).

⁴ Environmental Management Plan Moorebank Precinct East, 400 Moorebank Avenue, Moorebank NSW, EP Risk Management Pty Ltd, January 2018 (EP Risk 2018a).

- Butchers Knife (Aecom 2016b⁵), the Site Auditor certified the Butchers Knife was suitable for commercial / industrial use subject to compliance with the site management plan (Golder 2016b⁶) (**Appendix A**) due to contamination remaining on the site.

Since the completion of the former CMP (EP Risk 2019) the following portions of the MPE Project have been assessed and certified as suitable for commercial/industrial use (**Figure 1, Attached Figures**):

- Northwest Limited Works (NWLW) Stage:
 - *Site Audit Statement 0301-1613-1R Northwest Limited Works Stage Moorebank Precinct East*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2019⁷).
- Proposed Lot 22 Site, Moorebank Precinct East:
 - *Site Audit Statement 0301-1613-4 Proposed Lot 22 Site, Moorebank Precinct East*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2019b⁸).
- Proposed Lot 23 Site, Moorebank Precinct East:
 - *Site Audit Statement 0301-1613-6 Proposed Lot 23 Site, Moorebank Precinct East*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2020⁹).

Additionally, the adjoining property, Stage 1 MPE (**Figure 1, Attached Figures**), also known as the Import Export Terminal (IMEX), has been signed off (Section A2) as suitable for commercial / industrial land use (Enviroview 2019a¹⁰) subject to the compliance of the Former DNSDC Refuelling Area EMP (GHD 2018b). The IMEX portion of the MPE Site is outside the boundary of the Site.

Within the remaining areas requiring management, the SASs (JBS&G 2016a and AECOM 2016b) indicated the Site was suitable for continued commercial/industrial use, subject to the implementation of a EMP/SMP (GHD 2016 and Golder 2016b). A number of contamination issues, predominately isolated lead, asbestos and ordnance related contamination were identified as requiring management within each of the portions of the Site and are discussed in further details **Section 4.1**.

During the update of the EMP (EP Risk 2018a), it was noted, while GHD (2015a) and JBS&G (2016a) reported the Site posed a low contamination risk for Per- and poly-fluoroalkyl substances (PFAS),

⁵ *Site Audit Report and Site Audit Statement - Butchers Knife Part Lot 4 DP 1197707, Moorebank, NSW*. Report Ref 60507697, 12 August 2016 (Aecom 2016b).

⁶ *Contamination Summary Report, Remedial and Site Management Plan— Butchers Knife, Moorebank Intermodal Terminal*. Document No. 147623070-055-R-Rev2, 10 August 2016 (Golder 2016b).

⁷ *Site Audit Report Northwest Limited Works Stage Moorebank Precinct East, Sydney Intermodal 400 Moorebank Avenue, Moorebank, Enviroview Pty Ltd*, May 2019, (Enviroview 2019).

⁸ *Site Audit Statement 0301-1613-4 Proposed Lot 22 Site, Moorebank Precinct East, Sydney Intermodal*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301, 15 October 2019 (Enviroview 2019b).

⁹ *Site Audit Statement 0301-1613-6 Proposed Lot 24 Site, Moorebank Precinct East, Sydney Intermodal*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301, 21 July 2020 (Enviroview 2020).

¹⁰ *Site Audit Report IMEX Terminal Moorebank Precinct East, Sydney Intermodal 400 Moorebank Avenue, Moorebank, Enviroview Pty Ltd*, August 2019 (Enviroview 2019a).

Site Audit Statement 0301-1613-2 IMEX Terminal Moorebank Precinct East, Sydney Intermodal, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2019a).

Australian guidance has been revised since 2016. PFAS had been historically used stored at the MPE Project Site (proximal to Building 26) and further assessment was required in accordance with current guidance.

Since the completion of the previous CMP (EP Risk 2019) a supplementary PFAS assessment was conducted for the area within and adjacent the former Building 26. The summary findings of EP Risk (2018b¹¹) concluded there was no potential risks to onsite construction, maintenance workers and users of the Site. However, a potential risk to offsite recreational and ecological receptors was identified which needed additional assessment.

A subsequent site wide groundwater assessment was undertaken at the MPE Project Site (EP Risk 2019a¹²) and overall, reported:

- There are no potential risks to current or future onsite construction, maintenance workers and users of the MPE Project Site.
- During construction the potential risk to on- and off-site recreational and ecological receptors was identified as low, subsequent to proper implementation of the PFAS Stormwater Management Strategy v2 (EP Risk 2019b¹³).
- The future potential risk to on- and off-site recreational and ecological receptors, post construction of the MPE redevelopment, was identified as being low to no risk.

Development of the CMP

This revised CMP has been prepared to reflect the current stage of redevelopment of the MPE Site in accordance with Condition A14 and only includes the portions of the MPE Site provided in **Figure 1**. This CMP has been prepared in accordance with condition A15 and has been prepared with consideration to the previous assessments and management plans previously prepared for the Site (where relevant).

This CMP is limited to the Existing Warehouses and OSD 2 as defined within **Table 1**.

¹¹ *Building 26 Supplementary Per- and Poly- Fluoroalkyl Substances (PFAS Assessment) MPE Stage 2*, EP Risk Management Pty Ltd, 20 December 2018 v4 (EP Risk 2018b).

¹² *PFAS Groundwater Characterisation Assessment Moorebank Precinct Stage 2, 400 Moorebank Avenue, Moorebank, NSW*, EP Risk Management Pty Ltd, 29 April 2019 (EP Risk 2019a).

¹³ *Per- and Poly- Fluoroalkyl Substances (PFAS) Stormwater Management Strategy v2 Moorebank Precinct East, Moorebank Ave, Moorebank, NSW*, EP Risk Management Pty Ltd, 2 April 2019 (EP Risk 2019b).

1.2 Conditions of Consent

The Development Consent made under *Section 89E of the Environmental Planning and Assessment Act 1979* has listed the conditions of consent (CoC) (SSD 7628) as **Appendix D** in relation to the CMP.

Additionally, the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) approval for the SIMTA Intermodal Facility (EPBC 2011/6229) was granted by the Minister for the Environment on 6 March 2014. That approval was provided for the impact of the MPE Project on listed threatened species and communities (Sections 18 and 18A of the EPBC Act) and Commonwealth land (Sections 26 and 27A of the EPBC Act).

The EPBC 2011/6229 conditions of approval provide limited guidance on contamination management at MPE. However as this CMP operates alongside a similar CMP for the Moorebank Avenue Upgrade Works (EP Risk 2021¹⁴), Qube decided to align the requirements of this plan with the more detailed control measures and management commitments in contamination management during the Moorebank Avenue upgrade.

The relevant requirements of the EPBC Act approval for MPW (EPBC 2011/6086) are as **Appendix D** and addressed where appropriate in this CMP. In this way Qube considered contamination management for this stage of development of the MPE Site will address the intent and prescriptions of contamination management in the conditions of approval for EPBC 2011/6229.

1.3 Objectives

The objectives of this CMP are to meet the requirements of Conditions of Consent B134 and B135 and EPBC 2011/6229 conditions of approval, and provide procedures to manage the following remnant contamination issues during the Site construction activities:

- Excavation within the southern burial pits – lead and asbestos containing materials (ACM);
- Removal/Remediation of Understand Storage Tanks (UST);
- Disturbance of soil containing asbestos material; and
- Demolition of buildings containing asbestos materials.

As per Condition of Consent B134 and EPBC Condition 7, this plan forms a sub-plan to the CEMP. As per Condition of Consent B135 the CMP will also include the following management plans:

- An unexploded ordnance (UXO), Exploded Ordnance Waste (EOW) and Explosive Ordnance waste (EO) Management and Remediation Plan prepare by G-tek Australia Pty Ltd (G-tek) a qualified member of the Defence Panel - procedures required for handling and disposing of any identified UXO, EOW or EO during the development;
- Asbestos Management Plan (AMP) - procedures required for handling and disposing of any identified ACM and asbestos impacted soils during the development; and

¹⁴ Contamination Management Plan, Moorebank Avenue Upgrade Works, 400 Moorebank Avenue, Moorebank NSW, EP Risk Management Pty Ltd, 26 May 2021 (EP Risk 2021).

- Unexpected Finds Procedure (UFP) - provide an appropriate framework for identifying and addressing any discovery of chemical contamination, potentially explosive ordnance or any other form of hazard during development so as to ensure a safe working environment for workers and to avoid unacceptable impact on the natural environment.

Additionally, as per Condition of consent B136, *following demolition, a supplementary UXO, EO and EOW Site Assessment Survey is to be undertaken and an updated Contamination Management Plan is to be prepared to the satisfaction of the Secretary to address any additional contamination issues identified. Remediation works must only be carried out by suitably qualified and experienced contractor(s) including a contractor listed on the Defence Panel in the case of UXO, EO and EOW.*

The successful implementation of the CMP requires the appropriate briefing and Specific Work Health and Safety (WHS) induction of site workers who may uncover potential chemical contamination (including potential asbestos containing materials) and/or explosive ordnance. It is proposed this briefing will include the review of this CMP and the associated flow chart (**Appendix B**).

Consistent with the CMP for upgrade works at Moorebank Avenue, this plan also provides objectives, targets and indicators for managing contamination as provided in **Table 1**.

Table 1 – Objectives and Performance Indicators		
Objectives ¹⁵	Targets	Performance indicators
During the pre-construction and construction phases of the Project, ensure that the proposed contamination and soil controls are implemented.	Contamination and soil control measures have been implemented during construction.	Instances where nominated controls measures have not been implemented during construction phase.
Establish and maintain awareness of the importance of ensuring impacts associated with contamination and disturbance of soil associated with the Project are minimised.	All Project and workforce will be inducted and the unexpected finds flow chart (Appendix B) will be hung in the site offices and lunch rooms.	Number and percentage of project and workforce personnel who have not attended required induction prior to commencing work on the project site.
During construction and operational phases, all contaminated material including soil/spoil and hazardous materials (e.g. asbestos containing material) are handled, stored, transported and disposed of in a lawful manner.	Zero environmental incidents.	Project environmental and safety incident statistics during construction phase.

This CMP describes reporting procedures and lines of responsibility, including the contact numbers for relevant experts at the commencement of the development works (See **Section 1.5**). These experts

¹⁵ The implementation of a remediation program applicable to each stage of development in accordance with the Moorebank Intermodal Terminal Remediation Action Plan was not required as it was determined by the NSW EPA Auditor remnant contamination could be managed during construction via a Contamination Management Plan (CMP).

will include those with detailed knowledge of the Site, and access to, the supporting documents related to the assessment of the Site.

The Site has been audited and declared suitable for the intended use (JBS&G 2016a and Aecom 2016b), subject to the implementation of an EMP / SMP (GHD 2016 and Golder 2016b). Remnant contamination, if present, is most likely to be discovered during the development earthworks. The approaches included in this CMP are intended for use only during the Site preparation phase of development, during which structures are demolished and disposed of, land levels are altered and redundant infrastructure is removed and new infrastructure is installed and has been generally based on the DNSDC EMP (GHD 2016). Post-construction management plans, if required, would be administered through the relevant local government authority or the NSW Department of Planning.

1.4 Scope of Work

The scope of work undertaken to achieve the CMP objectives comprised the following:

1. Review of existing documentation; and
2. Preparation of this CMP in general accordance with the requirements of Commonwealth Environment, NSW legislation, NSW EPA and Safe Work NSW Codes of Practice.

1.5 Roles and Responsibilities

Provided in **Table 2** are the terminology and roles and responsibilities relevant to the Site.

Table 2 – Responsibilities for CMP Implementation	
Position and Company/Entity	Responsibilities
Client	QUBE c/o of Tactical. The owner of the Site. Responsible for the overall management of the Site and the engagement of the Principal Contractor and Environmental Consultant.
Principal Contractor	Means the contractor in primary control of the Site. Responsible for notifying the client, appropriate consultant or contractor in relation to unexpected finds. Also responsible for quarantining AOC with suitable barricades and informing other workers of its location.
Environmental Consultant	As defined under the NEPM (NEPC 2013) (Schedule B9) the environmental consultant responsible for the assessment of contaminated sites and preparation of assessment reports must be able to demonstrate relevant qualifications and experience to a level appropriate to the contamination issues relevant to the site under investigation. The environmental consultant is to have a certified practitioner recognised by one of the certifying bodies recognised by the NSW EPA. Any reports prepared will be 'signed off' by the individual certified practitioner. ----- Responsible for notifying the Client and Principal Contractor of any unexpected finds. Also responsible for undertaking the assessment, remediation and validation of any AOC in relation to chemical contamination. Additionally, responsible for engaging the Ordnance contractor.
Ordnance Contractor	Persons and/or company appropriately qualified to undertake ordnance searches, clearances and prepare reports. Responsible for undertaking ordnance searches, removal of items and clearances.

Table 2 – Responsibilities for CMP Implementation	
	The ordnance contractor is to be a qualified contractor listed on the Defence Environment and Heritage Panel (DEHP) as a D2 and/or F2.
Licensed Asbestos Assessor	Means a person who holds an asbestos assessor licence. Responsible for final clearances after asbestos removal works are undertaken.
Licensed asbestos removalist (Asbestos Removal Contractor)	Means a person conducting a business or undertaking who is licensed under the WHS Regulation to carry out Class A or Class B asbestos removal work. Responsible for the safe removal of asbestos of any AOC in accordance with the relevant legislation and codes of practice.
Asbestos Consultant / Competent Person	A person who has acquired through training or experience the knowledge and skills of relevant asbestos removal industry practice and holds a certification in relation to the specified vocational education and training (VET) course for asbestos assessor work or a tertiary qualification in occupational health and safety, occupational hygiene, science, building, construction or environmental health. For all other purposes, competent person means a person who has acquired through training, qualification or experience, the knowledge and skills to carry out the task.
Remediation Contractor	Persons and/or company appropriately qualified to undertake the required remediation works and has the appropriate insurances and licences. Responsible for undertaking remedial works in accordance with any developed remediation action plans or strategies.
Worker	Any worker on the Site, including any contractor or sub-contractor. 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.

2 Site Identification

The site identification details are presented in **Table 3**.

Table 3 – Site Identification	
Item	Description
Site Address	MPE Site, 400 Moorebank Avenue, Moorebank, NSW (see Figure 1, Attached Figures)
Legal Description	Part Lot 27 DP 1253673 (Existing Warehouses) ¹⁶ . Part Lot 4 DP 1197707 (Portion of Butchers Knife).
Approximate Site Area	16 Hectares
Site Owner	Sydney Intermodal Terminal Alliance (SIMTA), a consortium comprising Qube and Aurizon Holdings.
Municipality	Liverpool City Council
Site Zoning	IN1 General Industry

2.1 MPE Site Identification Summary

This CMP is limited to the Existing Warehouses and a Portion of the Butchers Knife (OSD 2) which form part of the MPE Site as detailed within **Table 3**, and **Figures 1 and 2 (Attached Figures)**.

Aspect Environmental Pty Limited (Aspect) on behalf of SIMTA, as Qube Holdings Limited, submitted a modification application, pursuant to section 4.55(7A) of the EP&A Act. The modification included the extension of the construction and operational footprint to the south to facilitate OSD 2. The Stage 2 MPE MOD 2 – SSD-7628 was approved on 31 January 2020 and included changes to the design of three OSD basins, notably OSD 2 which extends further into the Butchers Knife land. The NSW Government Modification Assessment Report noted: *“The proposed modification does not substantially change the nature of the development or use of the site and it supports the broader project benefits and their contribution to the public interest. This includes employment and shifting freight to rail, thereby reducing the impact of heavy vehicles on the road network. The Department considers the proposed modification to be acceptable and recommends the consents be modified with conditions”*.

OSD 2 has become part of the MPE Site through an agreement with the Commonwealth through the *Moorebank Intermodal Terminal Development – Development and Operations Deed (ref: 42727505)*. It is understood the purpose of OSD 2 is for the management of stormwater from the wider MPE Site.

¹⁶ Part Lot 27 DP 1253673 is the same area identified as Proposed Lot 21 DP1197707 (see **Figure 1, Attached Figures**).

The area of the MPE Site where the CMP applies has been reduced based on the subdivision and development of various lots, including provision of SASs as summarised below:

- NWLW (Lots 12 and 13 in DP 1251885) – May 2019, SAS (Enviroview 2019).
- IMEX (Lot 26 in DP 1253673) – August 2019, Section A2 SAS (Enviroview 2019a) subject to the compliance of the Former DNSDC Refuelling Area EMP (GHD 2018b).
- Proposed Lot 22 (Lot 22 in DP 1048263), Lot registered as Lot 22 in DP 1253673 – October 2019, SAS (Enviroview 2019b).
- Proposed Lot 23 (Lot 23 in DP 1048263), Lot registered as Lot 23 in DP 1253673 – July 2020, SAS (Enviroview 2020).

3 Site Conditions and Surrounding Environment

The Site, is located approximately 27 km south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany. The 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. The Site is located approximately 800 m south of the intersection of Moorebank Avenue and the M5 Motorway. The location of the Site is shown in **Figure 1 (Attached Figures)**.

3.1 Current and Proposed Land Use

Currently the former DNSDC portion of the Site is undergoing development as part of the IMEX Intermodal Facility (**Section 1.1**) and also contains offices and amenities to support the development works in both Stage 1 and 2 for the MPE Project.

3.2 Site Description and Surrounding Land Use

The Site is located within Part Lot 27 DP 1253673 (Proposed Lot 21 DP 1197707) and part Lot 4 DP 1197707, which formerly contained part of the DNSDC site and is characterised by:

- Concrete access roads providing access to a number of enclosed warehouse/storage structures.
- Filling and construction zones.
- Open storage/parking areas bordered by various open grassed areas.

The Butchers Knife portion (Part Lot 4 DP 1197707) is predominately vacant vegetated land with dirt vehicle tracks and a portion of the new rail alignment. Historically the area was part of the former DNSDC site.

The northern portion of the Site includes a variety of buildings which have been previously used to store various items, including batteries, electrical equipment and chemicals and the storage of vehicles. Existing buildings and features on the Site are shown in **Figure 1** and **Figure 2 (Attached Figures)**.

A summary of each of the remaining buildings since the previous CMP (EP Risk 2019) is presented below:

- Building 049: Battery Shop Mechanical - Waste water UST located on the western side of the building.
- Building 053: Storehouse Bulk - Septic UST located on the southern side of the building.
- Buildings 050, 051, 052 and 054 – storehouses.
- East of B53 and B54 - 21 Supply Battalion disposal area – noted to potentially have been remediated during the construction of the DNSDC. Reported to have been used to “burn, bash and bury” World War II waste material (Acardis 2016).
- A portion of the northern area reportedly underlain by areas of historical waste disposal (Acardis 2016) - Board of Survey disposal area used to “burn, bash and bury” waste which was reportedly largely removed for appropriate disposal in the mid-1990s.

The land surrounding the Site comprises:

- The MPE Site, including IMEX, Lot 22 and 23, and NWLW which have undergone earthworks and construction of large warehouse buildings, concrete/bitumen hardstand and rail / freight infrastructure.
- The MPW Site, formerly the School of Military Engineering (SME), on the western side of Moorebank Avenue directly adjacent to the Site.
- The East Hills Rail Corridor to the south of the Site, which is owned and operated by Sydney Trains.
- The Holsworthy Military Reserve, to the south of the East Hills Rail Corridor, which is owned by the Commonwealth; The Boot Land, to the immediate east of the Site between the eastern boundary and the Wattle Grove residential area, which is owned by the Commonwealth.
- The southern Boot Land, to the immediate south of the MPE Site between the southern site boundary and the East Hills Rail Corridor, which is owned by the Commonwealth.
- Glenfield Waste Services, south-west of the Site.

3.3 Biodiversity

The construction and development footprint for OSD 2 will require clearing of 2.02 ha of vegetation to the area immediately south of the MPE Stage 2 Site. A Biodiversity Development Assessment Report (BDAR) was provided with the modification submission which considered biodiversity offsetting requirements associated with new impacts to threatened species and communities as a result of the modification. The Stage 2 MPE MOD 2 – SSD-7628 Report concluded *“Overall, the Department has considered the impacts of the proposal on biodiversity values and concludes that the Applicant proposes to adequately offset those impacts.”*

Full reference should be made to the Stage 2 MPE MOD 2 – SSD-7628, approved on 31 January 2020, for further information.

3.4 Topography

As reported by Acardis (2016) the existing topography of the Site is defined by a ridge, which runs along the central portion of the MPE Site, running parallel to Moorebank Avenue. This ridge results in surface water drainage flowing in an easterly direction towards Anzac Creek to the east of the ridge and towards Moorebank Avenue and the Georges River to the west. Drainage flow direction has not been changed as part of the development works.

Currently, internal drainage is managed as part of the constructions works and in accordance with the CEMP. Two outlets (Outlets A and B) discharge eastward into Anzac Creek, while the remainder of flows are collected and discharged into the Georges River via the neighbouring MPW Site from Outlet C.

3.5 Hydrology

The closest significant water body to the Site is the Georges River, located approximately 700 m to the west of the Proposal site. The Georges River flows through to Lake Moore, which is situated approximately 2.5 km north, north east of the Site, and into Chipping Norton Lake, located approximately 5.6 km north east of the Site. The Site is situated near the upstream portion of Georges River, which flows in a general north, then east / south easterly direction towards Botany Bay which is located approximately 20 km south south-east of the Site (GHD 2016).

Other surface water bodies identified in the surrounding area include:

- Anzac Creek, located approximately 250 m to the south and east of the Site. Anzac Creek is east west aligned and flows generally north-east to its confluence with the Georges River, approximately 5 km north of the Site. The western extent of Anzac Creek appears to exist in the former Royal Australian Engineers (RAE) Golf Course on the western side of Moorebank Avenue (within the MPW Site), where the creek appears to have been modified into a series of water features (dams/ponds). These water features have been replaced by a number of onsite detention basins (OSDs) that have been constructed on the MPW Site.
- Another series of dams/ponds are visible on the northern portion of the Moorebank Precinct situated to the west of Moorebank Avenue. The visible bodies range in shape, area and distance from the Site as follows:
 - A rough rectangular shaped pond is present with an approximate area of 550 m², situated approximately 300 m to the west of the boundary of the Site.
 - A circular body of water is present with a diameter of 60 m, and an approximate area of 3000 m². This pond is situated approximately 100 m to the west of the Site.

3.6 Geology

The Site is reported to be underlain by Tertiary fluvial deposits comprising clayey sand and clay, as well as silty clay with some ironstone Arcadis (2016). Clay is present to depths of at least 10 m to 12 m BGS. Surface cover material overlying the clay includes silty sand topsoil to approximately 0.3 m BGS and clay fill to variable depth between 0.5 m and 1.5 m BGS.

Additionally, Arcadis (2016) reported surface material and fluvial deposits are underlain at depth by shale associated with Ashfield Shale deposits. Registered bores immediately west of the Georges River, associated with the Glenfield Waste Facility, indicate sandy clay and sands to 10 m BGS overlying shale to 20 m BGS overlying sandstone to 30 m BGS. Furthermore, Arcadis (2016) noted shale bedrock was encountered in the eastern portion of the Site, while sandstone bedrock was reported in the southern portion of the Site.

3.7 Hydrogeology

GHD (2016) reported the regional geology consists of Tertiary aged fluvial deposits of clayey quartzose sand clay overlying a thin band of Middle Triassic ages Ashfield Shale of the Wianamatta Group overlying Hawkesbury Sandstone.

Arcadis (2016) reported that groundwater was intercepted at varying depths across the MPE Site, though generally found between 4 m BGS and 5 m BGS. Groundwater was noted within a number of geological units including the fill material, shale and sandy clays. Groundwater is expected to flow in a westerly or north-westerly direction towards the Georges River.

Arcadis (2016) reported deeper groundwater generally exhibited high salinity and therefore has little or no beneficial use. Shallow groundwater was reported having lower salinity, potentially as a result of local recharge via surface infiltration.

4 Previous Environmental Works

A number of investigations and related works have been undertaken at the Site since the 1980s. The following reports related to the works completed since 2000 were made available for Arcadis (2016) to review:

- Egis (2000) Preliminary Site Investigation at the Defence National Supply and Distribution Centre, Moorebank Defence Lands, September 2000.
- Graham Brooks and Associates (2002) Heritage Assessment Defence National Storage Distribution Centre (DNSDC) Moorebank Defence Site, Moorebank, October 2002.
- URS (2002a) Assessment of DNSDC Buildings – Supplement to Egis 2000 Stage 1 Preliminary Site Investigation of Areas A1 to A6, March 2002.
- HLA (2002) Soil and Groundwater Investigation, Precinct H (DNSDC), Moorebank Defence Lands, November 2002.
- URS (2002b) Investigation Review Report DNSDC, Moorebank Defence Lands, 10 December 2002.
- Contamination Management (CM 2002) Summary Site Audit Report and Site Audit Statement, DNSDC Site, Moorebank, December 2002.
- Environmental and Earth Sciences (EES 2002a) Memorandum: Review of Reports Pertinent to Environmental Investigations Conducted at DNSDC, Moorebank, NSW, 12 December 2002.
- EES (2002a) Memorandum: Review of Investigation Review Report DNSDC, Moorebank Defence Lands (URS) and Site Audit Statement WRR118 (Dr William Ryall), 16 December 2002.
- Milsearch (2002) Ordnance Investigation, 2002.
- Douglas Partners (DP 2009) Summary Environmental Conditions, Proposed Intermodal Freight Terminal, DNSDC Site – Moorebank Avenue, Moorebank, December 2009.
- GHD (2015a) DNSDC Moorebank Intrusive Site Investigations, September 2015.
- GHD (2015b) DNSDC Moorebank – Refuelling Area Remedial Action Plan. Report Ref. PRECQPMS- EN-RPT-0007, November 2015. GHD (2016) Former DNSDC, Moorebank NSW Environmental Management Plan, July 2016.
- Golder (2016a) Moorebank Avenue Site Management Plan. Report Ref. 147623070_052-Rev1, 4 July 2016.
- Golder Associates (Golder 2016b). Contamination Summary Report, Remedial and Site Management Plan– Butchers Knife, Moorebank Intermodal Terminal. Document No. 147623070-055-R-Rev2, 10 August 2016.
- Aecom/Frank Mohen (Aecom 2016b) Site Audit Report and Site Audit Statement - Butchers Knife Part Lot 4 DP 1197707, Moorebank, NSW. Report Ref 60507697, 12 August 2016.
- GHD (2016) Department of Defence Former DNSDC Moorebank NSW Environmental Management Plan, GHD Pty Ltd.

- JBS&G (2016a) Site Audit Statement and Report 0503-1611-R Part Lot 1 in DP 1048263 Former Defence National Storage and Distribution Centre (DNSDC) Moorebank Avenue, Moorebank, NSW, 12 October 2016.

Since the completion of JBS&G (2016a) the following reports have been completed:

- Site Audit Report and Statement 0503-1907 Former Defence National Storage and Distribution Centre (DNSDC) – Licensed Area Moorebank Avenue, Moorebank NSW, JBS&G Australia Pty Ltd, 30 October 2018 (JBS&G 2018).
- Site Audit Report Northwest Limited Works Stage Moorebank Precinct East, Sydney Intermodal 400 Moorebank Avenue, Moorebank, Enviroview Pty Ltd, May 2019 (Enviroview 2019).
 - Site Audit Statement 0301-1613-1R Northwest Limited Works Stage Moorebank Precinct East, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2019).
- Site Audit Report IMEX Terminal Moorebank Precinct East, Sydney Intermodal 400 Moorebank Avenue, Moorebank, Enviroview Pty Ltd, August 2019 (Enviroview 2019a).
 - Site Audit Statement 0301-1613-2 IMEX Terminal Moorebank Precinct East, Sydney Intermodal, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2019a).
- Proposed Lot 22 Site, Moorebank Precinct East:
 - *Site Audit Statement 0301-1613-4 Proposed Lot 22 Site, Moorebank Precinct East*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301, October 2019 (Enviroview 2019b).
- Proposed Lot 23 Site, Moorebank Precinct East:
 - *Site Audit Statement 0301-1613-6 Proposed Lot 23 Site, Moorebank Precinct East*, prepared by Mr James Davis NSW EPA Site Auditor Accreditation no. 0301 (Enviroview 2019c).

Section 4.1 below presents a discussion of the remaining contamination issues within the Site based on the historical reports listed above.

The Conceptual Site Model (**Section 5**) summaries the remaining contamination issues on the Site which will be managed under this CMP.

4.1 Remaining Contamination Issues

Part Lot 27 DP 1253673 (Proposed Lot 21 DP 1197707) (part of Former DNSDC)

GHD (2016) identified the following contamination issues required management under the CMP:

- Fragments of ACM were noted on the ground surface and shallow soils at several locations across the former DNSDC, most notably in the southern portion of the site associated the Southern Burial Pits which extend off-site to the south and adjacent to the Rail Spur. The

potential for widespread presence of ACM on the surface across this portion of the Site cannot be discounted.

A summary of each of the remaining buildings since the previous CMP (EP Risk 2019) is presented below:

- Building 049: Battery Shop Mechanical - Waste water UST located on the western side of the building.
- Building 053: Storehouse Bulk - Septic UST located on the southern side of the building.
- Buildings 050, 051, 052 and 054 – storehouses.
- East of B53 and B54 - 21 Supply Battalion disposal area – noted to potentially have been remediated during the construction of the DNSDC. Reported to have been used to “burn, bash and bury” World War II waste material (Acardis 2016).

Butchers Knife

A portion of the Butchers Knife is located within the Site (**Figure 2, Attached Figures**).

Aecom (2016b) reported a review of previous investigations by Golder (2016b) identified a potential for future Site users to be exposed to soils impacted with lead and asbestos and to potentially negatively influence the migration of petroleum hydrocarbon-impacted groundwater identified to the north of the Site (former DNSDC refuelling facility) through uncontrolled excavation and/or groundwater extraction.

Given the former refuelling facility is not located within the Site and is being remediated/managed in accordance with GHD (2015b) and the proposed development within the Butchers Knife portion of the Site will not include uncontrolled excavation and/or groundwater extraction, the remaining contaminants of concern which require management during construction, in accordance with this CMP, are associated with the soils and comprise lead, asbestos and unexpected finds of UXO, EOW and EO from burial/waste sites.

- Lead in the vicinity of the Railway Spur (**Figure 1, Attached Figures**);
- Unexpected finds of bonded asbestos within surface and/or fill materials; and
- Unexpected finds of UXO, EOW and EO within surface and/or fill materials.

As mentioned in **Section 1.1** a PFAS in groundwater assessment was provided for the MPE Project Site (EP Risk 2019a) which in addition to the AECOM (2016) SAS, did not identify PFAS as a CoPC. Stormwater should be managed in accordance with the PFAS Stormwater Management Strategy (EP Risk 2019b) and applicable EPL.

After the completion of the previous CMP (EP Risk 2019) the former AOCs TP062, TP056 and BH107 have been remediated, validated and signed off as suitable for commercial / industrial land use under the Proposed Lot 23 SAS (Enviroview 2020).

Summary

Overall, based on the review of the recent Site Audits the following potential contamination may be encountered and require management:

- Lead along the railway spur.
- ACM in shallow fill and extending off-site to the south.
- Potential risk of UXO or EOW relating to the southern burial pits in the southern portion of the Site.
- Waste water and septic USTs.
- Unexpected finds of bonded asbestos within surface and/or fill materials; and
- Unexpected finds of UXO, EOW and EO within surface and/or fill materials.

JBS&G (2016a) noted relatively limited sampling had been conducted beneath the remaining buildings, but the soil data from the audited area as a whole did not indicate any additional contamination issues were likely to be present. Should existing building slabs / pavements be removed, then the requirements in the CMP relating to the management of asbestos / lead / UXO / EOW, or any other forms of contamination as directed by the unexpected finds protocol, should be adhered to.

4.2 Southern Burial Pits - UXO

As reported in G-tek (2018a) the Milsearch (2002) report indicated scattered inert remnants from functioned 36M hand grenades were present within the southern burial pits. As a result of the Milsearch (2002) report, Defence contracted G-tek (2003a¹⁷ and 2003b¹⁸) to conduct remediation of the south-east portion of the DNSDC to remove any potential material the size of a 36M hand grenade. This remediation was conducted through electromagnetic digital imaging of the Site, data processing and interpretation and intrusive investigation of interpreted anomalies. G-tek (2018a) reported the Southern burial pits were remediated for potential UXO, EOW and EO in 2003 and no additional UXO, EO or EOW Site Assessment Surveys are required within the southern burial pits prior to any demolition, entry or subsurface activities within the area

Subsequent G-tek (2003 and 2018a) investigations revealed a training Hand Grenade Range was established south of the former DNSDC during World War Two (WWII). It would appear this area was the source of the EOW contaminated soil rather than Anzac Rifle Range. The former Hand Grenade Range area has also been remediated for UXO by Defence.

Based on the above assessments and reviews G-tek (2018a and 2018b) concluded the MPE Site, including the southern burial pits, were designated as 'low risk' UXO sites because of past assessment and remediation activities and a lack any UXO finds evidence.

¹⁷ Post Activity Report Hazard Reduction Precinct H, Moorebank Defence Land Moorebank NSW, G-tek Australia Pty Ltd, October 2003 (G-tek 2003a).

¹⁸ Post Activity Report Hazard Reduction Precinct I, Moorebank Defence Land Moorebank NSW, G-tek Australia Pty Ltd, October 2003 (G-tek 2003b).

With the risk categorisation as 'low', intrusive works and redevelopment can take place with the following controls implemented:

- UXO awareness induction to be provided to all on-site personnel.
- Appropriate 'Unexpected Finds Protocol' to be implemented (**Appendix B**).
- UXO potential noted in any intrusive works contractors Safe Work Method Statements (SWMS)/Job Safety Analysis (JSA) or similar safety document.
- An UXO contractor member of the Department of Defence Environment and Heritage Panel 2014 – 19 (DEHP) will be appointed to the project team to provide support and callout response as required to potential UXO "finds".

5 Conceptual Site Model

The information in this section together with the figures included in this report aid in presenting a CSM for the Site, based on a review of relevant background historical site information sourced from GHD (2016) and Golder (2016a and 2016b).

The National Environment Protection (Assessment of Site Contamination) Measure, NEPC, 1999 (as amended 2013, NEPC 2013) identifies a CSM as a representation of site related information regarding contamination sources, receptors, and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments and remediation activities.

NEPC (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.
- Any potential preferential pathways for vapour migration (if potential for vapours identified).

5.1 Sources and Contaminants of Concern

Following a review of the findings of intrusive investigations and in which AOCs were investigated and assessed, the remaining AOCs and COPCs have been identified in **Table 4** and presented in **Figure 1 (Attached Figures)**.

Table 4 – Areas of Identified Environmental Concern and Associated Contaminants of Concern	
AOC	Contaminants of Potential Concern (COPC)
Part Lot 27 DP 1253673 (Proposed Lot 21 DP 1197707) areas where filling may have occurred. Under building slabs	As per GHD (2016) Unexpected Finds TPH PAHs OCPs/OPPs PCBs Asbestos Metals
Railway spur into Butchers Knife– Figures 1 and 2 (Attached Figures)	As per GHD (2016) Lead Bonded ACM
Southern burial pits into Butchers Knife - Figure 1 and 2 (Attached Figures)	As per GHD (2016) Unexpected finds TPH PAHs OCPs/OPPs PCBs Asbestos Metals
USTs (B49) – Figure 1 (Attached Figures) and Section 3.2	As per GHD (2016) TPH PAHs VOCs Phenols Asbestos Metals

5.2 Potentially Contaminated Media

Potentially contaminated media present at the site may include:

- Fill material, including buried wastes;
- Surface soil (potential dust);
- Natural soils;
- Groundwater; and
- Stormwater/surface water.

5.3 Pathways

Potential pathways by which contamination could migrate towards an identified off-site receptor or present a potential exposure pathway to commercial/industrial site workers include:

- Direct contact.
- Inhalation of particulates.
- Solubilisation into groundwater and groundwater, potential discharge into Georges River.

5.4 Potential Receptors

The Moorebank Precinct is currently undergoing construction and approximately 6-12 buildings are tenanted, pending the approval of the Stage 2 commercial / industrial Project. The potential receptors for contamination during development are considered to include:

- Construction and maintenance workers.
- Commercial workers on the site.
- Downstream ecological receptors – Georges River.

5.5 CSM Summary

Previous investigations conducted within the Site have not identified widespread residual contamination and as such, the risk posed by contamination on the Site is considered to be low. However, this finding does not preclude the possibility of encountering unexpected and incidental contamination during the development of the Site.

6 Adopted Assessment Criteria

6.1 Soil Criteria

For the purposes of assessing the results of analytical testing of soil at the Site, the following guidelines will be considered:

- 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).
- Friebe, 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.

In accordance with the decision-making process for assessing urban redevelopment sites (Appendix A, NSW DEC, 2017), soil concentrations, where required, will be compared against the following soil investigation levels (SILs):

- **Health-based Criteria for the proposed land use:** ASC NEPM (2013) Health-based Investigation levels (HILs) for commercial/industrial land uses, the Health Screening Levels ('HSLs') for commercial/industrial land uses and the CRC Care (2011) Soil Health Screening Levels for Direct Contact and Intrusive Maintenance Worker (HSLs).
- **Environmental Criteria:** ASC NEPM (2013) Ecological Screening Levels (ESLs) and Ecological Investigation Levels (EILs) for commercial/industrial.
- **Management Limits:** ASC NEPM (2013) Management Limits for commercial/industrial land use (Management Limits).
- **Aesthetics:** The consultant should also consider the need for remediation based on the 'aesthetic' contamination as outlined in Schedule B (1) of the ASC NEPM (2013) that states that *'there are no numeric Aesthetic Guidelines however site assessment requires balanced consideration of the quality, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity'*. Where required, soil odour and discolouration may need to be assessed.

6.2 Ground and Surface Water Criteria

Where required, for the purposes of assessing any results of analytical testing of surface water and/or groundwater at the Site, the following guidelines will be considered:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines (ANZG 2018);
 - o ANZG 2018 is the current revision of the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management

Council of Australia and New Zealand (ARMCANZ) guidelines, presented as an online platform.

- Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination, NSW DEC, March 2007 (DEC 2007);
- National Health and Medical Research Council (NHMRC) Guidelines for Managing Risk in Recreational Waters, 2008 (GMRRW 2008);
- National Environment Protection Council (NEPC) 2013, National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), Canberra (ASC NEPM, 2013);
- NSW DEC (2017) Guidelines for the NSW Site Auditor Scheme (Third Edition); and
- Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan Version 2.0*, January 2020 (HEPA 2020).

The NEPM (2013) Groundwater Investigation Levels (GILs) for freshwater aquatic ecosystems are adopted as one component of the surface water and/or groundwater investigation criteria for the Site. It is noted that the NEPM GILs apply to typical slightly to moderately disturbed systems and have been adopted from the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000), National Water Quality Management Strategy, Australian Water Quality Guidelines for the Protection of Aquatic Ecosystems (ANZECC/ARMCANZ, 2000), which has recently been revised as ANZG (2018).

It is noted where any stormwater has accumulated during construction of the Moorebank Precinct Environmental Protection Licence (EPL, 21054) requirements and discharge criteria will be followed.

The Site is located in an urban environment with reticulated potable water supply and the current and future land use is commercial / industrial. Based on the evaluation undertaken, drinking water is not considered to be a relevant current or future environmental value at the Site.

Where required, to evaluate the potential risk posed from vapour intrusion (VI) from groundwater, analytical results would need to be compared to the NEPM (2013) HSLs for VI from groundwater. The NEPM HSLs have generally adopted the CRC Care HSLs for evaluation of VI risk posed from groundwater with some minor deviations. Based on the intended ongoing land use of the site being commercial/industrial, the analytical results will be compared to the clay HSL D criteria for VI.

The NEPM groundwater HSLs have been drafted as a screening tool to determine whether further investigation is necessary. This means should the identified concentrations be below the adopted HSLs then no further investigation is required. However, should the identified concentrations be above the HSLs it is noted this is a trigger value requiring further detailed assessment.

Where no criterion is available, the background levels (if known) or the laboratory limit of reporting can be adopted as the water criteria.

7 Remediation and Validation of Known Areas of Contamination

The following AOCs may present unexpected finds which require excavation, waste disposal and validation (**Figures 1 and 2, Attached Figures**).

- Lead potentially extending along the railway spur into the Butchers Knife.
- Asbestos associated with the Southern Burial Pits which extend into the Butchers Knife.

7.1 Management Strategy

Objective

The objective of these management activities will be to ensure the Site is suitable for the proposed land use.

Regulatory Requirements

Environment Planning and Assessment Act 1979 / SEPP55

The nature of management works is relatively straightforward, and it is considered most appropriate that development applications for remediation works are included with development application documentation for the associated earthworks as ancillary to other development.

Protection of the Environment Operations Act 1997 (POEO Act)

The proposed management/validation activities are not required to be licensed under the Protection of the *Environment Operation Act* 1997. None of the individual work stages are found to be greater than 3 hectares in area nor is there greater than 30,000 m³ of soils to be remediated, and hence do not trigger the licensing requirements.

Chapter 5, Part 5.6 Division 3, Section 144AAA Unlawful disposal of asbestos waste stipulates a person disposing of asbestos waste off the site at which it is generated must do so at a place that can lawfully receive the waste. Additionally, Section 144AAB states a person must not or permit asbestos waste in any form to be re-used or recycled.

Water Management Act 2000

A dewatering and re-injection approval is unlikely to be required from the NSW Office of Water (NOW) for any proposed management works. If dewatering is required as part of the works approval, the appropriate approvals will need to be obtained prior to undertaking any works.

Protection of the Environment Operations (Waste) Regulation 2014

The Regulation provides requirements relating to non-licensed waste activities and waste transporting. The proposed works on the Site are unlikely to be required to be licensed.

Part 7 Section 78 of the Regulation stipulates special transportation, re-use or recycling requirements relating to asbestos waste and must be complied with regardless of whether the activity is licensed.

Part 7 Section 79 of the Regulation stipulates reporting on transportation of asbestos waste solely in NSW and applies to the transportation of asbestos waste as defined in Schedule 1 Part 3 of the POEO Act.

Additionally, Section 79 stipulates the transporter of a load of asbestos waste must ensure that the occupier of any premises to which the transporter causes the load to be delivered is given the following information (in the prescribed form and manner) no later than on delivery:

- The unique consignment code issued by the NSW EPA in relation to that load.
- Any other information specified in the Asbestos and Waste Tyres Guidelines issued by the NSW EPA.

Section 80 of the Regulation relates to the disposal of asbestos waste and indicates the following:

- A person disposing of asbestos waste off the site at which it is generated must do so at a landfill site that can lawfully receive the waste.
- When a person delivers asbestos waste to a landfill site, the person must inform the occupier of the landfill site that the waste contains asbestos.
- When a person unloads or disposes of asbestos waste at a landfill site, the person must prevent:
 - any dust being generated from the waste; and
 - any dust in the waste from being stirred up.

Provision is provided in the Regulation and recent EPA (2014) guidelines for the NSW EPA to approve the immobilisation of contaminants in waste (if required with unexpected finds).

Waste Classification Guidelines (EPA 2014)

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline. Where wastes require immobilisation prior to off-site disposal (to reduce waste classifications) an immobilisation approval shall be sought in accordance with Part 2 of this guideline. Immobilisations are only anticipated to be required with unexpected finds. Additionally, materials may be characterised under one the general resource recovery exemptions made under the Protection of the Environment Operations (Waste) Regulation 2014.

Asbestos Removal Regulations and Code of Practice

The removal and disposal of asbestos will be managed in accordance with the Work Health and Safety Act (2011) and Work Health and Safety Regulation (2017).

Excavation and removal of friable asbestos contaminated soils are required to be conducted by a Class A licensed contractor. Excavation, onsite remediation and offsite removal of bonded ACM contaminated soils are required to be conducted by at least a Class B licensed contractor.

Before starting any asbestos removal works, the appointed contractor is required to obtain a site-specific permit approving the asbestos removal works from SafeWork NSW. A permit will not be granted without a current licence and the permit application must be made at least seven days before the work is due to commence.

Extent of Remediation and Management Required

The areas remaining are only inferred to be potentially contaminated and should be managed in accordance with the Unexpected Finds Procedure **Section 11**.

Preferred Management Strategy

The preferred management strategy for the areas of contamination is excavation and offsite disposal of any identified lead and/or asbestos contaminated materials.

7.2 Management Plan

Approvals Licenses and notifications

Excavation, remediation and offsite removal of bonded ACM contaminated soils are required to be conducted by a contractor holding at least a Class B licence. If fibrous asbestos is detected a Class A license may be required. However, at this stage only bonded asbestos has been identified.

Before starting the works, the appointed contractor is required to obtain a site-specific permit approving the asbestos works from SafeWork NSW. A permit will not be granted without a current licence and the permit application must be made at least seven days before the work is due to commence.

Site Establishment

All safety and environmental controls are to be implemented as the first stage of remediation works. These controls will include, but not be limited to:

- Locate and isolate all required utilities in the proximity of the works.
- Assess need for traffic controls.
- Work area security fencing.
- Site signage and contact numbers.
- Stabilised site entry gate.
- Sediment fencing.
- Stormwater runoff sediment controls.

All environmental controls are specified the Construction Environmental Management Plan (CEMP).

Management Works

The remediation and validation works will be supervised by an appropriately qualified and experienced environmental consultant and, where required, undertaken by an appropriately licensed remediation contractor.

Air Monitoring

Where remedial works are required for the management of asbestos impacted soils, perimeter air monitoring will be conducted on each of the site boundaries. Additional downwind monitoring locations will be included in the air monitoring program as required.

Air monitoring will be conducted in accordance with **Section 10**.

Lead and Asbestos Contaminated Soils

Where lead and/or Asbestos impacted Soils are identified unexpectedly, they will be managed as follows:

- Excavation of the contaminated material to the extent indicated by the Environmental Consultant.
- The impacted area will be excavated based on any visual observations of contamination (odours and staining and/or any other signs of contamination). Materials containing the visual signs of contamination will be separated in an attempt to minimise the volume of any heavily impacted materials requiring offsite disposal.
- Disposal of the material to an appropriately licensed waste facility:
 - Prior to off-site disposal excavated contaminated materials may be stockpiled within a stockpiling area/s and managed in accordance with **Sections 11.8 and 0**; or
 - excavated contaminated materials may be loaded directly onto trucks and disposed at a licensed waste facility in accordance with requirements detailed in **Section 11.8**.

Validation

Excavations are to be validated as per **Sections 11.2 to 11.7**. Should validation fail the failed wall/s or base of the excavation will be excavated further in the direction of the failure and the validation process repeated until validation is achieved.

Following validation of the excavation as outlined in **Sections 11.2 to 11.7**, either backfill the excavation with clean fill sourced from elsewhere on the development site or proceed with development works taking note of the remaining requirements within the CMP for unexpected finds.

Site Dis-establishment

On completion of the remediation works all plant/equipment and safety/environmental controls shall be removed from the Site.

8 Removal and Remediation of Underground Storage Tanks

There are several waste water and septic USTs remaining within the Site see **Figure 2 (Attached Figures)**. The following program will be implemented to ensure correct removal and validation of the infrastructure has occurred.

8.1 Remedial Actions

Where USTs or other underground waste tanks are identified the following remediation works shall be undertaken:

- A licensed contractor is required to remove and dispose of any residual liquid contents of the tank for off-site disposal to a licensed liquid waste facility lawfully able to accept the waste.
- Removal of the tank and associated infrastructure (dispensers, feed lines and remote fill points) for appropriate off-site destruction. The contractor must keep destruction documentation for validation purposes.
- Provision of all disposal documentation.
- Excavation and stockpiling of any surrounding impacted soils, managed in accordance with **Section 11**.
- Prior to off-site disposal the environmental consultant shall undertake sampling for waste classification purposes in accordance with *Waste Classification Guidelines Part 1: Classifying Waste* EPA 2014a and **Section 11.8**.
- Validation of the tank pit and associated infrastructure excavations and as per the sampling and analytical protocols provided in EPA 2014b¹⁹ and **Section 8.2**.
- The environmental consultant shall make an assessment based on the condition of the tank, nature and extent of any soil impacts to determine the need for groundwater validation via the installation and sampling of groundwater monitoring wells. Groundwater wells will be required if:
 - On removal it appears to contain holes; and/or
 - On removal a sheen is observed on seepage water; and/or.
 - Natural soil samples in the base and/or walls of the tank pit are impacted above the adopted criteria (**Section 6**).

¹⁹ *Technical Note: Investigation of Service Station Site*, NSW Environment Protection Authority, April 2014 (EPA 2014b)

8.2 Validation Sampling and Analysis Plan

State the Problem

Validation required of a former UST and associated infrastructure.

Identify the Decision

To assess whether the remediation works undertaken were sufficient to remediate any impacted soil for the intended land use, decisions to be address as per **Section 11.2**.

Identify Inputs into the Decision

The inputs required to make the decision include the following:

- Site inspection observations.
- Available geological and hydrogeological information.
- Visual observations of staining as well as field screening of soils with a photoionisation detector ('PID').
- Concentrations of the COPC from validation soil samples assessed against the adopted human health and environmental criteria.

Define the Boundaries of the Study

The immediate vicinity of any known or unknown (unexpected) USTs.

Develop a Decision Rule to Identify the Decision

The decision rules to identify the decision as per **Section 11.5**.

The assessment criteria for the contaminants of concern are presented in **Section 6**.

Specify Acceptable Limits of Decision Errors

Limits of decision errors as per **Section 11.6**.

Optimise the Design for Obtaining Data

Minimum sampling and analysis requirements as per EPA 2014b and **Table 5**.

Table 5 – Minimum Recommended Soil Sampling

Area of concern (location)	Indicative no. of samples/locations	Action
1. Underground storage tank (UST)	Minimum two samples per tank with samples taken from each tank wall and floor	Collect samples if tank is to remain in place or during excavation and tank removal. Samples to be taken at or below the base of the tanks.
2. UST pit natural soils and backfill sands	Two samples (though may not be necessary if backfill sands are found to be unaffected)	Samples between 0–200 mm into surrounding soil. Recommended to be at or below the base of the tank.
3. UST pit water	One sample	Sample if there is water present and backfill sands or natural soils appear contaminated.
4. Dispensers	One sample per dispenser backfill and one per natural soil (if needed)	Sample area adjacent to line and dispenser junction, taking representative sample of backfill during excavation and removal of the dispenser. If contamination apparent, sample 0–200 mm into natural soils.
5. Fuel feed lines to dispensers	One sample every 5 m of line	Take representative sample of backfill sands and, if it appears contaminated, sample 0–200 mm into natural soils. Additional attention will be given to changes of line direction and the depth of burial of the line.
6. Remote fill points	One sample per fill point	Representative sample from backfill sands and, if it appears contaminated, sample 0–200 mm into natural soils.
7. Above-ground fuel storage (drum/tank)	One sample per 25 m ²	Collect samples in areas of spills, otherwise collect samples below storage area at depth intervals of 0–200 mm and 200–500 mm.
8. Below-ground waste oil/wastewater tank	Two samples per tank	Collect samples if tank is to remain in place or collect samples during excavation and tank removal.
9. Spent battery storage	One sample per 25 m ²	Take representative auger samples in the 0–200 mm layer.
10. Waste disposal areas (including wastewater disposal on site)	One sample per 25 m ²	Collect samples at the site of contamination or within the disposal area in the 0–200 mm layer.
11. Fill materials of unknown origin	Adopt sampling density in accordance with Section 6 and 7 of Schedule B2 of the ASC NEPM	Collect representative auger/ borehole samples from surface to natural ground level.
12. Workshop (current or historical – may include smash repair activities, i.e. blasting grits)	Dependent on CSM and site observations	Collect samples at the site of contamination at depth intervals of 0–200 mm and 200–500 mm. Where pits or hoists are present, sampling will extend below the base of the structure.
13. Carwash	Dependent on CSM and site observations	Take representative samples in the 0–200 mm layer.

A systematic based sampling pattern will be collected for the validation works. A suite of COPC will be selected based on the historical use of the UST to provide characterisation of the status of soil, surface water and groundwater contamination (if any). The adopted sampling approach will be consistent with NEPM (2013) and AS4482.1 (2005).

General soil and groundwater sampling methodology as per **Section 11.7**.

9 UXO, EO and EOW Management and Remediation Plan

As provided in G-tek (2018a²⁰) G-tek Australia Pty Limited (G-tek) has reviewed previous reports and activities relating to intrusive works within the Moorebank Precinct East (MPE) with particular emphasis on the potential for remnant UXO, EO and EOW within the overall Site and the area referred to as the “southern burial pits” (**Figure 1, Attached Figures**). G-tek (2018a) concluded as a result of this review the overall MPE Site was found to be free of UXO risk.

The above conclusion was based on the results of a Site Assessment Survey conducted by Milsearch (2002) as reported in G-tek (2018a) and additional Site Assessment Surveys conducted within the Southern Burial Pit (G-tek 2003a and 2003b) reported in G-Tek (2018a). G-Tek (2018a) reviewed these historical reports and as a result of the review found overall the MPE was found to be free of UXO risk. Based on this, it was considered the requirements of CoC B133 were met and no further UXO, EO or EOW Site Assessment Surveys are required within the MPE Site prior to any demolition, entry or subsurface activities.

The UXO, EO and EOW Management and Remediation Plan is provided within the report (G-tek 2018b²¹).

Additionally, as per Condition of consent B136, following demolition of the existing buildings (**Figure 1, Attached Figures**), a supplementary UXO, EO and EOW Site Assessment Survey is to be undertaken by a qualified contractor listed on the Defence Environment and Heritage Panel (DEHP) as a D2. D2 companies can undertake UXO related materials assessment and management.

The Site Assessment Survey will be conducted underneath the buildings in accordance with similar methodologies conducted during previous historical assessments (G-tek 2003).

Should any contamination issues be identified the CMP will be updated to the satisfaction of the Secretary. Where remediation works are required, they will only be carried out by a suitably qualified and experienced contractor(s) contractor listed on the Defence Environment and Heritage Panel (DEHP) as a F2. F2 companies can undertake UXO remediation works.

²⁰ CoA B133 – Moorebank Precinct East – Tactical, G-tek Australia Pty Limited, 9 February 2018 (Gtek 2018a).

²¹ *Unexploded Ordnance (UXO) Management Plan for Moorebank Precinct East Stage 2 Development Site*, G-tek Australia Pty limited, 15 February 2018 (G-tek 2018b).

10 Asbestos Management Plan (AMP)

An Asbestos Management Plan (AMP) is required to ensure if asbestos containing materials (ACM) or asbestos impacted soils are encountered at the Site during the redevelopment, it is appropriately managed to ensure protection of human health of site workers, future site workers and the neighbouring community. This AMP also outlines the requirements for managing any potentially asbestos impacted fill materials. Additionally, this plan will apply to currently known areas of bonded ACM impacts see **Figure 1 (Attached Figures)**.

10.1 Summary of Contaminant Type

Friable asbestos is defined by Safe Work Australia's Code of Practice 'How to Safely Remove Asbestos (2019)' as being "...material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contains asbestos". This includes asbestos fibre impacted soils (fibrous asbestos, FA or asbestos fines, AF) and asbestos fines as identified by laboratory analysis.

Non-friable asbestos material is defined by How to Safely Remove Asbestos (2019) as being "...material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound." This includes bonded asbestos fragments found in soils, subject to laboratory analysis for respirable fibres.

Mechanical disturbance of the fragments may result in the release of fibres and therefore, such activities will be managed to prevent any fibres becoming airborne. The primary issue associated with the asbestos contamination is inhalation of respirable fibres if the materials were to be disturbed and abraded. A secondary issue with asbestos contamination is disposal of excess spoil that may be impacted with asbestos.

10.2 Objectives

The purpose of this AMP is to outline the required procedures for handling and disposing of any identified ACM and asbestos impacted soils during the development (bulk earthworks) at the Site, to outline the measures required to protect the health and safety of workers who may encounter asbestos containing materials or asbestos impacted soils whilst completing the planned works and to prevent any adverse health effects on any future workers or neighbouring community in accordance with relevant National Codes of Practice and Work Health and Safety Legislation.

Specifically, the objectives are to:

- Outline, monitor and enforce safe working condition for all workers.
- Outline, monitor and enforce safe environmental conditions for all persons outside of the AOC.
- Outline, monitor and enforce procedures to manage works within asbestos impacted soils identified in the Site during works.
- Outline measures for the safe onsite storage and, if required, off-site disposal of asbestos materials in accordance with all relevant legal and statutory requirements.
- Outline ongoing management requirements of the Site to ensure the risk posed by any potential asbestos contamination is properly managed.

10.3 AMP Responsibilities during Redevelopment Works

Appointment of Principal Contractor

In accordance with the provisions of the Work Health and Safety Regulation 2017 prepared under the Work Health and Safety Act 2011 QUBE c/o Tactical has been appointed as the “person conducting a business or undertaking” (PCBU).

Responsibilities of the Principal Contractor

Responsibilities of the Principal Contractor include, but are not limited to the following. The Principal Contractor must:

- Be responsible for the proposed project work at all times until the work is completed.
- Ensure that all persons involved with proposed project work have undertaken occupational health and safety training if ACM is identified.
- Keep records of induction training for workers and any specific training.
- Ensure that any subcontractors provide safe work method statements for the activities for which they are engaged.
- Ensure all asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2017 and the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos, 2nd Edition.
- Monitor any subcontractors to ensure that they are complying with the safe work method statements.
- Maintain a hazardous substances register for all hazardous substances used or present on the Site.

The Principal Contractor is responsible for co-ordinating health and safety activities for the project. Other responsibilities of the Principal Contractor include:

- Compliance with occupational health and safety and environmental legislation, regulations, standards, codes and the Central Precinct specific rules relating to safety contained in this AMP.
- Ensuring that sufficient funds are available to procure the necessary health and safety equipment such as personal protective equipment (PPE).
- Managing accident and emergency procedures.
- Managing workplace injury management and rehabilitation.

The Principal Contractor has the authority to provide for the auditing of compliance with the provisions of this AMP, suspension or modification of work practices, and administration of disciplinary actions for individuals whose conduct does not meet the requirements set forth herein.

Asbestos Consultant or Competent Person

An Asbestos Consultant or Competent person, shall be engaged by the Principal Contractor or Remediation Contractor to assess any suspected asbestos containing materials when encountered during the redevelopment of the Site and prepare a management/remediation plan, if necessary.

The asbestos consultant or competent person shall also complete airborne asbestos monitoring and dust monitoring during any asbestos works. Where required, air monitoring will be conducted in accordance with **Section 10.6**.

The Asbestos Consultant shall:

- Provide a remediation or management strategy prior to works commencing.
- Provide on-site supervision of all potential asbestos works.
- Licensed Asbestos Assessor (LAA) to complete static asbestos air monitoring during any potential asbestos works and display daily results for the information of workers.
- Provide on-site advice, if required, in relation to suspected asbestos containing materials and the management of asbestos issues associated with the works.
- Be available, if required, for consultation with regards to the conditions and requirements of this AMP.

Should asbestos be encountered during the planned excavation works, additional clearance inspections and clearance asbestos air monitoring may be required to confirm the suitability of the AOC prior to works recommencing.

Class A/ B Licensed Asbestos Removal Contractor

A Class A (friable) or Class B (non-friable) licensed asbestos removal contractor shall be engaged if ACM is identified. The asbestos removal contractor will remove ACM or asbestos impacted soils from the AOC and dispose of them to a suitably licensed waste facility lawfully able to accept the waste. The licensed asbestos removal contractor will be the primary person responsible and in charge for works on site involving ACM or asbestos impacted soils.

Their responsibilities include:

- Complete a site walkover and 'emu-pick' to remove any observed ACM on the ground surface prior to any topsoil stripping works commencing.
- Completion of required SafeWork NSW permits (friable asbestos removal) or notifications (non-friable asbestos removal).
- Prepare a site-specific Asbestos Removal Control Plan (ARCP) prior to commencement of any asbestos removal works.
- Ensuring compliance with relevant legislation and the conditions of this AMP.

- Removal and disposal of asbestos containing materials or asbestos impacted soils from the site in accordance with relevant legislation. Or remediate bonded ACM impacted soils via an approved method (e.g. walking and picking or tilling etc).
- Ensure appropriate environmental and safety controls outlined in this AMP are maintained for the duration of the works.
- Assisting all site sub-contractors where required in complying with relevant legislation and the procedures outlined in this AMP.
- Completion of a final site walkover and removal of all visible asbestos containing material from the ground surface across the site.

10.4 Health and Safety Management

Safe Work Method Statements

Safe work method statements must be prepared by the Principal Contractor or by subcontractors completing significant intrusive works and also covering other aspects of the proposed project works not related to significant intrusive works, are to be prepared and approved by the Principal Contractor prior to those activities commencing.

Safe Work Method Statements must:

- Describe how work is to be carried out.
- Identify the safety risks.
- Describe the control measures that must be applied to the work.
- Describe the equipment used in the work.
- Describe any standards or codes applicable to the work.
- Training and qualifications required of persons undertaking the work.

Safe work method statements for all workers must be reviewed and approved by the Principal Contractor.

Site Access Control

The Principal Contractor shall ensure if works are to occur in an area in which ACM has been identified the construction area is securely fenced and access is controlled. Entrance to the asbestos area will be via a dedicated entry point which will contain the following features in addition to site security measures as required for a construction site as per relevant health and safety provisions:

- Readily identifiable and delineated site access / egress point. Where possible this location shall be visibly identifiable by site fencing / barricading.
- Decontamination unit for all workers to remove PPE and dispose of contaminated articles and will also include a hand wash and boot wash facility. The decontamination unit will be located in close proximity of the designated site access / egress point.

- Signage including “No Entry Without Required PPE” and a contact number for members of the public to direct any queries / complaints.
- Emergency contact details.

The overall construction site boundary will be secured by fencing. It is anticipated if areas of ACM are identified then localised active construction site access points maybe delineated within the overall site boundaries. Access to the construction site will be controlled and permitted by the Principal Contractor only after persons entering the area have been advised of the potential contamination hazards. This shall at least include notification of the potential presence of asbestos containing materials and asbestos impacted soils.

If ACM is identified then any authorised person accessing the site will do so in accordance with health and safety requirements as indicated in this AMP. The implementation of the health, safety and environmental requirements will be administered by the Principal Contractor.

Site access will not be allowed until the workers have been inducted, have signed in, and if entering the asbestos area must have donned the required PPE (below). Upon exiting the area, personnel must remove and dispose of/clean the PPE in the provided decontamination area.

Asbestos removal boundaries (if required) shall be determined by the Principal Contractor in consultation with the asbestos consultant and will vary according to the location and size of the required daily activities. Any asbestos removal boundaries will be designed to allow other site works not involving significant intrusive works to continue without being required to adhere to this AMP.

It may be found that the asbestos removal boundaries require to be assigned to the Site boundaries, in which case all site workers must adhere to the requirements of this AMP.

Training and Certification

The Principal Contractor must not allow any person to carry out project works unless he/she are satisfied that the person has undergone OHS induction training.

The OHS induction training required by the Regulation is as follows:

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

For each person carrying out project works, for a period of three years, the Principal Contractor must keep a record of the following:

- A copy of relevant statements of OHS induction training, or a statement indicating 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.

Site Safety Induction

If ACM is identified it is the responsibility of the Principal Contractor to ensure all persons carrying out construction work on site are given site-specific occupational health and safety training. The induction shall be undertaken by the Principal Contractor. The induction shall be undertaken as per a standard presentation which will address the following topics as per the requirements of this AMP:

- Identification of any site specific hazards and risk control measures in relation to the asbestos impacted nature of the site.
- Regulatory requirements or codes of practice relevant to identified site specific hazards as restricted to asbestos impact.
- Directions on what to do if suspected asbestos containing materials or asbestos impacted soils are encountered.
- Site orientation at least including location of asbestos decontamination areas at site access / egress points.
- Site specific safety rules in relation to asbestos.

The Principal Contractor is responsible for establishing site specific safety rules. The rules must be displayed in an easily observable location (nominally in the site office) so as to ensure all site workers, have ready access.

At the completion of the induction presentation, each worker shall be required to acknowledge that they have understood the requirements for the site works and health, safety and environmental obligations by completion of a site induction form.

Personal Protective Equipment (PPE) Requirements

Prior to any asbestos containing materials or asbestos impacted soils being encountered, no additional PPE is required above the standard construction site PPE outlined by the Principal Contractor for the site. Should suspected ACM be identified then the supervising asbestos consultant will be contacted, the following additional items of PPE are required in addition to the standard construction site PPE outlined by the Principal Contractor for the Site, and applies for any ground workers within the asbestos work area, as defined by the supervising asbestos consultant:

- Disposable 'type 5, category 3 (EN ISO 13982–1) rated or better' coverall suits must be worn.
- Disposable gloves – non disposable gloves must be cleaned within the decontamination unit in accordance with Safe Work Australia (2018).
- P2 class respirator or higher – non disposable respirators must be cleaned in the decontamination unit in accordance with How to Safely Remove Asbestos (2019).
- Laceless steel capped rubber soled work shoes or gumboots.

Plant operators must close cabin doors and windows and set air conditioning to re-circulate when operating within the asbestos work area.

Management of Subcontractors

If ACM is identified then workers on-site will be required to adopt the provisions of this AMP and will be advised of potential safety and environmental issues on site during site-specific induction training. This induction will include the occupational health and safety responsibilities, requirements and controls for all workers on site. All workers activities involved in asbestos works will be monitored by the Principal Contractor, the licensed Asbestos Removal Contractor and the Asbestos Consultant to ensure compliance with the requirements of this AMP.

Workers whose work will be performed on-site, or who otherwise could be exposed to health and safety hazards, will be advised of known hazards through distribution of site information contained in this AMP.

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

- Providing their own personal protective equipment as required by the Principal.
- Conditions set out in this AMP.
- Training their employees in accordance with applicable laws.
- Providing medical surveillance and obtaining medical approvals for their employees, as appropriate.
- Ensuring their employees are advised of and meet the minimum requirements of this AMP and any other additional measures required by their site activities.
- Designating their own site safety officer.

Workers must sign an acceptance form prior to commencing work on site. Workers may only modify, and then only to improve, the conditions specified in this AMP with approval from the Principal Contractor, or his nominee.

10.5 Environmental Management

Asbestos Works

In the event significant asbestos contamination is identified and intrusive works are to be carried out in the asbestos work area then the following management measures will apply.

Prior to any intrusive work commencing:

- Review of the information available for the site.
- Approval for the works must be sought from the Principal Contractor or their representative who will assess whether the works are necessary or if there is an alternative that will not result in exposure of ACM impacted soils. The Principal Contractor must review the job specific risk assessment (JSRA) and safe work method statements (SWMS) and ensure that workers who will undertake the works are inducted into the AMP.

- The asbestos consultant must complete supervision of the significant intrusive works and complete regular inspections for the presence of visible asbestos. Static airborne asbestos monitoring must also be completed by the asbestos consultant for the duration of significant intrusive works.
- The works area must be isolated from casual entry using temporary barriers and only personnel inducted in the requirements of the AMP will be permitted to enter the works area.
- Sufficient room must be provided within the works area to allow stockpiling of spoil from excavations, if required, in accordance with **Section 11.10**.
- A water supply must be provided to the works area for the purpose of maintaining exposed asbestos impacted fill or soil in the excavations and stockpiles in a moist state.
- Personnel entering the works area must wear appropriate PPE in accordance with the section above.
- Stockpiles of excavated spoil must be managed in accordance with **Section 11.10**.
- Air monitoring requirements must be met as outlined in **Section 10.6**.

Should visible asbestos be identified by the asbestos consultant or airborne asbestos monitoring results identify airborne asbestos fibres in the vicinity of the works area, specific requirements for working with asbestos containing materials or asbestos impacted materials shall be enforced as outlined in below.

Specific Requirements for Working with Asbestos Impacted Material

Asbestos may be present in non-friable or friable form. In the event that either friable or nonfriable asbestos is encountered, as determined by the Asbestos Consultant, the following procedures shall be implemented for the remaining significant earthworks to ensure workers safety and to mitigate any potential off site migration of contamination.

Friable and Non-Friable Asbestos

Prior to Excavation:

- Workers and visitors to the asbestos work area will be made aware of the encountered soil contamination and only authorised people shall enter the asbestos work area, which must contain a perimeter barrier separate to the site boundaries to restrict entry. Where the asbestos work area boundary is also the site perimeter boundary, an exclusion zone of at least 5 m shall be erected beyond the site perimeter boundary (if practical/possible) to restrict access to the asbestos work area.
- Asbestos removal caution signs shall be placed on the perimeter barrier (or exclusion zone barrier, whichever is furthest from the asbestos removal work area), as per AS1319.

During Excavation/Transport/Disposal

- A WorkCover permit for friable asbestos removal works or WorkCover notification for non-friable asbestos removal works shall be sought by the licensed asbestos removal contractor.

Friable asbestos removal permits must be submitted at least 7 days prior to any friable asbestos being disposed off-site.

- All wastes will be classified, managed and disposed in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014).
- Personnel within the excavation work area shall wear a Disposable 'type 5, category 3 (EN ISO 13982-1) rated or better' coverall suit, respirator (e.g. half faced P2 respirator), disposable gloves and laceless steel capped rubber soled work shoes or gumboots at all times when within the asbestos work area and until clearance certification is provided by the asbestos consultant.
- Any obvious pieces of asbestos containing materials shall be picked up and placed into a labelled asbestos waste bag and set aside in a designated waste storage area for off-site disposal.
- The excavation shall be kept damp by water spraying at all times during excavation to reduce the possibility of dust generation.
- Personal protective equipment used during the works, such as disposable coverall suits and half faced respirators, shall be disposed of as asbestos waste.
- Airborne asbestos monitoring shall be conducted for the duration of the excavation works in accordance with **Section 10.6**.
- Any stockpiled excavated material shall be kept moist, covered or appropriately stabilised if left for more than 24 hours in accordance with the Dust Management section below.
- Appropriate leak proof transport vehicles must be used to transport materials offsite.
- Transport vehicle shall be covered prior to leaving Site and any material removed from wheels to prevent tracking outside the Site.
- Any areas required imported materials for backfill must only be completed in accordance with **Section 11.9**.

Post Excavation

- Any excavation floor and walls shall be inspected by the Asbestos Consultant who is trained and experienced in the identification of asbestos. Any visible ACM shall be removed by the licensed Asbestos Removal Contractor.
- Where friable asbestos has been encountered, validation samples shall be collected from the excavation walls and base and analysed at a NATA Accredited testing laboratory for the presence of asbestos. Clearance airborne asbestos monitoring shall also be conducted by a Licensed Asbestos Assessor following the completion of the excavation and reinstatement works to be included in clearance certification. Clearance monitoring is not required if only non-friable asbestos is encountered.
- Upon receipt of both visual and laboratory data (where required) confirming the absence of asbestos, the asbestos work area shall be deemed suitable for reoccupation and a clearance letter shall be provided by the Asbestos Consultant.

Disposal and Storage of Asbestos Containing Materials

Where asbestos fragments or other forms of asbestos are identified either during redevelopment works or on the ground surface, these materials will be removed under the supervision of a licensed Asbestos Removal Contractor and in accordance with *How to Safely Remove Asbestos* (2019).

The asbestos materials will be placed into heavy-duty 200µm (minimum thickness) polythene bags that are no more than 1200 mm long and 900mm wide. The bags will be labelled as asbestos waste, sealed and placed in a designated waste area for off-site disposal.

Stockpiles will be managed in accordance with **Section 11.10**.

Dust Management

Dust levels shall be managed by ensuring:

- All stockpiles will be either periodically wetted down, covered to control dusts or otherwise appropriately stabilised.
- Water sprays will be used on the excavation areas, stockpiles and haulage pathways where necessary.
- Any haulage vehicles shall be covered and leave via the designated (stabilised) site access;
- All haulage vehicles and plant and equipment shall be washed down whenever they leave the Asbestos in Soil (ASBINS) work area.
- All access roads are sufficiently maintained to ensure no visible dust at the site boundary.
- Dust suppressors will be fitted to equipment as required.

If dust is visible at the boundary of the work area, then additional dust control measures shall be employed, which may include:

- Temporarily suspending activities until wind speeds reduce; and/or
- additional use of water sprays.

Waste Management

There shall be no wastes brought onto the Site for storage, treatment, processing, reprocessing or disposal unless permitted by a licence issued under the POEO Act.

All wastes will be classified, managed and disposed in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014).

All wastes disposed off-site will be controlled as per the EPA's requirements for waste tracking and acceptance using the WasteLocate online tracking system. Under clauses 76 and 79 of the *Protection of the Environment Operations (waste) Regulation 2014* transporters must use WasteLocate when:

- consigning, transporting or accepting more than 100 kilograms of asbestos waste, or more than 10 square metres of waste asbestos sheeting, in any single load.

10.6 Monitoring Program

In the event that significant asbestos is found a monitoring program may be needed to ensure that the control measures being implemented at the Site are effective, the following monitoring procedures will be implemented:

- Daily static airborne asbestos fibre monitoring at work area boundaries during significant asbestos works; and
- clearance monitoring (if friable asbestos is encountered only).
- Site Inspections.

Daily Static Airborne Asbestos Fibre Monitoring

During excavation works or any other works that may disturb significant asbestos in soil at the Site, airborne asbestos fibre monitoring will be undertaken by a licensed Asbestos Assessor using calibrated portable air sampling pumps. Monitoring will be conducted at 4 locations around the work area boundaries each day over the work period and targeting any neighbouring sensitive receptors and with consideration to the daily location of works.

At the end of each monitoring period the pump and attached filter will be collected and analysed at a NATA-accredited laboratory in accordance with NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition (NOHSC:3003 [2005]).

The results of air monitoring will be available on a 24-hour turnaround time basis. Daily air monitoring reports shall be displayed in a common area outside of the asbestos work area (e.g. site office or lunch shed) or be able to be produced upon request.

The following action levels will be applied upon receipt of daily results, as outlined in the How to Safely Remove Asbestos (2019):

- Reading of less than 0.01 fibres/mL – control measures in place are working effectively, site works to continue.
- Reading between 0.01 and 0.02 fibres / mL – a review of control measures shall be completed in the work area.
- Reading greater than 0.02 fibres / mL – works shall cease until the cause of contamination is identified and rectified.

It is noted that these action levels adopted are more conservative than the exposure standard for airborne asbestos (0.1 fibres/mL (TWA)) as outlined in the Adopted National Exposure Standards for Workplace Exposure Standards for Airborne Contaminants (Safe work Australia 2013) for an 8 hour shift.

Clearance Monitoring

In the event that friable asbestos is encountered during the excavation works, clearance airborne asbestos monitoring will be conducted following the friable asbestos removal. Following the completion of all earthworks, backfill of the excavated area, clearance air monitoring will take place in the vicinity of the work area to ensure that there is no residual contamination remaining at the Site. Clearance air monitoring will be achieved by recording airborne asbestos concentration levels in all sampling locations below 0.01 fibres / mL.

Site Inspections

Following the completion of any asbestos removal works, a final site walkover will be completed by the Asbestos Consultant to inspect the site ground surface for the presence of ACM. Any ACM observed will be removed and placed in asbestos waste bags in accordance with *How to Safely Remove Asbestos* (2019). Once a successful inspection has been completed and both the licensed Asbestos Removal Contractor and the Asbestos Consultant are satisfied there is no visible residual asbestos impacts on the ground surface, the area shall be deemed suitable for re-occupation and a clearance report issued by the Asbestos Consultant.

10.7 Demolition of Buildings Containing Asbestos

Prior to any proposed demolition within buildings, a destructive asbestos survey and management plan will be conducted by a competent person and / or asbestos hygienist to determine whether potential hazardous substances are located in areas that have not been assessed or were inaccessible during any previous survey.

The destructive asbestos survey must be conducted in accordance with Part 8.6 of the NSW *Work Health and Safety Regulation, 2017*, the NSW *Code of Practice: How to Manage and Control Asbestos in the Workplace, 2018*, *Code of Practice: Demolition Work, 2016* and other industry related standards and guidance notes.

It will be noted the asbestos building materials report for the Site will **not** be used for the purposes of demolition works unless accompanied by an appropriate and site-specific scope of works.

If any asbestos materials have been identified in the demolition works area and are likely to be disturbed by the works, then these materials will be required to be removed by an appropriately licensed Asbestos Removal Contractor prior to the commencement of the proposed works according to an Asbestos control plan prepared in accordance with the NSW *Code of Practice: How to Safely Remove Asbestos 2019*.

11 Unexpected Finds Protocol

The Site has previously been the subject of number of environmental investigations. Detailed site history is provided in the GHD (2014), Arcadis (2016), Golder (2016a, 2016b and 2016c). However, given the size of the Site, there is potential for the presence of unexpected finds of contamination during bulk excavation. The unexpected Finds Protocol (UFP) is summarised in **Appendix B** and is detailed in the following sections.

The objective of the UFP is to provide clear guidance on the safe and appropriate actions in the event of encountering potential chemical or ordnance contamination during development works.

Where such material is uncovered the UFP prescribes the quarantining of the relevant area of concern, allowing other works to proceed unhindered, while the area of concern is assessed and, if necessary, remediated and validated.

The AOC may be identified by the Principal Contractor, Environmental Consultant or a site worker. The AOC will be quarantined by the Principal Contractor by means of some appropriate barrier to prevent access to the area. The quarantined area/s will be communicated with workers during the daily tool box talks.

Two classes of potential contamination: chemical (including potential asbestos containing materials), presented in the following sections and ordnance, discussed in **Section 9**.

11.1 State the Problem

It is acknowledged previous investigations of the Site have been undertaken to assess COPC. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations during redevelopment. The nature of any residual hazards which may be present at the Site are generally detectable through visual or olfactory means, for example:

- Potentially asbestos containing sheeting, fragments or insulation materials (visible).
- UXO, EOW and EO (visible).
- Discoloured / odorous soils (visible and odorous).
- Drums / bottles / containers of chemicals (visible).
- Construction / demolition waste (visible).
- Ash and/or slag contaminated soils / fill materials (visible).
- Petroleum contaminated soils (staining / odorous / discolouration visible).
- Volatile organic compound contaminated soils (odorous).
- Asphalt contaminated fill (visual).
- Uncovering in-ground infrastructure (e.g. underground storage tanks, USTs).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances be identified (or any other unexpected potentially

hazardous substance), the procedure summarised in **Appendix B** and detailed in the following sections is to be followed.

An enlarged version of the unexpected finds protocol, suitable for use at the Site, will be posted in the site Office and referred to during the Site Specific Induction by the Principal Contractor.

If the Principal Contractor considers material to be potential chemical contamination the area will be quarantined and a suitably qualified Environmental Consultant will be contacted. The Environmental Consultant will be responsible for assessing the findings, taking samples to characterise and delineate the extent of the potential contamination and defining appropriate remedial actions, if required, in accordance with **Section 11.1 to 11.7**.

Suspected asbestos containing materials will be assessed in accordance with **Section 11.1 to 11.7** and managed in accordance with relevant WorkCover requirements and the asbestos management plan (AMP) detailed in **Section 10**.

Suspected UXO, EOW or EO will be managed and remediated in accordance with G-Tek (2018b).

Where contamination is identified within any AOC an Investigation Report and Remediation Action Plan will be prepared by the Environmental Consultant detailing how the impacts will be managed, validated and reported.

If the area is determined by the Environmental Consultant to not be contaminated or the analyses meet the relevant site criteria (**Section 6**), the Environmental Consultant will notify the Principal Contractor that the quarantine restrictions on the area can be lifted and the works in that area may resume. The Environmental Consultant will prepare a report on the investigation and the conclusions drawn.

11.2 Identify the Decision

Based on the decision making process for assessing urban redevelopment sites detailed in DEC (2017), modified to meet the specific project objectives, the following decisions must be made during any unexpected find assessment:

- Are there any unacceptable risks to likely future onsite receptors from impacted soils during development?
- Are there any issues relating to local area background soil concentrations that exceed the appropriate soil criteria?
- Are there any impacts of chemical mixtures?
- Are there any aesthetic concerns in fill soils present at the Site?
- Is there any evidence of, or potential for, migration of contaminants off-site?
- Is the site specific risk assessment required to be updated?
- Is a site management strategy required?

11.3 Identify Inputs to the Decision

Inputs to the decisions are:

- Environmental data as collected by sampling and analysis and site observations made during this investigation.
- Assessment criteria to be achieved on the site as based on the intended land use and project objectives, as defined by assessment criteria nominated in **Section 6**.
- Final site surface survey.
- Confirmation that data generated by sampling and analysis are of an acceptable quality to allow reliable comparison to assessment criteria as undertaken by assessment of quality assurance / quality control (QA/QC) as per the data quality indicators (DQIs) established in **Section 11.6**.

11.4 Define the Study Boundaries

Each AOC identified and investigated and where required, remediated, will be surveyed to provide accurate boundaries. The vertical extent of any investigation will be 0.3 m into natural soils. Data will be representative of the timing and duration of each investigation.

11.5 Develop a Decision Rule

Laboratory analytical data will be assessed against NSW EPA endorsed criteria as identified in **Section 6**. The decision rules adopted to answer the decisions identified in **Section 11.2** are summarised in **Table 6**.

Table 6 – Summary of Decision Rules	
Site	Area and Aspect
1. Are there any unacceptable risks to likely future onsite receptors from impacted soils during development?	The nature and extent of soil impacts will be assessed, and soil analytical data will be compared against EPA endorsed criteria (health and ecological). Statistical analyses of the data in accordance with relevant guidance documents will be undertaken, if appropriate, to facilitate the decisions. The following statistical criteria will be adopted with respect to soils: Either: the reported concentrations are all below the site criteria; Or: the average site concentration for each analyte must be below the adopted site criterion; no single analyte concentration exceeds 250% of the adopted site criterion; and the standard deviation of the results must be less than 50% of the site criteria. And: the 95% upper confidence limit (UCL) of the average concentration for each analyte must be below the adopted site criterion. If the statistical criteria stated above are satisfied, and an assessment of risk indicates no unacceptable risks, the decision is No. Otherwise, the decision is Yes.
2. Are there any issues relating to the local area background	If the 95% UCL of natural soils exceeded calculated background concentrations (NEPC 2013), the decision is Yes.

Table 6 – Summary of Decision Rules	
Site	Area and Aspect
soil concentrations that exceed relevant investigation criteria?	Otherwise the decision is No.
3. Are there any chemical mixtures	Are there more than one group of contaminants present which increase the risk of harm? If there is, the decision is Yes. Otherwise, the decision is No.
4. Are there any aesthetics issues in fill soils at the site?	If there are any unacceptable odours, anthropogenic materials or staining the answer to the decision is Yes. Otherwise, the answer to the decision is No.
5. Is there any evidence of, or potential for, migration of contaminants off-site?	Are contaminants present within natural soils at concentrations exceeding EPA endorsed criteria? If yes, the answer to the decision is Yes. Otherwise, the answer to the decision is No. And If groundwater analytical results exceed the NEPC 2013 criteria and the downgradient groundwater impacted, the decision is yes. Otherwise, the decision is No.
6. Is a site specific risk assessment required?	If the 95%UCLs of the COPC are detected above the adopted Site criteria, a Site Specific Risk Assessment may be required.
7. Is a site management strategy required?	Is the answer to any of the above decisions Yes? If yes, a site management strategy will be required to be developed. If no, a site management strategy is not required.

11.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013) and appropriate indicators of data quality (DQIs used to assess QA/QC).

To assess the usability of the data prior to making decisions, the data will be assessed against predetermined DQIs for completeness, comparability, representativeness, precision and accuracy. The acceptable limit on decision error is 95% compliance with DQIs.

The pre-determined DQIs established for the project are discussed below in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters), and are shown in **Table 7**.

- Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- Accuracy - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical

results of laboratory control samples, laboratory spikes and analyses against reference standards.

- Representativeness –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- Comparability - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- Completeness – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.

If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

Table 7 – DQO, Requirements and Indicators		
DQO	Requirement	DQI
Precision		
Standard operating procedures appropriate and complied with	The sampling methods comply with industry standards and guidelines	Meet requirement
Intra-laboratory duplicates	1 per 20 samples	RPDs < 50%
Inter-laboratory duplicates	1 per 20 samples	RPDs < 50%
Laboratory duplicates	Minimum of 1 per batch per analyte	RPDs < 50%
Accuracy		
Laboratory matrix spikes	1 per batch per volatile/semi-volatile analyte	Recoveries 50% to 150%
Laboratory surrogate spikes	1 per volatile/semi-volatile analyte sample (as appropriate)	Recoveries 70% to 130%
Laboratory control/method blank samples	At least 1 per batch per analyte tested for	Result < laboratory reporting limit
Trip blanks	1 per lab batch for volatile analytes	Result < laboratory reporting limit
Trip spikes	1 per lab batch for volatile analytes	Recoveries 60-100%
Representativeness		
Sampling methodology - preservation	Appropriate for the sample type and analytes	Meet requirement
Samples extracted and analysed within holding times	Specific to each analyte	Meet requirement

Table 7 – DQO, Requirements and Indicators		
DQO	Requirement	DQI
Field equipment calibration	All field equipment calibrated and calibration records provided.	Meet requirement
Comparability		
Sampling approach	Consistent for each sample	Meet requirement
Analysis methodology	Consistent methodology for each sample	Meet requirement
Handling conditions and sampler	Consistent for each sample	Meet requirement
Field observations and analytical	Field observations to support analytical results	Meet requirement
Consistent laboratory reporting limit	Consistent between primary and secondary laboratories	Meet requirement
Completeness		
Sampling staff	Consistent sampling staff used.	Meet requirement
Laboratory accreditation	NATA Accredited laboratory for methods used	Meet requirement
Accredited methods	NATA accredited methods used appropriate for each analyte.	Meet requirement
ASC NEPM (2013) lab methods	Lab methods consistent with the ASC NEPM (2013).	Meet requirement
Laboratory reporting limit	Laboratory reporting limit consistent and appropriate	Meet requirement
Consistent weather / field conditions	Consistent	Meet requirement
Chain of custody documentation	Appropriately completed	Meet requirement
Field sampling documentation	Appropriately completed	Meet requirement

11.7 Optimise the Design for Obtaining Data

Various strategies for developing a statistically based sampling plan are identified in EPA (1995), including judgemental, random, systematic and stratified sampling patterns. Random sampling is not appropriate. Based on the history of the site a systematic sampling program is considered the most appropriate for any unexpected finds. Sampling locations will initially be placed systematically across the AOC.

Soil Sampling Methodology

Each sample collected as part of the assessment will be examined for signs of contamination and screened with a calibrated PID to identify the presence of VOCs, which might indicate contamination.

Soil samples will be collected directly from the excavator bucket and/or walls of the excavation surface using a dedicated pair of nitrile gloves for each sample to prevent cross contamination.

Test pitting will be undertaken by the Environmental Consultant, with the use of an excavator or backhoe, on an appropriately spaced grid (*in situ* materials and stockpile footprints) or 1 sample per

25 m³ if potential impacts are identified within a stockpile. Test pits will be extended through fill material or the stockpile to a maximum depth of 0.3 m into natural, whichever is the shallower.

Soil samples will be collected at 0-0.15 m, 0.3 m, 0.5 m and every 0.5 m interval to a maximum depth of 0.3 m into natural materials (or prior refusal). Should physical evidence of gross contamination be identified during the works, sampling locations may be extended to vertically delineate contamination. During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indicators of contamination will be noted.

Samples will be placed into laboratory prepared glass sampling jars with lined screw-on caps. Sample identification details will be added to the label on each jar.

The sample jar will be preserved on ice immediately after sampling and during shipment to National Association of Testing Authorities Australia (NATA) accredited laboratories. The laboratory chain of custody documentation will be completed and accompany the samples during shipment.

Potential ACM Areas

Where potential ACM has been identified an additional 10 L sample will be collected from each 1 m interval for asbestos quantification, as detailed below:

- Environmental Consultant trained and experienced in the identification of ACM.
- If ACM is identified within stockpiled material, the AQ sample will be collected at a rate of 1/70 m³ (as per guidance provided in NEPM 2013).
- If ACM is identified within in-situ fill material, the AQ samples will be collected on an appropriately spaced grid across the area.
- Test pit locations will be flagged for subsequent remedial works.
- ACM in stockpiled fill material will be quantified by the methods advised in NEPM 2013 and WA DoH 2021²². At each sample location, recovered fill material (10 L) will be spread and raked. All ACM will be recovered and bagged. The volume of fill material within the test pit will be calculated and logged.
- One 500 mL soil sample will be collected from within the 10 L AQ sample and submitted for laboratory analysis to assess for the presence of FA/AF and free asbestos (respirable) fibres.
- ACM collected and bagged from each test pit will be weighed in-house using an externally calibrated scale with an accuracy of 1 g.
- Should any asbestos be observed during field works, these areas will be noted for later excavation for off-site disposal and validation. No allowance is made for management of such material during assessment works.

²² Western Australia Department of Health (WA DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, May 2021 (WA DoH 2021)

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination (e.g. ACM, staining, odours) will be noted. Photographs of site layout and features will be taken.

Decontamination

Prior to the commencement of sampling activities, any non-disposable sampling equipment, including sampling trowel/knife will be cleaned with a water/detergent spray, rinsed with water and then air dried. The equipment will then be inspected to ensure that no soil, oil, debris or other contaminants were apparent on the equipment prior to the commencement of works. Sampling equipment will be subsequently decontaminated using the above process between each sampling location.

Duplicate and Triplicate Sample Preparation

Field soil duplicate and triplicate samples will be obtained during the field works. The collected samples will be divided laterally into three samples with minimal disturbance to reduce the potential for loss of volatiles and placed in three clean glass jars and sample bags as appropriate. Each sample will then be labelled with a primary, duplicate or triplicate sample identification before being placed in the same chilled esky for laboratory transport.

Laboratory Analysis

The Environmental Consultant will contract a NATA registered primary and secondary laboratory for all analyses. Laboratory analysis of samples will be conducted as summarised in **Table 8**.

Table 8 – Unexpected Finds Sampling and Analytical Program		
UF Indicator	Sampling Strategy	COPC
Discoloured / Odorous soils (visible and odorous); Drums / bottles / containers of chemicals (visible); Construction / demolition waste (visible); Ash and/or slag contaminated soils / fill materials (visible); Petroleum contaminated soils (staining / discolouration visible); or Volatile organic compound contaminated soils (odorous).	Appropriately spaced grid. Or 1 per 25 m ³ Or 1 per 5 lineal meters and 1 per 25 m ²	Heavy Metals ¹ TPH/BTEX PAHs OCP/PCBs Asbestos PFAS ²
Potentially asbestos containing sheeting, fragments or insulation materials (visible)	Appropriately spaced grid. Or 1 per 25 m ³ Or	Asbestos

Table 8 – Unexpected Finds Sampling and Analytical Program		
UF Indicator	Sampling Strategy	COPC
	1 per 5 lineal meters and 1 per 25 m ²	
Uncovering in-ground infrastructure (e.g. underground storage tanks, USTs)	As per Section 8	Heavy Metals ¹ TPH/BTEX VOCs PAHs Phenols MTBE

¹ Heavy metals analysis includes As, Ba, Cd, Cr, Cu, Pb, Ni, Hg, Ni, Zn.

² PFAS – 28 parameter suite.

Potential Groundwater Contamination

Should indicators of potential groundwater contamination be noted during any unexpected find assessment works, then the installation and sampling of groundwater wells conducted.

Indicators for potential groundwater impact can include the following:

- Concentration of contaminants in soils above the site criteria within natural soils; and / or
- odours or sheen on seepage water.

Groundwater assessment, if conducted, will consider DEC (2007) guidance, including adoption of appropriate groundwater investigation levels protective of relevant environmental values.

Remediation and Validation of Unexpected Finds

If any of the decisions in **Table 7** are 'yes', i.e. where unexpected finds are assessed as a potential human health or ecological risk to remain on the Site, a remediation/management plan will be developed and implemented.

Reporting

All unexpected finds will be documented in a report/letter prepared in general accordance with the NSW EPA *Consultants Reporting on Contaminated Land – Contaminated Land Guidelines* April 2020 (EPA 2020).

11.8 Waste Classification

Contaminated soils requiring disposal off-site shall be assessed in accordance with EPA (2014) *Waste Classification Guidelines Part 1: Classifying Waste*. No hazardous or regulated wastes would be disposed of onsite.

11.9 Imported Fill Materials

Prior to the importation of fill materials onto the Site the following will be undertaken:

- Material characterisation reports/certification showing the material being supplied is virgin excavated natural material (VENM) / excavated natural material (ENM) must be provided.
- Each truck entry will be visually checked and documented to confirm only approved materials consistent with the environmental approvals are allowed to enter the site. Only fully tarped loads are to be accepted by the gatekeeper. Environmental assurance of imported fill material will be conducted to confirm the materials comply with NSW EPA Waste Classification Guidelines and the Earthworks Specification for the Site. The frequency of assurance testing will be endorsed by the Environmental Representative/Site Auditor.
- The importation of fill will be managed by the Importation of Fill Protocol CARAS (2018²³).

11.10 Stockpile Management

Earthworks in the development phase are likely to, temporarily, generate excess material which may be stockpiled for re-use. Unless some event or observation indicates the material excavated and placed into the stockpile is potentially contaminated, no particular treatment is required other than normal dust suppression, and erosion controls in accordance with relevant CEMP requirements.

All stockpiles will be managed in accordance with the CEMP and sub-plans (SIMTA 2018a²⁴), 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 prevent collapse or sliding of the stockpiled materials.

Subject to the agreement of the relevant Consultant, it may be possible to move and stockpile impacted material. 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 Site Materials Management and Tracking Plan as part of the CEMP.

If assessment by the Environmental Consultant or the Ordnance Contractor identifies contamination, or a stockpile is observed to be contaminated, then the Environmental Consultant will assess the stockpile in accordance with Section 11 to delineate the contamination and assess the extent of remediation, if required. In the event the stockpile contains asbestos the stockpile will be covered to minimise dust and potential asbestos release.

In the event that covers are required, they shall extend beyond the perimeter 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. Contaminated or potentially contaminated materials

²³ *Moorebank Precinct East (MPE) Imported Fill Protocol (IFP)*, Construction and Remediation Advisory Services, 5 February 2018 (CARAS 2018).

²⁴ *Early Works Spoil Management Plan Moorebank Precinct East Stage 2*, Sydney Intermodal Terminal Alliances, 27 February 2018 (SIMTA 2018a).

would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas).

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 F 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, and contaminated material will be covered to prevent increased moisture from rainwater infiltration and to reduce windblown dust or odour emission.

11.11 Soil Classification and Treatment

All soils will be managed in accordance with this CMP, the CEMP, sub-plans (SIMTA 2018a) and the EPBC Act conditions of approval for 2011/6086. As part of the management of potential PFAS contamination on MPE, additional Aqueous Film Forming Foam Assessment (AFFF) has been undertaken to determine if any direct remedial and/or management actions are required (EP Risk 2018b and 2019a).

The handling, stockpiling and assessing any impacted materials from the Site will be done in a Contamination Assessment and Treatment Area (CATA), to be established. The CATA will be capable of receiving, assessing and subsequently treating impacted soils. The process undertaken at the CATA will include:

- Stockpiling for initial materials classification;
- Sorting based on initial assessments;
- Potential treatment – including but not limited to emu picking for bonded asbestos, bioremediation of hydrocarbon impacted soils and fixation or encapsulation (lead, PFAS, PAHs);
- Dispatching materials classified for offsite disposal or onsite isolation. Contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities; and
- Offsite disposals will be carried out by approved transport operators and to approved facilities.

The material processed through the CATA can be reused on the site subject to being classified as suitable to be reused onsite. Before the reuse of any material on-site, it would be validated so that the lateral and vertical extent of the contamination is defined.

Materials Tracking

A Materials Tracking Plan (MTP) will be implemented during the development works. 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 final 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; and
- Educate all operators in the requirements of the system.

12 Contamination Management Plan Periodic Review

12.1 Periodic Review

A periodic review of the CMP will be undertaken for the following:

- In accordance with the conditions of consent the CMP will be revised:
 - Where required, following the UXO/EO investigations required under condition B136.
 - Where required following any additional PFAS investigations under condition B131.
- The CMP will be reviewed and potentially revised if there are any regulatory changes relevant to the implementation of the CMP.
- The CMP will be reviewed if there is any significant change in land use or development of the Site.
- Any revisions to the CMP must be approved by the appointed NSW EPA Accredited Auditor in accordance with condition B135 (**Section 1.2**) and in accordance with the EPBC Act approval (EPBC 2011/6229).
- Where the CMP is revised, copies will be provided to all current stakeholders (Liverpool City Council, NSW Department of Planning Industry and Environment and Australian Department of the Environment and Energy), training provided and induction procedures updated where necessary.

12.2 Managing and Reporting

Incidents and Non-compliances

Incidents and non-compliances will be managed in accordance with Section 2.4 of CEMP sub-plan *Community Communication Strategy Moorebank Precinct East Stage 2* (SIMTA 2018b) and Section 2.9 and 4.4 of *Early Works Environmental Management Plan (EWEMP) Moorebank Precinct East Stage 2* (SIMTA 2018c).

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

Where contaminated soil/spoil and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal) 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 CMP, 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; and

- Where required, notify regulatory authorities.

Complaints

All complaints will be managed in accordance with the CEMP sub-plan *Community Communication Strategy Moorebank Precinct East Stage 2* (SIMTA 2018b, Section 2.5, Section 3.3.5, Section 3.3.5.3, Appendix B, Table 2, Table 3, Table 7, Table 10, Table 11 and Table 8).

Non-Compliances with statutory requirements

Non-compliances with statutory requirements will be managed in accordance with the CEMP, Section 2.4 of CEMP sub-plan *Community Communication Strategy Moorebank Precinct East Stage 2* (SIMTA 2018b) and Section 2.9 and 4.4 of *Early Works Environmental Management Plan (EWEMP) Moorebank Precinct East Stage 2* (SIMTA 2018c), and in consultation with the relevant government agencies.

Continual Improvement

Review and improvement of this CMP will be undertaken in accordance with the approved Stage 2 CEMP, Section 1.2.6 of the (EWEMP) (SIMTA 2018c) and **Section 12.1**. 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 as specified in this CMP

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

12.3 Environmental Monitoring

Environmental monitoring will generally be conducted as per the CEMP (SIMTA 2018a) Section 4. However, environmental monitoring specific to this CMP, discussed throughout the document is summarised in **Table 9** below.

Table 9 – Summary of Environmental Monitoring under the CMP

Monitoring Type	Frequency	Responsibility	Relevant Standards	Technique, Location and Installation Requirements	Sample Collection Requirements	Calibration and Maintenance Requirements	Record
Stormwater - PFAS	Prior to stormwater discharge	Environmental Consultant	In accordance with EP Risk (2019b) and Environment Protection Licence (EPL) 21054.				Letter Report
Supplementary UXO, EO and EOW Site Assessment Survey.	Per Condition of consent B136, following demolition of a building.	Qualified contractor listed on the Defence Environment and Heritage Panel (DEHP) as a D2.	The Site Assessment Survey will be conducted underneath the buildings in accordance with similar methodologies conducted during previous historical assessments (G-tek 2003).				Report
Asbestos Air Monitoring	Where remedial works are required for the management of asbestos impacted soils or during asbestos removal works.	Licensed Asbestos Assessor	Detailed in Section 10.6 . NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition (NOHSC:3003 [2005]). How to Safely Remove Asbestos (2019).				Daily Letter Report where required.
Asbestos Clearances	Where ACM are removed from buildings, infrastructure or soils.	Licensed Asbestos Assessor	Detailed in Section 10.6 and 10.7 .				Letter Report.
Validation Sampling	Where remedial works are required for the management of USTs and lead and asbestos impacted soils.	Environmental Consultant	Lead and Asbestos Impacted Soils - Detailed in Section 7, 10 and 11 . USTs – Detailed in Section 8 and 11 and Table 7 . The adopted sampling approach will be consistent with NEPM (2013) and AS4482.1 (2005).				Validation Report as per OEH 2011 and/or EPA 2014b.
Waste Classification	Where materials require disposal to an appropriately licensed waste facility.	Environmental Consultant	Must be completed in accordance with <i>Waste Classification Guidelines Part 1: Classifying Waste</i> EPA 2014a Detailed in Section 11.8 .				Classification Report as per EPA 2014a.

Table 9 – Summary of Environmental Monitoring under the CMP

Monitoring Type	Frequency	Responsibility	Relevant Standards	Technique, Location and Installation Requirements	Sample Collection Requirements	Calibration and Maintenance Requirements	Record
Chemical unexpected Finds Sampling	Where a chemical unexpected find is located.	Environmental Consultant	Detailed in Section 11 . The adopted sampling approach will be consistent with NEPM (2013) and any NSW EPA endorsed guidelines.				Report as per OEH 2011.
Ordnance unexpected Finds	Where an ordnance unexpected find is located.	Qualified contractor listed on the Defence Environment and Heritage Panel (DEHP) as a D2 and F2.	The UXO, EO and EOW Management and Remediation Plan (G-TEK 2018a and G-TEK 2018b). .				(G-TEK 2018a and G-TEK 2018b).
Materials Tracking	During the movement of bulk excavated materials within and off the Site.	Principal Contractor	Detailed in Section 11.11				Daily Tracking Sheets.

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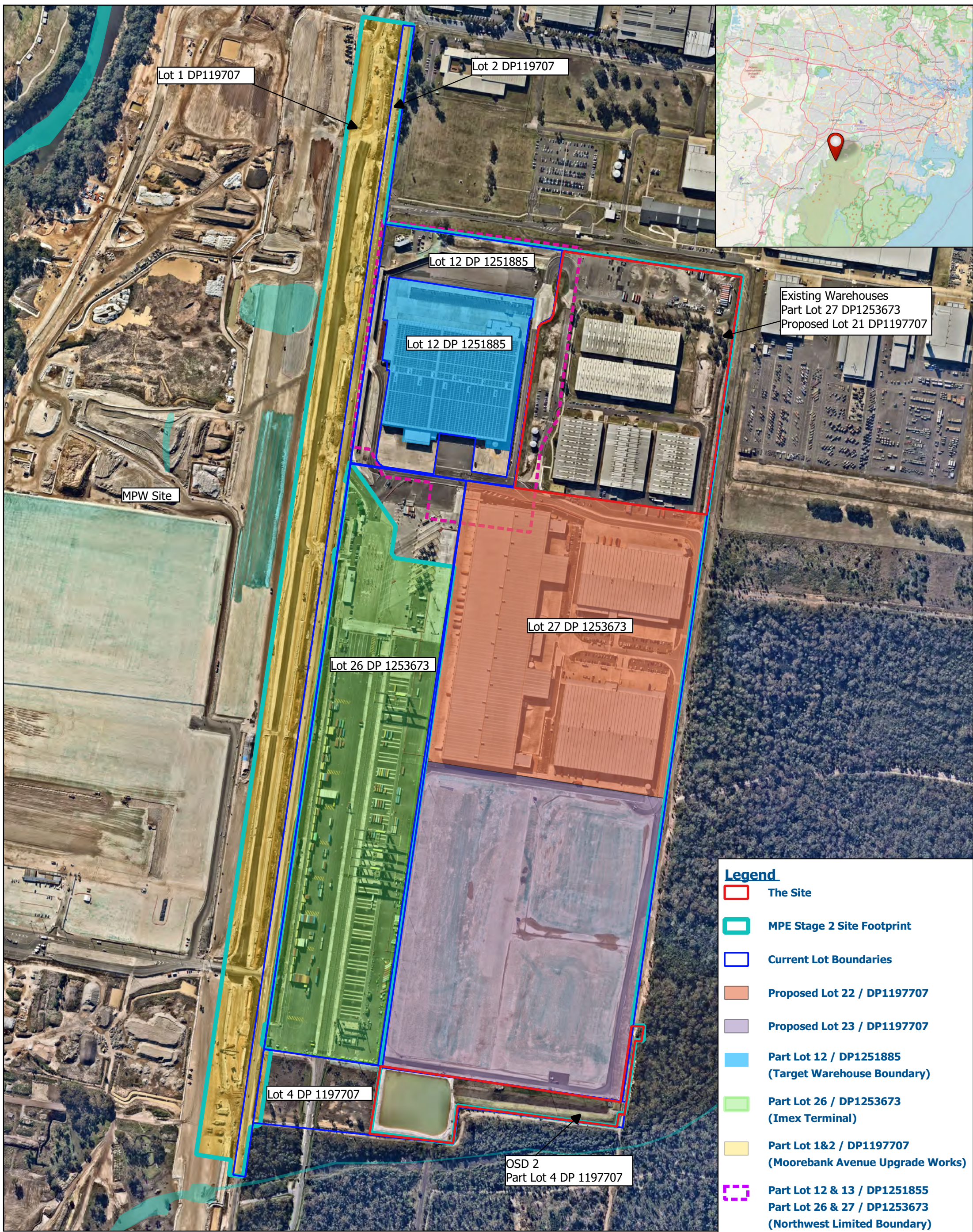
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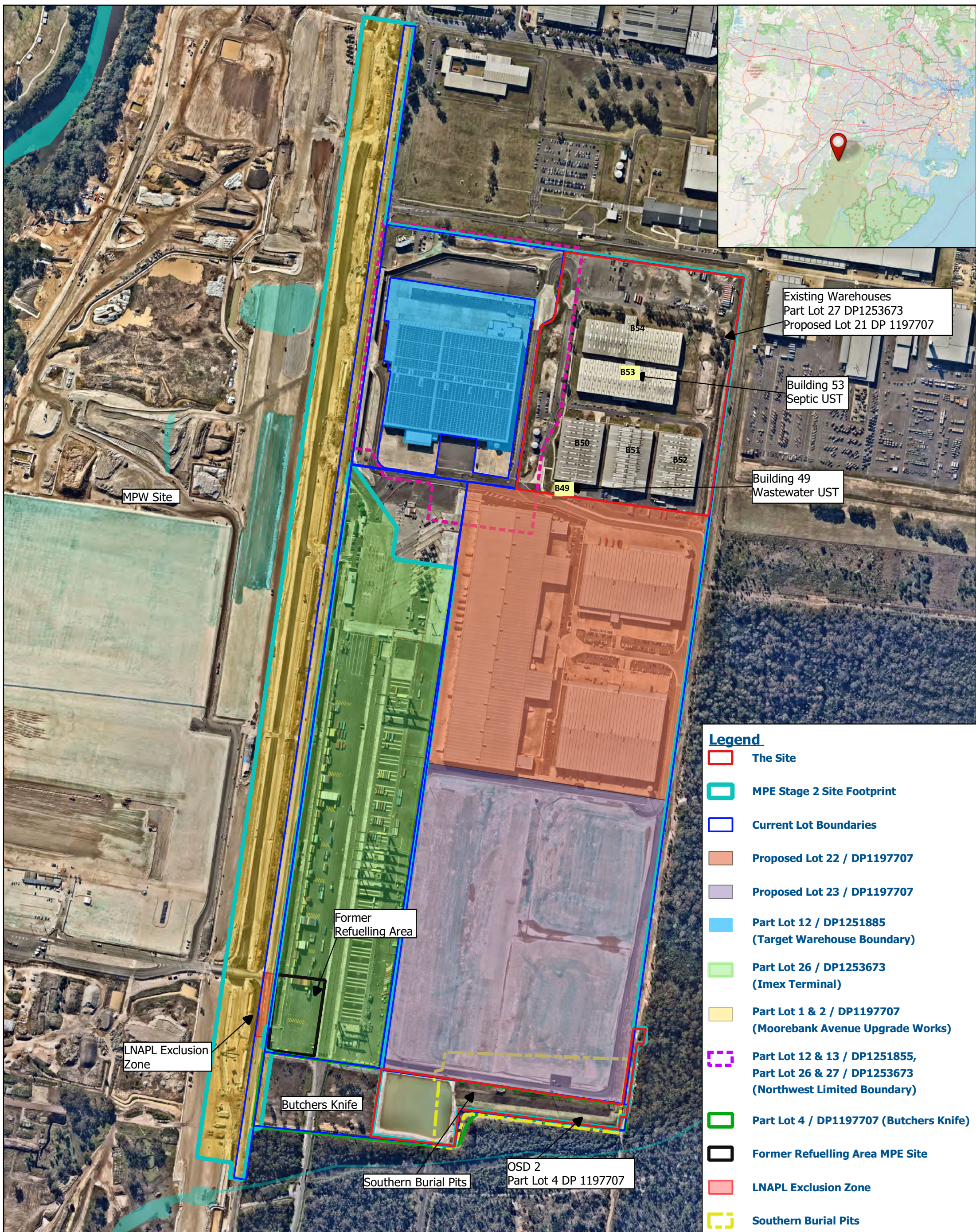
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Moorebank Precinct East Site Contamination Management Plan

Figure 1 - Project Plan and Boundary





Moorebank Precinct East Site Contamination Management Plan

**Figure 2 - Remaining Buildings
and Areas of Concern**



Appendix A

BUTCHERS KNIFE SMP (GOLDER 2016B)



10 August 2016

MOOREBANK INTERMODAL TERMINAL

Contamination Summary Report, Remedial and Site Management Plan - "Butchers Knife"

Submitted to:

Moorebank Intermodal Company
Suite 2, Level 27
1 O'Connell Street
Sydney NSW 2000

Report Number. 147623070-055-R-Rev2

Distribution:

MIC - 1 electronic
AECOM - 1 electronic





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Important information relating to this document



1.0 INTRODUCTION

Golder Associates (Golder) was commissioned to deliver detailed geotechnical and geochemical investigations for the Moorebank Intermodal Terminal (MIT) to the Moorebank Intermodal Company (MIC). Further to these investigations, Golder has been engaged by MIC to prepare a Contamination Summary Report for the land dividing the former Defence National Storage and Distribution Centre (DNSDC) site (owned by SIMTA) from the vacant “*boot land*” located to the south. The area of interest is referred to as the “*Butchers Knife*” (the site). The various land parcels are described in Section 1.1 and presented on Figure 1 (Appendix A).

1.1 Background

The Moorebank Intermodal Logistic Precinct (the Precinct) Project (the Project) involves the development of approximately 220 hectares (ha) of former Department of Defence (Defence) land. Moorebank Avenue bisects the Precinct, which is comprised of the MIC property (including Moorebank Avenue) to the west and the Sydney Intermodal Terminal Alliance (SIMTA) Property to the east (refer to Figures 1 and 2, Appendix A).

The Precinct will include:

- an open access import-export (IMEX) freight terminal with an ultimate capacity of up to 1.05 million twenty foot equivalent units (TEU) per annum, including on-site freight rail sidings;
- an open access interstate freight terminal with an ultimate capacity of up to 500,000 TEU per annum;
- terminal warehousing and distribution facilities comprising approximately 850,000 m² of warehouse with ancillary offices;
- a rail link, connecting the Southern Sydney Freight Line (SSFL) at the southern end of the IMEX terminal site and interstate terminal site;
- northern and southern connections into the SSFL to accommodate 1800 m trains; and
- a freight village providing support services on site including management and security offices, meeting rooms, driver facilities, retail and other business services.

On June 3 2015, MIC reached an agreement with SIMTA to develop the Project across the entire Precinct. In order to reach ‘Financial Close’ for the agreement, MIC is required to provide SIMTA with a Site Audit Statement for its land. To facilitate this, the Auditor has requested that an assessment of land suitability for commercial/industrial land use (including rail infrastructure) be completed.

For clarity, the following terminologies will be applied throughout this document:

- Butchers Knife (the ‘site’): the land dividing the former DNSDC site (the SIMTA Property) from the vacant “*boot land*” located to the south (part Lot 4 DP 1197707).
- Moorebank Avenue: The Moorebank Avenue Roadway, formally identified as Lot 2 DP 1197707.
- The SIMTA Property: the land situated to the east of Moorebank Avenue, owned by the Sydney Intermodal Terminal Alliance.
- The MIC Property West: the land situated to the west of Moorebank Avenue formerly occupied for Steele Barracks (including the School of Military Engineering (SME)) and Moorebank Barracks, which will be leased to MIC by the Australian Government under a long-term lease.
- The MIC Property East which is also leased by the MIC and encompasses:
 - the land designated for the Moorebank Avenue re-alignment to the east of the SIMTA property;
 - the *Boot Land* which is designated as an ecological conservation area; and



- the *Rail Access Corridor* which is designated for the development of a rail line connecting a portion of the Precinct development with the Southern Sydney Freight Corridor.
- The Precinct: The land occupied by the proposed Moorebank Intermodal Logistical Precinct encompassing both the SIMTA property, the MIC Property West and the MIC Property East.

1.2 Objectives

The objectives of this assessment are to sufficiently characterise the soil and groundwater contamination risks associated with Butchers Knife (part Lot 4 DP 1197707) (the 'site') and to assess the land use suitability for the proposed end uses (commercial/industrial, including rail infrastructure). The proposed end land uses for the site are outlined in Figure 2.

1.3 Scope of Works

These assessment works included in the following scope:

- **Desktop studies** - a desktop study was completed to review existing information pertaining to the Butchers Knife.
- **Site inspection** - the site was inspected to observe site conditions at the time of preparing this summary report and to confirm current conditions at the site are generally consistent with those considered as part of the previous contamination investigations.
- This **Contamination Summary Report (CSR)** was prepared.



2.0 SITE DESCRIPTION AND REGIONAL SETTING

2.1 Site Identification

The site locality and layout are presented in Figure 1 and Figure 2, respectively. Table 1 summarises the site identification.

Table 1: Site Identification

Item	Details
Address	Moorebank Avenue, Moorebank, NSW
Title Identification Details/ Legal Description	Portion of Lot 4 DP 1197707
Local Government Authority (LGA)	Liverpool
Site Area	Approximately 5.1 hectares
Zoning	IN1 General Industrial, Liverpool City Council Local Environmental Plan (LEP) 2008

2.2 Site Description

The site is positioned in the southern most portion of the fenced area formerly used as the Defence National Storage and Distribution (DNSDC) facility, between the former operational portion of the SIMTA property to the north, the Boot Land to the south and east and Moorebank Bank Avenue to the east, with the MIC Property West beyond Moorebank Avenue.

The site is relatively flat, generally with grass and scattered shrubs or trees and has no structures with the exception of a redundant rail line which passes through the approximate centre of the site in a north south direction. The elevation at the site is approximately 15 metres (m) Australian Height Datum (AHD).

2.3 Surrounding Environment

The adjoining land uses are as follows:

- North: The SIMTA Property (including the former DNSDC) and the MIC Property East (including bushland and a service corridor);
- South: The Boot Land which is undeveloped bushland and part of the MIC Property East with the East Hills Railway Line beyond the Boot Land to the south.
- East: The Boot Land which is predominately undeveloped bushland and part of the MIC Property East with the proposed Moorebank Avenue realignment located immediately east of the site within the Boot land and running north / south along the eastern boundary of the SIMTA property. The residential suburb of Wattle Grove is beyond the Boot land to the east.
- West: Moorebank Avenue, with the MIC Property West located beyond Moorebank Avenue. The activities on the MIC Property West including the former School of Military Engineering (SME) followed by the Georges River which created the western boundary of the MIC Property West.

2.4 Geology

Existing information of relevance to the geotechnical studies that is available in the public domain includes:

- Published geological maps, 1:100,000 Penrith Geological Map (NSW Department of Minerals, 1991); and
- The Penrith Soils Landscape Map (Soil Conservation Service of NSW, 1989).

The geological map shows the area on which the site lies as being characterised by Tertiary alluvial and fluvial deposits including sand, clay and silt. The published mapping indicates nearby surface rock outcrop of



Ashfield Shale and also the lower stratigraphic sequence unit Hawkesbury Sandstone. In view of the published mapping it is likely that the Ashfield Shale would be the rock unit encountered immediately below the overlying soils across the majority of the site. However, it is possible that over some portions of the site, particularly toward the south east, the Ashfield Shale may be absent from the subsurface profile and Hawkesbury Sandstone would be the first rock encountered beneath shallow soils.

A transitional unit, known as the Mittagong formation is often present between the Ashfield Shale and the underlying Hawkesbury Sandstone and has the potential to be intersected within the subsurface profile of the site. It is noted that the resolution of mapping may not capture local site scale variations in stratigraphic boundaries and whilst the majority of the site lies entirely within an area mapped as having surface coverage of Tertiary Alluvium, the site has a long history of intensive military usage with associated cut and fill activities. In some areas it is likely that the pre-existing alluvium will have been removed or re-worked as fill.

The Penrith Soils Landscape Map (Soil Conservation Service of NSW, 1989) indicates that the site lies in an area characterised by soils of the Berkshire Park Group. This group is produced on alluvial soils, commonly on elevated Tertiary terraces. The soils comprise shallow clayey sand soils, with frequent ironstone nodules.

2.5 Hydrogeology

There are two main aquifer systems at the Precinct, a shallow system within alluvial soils and a deeper aquifer within the bedrock (Golder, 2015a and JSB&G, 2015). Previous investigations at the SIMTA property intercepted groundwater at depths generally between 8 to 10 m bgl, and was expected to flow westerly – north westerly.

The GHD (2015a) investigations identified perched water between 3 and 5 m bgl in an area immediately north of the site, and also indicated that groundwater in the southern portion of the DNSDC as potentially flowing to the south towards Anzac creek. A southerly flow direction in this portion of the site would be consistent with a deeper bedrock profile identified in this portion of the Precinct, however, as there are limited groundwater monitoring wells in this portion of the Precinct and there is some uncertainty with the inferred flow directions.

Golder's review of existing groundwater bore records accessed using the NSW Water Information Database was completed on 21 July 2016. The closest registered bore was a monitoring bore located on the Glenfield Waste facility located approximately 800m west of the site on the western side of the Georges River. No extraction bores were identified within 1 km radius of the site. The site is also serviced by reticulated water, hence water is not extracted from the site for the purpose of domestic supply.

2.6 Surface Water

A small creek (Anzac Creek) passes parallel with the southern boundary of the site, and passes within approximately 20m of the southern eastern corner of the site. The creek runs from the former SME golf course (located on the MIC Property West) to the north east away from the Georges River (east), prior to re-joining the Georges River at Lake Moore, located approximately 1.8 km north east of the site.

There are no apparent surface water drainage features within the site, however, within the SIMTA Property, several open concrete-lined channels and box culverts ultimately drain surface water to the Georges River via the property's stormwater system. One such open channel is present approximately 50 m north of the site and drains water west through the Boot land and joins Anzac Creek approximately 200 m north west of the site.

Surface water from the site is expected to drain either south directly to Anzac creek or north-west into the drainage pathway located on the SIMTA property 50 m north of the site.

2.7 Acid Sulfate Soils

The Australian Soil Resource Information System (ASRIS) indicates that the site has no known occurrence of Acid Sulfate Soils (ASS). No indications of ASS or PASS were identified in the soils encountered during the SIMTA Stage 1A Phase 2 Investigations (JBS&G, 2015).



Soils encountered on the eastern boundary of the MIC Property West during the Post Phase 2 Investigation exhibited higher risk potential for acidic soils (Golder 2015a). Analytical results for soil samples collected from BH104 (collected at 7.1 m depth) and BH106 (collected at 8.8m depth) reported total actual acidity (TAA) concentrations exceeding the investigation action criteria. Based on the low soluble sulphur ($<0.02\%$ S) and no reportable oxidisable sulphur ($<0.005\%$ S_{CR}) the acid generation potential observed in these samples was unlikely to be associated oxidation of sulfides. The cause of the acidity was not known and may have been attributed to a variety of reasons, including age, landscape position and other geochemical interactions (such as organic acidity) confounding the interpretation (Golder, 2015). Both BH104 and BH106 were located on the eastern boundary of the MIC Property West approximately 40 m to the west of Moorebank Avenue and approximately 60 m west of the site.



3.0 REMEDIATION REGULATORY FRAMEWORK

3.1 *Environmental Protection and Biodiversity Conservation Act, 1999 (EPBC Act)*

Under the Commonwealth process the wider development project (inclusive of the remediation activities) is a 'controlled action' under the Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999 (EPBC Act)* and requires approval from the Commonwealth Minister for the Environment.

3.2 Contaminated Land Management Act 1997

In NSW, the management of contaminated land is shared by the NSW Environment Protection Authority (EPA), the NSW Department of Planning and Environment Infrastructure and planning consent authorities (usually local councils).

Under the NSW *Contaminated Land Management Act (CLM Act) 1997*, the NSW EPA regulates contaminated sites where the contamination is Significant Enough to Warrant Regulation (SEWR). Contaminated sites that are not regulated by the NSW EPA are managed by local councils through land use planning processes (such as change of land use or some remediation works).

The NSW EPA also administers the NSW Site Auditor scheme under Part 4 of the *CLM Act*. The NSW EPA accredits individuals under the Act as Site Auditors to provide independent review of work conducted by contaminated site consultants.

3.3 Environmental Planning and Assessment Act 1979

Under the NSW Government process a staged development approval will be sought under the NSW approvals process as a State significant development (SSD) under the *NSW Environmental Planning and Assessment Act 1979 (EP&A Act)*.

3.3.1 SEPP 55 – Remediation of Land

The *State Environmental Planning Policy No. 55 (SEPP 55) – Remediation of Land* under the *Environmental Planning and Assessment Act (EP&A Act) 1979* provides a state wide planning approach for the remediation of contaminated land. In particular, *SEPP 55* provides for Category 1 and Category 2 remediation. Projects classified as Category 1 require development consent. As the works are included within a development which requires development consent, the works are considered to be Category 1 remediation works.

3.4 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997 (NSW) (POEO Act)* is the key piece of environment protection legislation administered by the NSW EPA.

The POEO Act provides a single integrated licensing arrangement to control the air, noise, water and waste impacts of an activity. The NSW EPA is the regulatory authority for the licensing of activities specified under Schedule 1 of the *POEO Act* (scheduled activities) and in most cases councils are the regulatory authority for non-scheduled activities. Licences can also be issued to regulate water pollution from activities that are not in Schedule 1. Such licences can provide protection against prosecution for water pollution if the licence conditions are complied with.

The *POEO Act* also provides the key mechanisms (including the issuing of three types of environment protection notices including: clean-up, prevention and prohibition notices) for protecting the environment. It also provides the regulatory regime for waste management under the *Protection of the Environment Operations (Waste) Regulation 2005 (Waste Regulation)*.

All remediation works completed at the site will be conducted in compliance with the relevant requirements of the *POEO Act*.



3.4.1 Protection of the Environment Operations (Waste) Regulation 2005

The following outlines the required documentation and approvals required for the handling, off site transport and disposal of waste during the remediation works in accordance with the *Protection of the Environment Operations (POEO) (Waste) Regulation 2005* and the *POEO Act 1997*.

Waste Transporter Requirements

Under Schedule 1, Part 2 of the *POEO Act 1997* the transport of several classifications of waste in loads exceeding 200 kilograms is declared to be a scheduled activity for which a licence is required. As such the proposed transport of the selected wastes from the site to off-site disposal facilities will require the use of licensed transporters.

Waste Tracking Requirements

The *POEO (Waste) Regulation 2005* specifies requirements for the tracking of waste both within NSW and interstate. The wastes that must be tracked are listed in the Schedule 1 of the Regulation (this Schedule includes soil contaminated with waste oil/ water, hydrocarbons/ water mixtures or emulsions).

Wastes that need to be tracked need to be characterised in accordance with the NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, November 2014). The following characteristics of the waste must also be determined:

- the form of the waste (the physical state e.g. solid);
- the waste code;
- the waste description; and
- the Dangerous Goods properties (if applicable).

A NSW EPA on line tracking system is available to track waste that is transported within NSW or into NSW from other states or territories.

Waste Disposal Facilities

Before wastes are transported from the site, it is necessary to confirm that the facility (e.g. landfill/ recycling facility) where the waste is being transported to is legally able to accept the waste.

Waste Records

If not using an approved on line tracking system records must be maintained of the waste transport certificates for at least four years. The use of the NSW EPA on line tracking system removes the requirement to maintain these records



4.0 PREVIOUS ENVIRONMENTAL ASSESSMENTS

An environmental investigation specifically designed for the assessment of the Butchers Knife has not been undertaken, however, the area has been included in several larger site investigation programs on the SIMTA site.

Initial environmental investigations on the SIMTA site were completed by Douglas Partners (DP) in 1980, then between 1993 and 1995 and were part of geotechnical investigations completed for development on specific parts of the SIMTA site. These included:

- Subsoil Investigation (Ref: SSI/5-6818, dated 17 September 1980).
- Buildings N13, N21, N22, N24 & Hardstand N20 and Associated Roads (Project 14923J, dated 7 October 1993).
- Corrosion of Steel Water Mains (Project 14923K, dated 20 October 1993).
- Report on Geophysical and Contamination Assessment Buildings N9A, N9B and N13; Project 14923M, dated 24 November 1993).
- Additional Geophysical and Contamination Assessment Buildings N9A and N9B (Project 14923N, dated 21 January 1994).
- Site Contamination Investigation Shed 2 (Project 20792, dated 12 July 1995).

The abovementioned reports have not been sighted by Golder, however, were referenced by DP in 2009 in a summary of environmental conditions (see below). Buildings N9A and N9B are now referred to as DNSDC buildings 25 and 26. The next series of investigations were completed in the period between 2000 and 2002, and were primarily completed in preparation for sale of the SIMTA site. These included:

- Egis (2000) Preliminary Site Investigation at the Defence National Supply and Distribution Centre, Moorebank Defence Lands, dated September 2000.
- URS (2002a) Assessment of DNSDC Buildings – Supplement to Egis 2000 Stage 1 Preliminary Site Investigation of Areas A1 to A6, dated March 2002.
- HLA (2002a) Work Plan Soil and Groundwater Investigation Moorebank Defence Land, dated 17 September 2002.
- HLA (2002b) Soil and Groundwater Investigation, Precinct H (DNSDC), Moorebank Defence Lands, dated November 2002.
- Milsearch (2002) Ordnance Investigation and Hazard Analysis of the DNSDC Moorebank, dated October 2002.
- URS (2002b) Investigation Review Report, DNSDC, Moorebank Defence Lands, dated December 2002.
- Contamination Management (2002a) Summary Site Audit Report, DNSDC Site, Moorebank, dated December 2002.
- Contamination Management (2002b) Site Audit Statement, Defence National Storage and Distribution Centre, Moorebank Avenue, Moorebank, dated December 2002.
- Environmental and Earth Sciences (2002a) Memorandum: Review of Reports Pertinent to Environmental Investigations Conducted at DNSDC, Moorebank, NSW, dated 12 December 2002.
- Environmental and Earth Sciences (2002a) Memorandum: Review of Investigation Review Report DNSDC, Moorebank Defence Lands (URS) and Site Audit Statement WRR118 (Dr William Ryall), dated 16 December 2002.



As part of the proposed development of the SIMTA property, several summary reports have been prepared for development approval applications submitted for the Precinct. These include:

- ARUP (2008) Stockland Moorebank Intermodal Terminal Geotechnical Desk Study Report, dated December 2008.
- Douglas Partners (2009) Summary Environmental Conditions, Proposed Intermodal Freight Terminal, DNSDC Site – Moorebank Avenue, Moorebank, dated December 2009.
- Golder Associates (2010) Phase 1 Environmental Site Assessment, Stage 1A of Moorebank Intermodal Freight Terminal Development, dated August 2011.
- Golder Associates (2013a) Phase 1 Environmental Site Assessment, Rail Corridor for SIMTA Moorebank Intermodal Terminal Facility (document no. 107623148-003-R-Rev5).
- Golder Associates (2013b) Preliminary Environmental Site Assessment, SIMTA Site and Associated Rail Corridor (document no. 107623148-004-L-Rev5).

Over the period of preparation of the above reports, the flow of information related to the environmental conditions on the sites has not been continuous. The reports completed in the period between 1993 and 1995 were identified by DP in 2009 following a search of the company's archive. As a result, the Egis 2000 report did not reference these reports, rather it stated that no previous environmental investigation had been completed but acknowledged there was anecdotal evidence that remedial activities had been undertaken at the site in the early to mid-1990's. This observation carried through in the remaining reports completed in 2002. The reviews completed in 2002 and 2009, as part of the sale and development of the site, were also based on a subset of the previous reports. Particularly, the DP 2009 report references the 1993 to 1995 reports, however, does not provide details of the investigations or remediation works completed. The Egis (2000) and HLA (2002b) reports were also excluded from the DP 2009 review.

More recently an additional series of environmental investigations has been completed. These were completed by either GHD as part of the Defence lease exit obligations from the SIMTA site, or JBS&G for inclusion in the SIMTA NSW Stage 1 State significant development (SSD) application. These investigations have included:

- GHD (2014) DNSDC Gap Analysis Report (unknown reference number).
- GHD (2015a) DNSDC Moorebank Intrusive Site Investigations (21/24133/207651).
- GHD (2015b) DNSDC Moorebank Refuelling Area Additional site investigations and remedial options evaluation (21/24133/209789).
- GHD (2015c) DNSDC Moorebank Refuelling Area Remedial Action Plan (21/24133/211259).
- GHD (2015d) Moorebank Intermodal Company – Butchers Knife Intrusive Site Investigations, Butchers Knife portion of Boot Land, Moorebank Avenue, Moorebank NSW (21/25610).
- JBS&G (2015a) Phase 2 Environmental Site Assessment, SIMTA Intermodal Terminal Facility – Stage 1 (document no. 50342-60868 Rev3).
- JBS&G (2015b) Remedial Action Plan, SIMTA Intermodal Terminal Facility – Stage 1 (document no. 50342-61155 Rev1).

The inconsistent flow of information continued during the later stages of the site's investigation. The GHD and JBS&G investigations appear to overlap and to have occurred concurrently. The GHD (2015a) intrusive site investigations also included a review of information not previously identified during the investigations completed between 2010 and 2013, nor during the JBS&G investigations completed in 2015. These additional investigations included:

- G-tek (2003a) Hazard Reduction Precinct H, Moorebank Defence Land, Moorebank NSW;
- G-tek (2003b) Hazard Reduction Precinct I, Moorebank Defence Land, Moorebank NSW; and.



- HLA (2006) Contamination Investigations, Defence Integrated Distribution Systems Sites, Defence National Storage Distribution Centre, Moorebank (reference D1045718_RPTFinal_Moorebank_Sept06).

The above mentioned reports were not reviewed by HLA in the preparation of the 2006 contamination investigations. The information presented in the G-tek reports is only summarised briefly within the GHD (2015d) intrusive investigations report.

The most pertinent information related to the wider SIMTA site is within the URS (2002b) Investigation Report Review and the Contamination Management (CM) (2002a) Summary Site Audit Report and Site Audit Statement (CM, 2002b). The URS (2002b) report was an interpretative report, presenting the findings of the intrusive soil and groundwater investigations completed by HLA (2002), and the ordnance investigation completed by Milsearch (2002). The CM (2002a) was a non-statutory contaminated site audit completed by Dr William R Ryall (NSW EPA Accredited Site Auditor No. 9809). The investigations undertaken by HLA/URS (2002) however, did not include investigations within the Butchers Knife. The investigation included several investigation locations immediately north of the site and the results of these are discussed further below.

The ensuing sections summarise the most pertinent information from the above mentioned reports, and figures from the previous reports are presented in Appendix B.

4.1 Egis (2000a) – Preliminary Site Investigation

Egis completed a Preliminary Site Investigation (PSI) of the entire Moorebank Defence Lands in 2000. It included a review of available information and historical records, as well as an inspection of the broader area. The Egis (2000) figures are presented in Appendix B1. Conclusions relevant to the site included:

- Egis (2000) noted that the south western portion of the DNSDC was an “*unauthorised*” burial ground and reported that works in the area in 1994 identified the pits, which were partially remediated at the time. Egis (2000) reported that the pits were suspected of containing batteries as the old battery store was located in this portion of the site prior to the development of the current DNSDC.

The bushland located south of the site and west of the current rail spur, was reported to have been used as grenade range from the 1950s to the 1980s. The Milsearch (2000) report, which was appended to the Egis report, provided greater detail in regards to the former grenade range. Milsearch (2000) noted that the grenade range had operated south of the DNSDC site for a considerable period, with a permanent facility constructed in the 1950s. However, it was likely that the area was initially used during World War II. The position of the grenade range was predominately on the western side of the current rail spur, however, a portion of the former lineal range may have intersected by the current rail spur. A 200m x 200m portion of the grenade range was reported to have been remediated in 1994, and was evident on the 1994 aerial photograph, however, a report on the remediation was not sighted by Milsearch or Egis. The Milsearch (2000) report recommended additional investigations be completed, particularly to delineate the areas impacted by the projected grenades and by early hand-thrown grenades including areas south-west of the previously remediated areas.

4.2 HLA (2002) and URS (2002b) Soil and Groundwater Investigation

HLA performed a soil and groundwater investigation of the DNSDC under the direction of URS Australia in 2002. This investigation included soil and groundwater sampling to assess potential contamination based on the results of PSI (Egis 2000) and included a series of approximately 170 investigation locations across the DNSDC site. The URS (2002) figures are presented in Appendix B2.

The investigations did not include locations within in the DNSDC site (i.e. the Butchers Knife), however, they included investigations within the portions of the site located immediately to the north, within the southern portion of the DNSDC. The investigation results relevant to the site included:

- Perched groundwater impacted with hydrocarbons including phase separated hydrocarbon was identified in burial pits located on the eastern boundary of the DNSDC, approximately 125 m north of the site.



- Hexachlorobenzene (HCB) was detected in soils in a test pit completed adjacent to the current rail spur approximately 20m north of the site. The detected concentration was 2.26 mg/kg which was below the current NEPM (2013) HIL D trigger value of 80 mg/kg.
- URS (2002b) reported on the observation of AC sheeting on the ground surface within the southern portions of the DNSDC.
- The occurrence of M36 grenade fragments were observed in the south eastern portion of the site, suggesting the potential for UXO to exist within this portion of the site.
- URS (2002b) considered it unlikely, but noted that there is a potential for munitions to be present in historical burial pits located in the site.

4.3 Milsearch (2002)

The investigations completed by Milsearch were completed as part of the URS / HLA investigations of the DNSDC, hence the reports did not directly include the site (i.e. the Butchers Knife). However as mentioned above as the investigations considered the southern portions of the DNSDC and therefore the investigations included information pertinent to the site. The Milsearch (2002) report also included additional details on the remediation activities completed in the 1990's as indicated by Douglas Partners (2009), and also appear to have included the geophysical assessment of the eastern portion of the site (i.e. the portion of the Butchers Knife east of the rail spur). The Milsearch (2002) figures are presented in Appendix B2.

The investigation results relevant to the site included:

- A burial trench, referred to as Pit 8 was identified as running parallel and potentially underlying the current rail spur and appeared to extend up to the boundary of the site. The pit was described as being 6 m wide and 6 m deep and continued for approximately 88 m up to the Precinct H boundary. The pit contained quantities of general stores equipment including shelving, metal mugs, building tie bars, small arms ammunition boxes (all empty) and remnants of old building material.
- A burial pit, referred to as Pit 12 was also identified on the northern boundary within the eastern portion of the site. This Pit was not investigated during the Milsearch and HLA / URS investigations in 2002.
- Debris from expended WW2 era 36M hand grenades was noted visually on the surface, and confirmed by the mine detector survey in the south eastern portion of the site DNSDC, including within the south eastern portion of the site (i.e. within the Butchers Knife). The debris was described as being typical of that found in the bursting ground of a live grenade training facility. Milsearch included reference to an interview with Warrant Officers Haz and Edwards which indicated the material may have been trucked onto the site in the late 1970s as part of an earthworks training exercise. It was indicated that the materials were sourced from the eastern half of the former Anzac Rifle Range.

4.4 Contamination Management (2002)

Dr Bill Ryall (EPA-accredited Auditor) of Contamination Management (CM) prepared a summary site audit report for the DNSDC site. This review was limited to the investigations completed on the DNSDC site, which included the ordnance investigation completed Milsearch (2002). The investigations did not extend into the site (i.e. within the Butchers Knife). However, the site audit statement noted several issues which were required to be addressed through the development and implementation of a site management plan (SMP).

Issues noted by CM (2009) which were specific to the site (i.e. the Butchers Knife) included:

- *Additional investigations be under taken in the filled areas in the south-eastern part of the site, inclusive of the areas adjacent to the rail spur;*
- *HCB be identified as a chemical of potential concern during remediation of contamination identified in the southern part of the site adjacent to the rail spur; [and]*
- *Measures be taken to prevent access to unauthorised personnel in the south-east corner of the site where fragments of grenades have been identified until an appropriate health and safety procedure has*



been implemented and undertake, as a matter of priority, a hazard reduction operation in the area according to the recommendation made in the Ordnance Investigation report by Milsearch dated 2002.

4.5 G-tek (2003)

In response to the investigations completed by Milsearch in 2002, Defence commissioned G-tek to “locate any complete grenades,” potentially located within precincts H and I. Precinct H was the south eastern portion of the DNSDC site, while Precinct I was the eastern portion of the Butchers Knife. G-tek completed a Total Magnetic Intensity survey across the area, with data collected at 0.1 second intervals along 0.375m transects. The data was processed into a 0.1m grid to identify items of potentially grenade size or larger. Items identified in the survey were subsequently nominated for intrusive investigation. The intrusive investigations were completed by identifying the anomaly, using a magnetometer and EM mine detector and then manually excavating the source of the signal. Excavations continued until the source of the signal was positively identified and if possible removed from the area.

Within the Butchers Knife (Precinct I) and total of 179 anomalies were investigated, 24 items the size of a grenade were located, and only 7 items were identified as grenade fragments. G-tek concluded that no grenades or any items that could be perceived as hazardous were located. A large anomaly was identified in the western portion of the investigation, however, this was investigated and identified as highly mineralised stones in what appeared to be imported soils. The G-tek (2003) figures are presented in Appendix B3.

4.6 Douglas Partners (2009)

Douglas Partners prepared two reports for Stockland Developments in December 2009 regarding the DNSDC site, one summarising the environmental conditions (2009a) and the other summarising the geotechnical conditions (2009b). These reports summarised some of the work that had been performed to date (URS 2002, CM 2002 and ARUP 2009¹), however were not related to the Butchers Knife.

4.7 Golder (2013)

Golder Associates prepared a Phase 1 ESA for the proposed SIMTA Stage 1 SSD rail corridor. The proposed rail corridor passes through the western portion of the site, and this portion of the site was considered in the Phase 1 ESA. The Golder Phase 1 ESA did not provide additional information pertaining to the site, and referenced information presented in the previous investigations. The Phase 1 ESA noted that the partially remediated “unauthorised” burial grounds were present in the southern portion of the DNSDC (i.e. within the Butchers Knife) and noted these as an area of potential concern warranting further investigation. The Golder (2013) figures are presented in Appendix B4.

4.8 GHD (2015)

GHD prepared four reports in 2015. The fourth report (GHD, 2015d) presented the results of the intrusive investigation completed within the vicinity of the Butchers Knife. The investigations were completed as part of the wider SIMTA property investigation, completed on behalf of Defence for the purpose of satisfying Defence’s lease obligations with SIMTA. The intrusive investigations were targeted at areas where GHD considered additional works were required through a gap analysis process (GHD, 2014). The gap analysis identified the Southern Burial Pits and the Rail Spur, as areas of potential concern warranting further assessment within the site (i.e. within the Butchers Knife). The investigations also included several of the former DNSDC buildings immediately north of the site, including the former refuelling station located on the western boundary of the SIMTA property, approximately 30 m north of the site. The GHD (2015d) figures and analytical tables are presented in Appendix B5.

The GHD investigations also included direct responses to the items raised within the CM (2002) site audit statement. GHD (2015a) concluded that each of the issues raised had been suitably closed out at the completion of the investigations. The GHD responses to the issues related to the site (i.e. the Butchers Knife) as noted by CM (2002) included the following:

¹ Note ARUP 2009 provides geotechnical information only which has not been referenced in this report.



- *Additional investigations be under taken in the filled areas in the south-eastern part of the site, inclusive of the areas adjacent to the rail spur;*

GHD's response was "Additional intrusive soil and groundwater investigations have been undertaken by HLA (2006) and GHD as part of the recent Detailed Site Investigation (2015)."

In summary, GHD completed 29 test pits within the area identified as the 'southern burial pits', inclusive of the current rail spur. Of the 29 test pits completed by GHD approximately 19 were within the site (i.e. within the Butchers Knife). One groundwater monitoring well was also installed on the southern boundary of the site (GW077). The test pits were targeted to anomalies identified during the UXO safe guarding works. The test pits included the collection and analysis of approximately 8 soil samples from within the site which were submitted for the analysis of:

- Total Reportable Hydrocarbon (TRH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAHs);
- Hexachlorobenzene (HCB); and
- Asbestos

The test pits were advanced to residual soils or prior refusal, with depth ranging from 0.5 – 2.5m. Generally, no obvious visual or olfactory indicators of potential contamination were noted within the majority of the test pits. The following exceptions were noted:

- Army licence number plates were encountered in TP055 between 0.6 and 0.8 m depth, which was located north of the site;
- TP056 including electrical conduit and barbed wire at 1.2m depth, which was located north of the site;
- Within TP062 a white "waxy" substance was observed mingled with dark clay between 0.5 and 1.9m depth, which was located on the northern boundary of the site;
- Within TP063 an unidentifiable odour was observed, however no elevated PID results were recorded. TP063 was not located north of the site.
- Fragments of asbestos containing materials (ACM) were noted on the ground surface in the vicinity of TP068, TP072A, TP072B, TP073C, TP073, TP074, TP075 and TP076, which were all located within the site. ACM was also identified at depth in test pits TP062 (0.3 m) located on the northern site boundary and TP075 (0.4 m) located within the site.

GHD screened the soil sample analytical results against commercial / industrial land use criteria, which is consistent with the proposed future land use. The analytical results indicated the concentrations of potential contaminants of concern were below the adopted trigger values or the laboratory limit of reporting (LOR) with the exception of lead in two locations (TP072A at 0.5m depth and TP062 at 0.7m depth) and total PAHs in one location (TP062 at 0.7m depth). The impacts in TP062 appeared to be associated with the "waxy" substance observed in the fill materials, and lead concentrations were reported at 22,000 mg/kg. GHD (2015) concluded that the lead and PAH impacts were delineated laterally and vertically.

TP072 is located within central portion of the site, while TP062 is located adjacent to the eastern side of the rail spur on the northern boundary of the site. Each of the locations where ACM was identified are also located within the site.

A groundwater sample was collected from GW077 which was installed in the south western portion of the site against the southern fence. The sample was submitted for analysis of TRH, BTEX, PAHs and



volatile organic compounds (VOCs) which were reported below the laboratory LOR with the exception of a minor concentration of TRH which was below applicable commercial / industrial criteria.

- *Hexachlorobenzene be identified as a chemical of potential concern during remediation of contamination identified in the southern part of the site adjacent to the rail spur;*

GHD's response was "No evidence of hexachlorobenzene impact in soil or groundwater was evident during the recent site investigations undertaken by GHD"

GHD analysed for HCB in soil samples collected from three test pits (TP062, TP063 and TP079) and one soil bore (GW072A) completed in the vicinity of the previous HCB detection. Concentrations of HCB were below the laboratory LOR in the samples analysed.

- *Measures be taken to prevent access to unauthorised personnel in the south-east corner of the site where fragments of grenades have been identified until and appropriate health and safety procedure has been implemented and undertake, as a matter of priority, a hazard reduction operation in the area according to the recommendation made in the Ordnance Investigation report by Milsearch dated 2002.*

GHD's response was "G-Tek was engaged by Defence in 2003 to conduct a hazard assessment of the site. A geophysical survey was undertaken. No grenades or any items that could be perceived as hazardous were located. A number of scrap items, infrastructure, and rubbish items were however identified."

The GHD investigations also identified elevated concentrations of hydrocarbons in soil and groundwater, including the presence of LNAPL within the foot print of the former Refuelling facility (Building 21). The former Refuelling facility is located north of the site, and the southernmost extent of LNAPL and dissolved phase hydrocarbon impacts inferred by GHD to be approximately 50 m north of the site. The direction of groundwater flow in the area is not clear due to the presence of the LNAPL, however, based on the extent of the impacts the LNAPL appears to be migrating away from the site towards the north and north-west.

GHD concluded that the presence of ACM on the ground surface within the southern burial pits should be managed as part of future works in the area, and while the potential for exposure was considered to be low, GHD also recommended that the management of the localised lead hotspot at TP062 be considered as part of any further works in this area of the site.

4.9 JBS&G (2015)

JBS&G completed a Phase 2 ESA as part of the SIMTA Stage 1 SSD Environmental Impact Statement (EIS). These works included the assessment of the rail corridor, which passes through the western portion of the site. The JBS&G (2015) figures and analytical tables are presented in Appendix B6.

The JBS&G scope of work was based on the Golder (2013) Phase 1 ESA and included the excavation of four test pits (TP21, TP22, TP23 and TP24) in the area where the proposed rail corridor passed over the unauthorised burial grounds (i.e. within the butchers knife). Within these test pits, a surface layer of fill materials described as clayey sand, medium to coarse grained, yellow to orange colour was encountered between 0.2 to 0.4 m depth. No staining, odours or asbestos was observed in the fill profile. The fill materials were overlying natural materials described as clay, orange, grey red with medium plasticity. JBS&G submitted approximately one soil sample per location for analysis, and the following contaminants of potential concern were selected:

- Heavy metals/ metalloids including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc (4 samples).
- TPH (4 samples).
- BTEX (4 samples).
- OCPs / PCBs (2 samples).
- PAHs (4 samples).



- Asbestos (4 samples).
- Explosive residues (4 samples).

JBS&G screened the results against the current commercial/ industrial land use criteria, with is consistent with the proposed use of the site. The analytical results indicated the concentrations either below the laboratory LOR and / or the adopted investigation levels.

On the basis of the Phase 2 ESA, JBS&G developed a Remediation Action Plan (RAP). The extent of remediation required did not include areas within the site (i.e. within the Butchers Knife).



4.10 Key Findings

Based on the results of the pertinent investigations discussed above the following are considered key findings relevant to the site:

Burial Pits

The south western portion of the DNSDC was used as an “*unauthorised*” burial ground and burials appear to date from the period between 1940’s to approximately the 1970’s. Detailed reviews of the historic aerial photographs was completed by Egis and Milsearch in 2002. The earliest ground disturbances are apparent in the 1949 aerial photograph and Mileseach (2002) identified evidence of burial pits in the 1949, 1965 and 1970 aerial photographs.

To date, the investigations have identified numerous individual burial pits generally containing inert materials such as general stores, shelving, metal mugs, building tie bars, number plates, small arms ammunition boxes (all empty) and remnants of old building material. The burial pits located in the vicinity of DNSDC buildings 24 and 25 were remediated in approximately 1994, to facilitate the development of those buildings. However, no records are available on the remediation activities, and therefore, the extent of the remediation activities is not known but is unlikely to have included land within the site.

Intrusive investigations completed by GHD (2015) and JBS&G (2015) included the excavation of a total of 23 test pits within the site. The four test pits completed by JBS&G (2015) were targeted in the proposed rail corridor, while the GHD test pits were targeted at anomalies detected during the UXO safeguarding undertaken in the area. Generally the materials encountered during the intrusive investigations reported contaminant concentrations in the samples analysed below the NEPM 2013 commercial / industrial land use guideline values (NEPM HIL(D)). The exceptions were concentrations of lead in two locations (TP072A at 0.5m depth and TP062 at 0.7m depth).

The lead concentration in TP072A was 3,100 mg/kg, and exceeded the NEPM 2013 HIL(D) value of 1,500 mg/kg. The lower sample collected from 1.3 m depth reported lead concentrations below the HIL(D) value. The elevated lead was reported in fill materials described as including wood, metal, and glass.

The lead impacts in TP062 appeared to be associated with the “waxy” substance observed in the fill materials between 0.7 and 1.9 m depth, and lead concentrations were reported at 22,000 mg/kg. The lead concentrations in the underlying natural sands at approximately 2.0 m depth was 12 mg/kg. GHD (2015) did not provide comment on the potential source of the impacts, however, based on the ‘waxy’ description and the presence of both lead and minor concentrations of PAHs, it appears to have originally been associated with paint and/or a water proofing agent which has historically been placed in the burial pit. TP062 is located on the northern edge of the site, immediately east of the rail spur. The impacted materials were not observed by GHD in test pits TP076 and TP061 located between 10 m and 20 m south of TP062. Investigation locations were not advanced to the east or west of TP062, hence there is some uncertainty on the lateral extent of the impact in an east / west direction. The impacts appear to be associated with waste placed within the burial pit described by Milsearch as “Pit 8”. The Milsearch (2002) geophysical investigation of Pit 8 indicated the pit was approximately 6 m wide. Therefore, the extent of impact is estimated at approximately 20m long x 6m wide and extends to approximately 2m depth. There is limited information on groundwater in the area, however, the nearest monitoring wells (GW076A, GW029 and GW077) did not report elevated concentrations of lead. However, the leachability of the impacted materials was not assessed by GHD (2015).

Fragments of asbestos containing materials (ACM) were noted on the ground surface in the vicinity of TP068, TP072A, TP072B, TP073C, TP073, TP074, TP075 and TP076. ACM was also identified at depth in test pits TP062 (0.3 m) and TP075 (0.4 m). These test pits are generally located in the western portion of the site.

Limited groundwater investigations have been completed in the vicinity of the burial pits. GHD installed one monitoring well within the site (GW077) which reported low concentrations of TRH below the commercial / industrial criteria. LNAPL was identified on the groundwater in the vicinity of the former refuelling station, and GHD (2015c) inferred the edge of the LNAPL and dissolved phase hydrocarbon plume to be approximately



50 m north of the site. Based on the distribution of the hydrocarbon contaminants in the vicinity of the refuelling facility, the plume appears to have migrated to the north and north-west.

Perched groundwater was encountered between 3 and 5 m depth in the south western portion of the DNSDC, north of the site near the rail spur. Monitoring well MW076A and MW076B were installed in this portion of the site. The extent of perched water was not delineated during the GHD (2015) investigations. Based on the observations made during the various test pitting programs completed across the site and the southern burial pit areas there is potential for additional isolated areas of perched water to exist on the site. The GHD (2015) investigations also identified the presence of low level concentrations of VOCs (trichloroethylene [TCE] – 34 µg/L, vinyl chloride [VC] – 24 µg/L, and cis, 1-2-dichloroethylene [cis 1-2 DCE] – 22 µg/L) in monitoring well GW076B. These VOCs are typically associated with TCE based solvents and degreasing agents. GW076B is located approximately 50 m north of the site, immediately west of the rail spur. Historically solvents were used on the DNSDC, particularly within buildings 67 (located in the north of the DNSDC) and 16 (located in the centre of the DNDC). However, based on historic activities on the DNSDC, there is no apparent source area in the immediate proximity of the southern burial pits. Solvents may have been stored in buildings 25 and 26, but these building are located in a down gradient or across gradient position relative to GW076B. There is potential that solvents, or solvent impacted materials have historically been disposed of in the burial pits located to the north of the site, although this has not been confirmed. And the extent of the VOCs identified in the deeper groundwater has not be delineated, and is potentially migrating towards the site.

Rail spur

A rail spur passes through the centre of the site, and this was investigated by GHD (2015). Four test pits (TP062, TP061, TP075 and TP076) were completed in the vicinity of the rail spur, and the samples were analysed for chemicals of concern generally considered relevant to the historic rail activities. With the exception of elevated concentrations of lead in TP062 (as discussed above) the concentrations of chemicals of concern analysed in the samples collected by GHD were below the commercial / industrial land use.

UXO / EOW wastes

The Milsearch (2002) investigations identified debris from expended WW2 era 36M hand grenades in the south eastern portion of the DNSDC, including within the south eastern portion of the site (i.e. within the Butchers Knife). The debris was described as being typical of that found in the bursting ground of a live grenade training facility, and anecdotal information gathered at the time suggested the materials were trucked onto the site in the late 1970s as part of an earthworks training exercise. Gtek (2003) undertook further investigations of these items, and concluded that no grenades or any items that could be perceived as hazardous were located.

Former Refuelling Facility

The GHD and JBS&G investigations identified elevated concentrations of hydrocarbons in soil and groundwater, including the presence of LNAPL within the foot print of the former Refuelling facility (Building 21). The former Refuelling facility is located north of the site, and the southernmost extent of LNAPL and dissolved phase hydrocarbon impacts inferred by GHD to be approximately 50 m north of the site. The flow of the groundwater in the area is not clear due to the presence of the LNAPL, however, based on the extent of the impacts the LNAPL appears to be migrating away from the site towards the north and north-west.



5.0 PRELIMINARY CONCEPTUAL SITE MODEL

A preliminary conceptual site model (CSM) has been developed based on the information gathered through the previous investigations. The CSM is a qualitative tool used to identify potential source, receptor linkages which may exist on the site and therefore determine if there are potential risks which warrant further assessment, or remediation / management.

A risk cannot exist without a linkage between the sources of contamination, which need to be significant enough to present a potential risk and the receptors (human health and / or environment) via plausible exposure pathways.

5.1 Contaminants of Potential Concern and Sources

Based on the information presented in the previous investigations the following contaminants of potential concern (COPCs) and their source(s) have been identified within the site:

- **Lead** impacted fill materials located on the northern boundary of the site. The maximum reported lead concentration was 22,000 mg/kg which exceeded the NEPM HIL(D) trigger value for commercial / industrial use of 1500 mg/kg. The impacts are associated with a "waxy" substance, which is potentially paint or water proofing agents disposed of within the burial pit, and encountered up to 1.9 m depth. The extent of the impacts are expected to be limited to a localised portion of the burial pit, however, as the burial activities were unknown there is potential for similar materials to be present elsewhere within the burial pits. The waxy materials were first encountered at approximately 0.3m depth within TP062, and based on the GHD (2015) test pit log were not apparent in the surface soils.

There is limited information on groundwater in the area, however, the nearest monitoring wells (GW076A, GW029 and GW077) did not report elevated concentrations of lead. However, the leachability of the impacted materials was not assessed by GHD (2015), and the groundwater in the immediate vicinity of the burial pit has not been assessed.

- **Asbestos** fragments were encountered in numerous locations across the site in both the surface soils and within the fill materials. The ACM fragment are likely to be associated with the historic disposal of building materials in the burial pits.

Based on the information presented in the previous investigations the following contaminants of potential concern (COPCs) and their source(s) have also been identified immediately adjacent to the site and warrant consideration within the preliminary CSM:

- **Petroleum Hydrocarbon** impacted groundwater has been identified in the vicinity of the former refuelling facility which is located approximately 50m north of the western end of the site. The groundwater in the areas has been impacted with LNAPL and dissolved phase hydrocarbons. Currently the petroleum hydrocarbon plume appears to have migrated north and northwest.
- **Chlorinated hydrocarbon** impacted groundwater has been identified in the deeper groundwater in the vicinity of the burial pit located 50 m north of the central portion of the site. The source of the impacts is not apparent, and the extent of the impacts has not been delineated.

5.2 Receptors

The Butchers Knife will be included as part of the wider Precinct redevelopment into an intermodal terminal, which will include the installation of rail, road infrastructure and warehousing structures. As such the future land use for the Butchers Knife will be commercial / industrial land use, inclusive of rail infrastructure and commercial structures. Subsequently, the potential future users are considered to include:

- Workers involved in the development of the precinct, particularly those involved in excavation works;
- Future workers employed on the property, including shallow intrusive maintenance workers requiring access to underground services potentially installed in the area.



The contaminated materials may also present a risk to ecological receptors on the site and offsite if not appropriately managed. The nearest offsite ecologically sensitive receptors include:

- The Boot Land which has been nominated as ecological conservation area, and includes Anzac creek which passes 25 m from the southern boundary of the site at its nearest point; and
- The Georges River, and the associated riparian zone which is located approximately 750 m west of the site.

5.3 Pathways

5.3.1 Lead Exposure

The lead presents a potential risk to future users of the site through either direct contact and / or the inhalation of dust. Based on the observed depth of the impacts and the current grass cover in the area this is only likely to occur during future excavation works and if the exposed materials are not appropriately managed during those works. The risks associated with dust are only likely to occur if the impacted materials are exposed and allowed to dry and generate dust.

The potential extraction of impacted soil during the future development activities, also presents a potential hazard to ecological receptors, if the cuttings are not appropriately controlled.

Elevated concentrations of lead were not identified in the groundwater surrounding the area, however, as the leachability of the impacted materials has not been assessed it is not known if there is potential for the materials to impact the underlying groundwater.

5.3.2 Asbestos Exposure

Bonded ACM is the most common form of asbestos contamination in or on soil across Australia (NEPC, 2013), and generally arises from inadequate removal and disposal practices during demolition activities, widespread dumping and historic filling using unsorted demolition materials. Bonded ACM in sound condition represents a low human health risk, however, fibrous asbestos (FA) and asbestos fines (AF) have the potential to release asbestos fibres and need to be carefully managed.

The identified ACM fragments present a potential risk to future users of the site through the inhalation of respirable fibres, and requires management during the future development of the site.

5.3.3 Petroleum Hydrocarbon Exposure

The potential exposure of future workers to the hydrocarbons identified to the north of the site will be subject to the outcomes of the remediation actions proposed by Defence. As the outcomes of the remediation works are not yet known, it should be conservatively assumed that residual LNAPL will remain on the groundwater in close proximity to the northern boundary of the site. Furthermore, due to the presence of LNAPL the groundwater flow direction is not clearly apparent, hence there is potential for the LNAPL to migrate beneath the site, particularly if the construction activities on the site include the extraction of groundwater, or excavation dewatering.

The principal exposure route and potential hazard for future users of the site is also via inhalation of vapours potentially emanating from the LNAPL and dissolved hydrocarbon plume. There is also potential for workers to be directly exposed to contaminated groundwater and/or soils should deep excavation (>5 m depth) and/or groundwater extraction be required during the redevelopment works. Deep excavation works, and/or extraction of impacted groundwater will also increase the potential for workers to be exposed to vapours.

The potential extraction of impacted soil and/or groundwater during the future development activities, also presents a potential hazard to ecological receptors if the cuttings and/or extracted materials are not appropriately controlled. Without appropriate containment the contaminated materials may be dispersed across the site or off-site, and present a risk to ecological receptors on the site and offsite.



5.4 Key Data Gaps

Based on the preliminary conceptual site model, the following have been identified as key data gaps in the current information pertaining to the contamination risks on the site;

- **Chlorinated hydrocarbons** – only relatively low level concentrations have been identified approximately 50 m north of the site. However, there is limited information available on the source of these impacts and the vertical and lateral extent in both soil and groundwater. Furthermore, the assessments have not considered possible vapour risks to future site users.
- **Lead** – Elevated concentrations of lead were not identified in the groundwater surrounding the area, however, as the leachability of the impacted materials has not been assessed it is not known if there is potential for the lead impacted wastes to contaminate the underlying groundwater. And the extent of any contamination is not known.
- **Unidentified Contamination** – due to the historic use of the site for unauthorised disposal activities there is potential for additional unidentified areas of contamination to be present across the site. Furthermore, as demonstrated in TP062 there is also potential for the wastes to vary significantly within the known burial pits. Limited geophysical and intrusive investigations have been completed across the site, and the majority of the intrusive investigation locations targeted anomalies detected with a mine detector. As such the locations were potentially biased to where the burial pits contained metal.

5.5 Preliminary CSM Outcomes

Based on the investigations completed within the site the following are considered to be the principle outcomes of the CSM:

- Without appropriate management or remediation, there is a potential for future site users to be exposed to soils impacted with lead and asbestos.
- If not appropriately controlled there is also potential for future users of the site to negatively influence the migration of the petroleum hydrocarbon impacted groundwater identified to the north of the site through uncontrolled excavation dewatering and or groundwater extraction.
- There are also gaps in the current understanding of the burial pits across the site, the distribution of chlorinated hydrocarbons identified in the groundwater to the north of the site, and the presence of absence of lead impacts in groundwater in the vicinity of the lead impacted burial pit.

Subsequently, contamination management measures will need to be implemented to facilitate the future redevelopment of the site.



6.0 SITE MANAGEMENT PLAN - CONTROLS

6.1 Rationale

Based on the investigations completed within the site there is a potential for a complete exposure pathway to be present between the contaminated soils identified on the site and future site users. There are also gaps in the current understanding of contamination on the site. Subsequently, the future development of the site will require the implementation of appropriate controls to ensure the contamination risks are appropriately managed during the future development of the site.

We note that the terms “remediation” and “management” in the context of this document refer to actions required to either treat material, remove it offsite or to isolate it on-site to provide an acceptable risk outcome for the proposed land uses. The context of “management” is also inclusive of administrative controls put in place during development and construction to ensure the risks posed by contamination are appropriately managed.

The objectives of the SMP is to ensure the risks associated with the identified contamination and key data gaps are appropriately managed or remediated to allow the future development of the site for commercial / industrial land use, including a rail access corridor.

6.2 Lead Hot Spot Remediation and Management

Due to the concentrations of lead (22,000 mg/kg) identified in the soils in TP062 between 0.3 and 1.9 m depth, it is recommended that the hot spot be remediated prior to or during the proposed redevelopment of the site. The extent of impact is estimated at approximately 20 m long x 6 m wide and extends to approximately 2 m depth. Interim management measures should also be implemented prior to and during the remediation works.

The identified impacts are similar to other hot spots of contamination identified on the MIC Property West and the future management of these impacts are to comply with the requirements specified within the MIC RAP (PB, 2014) and the MIC Validation Plan – Principles (Golder, 2015c) particularly *Section 6.2 Approach to Materials Classification*.

6.2.1 Remediation Strategy

The hot spot of lead contaminated soil will be excavated, and the excavated materials disposed offsite at a facility licenced to receive hazardous waste / special waste (asbestos waste). The subsequent excavation will be validated. The location of the proposed remediation excavation is shown on Figure 2 (Appendix A).

The abovementioned approach to the lead hot spot remediation is based on a worst case scenario, in which the lead impacted materials will present a long term risk if retained on the site, and subsequently the materials are required to be excavated and disposed off-site. Based on the limited volume of the materials the above mentioned approach is considered to be the most efficient remedial option. Further assessments are required to determine the full extent of the impacts, and should the volume of contaminated materials requiring offsite disposal increase significantly, consideration should be given to alternative remediation approaches. Any alternative approached to the management of the materials will need to be approved by the appointed NSW EPA Accredited Site Auditor.

6.2.2 Validation the Lead Hotspot Excavation

Excavation validation soil sampling will be carried out to confirm that contaminated soil has been removed. The walls and bases of the excavations will be validated through the collection of representative soil samples to confirm the absence of residual contamination, or identify requirements for further management. The excavations will be left open and fenced to prevent access until analytical validation results have been obtained and confirm acceptable residual concentrations of contaminants of concern.

Validation of the resulting excavation will be undertaken as follows:



- Validation soil sampling of the base of the excavations will be undertaken at a minimum of two samples and on a 10 m by 10 m grid with additional targeted sampling in areas of known or potential environmental concern for larger excavations.
- Validation soil samples from the walls of excavations will be applied to each depth unit within each excavation with a minimum of one validation sample per exposed face or per 10 m length of exposed face for every one metre depth of each depth unit will be collected.
- Validation soil samples will be submitted for laboratory analysis for lead and asbestos. Where required additional contaminants will also be scheduled where field observations (odour, staining and photoionisation detector [PID] readings) indicate an additional area of concern.

The asbestos validation samples will be classified using the gravimetric approach, as described within the ASC NEPM (NEPC, 2013), where the soil is tested using a representative number of individual 10L samples. If materials are heterogeneous, then each individual 10L sample will be considered representative of specific soil materials present within the stockpile. Should bonded ACM be identified in poor condition, additional laboratory analysis, in accordance with AS4964 – 2004, may also be required to validate the materials.

Where validation samples record results in excess of the adopted remediation criteria (refer to Appendix C), further excavation of the material will be undertaken followed by collection of additional validation samples, as described above. The extent of further excavations will be evaluated by the Environmental Consultant and presented on a plan defining the excavation extents by co-ordinates and depth.

6.2.3 Lead Hot Spot Management Controls

Management Controls are required to create awareness of the presence of contamination and ensure the exposure risks are appropriately managed prior to and during the abovementioned remediation works. The proposed management controls to be implemented during the lead hot spot remediation are identified in Table 2 below.

Table 2: Management Controls – Lead Hot Spot Remediation

Management task	Commentary
Objective	Management controls are required to alert users of the site to the potential direct exposure and dust inhalation risks associated with the lead impacted soil present within the Lead Hot Spot Exclusion Zone.
Performance criteria	Uncontrolled sub surface activities are not to be undertaken in the Lead Hot Spot Remediation Zone (refer to Figure 2). Appropriate controls are to be implemented during the proposed remediation works.
Management controls	Prepare a training and induction process notifying all employees and contractors on the hazards associated with the Lead Hot Spot Remediation Zone (refer to Figure 2), and implement as appropriate prior to works commencing. No excavation or disturbance to site soils within the Exclusion Zone without written authorisation by the Head lessee or Site Manager. Prepare and implement a Job Safety Analysis (or equivalent) prior to commencement of excavation and /or groundwater extraction activities. The JSA must include as a minimum the following control measures: ■ Appropriate confined space gas/vapour monitoring procedures suitable for management of potential exposure to lead and asbestos impacted soils. ■ Appropriate hot work permitting procedures including gas/vapour testing procedures suitable for management of explosive risks associated with petroleum hydrocarbon vapours.



Management task	Commentary
	■ Definitions of appropriate person protective equipment requirements. ■ Appropriate controls on personal hygiene to minimise ingestion by hand to mouth of potentially impacted soils and /or groundwater. ■ Appropriate personnel decontamination procedures. Prepare and implement a Construction Environmental Management Plan (CEMP) prior to commencement of remediation / excavation activities. The CEMP must include as a minimum the following control measures for the following aspects: ■ Surface water discharge of contaminated materials. ■ Dust/vapour and odour emissions emanating from contaminated materials. ■ On-site remediation and / or treatment of extracted contaminated soils and groundwater. ■ Waste classification, haulage and offsite disposal. ■ Spillage of contaminated materials. ■ Appropriate equipment decontamination procedures. Initiate corrective actions as soon as practicable and within two weeks of identification of non-conformance.
Responsibility	Head Lessee or delegate
Corrective Actions	Corrective actions will be required if any of the above mentioned management controls are not complied with. The Non-conformance and complaints register presented as Appendix D identifies the requirement for corrective action and recommendations for preventative actions. Corrective and preventative actions are to be reviewed and implemented by the Site Manager or his/her delegate.

6.3 Management of Asbestos in or on Soils

The identification of ACM on and in the soils will require management during the future development to prevent the exposure of future site workers to respirable asbestos fibers. The identified asbestos materials are consistent with that identified on the wider sections of the SITMA Property and MIC Property West. Therefore, the future management of these impacts are to comply with the requirements specified within the MIC RAP (PB, 2014), the JBS&G (2015) SIMTA Stage 1 RAP and the MIC Validation Plan – Principles (Golder, 2015c) particularly *Section 6.8 Approach to Asbestos*.

In summary the following approach is to be implemented during the proposed development works:

- An asbestos management plan (AMP) will be prepared by a competent person as defined within the NSW WorkCover and Safe Work Australia *How to Safely Remove Asbestos, Code of Practice (December 2011)*. The AMP will define the actions, roles and responsibilities associated with the management of asbestos on the site including consultation requirements, licencing requirements, health monitoring and air monitoring requirements. The AMP could be prepared on a site wide or stage specific approach as part of the CEMP.
- Prior to commencing works within a specific site area, a grid-based walkover of the areas will be completed by an appropriately qualified person and/or occupational hygienist to assess for the presence of visible surface asbestos. The observations will assist in defining whether the area has a



high potential for asbestos contamination in or on soil, and will assist in determining the asbestos management strategy for the selected area.

- Any visual observations of asbestos will be recorded by GPS, as well as the asbestos type, and the asbestos will be manually collected via 'emu-bobbing' using a licensed asbestos removal contractor. The walkover will generally use a methodology consistent with those proposed by the Western Australia Department of Health (WA DOH, 2009). Validation will comprise the issuance of a clearance certificate by an occupational hygienist confirming no visible asbestos remains in the area targeted for clearance.
- Where required, the known asbestos in sub-surface soils will be targeted for active remediation excavation and validation. Excavation validation will comprise the issuance of a clearance certificate by an occupational hygienist confirming no visible asbestos has been identified. Following excavation, asbestos impacted soils will be disposed of offsite, or placed in a location considered suitable for onsite containment and management through the LTEMP.
- Stockpiled materials will be validated using the gravimetric approach, as described within the ASC NEPM (NEPC, 2013), where the soil is tested using a representative number of individual 10L samples. If the stockpile comprises heterogeneous materials, then each individual 10L samples will be considered representative of specific soil materials present within the stockpile. Should bonded ACM be identified in poor condition, additional laboratory analysis, in accordance with AS4964 – 2004 may also be required to validate the stockpiled materials.

Asbestos identified at the site will be mapped on the site GIS Interactive Map, and is it expected that this mapping will continue throughout the remediation and development process. The ongoing mapping of asbestos will include:

- Surface observations of visible ACM via site walkovers.
- Subsurface observations through, soil investigation programs, that encountered during excavations or that encountered within stockpiles.

6.4 Management of Foreign Materials (Wastes)

The previous investigations have identified the presence of disposal pits across the site where foreign materials (wastes) have been buried (referred to as tip sites). These have been the subject of previous investigations, and the majority of the materials sampled reported chemical concentrations below the adopted investigation levels (with the exception of the lead hot spot noted above). These tip sites include various forms of wastes, and are likely to include some soil discolouration and residual odour. They also include occasional pieces of asbestos containing materials.

The location and nature of the identified tip sites is consistent with those identified on the wider sections of the SIMTA Property and MIC Property West. Therefore, the future management of these areas is to comply with the requirements specified within the MIC RAP (PB, 2014), the JBS&G (2015) SIMTA Stage 1 RAP and the MIC Validation Plan – Principles (Golder, 2015c) particularly *Section 6.9 Approach to Aesthetics and Foreign Materials (Wastes)*.

Given the proposed commercial / industrial land use it is not expected that aesthetic issues form a driver for remediation, nor would they necessitate the need to validate these areas of the site. Any remediation or management actions and the subsequent validation will focus on the mitigation of the risks posed by the elevated chemical concentrations, in the context of the proposed future commercial / industrial land use.

There is potential that additional unidentified tip sites are present on the site. If a previously unidentified tip site is encountered and there is a requirement for the materials to be excavated, and if adverse conditions are observed, then an assessment and validation process appropriate for the volume and character of the materials observed will be implemented. The adverse conditions which may warrant additional assessment and validation include;

- highly malodorous soils or seepage water (e.g. strong residual petroleum odours);



- hydrocarbon sheen on surface water;
- discoloured chemical deposits or soil staining with chemical waste other than of a minor nature;
- large 'monolithic' deposits of materials (e.g. gypsum as powder, or plaster board);
- presence of putrescible refuse including material that may generate hazardous levels of ground gases (e.g. methane) such as large quantities of green waste or timber waste; and
- presence of objects which may indicate the presence of chemical contamination, such as drums, tanks or other such storage items.

The materials within the tip sites may not be geotechnically suitable and rectification works maybe required. The ASC NEPM (NEPC, 2013) notes that geotechnical issues should be considered separately to contamination issues. However, with the uncertainty regarding additional un-identified tip sites remaining on the site, there is opportunity to use the processes associated with geotechnically preparing the site for development to provide evidence that additional unidentified tip sites do not exist within the footprint of the proposed development.

The verification that an area has achieved the required geotechnical characteristics to allow filling or development, is also considered to provide sufficient evidence that that site area does not include significant volumes of anthropogenic fill (waste). Records of geotechnical testing and any improvement activities will need to be included within the Validation Report, and presented to the Site Auditor for review.

6.5 Management of UXO and EOW

The previous investigations have identified the potential for UXO and / or EOW to be present in areas immediately adjacent to the site. The UXO investigations (G-tek, 2014) concluded that the primary UXO risks were associated with the unauthorized grenade range, located to the south of the site.

A detailed area specific UXO Management Plan will need to be developed as part of the detailed design process for the site. The object of the management will be to ensure a safe working environment is established during construction phase earthworks, and that site is remediated (where required) safe such that future workers within the site are protected. The UXO Management Plan is to be prepared by a suitably qualified UXO contractor, such as a member of the Department of Defence Environmental and Heritage Panel F2 stream, and is to be specific to the proposed development works particularly any excavations works.

In general EOW and UXO Management plan is to include, but not be limited to the following:

- **Roles and Responsibilities** – appropriate management personnel should be designated with specific responsibilities in the event of UXO or EOW being identified within the Site during the development works. Where required, these roles should include appropriately qualified contractors, such as UXO contractors who are members of the Department of Defence Environmental and Heritage Panel F2 stream. A UXO / EOW Contact list is to be maintained as part of the management plan, detailing the name, position, responsibility and contact details of each individual who may need to be involved in any UXO/EOW activity;
- **Fencing and Signage** – installation and maintenance of appropriate fencing and signage, sufficient to prevent access by unauthorized persons. Signage shall be placed at a maximum of 50 m intervals around the boundary detailing "no unauthorized access", and also be placed in key areas where persons are likely to enter the area. Signs are to be placed at a maximum height of 1.5m above ground level and be maintained such that they are clear of vegetation and clearly visible. Access is to be controlled by the Head Lessee (or their delegate), and the site only accessed by persons authorized by the Head Lessee (or their delegate) following completion of the required induction process as defined with the UXO / EOW management plan.
- **Site Induction** – a UXO/EOW awareness training process is to be detailed within the UXO/EOW management plan. The induction process is to detail the UXO/EOW safety induction for all staff



engaged in Site works regardless of whether they are directly involved in excavation activities. The induction should include but not be limited to:

- Site History;
- Potential UXO/EOW that may be remnant within the Site;
- Roles and Responsibilities of all staff and key UXO/EOW staff;
- Process to be followed if UXO/EOW is potentially encountered.

■ **Management Process** – a clear management process is to be detailed for the discovery of a potential UXO/EOW item during future site works. This is to include, but not be limited to the following:

- The communication protocol notifying the UXO/EOW contractor or UXO /EOW manager on the site as soon as practical;
- The process for making the discover site safe, such as making sure the discovered item should not be moved or touched and works that could move or disturb the items are ceased. An exclusion area of 5m radius be established and enforced around the item until the UXO/EOW contractor or UXO/EOW manager has completed the initial assessment;
- Notification of occupants of any work sites or buildings in close proximity to the exclusion zone, in case future evacuation is required;
- The assessment process, where the UXO/EOW contractor or UXO/EOW manager will assess the discovered item to determine whether it is a risk. If identified as a risk, the UXO /EOW manager will inform the Site Manager and if required increase the exclusion zone;
- The clearance process, where subject to the class of the materials identified the UXO/EOW manager and Site Manager will liaise with the Department of Defence to ensure the timely and appropriate disposal of the materials.
- The documentation process, where the UXO/EOW contractor and or UXO/EOW manager will maintain an incident register and record any reported discovery, outlines any assessment and the final disposal of the materials identified. These records will be presented to the appropriate consent authority on request.

The future LTEMP developed for the Moorebank Avenue realignment will need to include appropriate fencing / signage and unexpected finds protocols which will stipulate what fencing and signage requirements are to be installed and maintained following development and what actions are to be followed should additional UXO/EOW be identified during the future operation of the site (i.e. an unexpected finds protocol).

The UXO/EOW remediation and management plan will need to be presented to the Environmental Auditor for comment, and records of the UXO/EOW materials encountered and the removal or management activities implemented during the remediation / development documented and presented to the appropriate consent authority on request.

This approach is generally consistent with the MIC Validation Plan – Principles (Golder, 2015c) particularly *Section 6.10 Approach to UXO and EOW*.

6.6 Management of Groundwater Extraction

Controls are required to create awareness of the presence of hydrocarbon contaminated groundwater to the north of the site and where possible restrict activities on the site to minimise the potential disturbance of the identified LNAPL and dissolved hydrocarbon plume. The proposed management controls are identified in Table 3 below.

Table 3: Management Controls – Offsite Hydrocarbon Plume



Management task	Commentary
Objective	Administrative controls are required to alert users of the site to the presence of LNAPL and dissolved phase hydrocarbons to the north of the site in the vicinity of the former Refuelling Facility and to restrict un-necessary disturbance of the contaminated groundwater located at depth in the western portion of the site.
Performance criteria	Uncontrolled sub surface activities are not to be undertaken on the site. Uncontrolled groundwater extraction activities are not to be undertaken on the site.
Management controls	Prepare a training and induction process notifying all employees and contractors on the hazards associated with the adjacent LNAPL plume, and implement as appropriate prior to works commencing. No excavation or disturbance to site soils and no extraction of groundwater from within the site without written authorisation by the Head Lessee or Site Manager. Where possible, the future redevelopments are to be designed that that the potential disturbance of the groundwater within the site is minimised. This may include the consideration of designs and or construction methods which minimise deep excavations (including piling) and / or groundwater extraction. Prepare and implement a Job Safety Analysis (or equivalent) prior to commencement of excavation and /or groundwater extraction activities. The JSA must include as a minimum the following control measures: ■ Appropriate confined space gas/vapour monitoring procedures suitable for management of potential exposure to petroleum hydrocarbon vapours. ■ Appropriate hot work permitting procedures including gas/vapour testing procedures suitable for management of explosive risks associated with petroleum hydrocarbon vapours. ■ Definitions of appropriate person protective equipment requirements. ■ Appropriate controls on personal hygiene to minimise ingestion by hand to mouth of potentially impacted soils and /or groundwater. ■ Appropriate personnel decontamination procedures. Prepare and implement a Construction Environmental Management Plan (CEMP) prior to commencement of excavation and /or groundwater extraction activities. The CEMP must include as a minimum the following control measures for the following aspects: ■ Surface water discharge of contaminated materials. ■ Dust/vapour and odour emissions emanating from contaminated materials. ■ On-site remediation and / or treatment of extracted contaminated soils and groundwater. ■ Waste classification, haulage and offsite disposal. ■ Spillage of contaminated materials. ■ Appropriate equipment decontamination procedures. Initiate corrective actions as soon as practicable and within two weeks of identification of non-conformance.



Management task	Commentary
Record keeping and reporting	Maintain a log of inspections, non-conformances and corrective actions.
Responsibility	Head Lessee or delegate
Corrective Actions	Corrective actions will be required if any of the above mentioned management controls are not complied with. The Non-conformance and complaints register presented as Appendix D identifies the requirement for corrective action and recommendations for preventative actions. Corrective and preventative actions are to be reviewed and implemented by the Site Manager or his/her delegate.

6.7 Additional Investigations – Chlorinated Hydrocarbons and Lead in Groundwater

Low level concentrations of chlorinated hydrocarbons have been identified in the deeper groundwater approximately 50 m north of the site. However, based on current investigations there is limited information available on the source impacts and the vertical and lateral extent of the impacts in both soil and groundwater. Furthermore, the current assessments have not considered possible vapour risks to future site users.

Chlorinated hydrocarbons have historically been used in selected areas of the site, and there is potential that chlorinated hydrocarbons and chlorinated hydrocarbon impacted materials have been disposed of in the burial pits / tip site located either in the site or in close proximity to the site.

Furthermore, the leachability of the lead impacted materials has not been assessed, and therefore the extent of any lead impacted groundwater is not known.

Further assessments are recommended, and the objective of the investigation should be to develop sufficient evidence that the impacts are not going to present an unacceptable risk to the future users of the site, and / or the offsite receiving environments. The objectives chlorinated hydrocarbon investigations are to assess the potential migration and intrusion of vapours in to future buildings positioned on this portion of the site, and the objective of the lead impacted groundwater investigations are to determine of the groundwater is impacted with lead, and whether those impacts (if present) pose a risk to offsite receptors.

Prior to commencing the additional investigations a Sampling Analysis and Quality Plan (SAQP) should be prepares in consultation with the Auditor. The SAQP is to be prepared in accordance with the Data Quality Objectives (DQO) process, as described in the NSW EAP Contaminated Site Auditor Guidelines (2997) and provide detail on the proposed investigation scope and the investigation methods. The SAQP is to consider the most appropriate investigation methods to achieve the objectives of the investigation.



7.0 SITE MANAGEMENT PLAN - IMPLEMENTATION

7.1 Responsibility

The contamination management measures detailed in this report are to be implemented for the ongoing use of the site, or until it is proven to the satisfaction of the accredited NSW EPA contaminated site auditor (the Auditor) that the site is suitable for ongoing commercial / industrial use.

The implementation of the contamination control measures described in this report is the responsibility of the Head Lessee (MIC) under the obligations imposed under Clause 6.1(b)(1) of the Head Lease from the Commonwealth to MIC, where:

“remediating all Contamination on, in or in respect of the Premises to the standard required under any applicable Environmental Law from time to time irrespective of who caused the Contamination and irrespective of whether the Contamination first occurred or was first caused or was first disturbed prior to the Commencement Date or the date of the Tenant’s first occupation of the Land.”

To clarify, in respect of this report the abovementioned term “remediation” includes the implementation of a management approach where appropriate.

The responsible person for the overall implementation of the contamination management measures is the Head Lessee and/or their nominated representative or delegate. Implementation of the contamination management plan during specific works is the responsibility of the works supervisor, considered to be the delegate of the Site Manager.

The roles and responsibilities for the implementation of the SMP are identified in Table 4 below.

Table 4: SMP Roles and Responsibilities

Role	Responsibility
Head Lessee (MIC) or delegate	Approve the SMP and contamination management measures. Advise persons working at the site of the requirements of the SMP. Ensure appropriate consents and licences (as required) are obtained for the works. Ensure appropriate fencing and signage is installed and maintained, such that unauthorised access to the site is controlled. Provide training and induction of employees and contractors before and during the works, as appropriate. Provide a copy of the SMP to the supervisor or person-in-charge of employees and/or contractor/s who are undertaking the works. Ensure implementation of the SMP. Maintain a log of Project Personnel. Ensure staff and contractors comply with the requirements of the SMP. Ensure staff and contractors clearly understand the requirements of the SMP and ensure that compliance with the SMP is a condition of any agreement with contractors. Update the SMP if the condition of the site is changed, and, if necessary, inform other parties of the changes. Ensure the site is maintained in accordance with the SMP. Provide the SMP for inclusion on the relevant records maintained by MIC and others (including owners and /or agents responsible for the management of assets within the site).



Role	Responsibility
	Ensure an inspection of the site is undertaken at six-monthly intervals or at another intervals as decided by MIC and record the results of the inspections in Appendix E. Ensure all non-conformance and/or complaints are recorded in Appendix D of the SMP.
Site Manager	Implement the SMP to ensure compliance. Complete the registers, databases and records required by the SMP. Conduct works in an environmentally responsible manner. Meet relevant WH&S regulatory requirements. Implement the works in a safe and responsible manner. Ensure that environmental protection measures are in place and are functioning correctly during the works and after completion of the works, if required. Complete non-conformance and corrective action reports as required and undertake follow-up corrective actions, as required. Conduct monitoring as required in the SMP. Undertake audits of activities in accordance with the requirements of the SMP. Ensure non-conformance and/or complaints are reported to the Site Manager and Site Owner. Undertake corrective actions in response to requests regarding specific environmental or safety issues. Ensure all works comply with relevant regulatory requirements. Inform the Site Manager if conditions change significantly from those documented in the SMP.
Site Developer	Provide the SMP to any maintenance worker or contractor (who is engaged under the direction of the site developer). Comply with the SMP during development of the site, including being aware of and accommodating the requirements of the contamination management measures site within the design redevelopment. Prepare and implement a Construction Environmental Management Plan, for any activities proposed within the site, and ensure the CEMP addresses the risks identified in this SMP and any supplementary plans including but not limited to a an AMP and UXO/EOW management plan. Ensure potential risks are managed through implementation of the SMP. Monitor adherence to the SMP. Initiate and undertake corrective actions for non-conformance under the SMP. Inform the Site Owner and Site Manager if in-ground conditions change significantly from those documented in the SMP.
Maintenance Work / Contractor	Comply with the SMP, including relevant legislation and guidance when conducting works at the site.



Role	Responsibility
	Ensure tasks are approved by the Site Owner their delegate (Site Manager or Site Developer) prior to commencing work. Inform the Site Owner/ Site Manager/Site Developer if ground conditions differ and/or change significantly from those documented in the SMP.

7.2 Contamination Management Contingency Actions

Table 5 identifies contingency actions to be performed in the event of unexpected exposure of site occupants or visitors to contamination on the site occurs or the potential for exposure occurs.

Table 5: SMP Contingency Actions

Trigger	Action
Unauthorised excavations in the site.	If excavations are in process: ■ Stop work and contact the Site Manager and Site Owner. ■ Stockpile suspected contaminated material which has been excavated on an impervious surface (concrete slab or minimum two layers of builders plastic), cover stockpile and bund to prevent surface water run-off. ■ Site Manager to engage an experience environmental consultant and /or occupational hygienist to assess exposure of workers to potentially contaminated materials. If excavations have occurred and the area has been reinstated: ■ Assess condition of surface soils in the work area against appropriate land use criteria to confirm contaminated soils do not remain on the site surface. ■ Instigate preventative action to limit the potential for reoccurrence.
Identification of unexpected contaminated materials during excavation works on the site.	If unexpected contamination² is encountered during excavation works the following actions should be taken: ■ Stop work and contact the Site Manager and Site Owner. ■ Stockpile suspected contaminated material which has been excavated on an impervious surface (concrete slab or minimum two layers of builders plastic), cover stockpile and bund to prevent run-off. ■ Site Manager to engage an experience environmental consultant to assess potentially contaminated materials. ■ Update the SMP. Adverse conditions which may warrant action include; ■ highly malodours soils or seepage water (e.g. strong residual petroleum odours); ■ hydrocarbon sheen on surface water;

² Contamination may include, but not be limited to, hydrocarbons, poly cyclic aromatic hydrocarbons and asbestos.



Trigger	Action
	■ discoloured chemical deposits or soil staining with chemical waste other than of a minor nature; ■ large monolithic deposits of materials (e.g. gypsum as powder, or plaster board); ■ presence of putrescible refuse including material that may generate hazardous levels of ground gases (e.g. methane) such as large quantities of green waste or timber waste; ■ presence of objects which may indicate the presence of chemical contamination, such as drums, tanks or other such storage items; and ■ presence of asbestos containing materials (ACM).
Identification of unexpected UXO during excavation works on the site.	If unexpected UXO / EOW is encountered during works the following actions should be taken: ■ Stop work and contact the Site Manager and Head Lessee. ■ Site Manager and Head Lessee to notifying the UXO/EOW contractor or UXO /EOW manager as soon as practical. ■ The discovered item should not be moved or touched and works that could move or disturb the items are ceased. ■ An exclusion area of 5m radius be established and enforced around the item until the UXO/EOW contractor or UXO/EOW manager has completed the initial assessment. ■ Notify occupants of any work sites or buildings in close proximity to the exclusion zone, in case future evacuation is required. ■ UXO/EOW contractor or UXO/EOW manager to assess the discovered item to determine whether it is a risk. If identified as a risk, the UXO /EOW manager will inform the Site Manager and Head Lessee if required increase the exclusion zone. ■ UXO/EOW contractor or UXO/EOW manager to complete the required clearance process and will liaise with the Department of Defence to ensure the timely and appropriate disposal of the materials. ■ Site Manager is to maintain an incident register and record any reported discovery, outlines any assessment and the final disposal of the materials identified. These records will be presented to the appropriate consent authority on request.
Other	Liaise with Site Manager / Site Owner to determine appropriate actions to mitigate adverse impacts from the event.

7.3 Contamination Management Review and Timeframe

7.3.1 Review

This SMP must be reviewed annually by a competent person and assessed against any changes in site conditions, work requirements, legislation, environmental conditions and other relevant factors including the result of corrective and preventative action reports. If required, this SMP must be reviewed at the conclusion of the additional groundwater and soil vapour investigations described within Section 6.7. Where relevant,



preventative actions should be incorporated into the SMP, including additional actions required to manage the potential risks of the known and potential groundwater contamination.

If revision of this SMP is considered necessary then the revision should be agreed by at least the following:

- the Head lessee;
- the Site Manager;
- the Auditor, as required.

7.3.2 Timeframe

This SMP, or any subsequent revision, should apply in perpetuity or until:

- Investigations indicate the concentrations of the contaminants of concern in soil and or groundwater have attenuated or have been remediated to levels below the below endorsed criteria for the commercial/industrial land use. And this assessment has been endorsed by the appointed NSW EPA Accredited Contaminated Site Auditor; or
- Reassessment of contaminant concentrations against future revisions of land use criteria indicates the measured concentrations are below endorsed criteria for the relevant land use (i.e. commercial/industrial land use); or
- The redevelopment and or remediation of the site has been completed, and it is agreed with the appointed NSW EPA Accredited Contaminated Site Auditor that the controls of this SMP are to be incorporated into the wider LTEMP when developed; or
- The land use changes to a more sensitive land use and reassessment of potential risks to site occupants is required.



8.0 CONCLUSION AND RECOMMENDATIONS

It is considered that extensive information is available on the surface and shallow subsurface contamination status of the SIMTA site, and portions of this information are relevant to the Butchers Knife.

Based on the investigations completed within the site the following are the principal outcomes of the CSM:

- Without appropriate management or remediation, there is a potential for future site users to be exposed to soils impacted with lead and asbestos.
- If not appropriately controlled there is also potential for future users of the site to negatively influence the migration of the petroleum hydrocarbon impacted groundwater identified to the north of the site through uncontrolled excavation dewatering and or groundwater extraction.
- There are also gaps in the current understanding of the burial pits across the site, and the distribution of chlorinated hydrocarbons identified in the groundwater to the north of the site.

Subsequently, contamination management measures will need to be implemented to facilitate the future redevelopment of the site. The following remediation and contamination management controls are recommended for the site:

- Remediation of the soils impacted with lead in the vicinity of test pit TP062, through delineation and subsequent excavation, then offsite disposal of the impacted soils and validation of the resultant excavation. The extent of impacted materials is estimated at approximately 240m³ (insitu), however, further assessments are recommended to delineate the extent of impacts.
- Implementation of a management approach to the identified asbestos in soils, waste / tip sites and potential UXO / EOW risks. The nature of the impacts are similar to those identified on the MIC Property West, and it is recommended that the adopted management approaches be commensurate with those presented in the PB (2014) RAP and Golder (2015) Validation Plan – Principles developed for the MIC Property West.
- Implementation of a management approach to the minimise the potential disturbance of the LNAPL and dissolved phase hydrocarbon plume identified in the vicinity of the former refuelling station located approximately 50 m north of the site.
- Undertake further assessments of the chlorinated hydrocarbons identified in groundwater approximately 50 m north of the site with the objective of determining whether the impacts present an unacceptable risk to the future users of the site. Particularly through the migration and intrusion of vapours in to future buildings positioned on this portion of the site.
- Undertake further assessments to determine whether the lead impacted materials in the burial pit have leached to groundwater, and whether the lead impacted groundwater presents a potential risk to offsite environmental receptors.
- Implementation of the SMP presented within this report, including revising the SMP as required at the conclusion of the abovementioned additional groundwater and soil vapour investigations.



Report Signature Page

GOLDER ASSOCIATES PTY LTD

Greg Stratton
Principal Environmental Scientist

Gavin Butterfield
Principal Environmental Scientist

GVS/GB/gvs

A.B.N. 64 006 107 857

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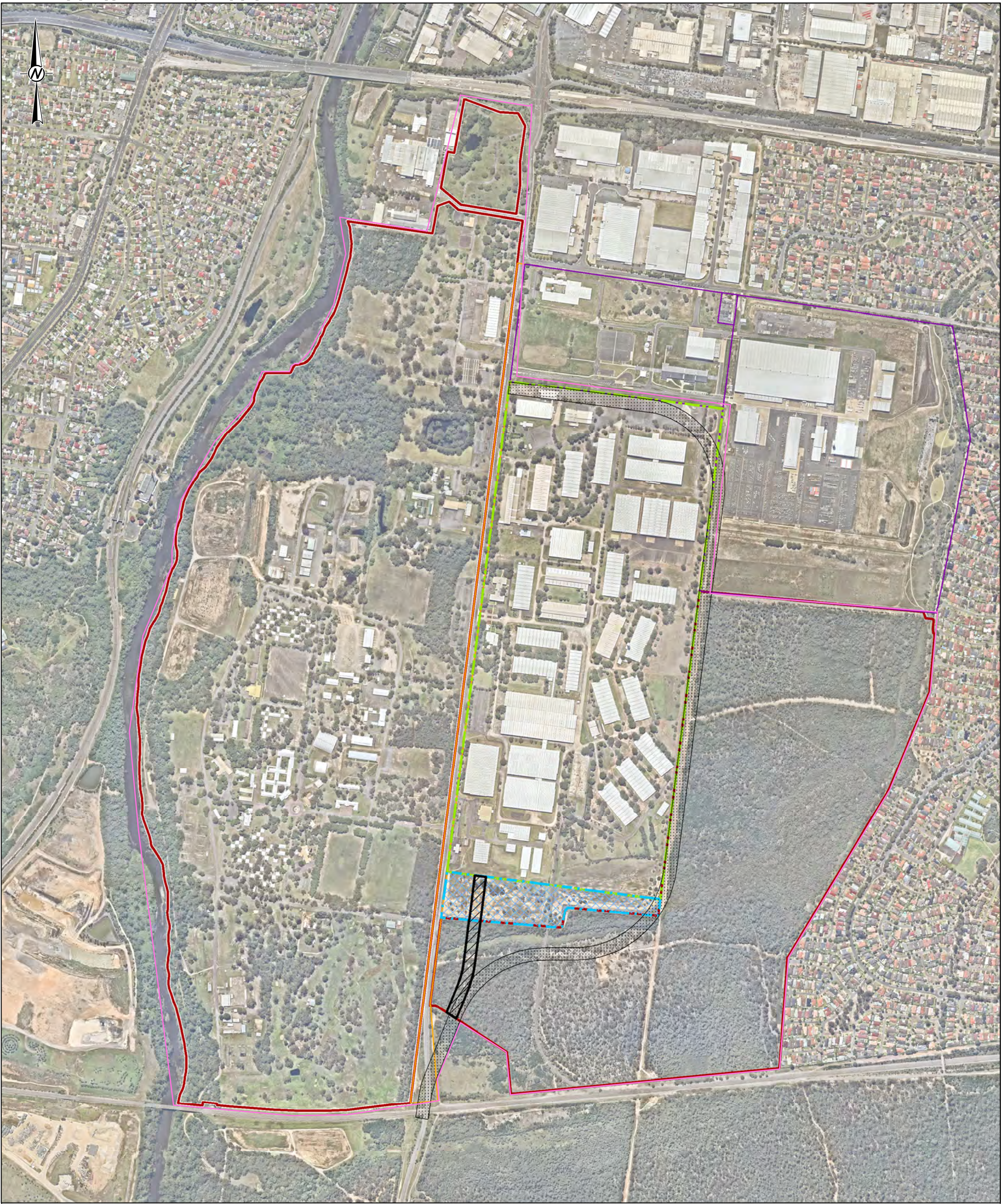
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APPENDIX A

Figures



LEGEND

- The Precinct (approximate)
- MIC Property West
- Bootland (MIC Property East)
- Butchers Knife (The Site)
- SIMTA Property
- Joint Defence Logistics Complex Moorebank
- Moorebank Ave
- Moorebank Ave Realignment
- Rail Access Corridor

NOTE(S)

LNAPL - Light Non Aqueous Phase Liquid

REFERENCE(S)

1. Lot boundaries provided by Land and Property Information NSW

COPYRIGHT

Aerial Photography Copyright
1.NearMap Pty Ltd.

0 420 840
1:10,000
PROJECTION: GDA 1994 MGA Zone 56
METRES

CLIENT

MOOREBANK INTERMODAL COMPANY

PROJECT

BUTCHERS KNIFE SUMMARY REPORT AND SMP

TITLE

SITE OVERVIEW

CONSULTANT



PROJECT NO.
147623070

CONTROL
055

YYYY-MM-DD	2016-07-13
PREPARED	KJS
DESIGNED	####
REVIEWED	GVS
APPROVED	GVS

REV.
1

FIGURE
001



Point_ID	POINT_X
1	308558.55
2	308552.84
3	308301.59
4	308292.74
5	308284.21
6	308278.74
7	307947.03
8	307963.35

LEGEND

Lead Remediation Area

The Precinct (approximate)

MIC Property West

Bootland (MIC Property East)

Butchers Knife (The Site)

SIMTA Property

Moorebank Ave

Moorebank Ave Realignment

Rail Access Corridor

NOTE(S)
LNAPL - Light Non Aqueous Phase Liquid

REFERENCE(S)
1. Lot boundaries provided by Land and Property Information NSW

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1.NearMap Pty Ltd.

0100200
1:2,500
PROJECTION: GDA 1994 MGA Zone 56

METRES

CLIENT
MOOREBANK INTERMODAL COMPANY

PROJECT
BUTCHERS KNIFE SUMMARY REPORT AND SMP

TITLE
LEAD REMEDIATION AREA

CONSULTANT

YYYY-MM-DD
2016-07-27

PREPARED
KJS

DESIGNED
####

REVIEWED
GVS

APPROVED
GVS

PROJECT NO.
147623070

CONTROL
055

REV.
1

FIGURE
002

Golder Associates

25mm

THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN. THE SHEET SIZE HAS BEEN COPIED FROM A3



APPENDIX B

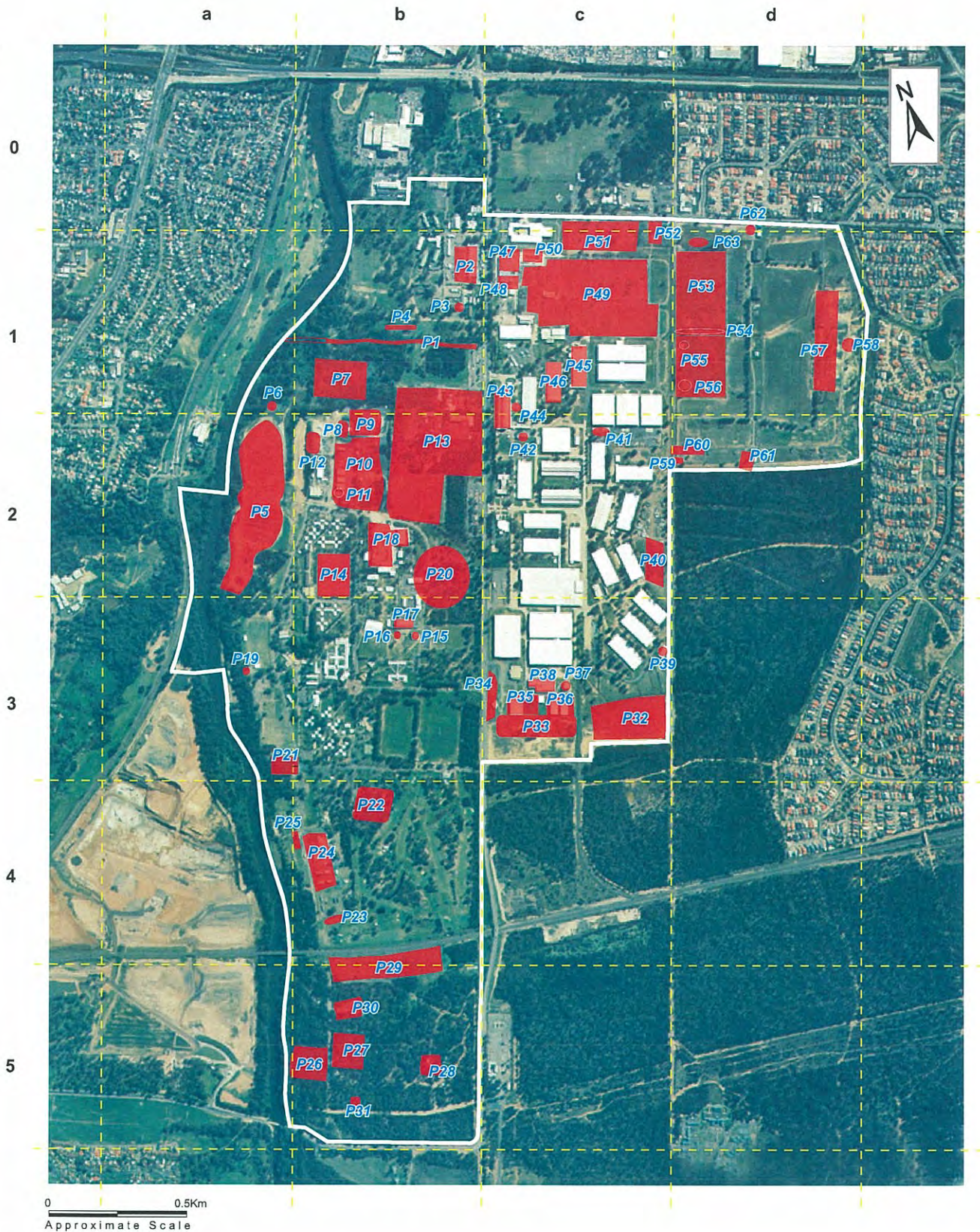
Figures and Tables from Previous Consultants Reports



APPENDIX B1 – FIGURES FROM EGIS (2000)

SITE INSPECTION

MOOREBANK DEFENCE LANDS



See attached Table

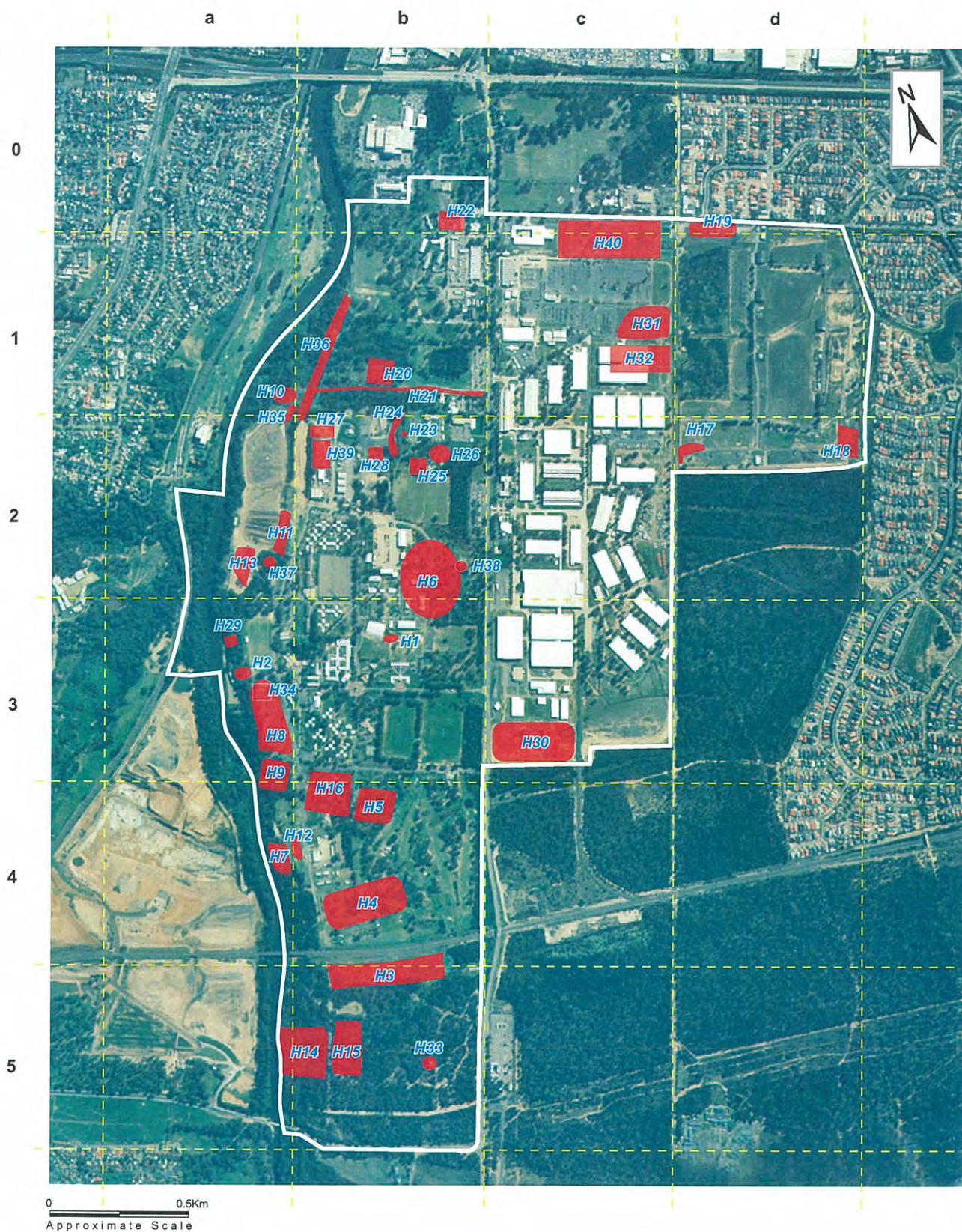
Source : Copyright Surveyor General's Department, 29 September 1998

Date : 3 August 2000

File Name : VA033427.cdr

SITE HISTORY

MOOREBANK DEFENCE LANDS



See attached Table

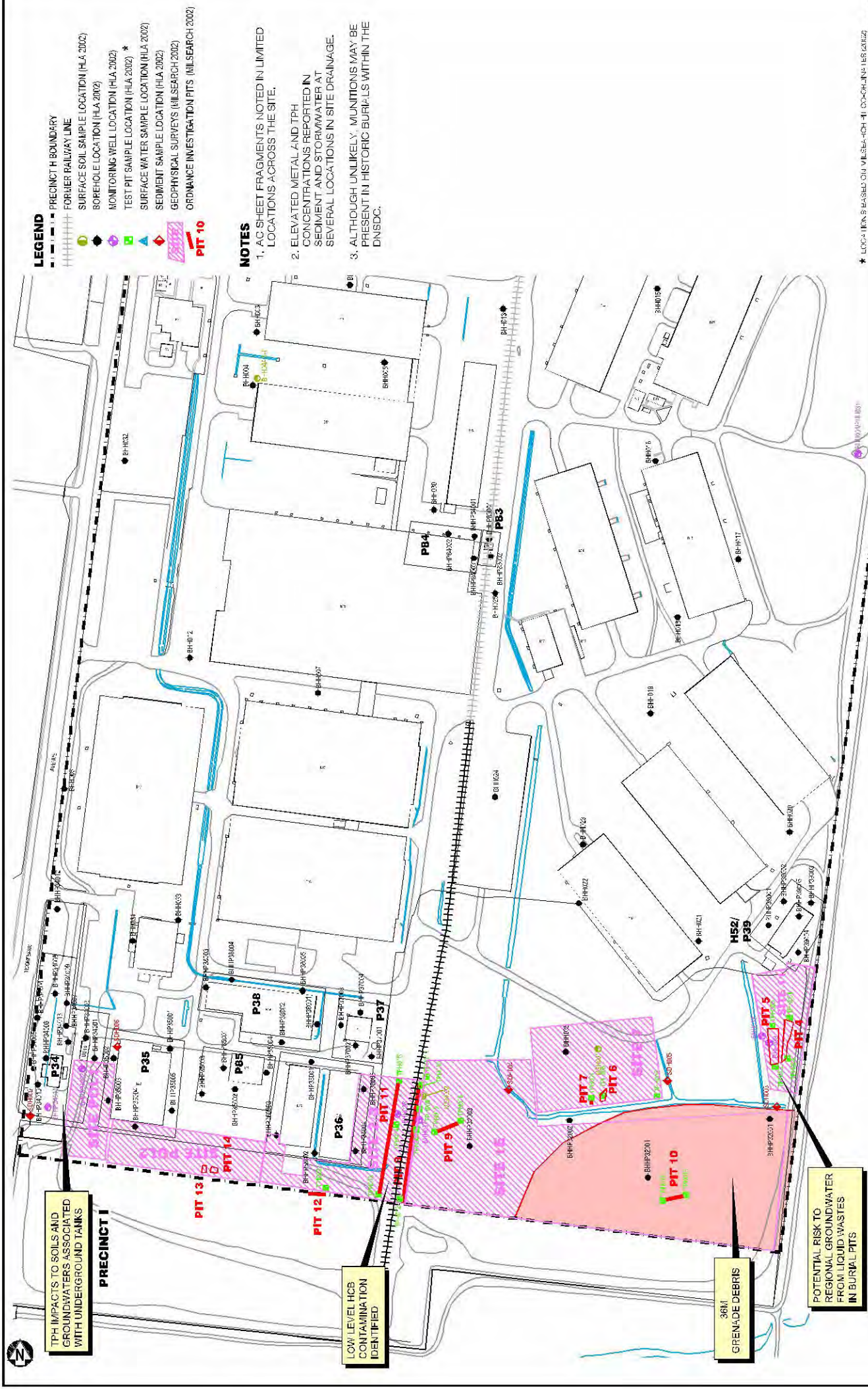
Source : Copyright Surveyor General's Department, 29 September 1998

Date : 3 August 2000

File Name : VA033434.cdr



APPENDIX B2 – FIGURES AND TABLES FROM URS (2002)



- LEGEND**
- PRECINCT H BOUNDARY
 - FORMER RAILWAY LINE
 - SURFACE SOIL SAMPLE LOCATION (HLA 2002)
 - BOREHOLE LOCATION (HLA 2002)
 - MONITORING WELL LOCATION (HLA 2002)
 - TEST PIT SAMPLE LOCATION (HLA 2002) *
 - SURFACE WATER SAMPLE LOCATION (HLA 2002)
 - SEDIMENT SAMPLE LOCATION (HLA 2002)
 - GEOPHYSICAL SURVEYS (MILSEARCH 2002)
 - ORDNANCE INVESTIGATION PITS (MILSEARCH 2002)
 - PIT 10**

NOTES

1. AC SHEET FRAGMENTS NOTED IN LIMITED LOCATIONS ACROSS THE SITE.
2. ELEVATED METAL AND TPH CONCENTRATIONS REPORTED IN SEDIMENT AND STORMWATER AT SEVERAL LOCATIONS IN SITE DRAINAGE.
3. ALTHOUGH UNLIKELY, MUNITIONS MAY BE PRESENT IN HISTORIC BURIALS WITHIN THE DNSDC.

* LOCATION S 453500 ON VLSH-404-41, COACH-IN-185 (M22)
SOURCE: PUA-ENTRANCES/DEFENSE IT-7 TO DPG 1A, 0007-2002-FOUR 3B.

CLIENT: PROPERTY DISPOSAL TASK FORCE		TITLE: AREAS OF CONCERN TO BE INCORPORATED IN SITE MANAGEMENT PLAN		FIGURE: 4a
PROJECT: DNSDC (PRECINCT H) INVESTIGATION MOOREBANK DEFENCE LAND		REQUEST: 12343-213		
DESIGNED: SM		APPROVED: SM		
DRAWN: RR		DATE: 03/12/02		
DATE: 03/12/02		STATUS: A		

This drawing is subject to copyright. It remains the property of URS Australia Pty Ltd.

ALPHA GEOSCIENCE Pty. Limited.
(ABN 14 080 819 209)
Suite 1, 23 Gray Street
Sutherland, NSW, 2232, Australia
Telephone +61 2 9542 5266
Facsimile +61 2 9542 5263
E-mail info@alpha-geo.com
Website www.alpha-geo.com



Acquisition Parameters

Instrument:
Sampling mode:
Sample interval:
Line spacing:
Acq. software:

Processing Parameters

Data recovery: AGSProc V1.73
Data gridding: AGSProc V1.73
method: Minimum curvature
Grid cell size: 0.40m x 0.40m
Other processing:

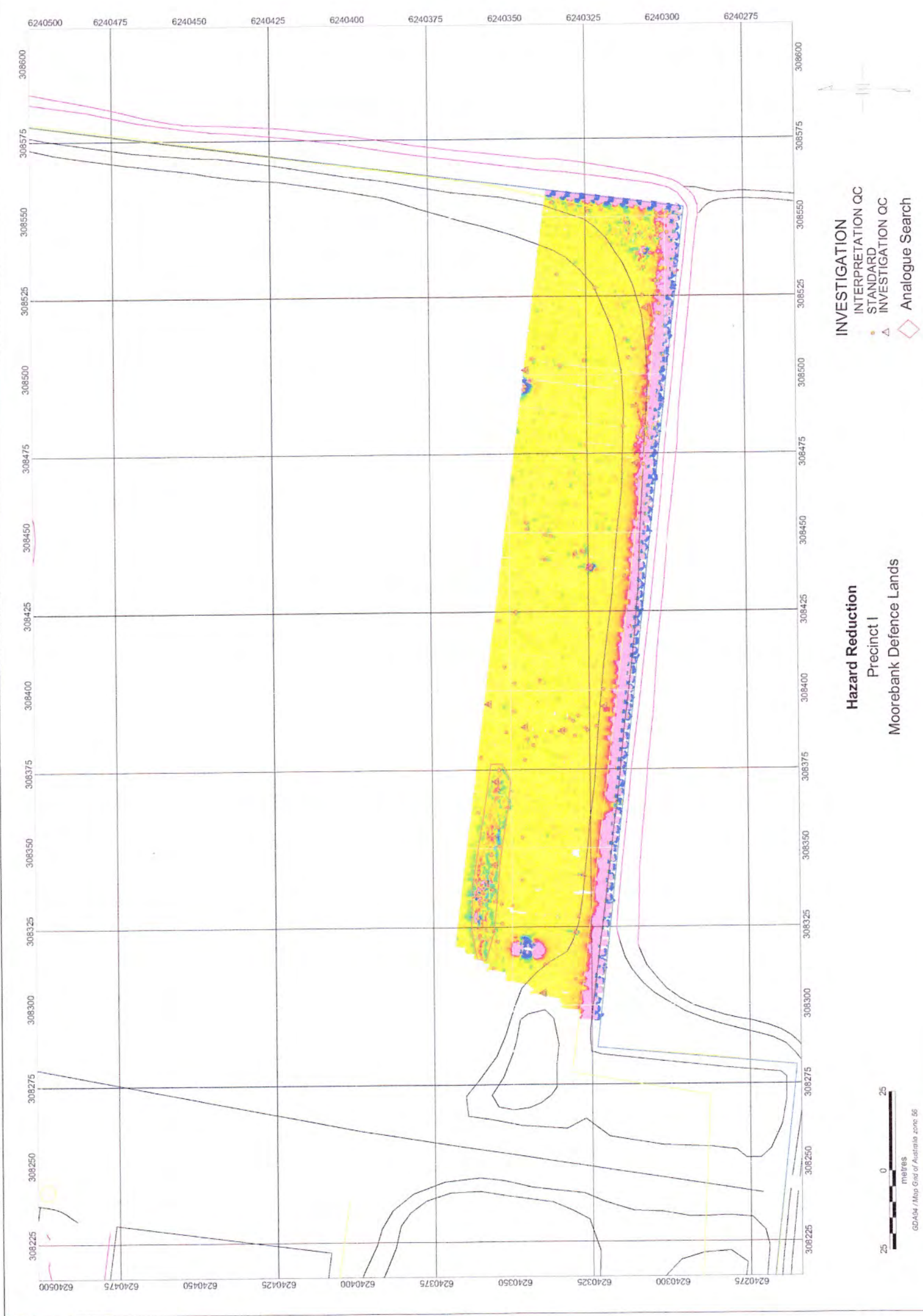
Colour Image of Total Magnetic Field

Project: DNSDC, Moorebank
Project ID: AG-058
Client: Milsearch Pty. Ltd.
Processed by: Timothy Pippett
Map scale: 1:6000
Date printed: 29 October 2002
Program version: AGSProc V1.73

Total_Site



APPENDIX B3 - FIGURES FROM G-TEK (2003)



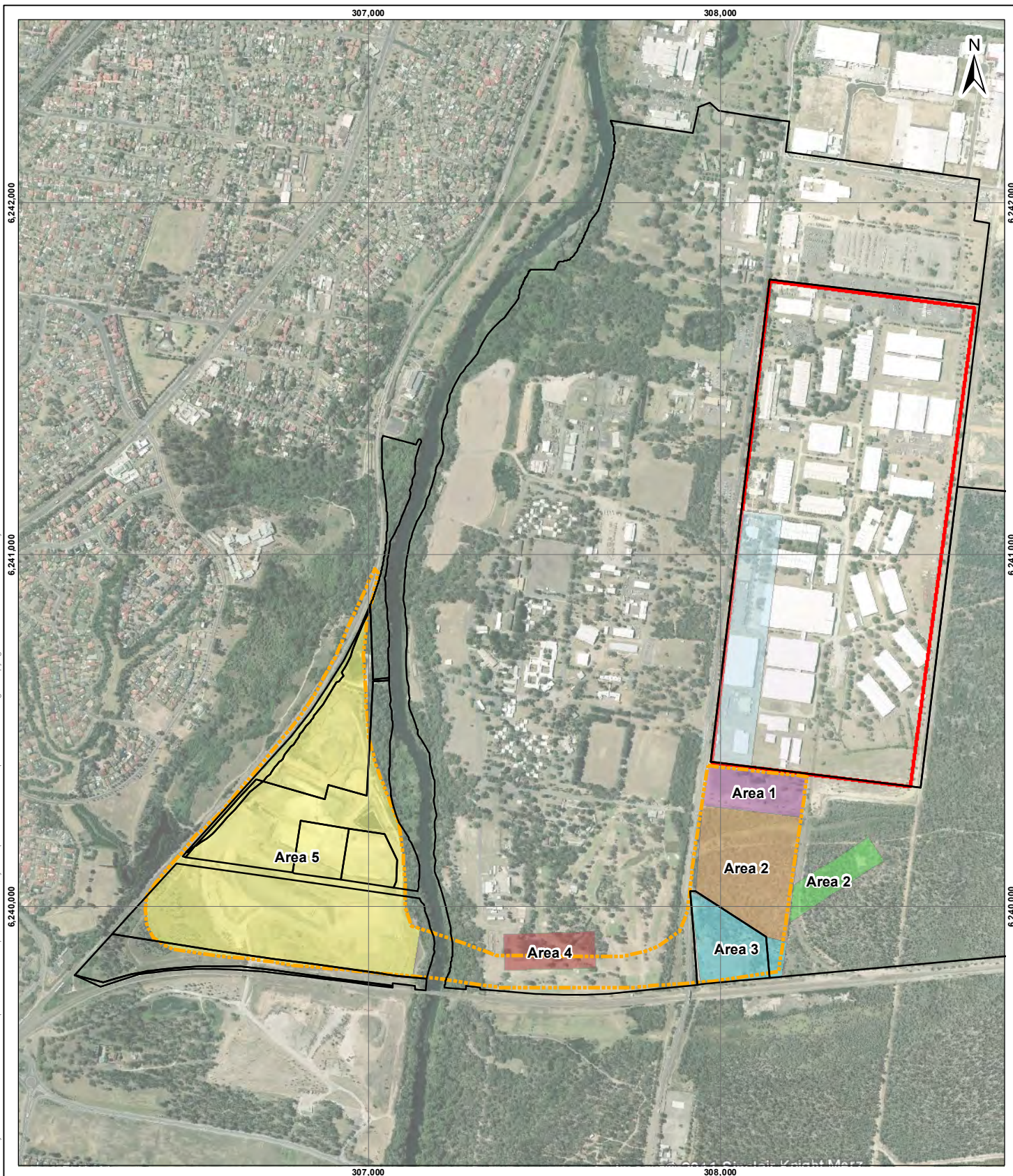
INVESTIGATION
INTERPRETATION QC
STANDARD INVESTIGATION QC
Analogue Search

Hazard Reduction
Precinct I
Moorebank Defence Lands

25 0 25
metres
GDA94 / Map Grid of Australia zone 56



APPENDIX B4 – FIGURES FROM GOLDER 2013



PHASE 1 ASSESSMENT OF RAIL CORRIDOR ALLOTMENT

STOCKLAND DEVELOPMENTS PTY LTD

AREAS OF ENVIRONMENTAL INTEREST

COPYRIGHT
Google Earth 2009



Legend

- Cadastre
- Rail Link
- Area 1a
- DNSDC Boundary
- Areas Of Environmental Interest**
 - Area 1 - Unauthorised Dumping Area
 - Area 2 - Former Grenade Range
 - Area 2 - Illegal Dumping Identified
 - Area 3 - Area of Land Filling
 - Area 4 - Former Mock Viet Cong Village
 - Area 5 - Glenfield Quarry & Waste Disposal Facility

0 55 110 220 330 440 550 metres

SCALE (at A4) 1:15,000
DATUM GDA 94, PROJECTION MGA Zone 56

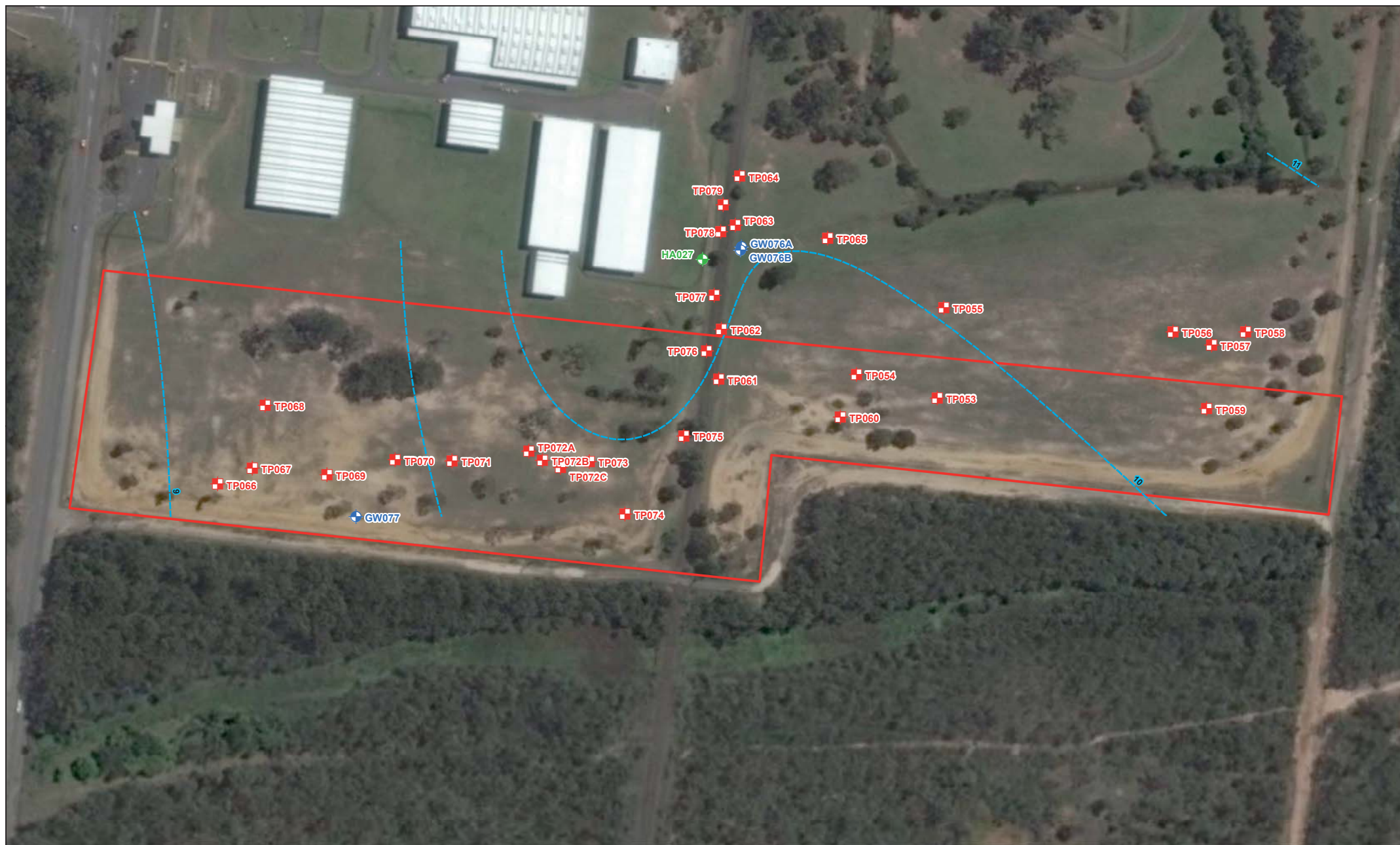
PROJECT: 107623148
DATE: 26/08/2011
DRAWN: AJW
CHECKED: GS

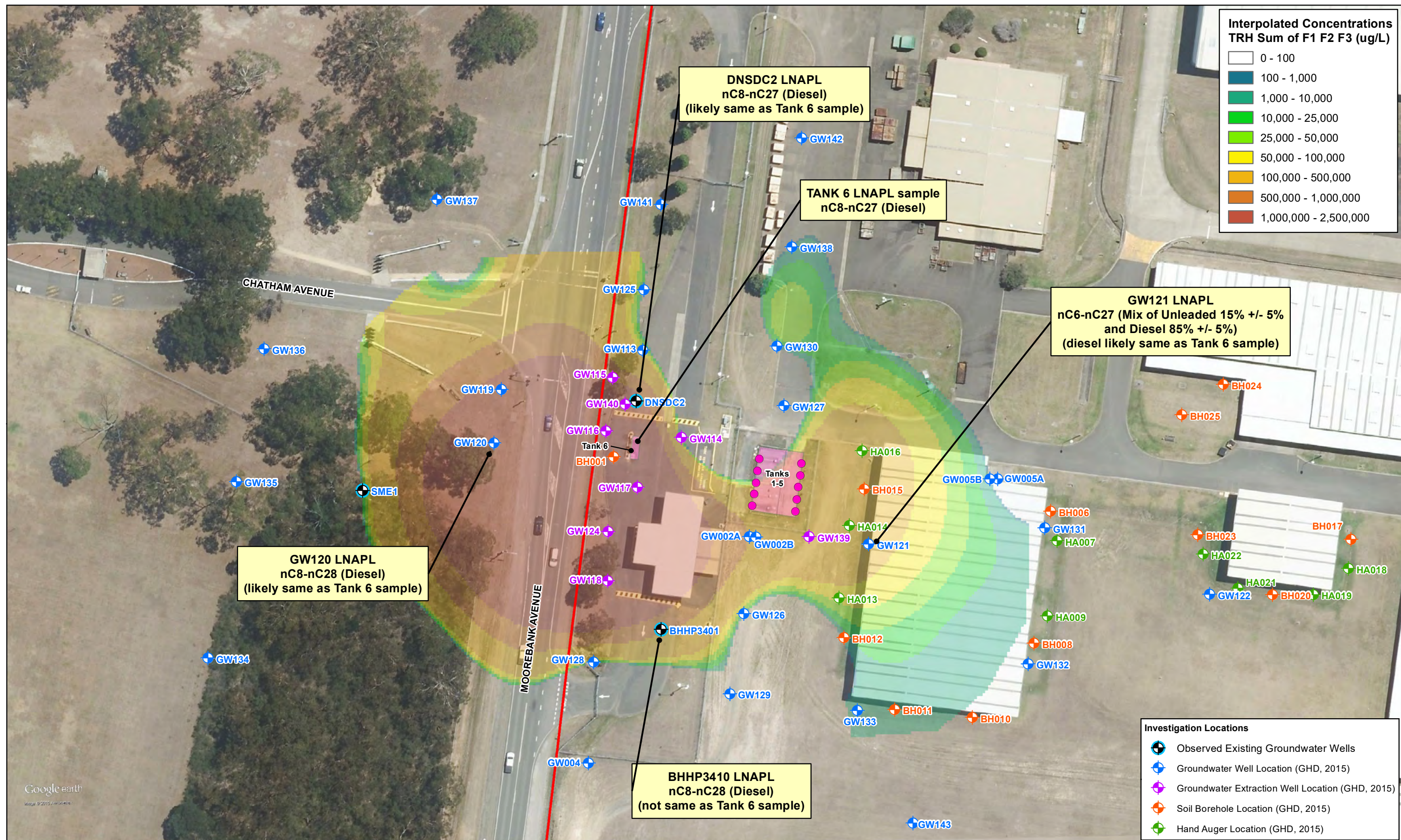
FIGURE 2





APPENDIX B5 – FIGURES AND TABLES FROM GHD (2015)





Appendix [C]

**Table A: Soil summary analytical data
DNSDC Moorebank
Stage 2 Contaminated site assessment**

[illegible]

Table B: Groundwater summary analytical data
DNSDC Moorebank
Stage 2 Contaminated site assessment

				AFFF Compounds			Metals										TRH - NEPM 2013					BTEX					PAH																		
				PFO8	6:2 Fluorotelomer Sulfonate (6:2 FS)	Perfluorooctanoate	Arenatic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C8-C10 minus BTEX (F1)	>C10-C16 minus Naphthalene (F2)	>C16 - C34 Fraction (F3)	>C34 - C46 Fraction (F4)	>C10 - C46 (Sum of Total)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)pyrene	Benzo(g,h,i)fluoranthene	Benzo(k)fluoranthene	Benzo(a,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc			
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
EOL				0.01	0.05	0.01	1	0.1	1	1	1	1	0.1	1	5	20	50	100	100	100	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																																													
2-4m																	NL	NL				30,000	NL	NL		NL																			
4-8m																	NL	NL				30,000	NL	NL		NL																			
>8m																	NL	NL				35,000	NL	NL		NL																			
NEPM 2013 Table 1C GILs, Fresh Waters							13 (a)	0.2		1.4	3.4	1900	0.06	11	8							950			350																				
US EPA Region 4 (2009)				0.2	5	0.4																																							
Location Code	Sample Date	Monitoring Zone		-	-	-	<1	0.4	<1	7	2	-		67	64	<20	<50	100	<100	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
GW077	14/04/2015	Burial Pits		-	-	-	<1	<0.1	<1	<1	<1	-	74	<100	<1	<20	<50	<100	<100	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
GW076A	14/04/2015	Rail Spur		-	-	-	<1	<0.1	<1	<1	<1	-		<100	<1	<20	<50	<100	<100	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
GW076B	14/04/2015	Rail Spur		<0.01	<0.05	<0.01	<1	<0.1	<1	<1	<1	-		<100	12	14	60	<50	<100	<100	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	

(a) Conservative application of freshwater guideline for As(V)
(b) Low reliability trigger value for freshwater (ANZECC 2000)
NL Not Limiting

Table B: Groundwater summary analytical data
DNSDC Moorebank
Stage 2 Contaminated site assessment

			Phenols				VOCs						MNA Parameters					
			2-methylphenol	3,4-methylphenol	Pentachlorophenol	Phenol	1,3,5-trimethylbenzene	1,2,4-trichlorobenzene	TCE	Vinyl chloride	1,2,4-trimethylbenzene	Isopropylbenzene	Hexachlorobenzene	Sulphate	Methane	Nitrate (as N)	Cyanide (Free)	Ferrous Iron
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L
EOL			2	4	10	2	1	1	1	1	1	1	0.1	2	50	0.01	5	0.5
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intr																		
2-4m																		
4-8m																		
>8m																		
NEPM 2013 Table 1C GILs, Fresh Waters					3.6	320			330 ^(a)	100 ^(b)								
US EPA Region 4 (2009)																		
Location Code	Sample Date	Monitoring Zone																
GW077	14/04/2015	Burial Pits	<2	<4	<10	<2	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	-
GW076A	14/04/2015	Rail Spur	<2	<4	<10	<2	<1	<1	<1	<1	<1	<1	<1	29	2200	<0.1	<5	8.5
GW076B	14/04/2015	Rail Spur	<2	<4	<10	<2	<1	22	34	24	<1	<1	<0.1	-	-	-	<5	-

(a) Conservative application of freshwater guid
(b) Low reliability trigger value for freshwater (c)
NL Not Limiting



APPENDIX B6 – FIGURES AND TABLES FROM JBS&G (2015)



Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment



Chlorinated Alkanes																				Chlorinated Alkenes							
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
1,1,1,2-tetrachloroethane																											
1,1,1-trichloroethane																											
1,1,2,2-tetrachloroethane																											
1,1,2-trichloroethane																											
1,1-dichloroethane																											
1,2,3-trichloropropane																											
1,2-dichloropropane																											
1,3-dichloropropane																											
bromodichloromethane																											
Carbon tetrachloride																											
Chloroform																											
Chloroethane																											
Chloromethane																											
dibromochloromethane																											
Dichlorodifluoromethane																											
Dichloromethane																											
Hexachloroethane																											
Trichlorofluoromethane																											
1,1,2,2-tetrachloroethylene																											
1,1-Dichloroethene																											
1,1-Dichloroethene																											
trans-1,2-dichloroethene																											
trans-1,3-dichloropropene																											
Trichloroethene																											
Vinyl Chloride																											

* Value for Chromium VI used

Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment



EOL	Monocyclic/Aromatic Hydrocarbons					Miscellaneous Hydrocarbons						
	1,4-trimethyl benzene mg/kg	1,5-trimethyl benzene mg/kg	Bromobenzene mg/kg	Isopropylbenzene mg/kg	Styrene mg/kg	1,2-dichloroethane mg/kg	2-Butanone (MEK) mg/kg	4-Methyl-2-pentanone (MIBK) mg/kg	Bromoforn mg/kg	Bromomethane mg/kg	Dibromomethane mg/kg	Iodomethane mg/kg
NEPC 2013 EIL, Ella Agard Sediment	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
NEPC 2013 EIL Commercial and Industrial, Coarse Soil												
NEPC 2013 Management Limits - Commercial and Industrial, Coarse												
NEPC 2013 Soil RHL D												
NEPC 2013 Soil RHL D for Vapour Intrusion - Sand 0 to <1m												
NEPC 2013 Soil RHL D for Vapour Intrusion - Sand 1 to <2m												

Location Area	Sample	Location	Depth Range
Stage 1 DNSDC	MW01 0.0-1	MW01	0.0-1
Stage 1 DNSDC	QC04		
Stage 1 DNSDC	MW02 0.0-1	MW02	0.0-1
Stage 1 DNSDC	MW02 1.6-1.8	MW02	1.6-1.8
Stage 1 DNSDC	MW03 0.1-0.2	MW03	0.1-0.2
Stage 1 DNSDC	MW03 0.4-1.0	MW03	0.4-1.0
Stage 1 DNSDC	MW03 0.4-0.6	MW03	0.4-0.6
Stage 1 DNSDC	MW04 0.0-1	MW04	0.0-1
Stage 1 DNSDC	MW04 0.2-0.3	MW04	0.2-0.3
Stage 1 DNSDC	MW04 0.0-1	MW04	0.0-1
Stage 1 DNSDC	MW04 0.5-0.7	MW04	0.5-0.7
Stage 1 DNSDC	MW04 0.0-1	MW04	0.0-1
Stage 1 DNSDC	MW05 0.0-1	MW05	0.0-1
Stage 1 DNSDC	MW05 1.0-1.1	MW05	1.1-1
Stage 1 DNSDC	TP01 0.0-1	TP01	0.0-1
Stage 1 DNSDC	TP02 0.3-0.4	TP02	0.3-0.4
Stage 1 DNSDC	TP02 0.0-15	TP02	0.0-15
Stage 1 DNSDC	TP03 0.3-0.4	TP03	0.3-0.4
Stage 1 DNSDC	TP03 0.0-15 (LIGHT BROWN)	TP03	0.0-15
Stage 1 DNSDC	TP04 0.0-1	TP04	0.0-1
Stage 1 DNSDC	TP05 0.3-0.4	TP05	0.3-0.4
Stage 1 DNSDC	TP05 0.0-15	TP05	0.0-15
Stage 1 DNSDC	TP06 0.0-15	TP06	0.0-15
Stage 1 DNSDC	TP06 1.1-1	TP06	1.1-1
Stage 1 DNSDC	TP07 0.2-0.3	TP07	0.2-0.3
Stage 1 DNSDC	TP07 0.0-1	TP07	0.0-1
Stage 1 DNSDC	TP08 0.3-0.4	TP08	0.3-0.4
Stage 1 DNSDC	TP09 0.4-0.5	TP09	0.4-0.5
Stage 1 DNSDC	TP09 0.0-15	TP09	0.0-15
Stage 1 DNSDC	TP10 0.3-0.4	TP10	0.3-0.4
Stage 1 DNSDC	TP11 0.0-15	TP11	0.0-15
Stage 1 DNSDC	TP12 0.3-0.4	TP12	0.3-0.4
Stage 1 DNSDC	TP13 0.0-15	TP13	0.0-15
Stage 1 DNSDC	TP13 0.3-0.4	TP13	0.3-0.4
Stage 1 DNSDC	TP14 0.6-0.7	TP14	0.6-0.7
Stage 1 DNSDC	TP14 0.0-15	TP14	0.0-15
Stage 1 DNSDC	TP15 0.0-1	TP15	0.0-1
Stage 1 DNSDC	TP16 0.2-0.3	TP16	0.2-0.3
Stage 1 DNSDC	TP16 0.0-15	TP16	0.0-15
Stage 1 DNSDC	TP17 0.2-0.3	TP17	0.2-0.3
Stage 1 DNSDC	TP17 0.0-15	TP17	0.0-15
Stage 1 DNSDC	TP18 0.2-0.3	TP18	0.2-0.3
Stage 1 DNSDC	TP18 0.0-15	TP18	0.0-15
Stage 1 DNSDC	TP19 0.4-0.5	TP19	0.4-0.5
Stage 1 DNSDC	TP19 0.0-15	TP19	0.0-15
Stage 1 DNSDC	TP20 0.0-15	TP20	0.0-15
Stage 1 DNSDC	QC03		
DNSDC South	TP21 0.2-0.3	TP21	0.2-0.3
DNSDC South	TP21 0.0-15	TP21	0.0-15
DNSDC South	TP22 0.5-0.6	TP22	0.5-0.6
DNSDC South	TP22 0.0-15	TP22	0.0-15
DNSDC South	TP23 0.5-0.6	TP23	0.5-0.6



Monocyclic Aromatic Hydrocarbons										Miscellaneous Hydrocarbons					
1,4-trimethyl benzene	1,5-trimethyl benzene	Bromobenzene	Isopropylbenzene	styrene	1,2-dibromethane	2-Butanone (MEK)	4-Methyl-2-pentanone (MIBK)	Bromoforn	Bromomethane	Dibromomethane	Iodomethane				
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05				
NEPC 2013 EIL, EILs Aged Sediment															
NEPC 2013 EIL Commercial and Industrial, Coarse Soil															
NEPC 2013 Management Limits - Commercial and Industrial, Coarse															
NEPC 2013 Soil HIL D															
NEPC 2013 Soil HIL D for Vapour Intrusion - Sand 0 to <1m															
NEPC 2013 Soil HIL D for Vapour Intrusion - Sand 1 to <2m															

Location Area	Sample	Location	Depth Range
DNIS/C South	TP23 0.0-0.15	TP23	0.0-0.15
DNIS/C South	TP24 0.3-0.4	TP24	0.3-0.4
DNIS/C South	TP24 0.0-0.15	TP24	0.0-0.15
Southern Commonwealth	TP25 0.0-0.1	TP25	0.0-0.1
Southern Commonwealth	TP26 0.3-0.5	TP26	0.3-0.5
Southern Commonwealth	TP28 0.0-0.1	TP28	0.0-0.1
Southern Commonwealth	TP29 0.3-0.4	TP29	0.3-0.4
Southern Commonwealth	TP30 0.0-0.15	TP30	0.0-0.15
Southern Commonwealth	TP30 0.5-0.6	TP30	0.5-0.6
North of East Hills Rail Corridor (Golf Course)	TP40 0.0-0.15	TP40	0.0-0.15
North of East Hills Rail Corridor (Golf Course)	TP40 0.0-0.1	TP40	0.0-0.1
North of East Hills Rail Corridor (Golf Course)	TP41 0.2-0.4	TP41	0.2-0.4
North of East Hills Rail Corridor (Golf Course)	TP42 0.0-0.1	TP42	0.0-0.1
North of East Hills Rail Corridor (Golf Course)	QC02	TP42	0.0-0.1
North of East Hills Rail Corridor (Golf Course)	TP43 0.4-0.5	TP43	0.4-0.5
North of East Hills Rail Corridor (Golf Course)	TP44 0.0-0.1	TP44	0.0-0.1
North of East Hills Rail Corridor (Golf Course)	TP45 1.1-1.3	TP45	1.1-1.3
North of East Hills Rail Corridor (Golf Course)	MW06 1.2-1.4	MW06	1.2-1.4
North of East Hills Rail Corridor (Golf Course)	AHM501 - SIMTA 0.3-0.4	Golden TPO5	0.3-0.4
Glenfield	TP46 0.0-0.1	TP46	0.0-0.1
Glenfield	QC01	TP46	0.0-0.1
Glenfield	TP47 0.8-1.0	TP47	0.8-1
Glenfield	TP48 0.6-0.8	TP48	0.6-0.8
Glenfield	TP49 2.8-3.0	TP49	2.8-3
Glenfield	TP50 1.0-1.2	TP50	1.1-2
Glenfield	TP51 1.8-2.0	TP51	1.8-2

* Value for Chromium VI used

Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment

[illegible]

Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment





Chlorinated Benzenes												Phthalates					Ethers		Anilines		Amines					
1,2,3,4-tetrachlorobenzene	1,2,3-tetrachlorobenzene	1,2,3-trichlorobenzene	1,2,4-tetrachlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3,5-trichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	Pentachlorobenzene	D(2-ethylhexy) phthalate	Dibutyl phthalate	Diethyl phthalate	Di-n-octyl phthalate	Butyl Benzyl phthalate	Bis(2-chloroisopropyl)ether	4-Chlorophenyl phenyl ether	4-Bromophenyl phenyl ether	2-Nitroaniline	Aniline	1-Naphthylamine	2-Naphthylamine	N-Nitrosodibutylamine	N-Nitrosodipropylamine	N-Nitrosopiperidine	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.05	0.05	0.05	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
NEPC 2013 EIL, EIS Aged Sediment																										
NEPC 2013 ESL Commercial and Industrial, Coarse Soil																										
NEPC 2013 Management Limits - Commercial and Industrial, Coarse																										
NEPC 2013 Soil HIL D																										
NEPC 2013 Soil HSL D for Vapour Intrusion - Sand 0 to <1m																										
NEPC 2013 Soil HSL D for Vapour Intrusion - Sand 1 to <2m																										
80																										

EQCL

Location Area	Sample	Location	Depth Range	1,3,4-tetrachlorobenzene	1,3,5-tetrachlorobenzene	1,3,5-trichlorobenzene	1,4-trichlorobenzene	1,2-Dichlorobenzene	1,3,5-trichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	Pentachlorobenzene	D(2-ethylhexy) phthalate	Dibutyl phthalate	Diethyl phthalate	Dimethyl phthalate	D(4-n-octyl) phthalate	Butyl benzyl phthalate	Bis(2-chloroisopropyl) ether	4-Chlorophenyl phenyl ether	4-Bromophenyl phenyl ether	2-Nitroaniline	Aniline	1-Naphthylamine	2-Naphthylamine	N-Nitrosodibutylamine	N-Nitrosodipropylamine	N-Nitrosopiperidine
Stage 1 DNSDC	MW01	MW01 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	QC04	QC04	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW01	MW01 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW02	MW02 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW02	MW02 1.6-1.8	1.6-1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW03	MW03 0.1-0.2	0.1-0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW03	MW03 0.2-1.0	0.2-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW03	MW03 0.4-0.6	0.4-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW01	MW01 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW02	MW02 0.2-0.3	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW02	MW02 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW03	MW03 0.5-0.7	0.5-0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW04	MW04 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW05	MW05 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW06	MW06 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW07	MW07 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW08	MW08 0.3-0.4	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW09	MW09 0.4-0.5	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW10	MW10 0.5-1.1	0.5-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW11	MW11 0.2-0.4	0.2-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW12	MW12 0.3-0.4	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW13	MW13 0-0.15	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW14	MW14 0-0.15	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW15	MW15 0-0.1	0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW16	MW16 0-0.15	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW17	MW17 0-0.15	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW18	MW18 0.3-0.4	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW19	MW19 0.4-0.5	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	MW20	MW20 0-0.15	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1 DNSDC	QC03	QC03	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNSDC South	TP21	TP21 0.2-0.3	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNSDC South	TP22	TP22 0.5-0.6	0.5-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNSDC South	TP22	TP22 0-0.15	0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNSDC South	TP23	TP23 0.5-0.6	0.5-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment





Chlorinated Benzenes										Phthalates						Ethers			Anilines		Amines									
1,3,4-tetrachlorobenzene	1,3,5-trichlorobenzene	1,2,3-trichlorobenzene	1,2,4,5-tetrachlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3,5-trichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	Pentachlorobenzene	Di(2-ethylhexy) phthalate	Dibutyl phthalate	Diethyl phthalate	Dimethyl phthalate	Di-n-octyl phthalate	Butyl benzyl phthalate	Bis(2-chloroisopropyl) ether	4-Chlorophenyl phenyl ether	4-Bromophenyl phenyl ether	2-Nitroaniline	Aniline	1-Naphthylamine	2-Naphthylamine	N-Nitrosodibutylamine	N-Nitrosodipropylamine	N-Nitrosopiperidine				
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.05	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50				
NEPC 2013 EIL, EILs Aged Sediment																														
NEPC 2013 EIL Commercial and Industrial, Coarse Soil																														
NEPC 2013 Management Limits - Commercial and Industrial, Coarse																														
NEPC 2013 Soil HIL D																														
NEPC 2013 Soil HSL D for Vapour Intrusion- Sand 0 to <1m																														
NEPC 2013 Soil HSL D for Vapour Intrusion- Sand 1 to <2m																														
80																														
EOL																														
Location Area	Sample	Location	Depth Range																											
DNISDC South	TP23 0.0-1.5	TP23	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNISDC South	TP24 0.3-0.4	TP24	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNISDC South	TP24 0.0-1.5	TP24	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP25 0.0-1.5	TP25	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP26 0.3-0.5	TP26	0.3-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP26 0.0-1.5	TP26	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP29 0.3-1.4	TP29	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP29 0.0-1.5	TP29	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP29 0.5-1.6	TP29	0.5-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern Commonwealth	TP30 0.0-1.5	TP30	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	TP40 0.0-1	TP40	0.0-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	TP41 0.2-0.4	TP41	0.2-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	TP42 0.0-1	TP42	0.0-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	QC02	TP42	0.0-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	TP43 0.4-0.5	TP43	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	TP44 0.0-1	TP44	0.0-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	TP45 1.1-1.3	TP45	1.1-1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	MW06 1.2-1.4	MW06	1.2-1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North of East Hills Rail Corridor (Golf Course)	AHM501 - SIMTA 0.3-0.4	Golden TPO5	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	TP46 0.0-1	TP46	0.0-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	QC01	TP46	0.0-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	TP47 0.8-1.0	TP47	0.8-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	TP48 0.6-0.8	TP48	0.6-0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	TP49 2.8-3.0	TP49	2.8-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	TP50 1.0-1.2	TP50	1.1-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glenfield	TP51 1.8-2.0	TP51	1.8-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Value for Chromium VI used

Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment





	Herbicides & Fungicides												Phenols																	
	2,4,5-T	4-D	4-DB	Dicamba	Dichlorprop	Difluro-cresol	Dinoseb	Fenoprop	MCPA	MCPB	Mecoprop	Propyzamide	Trifluralin	2,3,4,6-tetrachlorophenol	4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-Methylphenol	2-nitrophenol	3- & 4-Methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Pentachlorophenol	Phenol		
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
ECOL	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	1	1	0.50	0.50	5.00	0.50	0.50	0.20	1	0.40	1	5	1	0.50		
NEPC 2013 EIL, EIS Agred Sediment																														
NEPC 2013 ES, Commercial and Industrial, Coarse Soil																														
NEPC 2013 Soil HSL D																														
NEPC 2013 Soil HSL D for Vapour Intrusion - Sand 0 to <1m	5000	9000							5000	5000	5000																			
NEPC 2013 Soil HSL D for Vapour Intrusion - Sand 1 to <2m																												660	240000	

Location Area	Sample	Location	Depth Range
Stage 1 DNSDC	MW001 0.0-1	MW001	0.0-1
Stage 1 DNSDC	QC04		<0.5
Stage 1 DNSDC	MW002 0.0-1	MW002	<0.5
Stage 1 DNSDC	MW002 1.6-1.8		<0.5
Stage 1 DNSDC	MW003 0.1-0.2	MW003	<0.5
Stage 1 DNSDC	MW003 0.4-1.0		<0.5
Stage 1 DNSDC	MW003 0.4-0.6	MW003	<0.5
Stage 1 DNSDC	MW004 0.0-1	MW004	<0.5
Stage 1 DNSDC	MW004 0.2-0.3	MW004	<0.5
Stage 1 DNSDC	MW004 0.0-1	MW004	<0.5
Stage 1 DNSDC	MW004 0.5-0.7		<0.5
Stage 1 DNSDC	MW004 0.0-1	MW004	<0.5
Stage 1 DNSDC	MW005 0.0-1	MW005	<0.5
Stage 1 DNSDC	MW005 1.0-1.1		<0.5
Stage 1 DNSDC	TP001 0.0-1	TP001	<0.5
Stage 1 DNSDC	TP002 0.3-0.4	TP002	<0.5
Stage 1 DNSDC	TP002 0.0-0.5	TP002	<0.5
Stage 1 DNSDC	TP003 0.3-0.4	TP003	<0.5
Stage 1 DNSDC	TP003 0.0-0.15 (LIGHT BROWN)	TP003	<0.5
Stage 1 DNSDC	TP004 0.0-1	TP004	<0.5
Stage 1 DNSDC	TP005 0.3-0.4	TP005	<0.5
Stage 1 DNSDC	TP005 0.0-0.5	TP005	<0.5
Stage 1 DNSDC	TP006 0.0-0.15	TP006	<0.5
Stage 1 DNSDC	TP006 1.1-1		<0.5
Stage 1 DNSDC	TP007 0.2-0.3	TP007	<0.5
Stage 1 DNSDC	TP007 0.2-0.3	TP007	<0.5
Stage 1 DNSDC	TP007 0.0-0.1	TP007	<0.5
Stage 1 DNSDC	TP008 0.3-0.4	TP008	<0.5
Stage 1 DNSDC	TP009 0.4-0.5	TP009	<0.5
Stage 1 DNSDC	TP009 0.0-0.15	TP009	<0.5
Stage 1 DNSDC	TP010 0.0-0.1	TP010	<0.5
Stage 1 DNSDC	TP010 0.4		<0.5
Stage 1 DNSDC	TP011 0.0-0.15	TP011	<0.5
Stage 1 DNSDC	TP012 0.3-0.4	TP012	<0.5
Stage 1 DNSDC	TP013 0.0-0.15	TP013	<0.5
Stage 1 DNSDC	TP013 0.3-0.4	TP013	<0.5
Stage 1 DNSDC	TP014 0.6-0.7	TP014	<0.5
Stage 1 DNSDC	TP014 0.0-0.15	TP014	<0.5
Stage 1 DNSDC	TP015 0.0-0.15	TP015	<0.5
Stage 1 DNSDC	TP015 0.0-1	TP015	<0.5
Stage 1 DNSDC	TP016 0.2-0.3	TP016	<0.5
Stage 1 DNSDC	TP016 0.0-0.15	TP016	<0.5
Stage 1 DNSDC	TP017 0.2-0.3	TP017	<0.5
Stage 1 DNSDC	TP017 0.0-0.15	TP017	<0.5
Stage 1 DNSDC	TP018 0.2-0.3	TP018	<0.5
Stage 1 DNSDC	TP018 0.0-0.15	TP018	<0.5
Stage 1 DNSDC	TP019 0.4-0.5	TP019	<0.5
Stage 1 DNSDC	TP019 0.0-0.15	TP019	<0.5
Stage 1 DNSDC	TP020 0.0-0.15	TP020	<0.5
Stage 1 DNSDC	QC03		<0.5
DNISDC South	TP201 0.2-0.3	TP201	<0.5
DNISDC South	TP201 0.0-0.15	TP201	<0.5
DNISDC South	TP202 0.5-0.6	TP202	<0.5
DNISDC South	TP202 0.0-0.15	TP202	<0.5
DNISDC South	TP203 0.5-0.6	TP203	<0.5

Table 1: Soil Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment



Semi-volatile Organic Compounds														Other VOCs	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Hechchlorobutadiene	Hechchlorocyclopentadiene	Hechchloroethane	Benzyl chloride	Bis(2-chloroethoxy)methane	Dibenz(a,j)acridine	Dibenzofuran	Dimethylaminobenzene	2-Picoline	Acetophenone	4-Aminobiphenyl	1-Chloronaphthalene	3,3-Dichlorobenzidine	2-Chloronaphthalene	2-Propanone (Acetone)	Carbon disulfide
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.05	0.05
NEPC 2013 EIL, EILs Agred Sediment															
NEPC 2013 EIL Commercial and Industrial, Coarse Soil															
NEPC 2013 EIL Commercial and Industrial, Fine Soil															
NEPC 2013 Soil HIL D															
NEPC 2013 Soil HIL D for Vapour Intrusion - Sand 0 to <1m															
NEPC 2013 Soil HIL D for Vapour Intrusion - Sand 1 to <2m															
80															

Location Area	Sample	Location	Depth Range
Stage 1 DNSDC	MW01 0.0-1	MW01	0.0-1
Stage 1 DNSDC	QC04		
Stage 1 DNSDC	MW02 0.0-1	MW02	0.0-1
Stage 1 DNSDC	MW02 1.6-1.8	MW02	1.6-1.8
Stage 1 DNSDC	MW03 0.1-0.2	MW03	0.1-0.2
Stage 1 DNSDC	MW03 0.2-1.0	MW03	0.2-1.0
Stage 1 DNSDC	MW03 0.4-0.6	MW03	0.4-0.6
Stage 1 DNSDC	MW04 0.0-1	MW04	0.0-1
Stage 1 DNSDC	MW04 0.2-0.3	MW04	0.2-0.3
Stage 1 DNSDC	MW04 0.0-1	MW04	0.0-1
Stage 1 DNSDC	MW04 0.5-0.7	MW04	0.5-0.7
Stage 1 DNSDC	MW04 0.0-1	MW04	0.0-1
Stage 1 DNSDC	MW05 0.0-1	MW05	0.0-1
Stage 1 DNSDC	MW05 1.0-1.1	MW05	1.1-1
Stage 1 DNSDC	TP01 0.0-1	TP01	0.0-1
Stage 1 DNSDC	TP02 0.3-0.4	TP02	0.3-0.4
Stage 1 DNSDC	TP02 0.0-1.5	TP02	0.0-1.5
Stage 1 DNSDC	TP03 0.3-0.4	TP03	0.3-0.4
Stage 1 DNSDC	TP03 0.0-1.5 (LIGHT BROWN)	TP03	0.0-1.5
Stage 1 DNSDC	TP04 0.0-1	TP04	0.0-1
Stage 1 DNSDC	TP05 0.3-0.4	TP05	0.3-0.4
Stage 1 DNSDC	TP05 0.0-1.5	TP05	0.0-1.5
Stage 1 DNSDC	TP06 0.0-1.5	TP06	0.0-1.5
Stage 1 DNSDC	TP06 1.1-1	TP06	1.1-1
Stage 1 DNSDC	TP07 0.2-0.3	TP07	0.2-0.3
Stage 1 DNSDC	TP07 0.0-1	TP07	0.0-1
Stage 1 DNSDC	TP08 0.3-0.4	TP08	0.3-0.4
Stage 1 DNSDC	TP09 0.4-0.5	TP09	0.4-0.5
Stage 1 DNSDC	TP09 0.0-1.5	TP09	0.0-1.5
Stage 1 DNSDC	TP10 0.3-1.1	TP10	0.3-1.1
Stage 1 DNSDC	TP11 0.0-1.4	TP11	0.0-1.4
Stage 1 DNSDC	TP12 0.0-1.5	TP12	0.0-1.5
Stage 1 DNSDC	TP13 0.3-0.4	TP13	0.3-0.4
Stage 1 DNSDC	TP13 0.0-1.5	TP13	0.0-1.5
Stage 1 DNSDC	TP14 0.6-0.7	TP14	0.6-0.7
Stage 1 DNSDC	TP14 0.0-1.5	TP14	0.0-1.5
Stage 1 DNSDC	TP15 0.0-1	TP15	0.0-1
Stage 1 DNSDC	TP16 0.2-0.3	TP16	0.2-0.3
Stage 1 DNSDC	TP17 0.2-0.3	TP17	0.2-0.3
Stage 1 DNSDC	TP17 0.0-1.5	TP17	0.0-1.5
Stage 1 DNSDC	TP18 0.2-0.3	TP18	0.2-0.3
Stage 1 DNSDC	TP18 0.0-1.5	TP18	0.0-1.5
Stage 1 DNSDC	TP19 0.4-0.5	TP19	0.4-0.5
Stage 1 DNSDC	TP20 0.0-1.5	TP20	0.0-1.5
Stage 1 DNSDC	QC03		
DNISDC South	TP21 0.2-0.3	TP21	0.2-0.3
DNISDC South	TP21 0.0-1.5	TP21	0.0-1.5
DNISDC South	TP22 0.5-0.6	TP22	0.5-0.6
DNISDC South	TP22 0.0-1.5	TP22	0.0-1.5
DNISDC South	TP23 0.5-0.6	TP23	0.5-0.6



EOL	Semi-volatile Organic Compounds														Other VOCs	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NEPC 2013 EIL, EILs Aged Sediment	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.05	0.05
NEPC 2013 EIL Commercial and Industrial, Course Soil																
NEPC 2013 EIL Commercial and Industrial, Commercial and Industrial, Course																
NEPC 2013 Soil HIL D	80															
NEPC 2013 Soil HIL D for Vapour Intrusion - Sand 0 to <1m																
NEPC 2013 Soil HIL D for Vapour Intrusion - Sand 1 to <2m																

Location Area	Sample	Location	Depth Range
DNSSC South	TP23 0.0-1.5	TP23	0.0-1.5
DNSSC South	TP24 0.3-0.4	TP24	0.3-0.4
DNSSC South	TP24 0.0-1.5	TP24	0.0-1.5
Southern Commonwealth	TP25 0.0-1	TP25	0.0-1
Southern Commonwealth	TP26 0.3-0.5	TP26	0.3-0.5
Southern Commonwealth	TP28 0.0-1.5	TP28	0.0-1.5
Southern Commonwealth	TP29 0.3-1.4	TP29	0.3-1.4
Southern Commonwealth	TP30 0.5-1.6	TP30	0.5-1.6
Southern Commonwealth	TP30 0.0-1.5	TP30	0.0-1.5
North of East Hills Rail Corridor (Golf Course)	TP40 0.0-1	TP40	0.0-1
North of East Hills Rail Corridor (Golf Course)	TP41 0.2-0.4	TP41	0.2-0.4
North of East Hills Rail Corridor (Golf Course)	TP42 0.0-1	TP42	0.0-1
North of East Hills Rail Corridor (Golf Course)	QC02	TP42	0.0-1
North of East Hills Rail Corridor (Golf Course)	TP43 0.4-0.5	TP43	0.4-0.5
North of East Hills Rail Corridor (Golf Course)	TP44 0.0-1	TP44	0.0-1
North of East Hills Rail Corridor (Golf Course)	TP45 1.1-1.3	TP45	1.1-1.3
North of East Hills Rail Corridor (Golf Course)	MW06 1.2-1.4	MW06	1.2-1.4
North of East Hills Rail Corridor (Golf Course)	AHM501 - SIMTA 0.3-0.4	Golden TPO5	0.3-0.4
Glenfield	TP46 0.0-1	TP46	0.0-1
Glenfield	QC01	TP46	0.0-1
Glenfield	TP47 0.8-1.0	TP47	0.8-1
Glenfield	TP48 0.6-0.8	TP48	0.6-0.8
Glenfield	TP49 2.8-3.0	TP49	2.8-3
Glenfield	TP50 1.0-1.2	TP50	1.1-2
Glenfield	TP51 1.8-2.0	TP51	1.8-2

* Value for Chromium VI used



Well ID	Date Gauged and Purged	Top of Casing Elevation	Depth to water (mbTOC)	Depth to LNAPL (mbTOC)	Groundwater Elevation (AHD)	Bottom of Screen (mbTOC)	Volume Removed (L)	Physical Parameters					Comments
								Dissolved Oxygen (mg/L)	Electrical Conductivity (uS/cm)	pH	Redox (mV)	Temperature (°C)	
MW01*	12/23/2014	-	7.935	-	-	10.500	12	-	-	-	-	-	Purged Dry
MW02*	12/23/2014	-	10.000	-	-	10.101	0	-	-	-	-	-	Dry
MW03*	12/23/2014	-	-	9.123	-	9.123	5	-	-	-	-	-	Purged dry, strong hydrocarbon odour, yellow colour
MW06*	12/23/2014	-	10.000	-	-	9.000	0	-	-	-	-	-	Dry
MW01 ¹	1/12/2015	-	8.538	-	-	10.500	2.4	0.22	7.29 mS/cm	4.80	124.0	22.5	No odour, grey, turbid, no sheen
MW02 ¹	1/12/2015	-	8.640	-	-	10.101	2	1.23	18.81 mS/cm	5.09	97.0	22.8	No odour, slight grey, very low turbidity, no sheen
MW03 ¹	1/12/2015	-	-	6.163	-	9.123	2.4	-	-	-	-	-	Strong hydrocarbon odour (diesel)
BHHP34011 ¹	1/12/2015	-	-	6.335	-	10.540	1.5	-	-	-	-	-	Hydrocarbon odour (diesel)
MW06 ¹	1/12/2015	-	6.602	-	-	9.000	2.1	1.81	671	5.67	25.0	20.4	No odour, no colour, non-turbid, no sheen
MW01 ²	1/22/2015	-	8.563	-	-	-	-	-	-	-	-	-	-
MW02 ²	1/22/2015	-	8.653	-	-	-	-	-	-	-	-	-	-
MW03 ²	1/22/2015	-	9.020	6.155	-	-	-	-	-	-	-	-	-
BHHP34011 ²	1/22/2015	-	7.111	6.427	-	-	-	-	-	-	-	-	-
MW06 ²	1/22/2015	-	7.354	-	-	-	-	-	-	-	-	-	-

Comment

bTOC = Below top of casing

* Initial Purge post-installation 23/12/2014

1 Water levels and Field parameters during Groundwater monitoring Event on 12/01/2015

2 Groundwater levels during Groundwater Gauging event on 22/01/2015

Table 2: Groundwater Analytical Results
 Project Number: 50342
 Project Name: SIMTA Stage 1 Moorebank Assessment





Product ID	BTEX						TPHs (NEPC 1999)					TRHs (NEPC 2013)					
	Benzene µg/L	Ethylbenzene µg/L	Toluene µg/L	Xylene (m & p) µg/L	Xylene (o) µg/L	Xylene (Total) µg/L	C6-C9 Fraction µg/L	C10-C14 Fraction µg/L	C15-C28 Fraction µg/L	C29-C36 Fraction µg/L	C10-C36 Fraction (Total) µg/L	>C10-C16 Fraction µg/L	>C16-C34 Fraction µg/L	>C34-C40 Fraction µg/L	>C10 - C16 less Naphthalene (F2) µg/L	C6-C10 Fraction µg/L	C6 - C10 less BTEX (F1) µg/L
EQL	1	1	1	2	1	3	20	50	100	100	100	50	100	100	50	20	20
NEPC 2013 Groundwater Investigation Levels - Fresh Waters	950			200	350												
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 4 to <8m	5000	NL	NL			NL									NL		6000
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+	5000	NL	NL			NL									NL		7000

Sample ID	Location	Sample Date		<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<50	<100	<100	<20	<20	<20
MW01	MW01	1/12/2015	-	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<50	<100	<100	<20	<20	<20
MW02	MW02	1/12/2015	-	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<50	<100	<100	<20	<20	<20
MW03	MW03	1/12/2015	Diesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	MW03	1/12/2015	Diesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01A	MW03	1/12/2015	Diesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BHHP34011	BHHP34011	1/12/2015	Diesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	MW06	1/14/2015	-	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<50	<100	<100	<20	<20	<20

*Value for Arsenic V used

Table 2: Groundwater Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment





Chlorinated Alkanes															Chlorinated Alkenes														
1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	bromodichloromethane	Carbon tetrachloride	Chloroform	Chloroethane	Chloromethane	dibromochloromethane	Dichlorodifluoromethane	Dichloromethane	Hexachloroethane	Trichlorofluoromethane	1,1,2,2-tetrachloroethylene	1,1-Dichloroethene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride		
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
1	1	5	1	1	1	1	1	1	1	1	5	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1		
EQC																													
NEPC 2013 Groundwater Investigation Levels - Fresh Waters																													
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 4 to <8m																													
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+																													
Sample ID	Location	Sample Date																											
MW01	MW01	1/12/2015																											
MW02	MW02	1/12/2015																											
MW03	MW03	1/12/2015																											
QC01	MW03	1/12/2015																											
QC01A	MW03	1/12/2015																											
BHP34011	BHP34011	1/12/2015																											
MW06	MW06	1/14/2015																											
-	-	-	<1	<5	<1	<1	<1	<1	-	<1	<5	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	

*Value for Arsenic V used

Table 2: Groundwater Analytical Results
 Project Number: 50342
 Project Name: SIMTA Stage 1 Moorebank Assessment





	Miscellaneous Hydrocarbons							Monocyclic Aromatic Hydrocarbons							Polycyclic Aromatic Hydrocarbons																
	1,2-dibromomethane	2-Butanone (MEK)	4-Methyl-2-pentanone (MIBK)	Bromoform	Bromomethane	Dibromomethane	Iodomethane	1,2,4-trimethyl benzene	1,3,5-trimethyl benzene	Bromobenzene	Isopropylbenzene	styrene	2-Methylnaphthalene	3-Methylcholanthrene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	PAHs (Total)	Pyrene	
EQCL	1	1	1	1	1	5	1	1	1	1	1	1	2	2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NEPC 2013 Groundwater Investigation Levels - Fresh Waters																															16
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 4 to <8m																															NL
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+																															NL

Sample ID	Location	Sample Date																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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*Value for Arsenic V used

Table 2: Groundwater Analytical Results
 Project Number: 50342
 Project Name: SIMTA Stage 1 Moorebank Assessment





JBS&C

Organochlorine Pesticides																				
	Aldrin	alpha-BHC	beta-BHC	delta-BHC	Chlordane	DDD	DDE	DDT	Dieldrin	Endosulfan alpha	Endosulfan beta	Endosulfan Sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Lindane	Methoxychlor	Toxaphene
EQ/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.10	0.10	0.10	0.10	1.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	10
					0.03			0.006		0.03			0.01			0.01		0.2		0.1
NEPC 2013 Groundwater Investigation Levels - Fresh Waters																				
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 4 to <8m																				
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+																				

Sample ID	Location	Sample Date																		
MW01	MW01	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	MW02	1/12/2015	<2	-	<2	<2	<4	<2	<2	-	-	<2	<2	<2	<2	<2	<2	<2	<1	-
MW03	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01A	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BHP34011	BHP34011	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	MW06	1/14/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10

*Value for Arsenic V used

Table 2: Groundwater Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment





Organophosphorus Pesticides															Chlorinated Benzenes																
Azinphos methyl	Chlorpyrifos	Cumaphos	Demeton	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprophos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Mevinphos	Monocrotophos	Parathion	Parathion methyl	Phorate	Prothiofos	Ronnel	Stirophos	Sulprofos	Trichloronate	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	Pentachlorobenzene			
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
2	2	2	4	2	2	2	2	2	2	2	2	2	2	2	20	2	2	2	2	2	2	2	2	1	1	1	1	0.10	2		
EQI	0.01			0.01	0.01	0.15				0.2			0.05			0.004								160	260	60					
NEPC 2013 Groundwater Investigation Levels - Fresh Waters																															
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 4 to <8m																															
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+																															
Sample ID	Location		Sample Date																												
MW01	MW01		1/12/2015		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW02	MW02		1/12/2015		<2	<2	-	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-	<1	<1	<2	-	-	-	
MW03	MW03		1/12/2015		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	MW03		1/12/2015		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01A	MW03		1/12/2015		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BHP34011	BHP34011		1/12/2015		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	MW06		1/14/2015		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1

*Value for Arsenic V used

Table 2: Groundwater Analytical Results
 Project Number: 50342
 Project Name: SIMTA Stage 1 Moorebank Assessment





Polychlorinated Biphenyls				Phenols										Heavy Metals										Non-Metallic Inorganics		Anilines																																						
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L																																
Atroclor 1016	Atroclor 1232	Atroclor 1242	Atroclor 1248	Atroclor 1254	Atroclor 1260	PCBs (Total)	2-chlorophenol	2-methylphenol	2-nitrophenol	3- & 4-methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Pentachlorophenol	Phenol	Phenols (Total)	Arsenic (Total) (Filtered)	Cadmium (Filtered)	Chromium (Total) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Inorganic) (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Ammonia	Sulfate (as S)	Nitrate (as N)	2-Nitroaniline	Aniline																																				
1	1	1	1	1	1	1	2	2	2	4	2	2	10	2	10	1	0.10	1	1	1	0.10	1	1	10	2	10	4	2					8																															
EQCL																																																																
NEPC 2013 Groundwater Investigation Levels - Fresh Waters																																																																
NEPC 2013 Groundwater HSL D for Vapour Intrusion- Sand 4 to <8m																																																																
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+																																																																
Sample ID	Location	Sample Date																																																														
MW01	MW01	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	<10	<1	0.2	<1	2	<1	<0.1	43	92	40	88	2	-	-																																				
MW02	MW02	1/12/2015	-	-	-	-	<2	<2	<2	<4	<2	<2	<10	<2	<10	1	0.5	1	2	<1	<0.1	220	280	170	410	2	<4	<2																																				
MW03	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																															
QC01	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																															
QC01A	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																															
BHP34011	BHP34011	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	<50	<1	<0.2	<1	<1	<1	<0.1	4	17	20	<5	11,000	-	-																																				
MW06	MW06	1/14/2015	-	-	-	-	-	-	-	-	-	-	-	-													-	-																																				

*Value for Arsenic V used

Table 2: Groundwater Analytical Results
Project Number: 50342
Project Name: SIMTA Stage 1 Moorebank Assessment



JBS&G																								
	Nitrobenzenes				Nitrotoluenes				Phthalates				Miscellaneous Chemicals				Major Cations				Major Anions			
	1,3,5-trinitrobenzene µg/L	1,3-dinitrobenzene µg/L	Nitrobenzene µg/L	pentachloronitrobenzene µg/L	2,4,6-trinitrotoluene µg/L	2-nitrotoluene µg/L	2,4 & 2,6-Dinitrotoluene µg/L	3-nitrotoluene µg/L	Di(2-ethylhexy) phthalate µg/L	Dibutyl phthalate µg/L	Diethyl phthalate µg/L	Dimethyl phthalate µg/L	di-n-octylphthalate µg/L	Hexachlorobutadiene µg/L	Carbon disulfide µg/L	RDX µg/L	50	4	0.50	0.50	0.50	0.50	mg/L	mg/L
50	50	2	2	2	50	50	100	50	20	2	2	2	2	2	1	50						5	1	5
EQCL																								
NEPC 2013 Groundwater Investigation Levels - Fresh Waters			550		140					10	1000	3700												
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 4 to <8m																								
NEPC 2013 Groundwater HSL D for Vapour Intrusion - Sand 8m+																								

Sample ID	Location	Sample Date																						
MW01	MW01	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<10	110	1500	<10	18	2900	<5
MW02	MW02	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	750	4500	<10	43	9900	<5
MW03	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01A	MW03	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BHP34011	BHP34011	1/12/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	MW06	1/14/2015	<50	<50	<50	<50	<100	<50	-	-	-	-	-	-	-	-	-	14	10	110	1.4	45	170	<10

*Value for Arsenic V used



APPENDIX C

Remediation Criteria



Tier 1 Soil Criteria

Guidance on the assessment of contaminant concentrations on sites is presented in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2013), herein referred to as the ASC NEPM (NEPC, 2013). Exposure settings considered in the ASC NEPM (NEPC, 2013) are low and high density residential; recreational/open space; and commercial / industrial land uses.

As the site is proposed for commercial / industrial purposes it is considered appropriate to compare the results of soil analysis against the investigation levels for commercial / industrial land.

The following health based criteria have been considered as assessment criteria:

- Health investigation levels (HILs) are generic assessment criteria for a range of metals and organic substances designed to be used in the first stage of the assessment of potential risks to human health from chronic exposure to contaminants. Table 1A(1) in Schedule B1 of ASC NEPM 2013 presents the HILs, which are generic to all soil types; and
- The ASC NEPM (NEPC, 2013), provides HSL for asbestos in soil, which are 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* (WA DoH, 2009). Table 7 in Schedule B1 of ASC NEPM 2013 presents the HSLs for asbestos contamination in soil.

Although the majority of the site will be converted to terrestrial ecosystem of limited value (i.e. a commercial/ industrial development), in accordance with Section 2.5.3 in Schedule B1 of the ASC NEPM 2013, consideration should also be given to the ecological investigation levels (EILs) within commercial/industrial land uses and EILs have been derived for commercial/industrial land uses. Furthermore, EILs have been derived for areas of ecological significance, which are considered to be areas where the planning provisions or land use designation is for the primary intention of conserving and protecting the natural environment, and include areas designated conservation areas (ASC NEPM, 2013). Therefore, the following ecological based criteria have been considered as assessment criteria:

- Generic ecological investigation levels (EILs) are provided for lead in Schedule B1 of NEPC 2013, and are independent of soil type.

Summary of Adopted Commercial/Industrial Soil Assessment Criteria (mg/kg)

Analyte	HIL – D Commercial Industrial	EIL- Commercial / Industrial
Inorganics		
Lead	1,500	1,800
Asbestos		
Bonded ACM	0.05% w/w	-
Friable Asbestos	0.001% w/w	-

Notes:

- No guideline available

+ HSLs for direct contact where HSL for vapour intrusion is NL adopted from CRC Care, 2011.

* ESLs are of low reliability except where indicated by * which indicates the ESL is of moderate reliability



APPENDIX D

Non Conformance Register



APPENDIX D COMPLAINTS AND NON CONFORMANCE REGISTER

The purpose of this Complaints and Environmental Incident Register is to maintain a register of complaints from local residents or stakeholders, which will include a record of any action taken with respect to the complaints.

Entries into the Complaints and Environmental Incident Register are to commence immediately following the receipt of any complaints associated with works undertaken on the "Butchers Knife".

Date	Time	Form of communication	Name, address, contact phone of complainant	Nature of complaint / non-conformance	Response / corrective action / recommended preventative action	Date of response	Date complainant notified of action	Signature / position



APPENDIX D COMPLAINTS AND NON CONFORMANCE REGISTER

Date	Time	Form of communication	Name, address, contact phone of complainant	Nature of complaint / non-conformance	Response / corrective action / recommended preventative action	Date of response	Date complainant notified of action	Signature / position

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APPENDIX E

Site Inspection Records



APPENDIX E SMP INSPECTION REPORT

The purpose of this Inspection Report is to facilitate maintenance of a record of inspections undertaken at the "Butchers Knife", and to record the results of the inspections including a record of any corrective actions required.

The Inspection Report is to be reviewed and signed by the site manager following completion of the inspection and corrective actions (if any).

Date:	
Time:	
Inspector (name & signature):	
Observations:	
Problems (if observed):	
Report to:	
Corrective action (if required):	
Corrective action completed (signed & dated by site manager):	
Preventative action to limit future occurrences:	
Site manager review (signed & dated):	

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APPENDIX F

Important information relating to this document



LIMITATIONS

This Document has been provided by Golder Associates Pty Ltd ("Golder") subject to the following limitations:

This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

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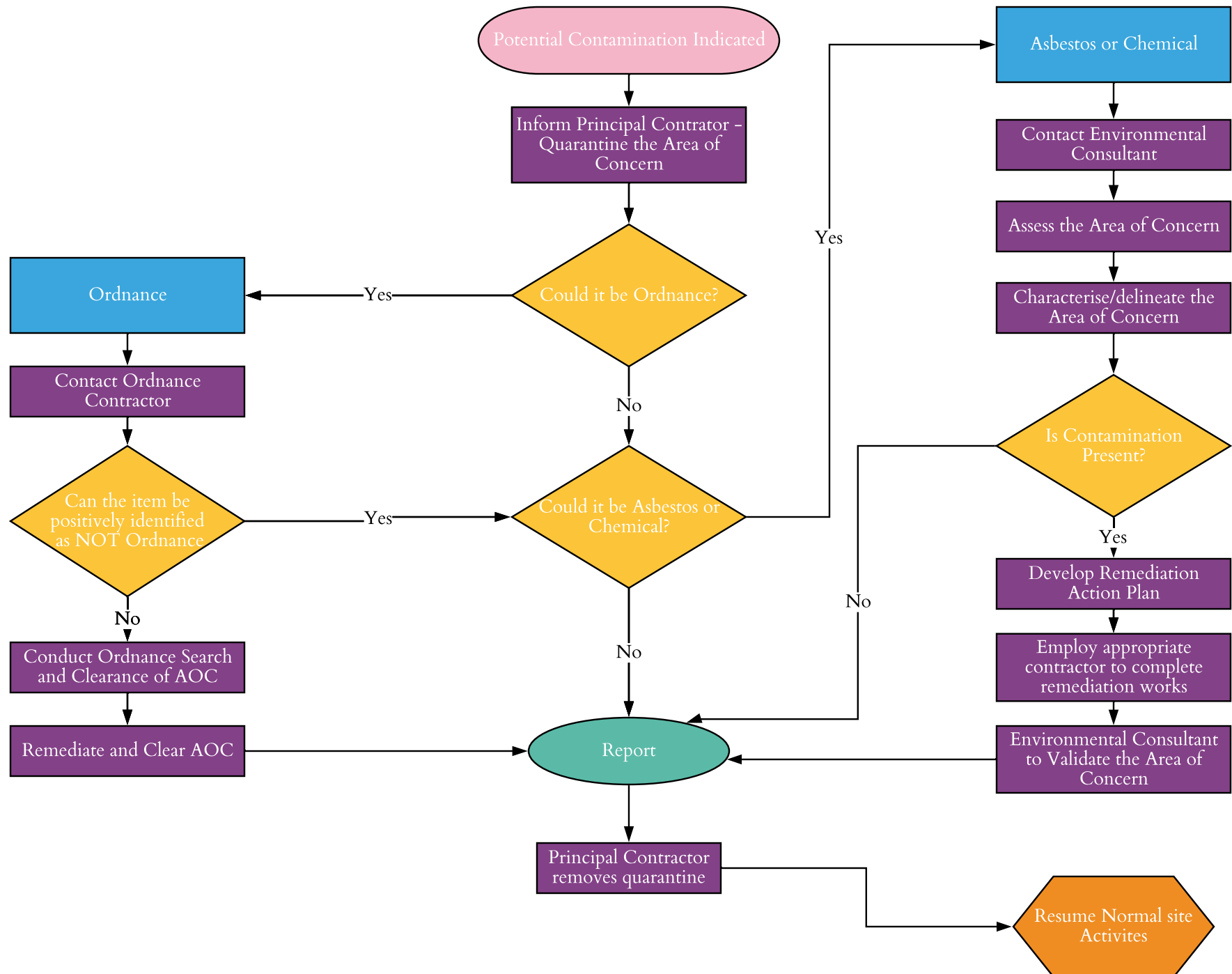
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Appendix B

UFP FLOW CHARTS



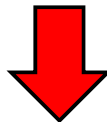
Potential Site Hazards



If you **SEE** or **SMELL** anything unusual



STOP WORK & contact Site Foreman



Do not restart work before
the area has been investigated
and cleared by an
Environmental Consultant

Appendix C

NSW EPA ACCREDITED SITE AUDITOR ENDORSEMENT

Appendix D

COMPLIANCE MATRIX

Table F1 – Conditions of Consent (CoC)

CoC	Requirement	Document Reference	How Addressed
A14	With approval of the Secretary, the Applicant may submit any strategy, plan or program required by this consent on a Staged basis.	Section 1.1	The subject of this version of the CMP, is a portion of the MPE Site predominately located on the former DNSDC but also includes a portion of the “butchers knife” land located to the south of the DNSDC. (Figure 2, Attached Figures).
A15	If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program.	Section 1.1	This plan is an update to the former CMP (EP Risk 2019) This version of the CMP only includes portions of the Stage 2 MPE Site as shown on Figure 1 .
C7	The applicant must ensure that the environmental management plans required under this consent are prepared in accordance with any relevant guidelines, and include: a) Baseline data; b) A description of: (i) The relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) Any relevant limits or performance measures/criteria; and (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 measurement measures; c) A description of the management measures to be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria; d) A program to monitor and report on the: (i) Impacts and environmental performance of the development; and (ii) Effectiveness of any management measures (see (c) above); e) A contingency plan to manage any unpredicted impacts and their consequences; f) A program to investigate and implement ways to improve the environmental performance of the development over time;	a) Section 1.1, 4 and 5; b) (i) Section 6, 7.1, 7.2, 10, 11.8 and 0; (ii) Section 1.3, 6, 8.2, 10.2 and 11.5; (iii) Section 6, 7.2, 8.2, 10.6 and 11.5; c) Section 7, 8, 9, 10.5, 11.9, 11.10, 11.11; d) (i) Section 8.2, 10.6, 11.7 and 12.3; and (ii) Section 12.3; e) Section 11; f) Section 12.2; g) (i) Section 12.2; (ii) Section 12.2; (iii) Section 12.2; and h) Section 12.1.	a) Includes known site conditions, summarised remaining contamination issues and conceptual site model; b) (i) Each section covers any relevant approval and/or license for each type of contamination management activity; (ii) Specifies adopted criteria to be used for assessment and validation; (iii) Specifies sampling and validation plans and the decision questions needing to be answered for each different type of assessment/validation; c) Specifies the details of each management plan and the Condition of Consent B134 and B135; d) (i) Each section describes the sampling analysis and reporting program for each contamination issue requiring management; and (ii) The sampling and validation programs will report on the effectiveness of the any of the management measures; e) Details the Unexpected Finds Procedure in relation to contamination; f) Continual improvement for the CMP is discussed;

Table F1 – Conditions of Consent (CoC)

CoC	Requirement	Document Reference	How Addressed
	g) A protocol for management and reporting any: (i) Incidents and non-compliances; (ii) Complaints; (iii) Non-compliances with statutory requirements; and h) A protocol for periodic review of the plan.		g) (i) Specifies how incidents and non-compliances will be managed; (ii) Specifies how complaints in relation to contamination will be managed; (iii) Specifies how non-compliance to statutory requirements will be managed; and h) Specified how the CMP will be reviewed/updated.
B133	Prior to any demolition on the site, and entry and any subsurface activities within the southern burial pits, an UXO, EO and EOW Site Assessment Survey must be undertaken by a UXO contractor listed on the Defence Panel of suitably qualified UXO consultants and contractors and submitted to the Secretary.	Section 4.2 Section 9 G-Tek 2018a and 2018b	G-tek a Defence Panel qualified UXO consultant, were engaged to review historical reports and additional works conducted by them in 2003 within the Southern Burial Pits and concluded “...the requirements of CoC B133 are met and that no additional UXO, EO or EOW Site Assessment Surveys are required within the MPE Site prior to any demolition, entry or subsurface activities. The above conclusion was based on the results of a Site Assessment Survey conducted by Milsearch (2002) as reported in G-tek (2018a) and an additional Site Assessment Surveys conducted within the Southern Burial Pit (G-tek 2003a and 2003b, reported in G-Tek (2018a). G-Tek (2018a) reviewed these historical reports and as a result of the review found that overall the MPE was found to be free of UXO risk.
B134	Prior to early works and fill importation, a Contamination Management Plan must be prepared to the satisfaction of the Secretary and form part of the Construction Environmental Management Plan (CEMP) required under condition C1. The Contamination Management Plan is to be based on the Environmental Management Plan prepared by GHD (2016) and results of the UXO, EO and EOW Site Assessment Survey and must take into account additional risks posed by the proposed works and in particular: (a) excavation within the southern burial pits; (b) removal/remediation of underground storage tanks; (c) disturbance of soil containing asbestos material; and (d) demolition of buildings containing asbestos materials.	This plan. GHD 2016 – Sections 1.1, 4, 4.1, 5, 7.1, 7.3, 8, 9, 10 and Appendix A UXO, EO and EOW – Section 4.2, 9 and G-Tek 2018a and 2018b a) Section 9, 10 and 11 b) Section 8 c) Section 7 and 10 d) Section 10.7	This plan forms a sub-plan to the CEMP. This CMP has been developed based on the EMP (GHD 2016), whereby the DNSDC conceptual site model and the remaining contamination issues presented within the EMP have been incorporated for management into this plan. As per Section 1.6 of GHD (2016) the EMP required amendment should the Site be redeveloped. The Site is currently the subject of two State Significant Development (SSD) approvals, SSD 6766 MPE Stage 1 (approved) and SSD 7628 MPE Stage 2. The EMP (GHD 2016) was updated and reported in EP Risk (2018a). The GHD (2016) EMP

Table F1 – Conditions of Consent (CoC)

CoC	Requirement	Document Reference	How Addressed
			was reviewed and endorsed by the NSW EPA Site Auditor (JBS&G 2016a). The CMP has been prepared with reference to CoC B133, see comments above. Additional risks will be managed as follows: a) Based on the above assessments and reviews, G-tek (2018a²⁵ and 2018b²⁶) concluded the MPE Site, including the southern burial pits, was designated as a 'low risk' UXO site because on past assessment and remediation activities and the lack any UXO finds. Unexpected Finds will be managed as per Section 9 and 11 and (G-TEK 2018a and G-TEK 2018b). b) A plan has been provided in the CMP. c) The Asbestos Management Plan (AMP) details how Asbestos impacted soils should be managed. Additionally, Section 7 details how known impacts of Asbestos will be managed. Unexpected ACM, including in soils, will be managed in accordance with Section 11.1 to 11.7 and Section 10. d) A plan has been provided in the AMP, Section 10.7.
B135	The Contamination Management Plan must include: (a) an UXO, EO and EOW management and remediation plan, prepared by a qualified person(s) listed on the Defence Panel; (b) an Asbestos Management Plan; and (c) Unexpected Finds Procedure. The Contamination Management Plan must be approved by a NSW EPA Accredited Site Auditor prior to submission to the Secretary.	a) Section 9 and (G-TEK 2018a and G-TEK 2018b). b) Section 10 c) Section 11 and Appendix B	All plans provided in the Sections referenced and the CMP have been approved by the NSW EPA Accredited Site Auditor (Appendix C).

²⁵ G-tek 2018a, CoA B133 – Moorebank Precinct East – Tactical, G-tek Australia Pty Limited, 9 February 2018

²⁶ G-tek 2018b, Unexploded Ordnance (UXO) Management Plan for Moorebank Precinct East Stage 2 Development Site, G-tek Australia Pty limited, 15 February 2018.

Table F1 – Conditions of Consent (CoC)

CoC	Requirement	Document Reference	How Addressed
B136	Following demolition, a supplementary UXO, EO and EOW Site Assessment Survey is to be undertaken and an updated Contamination Management Plan is to be prepared to the satisfaction of the Secretary to address any additional contamination issues identified. Remediation works must only be carried out by suitably qualified and experienced contractor(s) including a contractor listed on the Defence Panel in the case of UXO, EO and EOW.	Section 9	Following demolition of the existing buildings (Figure 1, Attached Figures), a supplementary UXO, EO and EOW Site Assessment Survey is to be undertaken by a qualified contractor listed on the Defence Environment and Heritage Panel (DEHP) as a D2. D2 companies can undertake UXO related materials assessment and management. The Site Assessment Survey will be conducted underneath the buildings in accordance with similar methodologies conducted during previous historical assessments (G-tek 2003).
RtS	It is noted that the Stage 2 Response to Submissions (RtS) report outlines a number of Revised Mitigation Measures directly related to the preparation and implementation of the CMP. The additional Revised Mitigation Measures relevant to the CMP, and must be implemented prior to construction are listed below: (a) 6C, which requires the CMP to be prepared in consideration of the outcomes of the EMP (GHD, 2016) and SAS and Site Audit Report (JBS&G, 2016). (b) 6D, requiring a site-wide UXO, EO and EOW Management Plan.	(a) GHD 2016 – Sections 1.1, 4, 4.1, 5, 7.1, 7.3, 8, 9, 10 and Appendix A. (b) Section 9 and (G-TEK 2018a and G-TEK 2018b).	(a) This CMP has been developed based on previous management plans prepared for the MPE Site including the EMP (GHD 2016), whereby the DNSDC conceptual site model where remaining contamination issues presented within the EMP have been incorporated for management into this plan (where relevant). As per Section 1.6 of GHD (2016) the EMP required amendment should the Site be redeveloped. The Site is currently the subject of two State Significant Development (SSD) approvals, SSD 6766 MPE Stage 1 (approved) and SSD 7628 MPE Stage 2. The EMP (GHD 2016) was updated and reported in EP Risk (2018a). The GHD (2016) EMP was reviewed and endorsed by the NSW EPA Site Auditor (JBS&G 2016a). (b) G-tek a Defence Panel qualified UXO consultant prepared the UXO, EOW and EO Management and Remediation Plan after review of site historical reports. This plan is attached to the CMP as an appendix.

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	Reference	Condition Requirement	Document Reference and How Addressed
8a)	MPW Concept EIS, Soil and Contamination Provisional Environmental Management Framework (PEMF) Section 5 – Table 5.1	During the pre-construction and construction phases of the Project, ensure that the proposed contamination and soil controls are implemented.	Intention of the whole CMP.
		The implementation of a remediation program applicable to each stage of development in accordance with the Moorebank Intermodal Terminal Remediation Action Plan.	Not relevant. The Stage 2 MPE, did not have a Remediation Action Plan (RAP) as it was determined by the NSW EPA Auditor that remnant contamination could be managed during construction via a Contamination Management Plan (CMP). The Department of Planning, Industry and Environment (DPIE) determined conditions for SSD 7628 include the requirement for this CMP.
		Establish and maintain awareness of the importance of ensuring impacts associated with contamination and disturbance of soil associated with the Project are minimised.	The whole plan establishes the awareness of the importance of managing contamination and disturbance of soil via the inclusion of the requirement for inductions into the CMP Section 1.3 . Easy to read diagrams and flow charts for Unexpected Finds are included in Appendix B . These will be hung in site sheds.
		During construction and operational phases, all contaminated material including soil/spoil and hazardous materials (e.g. asbestos containing material) are handled, stored, transported and disposed of in a lawful manner.	Where addressed: The CMP deals only with the construction phase. Asbestos – Section 10.5 Soils/ spoil - Sections 11.8, 11.10 and 11.11
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.2 – Management controls – Early Works and Construction phase	Contaminated soil/fill material present will be ‘chased out’ during the excavation works based on visual, olfactory and preliminary field test results.	This has been defined in Sections 7 and 8 for identified contamination. Should unexpected finds be identified they will be managed and/or remediated in accordance with Section 11 .
		Excavated soil would be temporarily stockpiled, sampled and analysed for waste classification processes. Following receipt of waste classification results, the material would be transported to a licensed off-site waste disposal facility as soon as practicable to minimise dust and odour issue through storage of materials on-site	Section 11.8, 11.10 and 11.11

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086

CoA	Reference	Condition Requirement	Document Reference and How Addressed
		Stockpiled soils would be stored on a sealed surface and the stockpiled areas would be securely bunded using silt fencing to prevent silt laden surface water from entering or leaving the stockpiles or the Project site.	Section 11.10 and the Construction Environmental Management Plan (CEMP) sub-plans.
		All excavation works would be undertaken by licensed contractor experienced in remediation projects and the handling of contaminated soils.	Where unexpected finds are uncovered and require remediation. Unexploded Ordnance (UXO) – Section 9 Asbestos – Section 10 Unexpected Finds – Section 11
		All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).	Included within the Asbestos Management Plan - Section 10
		The removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos, 2nd Edition [NOHSC 2002 (2005)] (NOHSC 2005a).	Included within the Asbestos Management Plan - Section 10
		An appropriate asbestos removal license issued by WorkCover would be required for the removal of asbestos impacted soil.	Included within the Asbestos Management Plan - Section 10
		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.	Included within the Asbestos Management Plan - Section 10
		Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release	Section 11.10
		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).	Included within the Asbestos Management Plan - Section 10

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086

CoA	Reference	Condition Requirement	Document Reference and How Addressed
		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 the National Occupational Health and Safety Commission Guidance Note on the Membrane Filter Method For the Estimating Airborne Asbestos Fibre, 2nd Edition [NOHSC 3003 (2005)] (NOHSC 2005b).	Included within the Asbestos Management Plan - Section 10.6
		All stockpiles would be maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials.	Section 11.10
		Stockpiles would be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas).	Section 11.10 and 11.11 and associated sub-plans to the CEMP.
		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 F 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.	Section 11.10 and 11.11 and associated sub-plans to the CEMP.
		The stockpiles of contaminated material would be covered with a waterproof membrane (such as polyethylene sheeting) to prevent increased moisture from rainwater	Section 11.10 and 11.11 and associated sub-plans to the CEMP.

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	Reference	Condition Requirement	Document Reference and How Addressed
		infiltration and to reduce windblown dust or odour emission	
		Before the reuse of any material on-site, it would be validated so that the lateral and vertical extent of the contamination is defined	Section 11.11
		Where required, contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities	Section 11.11
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.4– monitoring	Within each of the Project specific management plans, the private sector developer would need to detail what monitoring would be undertaken to ensure compliance with the following:	
		The Project's EIS, with respect to the commitments made as well as the management and mitigation measures proposed;	Monitoring requirements summarised in Section 12.3 - Table 10
		Project approvals issued under the EPBC Act and EP&A Act;	EP&A Act conditions of consent compliance specified in Section 1.2 – Table 1
		Contractual requirements established between MIC and the developer and operator for the Project;	N/A
		Other permits and/or licences required during the Project; and	Section 12.3 – Table 10 EP Risk (2019b)
		Objectives, targets and indicators as presented in this PEMF.	Discussed Section 1.3 - reference <i>MPW Concept EIS, Soil and Contamination PEMF Section 5 – Table 5.1</i>
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.5 – Management response to incidents and non-compliances	Contaminated soil/spoil and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal).	Section 12.2
8b) and c)	REMM 7A	To minimise the risk of leakages involving natural gas, liquid natural gas (LNG) and flammable and combustible liquids to the atmosphere: appropriate standards for a gas reticulation network,	See Management Commitments Appendix E

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	Reference	Condition Requirement	Document Reference and How Addressed
		including AS 2944-1 (2007) and AS 2944-2 (2007), would be referred to in the detailed design process; correct schedule pipes would be used; a fire protection system would be installed if necessary for gas users; cathodic protection would be installed for external corrosion if appropriate; and access to the Project site would be secure.	
	REMM 7B	To minimise the risks of leakage of LNG and liquid petroleum gas (LPG) and flammable liquids during transport: materials would be transported according to the Australian Dangerous Goods (ADG) Code, relevant standards and regulations; and contractors delivering the gas would be trained, competent and certified by the relevant authorities	See Management Commitments Appendix E
	REMM 7C	To minimise hazards associated with venting of natural gas, LNG and LPG: LNG storage would be designed to AS/NZS 1596-2008 standards; access to the Project site would be secure; and significant separation distances to residences and other assets would be put in place	See Management Commitments Appendix E
8b) and c)	REMM 7D	Storage of flammable/combustible liquids would be carried out in accordance with AS 1940, with secondary containment in place and location away from drainage paths	See Management Commitments Appendix E
	REMM 7E	Standby or emergency generators and transformers would all have secondary containment	See Management Commitments Appendix E
	REMM 7F	Oil coolers would generally be located in areas where leaks and runoff are appropriately controlled at source or in a retention basin.	See Management Commitments Appendix E
	REMM 7I	No hazardous or regulated wastes would be disposed of onsite.	Section 11.8 and 11.11
	REMM 7J	All offsite disposals would be carried out by approved transport operators and to approved facilities	Section 11.8 and 11.11

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086

CoA	Reference	Condition Requirement	Document Reference and How Addressed
	REMM 7K	Other dangerous goods, including any waste materials present on the Project site, would be suitably contained, with secondary containment and runoff controls implemented where appropriate to prevent leaks or spills migrating to environmentally sensitive areas, in particular via stormwater systems that drain to the Georges River.	See Management Commitments Appendix E
	REMM 8I	Contaminated soil/fill material present will be 'chased out' during the excavation works based on visual, olfactory and preliminary field test results.	This has been defined in Sections 7 and 8 for identified contamination. Should unexpected finds be identified they will be managed and/or remediated in accordance with Section 11 .
	REMM 8J	Excavated soil would be temporarily stockpiled, sampled and analysed for waste classification processes. Subject to receipt of waste classification results, the material would be transported to a licensed offsite waste disposal facility as soon as practicable to minimise dust and odour issue through storage of materials on site.	Section 11.8 and 11.10
8b) and c)	REMM 8K	Stockpiled soils would be stored on a sealed surface and the stockpiled areas would be securely bunded using silt fencing to prevent silt laden surface water from entering or leaving the stockpiles or the Project site	Section 11.10 and the Construction Environmental Management Plan (CEMP) sub-plans.
	REMM 8L	All excavation works associated with potential contaminated lands would be undertaken by licensed contractors, experienced in remediation projects and the handling of contaminated soils.	Where unexpected finds are uncovered and require remediation. Unexploded Ordnance (UXO) – Section 9 Asbestos – Section 10 Unexpected Finds – Section 11
	REMM 8M	All asbestos removal, transport and disposal would be performed in accordance with the Work Health and Safety Regulation 2011 (WHS Regulation)	Asbestos Management Plan – Section 10 .
	REMM 8N	The removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos, 2nd Edition [NOHSC 2002 (2005)] (NOHSC 2005a).	Asbestos Management Plan – Section 10 .
	REMM 8RO	An appropriate asbestos removal licence issued by WorkCover NSW would be required for the removal of asbestos contaminated soil.	Asbestos Management Plan – Section 10 .
	REMM 8P	Environmental management and WHS procedures would be put in place for the asbestos removal during excavation	Asbestos Management Plan – Section 10 .

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	Reference	Condition Requirement	Document Reference and How Addressed
		to protect workers, surrounding residents and the environment.	
	REMM 8Q	Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release	Section 11.10
	REMM 8R	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)	Included within the Asbestos Management Plan - Section 10
8b) and c)	REMM 8S	Asbestos fibre air monitoring would be undertaken during the removal of ACMs and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with the National Occupational Health and Safety Commission Guidance Note on the Membrane Filter Method For the Estimating Airborne Asbestos Fibre, 2nd Edition [NOHSC 3003 (2005)] (NOHSC 2005b).	Included within the Asbestos Management Plan - Section 10.6
	REMM 8T	All stockpiles would be maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials	Section 11.10
	REMM 8U	Stockpiles would be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas)	Section 11.10 and 11.11 and associated sub-plans to the CEMP.
	REMM 8V	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 F of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 5A and 5B. All such preparatory works	Section 11.10 and 11.11 and associated sub-plans to the CEMP.

Table F2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	Reference	Condition Requirement	Document Reference and How Addressed
		would be undertaken before material is placed 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	
8b) and c)	REMM 8W	Any stockpiles of contaminated material would be covered with a waterproof membrane (such as polyethylene sheeting) to prevent increased moisture from rainwater infiltration and to reduce wind blown dust or odour emission	Section 11.10 and 11.11 and associated sub-plans to the CEMP.
	REMM 8X	Before the reuse of any material on site, it would be validated so that the lateral and vertical extent of the contamination is defined.	Section 11.11
	REMM 8Y	Where required, contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities	Section 11.11
	REMM 8Z	Where necessary, consider undertaking further investigations to determine whether other buildings have organochlorine pesticides (OCP) impacts subgrade materials, and to quantify the volume of OCP impacted materials across the site	Discussed in <i>Summary</i> in Section 4.1 and Section 5.1 Table 5
	REMM 8AA	Additional Aqueous Film Forming Foam Assessment (AFFF) be undertaken to determine if any direct remedial and/or management actions are required. A stage approach is considered appropriate and is detailed in the Preliminary AFFF Assessment (Golder Associates 2015b).	Additional assessment has been conducted and is discussed in Section 1.1 <i>Per- and Poly- Fluoroalkyl Substances</i>

Appendix E

MANAGEMENT COMMITMENTS

Qube makes the following management commitments in respect of hydrocarbons and waste materials, in particular natural gas, liquid natural gas and flammable and combustible liquids.

Conditions of Approval (CoA) – EPBC 2011/6086 – Management Commitments		
CoA	Reference	Condition Requirement
8b) and c)	REMM 7A	Minimise the risk of leakages involving natural gas, liquid natural gas (LNG) and flammable and combustible liquids to the atmosphere: - appropriate standards for a gas reticulation network, including AS 2944-1 (2007) and AS 2944-2 (2007), would be referred to in the detailed design process; - correct schedule pipes would be used; - a fire protection system would be installed if necessary for gas users; - cathodic protection would be installed for external corrosion if appropriate; and - access to the Project site would be secure.
	REMM 7B	Minimise the risks of leakage of LNG and liquid petroleum gas (LPG) and flammable liquids during transport: - materials would be transported according to the Australian Dangerous Goods (ADG) Code, relevant standards and regulations; and - contractors delivering the gas would be trained, competent and certified by the relevant authorities
	REMM 7C	Minimise hazards associated with venting of natural gas, LNG and LPG: - LNG storage would be designed to AS/NZS 1596-2008 standards; - access to the Project site would be secure; and - significant separation distances to residences and other assets would be put in place
8b) and c)	REMM 7D	Storage of flammable/combustible liquids would be carried out in accordance with AS 1940, with secondary containment in place and location away from drainage paths
	REMM 7E	Standby or emergency generators and transformers would all have secondary containment
	REMM 7F	Oil coolers would generally be located in areas where leaks and runoff are appropriately controlled at source or in a retention basin.
	REMM 7K	Other dangerous goods, including any waste materials present on the Project site, would be suitably contained, with secondary containment and runoff controls implemented where appropriate to prevent leaks or spills migrating to environmentally sensitive areas, in particular via stormwater systems that drain to the Georges River.

