LOGOS Development Management Pty Ltd

Remediation Action Plan

28 to 30 Burrows Road
St Peters, NSW

26 October 2022

62126-145521 (Rev 7)

JBS&G

www.jbsg.com.au

LOGOS Devlopment Management Pty Ltd

Remediation Action Plan

28 to 30 Burrows Road
St Peters, NSW

26 October 2022

62126-145521 (Rev 7)
JBS&G

Table of Contents

List of Tables

List of Figures

Appendices

Abbreviations

Term	Definition
ASS	Acid sulfate soil
bgl	below ground level
BTEX	Benzene, toluene, ethylbenzene and xylene
COPC	Contaminants of potential concern
CSM	Conceptual site model
DD	Due Diligence
DD	Due diligence
DGV	Default Guideline Value
DO	dissolved oxygen
DQI	Data quality indicator
DQO	Data quality objective
DSI	Detailed Site Investigation
EC	Electrical conductivity
ENM	Excavated Natural Material
EPA	NSW Environment Protection Authority
ESD	Ecological Sustainable Development
GME	Groundwater monitoring event
GPR	Ground penetrating radar
ha	Hectares
HIL	Health Investigation Level
HSL	Health Screening Level
JBS&G	JBS&G Australia Pty Ltd
LNAPL	Light non-aqueous phase liquids
LTEMP	Long-term environmental management plan
MAH	Monocyclic aromatic hydrocarbons
MNA	Monitored Natural Attenuation
MTP	Material tracking plan
OCP	Organochlorine pesticides
PAH	Polycyclic aromatic hydrocarbons
PASS	Potential acid sulfate soil
PCB	Polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances
PID	photoionization detector
PID	photoionization detector
QA/QC	Quality assurance/quality control
RAP	Remediation Action Plan
RL	Relative level
RWP	Remedial works plan
SES	Sullivan Environmental Sciences
SVE	Soil-vapour extraction
TRH	Total recoverable hydrocarbons
UPSS	Underground petroleum storage systems
UST	underground storage tank
VENM	Virgin Excavated Natural Material
VOC	Volatile organic compounds

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) has been commissioned by LOGOS Development Management Pty Ltd to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD 47601708) for the proposed flight training centre at 28-30 Burrows Road, St Peters (the site). The site is legally identified as Lot 2 DP 212652 and Lot 15 DP 32332 and occupies a total area of 7,961 m^2. The site location and layout are shown in **Figure 1** and **Figure 2.**

JBS&G has previously completed a Detailed Site Investigation (DSI) at the site, as documented in JBS&G (2022[1]). The site has historically been used as a mechanics workshop, including spray booths and a truck wash. The client is proposing to redevelop the site for the purposes of a flight training centre. The redevelopment proposal comprises demolition of existing structures (to be undertaken in accordance with a Complying Development Certificate) and construction of a three-storey warehouse building at grade.

JBS&G (2022) identified redundant infrastructure associated with historical site operations, including underground petroleum storage systems (UPSS), an oil/water separator system and a sewer pump. Additionally, JBS&G (2022) reported impacted soil and groundwater underlying the site. The DSI reported that remedial works were required to make the site suitable for the proposed redevelopment.

On this basis Logos has further engaged JBS&G to prepare a Remediation Action Plan (RAP) to address the contamination issues identified on site by previous investigations, such that the site can be made suitable for the proposed development.

This RAP was developed in accordance with guidelines made or approved by the NSW Environment Protection Authority (EPA) and relevant Australian Standards.

1.2 Objective

The objective of this RAP is to document the procedures and standards to be followed to remove the risks posed by the identified contamination issues, such that the site is made suitable for the proposed redevelopment while ensuring the protection of human health and the surrounding environment.

1.3 Previous Assessments

Previous environmental assessments and reports as available to JBS&G and/or prepared by JBS&G and relating to the site are listed following:

- SES (2020) *Due Diligence Contamination Assessment, 28-30 Burrows Road, St Peters NSW*. Sullivan Environmental Sciences dated 25 August 2020; and
- JBS&G (2022) *Detailed Site Investigation, 28-30 Burrows Road, St Peters, NSW*. JBS&G Australia Pty Ltd reference 62110/142,245 Rev A dated 8 June 2022.

[1] JBS&G (2022) *Detailed Site Investigation, 28-30 Burrows Road, St Peters, NSW*. JBS&G Australia Pty Ltd reference 62110/142,245 Rev A dated 8 June 2022.

1.4 Proposed Development

The development plans are provided in **Appendix A**. It is understood that the client is proposing to redevelop the site for a flight training centre.

The first stage of the development will comprise the demolition of all existing above ground structures and hardstand areas in accordance with a separate Complying Development Certificate (CDC) where it is not yet confirmed whether the existing pavements / hardstand will be removed as part of construction works. The second stage of the development will comprise the construction of:

- A slab-on-grade industrial building for the purposes of a flight training centre, occupying the central and northern site extent;
- Internal carparking and roadways; and
- A 10 m landscaping setback abutting Alexandra Canal along the southern site boundary.

As such, consideration has been given to the relevant land-use of "HIL D - Commercial/industrial, includes premises such as shops, offices, factories and industrial sites" as detailed in N*ational Environment Protection (Assessment of Site Contamination) Measure, 1999 (as amended 2013)*, National Environment Protection Council (NEPC 2013).

2. Site Condition and Surrounding Environment

2.1 Site Identification

The location of the site is shown on **Figure 1** and the layout is shown on **Figure 2**. The site details are summarized in **Table 2.1**, with the site described in detail in the following sections.

Table 2.1 Site Identification Details

Lot / DP	Lot 2 DP 212652 and Lot 15 DP 32332
Address	28-30 Burrows Road, St Peters NSW
Local Government Authority	City of Sydney Council
Approximate MGA Coordinates (MGA 56)	Easting: 332131 Northing: 6245552
Previous Use	Various industrial uses
Proposed Use	Flight training centre (Industrial Training Facility)
Site Zoning	IN1 General Industrial
Site Area	7,961 m^2

2.2 Site Condition

The site condition was reported in JBS&G (2022). The site was reported to comprise a rectangular parcel of land used for industrial purposes and was divided into two properties as discussed separately below. Relevant features are shown on **Figure 2.**

<u>28 Burrows Road</u>

This portion of the site contained a large warehouse (QMS Australia) in the western portion of the property with access from Burrows Road to the north. The warehouse was used as an outdoor furniture repair workshop and depot. The southern portion of the warehouse was previously used as a spray-booth but was used for the storage of outdoor furniture at the time of inspection. A disused truck wash was also present along the eastern boundary of the property and was being used as undercover storage for outdoor furniture stock.

A sump pit (previously used for waste oil storage) was located in the south-western portion of the property. The sump was in good condition with no evident cracking. Oil staining was present at the base of the sump.

A sewer pump, oil water separator and pit were located in the south-eastern portion of the property. The oil water separator and pit were not in use as part of current site operations but were noted to contained residual water with a hydrocarbon odour and sheen.

The ground surface of 28 Burrows Road was mostly covered in hardstand on which there were no obvious signs of gross contamination. Fill points and vent pipes present on site indicate the presence of five underground storage tanks (USTs) onsite in the northern and southern portions of site. An additional vent pipe was observed in the north-western portion of the site (north of the warehouse) indicating the potential for an additional UST in this area. The fill and/or dip points could not be opened during site investigations to confirm the contents of the USTs.

30 Burrows Road

A large warehouse was present on the western portion of 30 Burrows Road, containing four tenants (two mechanic workshops, engineering business and marine mechanic workshop). Units #1 and #4 housed automotive and truck mechanic workshops that contained several car hoists. No chemicals were stored on site with the exception of automotive engine oil and several aerosol paint tins in Units #1 and #4 and gas cylinders used for welding in Unit #3.

The eastern portion of the property was used for storage and as a car park for vehicles being serviced on the property. Several shipping containers used for storage were present along the south-east boundary. Scrap metal and disassembled cars were also stored in this area with surficial oil staining observed on the hardstand.

The ground surface of 30 Burrows Road was mostly covered by hardstand. Surface staining was observed throughout the carpark where cars and trucks were stored. Evidence of two USTs and the remains of a disused fuel bowser were observed in the north-eastern portion of the site.

2.3 Surrounding Land Uses

The land uses adjacent to the site as observed during the DSI and by review of readily accessible online records are listed below:

- North – The site has a direct road frontage to Burrows Road, close to the intersection with Campbell Road. Directly opposite the site to the north is the Westconnex Transurban MCC Main Office which comprises car parking facilities for motorists at the St Peters interchange. Sydney Park is further north on the opposite side of Campbell Parade.
- East – The immediately adjoining site to the east comprises industrial development. Campbell Road and Campbell Road Bridge are further east, with additional industrial land uses on the opposite side of Alexandra Canal, including Alexandria and Rosebery. Campbell Road connects the site to the broader Westconnex road network.
- South – The site is bound to the south by Alexandra Canal, a State Significant Heritage Item. Additional industrial land uses are located across the canal to the south, primarily comprising warehouse and distribution centres. Gardeners Road and Bourke Street provide access to Mascot and Eastlakes. Sydney Kingsford Smith Airport is further south.
- West – The immediately adjoining land comprises industrial development. The St Peters WestConnex Interchange is located to the north-west, with the Princes Highway beyond. Further west is low density residential and industrial land uses in the suburb of Sydenham. Sydenham Train Station is approximately 1.5km west of the site, providing services to the Sydney CBD.

2.4 Site Environmental Setting

2.4.1 Topography

A review of eSpade 2.2 (OEH 2022[2]) indicates that the site exists within an area mapped as 'Disturbed Terrain'. Topography is described as disturbed by human activity, local relief usually <2 m but up to 10 m. Most ground in these areas has been levelled to slopes <3 %.

The site inspection undertaken by JBS&G and reported in JBS&G (2022) indicates that the site is almost entirely paved and flattened, with the exception of southern portion of the site which grades down into Alexandra Canal.

[2] OEH (2022) *eSpade 2.0*

2.4.2 Geology and Soils

Areas of Disturbed Terrain are reported to comprise artificial fill, potentially dredged estuarine sand and mud, demolition rubble, industrial and household waste, often incorporating rocks and local soil materials.

SES (2020) reported that the site was mapped as being underlain by Quaternary sediments characterised by peat, sandy peat and muds. Intrusive investigations reported the presence of fill to a maximum depth of 0.8 m below ground level (bgl) that was underlain by natural alluvial soils. The fill was reported to include gravelly sands and clays with inclusions of slag, sandstone, ash, igneous gravel, brick fragments, steel, ironstone gravel and asbestos.

2.4.3 Acid Sulfate Soils

A review of DLWC (1998[3]) risk map for Botany Bay indicates that the site exists within an area mapped as Disturbed Terrain. Soil investigation is required to assess these areas for acid sulfate soil (ASS) potential.

JBS&G (2022) undertook a program of ASS assessment. JBS&G (2022) reported that the shallow gravelly sand fill-based soils encountered as part of this investigation do not comprise potential acid sulfate soil (PASS). However, the saturated underlying sands (at a depth of >2 m) comprise PASS and will require management during future construction activities if works were to result in the disturbance of these materials.

2.4.4 Hydrology

The site is largely occupied by buildings or otherwise covered in hardstand and there is limited potential for infiltration of surface water into site soils. Rainfall runoff is captured by building/site stormwater infrastructure that is expected to discharge to Alexandra Canal to the south of the site.

2.4.5 Hydrogeology

SES (2020) reported that the site is mapped within an area that includes porous and highly productive aquifers. The site is located within Prohibition Area 2 of the Botany Sands Groundwater Aquifer, where abstraction of groundwater for the above purposes is banned.

SES (2020) and JBS&G (2022) reported site groundwater to be present at depths ranging from 1.4 to 2.4 m bgl.

Site groundwater was reported to have the following characteristics:

- Electrical conductivity (EC) ranging from 498 to 964 µs/cm;
- pH ranging from 6.19 to 6.56; and
- Dissolved oxygen (DO) levels ranging from 0.04 to 1.81 mg/L.

Groundwater depths graded downward from the northern to the southern site portion, indicating that groundwater flow is generally toward Alexandra Canal. No evidence of tidal water intrusion / influence to groundwater underlying the site has been identified, with levels of dissolved solids measured in groundwater consistent with fresh water.

Based on the environmental setting and site conditions reported in SES (2020), groundwater at the site was expected to comprise a shallow unconfined system and flow to the south towards Alexandra Canal.

[3] DLWC (1998) *Acid Sulfate Soil Risk Maps – Edition 2, Botany Bay*. Department of Land and Water Conservation dated 1998.

3. Site History Review and Previous Investigations

3.1 Site History Summary

The site is situated within an industrial area that has contained factories, foundries, workshops and mills from circa 1920. Based on available information, it appears the site has been used for various commercial / industrial purposes including vehicle maintenance and storage from approximately 1955.

3.2 Contamination Assessment (SES 2020)

Sullivan Environmental Sciences (SES) completed a due diligence contamination assessment (DD) for the site. The scope of works included a desktop review of available background information, sampling a total of 21 soil bores, sampling a total of five groundwater monitoring wells (located in close proximity to likely USTs) and documentation of a contamination assessment report in order to assess potential health risks for future commercial/industrial use of the land and provide recommendations for additional investigations or remediation.

The following summarises the key findings of the assessment:

- At the time of the investigation, 28 Burrows Road was being used exclusively as a storage facility for taxicab vehicles, where access for intrusive investigations was limited. 30 Burrows Road contained a mechanics workshop business, engineering support business and paper roll warehouse. No further detail was provided on the historical land-uses of the site.
- Within 28 Burrows Road, evidence of up to six USTs were reported on the property. At least one of the USTs still contained fuel / liquid (approximately 1000 L) in which the tank had an estimated volume of 20 000 L. None of the tanks were being used at the time of the investigation, however, it could not be confirmed if the tanks had been decommissioned *in-situ*. Within 30 Burrows Road, evidence of up to two disused USTs were also identified, however the contents could not be confirmed. There were no records of Dangerous Goods licences as held by SafeWork NSW for either of the properties.
- Intrusive investigations were largely limited to outdoor areas where access was further restricted by the presence of parked cars stored across the extent of the site. The location of soil and groundwater samples are shown on **Figure 3**;
- Intrusive investigations reported the presence of fill to a maximum depth of 0.8 m bgl that was underlain by natural alluvial soils. The fill was reported to include gravelly sands and clays with inclusions of slag, sandstone, ash, igneous gravel, brick fragments, steel, ironstone gravel and asbestos.
- Petroleum hydrocarbon impacts (at levels exceeding health screening levels for vapour intrusion) were further reported in soils and groundwater in proximity of the USTs. It was considered that no enclosed buildings were present over the areas of impact, there was no vapour risk; however, should future development place buildings over or adjacent to these areas then impacted soils would present an unacceptable human health vapour risk that would require remediation.
- Further investigation works were recommended to delineate the extent of impacts and characterise areas that were inaccessible as part of the investigation. A RAP was also noted to be required to document the methods available to remediate identified contamination in those areas of concern around USTs and asbestos contaminated fill for future development purposes.

3.3 Detailed Site Investigation (JBS&G 2022)

JBS&G was engaged to undertake an DSI of the site. The scope of works comprised review of available background information, a detailed site inspection, completion of a program of intrusive investigation works as described following:

- Advancement of five new soil boreholes, collection of representative soil samples, field screening of samples with a photoionization detector (PID);
- Construction of new groundwater monitoring wells in the soil boreholes. Groundwater wells were constructed to target shallow groundwater and intercept light non-aqueous phase liquids (LNAPL) where present;
- Completion of a groundwater monitoring event (GME) on both newly installed and previously installed groundwater wells for contaminants of potential concern (COPCs);
- Installation and sampling of 42 sub-slab soil-vapour probes using VaporPins; and
- Laboratory analysis of selected samples for a range of potential COPCs including ASS and asbestos in soil.

The location of soil, groundwater and soil-vapour sampling locations are shown on **Figure 3**. Based on the results of the investigation, and with consideration of the proposed redevelopment, the following conclusions were provided:

- Medium to heavy chain petroleum hydrocarbon (TRH) impacts were reported at various locations across the extent of the site as associated with fuel storage infrastructure (comprising USTs and associated pipes, bowsers as well as sumps and pits etc.);
- The highest hydrocarbon concentrations were reported in the south-eastern portion at JBS_MW4, where TRH $C_{>10-40}$ was reported at a concentration of 3.4 mg/L. The concentration exceeds the solubility limit of 2.0 mg/L (NEPC 2013) which indicated the potential presence of LNAPL impacts within proximity to the location. The source of the TRH impacts reported at JBS_MW4 are considered to be most likely associated with surface oil staining observed in the area as sourced from the operation of the mechanics workshop;
- All other constituents within groundwater (including heavy metals, chlorinated hydrocarbons, per- and poly-fluoroalkyl substances (PFAS)) were reported at concentrations either below detection limits or not considered to pose a risk to on or off-site receptors and therefore do not require further assessment and/or management;
- Results from a sub-slab vapour investigation that included the installation of 42 probes reported contaminant concentrations below laboratory detection limits or the adopted guideline values for the assessment, thus indicating that the identified petroleum hydrocarbon impacts within site soils and groundwater as well as other potential volatile contamination sources underlying the site, do not pose an unacceptable health risk for the proposed development;
- Soil investigations identified the presence of fill across the extent of the site at depths ranging from 0.3 m to 0.9 m bgl. The fill comprises gravelly sand with ash, slag, brick, concrete. Asbestos was reported at three locations and likely extends across all fill-based soils at the site, given the presence of building and demolition wastes in all site fill. Isolated PCB impacts were reported in shallow fill to the south of the central portion of the site;
- Based on the results of the assessment it was considered that shallow gravelly sand-fill based soils do not comprise PASS. However saturated underlying sands at a depth of >2 m were considered to comprise PASS and would require management during future construction activities if works disturb these materials;

JBS&G (2022) reported that a RAP will be required to address remediation/management of:

- Asbestos impacted fill (present at depths ranging from 0.3 to 0.9 m) that is likely present across the site based on the results from SES (2020) and the observation of building and demolition wastes within fill across the extent of the site.
- Isolated PCB impacts within fill materials in the north-western portion of the site.
- The removal of all fuel storage infrastructure (comprising USTs and associated pipes, bowsers as well as sumps and pits etc) in accordance with the UPSS Regulation[4] to allow for the restoration of background groundwater quality to the extent practicable.

[4] *Guidelines for implementing the POEO (Underground Petroleum Storage Systems) Regulation 2019* (December 2020) (UPSS Regulation).

4. Summary of Known Contamination

4.1 General

Environmental data as abstracted from SES (2020) and JBS&G (2022) is provided as **Appendix B**. Concentrations of COPCs have been screened against a range of criteria as appropriate to the assessment of potential contamination on industrial sites. The criteria adopted are consistent with the DSI (JBS&G 2022).

The following sections present a conceptual site model (CSM) for the site prior to the commencement of remediation. The purpose of the CSM is to identify potentially complete source-pathway-receptor linkages at the site such that an informed assessment of potential remedial options can be made.

4.2 Conceptual Site Model

4.2.1 Sources of Contamination

Sources of contamination exist at the site as reported in JBS&G (2022). Point sources are shown on **Figure 2**.

- UPSS, comprising eight probable USTs and associated infrastructure as located throughout the site at four locations. The contents of the USTs was not able to be determined during the DSI;
- Residual disused operational infrastructure, comprising:
    - A sump pit servicing the western building;
    - An oil separator pit located adjacent to the central west building; and
    - A sewer pump located adjacent to the central west building.
- Surface oil staining on the southeast site corner.

In addition to the above, fill material is present throughout the site ranging in depth from 0.2 m to 1.1 m bgl. Fill material was observed to contain building and demolition wastes.

4.2.2 Affected Media

The available environmental data indicates that soil and groundwater at the site are contaminated. Both media have been identified to contain a range of typical urban/industrial contaminants, most notably TRHs.

Soil was identified to contain TRHs, BTEXN, polycyclic aromatic hydrocarbons (PAHs), PCBs, asbestos, heavy metals, organochlorine pesticides (OCPs), PFAS and monocyclic aromatic hydrocarbons (MAHs). Affected soils are associated with both point-based and diffuse sources as identified in **Section 4.2.1**. Exceedances of site assessment criteria are shown on **Figure 4**. Each of the areas of affected soils are discussed following:

- Soil proximal to USTs and operational infrastructure has been found to contain elevated TRHs, petroleum constituents (BTEXN and MAHs) and PAHs. The TRHs identified generally comprised semi- to non-volatile fraction ranges (principally $C_{>10-16}$ and $C_{>16-34}$), noting that volatile (C_{6-10}) and long chain non-volatile ($C_{>34-40}$) hydrocarbons were also identified in soil to a lesser extent. The concentration of TRHs in soil exceeded the applicable health screening levels (HSLs) adopted in JBS&G (2022) at three locations surrounding the central northern USTs: BH13, BH16 and BH18. Whilst concentrations of TRHs exceeded the adopted HSLs for vapour intrusion, soil-vapour assessment undertaken across the site did not identify potential risks associated with this pathway;

- Soil proximal to/underlying surface oil staining (at location JBS_MW4) has been found to contain elevated concentrations of semi- to non-volatile TRHs. Whilst not identified as presenting a potential risk to future onsite receptors, surface oil staining has been associated with elevated groundwater based TRHs and is a potential aesthetic issue;
- General fill-based soils have been found to contain heavy metals, PCBs and asbestos. No elevated heavy metals concentrations indicative of a substantial localised source were identified within the available data. PCBs were identified at one location to exceed the applicable health investigation level (HIL) for commercial/industrial land use. Asbestos was reported in fill material by SES (2020). The asbestos impacts appear to be associated with the observations of ash, slag and building demolition wastes within fill-based soils that extend across most of the site footprint to depths ranging from approximately 0.3 m to 0.9 m bgl. As such, it is assumed that the majority of fill-based soils at the site are likely to contain asbestos. Fill material was further reported to contain generally low/trace levels of OCPs and PFAS, which are considered not to pose a potential risk to future receptors.

Groundwater was identified to contain heavy metals, TRHs, BTEXN, PAHs, PFAS and MAHs. Elevated TRH in groundwater concentrations are shown on **Figure 5**. Each of the COPCs identified in groundwater are discussed following:

- Semi- to non-volatile TRHs ($C_{>10-16}$ and $C_{>16-34}$) were identified at various locations across the extent of the site. The highest concentration was reported at JBS_MW04 on the southeast site boundary (TRH $C_{>10-40}$ at 3.4 mg/L).
- Elevated concentrations of semi- to non-volatile TRHs were also reported at JBS_MW03 (TRH $C_{>10-40}$ at 0.9 mg/L) and MW05 (TRH $C_{>10-40}$ at 1.0 mg/L). Elevated levels of TRHs at these locations are attributable to point-source impacts as identified in **Section 4.2.1**;
- Petroleum constituents (BTEX and MAHs) were identified in groundwater, generally collocated with TRH impacts. Elevated benzene was reported at MW02 exceeding drinking water criteria. JBS&G (2022) reported that BTEX identified in groundwater were considered not to pose a potential risk to future onsite or offsite receptors; and
- Heavy metals, chlorinated hydrocarbons and BTEX were identified in groundwater. JBS&G (2022) reported that levels of heavy metals, chlorinated hydrocarbons and BTEX were either below detection limits or not considered to pose a risk to onsite or offsite receptors.

Soil-vapour was found to be generally absent of detectable concentrations of TRHs and/or VOCs. BTEX compounds were detected at three locations, substantially below the applicable HSLs. Whilst sources of potential volatile contaminant impact were identified at the site, direct sampling of soil-vapour immediately below existing concrete slabs indicated that sub-surface gas was free from volatile constituents at concentrations which represented potential risks to future receptors.

4.2.3 Human and Ecological Receptors

The primary human receptors of concern are future commercial users of the site and users of commercial properties surrounding the site. Other potential receptors will include construction workers during the site redevelopment, and potential future sub-surface intrusive / maintenance workers.

The primary ecological receptors of concern are proposed future on-site areas of plantings and the Alexandra Canal located downgradient of the site.

4.2.4 Potential and Complete Exposure Pathways

JBS&G (2022) summarises potential human receptors and associated exposure pathways for the site.

Table 4.1 Summary of Potential Human Exposures

Receptor	Location	Media	Potential Exposure Pathways	Exposure Pathway Status
On-site Receptors				
Existing and/or future industrial users	Within buildings	Soils	Inhalation (vapours)	Incomplete
		Groundwater	Inhalation (vapours)	Incomplete
	Outdoor areas	Soils[1]	Inhalation (particulates) Oral ingestion Dermal contact	Potentially complete in minor landscaped areas.
Construction worker or intrusive maintenance worker (short duration)	Construction areas/excavations	Soils	Inhalation (vapours and particulates/fibres) Oral (infiltrating seepage water) Dermal (infiltrating seepage water)	Complete
		Groundwater	Inhalation (vapours and particulates/fibres) Oral (infiltrating seepage water) Dermal (infiltrating seepage water)	Complete
Off-site Receptors				
Recreational users of Alexandra Canal	Surface waters downgradient of the site	Surface Water as potentially affected by site groundwater	Inhalation (vapours) Oral Dermal Ingestion	Incomplete
Off-site Commercial users	Within buildings or outdoor areas.	Soils and/or groundwater	Inhalation (vapours and particulates/fibres)	Incomplete

1) It is understood that the future ground surface at the site will largely comprise of hardstand which will result in limited potential human exposure pathways to underlying site soils. On this basis, the soil exposure pathways presented will only be applicable in minor areas of exposed soils.

Given that the site is primarily covered by hardstand pavements and building footprints which will largely remain or be replaced under the proposed development, site users will largely not be exposed by direct contact to any impacts within site soils. Notwithstanding, in minor landscaped areas, fill based soils will require appropriate management in order to preclude exposures to the impacts identified above.

Off-site receptors comprise the users of Alexandra Canal who may be exposed to environmental impact via a recreational exposure pathway – based on the available information, it is considered unlikely that site derived impacts are posing an unacceptable health risk to users of Alexandra Canal.

Potentially complete ecological exposure pathways comprise migration of impacted groundwater from the site into the adjacent marine/estuarine environment of Alexandra Canal and uptake by ecological receptors.

Additionally, plants established within future on-site areas of plantings will potentially be exposed to impacted soils and/or shallow groundwater.

4.2.5 Preferential Pathways

For the purpose of this assessment, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPC as either liquids or gasses.

No known service easements are located in proximity to the hydrocarbon impacts at the site. As such, migration of the petroleum hydrocarbon impacts via a preferential pathway is considered unlikely at the site.

4.2.6 Data Gaps

No significant data gaps have been identified by review of the CSM. However, data gaps that will require consideration during the implementation of this RAP are listed following:

- The extent of PCB impacted soils that require remediation has not been completely delineated. The extent of PCB impacts that will require remediation will be informed by the results of site validation activities (**Section 7.3.1**);
- Final waste characterisation of material to be removed from the site, including TCLP analysis is recommended once the surplus materials have been stockpiled and sampled in accordance with the requirements of this RAP;
- The extent of asbestos in soil occurrence has to date, not been completed at a density consistent with WA DOH (2021). As such, additional asbestos investigations may be required to further inform the scale and nature of asbestos exposure controls required for the construction works in accordance with SafeWork NSW as well as refine the extent of soils that may require on-going management during redevelopment of the site;
- Where future excavation works extend to a depth of groundwater, further confirmatory sampling/analysis for PASS will be required to inform appropriate management procedures of these materials; and
- There is the potential for additional unidentified sources of contamination at the site (e.g. example additional USTs, sumps or pits) where pre-remediation activities (**Section 6.3.1**) will be required to assess for these features to the extent practicable.

5. Remediation Options

5.1 Guidelines and Legislation

The RAP has been prepared with reference to the following guidelines and legislation:

- EPA (1995) *Contaminated Sites: Sampling Design Guidelines*. NSW Environment Protection Authority dated September 1995;
- EPA (2014a) *Best Practice Note: Landfarming*. NSW Environment Protection Authority;
- EPA (2014b) *Waste Classification Guidelines – Part 1: Classifying Waste*. NSW Environment Protection Authority dated 2014;
- EPA (2017) *Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd edition)*. NSW Environment Protection Authority dated October 2017;
- EPA (2020) *Consultants Reporting on Contaminated Land Contaminated Land Guidelines*, NSW Environment Protection Authority dated April 2020;
- *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* under the *Protection of Environment Operations Act 1997* (UPSS Regulation);
- *State Environment Planning Policy (Resilience and Hazards) 2021* (SEPP-RH);
- SWA (2020a) *How to safely remove asbestos - Code of Practice.* Safe Work Australia, 2020;
- SWA (2020b) *How to manage and control asbestos in the workplace - Code of Practice*. Safe Work Australia, 2020; and
- *Work Health and Safety Regulation 2017*.

5.2 Remediation Objectives

Redundant infrastructure and contaminated environmental media are present at the site which require to be remediated for the site to be considered suitable for the proposed land uses. This is consequent of:

- The presence of disused UPSS which requires to be decommissioned and removed in accordance with the UPSS Regulations;
- Elevated concentrations of TRHs in soil and groundwater which potentially pose unacceptable risks to offsite ecological receptors; and
- The presence of asbestos and, to a lesser extent, PCBs in fill-based soil which pose a potentially unacceptable risk to future human site users.

The objective of the remediation is to remove risks posed by the identified contamination issues, such that the site is made suitable for the proposed development. It is a further objective to undertake works, in accordance with applicable guidelines and legislation, in a manner which is concordant with the principles of ecologically sustainable development (ESD).

5.3 Extent of Remediation

Based on the findings of the previous investigations (see **Section 3**) and pre-empting the range of available remedial options as evaluated in **Section 5.2**, the anticipated extent of the proposed remedial works includes:

- Removal of disused UPSS/USTs and former operational infrastructure;
- Remediation of TRH impacted soils associated with UPSS/USTs, former operational infrastructure and grossly stained soils;
- Remediation of localised/minor extents of PCB impacted soils present within the central site extent. The PCB impacts are not yet delineated and the remedial extent will be informed by the results of validation sampling. As such, the excavation will proceed until validation is achieved;
- Application of engineering controls to fill-based soils across the entire extent of the site such that the potential risks posed by the presence of asbestos are reduced to low and acceptable levels; and
- Long-term monitoring of contaminant levels within groundwater at the site following source remediation activities.

An indicative extent of remediation is shown on **Figure 6**.

5.4 Remedial Options

The preferred hierarchy of options for remediation (clean up) and/or management adopted by NSW EPA has been established within the NEPC (2013) Assessment of Site Contamination Policy Framework as follows:

- On-site treatment so that the contaminant is either destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

If the above options are not practicable:

- Consolidation and isolation of the contaminant on site by containment with a properly designed barrier;
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material; or
- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

In addition, when deciding which option to choose, consideration is also required to be given to the sustainability (environmental, economic and social) aspects of each option to ensure an appropriate balance between the benefits and effects of undertaking remedial/management options. In cases where no readily available or economically feasible method is available for remediation, it may be possible to adopt appropriate regulatory controls or develop other forms of remediation.

Consideration of each of the approaches (EPA 2017), is presented in **Table 5.2** and **Table 5.2**. Under the UPSS regulation, disused petroleum storage infrastructure requires to be removed from the site. Further, as part of site demolition works, residual operational site infrastructure will be removed from the site. As such, the assessment is applicable only to TRH, asbestos and PCB impacted soil.

Table 5.1 Soil Remedial Options Assessment

Remedial Option	Applicability	Assessment
1. On-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level.	Impacted Fill There are no practical means of destroying/removing asbestos or PCBs within soils.	Not applicable
	Petroleum Hydrocarbon Impacted Soils Hydrocarbon impacts in soils can be addressed by bioremediation / landfarming of the impacted soils. There is sufficient space on site to address the likely small volume of petroleum hydrocarbon impacted soils and the soils are required to excavated regardless to facilitate the construction of the car park.	**The preferred option**
2. Off-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the soil is returned to the site.	Impacted Fill As above (**Option 1**).	Not applicable
	Petroleum Hydrocarbon Impacted Soils Hydrocarbon impacts in soils can be addressed by bioremediation / landfarming of the impacted soils. However treatment of impacted soils offsite provides no benefit over Option 1.	Not applicable.
3. On-site *in-situ* management of the contaminant by capping and cover, and ongoing management.	Impacted Fill This option provides for the retention of impacted soil on-site beneath a physical barrier such that there are no complete exposure pathways available between the contaminated material and sensitive human receptors and/or potential ecological receptors. Across the site, the barrier will comprise the hardstand surface under the proposed development scheme. In such instances, an asbestos register/asbestos management plan (AMP) would be required at the site to document the presence/location of bonded asbestos materials. Where persistent contaminants are present (i.e. PCBs) this would option would result in ongoing requirements for management under the contaminated land management framework. Moreover, this option minimizes the amount of waste produced from the proposed development works and is therefore consistent with ecological sustainable development (ESD) principles.	For fill impacted by asbestos only this is **The preferred option**. For fill impacted by PCBs, this is not preferred
	Petroleum Hydrocarbon Impacted Soils The petroleum hydrocarbon impacted soils pose a potential ongoing risk of impact migration to groundwater . This is not a preferred option as it does not result in the reduction of ongoing impacts to groundwater or an assocaited improvement to groundwater quality.	Not preferred.
4. Excavation and off-site removal of the impacted material.	Impacted Fill There are currently suitably licensed waste facilities in the Sydney Metropolitan region capable of accepting asbestos and PCB contaminated soils. Offsite disposal of impacted fill soils is likely the fastest method of remediation, but also involves disturbance of the impacted materials and should be limited to excess material that cannot remain contained onsite. This option also generates the highest quantity of waste, since the materials are disposed to landfill rather than retained on site. Off-site disposal is considered a potential option for all fill material, but only provides a beneficial outcome for PCBs (i.e. minimisation of extent of ongoing management requirements)	For fill impacted by asbestos only this is Not preferred. For fill impacted by PCBs, **this is preferred**
	Petroleum Hydrocarbon Impacted Soils Similarly to as discussed for impacted fill, waste facilities are available which can receive petroleum hydrocarbon impacted soils from the site. This method is not preferred as it will result in waste generation that can otherwise be avoided by on-site treatment.	A potential option.

Groundwater at the site is impacted as a result of point-source contamination comprising historical/disused UPSS and former operational infrastructure. Further impacts are likely present in groundwater as attributable to residual TRHs present in soils surrounding point-sources. As such, the primary remediation approach for groundwater will be to remove any ongoing sources of impact as per **Table 5.1**.

Notwithstanding, consideration has been given to the range of available remediation techniques which may be appropriate for the removal/reduction of any residual TRH impacts following source removal works.

Table 5.2 Groundwater Remedial Options Assessment

Remedial Option	Applicability	Assessment
Hydrocarbon source removal by multi-phase extraction (MPE)	MPE can be considered to be an effective method of removing existing LNAPL impact on the site, however no LNAPL has previously been identified in groundwater. The MPE system would consume substantial amounts of energy, which is not consistent with the ESD objectives of the remediation.	Not preferred
Hydrocarbon source destruction by ISCO	This option has not been considered further, as this is considered to be a non-proven remediation method in Australian conditions and it will likely result in significant changes to the underlying geochemistry of the site that could result in the mobilisation of contaminants. The resource and energy use associated with the chemical production of the oxidant is not considered to be consistent with the principles of ESD.	Not applicable
Hydrocarbon source removal by air sparging and soil vapour extraction	This remedial option is similar to MPE, with the exception that removal occurs via extraction of impacted soil-vapour. This system would consume substantial amounts of energy, which is inconsistent with the ESD principles of the remediation.	Not preferred
Hydrocarbon source removal by total fluids pumping and treatment of recovered fluid	This method is potentially effective at removal of impacted groundwater and LNAPL (if present). Notwithstanding, the impacts are generally present in fraction ranges which are semi to non-volatile and typically less mobile, limiting the effectiveness of direct extraction methods. This further increases the quantity of groundwater which would require to be removed to achieve an effective remediation. In addition, total fluids pumping would consume substantial amounts of energy and requires regular maintenance, which makes this option the least cost effective.	Not preferred
Hydrocarbon source removal by passive skimming	This option is considered an effective method of removing LNAPL. Notwithstanding, no LNAPL has been identified within site groundwater. This option is not suitable for removal of dissolved phase hydrocarbon impacts in groundwater.	Not applicable
Monitored natural attenuation (MNA) of source material	MNA comprises a range of natural occurring processes the cause the destruction/transformation of organic constituents. This includes both redox (i.e. chemical) and biological degradation. MNA is suitable to application at the site following removal of the groundwater source (as covered by **Table 5.1**)	**The preferred option**

Remedial Option	Applicability	Assessment
Hydraulic containment of hydrocarbon source material.	Hydraulic containment would work by the isolation by the current extent of hydrocarbon impacted water. This would comprise the installation of vertical barriers to contain the current extent of groundwater impact laterally. These vertical barriers would require to penetrate a substantial distance into the sub-surface. Recharge to the affected area would then require control by sealing of the surface of the affected area to prevent future infiltration. The installation of a containment system to the depth required is a substantial civil project. It will cause substantial disruption and generate substantial quantities of waste. The option is not considered to comply with the principles of ESD.	Not preferred

Should further impacted material (i.e. not previously identified in historical investigations) be identified as part of an unexpected find during construction works, the remedial options screening matrix in **Table 5.1** and **Table 5.2** will be required to be reviewed. Notwithstanding, it is anticipated that any impacts will be relatively isolated and could be appropriately managed through controlled excavation and off-site disposal.

Based on **Table 5.1** and **Table 5.2**, the following remedial approaches are preferred:

- Excavation and off-site disposal of PCB impacted fill materials;
- On-site management of asbestos fill materials by retention under hardstand proposed across the extent of the site, or otherwise under a sufficient depth of capping soils / growing media in the limited areas of the site where landscaping / plantings are proposed; and
- On-site treatment to remove petroleum hydrocarbons from impacted soils by bioremediation.

Under the UPSS regulation, disused petroleum storage infrastructure requires to be removed from the site. Further, as part of site demolition works, residual infrastructure will be removed from the site.

5.5 Assessment of Bioremediation

EPA (2014a) has been issued by the NSW EPA to control the bioremediation of hydrocarbon impacted soils. EPA (2014a) nominates several factors that affect the potential suitability of contaminants and soils to be remediated by bioremediation (referred to as landfarming in the guideline). Each of the factors has been assessed for the site in **Table 5.3** as applicable to the preferred remedial approach of bioremediation of soils to remove petroleum hydrocarbons.

Table 5.3 Assessment of Factors Affecting Bioremediation / Landfarming Suitability

EPA 2014 Factor	Assessment
Contaminant types	Landfarming is nominated as a suitable treatment method for petroleum hydrocarbons in soils. Biodegradation is nominated as causing the reduction of petroleum hydrocarbons in landfarmed soils.
Contaminant concentrations	A screening criteria of 8 % total petroleum hydrocarbon concentrations (80 000 mg/kg) is a nominated screening for suitability of soils for landfarming. The maximum levels of petroleum hydrocarbons in soils on the site are anticipated to be well below this level, noting that the highest previously reported concentration is less than 40 000 mg/kg. It is noted that petroleum hydrocarbon impacted soils are potentially malodorous, and where potentially offensive odours are detected at the site boundary, then air emissions management will be required for the soils.
Volume of contaminated soils	It is unlikely that large volumes of soils will require bioremediation. An estimated maximum quantity of 200 m3 of impacted soils is anticipated which is insignificant when considered with the overall extent of the site.
Site area	The site area exceeds the 0.5-hectare threshold nominated in EPA (2014a).
Site topography	EPA (2014a) reports sites with steep gradients are not suitable for landfarming. The site is relatively level, as consistent with the general topography of the local area (See **Section 2.4.1**).
Local geology	Impacted soils are considered likely to consists of sands, clayey sands and infrequently sandy clays and peat. The soils will be landfarmed within a purpose designed area within the extent of the site which shall be provided with surface cover to mitigate the potential for leaching of impact to soils underlying.
Hydrogeology	Groundwater underlying the site has been assessed and found to be impacted by site attributable hydrocarbons. Remediation of the site is being undertaken to reduce the extent of impacted soil in contact with groundwater. As noted above measures are available to be put in place to prevent additional contamination of the groundwater resource during remediation.
Meteorology	Sydney has a humid climate that is mild with no dry season, constantly moist (year-round rainfall). Summers are hot and muggy with thunderstorms. Winters are mild. Seasonality is moderate. The temperatures vary throughout the year, with high summer temperatures, sometimes peaking above 40 °C and colder temperatures of in winter with typical night time lows of 6 °C. Rainfall occurs throughout the year with typically 90 to 100 rain days a year.
Distance to sensitive receptors	The site is located within a historical commercial / industrial area, and substantial distances are present to potentially sensitive receptors as may be associated with residential developments as undertaken to the north and east and associated with larger Green Square Town Square.
Time	EPA (2014a) reports that timeframes associated with bioremediation will potentially vary. Provision has been made in the RAP for remedial timeframes of 6 weeks. Where bioremediation cannot be achieved in these timeframes, contingency actions are available to allow landfarming rates to be accelerated (i.e. increased turning of soils, addition of bioremediation additives etc).
Cost	EPA (2014a) notes that landfarming should not be considered a cheap remedial option and costs may become prohibitive to undertake landfarming properly. To this extent, it is considered that the cost to undertake landfarming is typically a function of the site area available to undertake the landfarming works and the resources required to control environmental emissions from the works. Landfarming / bioremediation will be a cost effective option for the site.

6. Remediation Action Plan

6.1 Approvals, licences and notifications

State Environment Planning Policy (Resilience and Hazards) 2021

From review of the site location and proposed activities, the remediation works are classified as Category 2 Remediation Works (**Section 11.2**) as per the meaning provided in *State Environment Planning Policy (Resilience and Hazards) 2021* (SEPP-RH) and will not require specific development consent under the *Environmental Planning and Assessment Act 1997*.

Notification of remediation works will be required to be given to Council at least 30 days prior to commencement, and Council requires notification within 30 days from completion of remediation works, consistent with SEPP-RH requirements and Council's Contaminated Land Policy.

Asbestos Works

Asbestos impacted fill-based soils have been reported in SES (2020) and JBS&G (2022). The asbestos appears to have been identified in bonded form (i.e. asbestos containing material (ACM)). Given that the proposed remediation works will result in the disturbance of these materials, there is a requirement for the Remedial Contractor, or their nominated sub-contractor, to notify SafeWork NSW five business days before commencing works. Further, the works must be undertaken by a Class B Licensed Asbestos Contractor – however, noting that the extent of asbestos in soil occurrence has to date, not been completed at a density consistent with WA DOH (2021), it is recommended that a Class A Licensed Asbestos Contractor be engaged for any works that involve the disturbance of fill based soils.

Remediation works shall not commence until all required approvals, licences and notifications have been granted and/or received.

6.2 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 underground utilities within the site such that excavation works can safely proceed;
- Assess the potential impacts of the excavation works to neighbouring properties. It is recommended that a suitably qualified engineer be consulted prior to any excavation works, such that appropriate controls (if required) can be implemented;
- Assess need for traffic controls;
- Work area security fencing;
- Site signage and contact numbers; and
- Sediment fencing as appropriate to mitigate sediment laden runoff from the site.

6.3 Remediation Works

6.3.1 Pre-Remediation Activities

6.3.1.1 GPR Survey

Following the demolition and removal of all above ground structures, a ground penetrating radar (GPR) survey will be required to be conducted by a practising geophysicist (under the supervision of environmental consultant) on an approximate 2 m grid over the complete site extent. The survey will attempt to identify any underground anomalies which may be indicative of a UST or other potential

source of hydrocarbon contamination (sump, pit etc) as well as delineate the extent of USTs previously identified (SES 2020).

Where potential USTs, sumps or pits are identified, then the hardstand overlying the areas shall be broken out and removed to allow for inspection and/or test pitting to be conducted until the infrastructure is positively identified or confirmed to be absent.

6.3.1.2 Hardstand Removal and Surface Inspection

Should the existing hardstand surfaces be removed as part of site works, then the materials will require inspection (by the environmental consultant and remedial contractor) for the potential presence of adhered asbestos (that may be encountered on the underside of the slabs) prior to potential crushing and off-site disposal in accordance with the requirements of NSW EPA (2014b).

Following the complete removal of all hardstand surfaces, the environmental consultant shall undertake a walkover (in a 2 m by 2 m grid) to identify any additional potential sources of contamination (such as surface staining, unidentified infrastructure etc) that may require remediation. Should surface oil staining or additional infrastructure be identified, then the underlying materials / features will be required to assessed or managed in accordance with **Section 6.3.1.3** or **Section 6.3.4** respectively. Should a unique source of contamination be identified (i.e. different from that identified as part of the site history in **Sections 3** and **4**) then the unexpected find protocol (**Section 8**) will be required to be implemented.

6.3.1.3 Delineation of TRH Impacts at JBS_MW4

The source of TRH impacts at historical sampling location JBS_MW4 is likely associated with surface oil staining. As such, the delineation of TRH impacts within this area will largely be informed by observing the extent of surface oil staining (either on the existing ground surface or underlying soils following hardstand removal as part of remediation works in the area or if all hardstand surfaces are decided to be removed). Notwithstanding, given the limited soil sampling works conducted as part of historical investigations (due to lack of access) within this portion of the site, additional sampling at locations shown on **Figure 7** will be conducted at a minimum in order to provide further delineation of TRH impacts within this portion of the site. The sampling will be conducted via the advancement of test-pits via the following methodology:

- Test pits will be advanced by excavator in one metre increments until groundwater is intercepted or field screening observations (see below) indicate a low potential for hydrocarbon impacts;
- Soil strata will be inspected by the environmental consultant for signs of contamination (discolouration, staining, odours etc);
- Soil samples will be collected directly underneath the hardstand then generally at 0.5-1.0 m intervals to the maximum depth of the test-pit. Select samples will be analysed for TRH/BTEX at a NATA accredited laboratory in order to inform any remediation requirements in the area. It is noted however, that the final remedial extent will be informed by validation sampling results in accordance with **Section 7.3.3**.

Should additional oil staining be observed in other areas of the site following demolition works, then the above methodology will be conducted within each area to inform the requirements for remediation.

6.3.2 Excavation of PCB Impacted Soil

The localised instance of PCB impacted soil requires to be excavated and disposed from the site. This impact is noted to coincide with the sewer pump (See **Section 6.3.3**). Any soil identified as potentially impacted by PCBs is considered not suitable for bioremediation and reuse on site. PCB

impacted soils require to be separated from residual soils on the southern side of the sewer pump (if possible) prior to commencement of sewer pump remediation (see **Section 6.3.3**).

The following work procedures are to be followed:

- Hardstand overlying JBS_MW3 shall be broken out and disposed in accordance with EPA (2014b);
- Fill-based soil shall be excavated over an approximate area of 5 m x 5 m up to a depth of 0.6 m (i.e. extent of fill material);
- Where this area coincides with soils to be remediated as part of **Section 6.3.3** the PCB impacted soils shall be separately stockpiled/managed so as to ensure that no PCB contaminated soils are retained on site following remediation; and
- The resulting excavation will require validation in accordance with **Section 7.3.1**.

The constraints on remediation as described in **Section 6.3.7** shall apply. Where possible, fill and natural soils (that require excavation for remedial purposes) should be segregated, handled and managed separately to minimise the extent of asbestos related management controls.

6.3.3 Removal of Residual Operational Infrastructure and Impacted Soils

Residual infrastructure requires to be removed. The infrastructure is identified on **Figure 2**, comprising:

- A sump pit servicing the western building;
- An oil separator pit located adjacent to the central west building; and
- A sewer pump located adjacent to the central west building.

In general, the following work procedures are to be followed:

- The contents of all liquid containers and sumps shall be disposed form the site in accordance with EPA (2014b);
- The infrastructure, including all piping, pumps, feed-in services, drainage conduits, concrete bunds, etc. shall be demolished and disposed form the site in accordance with EPA (2014b); and
- It is anticipated that soil impacts will be present proximal to the infrastructure. Impacted soils shall be progressively excavated under the supervision of the Environmental Consultant until all grossly impacted soils have been removed from the excavation to the practical extent. The resulting excavation will require validation in accordance with **Section 7.3.2**.

It is noted that the extent of removal of the sewer pump coincides with the northern extent of PCB impacted soil located at JBS_MW3. The removal of PCB impacted soils shall occur prior to removal of soils impacted by TRHs (only).

The constraints on remediation as described in **Section 6.3.7** shall apply.

6.3.4 Removal of UPSS/USTs and Associated Impacted Soils

Residual UPSS/USTs require decommissioning in accordance with relevant Australian Standards. In general, the following work procedures are to be followed:

- The location and extent of all residual UPSS/USTs shall be confirmed prior to commencement of works. This shall include:
    - A detailed site inspection comprising review of all ground surfaces previously covered by vehicles/stored materials in historical assessments;

- GPR survey of the site to look for underground anomalies which may indicate the presence of UPSS/USTs not currently known to exist on site; and
- Confirmation of the location/extent of known UPSS/USTs as shown on **Figure 2**.

- The USTs should be emptied of all dangerous goods and made gas-free. Any contents of the tank will be disposed off-site in accordance with EPA (2014b);
- Where possible, all associated piping should be disconnected and made safe so that no flammable or combustible liquid remain;
- Hardstand overlying areas suspected or known to contain UPSS/USTs shall be broken out and removed. Inspection and/or test pitting of soil shall be undertaken in areas with known or suspected UPSS/USTs until the infrastructure is positively identified or confirmed to be absent;
- UPSS/USTs will be excavated for off-site disposal in accordance with EPA (2014b); and
- It is anticipated that soil impacts will be present proximal to the UPSS/USTs. Impacted soils shall be progressively excavated under the supervision of the Environmental Consultant until all grossly impacted soils have been removed from the excavation to the practical extent. The resulting excavation will require validation in accordance with **Section 7.3.2**. Where possible, fill and natural soils (that require excavation for remedial purposes) should be segregated, handled and managed separately to minimise the extent of asbestos related management controls.

The constraints on remediation as described in **Section 6.3.7** shall apply.

6.3.5 Excavation of Hydrocarbon-Stained Soils and Associated Impacts

The localised instance of TRH staining on the southeast site portion requires to be excavated and remediated onsite. The following general work methodology shall be followed:

- The extent of surficial staining shall be confirmed upon vacation of stored materials and vehicles within the site;
- Hardstand on the southeast site portion shall be broken out and disposed in accordance with EPA (2014b) over an area of approximately 10 m x 10 m. The extent of hardstand removal shall include at least 2 m x 2 m surrounding JBS_MW04;
- Fill-based soil shall be excavated in 0.2 m layers;
- Upon removal of each consecutive layer, the Environmental Consultant shall observe exposed soils for potential localised gross hydrocarbon impact indicators. Where gross hydrocarbon impacted soils are identified, the excavation shall proceed over the area of impacted soils, with all liberated soils progressively stockpiled;
- Any grossly hydrocarbon impacted soils shall be subject to bioremediation (See **Section 6.3.6**);
- The resulting excavation will require validation in accordance with **Section 7.3.3**.

The constraints on remediation as described in **Section 6.3.7** shall apply. With respect to remedial excavations of hydrocarbon-stained soils on site, it is noted that excavations can only proceed to the extent that they will not undermine the structural integrity of any neighbouring structures. Specialist geotechnical and/or structural engineering advice will be required to inform safe excavation requirements, noting that excavations will only proceed to the extent that they do not undermine the structural integrity of any neighbouring structures as informed by the specialist's recommendations.

Where possible, fill and natural soils (that require excavation for remedial purposes) should be segregated, handled and managed separately to minimise the extent of asbestos related management controls.

6.3.6 Bioremediation

Impacted soils will be spread out in a designated landfarming area and will be subject to bioremediation prior to an assessment of whether the soils are suitable for re-use on site. It is anticipated that approximately 650 m^3 will be impacted by petroleum hydrocarbon and will be require bioremediation.

Soils to be bioremediated / landfarmed will be spread over a maximum area of approximately 500 m^2, with the maximum height not exceeding 0.5 m. The layout of landfarm piles shall be determined by the Environmental Consultant and Remedial Contractor based on screening during excavation. Controls to prevent sediment run-off will be placed around all landfarm piles.

It is proposed that the impacted soils be turned on a weekly frequency for a period of four to six weeks. JBS&G propose to inspect the material on a weekly basis, and where found to be suitable by field analysis, undertake validation sampling and analysis to demonstrate the suitability of the material to be used as backfill at the site.

Suitable bioremediated material will be used as backfill on-site. Material considered not suitable for reuse on-site (i.e. materials unable to be bioremediated) will be classified in accordance with EPA (2014b) prior to off-site disposal.

Where possible, fill and natural soils (that require bioremediation) should be segregated, handled and managed separately to minimise the extent of asbestos related management controls. Furthermore, the constraints on excavation and stockpiling (outlined in **Section 6.3.7**) including the requirements for assessment and management (where required) of ASS/PASS in saturated natural soils will require consideration when bioremediating soils.

6.3.7 Constraints on Excavation and Stockpiling

The practicable limits of excavation include the consideration of the following:

- Physical limitations of available equipment;
- Excavation of saturated materials (typically below a depth of 2 m bgs) shall only occur where aesthetic indicators of petroleum hydrocarbon impact are present. This may include hydrocarbons odours or otherwise sheens present in seepage water;
- Geotechnical constraints associated with excavation safety and excavation stabilisation requirements (e.g. benching) and / or potential effects on nearby infrastructure – this is most applicable along the southern boundary of the site, where uncontrolled excavations may undermine the structural integrity of neighbouring structures. (**Section 6.3.5**). As such, specialist geotechnical and/or structural engineering advice will be required to inform safe excavation requirements, noting that excavations will only proceed to the extent that they do not undermine the structural integrity of any neighbouring structures as informed by the specialist's recommendations; and
- Structural constraints should the excavation extend to a close proximity to roadways, footpaths, building and underground conduits.

Excavated material will be segregated and stockpiled based on an initial screening of levels of contamination. During excavation, any natural saturated soils encountered shall be stockpiled separately and field screened for the presence of ASS/PASS conditions during works. Where any such conditions are encountered, the requirements for management as informed by an acid sulfate soil management plan (ASSMP) (to be prepared elsewhere) shall be followed. The excavated

material will be temporarily stockpiled on plastic sheeting to provide a separation layer between potentially contaminated soils and surface soils.

Site won fill obtained from areas of the site not impacted by petroleum hydrocarbons and / or validated, stockpiled soils will be used to partially backfill the open excavations, battering the excavation edges to minimise fall hazards if required.

6.3.8 Onsite Containment

The preferred remedial option for the asbestos impacted fill based soils on the site is management on-site by long term containment. The following procedures as documented following will require to be implemented to ensure that environmental/health risks associated with the retention of these soils are appropriately controlled.

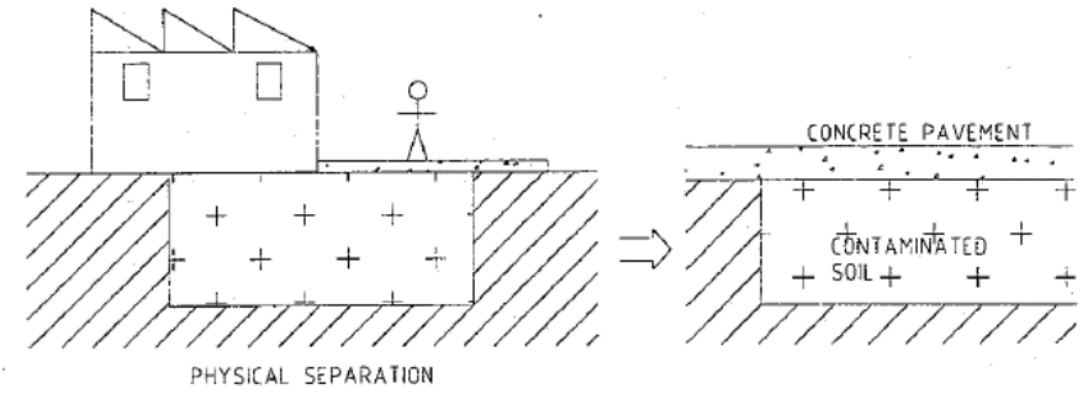
6.3.8.1 Overview

Impacted fill will be managed to the extent achievable via containment and the implementation of permanent physical separation which eliminates the inhalation exposure pathway for airborne asbestos fibres.

The minimum requirements for the physical separation to be adopted in remediation of the site include:

- A minimum soil cover thickness of 0.5 m[5] in landscaped or mass planting/shallow landscaped areas and 1.5 m in tree pit zones which is underlain by a visual "marker layer" in unpaved areas, i.e., planter boxes in landscaped areas etc.; or
- Permanent concrete floor/ground slabs as underlain by a 0.1 m minimum thickness (and potentially up to 1.5 m) "capping layer" and visual "marker layer", i.e., underlying buildings, roads, pathways; or
- Top (concrete) of pile foundations (no marker layer required for below pile foundations).

A conceptual sketch, sourced from ANZECC 1999[6], is shown following:



The marker layer shall consist of a bright orange coloured non-woven polyester continuous filament or PET (such as nonwoven geotextiles) or similar with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must:

- Be easily recognisable within soils (i.e., bright orange in colour);

[5] It is noted that excavations to a depth of 0.5 m to install a marker and capping layer will not be possible within if excavations have the potential impact the structural integrity of neighbouring structures. As such, it is proposed to install a minimum soil cover thickness of 0.1 m (underlain by a marker layer) in these areas. Specialist geotechnical and/or structural engineering advice to be completed prior to implementation of this RAP.

[6] *Guidelines for the Assessment of On-site Containment of Contaminated Soil,* Australian and New Zealand Environment and Conservation Council, September 1999. (ANZECC 1999).

- Be durable as a long term marker layer (i.e., > 140 grams per square metre); and
- Maintain integrity during remedial/civil works such as capping layer insulation and road/building construction.

Additionally, the marker layer must meet geotechnical and civil specifications where required.

The specific details of the marker layer are required to be included in the site validation report and long term Environmental Management Plan (LTEMP) documents in addition to surveyed plans showing the extent of the capped area.

6.3.8.2 Specific Capping Arrangements

The following capping procedures will be applied to each of the potential exposure scenarios across the site, prior to completion of construction works:

- Beneath permanent concrete structures, the installation of a marker layer over contaminated fill material with capping layer consisting of a minimum thickness of 0.1 m environmentally suitable materials below the permanent concrete slab as the physical barrier.
- Permanent hardstand structures (i.e., concrete slabs, pile caps or asphaltic concrete or similar, footpaths, but not bricks or pavers) – installation of a marker layer overlying potentially contaminated material followed by sub-grade material validated as environmentally suitable materials for human exposure and then the permanent structure (e.g., exterior concrete footpaths, asphaltic roads, etc.).
- Mass planting / shallow landscaping areas – installation of the marker layer at a minimum depth of 500 mm below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure.
- New tree pit zones / deep landscaping zones – installation of the marker layer at a minimum depth of 1.5 m below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure, noting that the maker layer should extend the depth required for installation of the new tree's existing root ball or otherwise consistent with the anticipated root zone of the deep landscaping area.
- Within underground services trenches / services – service infrastructure will require remediation to 150 mm below the depth of services, with a marker layer and capping layer installed consisting of environmentally suitable materials for potential human and/or ecological exposure.

Material above the marker layer extending to the final finished ground level will be required to be an environmentally suitable material for human and/or ecological exposure (as appropriate) as discussed further in **Section 6.5**.

Validation of the interim and permanent capping arrangements will be required as outlined in **Section 7,** including inspections by the Environmental Consultant, a survey plan prepared by a registered surveyor showing the level and lateral extent of the impacted soils, marker layer, and capping in relation to the site boundaries.

6.4 Establishment of Monitored Natural Attenuation Well Network

Remediation of groundwater at the site will occur by removal of hydrocarbon impact sources (See **Section 6.3.3** to **Section 6.3.5**) then monitoring of natural attenuation as is anticipated to occur following source removal. In order to verify the success of source removal in improving the condition of groundwater, a network of groundwater wells requires to be maintained during remedial works, or otherwise reinstalled, such that ongoing groundwater monitoring is able to be

undertaken under the LTEMP. As a minimum, the anticipated network of groundwater wells required to demonstrate the remedial objectives have been met is shown on **Figure 8**. However, additional wells may be required dependant upon the results from soil remediation activities. Where additional installation of wells is required, the location and construction of these wells will be determined by the Environmental Consultant at the time of installation to ensure that the remedial objectives are met and with due consideration of the future operational site layout.

6.5 Material Importation

Based on the scope of remedial works described herein, it is anticipated that if materials are required to be imported to site, it will generally be as a result of construction requirements or otherwise to ensure appropriate growing media are established within the planter boxes / garden areas as proposed on the site.

Prior to importation of all material, appropriate assessment of such materials must be completed to demonstrate the material is both fit for purpose and suitable from a contamination view point. In accordance with EPA requirements, the extent of assessment will be determined by the type of material proposed to be imported.

Where material proposed to be imported is Virgin Excavated Natural Material (VENM), an assessment must demonstrate that the material is compliant with the definition of VENM as presented in the POEO Act 1997, adopting in the minimum requirements for characterisation of fill material as presented in EPA (1995).

Where material proposed to be imported has been characterised under the Resource Recovery Framework (Order/Exemption), the material must firstly be demonstrated by the supplier as suitable for use in accordance with the requirements of the Order via provision of a statement of compliance. Suitable materials are anticipated to comprise but will not necessarily be limited to: excavated natural material – ENM, recycled aggregate, basalt fines, compost, mixed organic waste, pasteurised garden organics and recovered fines, with reference to the list of current orders and exemptions on the NSW EPA website.

In addition to the testing completed by the supplier, given the low frequency of compliance testing required under these Exemptions, the specific material proposed to be imported will require an additional compliance assessment prior to approval to import. The additional assessment is required to ensure that the incoming material does not pose an unacceptable risk to human health and/or environment at the placement site and is therefore suitable for use. It is anticipated that such assessment activities will include visual inspections, representative sampling and laboratory analysis of material to demonstrate the material meets the requirements of this RAP. As for VENM assessments, it is considered suitable to define such requirements on a specific site basis given the potential variability of project site requirements.

Material tracking records in addition to the import assessment report are required to be included in the final validation report for the site.

6.6 Validation

Validation of the remedial works will be conducted by the Environmental Consultant to demonstrate the remediation/management objectives have been achieved and to document the final condition of the site at the completion of works such that conclusions may be drawn on the end use suitability of the site for the proposed development. Details of the validation program are provided in **Section 7**.

It is noted that due to site access and/or construction constraints, that the remediation and validation works may occur in stages. Any works that occur at the site following validation of an area will be completed in accordance with the proposed Long-term environmental management plan (LTEMP) as per **Section 7.6.1**.

6.7 Site Dis-establishment

On completion of the remediation works all plant/equipment and safety/environmental controls shall be removed from the site. Details are provided in the Site Management Plan in **Section 9**.

6.8 Contingency Plan

Given the available site history information, consideration has been given to the potential for additional small scale issues that may arise during works (from a contamination viewpoint). Should further impacted material (i.e. not previously identified in historical investigations) be identified as part of an unexpected find during construction works, the remedial options screening matrix in **Table 5.1** will be required to be reviewed. Notwithstanding, due to the site history and relatively shallow depth of fill it is anticipated that any impacts will be relatively isolated and could be appropriately managed through either on-site in-situ management (i.e. option 3) or controlled excavation and off-site disposal.

7. Validation Plan

7.1 General

Data will be required to be collected during remediation/management and construction works to assess the effectiveness of the implemented management actions and document the final condition of the site at the completion of all works. Such information will allow conclusions to be drawn on the end suitability of the site for the proposed use. The general principles to be implemented with regard to the validation assessment are discussed in accordance with EPA (2017) requirements in the following sections.

It is anticipated that the validation assessment will be required to address the following broad issues:

- Confirm the site conditions are consistent with those identified during previous site investigation activities as documented herein;
- Evaluation of previously inaccessible areas of the site for indicators of potential contamination (i.e. previously unidentified UPSS/USTs, infrastructure or additional surface staining);
- Validation that source excavation/removal works have successfully separated historical infrastructure and associated impacted soils to the practical extent;
- Validation that soil remediation works has reduced the level of petroleum hydrocarbon contaminated to soils such that potential for ongoing contribution of TRH impacts to groundwater is minimised;
- Validation that soil remediation works has removed PCB contaminated soils from the site;
- Validation that the final site surface does not contain visually identifiable bonded asbestos impacts or other unacceptable aesthetic issues; and
- Confirmation that marker layer / site pavement is in place to retain underlying asbestos contaminated soils.

7.2 Data Quality Objectives

Data quality objectives (DQOs) have been developed for the validation assessment, as discussed in the following sections.

7.2.1 State the Problem

JBS&G (2022) has identified the presence of contaminated site media and residual disused infrastructure at the site. The infrastructure and associated contaminated media require to be remediated to make the site suitable for the proposed development.

A set of environmental data are required to verify that remediation works as documented in **Section 5** have been implemented in a manner which causes potential risks associated with contaminated site media to reduce to low and acceptable levels.

7.2.2 Identify the Decision

The following decisions are required to be made during the validation works:

- Is any disused infrastructure remaining at the site which represents a potential contamination risk?
- Are there any unacceptable risks to future human site receptors, associated with TRH and PCB impacts in site media, following the remediation of soils?
- Are impacted fill materials appropriately contained to control potential future exposures of human and ecological receptors to impacted material?
- Have all aesthetic issues been addressed?
- Has all material imported to site to achieve development objectives been demonstrated as suitable for use?
- Were surplus materials classified and disposed off-site to a facility licensed to accept the classified waste, or where relevant, appropriately recycled for beneficial re-use?
- Have the works been completed in accordance with the RAP, or where variations to the works were required, have these met the objectives of the RAP?
- Is the site suitable for the proposed land uses subject to implementation of long-term management of residual impacts?

7.2.3 Identify Inputs to the Decision

The inputs to the decisions are:

- Previous investigation results as discussed in **Section 3**;
- The proposed development and final proposed land form and site features;
- Field observations in relation to inspection of all excavation bases, walls, stockpiles and final site surfaces for signs of asbestos impacts or other indicators of potential contamination;
- Environmental data as collected from the validation of remedial excavations (if required as part of an unexpected find);
- Material characterisation data obtained during assessment of surplus material prior to off-site beneficial re-use or disposal;
- Disposal dockets and relevant documents in relation to appropriate disposal of material (if required) to be removed from site as part of the remediation works (landfill dockets, beneficial reuse / recycling dockets, trade waste disposal, etc.);
- Material characterisation data (including field observations, sampling and analytical data) obtained during assessment of material proposed to be imported to the site;
- Relevant guideline criteria for validation and waste classification;
- Records of installation of marker layers and capping by visual observation, photographs and supported by formal site survey;
- Management measures documented within an Asbestos Register/Management Plan (if required) to ensure compliance with WHS legislation; and
- Data quality indicators (DQIs) as assessed by quality assurance / quality control (QA/QC).

7.2.4 Define the Study Boundaries

The study boundaries are defined as the lateral site extent (**Section 2.1**) and the vertical extent of remediation works (not anticipated to exceed 2.5 m bgl.

Ultimately the study boundaries will comprise the lateral and vertical extent of the site successfully validated in accordance with the requirements of this plan. The temporal limits of the assessment will comprise the duration of the remedial works and validation program.

7.2.5 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Section 6.1.2** are summarised in **Table 7.1**.

Table 7.1 Summary of Decision Rules

Decision Required to be Made	Decision Rule
1. Is any disused infrastructure remaining at the site which represents a potential contamination risk?	Where: Inspection of the site surface and test-pitting within locations of known/suspected USTs, operational infrastructure and surface oil staining indicates that all these features have been identified; GPR survey of the site does not indicate that any additional UPSS/USTs are present on the site; and All known UPSS/USTs and operational infrastructure has been observed to be removed from the site. Then the answer is Yes. Otherwise the answer is No.
2. Are there any unacceptable risks to future human site receptors, associated with TRH and PCB impacts in soil, following the remediation of soils?	Soil validation data shall be collected of the walls and base of excavations and of the bioremediated soils. If the soils validation results meet the adopted validation criteria then the answer is Yes. If the soil validation results fail the adopted validation criteria then the answer is No.
3. Are impacted fill materials appropriately contained to control potential future exposures of human and ecological receptors to impacted material?	At the completion of the remediation and site development works a marker layer and capping consisting of pavement or otherwise an minimum depth of 0.5 m non-impacted soils shall be present across the extent of the site where fill materials are still in place. If site observations (inspections and photographs) and site surveys are available to demonstrate these works have occurred then the answer is Yes. If there is uncertainty as to whether these measures have been installed across the extent of the site then the answer is No.
4. Have all aesthetic issues been addressed?	If the final site surface is free of asbestos impacts and absent of significant petroleum odours or otherwise visual indicators of petroleum hydrocarbon impact (i.e. sheens), the answer to the decision will be Yes. Otherwise, the answer to the decision will be No.

Decision Required to be Made	Decision Rule
5. Were surplus materials classified and disposed off-site to a facility licensed to accept the classified waste, or where relevant, appropriately recycled for beneficial re-use?	**Waste Materials** Soil analytical data will be compared against EPA (2014b) criteria. Statistical analysis (comprising a review of 95% UCL of the mean, standard deviation and maximum values of dataset) of the data in accordance with relevant guidance documents will be undertaken, where appropriate, to facilitate the decisions (as detailed above). Documentation from the operation receiving the material including the dates, tonnage and classification of the accepted material will be required to facilitate the decision. If the statistical criteria stated above are satisfied, the decision is Yes, and if receipts are provided recording the disposal of material to an off-site licensed facility, the decision is Yes. If the material exceeds the criteria, and no disposal receipts are provided, the answer is No. **Beneficial Off-site Re-use** Based on the presence of ASS/PASS in natural site soils, and the presence of asbestos in site fill it is not anticipated that soil excavated from the site will be able to be beneficially reused under general exemptions. Where any such beneficial reuse is proposed a separate assessment will be required.
6. Where material is imported to site for development purposes is it considered environmentally suitability for use?	Analytical data sets and inspection data will be reviewed for each proposed material type/source against established definitions for acceptable material (i.e. VENM, resource recovery exemptions, etc) and EPA endorsed criteria as established in the RAP as validation criteria. If the complete data set for the applicable material meet the requirements relevant to the material type, the answer to the decision is Yes and material may be imported to site. If the data set exceeds the adopted criterion, the answer to the decision is No and the material cannot be imported to site for use in development activities.
7. Have remedial and validation works met the requirements of the RAP?	If the answer to Question 1 Yes and/or an answer to Questions 2-5 No, the answer to the decision is No. Further assessment is required to establish the nature and extent of additional remediation/management as may be required. If the RAP requirements were addressed, and there are no outstanding issues, the answer to the decision is Yes.
8. Is the site suitable for the proposed land uses subject to implementation of long-term management of residual impacts?	If the answer to Questions 6 and 7 is Yes, then the answer to the decision is also Yes. Otherwise, the answer to the decision is No. In this instance further remediation/ management actions will require to be implemented and appropriately documented such that a future review of the above decisions may result in a different decision outcome.

7.2.6 Specify the Limits on 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), appropriate indicators of data quality (DQIs used to assess quality assurance / quality control) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined DQI) established for the project as discussed below in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters). The acceptable limit on decision error is 95% compliance with DQIs.

The DQIs and data assessment criteria are summarised as presented in **Table 6.2**.

- **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.
- **Sensitivity** – expresses the appropriateness of the chosen field and laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 7.2 Summary of Data Quality Indicators

Data Quality Objectives	Frequency	Data Quality Indicator
Precision		
Blind duplicates (intra laboratory)	1 / 20 primary samples	1-10x LOR – no limit; 10x-30x LOR - <50 % relative percent difference (RPD)[1] >30x LOR - <30 % RPD
Blind duplicates (inter laboratory)	1 / 20 primary samples	
Laboratory duplicates	1 / 20 primary samples	
Accuracy		
Surrogate spikes	All organic samples	70-130 %
Laboratory control samples	1 per lab batch	70-130 %
Matrix spikes	1 per lab batch	70-130 %
Representativeness		
Sampling appropriate for media and analytes	All samples	-[2]
Samples extracted within holding times.	All samples	TRHs, VOCs and SVOCs – 14 days Asbestos – no limit
Trip spike (BTEX only)	1 per sampling event	70-130% recovery
Rinsate blank	1 per sampling event	<LOR
Method blank	1 per lab batch	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	NATA accredited methods
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples[2]
Limits of reporting appropriate and consistent	All Samples	All samples[2]
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples[2]
Appropriate documentation	All Samples	All samples[2]
Satisfactory frequency and result for QC samples	All QA/QC samples	95% compliance
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted Site assessment criteria	All samples	LOR ≤ site assessment criteria

[1] If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgment will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

[2] A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

7.3 Validation Inspections and Sampling

The validation inspections, sampling and analysis required for remediation areas are summarised in **Table 7.3** and detailed in the following sections.

Table 7.3 Validation Inspection and Sampling Program

Item	RAP Sampling Density			Analytical Suite
Source Removal Excavation Validation				
	Excavation Floors	Excavation Walls	Materials	
Excavations formed by the removal of contaminated soils (except PCB impacts).	1 / 100 m^2 (10 m grid) Minimum 2 samples per excavation. Minimum 2 samples per UST removed.	1 / 4 m (from each distinct horizon or material type or 1 m vertical soil profile)	N/A	TRHs and BTEXN (all excavations) Additional PCB analysis surrounding JBS_MW3
Excavations formed by the removal of impacted materials (if identified as part of an unexpected find)	1 / 100 m^2 (10 m grid) Minimum 2 samples	1 / 10 m (from each distinct horizon or material type or 1 m vertical soil profile) Minimum 4 samples	N/A	As determined by the nature of the impact
Petroleum Hydrocarbon Impacted Soils Remediation				
Bioremediated Soils / Landfarm pile(s)	1 sample per 25 m^3, minimum 3 samples per pile.			TRH BTEXN
Materials Importation				
Imported VENM	Minimum of 3 samples per source site / material type to 500 m^3 then 1 sample per 500 m^3 thereafter			TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (500 ml)
Quarry VENM Materials (e.g. blue metal, sandstone, shale)	Confirmation that the material is quarried rock (VENM) prior to importation, and visual confirmation.			Site Inspection required.
Material subject to a NSW EPA Resource Recovery Order/Exemption	Confirmation by the supplier that the material meets the terms of the order. Then environmental consultant sampling at a minimum of 3 samples per source site / material type to 500 m^3 then 1 sample per 500 m^3 thereafter, prior to importation			TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (500 ml)
Export of Materials				
Surplus waste materials for off-site disposal are to be classified in accordance with EPA (2014b).	**ALL FILL ASSUMED TO CONTAIN ASBESTOS** Stockpiled materials for off-site disposal require a minimum of 5 samples (up to 75 m^3) or a sample density of 1/25 m^3 to 200 m^3 (whichever is greater) Decreased sampling frequency to be justified on basis of stockpile homogeneity and risk of contaminants present.			Heavy metals TRH/BTEXN PAHs OCP/PCBs Asbestos Spocas (ASS) TCLP (Heavy metals and PAHs) at the Environmental Consultant's discretion.

7.3.1 Excavation of PCB Impacted Soil

The validation program for the removal of the PCB impacted soils comprises:

- Inspection of the excavated areas by a suitably trained and experienced environmental consultant to confirm the extent of potentially impacted materials have been removed. This inspection shall be cognisant of aesthetic indicators of PCB impact (i.e. staining, oils, etc.) whilst PCBs are not odourous, they are potentially dissolved within odourous solutes (i.e. oils). If additional potentially impacted material is identified, further excavation will be conducted and the affected area will be re-inspected until such time as visual and olfactory validation is obtained;
- Following visual and olfactory validation, soil (as appropriate to the nature of the impact) samples will be collected from the remediation area walls at a rate of 1 sample per 10 linear m, and from the excavation bases at a rate of 1 sample per 100 m^2 (minimum 2 samples per base and one sample from each wall); and
- Excavation validation samples will be analysed at a laboratory NATA accredited for the required analyses on an accelerated turnaround time (i.e. 24 hr) to allow for excavations to be backfilled as soon as possible and mitigate the potential risk of oxidising PASS (see further commentary below). If the concentration of COPCs are identified in any of the excavation validation samples exceeding criteria, then the soils will be excavated 0.3 m deeper or otherwise 3 m further in the lateral direction of failure and the validation process repeated. Alternatively, where impact exceeding criteria is not identified by the laboratory, the remedial areas will be deemed to have been successfully remediated and validated.

PCB impacted soils shall not be bioremediated for beneficial onsite reuse. Bioremediation of impacted soils may be undertaken where the quantity of PCB impacted soils is large and this may reduce the ultimate waste classification of material requiring to be disposed from the site (by reducing TRH concentrations).

Soils within the walls and base of the open excavation shall be field screened (in accordance with the requirements of the ASSMP) for ASS – where the results indicate the potential for PASS materials to be oxidised in the period following excavation pending validation results, the environmental consultant shall give direction to the contractor to backfill the excavation. Any additional remedial excavations required will be completed in subsequent stages.

7.3.2 Removal of Residual UPSS/USTs and Operational Infrastructure

Following removal of residual operational infrastructure, the Environmental Consultant shall:

- Inspect underlying surfaces and/or resultant excavation for indicators of additional connecting services or residual infrastructure (i.e. piping, concrete conduits, etc.);
- Where no indicators of residual infrastructure are identified, the Environmental Consultant shall photograph the resultant surfaces/excavation for inclusion in the validation report;
- The Environmental Consultant shall then direct the Remedial Contractor to undertake excavation/removal of residual impacted soils (if present). The procedure for validation of impacted soil removal is presented in **Section 7.3.3**; and
- Upon disposal of infrastructure, the Remedial Contractor shall provide disposal dockets to the Environmental Consultant for inclusion in the validation report.

7.3.3 Petroleum Hydrocarbon Impacted Soils Excavation

The validation program for the removal of the petroleum hydrocarbon impacted soils comprises:

- Inspection of the excavated areas by a suitably trained and experienced environmental consultant to confirm the extent of potentially impacted materials have been removed. This inspection shall be cognisant of aesthetic indicators of petroleum hydrocarbon impact. The potential presence of petroleum hydrocarbons should be further assessed by the use of a PID. If additional potentially impacted material is identified, further excavation will be conducted and the affected area will be re-inspected until such time as visual and olfactory validation is obtained;
- Following visual and olfactory validation, soil (as appropriate to the nature of the impact) samples will be collected from the remediation area walls at a rate of 1 sample per 4 linear m, and from the excavation bases at a rate of 1 sample per 100 m^2 (minimum 2 samples per excavation base or UST removed and two samples from each wall);
- Excavation validation samples will be analysed at a laboratory NATA accredited for the required analyses on an accelerated turnaround time (i.e. 24 hr) to allow for excavations to be backfilled as soon as possible and mitigate the potential risk of oxidising PASS (see further commentary below). If the concentration of COPCs are identified in any of the excavation validation samples exceeding criteria, then the soils will be excavated 0.3 m deeper or otherwise 3 m in a further lateral extent in the direction of failure and the validation process repeated. Alternatively, where impact exceeding criteria is not identified by the laboratory, the remedial areas will be deemed to have been successfully remediated and validated; and
- Excavated soils shall be transferred to the prepared area on the site for bioremediation by landfarming.

Soils within the walls and base of the open excavation shall be field screened (in accordance with the requirements of the ASSMP) for ASS – where the results indicate the potential for PASS materials to be oxidised in the period following excavation pending validation results, the environmental consultant shall give direction to the contractor to backfill the excavation. Any additional remedial excavations required will be completed in subsequent stages.

7.3.4 Validation of Bioremediated Soils

The completion of bioremediation of petroleum hydrocarbon impacted soils within the landfarm requires to be confirmed by validation sampling. Soils within the landfarm will be spread at a typical thickness of 0.5 m. Validation samples shall be collected from an excavation to a depth of 0.25 m below the landfarm surface and direct transfer of the soils to a laboratory supplied sample jar. Samples shall be confirmed to be free of aesthetic indicators of impact prior to analysis.

Samples shall be collected at a minimum frequency of 3 samples per 25 m^3. Landfarmed soils shall be analysed for concentrations of TRHs and BTEXN.

If the concentration of COPCs are identified in any of the landfarm pile samples exceeding criteria, then consideration will be given to continuing the process of landfarming, or alternatively disposing of soils from the site. Where impact exceeding criteria is not identified by the laboratory, the subject landfarm piles will be deemed to have been successfully remediated and validated, and will be considered suitable for reinstatement below the cap.

7.3.5 Validation of Retention of Impacted Soils On-Site

The preferred remedial method for the widespread asbestos affected soils is long term retention on the site. This shall be undertaken as per a long-term containment strategy.

A further objective of the site development works will be minimisation of wastes as generated by the project. There is a likelihood as consequent of the proposed development works, e.g. excavations as required to facilitate sub-surface service installation, that surplus soils will be generated during the site remediation and associate earthworks. Consideration may be given to assessment of surplus soils for beneficial reuse where the subject soils are free from asbestos and/or considered not to comprise ASS/PASS.

With this proposed waste minimisation strategy, it is likely that impacted fill soils may be caused to be redistributed across the site. For example, surplus soils from the northern portion of the site may be used to raise site levels on the southern site portion (subject to civil/earthworks requirements). This relocation of impacted soils / fill materials is proposed to be restricted to unsaturated horizons within the site only. The validation of the appropriate re-use of impacted materials within the site and the long-term management of the soils to control potential health and ecological risks will be dependent on three aspects of site validation:

- Material tracking;
- Consideration of distribution of site impacts by comparison to previous health risk assessments undertaken for the site;
- Installation of a marker layer; and
- Installation of a capping layer.

The validation of each component is discussed further following.

Material Tracking

The movement of all impacted materials (subject to long term containment) on the site is required to be subject to a Material Tracking Plan (MTP). The MTP shall be administered by the environmental consultant with the provision of all required information by the remediation contractor and will generally contain the following elements:

- Date (yyyy/mm/dd);
- Site figure showing source (cut) and placement (fill);
- Estimated volume (cubic metres);
- Type of material (asbestos, VENM etc);
- Depth of source (RL);
- Depth of placement (RL);
- Source (from) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Placement (to) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Source (from) information in terms of site feature (e.g. Building X);
- Placement (to) information in terms of site feature (e.g. under future basement);
- Reference document (where necessary, i.e. virgin excavated natural material / excavated natural material classification);
- Purpose of placement (i.e. containment, surplus to site requirements etc); and
- Comments (when required).

Marker Layer

Visual inspection will be undertaken by the Environmental Consultant to verify the installation of the marker layer across the complete extent of the site where fill soils are present in the sub-surface. Photographic records and a survey prepared by the Project Surveyor of the marker layer installation, including vertical and lateral extents will be retained for inclusion in the Validation Report.

Capping Layer

Material to be used as a capping layer (other than concrete pavement) must be validated by the Environmental Consultant to be environmentally suitable, consisting of VENM, ENM, suitable on-site materials (i.e. materials from another portion of the development site that are non-impacted) or material considered suitable for beneficial reuse via a resource recovery exemption issued by NSW EPA. Additionally, contaminant concentrations in any capping layer material must not exceed the adopted site validation criteria for soils.

The capping layer must be placed at the thicknesses specified for each capping scenario as detailed in **Section 6.3.8**. Photographic records and a survey of the capping layer installation, which details the final thicknesses of the capping layer, including the vertical and lateral extents prepared by the Contractor will be retained for inclusion in the Validation Report. This shall also make reference to the requirements for landscaping soils and zones as consistent with the final development plans (to be prepared).

7.3.6 Ground Surface Validation (Aesthetics)

Prior to the completion of remedial works and following placement of the marker layer, the ground surface of the site shall be thoroughly inspected by the environmental consultant to confirm the absence of visual ACM which may have been incidentally deposited during works.

Should any observable ACM be identified, the area should be emu-picked prior to re-inspection by the environmental consultant.

7.3.7 Groundwater Validation Data Requirements

7.3.7.1 Assessment of MNA

Monitored natural attenuation shall be undertaken by sampling and analysis events of all monitoring wells available within the monitoring network (refer to **Figure 8** and **Section 6.4**). The actual long term implementation of the MNA program shall be advised in the LTEMP to be prepared for the site at the cessation of the source remediation works. Notwithstanding, the assessment of MNA is anticipated to comprise:

- Sampling and analysis of available monitoring wells on a biannual basis;
- Analysis of samples for principle constituents of potential including TRH and BTEXN; and
- Additional analysis of all well for indicators of natural attenuation including nitrate, sulphate, ferrous iron and methane.

Groundwater analysis data shall be analysed to determine the occurrence of natural attenuation processes by primary and secondary lines of evidence. Prior to the availability of five rounds of data, assessment of primary lines of evidence shall be by qualitative assessment of the analytical data set. With the availability of five or more rounds, analysis data sets shall be assessed for each locations by Mann-Kendall analysis undertaken by ProUCL to determine a statistically significant trend.

On the basis of the results, revision of the requirements for ongoing monitoring will potentially be made to the EMP consistent with the following:

- Identification of the hydrocarbon impacted monitoring wells and inclusion for future monitoring;
- Identification of key “delineation” wells hydrogeologically downgradient of the extent of petroleum hydrocarbon impact; and
- Identification of hydrogeologically upgradient wells to be used as background wells.

As advised in detail to the proposed EMP, assessment of MNA shall be undertaken until such time that:

- Levels of COPCs in all monitoring wells are below the adopted assessment criteria in three consecutive rounds; or
- Levels of COPCs are found by statistical analysis undertaken using ProUCL to be reducing in each well; or
- Assessment of secondary indicators of natural attenuation supports the occurrence of natural attenuation processes in at least three consecutive events.

7.3.7.2 Groundwater Sampling

Groundwater sampling shall be conducted via a low flow sampling method with peristaltic pump for all other constituents. Purging was undertaken to ensure the sample collected is representative of groundwater conditions. Field parameters of pH, conductivity, redox and temperature will be measured with field electrodes in a flow cell and samples obtained once the parameters stabilise such that:

- Consecutive EC readings are within 3 %;
- Consecutive Eh readings are within 10 mV;
- Consecutive DO readings are within 10 %; and
- Consecutive pH readings are within 0.05.

Groundwater samples shall be transferred directly to laboratory supplied sample bottles. Sample bottles shall be clearly marked with sample identification details and transferred to an esky chilled with loose ice.

7.4 Validation Criteria

7.4.1 Soil

Soil validation data collected on site will be compared to the most conservative petroleum hydrocarbon in soil criteria as advised to NEPC (2013) for the protection of human health.

Aesthetic impacts of soils will be interpreted by on-site observations of indicators of soil staining and/or ACM and/or odours and/or other anthropogenic materials.

The petroleum hydrocarbon site validation criteria are nominated in **Table 7.4** following.

Table 7.4: Soil Validation Criteria

Constituent	Health Investigation Levels	Health Screening Level for Vapour Intrusion (mg/kg)	Management Limits – Coarse Soil
PCBs (total)	7	-	-
TRH C_{6-10} Less BTEX (F1)	-	45	700
TRH $C_{>10-C16}$ Less naphthalene (F2)	-	110	1000
TRH $C_{>16-34}$	-	-	3500
TRH $C_{>34-40}$	-	-	10 000
Benzene	-	0.5	-
Toluene	-	160	-
Ethylbenzene	-	55	-
Xylenes	-	40	-
Naphthalene	-	3	-

7.4.2 Groundwater

Groundwater data collected on-site will be compared to guidelines provided to ANZG (August 2018[7]) for marine ecosystems protective of 95% of species and the lowest of the criteria provided to NEPC (2013) for the protection of marine ecosystems, aquatic foods, recreational uses and visual amenity as consistent with the water quality objectives for the Cooks River catchment. With respect to the assessment of recreational exposures down-gradient of the site, data will be compared to drinking water guidelines as summarised in NEPC (2013) and adjusted by an order of magnitude consistent with a recreational exposure being the most likely sensitive potential exposure pathway. Noting that the site is situated within the Zone 2 Management Zone for the Botany Sands Aquifer, in which the use of groundwater for drinking purposes is banned, the comparison of groundwater data to drinking water guidelines is considered not applicable to the validation assessment.

The adopted groundwater petroleum hydrocarbon criteria are listed in **Table 7.5** following.

Table 7.5: Groundwater Validation Criteria (all units are µg/L unless otherwise shown)

	Limit of Reporting	Laboratory Method	Recreational Criteria[1]	Aquatic Ecosystem Criteria[2]	HSL –Commercial / Indsutrial[3]
TOTAL RECOVERABLE HYDROCARBONS					
F1 C_6-C_{10}	250	P&T GC/MS (USEPA 8020A, 8000)	-	-	6000
F2 >C_{10}-C_{16}	250	P&T GC/MS (USEPA 8020A, 8000)	-	-	NL
BTEX					
Benzene	1.0	P&T GC/MS (USEPA 8020A)	10	500	5000
Toluene	1.0	P&T GC/MS (USEPA 8020A)	8000	180	NL
Ethylbenzene	1.0	P&T GC/MS (USEPA 8020A)	3000	5	NL
m-Xylene	1.0	P&T GC/MS (USEPA 8020A)	6000 (total Xylene)	75	NL
p-Xylene	1.0	P&T GC/MS (USEPA 8020A)		200	NL
o-Xylene	1.0	P&T GC/MS (USEPA 8020A)		350	NL

Notes:
1. 10 times drinking water NHMRC (2011)
2. Ecological Criteria ANZG (2018) 95% Marine Waters reliability, unless otherwise noted.
3. NEPC (2013) B1 – Table 1A(4) HSL health screening values for vapour intrusion – sand soils 2-4 m. NL: Non limiting

7.5 Waste Disposal Off-site

All wastes requiring off-site disposal must be classified in accordance with *Waste Classification Guidelines* (EPA 2014). The Remedial Contractor is responsible for the lawful disposal of the classified waste to a licensed waste disposal facility lawfully able to accept the waste.

Disposal dockets for each individual off-site waste disposal load must be provided to the Principal and to the Remediation Consultant by the Contractor to demonstrate appropriate off-site disposal of waste occurred for site validation purposes.

7.5.1 Transport of Asbestos Impacted Materials

As further required to be considered in the requirements of material tracking, transport of materials affected by asbestos will require to be further cognisant of the requirements of *Work Health and Safety Act (2011)* and *Work Health and Safety Regulation (2017)*, *How to Manage and Control*

[7] Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, August 2018)

Asbestos in the Workplace: Code of Practice, October 2018, Safe Work Australia, *Managing Asbestos in or on Soil*, 2014, WorkCover and the EPA (2014b).

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 non-friable ACM only contaminated soils are to be conducted by at least a Class B Licenced Asbestos Removal Contractor – however, a Class A Licenced Contractor is recommended (**Section 6.1**).

Before starting any affected works, the appointed contractor is required to notify SafeWork NSW at least five days before commencement.

The details of the relevant Class B contractor shall be further advised to the relevant parts of the materials tracking form(s).

7.6 Validation Reporting

At the completion of the remedial works, a validation report will be prepared in general accordance with the *Consultants Reporting on Contaminated Land Contaminated Land Guidelines* (EPA 2020), documenting the works as completed. The report will contain information including:

- Details of the remediation works conducted;
- Information demonstrating that the objectives of this RAP have been achieved, in particular the validation sample results and assessment of the data against both the pre-defined DQO and the remediation acceptance (validation) criteria;
- Information demonstrating compliance with appropriate regulations and guidelines including UPSS infrastructure destruction/disposal documentation;
- Any variations to the strategy undertaken during the implementation of the remedial works;
- Results of all environmental monitoring undertaken during the course of the remedial works;
- Details of any environmental incidents occurring during the course of the remedial works and the actions undertaken in response to these incidents;
- Verification of regulatory compliance;
- Details on waste classification, tracking and off-site disposal including landfill dockets;
- Survey plans as relevant to the site, marker and capping layer extents;
- Photographic records of applicable remediation works;
- The extent of impacted materials as retained with the site and subject to the long-term management provisions; and
- Clear statement of the suitability of the site with respect to permissible land uses with specific reference to the LTEMP to be applied for the ongoing management of the extent of impacted materials as characterised at the completion of the construction works.

The report will serve to document the remediation works for future reference. It is noted that due to site access and/or construction constraints, that the remediation and validation works may occur in stages. Any works that occur at the site following validation of an area will be completed in accordance with the proposed LTEMP as per **Section 7.6.1**.

7.6.1 Long Term Environmental Management Plan

With the proposed on-site containment of impacted soils, a LTEMP will be required. The LTEMP will document provisions for the of long-term management of the marker and capping layers integrity and detail the required controls for future works below the marker layer.

Groundwater monitoring shall continue, following source removal validation, until such a time as it is able to be demonstrated that site attributable groundwater impacts do not pose a potential risk to offsite groundwater receptors. The specific requirements for ongoing MNA shall be determined following receipt of validation data and advised within the LTEMP, as required.

The LTEMP will be made legally enforceable through an appropriate mechanism such as development consent conditions, to give the plan a basis in law.

8. Unexpected Finds

The possibility exists for hazards to be present at the site other than those identified and expected based on previous investigations.

Environmental sampling is based on chemical analytes identified as a potential concern during a documented process of reviewing historical site activities. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations. The nature of any additional hazards which may be present at the site are generally detectable through visual or olfactory means, for example:

- Areas of previously unidentified ACM on the ground surface or within fill material;
- Uncontrolled filling, such as in eroded drainage lines;
- Drums or underground tanks;
- Chemical bottles; and
- Odorous or unusual coloured soils;

As a precautionary measure to ensure the protection of the workforce and surrounding community, if any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Flowchart 8.1** and detailed in the following sections is to be followed.

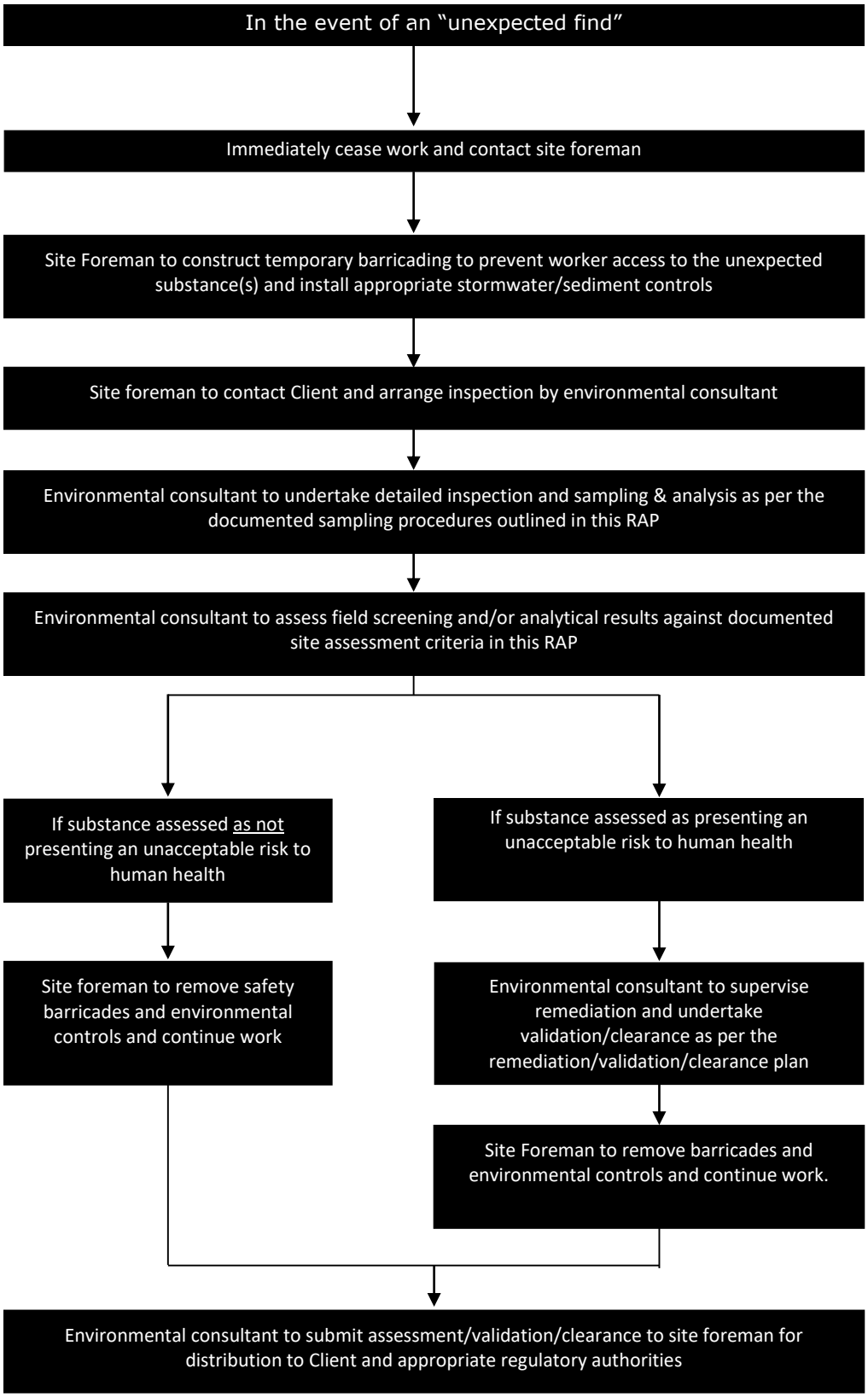
An enlarged version of an unexpected finds protocol, suitable for use on site, should be posted in the Site Office and referred to during the Site Specific Induction by the Principal Contractor.

The sampling strategy for each 'unexpected find' shall be designed by a suitably qualified environmental consultant, in accordance with guidelines made or endorsed by EPA. The strategy will, however, be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The sampling frequency of the identified substance / materials shall meet the requirements the NSW EPA Sampling Design Guidelines (1995).

The assessment criteria shall be determined by the Environmental Consultant, with the subject material to at least meet the criteria nominated in **Section 7.4**, and additional criteria (as necessary) obtained from published national guidance documents.

Flowchart 8.1: Unexpected Finds Protocol



9. Site Management Plan

This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site.

9.1 Contact Persons

Contact details for key personnel involved in remediation and validation works are summarised in **Table 9.1.**

Table 9.1 Contact Details

Client's Supervisor/Manager	Details
Name	To be advised
Company	To be advised
Address	To be advised
Contact Phone	To be advised
Remediation Contractor	**Details**
Name	To be advised
Company	To be advised
Contact Phone	To be advised
Environmental Consultant	**Details**
Name	To be advised
Company	To be advised
Address	To be advised
Contact Phone	To be advised

9.2 Hours of Operation

It is understood that the hours of operation for remedial works will be conducted in accordance with the recommended site hours suggested by the EPA[8], however, works hours will be subject to requirements of any development approval conditions provided by Council.

Typical hours of operation for remedial works are:

- Monday to Friday: 7am to 6pm.
- Saturday: 8 am to 1 pm.
- Sunday and public holidays: No work permitted.

Emergency work is permitted to be completed outside of these hours.

9.3 Soil and Water Management

All works shall be conducted in general accordance with Landcom (2004)[9] guidance (the Blue Book), which outlines the general requirements for the preparation of a soil and water management plan.

All remedial works shall be conducted in accordance with a soil and water management plan, which is to be kept onsite and made available to council officers on request. All erosion and sediment measures must be maintained in a functional condition through the remediation works by the remedial contractor.

To prevent the migration of impacted soil off site, silt fences shall be constructed at the down-gradient site boundaries by the remedial contractor. Any material which is collected behind the sediment control structures shall be removed off site to a licensed waste facility after waste classification.

[8] *Interim Construction Noise Guideline.* Department of Environment & Climate Change NSW. DECC 2009/265. July 2009.
[9] *Managing Urban Stormwater: Soils and Construction*, Landcom 4th Edition, March 2004.

In storm or extended rainfall event, the structures located on site for sediment control shall be monitored and replaced or altered if necessary by the contractor. Collected material shall be managed in accordance with remediation works by the contractor.

9.3.1 Stockpiles / Landfarms

All materials stockpiled onsite (inclusive of the Landfarm) will be managed by the remedial contractor. Unique numbers will be provided for each stockpile, the source of the stockpile, its volume, material characterisation and its location onsite (via GPS) recorded.

The following procedures will be implemented by the remedial contractor:

- No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior Council approval has been obtained;
- All stockpiles of soil or other materials shall be placed away from drainage lines gutters or stormwater pits or inlets;
- All stockpiles of soil or other materials likely to generate dust or odours shall be covered (where practical); and
- All stockpiles of contaminated soil shall be placed on plastic sheeting to limit cross contamination of the underlying soils and stored in a secure area.

9.3.2 Site Access

During remediation works, temporary fencing will be installed which will restrict access to remedial areas on the site. Only authorised persons will be permitted to enter the remedial areas.

Vehicle access to the site shall be stabilised to prevent the tracking of materials from the site and the adjoining driveway/access point to the road will be swept or cleaned on an as-needed basis. Any collected materials shall be treated as potentially contaminated and handled as per the classification/reuse/disposal requirements outlined in this RAP.

9.3.3 Excavation Pump-out

Any excavation pump-out water shall be sampled by the environmental consultant for analysis for total suspended solid concentrations, turbidity, pH and the identified contaminants of concern prior to release to stormwater with appropriate documentation indicating that the discharged water is compliant with the ANZG (2018[10]) default guideline values (DGVs) for the 95 % Protection of Marine Water Ecosystems. If not, appropriate waste disposal practices with a suitably licensed and experienced waste contractor.

Excavation pump out is not anticipated with the general remediation works given the general remedial plan of minimising ground disturbance and groundwater being undisturbed. Pump out following accumulation of surface water is the most likely scenario for water disposal.

[10] *Australian and New Zealand Guidelines for Fresh an Marine Water Quality*, August 2018, Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (ANZG 2018)

9.4 Noise

Remediation work shall not give rise to 'offensive noise' as defined in the POEO Act *1997*. All equipment and machinery associated with the remediation work shall be operated by the Contractor in accordance with *the POEO Act 1997* and the *Noise Control Regulations 2000*.

All machinery and equipment used on site will be in good working order and fitted with appropriate silencers when necessary.

Louder equipment shall be located away from noise sensitive areas. Works shall be staged as required to avoid concurrent operation of multiple pieces of noisy equipment. Works outside of normal hours of operation (**Section 9.2**) shall be avoided.

9.5 Vibration

The use of plant and machinery shall not cause vibrations to be felt or capable to be measured at neighbouring premises.

9.6 Air Quality

During remedial works, dust emissions and any odours will be confined within the site boundary.

9.6.1 Air Monitoring

Perimeter air monitoring will be required during the disturbance of asbestos impacted soils as potentially present across the extent of the site. Air monitoring will be conducted in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC) *Asbestos Code of Practice and Guidance Notes*, in particular the *Guidance Note on the Membrane Filter Method Estimating Airborne Asbestos Fibres* 2nd Edition [NOHSC 3002:2005].

9.6.2 Dust Control

During the remedial works, as necessary, excavation areas will be wetted down using a water spray to minimise the potential for dust to be generated by the remedial contractor.

Dust shall also be controlled by ensuring vehicles leave via the designated (stabilised) site access and all equipment have dust suppressors fitted by the remedial contractor.

During all remedial works, dust screens will be erected around the perimeter of the site by the remedial contractor. Where significant fugitive emissions are observed from specific site areas, these areas shall be wetted and/or covered by the remedial contractor.

Meteorological conditions will be monitored by the environmental consultant and remedial contractor. Remedial work will be stopped or modified where meteorological conditions are adverse (i.e., dry conditions and strong winds towards sensitive receptors).

Plant and vehicles should limit their speed when working within asbestos exclusion zones and only traverse wetted haul roads.

9.6.3 Odour

Given the nature of some of the material being excavated at the site, namely hydrocarbon impacted soils, there may be some odour issues at the site boundaries.

If odours are detectable at the site boundaries, then appropriate actions will be taken to reduce the odours, which may include: increasing the amount of covering of excavations / stockpiles; mist sprays; odour suppressants; or maintenance of equipment.

Records of volatile emissions and odours shall be kept by the remediation manager. Equipment and machinery will be adequately maintained to minimise exhaust emissions. No materials shall be burnt on the site.

9.7 Groundwater

No groundwater remediation or dewatering is proposed as part of site remediation works. No approvals are required under the *Water Management Act 2000*.

9.8 Material Transporting

Trucks will be loaded in a designated area in a manner designed to minimise noise, vibrations and odour to adjoining premises. The transportation contractor shall ensure that there is no material tracked out onto public roads and that each load is securely covered. Removal and deliveries of soils and materials, equipment and machinery will only occur during the hours of remediation works unless specific approvals are obtained.

All appropriate road rules shall be observed and state roads will be selected as far as practicable over local roads when deciding on the transport route to the off-site material disposal location. In addition, the transport contractor will be required to be appropriately licensed to transport and dispose of the waste identified as requiring removal from the site.

As of 1 July 2015, it will be required under the *Protection of the Environment Operations (Waste) Regulations 2014* (POEO 2014) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m^2 of asbestos sheeting. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the proximity principle, under POEO 2014, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the is waste is transported to one of the two nearest lawful disposal facilities to the place of generation.

9.9 Hazardous Materials

Hazardous and / or intractable wastes arising from the remediation work shall be removed and disposed of in accordance with the requirements of NSW EPA, SafeWork NSW and the relevant regulations by the Contractor.

Any hazardous wastes will be transported by a NSW EPA licensed transporter.

9.10 Disposal of Contaminated Soil

All soil will be classified, managed and disposed in accordance with the *Waste Classification Guidelines* (EPA 2014). Documentary evidence for all soil disposal shall be kept for inclusion in the Validation Report.

9.11 Site Signage and Contact Numbers

A sign shall be displayed adjacent to the site access throughout the duration of the works with the contact details of the remediation contractor and project manager.

9.12 Community Relations

Owners and/or occupants of premises adjoining the site will be notified at least seven days prior to the commencement of remedial works.

Any community concerns or queries should be directed to the site manager. The site manager will notify the site owner of any community queries or concerns so that the site owner will direct an appropriate person to address the community query or concern.

9.13 Site Security

The remedial areas shall be secured against unauthorised access by means of an appropriate fence.

9.14 Occupational Health and Safety

It is the employer's responsibility to ensure that all site remediation works comply with all Work Health and Safety and Construction Safety Regulations of NSW SafeWork. A Health and Safety Plan is provided in **Section 10.**

10. Health and Safety

This health and safety plan contains procedures and requirements that are to be implemented as a minimum during the remediation works.

The objectives of the health and safety plan are:

- To apply standard procedures that reduce risks resulting from the above works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.
- These objectives will be achieved by:
- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards and mandatory safety practices and procedures; and
- Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety plan does not provide safety information specific to construction and other demolition or excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own Safe Work Method Statements for their work activities. All parties working on the site shall comply with all applicable Health and Safety legislation, regulations, codes and guidelines.

10.1 Responsibilities

Remediation Supervisor

The remediation supervisor is responsible for ensuring that the work is carried out in accordance with the health and safety plan. This will include:

- Ensuring a copy of the health and safety plan is available at the site during the remediation/validation activities;
- Ensuring all works are undertaken in accordance with appropriate regulations and standards;
- Confirming individuals are competent in performing allotted tasks;
- Liaison with the contractor representatives, as appropriate, regarding safety matters; and
- Investigation and reporting of incidents and accidents.

Every individual worker is responsible for conducting their allocated tasks in a safe manner and in accordance with their training and experience. They must give due consideration to the safety of all others in their proximity and cooperate in matters of health and safety. All workers must leave their work areas in such a condition that the location will not be hazardous to others at any time.

10.2 Hazards

The known or potential hazards associated with the work activities described in **Section 4** are listed below:

- Inhalation hazards associated with the presence of ACM fragments in/on soil;
- Chemical hazards associated with the presence of potentially contaminated soil inclusive of elevated levels of petroleum hydrocarbons and PCBs;
- Physical hazards, including:
    - work in or near excavations;
    - operating machinery;
    - heat stress and UV exposure;
    - underground (particularly with the presence of UST(s)) or overhead services;
    - manual handling; and
    - noise.

In the event of the discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, or of any new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the Project Manager has been notified and appropriate instructions have been provided to field personnel.

10.2.1 Inhalation Hazards

The main inhalation hazards from the remediation/validation works are consequent of the presence of asbestos.

Measures require to be put in place to prevent/ minimise the generation of airborne fibres. These have been described in the environmental controls for the works. Where airborne emissions are likely to be generated, Personal Protective Equipment (PPE) shall be required to be worn to prevent potential exposure, as described in **Section 10.3**.

10.2.2 Chemical Hazards

When working with potentially contaminated materials in general, care must be taken to ensure that the contamination is not introduced to the worker via ingestion, inhalation or absorption. PPE and decontamination requirements related to the remedial works are summarised in **Section 10.3**.

10.2.3 Physical Hazards

Operating Machinery

Heavy plant and equipment operating in the vicinity of field personnel presents a risk of physical injury. Personnel should be cognisant of their position in relation to operating machinery at all times.

Never walk behind or to the side of any operating equipment without the operator's knowledge. Do not assume that the operator knows your position. Personnel should stay at least 1 m from the operational area of heavy equipment and should not stand directly below any load or piece of equipment (e.g. backhoes).

Work in or Near Excavations

All excavations shall be shored, sloped or otherwise constructed so as to minimise the potential for collapse. No excavations greater than 1.5 m depth are anticipated to be created.

Cuts and Abrasions

The manual work associated with the remediation works gives rise to the risk of cuts and abrasions to personnel working in the area. As well as the direct consequences of any cut or abrasion, such injuries can lead to the possibility of exposure to contaminants through the wound as well as diseases such as tetanus. To minimise the risk of direct or indirect injury, personnel will wear the personal protective equipment described in **Section 10.3**.

Heat Stress and UV Exposure

Site personnel may experience heat stress due to a combination of elevated ambient temperatures and the concurrent use of personal protection equipment; this depends in part on the type of work and the time of year.

In addition to heat stress, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. The use of a high protection sunscreen (SPF15 or greater) on all exposed skin is recommended. Hats (including hard hats in specified areas) will also provide additional sun protection during the peak (i.e. 10:00 am to 3:00 PM) sun period. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

Underground Services

There is the potential for underground services (electricity, natural gas lines, water, telephone, sewer, and stormwater) to be present beneath the work area. The remediation contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with excavation near services.

It is further noted that the presence of UST(S) will require appropriate decommissioning in which the Remedial Contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with the works.

Aboveground Electrical Hazards

All electrical plant and equipment must comply with the requirements of Australian Standard AS 3000. Hand held portable tools shall comply with AS/NZS 3160 Hand-held Portable Electric Tools and shall be double insulated. Cord connected portable hand lamps shall comply with AS/NZS 3118. A Residual Current Device (RCD) shall protect plug-in portable equipment, which is connected to a supply above Extra Low Voltage - 12-24volts (including equipment supplied from a generator or welding set). RCD protection shall be provided during use of portable electrical equipment at all times while the equipment is connected to a power supply above Extra Low Voltage, irrespective of whether power is switched ON or OFF. RCD's shall comply with AS 3190 and shall be type II units, rated to trip at or below 30 milliamps within 40 milliseconds.

All equipment shall be operated in compliance with the NSW WorkCover (2006) Work Near Overhead Power Lines: Code of Practice. Minimum approach distances for all equipment should exceed:

- 3.0 m for nominal phase to phase ac voltage lines up to 132,000 Volts;
- 6.0 m for 132 000 to 330 000 Volts;
- 8.0 m for greater than 330 000 Volts; and
- 3.0 m for nominal pole to earth dc voltage up to and including 1500 +/- volts.

Manual Handling

When lifting or handling heavy objects, use correct lifting techniques, bending the knees not the back. If the item to be lifted is too heavy or awkward for one person to lift, seek assistance from other company employees or use mechanical help.

Noise

Long-term exposure to high levels of noise is unlikely. However, operating machinery may cause significant noise exposures for short periods. Earplugs or earmuffs should be worn in any situation where noise levels make normal conversation difficult.

10.3 Personal Protective Equipment

All workers who may come into direct contact with contaminated soil will wear the following PPE:

- Overalls or long sleeved collared shirt;
- Heavy duty outer gloves (eg. leather) where there is a risk of cuts or abrasions, otherwise PVC outer gloves if in direct contact with contaminated soil;
- Steel capped boots;
- Safety glasses;
- High visibility vest or jacket; and
- Hard hat.

In addition to the above, the following PPE will be worn by the personnel responsible for handling of fill materials within the extent of the site (i.e. asbestos impacted soils) prior to the installation of the marker layer, or potentially exposed to airborne emissions:

- During any work in which direct contact of personnel to asbestos impacted soils may occur and prior to final clearance / placement of marker layer – overalls, gloves, rubber soled work shoes or gum boots should be work by personnel involved in the work. These shoes will remain inside the work area for the duration of the work.
- Approved respirators shall be worn during direct handling of asbestos impacted soils at all times to provide respiratory protection. The minimum protection is an approved properly fitting P2 disposable respirator or half faced respirator fitted with a particulate cartridge. However, it is expected that the remediation contractor will conduct a risk assessment in relation to the works and should consider the requirement for positive pressure, hood or full-face powered air-purifying respirator fitted with an approved Class M filter.
- The remediation contractor shall supply and keep in good order, two complete sets of protective clothing and respirators for authorised inspection personnel. These will remain the property of the contractor at the end of the contract.
- Respirators should be issued for personal use only and shall be kept in a clean condition. Alcohol based antiseptic swabs should be made available for the cleaning of respirators.
- Any respirator defects should be reported for subsequent repair. They should be maintained in a clean and safe working condition.
- Employees must receive instruction in the correct method of using the respirator and on the importance of correct facial fit and maintenance. No person with a beard shall be allowed within the asbestos work area except using an approved positive pressure continuous airflow hood.

In the event that the PPE detailed above differs from that required by the Class B licensed contractor, the requirements of the licensed contractor will prevail.

Vehicle, Plant and Equipment

All equipment, including personal protective equipment, will be washed or otherwise cleaned to ensure that contaminated soil, water or dust is removed before it leaves the Site. All plant and equipment will have their outer bodies thoroughly cleaned of soil and sediment before moving off the site.

10.4 Emergency Response

The remediation contractor will be responsible for preparing an emergency response plan, which will provide details on appropriate action and evacuation procedures in the event of an emergency.

In the event of an emergency arising on the site, appropriate action should be taken. Site evacuation procedures should be followed, as necessary.

In the event of an accident: evaluate the seriousness of the injury, and contact emergency services, if necessary; provide first aid, as appropriate, and if safe to do so evacuate the injured person via the Decontamination Zone; make the area as safe as possible without jeopardising safety.

If a serious accident occurs, do not disturb the scene, except to make safe and prevent further injury or damage, and keep all unauthorised people out, and report all accidents to the Project Manager.

11. Regulatory Approvals / Licensing

11.1 Protection of the Environment Operations Act 1997 (POEO 1997)

The proposed remediation/validation activities are not required to be licensed under the *Protection of the Environment Operation Act 1997*, which is based on the following:

- The proposed remediation works will not treat more than 1000 m^3 per year of contaminated soil received from off-site.
- The proposed remediation works will not involve the treatment of contaminated soil originating on-site with the capacity: (i) to incinerate more than 1000 m^3 per year of contaminated soil, or (ii) to treat (otherwise than by incineration) and store more than 30 000 m^3 of contaminated soil, or (iii) disturb an aggregate area of 3 hectares of contaminated soil.

11.2 State Environment Planning Policy (Resilience and Hazards) 2021

Development consent for remediation works is addressed by reference to State Environmental Planning Policy 55 – Remediation of Land (SEPP-RH) and associated Planning Guidelines (DUAP 1998).

The proposed remediation works are classified as 'Category 2' Remediation Works – i.e. not requiring consent. The notification requirements of SEPP 55 include notification to council 30 days before Category 2 remediation works commence. The proposed works do not constitute Category 1 works because it is understood that:

- The work is not Designated Development under Schedule 3 of the EPA&A Regulation or under a planning instrument.
- The work proposed is not on land identified as critical habitat under the *Threatened Species Conservation Act 1995*.
- Consideration of s.5A of the EP&A Act indicates the remediation work is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats.
- The work is not proposed in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:
    - coastal protection;
    - conservation or heritage conservation;
    - habitat area, habitat protection area, habitat or wildlife corridor;
    - environmental protection;
    - escarpment, escarpment protection or escarpment preservation;
    - floodway;
    - littoral rainforest;
    - nature reserve;
    - scenic area or scenic protection;
    - wetland, or
    - carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any

local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).

- The work does not require consent under another SEPP or regional environmental plan.

In addition, the notification will also include relevant contact details and a proposed remediation schedule. Notice is also required to be given to Council within 30 days of remediation works completion.

11.3 Protection of the Environment Operations (Waste) Regulation 2014

The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed. Section 48 of the Reg. requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.

It will be required under the *Protection of the Environment Operations (Waste) Regulations 2014* (POEO 2014) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m^2 of asbestos sheeting. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the proximity principle, under POEO 2014, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the waste is transported to one of the two nearest lawful disposal facilities to the place of generation.

11.4 Waste Classification Guidelines (EPA 2014b)

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline.

11.5 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), *Code of Practice How to Safely Remove Asbestos* (NSW Government 2019), *Code of Practice How to Manage and Control Asbestos in the Workplace* (NSW Government 2019), NSW SafeWork Guidelines, the NSW EPA (2014) *Waste Classification Guidelines*, and requirements under the *Protection of the Environment Operations (Waste) Regulation* (2014) for asbestos waste monitoring (NSW EPA 2015).

Excavation, onsite remediation and removal of asbestos impacted soils are required to be conducted by a Class A (Friable) or B (Bonded) Asbestos Removal licensed contractor.

11.6 City of Sydney (2012) 'Development Control Plan'

The Council DCP provides a number of environmental and site management provisions required to be employed during remediation works. These will require to be adopted as minimum standards for the environmental management of remediation works.

12. Conclusions and Recommendations

With reference to the limitations in **Section 13**, the following conclusions and recommendations are provided.

12.1 Conclusions

It is considered that the proposed actions outlined in this RAP conform to EPA requirements because they are: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines endorsed by NSW EPA.

Subject to the successful implementation of the measures described in this RAP and the recommendations below, it is concluded that the risks posed by potential direct human contact pathways / potential exposure of contaminated soils can be managed in such a way as to be adequately protective of human health such that the land can be made suitable for the proposed land use. It is further concluded that any potential ecological risks posed by offsite migration of TRH impacted groundwater will be appropriately addressed by the implementation of the remedial works documented herein.

12.2 Recommendations

It is recommended that the processes outlined in this RAP be implemented to ensure the risks and impacts during remediation and construction works are controlled in an appropriate manner.

Upon completion of the remediation works, a Validation Report is required to be prepared to verify remedial works were completed in accordance with the RAP. A LTEMP will further require to be prepared to ensure the ongoing management of the retained impacted soils, and monitor the attenuation of TRHs in groundwater, unless a comprehensive validation assessment is able to be generated otherwise that shows that levels of asbestos and/or other potential contaminants do not pose a potential human health or ecological risk.

13. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures

Legend

Approximate Site Boundary

JBS&G

Job No: 63126	
Client: Logos	
Version: R01 Rev A	Date 24/05/2022
Drawn By: AB	Checked By: RH

Scale 1:3,000

0 30 60

metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd,
St Peters, NSW

SITE LOCATION

FIGURE 1

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_01_SiteLocation.mxd
Reference:

Legend

- Approximate Site Boundary

Site Features

- Oil Staining
- Probable UST
- Shipping Containers - Storage
- Site Features

JBS&G

Job No: 62110

Client: Logos

Version: R01 Rev A	Date 29/11/2021
Drawn By: RH/JZ	Checked By: MN

Scale 1:750

0 10 20

metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd,
St Peters, NSW

SITE LAYOUT

FIGURE 2

File Name: N:\Projects\Logos\62110 St Peters DD\GIS\Maps\R01 Rev A\62110_02_SiteLayout.mxd
Reference:

Legend

- Approximate Site Boundary

Sample Locations

- Borehole / Monitoring Well, SES (2020)
- Borehole, SES (2020)
- Monitoring Well, JBSG (2021)
- Soil Vapour, JBSG (2021)

Site Features

- Shipping Containers - Storage
- Probable UST
- Site Features

JBS&G

Job No: 63126	
Client: Logos	
Version: R01 Rev A	Date 24/05/2022
Drawn By: AB	Checked By: RH
Scale 1:750	

0 9 18
metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd, St Peters, NSW

ENVIRONMENTAL DATA POINTS

FIGURE 3

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_03_EnvironmentalDataPoints.mxd
Reference:

BH16	Depth	Concentration (mg/kg)	Criteria and Value Exceeded (mg/kg)
Analyte			
F1 (C6-C10 minus BTEX)	0.5-0.6	415	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for

BH13	Depth	Concentration (mg/kg)	Criteria and Value Exceeded (mg/kg)
Analyte			
F1 (C6-C10 minus BTEX)	0.9-1	311	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for

JBS_MW3	Depth	Concentration (mg/kg)	Criteria and Value Exceeded (mg/kg)
Analyte			
PCBs (Sum of total)	0.2-0.3	18	NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (7)

BH18	Depth	Concentration (mg/kg)	Criteria and Value Exceeded (mg/kg)
Analyte			
F1 (C6-C10 minus BTEX)	1.1-1.2	373	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for

Legend

Approximate Site Boundary

Sample Locations

- Borehole / Monitoring Well, SES (2020)
- Borehole, SES (2020)
- Monitoring Well, JBSG (2021)

Site Features

- Shipping Containers - Storage
- Probable UST
- Site Features

JBS&G

Job No: 63126

Client: Logos

Version: R01 Rev A | Date 24/05/2022

Drawn By: AB | Checked By: RH

Scale 1:800

0 9.5 19

metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd, St Peters, NSW

SOIL CRITERIA EXCEEDANCES

FIGURE 4

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_04_SoilCriteriaExceedances.mxd
Reference:

Legend

Approximate Site Boundary

Sample Locations

Borehole / Monitoring Well, SES (2020)

Monitoring Well, JBSG (2021)

Site Features

Shipping Containers - Storage

Probable UST

Site Features

JBS&G

Job No: 63126

Client: Logos

Version: R01 Rev A	Date 24/05/2022
Drawn By: AB	Checked By: RH

Scale 1:750

0 9 18

metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd, St Peters, NSW

GROUNDWATER TRH IMPACTS

FIGURE 5

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_05_GroundwaterTRHImpacts.mxd
Reference:

Legend

- Approximate Site Boundary

Site Features

- Site Features
- Operational Infrastructure Remedial Extents
- PCB Impacted Soil Remedial Extent
- Surficial Hydrocarbon Staining Remedial Extent
- UPSS/UST Remedial Extents

JBS&G

Job No: 63126

Client: Logos

Version: R01 Rev A	Date 7/06/2022
Drawn By: AB	Checked By: RH

Scale 1:800

0 10 20

metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd, St Peters, NSW

INDICATIVE REMEDIAL EXTENT

FIGURE 6

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_06_IndicativeRemedialExtent.mxd
Reference: www.nearmap.com - 20211006

Legend

- Approximate Site Boundary

Site Features

- Oil Staining
- Probable UST
- Shipping Containers - Storage
- Site Features

X Test-Pit Locations

JBS&G

Job No: 63126	
Client: Logos	
Version: R01 Rev A	Date 24/05/2022
Drawn By: AB	Checked By: RH
Scale 1:750	

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 56

28-30 Burrows Rd, St Peters, NSW

JBS_MW4 Delineation Sampling Locations

FIGURE 7

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_02_SiteLayout.mxd
Reference:

Legend

Approximate Site Boundary

Site Features

Oil Staining

Probable UST

Shipping Containers - Storage

Site Features

X Monitoring Well Loactions

JBS&G

Job No: 63126

Client: Logos

Version: R01 Rev A | Date 24/05/2022

Drawn By: AB | Checked By: RH

Scale 1:750

0 10 20

metres

Coord. Sys. GDA 1994 MGA Zone 56

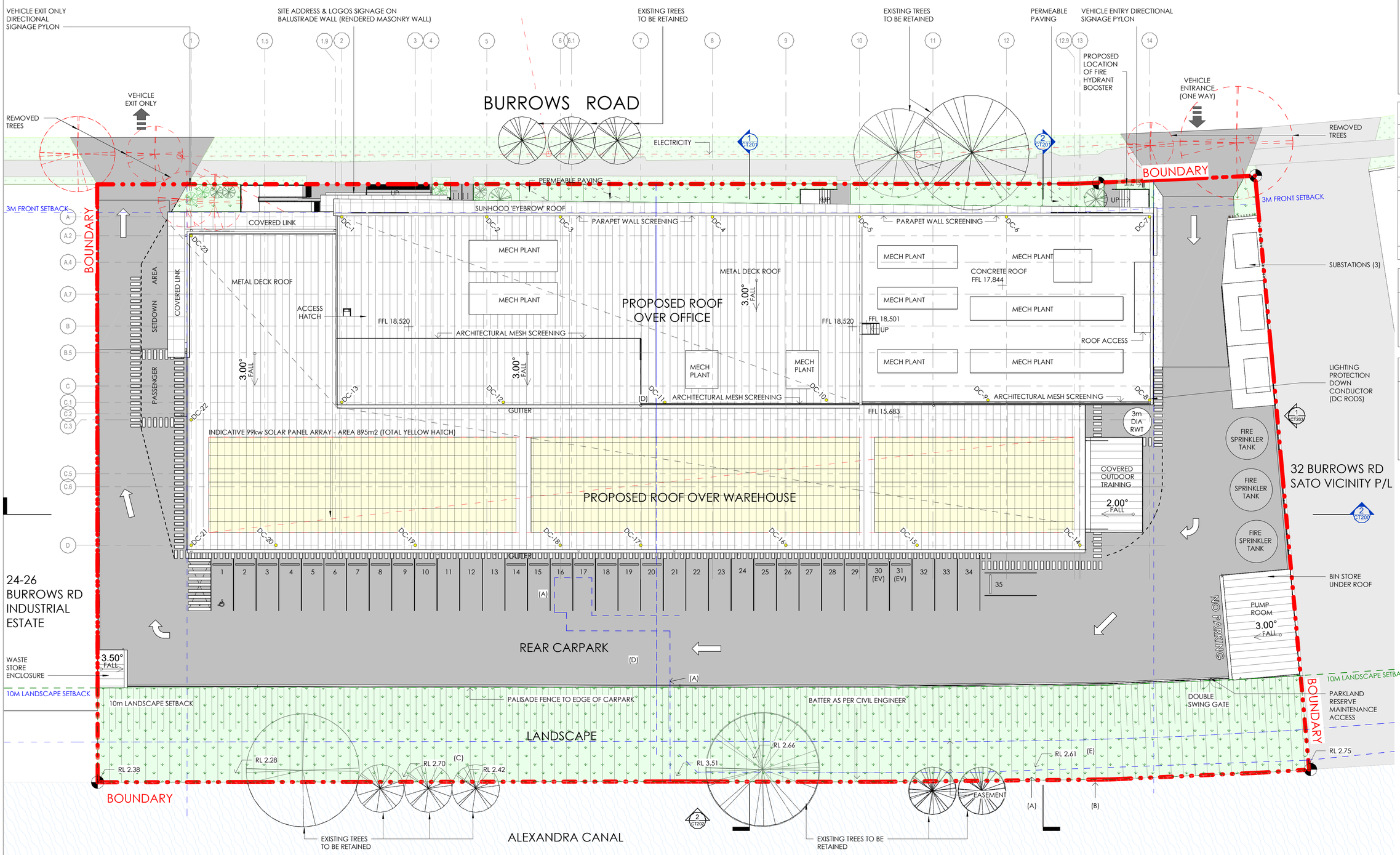
28-30 Burrows Rd, St Peters, NSW

Indicative Grondawater MNA Network

FIGURE 7

File Name: N:\Projects\Logos\63126 St Peters SEARs\GIS\Maps\R01 Rev A\63126_02_SiteLayout.mxd
Reference:

Appendix A Proposed Development Plans



1 SITE PLAN

1 : 200 A300

DISCLAIMER:

NOTE 1: ALLOW +/- 500mm TO THE PROPOSED FINISHED FLOOR LEVEL NOTE 2: BUILDING OVERALL DIMENSION (O/A) MEASURE TO OUTER-MOST FACE OF METAL CLADDING
NOTE 3: THE LOCATION OF PROPERTY ALIGNMENTS IS DETERMINED FROM SURVEY INFORMATION PROVIDED BY SURVEYOR.

DEVELOPMENT SUMMARY

TOTAL SITE AREA = 7,961m2

ZONING: IN1 GENERAL INDUSTRIAL
FSR ALLOWABLE (1.5:1) = 11,950.5m2
FSR PROVIDED (0.8:1) = 6,510m2

DEEP SOIL
LANDSCAPE AREA = 1,281m2
= 15.7% DEEP SOIL COVER
(REAR RESERVE HATCHED SETBACK ZONE ALONG ALEXANDRIA CANAL FOR FUTURE COUNCIL PARKLAND COMPRISING OF CONTINIOUS PEDESTERIAN & BIKE PATHWAYS)

LANDSCAPE AREA =1,511m2
= 18.9% LANDSCAPE AREA COVER
(STREET FRONTAGE & REAR RESERVE LANDSCAPE)

GFA

LOCATION	AREA
GROUND LEVEL	3253 m²
LEVEL 1	1629 m²
LEVEL 2	1627 m²
Grand total	6510 m²

- GFA MEASURED TO 'STANDARD INSTRUMENT' DEFINITION.
- GFA MEASURED TO INSIDE FACE OF EXTERNAL WALLS. EXCLUDED: SERVICES RISERS AND VOIDS, PLANT ROOMS, VERTICAL CIRCULATION (STAIRS AND LIFTS).

FLOOR SPACE RATIO (%)	80.22

PARKING SUMMARY

TOTAL ACCESSIBLE PARKING BAYS PROVIDED =1
TOTAL CAR PARKING BAYS PROVIDED: 34+1 =35
TOTAL ELECTRIC VEHICLE CHARGING BAYS =2

TOTAL BICYCLE PARKING BAYS PROVIDED: 4+20 =24
TOTAL FULL SIZE LOCKERS: 12 MALE + 12 FEMALE =24

EASEMENT SUMMARY

(A)-EASEMENT FOR DRAINAGE OF SEWAGE 1, 4 WIDE & VARIABLE WIDTH (DP1188332)
(B)-RESERVE 0.305 WIDE (DP 32332)
(C)-EASEMENT FOR ACCESS 4.265 WIDE (VIDE BK 1925 No.170)
(D)-EASEMENT FOR DRAINAGE 2.44 WIDE (VIDE BK 2596 No.880)
(E)-EASEMENT FOR ACCESS 4.265 WIDE (BK 1938 No.673)

PACEARCHITECTS
Member Australian Institute of Architects
A.B.N. 721 5926 6350
e ppace@pacearchitects.com.au
p 02 9425 1400
m 0404 450 317
w www.pacearchitects.com.au
a Level 1, Suite 5-6 , 100 Alexander Street, Crows Nest, NSW 2065

SYDNEY FLIGHT TRAINING CENTRE
28-30 Burrows Road, Sydney, Australia

PRELIMINARY

REVISION	DESCRIPTION	DATE
6	ISSUE FOR CLIENT SIGN-OFF	05.07.22
7	REVISED FIRE SPRINKLER TANKS (3 of)	12.07.22
8	REVISED ROOFTOP PARAPET	12.07.22
9	REVISED NORTHERN FACADE - CURTAIN GLASS WALL SETOUT AMENDED	20.07.22
14	ISSUE FOR CLIENT APPROVAL AS COUNCIL DEVELOPMENT APPLICATION DRAWING SET	07.09.22
15	COUNCIL MEETING REVISED WORK IN PROGRESS DRAWING SET	09.09.22
16	ISSUED FOR CONSULTANT CO-ORDINATION	20.09.22

ARCHITECT: PACE ARCHITECTS figurr
DEVELOPER / LESSOR: LOGOS
CLIENT: CAE QANTAS

GRAPHIC SCALE: 1:200

purpose PRELIMINARY

SITE PLAN

scale 1 : 200 A1
project no 220507
date 20.09.22
dwn WL
dwg no 220507 - CT100
issue 16

Appendix B Environmental Data

Table A2: PFAS Soil Analytical Results
Project Number: 62110
Project Name: St Peters Due Diligence

	PFAS																																		
	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanesulfonic acid (PFNS)	Perfluorodecanesulfonic acid (PFDS)	1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of PFAS (WA DER List)	Sum of PFAS
	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.01	0.05
PFAS NEMP 2020 Table 2 Health Industrial/Commercial					50																	20		20							20				
Field ID	**Sampled Date**	**Lab Report Number**																																		
JBS.MW1-1-1.1	12/11/2021	841777	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05
JBS.MW2-0.2-0.3	12/11/2021	841777	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05
QSA03 (duplicate of JBS.MW2-0.2-0.3)	12/11/2021	841777	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05
QSC02 (triplicate of JBS.MW2-0.2-0.3)	12/11/2021	282748	<0.0002	<0.0002	<0.0001	<0.0001	0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.005	<0.0002	<0.0002	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0011	-	0.0003	<0.0001	<0.0001	<0.0002	<0.0002	0.0011	-	0.0012	-	0.0015
JBS.MW3-0.2-0.3	12/11/2021	841777	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05
JBS.MW4-0.2-0.3	12/11/2021	841777	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05
JBS.MW5-0.2-0.3	12/11/2021	841777	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05

Table A3: Asbestos Analytical Results
Project Number: 62110
Project Name: St Peters Due Diligence

				Asbestos								
				Approximate Sample Mass	Mass ACM	Mass Asbestos in ACM	Asbestos from ACM in Soil	Mass FA	Mass Asbestos in FA	Mass AF	Mass asbestos in AF	Asbestos from FA & AF in Soil	Mass Asbestos in FA & AF
				g	g	g	% (w/w)	g	g	g	g	% (w/w)	g
EQL													
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil							0.05					0.001	
Field ID	**Sampled Date**	**Lab Report Number**											
JBS.MW1-0.2-0.9	12/11/2021	841777	742	0	0	0	0	0	0	0	0	0	0
QSC01 (triplicate of JBS.MW1-0.2-0.9)	12/11/2021	282748	837	-	-	<0.01	-	-	-	-	<0.001	-	
JBS.MW2-0.2-0.7	12/11/2021	841777	870	0	0	0	0	0	0	0	0	0	0
JBS.MW3-0.2-0.7	12/11/2021	841777	734	0	0	0	0	0	0	0	0	0	0
JBS.MW4-0.2-0.3	12/11/2021	841777	818	0	0	0	0	0	0	0	0	0	0
JBS.MW5-0.2-0.3	12/11/2021	841777	784	0	0	0	0	0	0	0	0	0	0

Table A4: ASS Analytical Results
Project Number: 62110
Project Name: St Peters Due Diligence

	Liming Rate	pH (KCl)	Titratable Actual Acidity	Titratable Peroxide Acidit	Titratable Sulfidic Acidity	pH (Ox)	SPOS
	kg CaCO3/t	pH Unit	mol H+/t	mole H+/t	mole H+/t	pH Unit	%S
EQL	1	0.1	2	2	2	0.1	0.02
ASSMAC (1998) Action Criteria (Coarse >1000 tonnes disturbed)				18	18		0.03
ASSMAC (1998) Action Criteria (Coarse 1-1000 tonnes disturbed)				18	18		0.03
Field ID	**Sampled Date**	**Lab Report Number**						
JBS.MW1-1-1.1	12/11/2021	841777	2	6.8	<2	<2	<2	5.5	0.11
JBS.MW1-3.9-4	12/11/2021	841777	9	5.5	6	110	100	3	0.19
JBS.MW2-0.2-0.3	12/11/2021	841777	<1	11	<2	<2	<2	9.2	0.05
JBS.MW2-3-3.1	12/11/2021	841777	9	6.7	<2	110	110	3.3	0.18
JBS.MW3-0.2-0.3	12/11/2021	841777	<1	8.6	<2	<2	<2	7.3	0.09
JBS.MW4-0.2-0.3	12/11/2021	841777	2	6.3	3	<2	<2	4.7	0.04
JBS.MW4-2-2.1	12/11/2021	841777	1	6.4	<2	13	13	3.7	0.03

Table A5: TCLP Analytical Results
Project Number: 62110
Project Name: St Peters Due Dillegence

			Heavy Metals		PAHs
			Lead	Nickel	Benzo(a)pyrene
			mg/L	mg/L	mg/L
EQL			0.01	0.01	0.001
NSW EPA (2014) TCLP1			5	2	0.04
Field ID	**Sampled Date**	**Lab Report Number**			
JBS.MW3-0.2-0.3	12/11/2021	844013	6.2	0.06	<0.001
JBS.MW5-0.2-0.3	12/11/2021	844013	0.06	-	-
QSA03 (duplicate of JBS.MW2-0.2-0.3)	12/11/2021	844013	-	-	<0.01

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

JBS&G

Sample ID	Location	Sample Date	Monitoring Round	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)
				Metals & Metalloids								TPHs (NEPC 1999)					TRHs (NEPC 2013)						
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/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
EQL				0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	20	50	100	100	100	20	50	100	100	100	20	50
ANZG (2018) Marine water 95% toxicant DGVs					0.0055[#1]	0.0044[#2]	0.0013[#3]	0.0044[#4]	0.0004[#5]	0.07[#5]	0.008[#6]												
ANZG (2018) Marine water 99% toxicant DGVs					0.0007[#17]	0.00014[#18]	0.0003[#19]	0.0022[#20]	0.0001[#21]	0.007[#22]	0.0033[#6]												
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand																							
2-4m																						6000[#28]	NL[#29]
4-8m																						6000[#28]	NL[#29]
>8m																						7000[#28]	NL[#29]
NEPM 2013 Table 1C GILs, Drinking Water				0.01	0.002[#30]	0.05[#31]	2[#30]	0.01[#30]	0.001	0.02[#30]													
PFAS NEMP 2020 Table 1 Health Recreational Water																							
PFAS NEMP 2020 Table 5 Interim marine 95%																							
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	0.015	0.012	0.007	<0.001	0.014	<0.0001	0.008	3.1	<20	<50	<100	<100	<100	<20	<50	200	<100	200	<20	<50
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	0.056	0.014	0.004	0.005	0.018	<0.0001	0.016	1.2	<20	<50	300	<100	300	<20	<50	400	100	500	<20	<50
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	0.028	0.0004	0.003	<0.001	0.014	<0.0001	0.006	0.2	<20	210	500	<100	710	<20	300	500	100	900	<20	300
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	0.027	<0.0002	0.002	<0.001	0.001	<0.0001	0.003	0.085	30	1300	1400	<100	2700	150	1300	1600	500	3400	140	1300
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	0.053	0.0022	0.006	<0.001	0.005	<0.0001	0.017	0.064	<20	90	<100	<100	<100	<20	<50	100	<100	100	<20	<50
MW01	MW01	13/07/2020	SES (2020)	0.022	<0.0001	<0.001	<0.001	<0.001	<0.0001	0.003	0.005	<20	<50	<100	<50	<50	<20	<100	<100	<100	<100	<20	<100
MW01	MW01	15/11/2021	JBS&G (2022)	0.002	<0.0002	0.002	0.002	0.001	<0.0001	0.002	0.027	<20	<50	200	<100	200	<20	<50	200	<100	200	<20	<50
MW02	MW02	13/07/2020	SES (2020)	0.005	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	<20	<50	<100	<50	<50	<20	<100	<100	<100	<100	<20	<100
MW02	MW02	15/11/2021	JBS&G (2022)	0.02	0.0009	0.004	0.001	0.019	<0.0001	0.009	0.19	50	<50	<100	<100	<100	50	<50	<100	<100	<100	30	<50
QA01	MW02	15/11/2021	JBS&G (2022)	0.001	<0.0001	<0.001	<0.001	<0.001	<0.00005	<0.001	0.002	-	-	-	-	-	-	-	-	-	-	-	-
QC01	MW02	15/11/2021	JBS&G (2022)	0.021	0.0008	0.004	<0.001	0.018	<0.0001	0.008	0.17	40	<50	<100	<100	<100	40	<50	<100	<100	<100	20	<50
MW03	MW03	13/07/2020	SES (2020)	<0.001	0.001	<0.001	0.022	<0.001	<0.0001	<0.001	0.052	<20	<50	<100	<50	<50	<20	<100	<100	<100	<100	<20	<100
FD05	MW03	13/07/2020	SES (2020)	<0.001	0.0009	<0.001	0.022	<0.001	<0.0001	<0.001	0.052	<20	<50	<100	<50	<50	<20	<100	<100	<100	<100	<20	<100
MW03	MW03	15/11/2021	JBS&G (2022)	0.002	0.012	<0.001	0.002	0.003	<0.0001	0.002	0.23	<20	<50	100	<100	100	<20	<50	200	<100	200	<20	<50
MW04	MW04	13/07/2020	SES (2020)	0.001	<0.0001	0.002	<0.001	<0.001	<0.0001	0.001	<0.005	<20	70	120	<50	190	40	<100	110	<100	110	40	<100
MW04	MW04	15/11/2021	JBS&G (2022)	0.021	0.001	0.002	0.005	0.004	<0.0001	0.002	0.2	<20	170	400	<100	570	<20	<50	400	100	500	<20	<50
MW05	MW05	13/07/2020	SES (2020)	0.005	<0.0001	0.001	<0.001	<0.001	<0.0001	<0.001	0.006	120	230	240	<50	470	160	280	160	<100	440	160	280
MW05	MW05	15/11/2021	JBS&G (2022)	0.005	0.0018	0.002	<0.001	0.003	<0.0001	0.002	0.14	90	280	700	<100	980	150	340	600	100	1040	150	340

Sample ID	Location	Sample Date	Monitoring Round	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Total BTEX	2-Methylnaphthalene	3-Methylcholanthrene	7,12-Dimethylbenz(a)anthracene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	2-(acetylamino) fluorene	Benzo(b,j+k)fluoranthene
				BTEXN							PAH																						
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/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
EQL				1	1	1	1	2	3		0.005	0.005	0.005	1	1	1	1	1		1	0.004	1	1	1	1	1	1	1	1	1	1	0.002	
ANZG (2018) Marine water 95% toxicant DGVs				700[#7]	180[#8]	80[#8]		75[#9]								0.4[#10]		0.2[#10]								1.4[#10]			70[#11]	2[#10]			
ANZG (2018) Marine water 99% toxicant DGVs				500[#23]	110[#10]	50[#10]		50[#9]								0.01[#24]		0.1[#24]								1[#24]			50[#23]	0.6[#24]			
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand																																	
2-4m				5000	NL	NL			NL																				NL				
4-8m				5000	NL	NL			NL																				NL				
>8m				5000	NL	NL			NL																				NL				
NEPM 2013 Table 1C GILs, Drinking Water				1	800	300			600									0.01															
PFAS NEMP 2020 Table 1 Health Recreational Water																																	
PFAS NEMP 2020 Table 5 Interim marine 95%																																	
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	<2	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.05	<0.005	<0.005	1	<1	<1	1	<1	-	<1	-	<1	<1	<1	<1	<1	<2	<1	<2	1	<1	-	-
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<1	<1	3	5	3	8	-	<0.005	<0.005	<0.005	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	1	<1	<5	<1	<1	-	-
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
MW01	MW01	13/07/2020	SES (2020)	<1	<2	<2	<2	<2	<2	<1	<0.002	<0.002	<0.002	<2	<2	<2	<2	<2	<0.002	-	-	<2	-	<2	<2	<2	<2	<2	<5	<2	<2	<0.002	<4
MW01	MW01	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
MW02	MW02	13/07/2020	SES (2020)	<1	<2	<2	<2	<2	<2	<1	<0.002	<0.002	<0.002	<2	<2	<2	<2	<2	<0.002	-	-	<2	-	<2	<2	<2	<2	<2	<5	<2	<2	<0.002	<4
MW02	MW02	15/11/2021	JBS&G (2022)	18	1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
QA01	MW02	15/11/2021	JBS&G (2022)	19	1	<1	<1	<2	-	-	<0.002	<0.002	<0.002	<2	<2	<2	<2	<2	-	-	<0.004	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<0.002	-
QC01	MW02	15/11/2021	JBS&G (2022)	17	1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
MW03	MW03	13/07/2020	SES (2020)	<1	<2	<2	<2	<2	<2	<1	<0.002	<0.002	<0.002	<2	<2	<2	<2	<2	<0.002	-	-	<2	-	<2	<2	<2	<2	<2	<5	<2	<2	<0.002	<4
FD05	MW03	13/07/2020	SES (2020)	<1	<2	<2	<2	<2	<2	<1	-	-	-	<2	<2	<2	<2	<2	<0.002	-	-	<2	-	<2	<2	<2	<2	<2	<5	<2	<2	<0.002	<4
MW03	MW03	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
MW04	MW04	13/07/2020	SES (2020)	<1	<2	<2	<2	<2	<2	<1	<0.002	<0.002	<0.002	<2	<2	<2	<2	<2	<0.002	-	-	<2	-	<2	<2	<2	<2	<2	<5	<2	<2	<0.002	<4
MW04	MW04	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
MW05	MW05	13/07/2020	SES (2020)	<1	<2	<2	<2	<2	<2	<1	0.006	<0.002	<0.002	9	<2	<2	<2	<2	<0.002	-	-	<2	-	<2	<2	<2	4	<2	<5	<2	<2	<0.002	<4
MW05	MW05	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<2	<3	-	<0.005	<0.005	<0.005	<20	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	-	-

Statistical Summary

Statistic	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)
Number of Results	18	18	18	18	18	18	18	18	17	17	17	17	17	17	17	17	17	17	17	17
Number of Detects	16	11	12	7	11	0	13	16	5	7	9	0	9	6	4	11	5	11	6	4
Minimum Concentration	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.00005	<0.001	0.002	<20	<50	<100	<50	<50	<20	<50	<100	<100	<100	<20	<50
Maximum Detect	0.056	0.014	0.007	0.022	0.019	ND	0.017	3.1	120	1300	1400	ND	2700	160	1300	1600	500	3400	160	1300
Average Concentration	0.016	0.0027	0.0025	0.0039	0.0059	0.000097	0.0047	0.32	34	168	280	82	401	48	184	298	124	482	45	184
Median Concentration	0.01	0.00085	0.002	0.001	0.002	0.0001	0.002	0.0745	20	50	100	100	100	20	100	160	100	200	20	100
Standard Deviation	0.017	0.0047	0.0018	0.0067	0.007	0.000012	0.0051	0.75	29	302	337	25	651	51	303	371	97	806	51	303
Number of Guideline Exceedances(Detects Only)	9	10	12	7	9	0	5	15	0	0	0	0	0	0	0	0	0	0	0	17
% of Results at or above the Detect Limit	89	61	67	39	61	0	72	89	29	41	53	0	53	35	24	65	29	65	35	24
% of Results below the Detect Limit	11	39	33	61	39	100	28	11	71	59	47	100	47	65	76	35	71	35	65	76
% of Detects at or above Guidelines	50	56	67	39	50	0	28	83	0	0	0	0	0	0	0	0	0	0	0	100
% of Results Below Guidelines or Non-Detect	50	44	33	61	50	100	72	17	100	100	100	100	100	100	100	100	100	100	100	0

Statistic	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Total BTEX	2-Methylnaphthalene	3-Methylcholanthrene	7,12-Dimethylbenz(a)anthracene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	2-(acetylamino) fluorene	Benzo(b,j+k)fluoranthene
Number of Results	18	18	18	18	18	17	6	17	17	17	18	18	18	18	18	6	11	1	18	11	18	18	18	18	18	29	18	18	7	6
Number of Detects	3	3	1	1	1	1	0	1	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0
Minimum Concentration	<1	<1	<1	<1	<2	<2	<1	<0.002	<0.002	<0.002	<1	<1	<1	<1	<1	<0.002	<1	<0.004	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.002	<4
Maximum Detect	19	1	3	5	3	8	ND	0.006	ND	ND	9	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	4	ND	ND	1	ND	ND	ND
Average Concentration	3.8	1.3	1.4	1.6	2.1	2.9	1	0.0068	0.0039	0.0039	2.8	1.4	1.4	1.4	1.4	0.002	1		1.4	1	1.4	1.4	1.4	1.8	1.4	5.4	1.4	1.4	0.002	4
Median Concentration	1	1	1	1	2	3	1	0.005	0.005	0.005	1	1	1	1	1	0.002	1	0.004	1	1	1	1	1	1.5	1	5	1	1	0.002	4
Standard Deviation	6.5	0.49	0.62	0.98	0.24	1.4	0	0.011	0.0015	0.0015	4.7	0.5	0.5	0.51	0.5	0	0		0.5	0	0.5	0.5	0.5	1.1	0.5	3.9	0.5	0.5	0	0
Number of Guideline Exceedances(Detects Only)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
% of Results at or above the Detect Limit	17	17	6	6	6	6	0	6	0	0	11	0	0	17	0	0	0	0	0	0	0	0	0	11	0	0	6	0	0	0
% of Results below the Detect Limit	83	83	94	94	94	94	100	94	100	100	89	100	100	83	100	100	100	100	100	100	100	100	100	89	100	100	94	100	100	100
% of Detects at or above Guidelines	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0
% of Results Below Guidelines or Non-Detect	83	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	94	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Metals & Metalloids								TPHs (NEPC 1999)				
	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	20	50	100	100	100
ANZG (2018) Marine water 95% toxicant DGVs		0.0055[#1]	0.0044[#2]	0.0013[#3]	0.0044[#4]	0.0004[#5]	0.07[#5]	0.008[#6]					
ANZG (2018) Marine water 99% toxicant DGVs		0.0007[#17]	0.00014[#18]	0.0003[#19]	0.0022[#20]	0.0001[#21]	0.007[#22]	0.0033[#6]					
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand													
2-4m													
4-8m													
>8m													
NEPM 2013 Table 1C GILs, Drinking Water	0.01	0.002[#30]	0.05[#31]	2[#30]	0.01[#30]	0.001	0.02[#30]						
PFAS NEMP 2020 Table 1 Health Recreational Water													
PFAS NEMP 2020 Table 5 Interim marine 95%													

	TRHs (NEPC 2013)							BTEXN						
	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Total BTEX
	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
EQL	20	50	100	100	100	20	50	1	1	1	1	2	3	
ANZG (2018) Marine water 95% toxicant DGVs								700[#7]	180[#8]	80[#8]		75[#9]		
ANZG (2018) Marine water 99% toxicant DGVs								500[#23]	110[#10]	50[#10]		50[#9]		
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand														
2-4m						6000[#28]	NL[#29]	5000	NL	NL			NL	
4-8m						6000[#28]	NL[#29]	5000	NL	NL			NL	
>8m						7000[#28]	NL[#29]	5000	NL	NL			NL	
NEPM 2013 Table 1C GILs, Drinking Water								1	800	300			600	
PFAS NEMP 2020 Table 1 Health Recreational Water														
PFAS NEMP 2020 Table 5 Interim marine 95%														

	PAH																						
	2-Methylnaphthalene	3-Methylcholanthrene	7,12-Dimethylbenz(a)anthracene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	2-(acetylamino) fluorene	Benzo(b,j+k)fluoranthene
	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/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
EQL	0.005	0.005	0.005	1	1	1	1	1		1	0.004	1	1	1	1	1	1	1	1	1	1	0.002	
ANZG (2018) Marine water 95% toxicant DGVs						0.4[#10]		0.2[#10]								1.4[#10]			70[#11]	2[#10]			
ANZG (2018) Marine water 99% toxicant DGVs						0.01[#24]		0.1[#24]								1[#24]			50[#23]	0.6[#24]			
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand																							
2-4m																			NL				
4-8m																			NL				
>8m																			NL				
NEPM 2013 Table 1C GILs, Drinking Water								0.01															
PFAS NEMP 2020 Table 1 Health Recreational Water																							
PFAS NEMP 2020 Table 5 Interim marine 95%																							

Sample ID **Location** **Sample Date** **Monitoring Round**

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check the resources listed in Read the detail, below, for spread of data and its significance.
#2:Very High Reliability Recommended for application for slightly to moderately disturbed ecosystems. Adopted from Chromium (CrVI)
#3:Very High Reliability Recommended for application for slightly to moderately disturbed ecosystems.
#4:Low Reliability Recommended for application for slightly to moderately disturbed ecosystems.
#5:Very High Reliability DGV may not protect key test species from chronic toxicity. Check toxicant DGV technical brief the resources listed in Read the detail, below, for spread of data and its significance.
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt and pH 6.5–8.0.
#7:Moderate Reliability DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check the resources listed in Read the detail, below, for spread of data and its significance.
#8:Unknown Reliability Recommended for application for slightly to moderately disturbed ecosystems.
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chronic toxicity. Check toxicant DGV technical brief the resources listed in Read the detail, below, for spread of data and its significance.
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to moderately disturbed ecosystems.
#15:Moderate Reliability Recommended for application for slightly to moderately disturbed ecosystems.
#16:Unknown Reliability DGV may not protect key test species from chronic toxicity. Check toxicant DGV technical brief and Read the detail, below, for spread of data and its significance.
#17:Very High Reliability To account for the bioaccumulating nature of this toxicant, it is recommended that the 99% species protection level DGV is used for slightly to moderately disturbed systems. Also see General comments.
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of this toxicant, it is recommended that the 99% species protection level DGV is used for slightly to moderately disturbed systems. Also see General comments.
#22:Very High Reliability Recommended for application for slightly to moderately disturbed ecosystems (to protect key species from chronic toxicity).
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of this toxicant, it is recommended that the 99% species protection level DGV is used for slightly to moderately disturbed systems. Also see General comments.
#25:Moderate Reliability To account for the bioaccumulating nature of this toxicant, it is recommended that the 99% species protection level DGV is used for slightly to moderately disturbed systems. Also see General comments.
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to moderately disturbed ecosystems (to protect key species from chronic toxicity). See Technical Brief and Read the detail, below, for details.
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific hardness guidance
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Organochlorine Pesticides																							
	Pentachlorophenol	4,4-DDE	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Aldrin + Dieldrin	Chlordane (cis)	Chlordane (trans)	DDT	DDD	DDT+DDE+DDD	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Methoxychlor
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005		2	0.002	0.005	0.005			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs	**0.022**[#12]														**0.01**[#12]				**0.000008**[#12]					
ANZG (2018) Marine water 99% toxicant DGVs	**0.011**[#25]														**0.005**[#25]				**0.000004**[#25]					
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																								
2-4m																								
4-8m																								
>8m																								
NEPM 2013 Table 1C GILs, Drinking Water	**0.01**					**0.01**			**0.0003**			**0.009**			**20**								**0.0003**	
PFAS NEMP 2020 Table 1 Health Recreational Water																								
PFAS NEMP 2020 Table 5 Interim marine 95%																								
Sample ID	**Location**	**Sample Date**	**Monitoring Round**																						
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW01	MW01	13/07/2020	SES (2020)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	-	-	<0.004	<0.002	<0.004	<2	<0.002	<0.002	-	<0.002	-	-	<0.002	-	-
MW01	MW01	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW02	MW02	13/07/2020	SES (2020)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	-	-	<0.004	<0.002	<0.004	<2	<0.002	<0.002	-	<0.002	-	-	<0.002	-	-
MW02	MW02	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
QA01	MW02	15/11/2021	JBS&G (2022)	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<2	<0.002	<0.002	<0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
QC01	MW02	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW03	MW03	13/07/2020	SES (2020)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	-	-	<0.004	<0.002	<0.004	<2	<0.002	<0.002	-	<0.002	-	-	<0.002	-	-
FD05	MW03	13/07/2020	SES (2020)	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW04	MW04	13/07/2020	SES (2020)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	-	-	<0.004	<0.002	<0.004	<2	<0.002	<0.002	-	<0.002	-	-	<0.002	-	-
MW04	MW04	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW05	MW05	13/07/2020	SES (2020)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	-	-	<0.004	<0.002	<0.004	<2	<0.002	<0.002	-	<0.002	-	-	<0.002	-	-
MW05	MW05	15/11/2021	JBS&G (2022)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Statistical Summary																									
Number of Results	18	17	17	17	17	17	17	17	5	1	1	17	17	5	5	17	17	12	17	12	12	17	12	12	
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Minimum Concentration	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<2	<0.002	<0.002	<0.002	<0.004	<2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Average Concentration	0.0073	0.0039	0.0039	0.0039	0.0039	0.0039	0.0039	0.0039	0.004			0.0045	0.0039	0.004	2	0.0039	0.0039	0.0048	0.0039	0.0048	0.0048	0.0039	0.0048	0.0048	
Median Concentration	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	2	0.002	0.005	0.005	0.004	2	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Standard Deviation	0.0039	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0			0.0008	0.0015	0	0	0.0015	0.0015	0.00087	0.0015	0.00087	0.00087	0.0015	0.00087	0.00087	
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Organochlorine Pesticides																							
	Pentachlorophenol	4,4-DDE	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Aldrin + Dieldrin	Chlordane (cis)	Chlordane (trans)	DDT	DDD	DDT+DDE+DDD	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Methoxychlor
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005		2	0.002	0.005	0.005			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs	**0.022**[#12]														**0.01**[#12]				**0.000008**[#12]					
ANZG (2018) Marine water 99% toxicant DGVs	**0.011**[#25]														**0.005**[#25]				**0.000004**[#25]					
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																								
2-4m																								
4-8m																								
>8m																								
NEPM 2013 Table 1C GILs, Drinking Water	**0.01**					**0.01**			**0.0003**			**0.009**			**20**								**0.0003**	
PFAS NEMP 2020 Table 1 Health Recreational Water																								
PFAS NEMP 2020 Table 5 Interim marine 95%																								

Sample ID Location Sample Date Monitoring Round

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of th
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of th
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of th
#25:Moderate Reliability To account for the bioaccumulating nature of th
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Organophosphorus Pesticides																								
	Azinophos methyl	Bromophos-ethyl	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethyl methanesulfonate	Fenitrothion	Fenthion	Malathion	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Phorate	Prothiofos	Ronnel	Safrole	Fenamiphos	Parathion	Pirimphos-ethyl
	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L
EQL	0.002	0.002			0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002	0.002	0.002		0.002	0.005	2	0.002	
ANZG (2018) Marine water 95% toxicant DGVs				**0.009**[#13]																					
ANZG (2018) Marine water 99% toxicant DGVs				**0.0005**[#20]																					
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																									
2-4m																									
4-8m																									
>8m																									
NEPM 2013 Table 1C GILs, Drinking Water	**0.03**		**0.002**	**10**			**0.004**	**0.005**	**0.007**	**0.004**	**0.004**		**0.007**	**0.007**	**0.07**	**0.006**	**0.0007**	**0.006**					**0.5**	**0.02**	
PFAS NEMP 2020 Table 1 Health Recreational Water																									
PFAS NEMP 2020 Table 5 Interim marine 95%																									

Sample ID	Location	Sample Date	Monitoring Round																							
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW01	MW01	13/07/2020	SES (2020)	-	-	<0.002	<2	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	-	-	<0.002	<0.002	-	-	-	-	<0.002	-	-	-	-	<0.002
MW01	MW01	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	MW02	13/07/2020	SES (2020)	-	-	<0.002	<2	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	-	-	<0.002	<0.002	-	-	-	-	<0.002	-	-	-	-	<0.002
MW02	MW02	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA01	MW02	15/11/2021	JBS&G (2022)	<0.002	<0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<2	<0.002	-
QC01	MW02	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	13/07/2020	SES (2020)	-	-	<0.002	<2	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	-	-	<0.002	<0.002	-	-	-	-	<0.002	-	-	-	-	<0.002
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04	MW04	13/07/2020	SES (2020)	-	-	<0.002	<2	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	-	-	<0.002	<0.002	-	-	-	-	<0.002	-	-	-	-	<0.002
MW04	MW04	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW05	MW05	13/07/2020	SES (2020)	-	-	<0.002	<2	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	-	-	<0.002	<0.002	-	-	-	-	<0.002	-	-	-	-	<0.002
MW05	MW05	15/11/2021	JBS&G (2022)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistical Summary

Number of Results	1	1	5	5	6	1	6	6	6	1	6	1	1	6	6	1	1	1	1	5	1	1	1	1	5
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.002	<0.002	<0.002	<2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<2	<0.002	<0.002
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration			0.002	2	0.002		0.002	0.002	0.002		0.002			0.002	0.002					0.002					0.002
Median Concentration	0.002	0.002	0.002	2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	2	0.002	0.002
Standard Deviation			0	0	0		0	0	0		0			0	0					0					0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Organophosphorus Pesticides																									
	Azinophos methyl	Bromophos-ethyl	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethyl methanesulfonate	Fenitrothion	Fenthion	Malathion	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Phorate	Prothiofos	Ronnel	Safrole	Tetramiphos	Parathion	Pirimphos-ethyl
	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L
EQL	0.002	0.002			0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002	0.002	0.002		0.002	0.005	2	0.002	
ANZG (2018) Marine water 95% toxicant DGVs				**0.009**[#13]																					
ANZG (2018) Marine water 99% toxicant DGVs				**0.0005**[#20]																					
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																									
2-4m																									
4-8m																									
>8m																									
NEPM 2013 Table 1C GILs, Drinking Water	**0.03**		**0.002**	**10**			**0.004**	**0.005**	**0.007**	**0.004**	**0.004**		**0.007**	**0.007**	**0.07**	**0.006**	**0.0007**	**0.006**					**0.5**	**0.02**	
PFAS NEMP 2020 Table 1 Health Recreational Water																									
PFAS NEMP 2020 Table 5 Interim marine 95%																									

Sample ID Location Sample Date Monitoring Round

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of th
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of th
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of th
#25:Moderate Reliability To account for the bioaccumulating nature of th
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

				Chlorinated Alkanes																				Chlorinated Alkenes													
				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-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Hexachloroethane	Pentachloroethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	cis-1.4-Dichloro-2-butene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	trans-1.4-Dichloro-2-butene	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	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	1	1	1	0.001	1	5	5	5	0.005	0.005	2	5	1	1	1	0.001	1	1	1		1	1	1		1	5
ANZG (2018) Marine water 95% toxicant DGVs					**270[#8]**	**400[#8]**	**1900[#14]**				**1900[#8]**	**900[#8]**	**1100[#8]**			**240[#8]**				**4[#8]**		**80[#8]**		**700[#8]**								**70[#8]**				**330[#8]**	**100[#8]**
ANZG (2018) Marine water 99% toxicant DGVs					**130[#10]**	**200[#10]**	**140[#26]**				**1000[#10]**	**600[#10]**	**700[#10]**			**150[#10]**				**3[#10]**		**30[#10]**		**500[#10]**								**40[#10]**				**220[#10]**	**70[#10]**
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																					
2-4m																																					
4-8m																																					
>8m																																					
NEPM 2013 Table 1C GILs, Drinking Water											**3**					**3**				**0.004**				**30**								**50**					**0.3**
PFAS NEMP 2020 Table 1 Health Recreational Water																																					
PFAS NEMP 2020 Table 5 Interim marine 95%																																					
Sample ID	**Location**	**Sample Date**	**Monitoring Round**																																		
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
MW01	MW01	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	-	<0.002	<5	<50	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50
MW01	MW01	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
MW02	MW02	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	-	<0.002	<5	<50	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50
MW02	MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
QA01	MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.001	<1	<10	<10	<10	-	<0.002	<2	<10	<1	<1	<1	-	<1	<1	<1	-	<1	<1	<1	-	<1	<10
QC01	MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
MW03	MW03	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	-	<0.002	<5	<50	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
MW04	MW04	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	-	<0.002	<5	<50	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50
MW04	MW04	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5
MW05	MW05	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	-	<0.002	<5	<50	<5	<5	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50
MW05	MW05	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<0.001	<1	<5	<5	<5	<0.005	<0.005	-	<5	<1	-	-	<0.001	<1	<1	<1	-	<1	<1	<1	-	<1	<5

Statistical Summary

Number of Results	17	17	17	17	17	17	6	17	17	17	6	12	17	17	17	17	11	17	6	17	17	6	6	11	17	17	17	5	17	17	17	5	17	17
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.001	<1	<5	<5	<5	<0.005	<0.002	<2	<5	<1	<1	<1	<0.001	<1	<1	<1	<5	<1	<1	<1	<5	<1	<5
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	2.2	2.2	2.2	2.2	2.2	2.2	4.3	2.2	2.2	2.2	4.3	0.001	2.2	19	19	19	0.005	0.0039	4.5	19	2.2	4.3	4.3	0.001	2.2	2.2	2.2	5	2.2	2.2	2.2	5	2.2	19
Median Concentration	1	1	1	1	1	1	5	1	1	1	5	0.001	1	5	5	5	0.005	0.005	5	5	1	5	5	0.001	1	1	1	5	1	1	1	5	1	5
Standard Deviation	1.9	1.9	1.9	1.9	1.9	1.9	1.6	1.9	1.9	1.9	1.6	0	1.9	21	21	21	0	0.0015	1.2	21	1.9	1.6	1.6	0	1.9	1.9	1.9	0	1.9	1.9	1.9	0	1.9	21
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Chlorinated Alkanes																				Chlorinated Alkenes													
	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-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Hexachloroethane	Pentachloroethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	trans-1,4-Dichloro-2-butene	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	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	1	1	1	1	1	1	1	1	1	0.001	1	5	5	5	0.005	0.005	2	5	1	1	1	0.001	1	1	1	1	1	1	1	1	1	5
ANZG (2018) Marine water 95% toxicant DGVs		270[#8]	400[#8]	1900[#14]				1900[#8]	900[#8]	1100[#8]			240[#8]				4[#8]		80[#8]		700[#8]								70[#8]				330[#8]	100[#8]
ANZG (2018) Marine water 99% toxicant DGVs		130[#10]	200[#10]	140[#26]				1000[#10]	600[#10]	700[#10]			150[#10]				3[#10]		30[#10]		500[#10]								40[#10]				220[#10]	70[#10]
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																		
2-4m																																		
4-8m																																		
>8m																																		
NEPM 2013 Table 1C GILs, Drinking Water								3					3				0.004				30								50					0.3
PFAS NEMP 2020 Table 1 Health Recreational Water																																		
PFAS NEMP 2020 Table 5 Interim marine 95%																																		

Sample ID Location Sample Date Monitoring Round

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of th
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of th
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of th
#25:Moderate Reliability To account for the bioaccumulating nature of th
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Semivolatile Organic Compounds																																		Solvents		
	1-Chloronaphthalene	2-Chloronaphthalene	Bis(2-chloroethoxy) methane	Hexachloropropene	Dibenz[a,j]acridine	Acetophenone	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	4-Bromophenyl phenyl ether	4-Chlorophenyl phenyl ether	2,6-dinitrotoluene	2-Picoline	4-Aminobiphenyl	N-Nitrosomorpholine	N-Nitrosopiperidine	N-Nitrosopyrrolidine	2-methyl-5-nitroaniline	N-Nitrosodiethylamine	N-nitrosodi-n-butylamine	N-nitrosodi-n-propylamine	N-Nitrosomethylethylamine	1-Naphthylamine	2-Naphthylamine	3,3-Dichlorobenzidine	4-(dimethylamino) azobenzene	Azobenzene	Diphenylamine	N-Nitrosodiphenyl & Diphenylamine	Carbazole	Butyl benzyl phthalate	4-Nitroquinoline-N-oxide	Dibenzofuran	Isosafrole	Methapyrilene	Phenacetin	Acetone	Isophorone	Benzyl chloride
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.005	0.005	0.002	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		0.005		0.005	0.005		0.005	0.005	0.005	0.005	0.005	0.005		0.005	0.005		0.005	0.005	0.01	0.005	0.005	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs																																					
ANZG (2018) Marine water 99% toxicant DGVs																																					
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																					
2-4m																																					
4-8m																																					
>8m																																					
NEPM 2013 Table 1C GILs, Drinking Water																																					
PFAS NEMP 2020 Table 1 Health Recreational Water																																					
PFAS NEMP 2020 Table 5 Interim marine 95%																																					
Sample ID	**Location**	**Sample Date**	**Monitoring Round**																																				
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	<0.005	-	<0.005	-	<0.005	<0.005
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
MW01	MW01	13/07/2020	SES (2020)	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.004	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	-
MW01	MW01	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
MW02	MW02	13/07/2020	SES (2020)	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.004	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	-
MW02	MW02	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
QA01	MW02	15/11/2021	JBS&G (2022)	-	<0.002	<0.005	<0.002	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.01	-	<0.005	<0.005	<0.01	<0.005	-	<0.005	-
QC01	MW02	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
MW03	MW03	13/07/2020	SES (2020)	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.004	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	-
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
MW04	MW04	13/07/2020	SES (2020)	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.004	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	-
MW04	MW04	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005
MW05	MW05	13/07/2020	SES (2020)	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.004	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	-
MW05	MW05	15/11/2021	JBS&G (2022)	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-	<0.005	-	<0.005

Statistical Summary

Number of Results	11	17	17	6	11	17	6	12	17	17	17	16	16	6	17	5	6	5	17	17	5	17	12	16	17	6	12	5	6	17	5	17	1	6	6	11	6	11
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Minimum Concentration	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.005	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.004	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.005	<0.002	<0.005
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003	ND	ND	ND	ND	ND	ND
Average Concentration	0.005	0.0039	0.0041	0.002	0.005	0.0041	0.0025	0.005	0.0041	0.0041	0.0047	0.0041	0.0041	0.0025	0.0041	0.004	0.0025	0.002	0.0041	0.0041	0.002	0.0041	0.005	0.0041	0.0041	0.0025	0.005	0.004	0.0025	0.0044	0.002	0.0042		0.0033	0.0025	0.005	0.0025	0.005
Median Concentration	0.005	0.005	0.005	0.002	0.005	0.005	0.002	0.005	0.005	0.005	0.005	0.005	0.005	0.002	0.005	0.004	0.002	0.002	0.005	0.005	0.002	0.005	0.005	0.005	0.005	0.002	0.005	0.004	0.002	0.005	0.002	0.005	0.005	0.002	0.002	0.005	0.002	0.005
Standard Deviation	0	0.0015	0.0014	0	0	0.0014	0.0012	0	0.0014	0.0014	0.00047	0.0014	0.0014	0.0012	0.0014	0	0.0012	0	0.0014	0.0014	0	0.0014	0	0.0014	0.0014	0.0012	0	0	0.0012	0.002	0	0.0013		0.0033	0.0012	0	0.0012	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	94	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Semivolatile Organic Compounds																																					Solvents		
	1-Chloronaphthalene	2-Chloronaphthalene	Bis(2-chloroethoxy) methane	Hexachloropropene	Dibenz[a,j]acridine	Acetophenone	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	4-Bromophenyl phenyl ether	4-Chlorophenyl phenyl ether	2,6-dinitrotoluene	2-Picoline	4-Aminobiphenyl	N-Nitrosomorpholine	N-Nitrosopiperidine	N-Nitrosopyrrolidine	2-methyl-5-nitroaniline	N-Nitrosodiethylamine	N-nitrosodi-n-butylamine	N-nitrosodi-n-propylamine	N-Nitrosomethylethylamine	1-Naphthylamine	2-Naphthylamine	3,3-Dichlorobenzidine	4-(dimethylamino) azobenzene	Azobenzene	Diphenylamine	N-Nitrosodiphenyl & Diphenylamine	Carbazole	Butyl benzyl phthalate	4-Nitroquinoline-N-oxide	Dibenzofuran	Isosafrole	Methapyrilene	Phenacetin	Acetone	Isophorone	Benzyl chloride
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.005	0.005	0.002	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		0.005		0.005	0.005		0.005	0.005	0.005	0.005	0.005	0.005		0.005	0.005		0.005	0.005	0.01	0.005	0.005	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs																																						
ANZG (2018) Marine water 99% toxicant DGVs																																						
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																						
2-4m																																						
4-8m																																						
>8m																																						
NEPM 2013 Table 1C GILs, Drinking Water																																						
PFAS NEMP 2020 Table 1 Health Recreational Water																																						
PFAS NEMP 2020 Table 5 Interim marine 95%																																						

Sample ID Location Sample Date Monitoring Round

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of th
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of th
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of th
#25:Moderate Reliability To account for the bioaccumulating nature of th
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

Phenols

Sample ID	Location	Sample Date	Monitoring Round	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-Methylphenol	2-nitrophenol	3&4-Methylphenol (m&p-cresol)	4,6-Dinitro-2-methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Phenol
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L
EQL				0.01	0.01	0.01	0.003	0.003	0.03	0.003	0.003	0.003	0.01	0.006	0.03	0.01	30	0.003
ANZG (2018) Marine water 95% toxicant DGVs																		0.4[#15]
ANZG (2018) Marine water 99% toxicant DGVs																		0.27[#12]
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																		
2-4m																		
4-8m																		
>8m																		
NEPM 2013 Table 1C GILs, Drinking Water						0.02	0.2				0.3							
PFAS NEMP 2020 Table 1 Health Recreational Water																		
PFAS NEMP 2020 Table 5 Interim marine 95%																		
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.005
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
MW01	MW01	13/07/2020	SES (2020)	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	-	<0.001
MW01	MW01	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
MW02	MW02	13/07/2020	SES (2020)	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	-	<0.001
MW02	MW02	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
QA01	MW02	15/11/2021	JBS&G (2022)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.004	<0.02	<0.01	<20	<0.002
QC01	MW02	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
MW03	MW03	13/07/2020	SES (2020)	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	-	<0.001
FD05	MW03	13/07/2020	SES (2020)	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	-	<0.001
MW03	MW03	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
MW04	MW04	13/07/2020	SES (2020)	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	-	<0.001
MW04	MW04	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003
MW05	MW05	13/07/2020	SES (2020)	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	-	<0.001
MW05	MW05	15/11/2021	JBS&G (2022)	<0.01	<0.01	<0.01	<0.003	<0.003	<0.03	<0.003	<0.003	<0.003	<0.01	<0.006	<0.03	<0.01	<30	<0.003

PFAS

Sample ID	Location	Sample Date	Monitoring Round	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanesulfonic acid (PFNS)	Perfluorodecanesulfonic acid (PFDS)	1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of PFAS (WA DER List)	Sum of PFAS
				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
EQL				0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
ANZG (2018) Marine water 95% toxicant DGVs																																						
ANZG (2018) Marine water 99% toxicant DGVs																																						
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																						
2-4m																																						
4-8m																																						
>8m																																						
NEPM 2013 Table 1C GILs, Drinking Water																																						
PFAS NEMP 2020 Table 1 Health Recreational Water								10[#32]																	2[#32]		2[#32]							2[#32]				
PFAS NEMP 2020 Table 5 Interim marine 95%								220																			0.13											
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<0.05	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<0.05	0.02	0.03	<0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.02	0.04	0.04	0.09	<0.1
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<0.05	0.02	0.04	0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.03[#1]	<0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.05	0.07	0.04	0.14	0.14
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<0.05	0.06	0.06	0.02	0.01[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.01[#1]	<0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.03	0.04	0.03	0.18	0.18
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<0.05	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.01	0.01	<0.01	0.06	<0.1
MW01	MW01	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW01	MW01	15/11/2021	JBS&G (2022)	<0.1	0.09	0.09	0.02	0.01[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.02[#1]	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.03	0.04	0.02	0.24	0.24
MW02	MW02	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	MW02	15/11/2021	JBS&G (2022)	<0.1	0.03	0.05	<0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.03[#1]	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.04	0.06	0.03	0.14	0.14
QA01	MW02	15/11/2021	JBS&G (2022)	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	0.02	-	-	-	<0.01	<0.02	-	0.05	-	0.03	-	0.06
QC01	MW02	15/11/2021	JBS&G (2022)	<0.1	0.03	0.05	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.03[#1]	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.04	0.05	0.02	0.13	0.13
MW03	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<0.05	0.02	0.03	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.01	<0.01	0.03[#1]	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.04	0.05	0.02	0.11	0.11
MW04	MW04	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04	MW04	15/11/2021	JBS&G (2022)	<0.05	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1
MW05	MW05	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW05	MW05	15/11/2021	JBS&G (2022)	<0.05	0.02	0.04	<0.01	0.01[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	0.03[#1]	<0.01	0.02[#1]	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	0.05	0.06	0.03	0.12	0.12

Statistical Summary

Statistic	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-Methylphenol	2-nitrophenol	3&4-Methylphenol (m&p-cresol)	4,6-Dinitro-2-methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Phenol
Number of Results	12	18	18	18	18	12	18	18	18	18	18	12	18	12	18
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.002	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.02	<0.001	<20	<0.001
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.0093	0.0066	0.0066	0.0023	0.0023	0.029	0.0023	0.0023	0.0023	0.0066	0.0046	0.029	0.007	29	0.0024
Median Concentration	0.01	0.01	0.01	0.003	0.003	0.03	0.003	0.003	0.003	0.01	0.006	0.03	0.01	30	0.003
Standard Deviation	0.0023	0.0044	0.0044	0.00096	0.00096	0.0029	0.00096	0.00096	0.00096	0.0044	0.0019	0.0029	0.0044	2.9	0.0011
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Statistic	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	FOSA	NMeFOSA	NEtFOSA	N-MeFOSE	NEtFOSE	NMeFOSAA	NEtFOSAA	PFPrS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FTSA	6:2 FTSA	8:2 FTSA	10:2 FTSA	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of PFAS (WA DER List)	Sum of PFAS
Number of Results	11	11	11	11	12	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	12	11	12	11	11	11	12	12	11	12	11	12	11	12
Number of Detects	0	9	11	3	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	9	0	9	0	0	0	0	0	0	10	9	9	9	8
Minimum Concentration	<0.05	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.05	0.06
Maximum Detect	ND	0.09	0.09	0.02	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	0.03	ND	0.02	ND	ND	ND	ND	ND	ND	0.05	0.07	0.04	0.24	0.24
Average Concentration	0.064	0.03	0.041	0.012	0.013	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.021	0.01	0.014	0.01	0.01	0.01	0.047	0.011	0.01	0.032	0.04	0.024	0.12	0.13
Median Concentration	0.05	0.02	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.025	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.035	0.04	0.025	0.12	0.115
Standard Deviation	0.023	0.024	0.022	0.004	0.0045	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0.0051	0	0	0	0.012	0.0029	0	0.016	0.021	0.011	0.058	0.046
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	82	100	27	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	75	0	75	0	0	0	0	0	0	83	82	75	82	67
% of Results below the Detect Limit	100	18	0	73	25	100	100	100	100	100	100	100	100	100	100	100	100	100	100	91	100	25	100	25	100	100	100	100	100	100	17	18	25	18	33
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

Phenols

	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-Methylphenol	2-nitrophenol	3&4-Methylphenol (m&p-cresol)	4,6-Dinitro-2-methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Phenol
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L
EQL	0.01	0.01	0.01	0.003	0.003	0.03	0.003	0.003	0.003	0.01	0.006	0.03	0.01	30	0.003
ANZG (2018) Marine water 95% toxicant DGVs															**0.4[#15]**
ANZG (2018) Marine water 99% toxicant DGVs															**0.27[#12]**
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San															
2-4m															
4-8m															
>8m															
NEPM 2013 Table 1C GILs, Drinking Water			**0.02**	**0.2**				**0.3**							
PFAS NEMP 2020 Table 1 Health Recreational Water															
PFAS NEMP 2020 Table 5 Interim marine 95%															

PFAS

	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanesulfonic acid (PFNS)	Perfluorodecanesulfonic acid (PFDS)	1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of PFAS (WA DER List)	Sum of PFAS
	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
EQL	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
ANZG (2018) Marine water 95% toxicant DGVs																																			
ANZG (2018) Marine water 99% toxicant DGVs																																			
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																			
2-4m																																			
4-8m																																			
>8m																																			
NEPM 2013 Table 1C GILs, Drinking Water																																			
PFAS NEMP 2020 Table 1 Health Recreational Water					**10[#32]**																	**2[#32]**		**2[#32]**							**2[#32]**				
PFAS NEMP 2020 Table 5 Interim marine 95%					**220**																			**0.13**											

Sample ID **Location** **Sample Date** **Monitoring Round**

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of t
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of t
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of t
#25:Moderate Reliability To account for the bioaccumulating nature of t
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - (
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

JBS&G

				MAH										
				1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Total MAH	Bromobenzene	Isopropylbenzene
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	0.003	1	1
ANZG (2018) Marine water 95% toxicant DGVs														30[#8]
ANZG (2018) Marine water 99% toxicant DGVs														20[#10]
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San														
2-4m														
4-8m														
>8m														
NEPM 2013 Table 1C GILs, Drinking Water										30				
PFAS NEMP 2020 Table 1 Health Recreational Water														
PFAS NEMP 2020 Table 5 Interim marine 95%														
Sample ID	**Location**	**Sample Date**	**Monitoring Round**											
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	<1
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	<1
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	<1
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	32	5	-	-	-	-	<1	-	0.017	<1	6
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	<1
MW01	MW01	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
MW01	MW01	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	<1
MW02	MW02	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
MW02	MW02	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	0.019	<1	<1
QA01	MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
QC01	MW02	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	0.018	<1	<1
MW03	MW03	13/07/2020	SES (2020)	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	<1
MW04	MW04	13/07/2020	SES (2020)	<5	<5	<5	8	<5	<5	<5	<5	-	<5	<5
MW04	MW04	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	<0.003	<1	2
MW05	MW05	13/07/2020	SES (2020)	<5	<5	<5	31	<5	<5	<5	<5	-	<5	**21**
MW05	MW05	15/11/2021	JBS&G (2022)	<1	<1	-	-	-	-	<1	-	0.021	<1	**21**
Statistical Summary														
Number of Results				17	17	6	6	6	6	17	6	11	17	17
Number of Detects				1	1	0	2	0	0	0	0	4	0	4
Minimum Concentration				<1	<1	<1	<1	<1	<1	<1	<1	<0.003	<1	<1
Maximum Detect				32	5	ND	31	ND	ND	ND	ND	0.021	ND	21
Average Concentration				4	2.4	4.3	9.2	4.3	4.3	2.2	4.3	0.0087	2.2	4.6
Median Concentration				1	1	5	5	5	5	1	5	0.003	1	1
Standard Deviation				7.4	2	1.6	11	1.6	1.6	1.9	1.6	0.008	1.9	6.4
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	0	2
% of Results at or above the Detect Limit				6	6	0	33	0	0	0	0	36	0	24
% of Results below the Detect Limit				94	94	100	67	100	100	100	100	64	100	76
% of Detects at or above Guidelines				0	0	0	0	0	0	0	0	0	0	12
% of Results Below Guidelines or Non-Detect				100	100	100	100	100	100	100	100	100	100	88

				Miscellaneous Hydrocarbons								
				1,2-dibromoethane	Bromomethane	Cyclohexane	Dibromomethane	Iodomethane	Vinyl Acetate	2-Hexanone (MBK)	4-Methyl-2-pentanone	Methyl Ethyl Ketone
				µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	5	0.001	1	1			5	5
ANZG (2018) Marine water 95% toxicant DGVs												
ANZG (2018) Marine water 99% toxicant DGVs												
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San												
2-4m												
4-8m												
>8m												
NEPM 2013 Table 1C GILs, Drinking Water					1							
PFAS NEMP 2020 Table 1 Health Recreational Water												
PFAS NEMP 2020 Table 5 Interim marine 95%												
Sample ID	**Location**	**Sample Date**	**Monitoring Round**									
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
MW01	MW01	13/07/2020	SES (2020)	<5	<50	-	<5	<5	<50	<50	<50	<50
MW01	MW01	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
MW02	MW02	13/07/2020	SES (2020)	<5	<50	-	<5	<5	<50	<50	<50	<50
MW02	MW02	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
QA01	MW02	15/11/2021	JBS&G (2022)	<1	<10	0.003	<1	-	-	-	-	-
QC01	MW02	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
MW03	MW03	13/07/2020	SES (2020)	<5	<50	-	<5	<5	<50	<50	<50	<50
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
MW04	MW04	13/07/2020	SES (2020)	<5	<50	-	<5	<5	<50	<50	<50	<50
MW04	MW04	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
MW05	MW05	13/07/2020	SES (2020)	<5	<50	-	<5	<5	<50	<50	<50	<50
MW05	MW05	15/11/2021	JBS&G (2022)	<1	<5	-	<1	<1	-	-	<5	<5
Statistical Summary												
Number of Results				17	17	1	17	16	5	5	16	16
Number of Detects				0	0	1	0	0	0	0	0	0
Minimum Concentration				<1	<5	0.003	<1	<1	<50	<50	<5	<5
Maximum Detect				ND	ND	0.003	ND	ND	ND	ND	ND	ND
Average Concentration				2.2	19		2.2	2.3	50	50	19	19
Median Concentration				1	5	0.003	1	1	50	50	5	5
Standard Deviation				1.9	21		1.9	1.9	0	0	22	22
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit				0	0	100	0	0	0	0	0	0
% of Results below the Detect Limit				100	100	0	100	100	100	100	100	100
% of Detects at or above Guidelines				0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect				100	100	100	100	100	100	100	100	100

				Chlorinated Benzenes											
				1,2,3,4-tetrachlorobenzene	1,2,3,5-tetrachlorobenzene	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	Chlorobenzene	Hexachlorobenzene	Pentachlorobenzene
				mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L
EQL				0.005	0.005	5	0.005	5	1	5	1	1	1	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs				0.004[#10]	0.005[#10]		0.005[#10]	80[#12]		13[#10]			55[#8]	0.0001[#10]	0.002[#10]
ANZG (2018) Marine water 99% toxicant DGVs				0.002[#24]	0.003[#24]		0.003[#24]	20[#23]		8[#24]			15[#10]	0.00005[#24]	0.0015[#24]
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San															
2-4m															
4-8m															
>8m															
NEPM 2013 Table 1C GILs, Drinking Water						30		30	1500	30		40	300		
PFAS NEMP 2020 Table 1 Health Recreational Water															
PFAS NEMP 2020 Table 5 Interim marine 95%															
Sample ID	**Location**	**Sample Date**	**Monitoring Round**												
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<50 - 42	<5	<1	<10 - 7	**22**	<0.005	<0.005
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
MW01	MW01	13/07/2020	SES (2020)	-	-	<5	-	<2	<2	-	<2	<2	<5	<0.004	<0.002
MW01	MW01	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
MW02	MW02	13/07/2020	SES (2020)	-	-	<5	-	<2	<2	-	<2	<2	<5	<0.004	<0.002
MW02	MW02	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
QA01	MW02	15/11/2021	JBS&G (2022)	-	-	<1	<0.002	<1	<1	-	<1	<1	<1	<0.002	<0.002
QC01	MW02	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
MW03	MW03	13/07/2020	SES (2020)	-	-	<5	-	<2	<2	-	<2	<2	<5	<0.004	<0.002
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
MW04	MW04	13/07/2020	SES (2020)	-	-	<5	-	<2	<2	-	<2	<2	<5	<0.004	<0.002
MW04	MW04	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
MW05	MW05	13/07/2020	SES (2020)	-	-	<5	-	<2	<2	-	<2	<2	<5	<0.004	<0.002
MW05	MW05	15/11/2021	JBS&G (2022)	<0.005	<0.005	<5	<0.005	<5	<1	<5	<1	<1	<1	<0.005	<0.005
Statistical Summary															
Number of Results				11	11	17	12	17	17	11	17	17	17	17	17
Number of Detects				0	0	0	0	0	1	0	0	1	1	0	0
Minimum Concentration				<0.005	<0.005	<1	<0.002	<1	<1	<5	<1	<1	<1	<0.002	<0.002
Maximum Detect				ND	ND	ND	ND	ND	42	ND	ND	7	22	ND	ND
Average Concentration				0.005	0.005	4.8	0.0048	3.9	3.9	5	1.3	1.7	3.4	0.0045	0.0039
Median Concentration				0.005	0.005	5	0.005	5	1	5	1	1	1	0.005	0.005
Standard Deviation				0	0	0.97	0.00087	1.6	11	0	0.47	1.8	5.1	0.0008	0.0015
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	1	0	0
% of Results at or above the Detect Limit				0	0	0	0	0	6	0	0	6	6	0	0
% of Results below the Detect Limit				100	100	100	100	100	94	100	100	94	94	100	100
% of Detects at or above Guidelines				0	0	0	0	0	0	0	0	0	6	0	0
% of Results Below Guidelines or Non-Detect				100	100	100	100	100	100	100	100	100	94	100	100

				Trihalomethanes				Herbicides & Fungicides			Phthalates				
				Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Dinoseb	Pronamide	Trifluralin	Bis(2-ethylhexyl) phthalate	Diethylphthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate
				µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL				1	5	1	1	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs					770[#16]										
ANZG (2018) Marine water 99% toxicant DGVs					370[#27]										
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San															
2-4m															
4-8m															
>8m															
NEPM 2013 Table 1C GILs, Drinking Water									0.07	0.09	0.01				
PFAS NEMP 2020 Table 1 Health Recreational Water															
PFAS NEMP 2020 Table 5 Interim marine 95%															
Sample ID	**Location**	**Sample Date**	**Monitoring Round**												
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005
MW01	MW01	13/07/2020	SES (2020)	<5	<5	<5	<5	-	<0.002	-	<0.01	<0.002	<0.002	<0.002	<0.002
MW01	MW01	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW02	MW02	13/07/2020	SES (2020)	<5	<5	<5	<5	-	<0.002	-	<0.01	<0.002	<0.002	<0.002	<0.002
MW02	MW02	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
QA01	MW02	15/11/2021	JBS&G (2022)	<1	<1	<1	<1	<0.01	-	-	<0.05	<0.01	<0.01	<0.01	<0.01
QC01	MW02	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW03	MW03	13/07/2020	SES (2020)	<5	<5	<5	<5	-	<0.002	-	<0.01	<0.002	<0.002	<0.002	<0.002
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW04	MW04	13/07/2020	SES (2020)	<5	<5	<5	<5	-	<0.002	-	<0.01	<0.002	<0.002	<0.002	<0.002
MW04	MW04	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW05	MW05	13/07/2020	SES (2020)	<5	<5	<5	<5	-	<0.002	-	<0.01	<0.002	<0.002	<0.002	<0.002
MW05	MW05	15/11/2021	JBS&G (2022)	<1	<5	<1	<1	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Statistical Summary															
Number of Results				17	17	17	17	1	16	11	17	17	17	17	17
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration				<1	<1	<1	<1	<0.01	<0.002	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
Maximum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration				2.2	4.8	2.2	2.2		0.0041	0.005	0.01	0.0044	0.0044	0.0047	0.0044
Median Concentration				1	5	1	1	0.01	0.005	0.005	0.01	0.005	0.005	0.005	0.005
Standard Deviation				1.9	0.97	1.9	1.9		0.0014	0	0.011	0.002	0.002	0.0024	0.002
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit				0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit				100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines				0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect				100	100	100	100	100	100	100	100	100	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	MAH											Miscellaneous Hydrocarbons									Chlorinated Benzenes													Trihalomethanes				Herbicides & Fungicides			Phthalates					
	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-Isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Total MAH	Bromobenzene	Isopropylbenzene	1,2-dibromoethane	Bromomethane	Cyclohexane	Dibromomethane	Iodomethane	Vinyl Acetate	2-Hexanone (MBK)	4-Methyl-2-pentanone	Methyl Ethyl Ketone	1,2,3,4-tetrachlorobenzene	1,2,3,5-tetrachlorobenzene	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	Chlorobenzene	Hexachlorobenzene	Pentachlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Dinoseb	Pronamide	Trifluralin	Bis(2-ethylhexyl) phthalate	Diethylphthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate
	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	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	1	1	1	1	1	1	1	1	0.003	1	1	1	5	0.001	1	1			5	5	0.005	0.005	5	0.005	5	1	5	1	1	1	0.005	0.005	1	5	1	1	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005
ANZG (2018) Marine water 95% toxicant DGVs											**30**[#8]										**0.004**[#10]	**0.005**[#10]		**0.005**[#10]	**80**[#12]		**13**[#10]			**55**[#8]	**0.0001**[#10]	**0.002**[#10]		**770**[#16]									
ANZG (2018) Marine water 99% toxicant DGVs											**20**[#10]										**0.002**[#24]	**0.003**[#24]		**0.003**[#24]	**20**[#23]		**8**[#24]			**15**[#10]	**0.00005**[#24]	**0.0015**[#24]		**370**[#27]									
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																																											
2-4m																																											
4-8m																																											
>8m																																											
NEPM 2013 Table 1C GILs, Drinking Water							**30**						**1**										**30**		**30**	**1500**	**30**		**40**	**300**							**0.07**	**0.09**	**0.01**					
PFAS NEMP 2020 Table 1 Health Recreational Water																																											
PFAS NEMP 2020 Table 5 Interim marine 95%																																											

Sample ID Location Sample Date Monitoring Round

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of th
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of th
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of th
#25:Moderate Reliability To account for the bioaccumulating nature of th
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Nitrobenzenes				Nitrotoluenes	Anilines					Organic Sulfur Compounds	Organic Alcohols	inated Hydrocar		Other		Pesticides
	1,3,5-trinitrobenzene	1,3-dinitrobenzene	Nitrobenzene	Pentachloronitrobenzene	2,4-dinitrotoluene	2-Nitroaniline	3-Nitroaniline	4-Chloroaniline	4-Nitroaniline	Aniline	Carbon disulfide	Benzyl Alcohol	Hexachlorocyclopentadiene	Hexachlorobutadiene	Low Molecular Weight PAHss	Phosalone	Chlorobenzilate
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L
EQL		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	1	0.005	0.005	5		0.002	
ANZG (2018) Marine water 95% toxicant DGVs																	
ANZG (2018) Marine water 99% toxicant DGVs																	
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																	
2-4m																	
4-8m																	
>8m																	
NEPM 2013 Table 1C GILs, Drinking Water				**0.03**										**0.7**			
PFAS NEMP 2020 Table 1 Health Recreational Water																	
PFAS NEMP 2020 Table 5 Interim marine 95%																	
Sample ID	**Location**	**Sample Date**	**Monitoring Round**															
JBS-MW01	JBS-MW01	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
JBS-MW02	JBS-MW02	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	2	-	<0.005	<5	-	-	-
JBS-MW03	JBS-MW03	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
JBS-MW04	JBS-MW04	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
JBS-MW05	JBS-MW05	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	2	-	<0.005	<5	-	-	-
MW01	MW01	13/07/2020	SES (2020)	<0.002	-	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<5	-	<0.01	<2	<0.002	-	<0.002
MW01	MW01	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	1	-	<0.005	<5	-	-	-
MW02	MW02	13/07/2020	SES (2020)	<0.002	-	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<5	-	<0.01	<2	<0.002	-	<0.002
MW02	MW02	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
QA01	MW02	15/11/2021	JBS&G (2022)	-	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<1	-	<0.002	-
QC01	MW02	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
MW03	MW03	13/07/2020	SES (2020)	<0.002	-	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<5	-	<0.01	<2	<0.002	-	<0.002
FD05	MW03	13/07/2020	SES (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	-	-
MW03	MW03	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
MW04	MW04	13/07/2020	SES (2020)	<0.002	-	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<5	-	<0.01	<2	<0.002	-	<0.002
MW04	MW04	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-
MW05	MW05	13/07/2020	SES (2020)	<0.002	-	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<5	-	<0.01	<2	0.013	-	<0.002
MW05	MW05	15/11/2021	JBS&G (2022)	-	-	<0.005	<0.005	<0.005	<0.005	-	-	-	<0.005	<1	-	<0.005	<5	-	-	-

Statistical Summary

Number of Results	5	1	17	17	16	17	6	6	6	17	16	1	17	17	6	1	5
Number of Detects	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0
Minimum Concentration	<0.002	<0.005	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<1	<0.005	<0.005	<1	<0.002	<0.002	<0.002
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	ND	ND	ND	0.013	ND	ND
Average Concentration	0.002		0.0041	0.0041	0.0047	0.0047	0.0042	0.0025	0.0025	0.0041	2.4		0.0065	3.9	0.0038		0.002
Median Concentration	0.002	0.005	0.005	0.005	0.005	0.005	0.004	0.002	0.002	0.005	1	0.005	0.005	5	0.002	0.002	0.002
Standard Deviation	0		0.0014	0.0014	0.00048	0.00047	0.00041	0.0012	0.0012	0.0014	1.9		0.0023	1.6	0.0045		0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	19	0	0	0	17	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	81	100	100	100	83	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table B Groundwater Analytical Results
Project Number: 62110
Project Name: St Peters

	Nitrobenzenes				Nitrotoluenes	Anilines					Organic Sulfur Compounds	Organic Alcohols	inated Hydrocar		Other		Pesticides
	1,3,5-trinitrobenzene	1,3-dinitrobenzene	Nitrobenzene	Pentachloronitrobenzene	2,4-dinitrotoluene	2-Nitroaniline	3-Nitroaniline	4-Chloroaniline	4-Nitroaniline	Aniline	Carbon disulfide	Benzyl Alcohol	Hexachlorocyclopentadiene	Hexachlorobutadiene	Low Molecular Weight PAHss	Phosalone	Chlorobenzilate
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L
EQL		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	1	0.005	0.005	5		0.002	
ANZG (2018) Marine water 95% toxicant DGVs																	
ANZG (2018) Marine water 99% toxicant DGVs																	
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, San																	
2-4m																	
4-8m																	
>8m																	
NEPM 2013 Table 1C GILs, Drinking Water				**0.03**										**0.7**			
PFAS NEMP 2020 Table 1 Health Recreational Water																	
PFAS NEMP 2020 Table 5 Interim marine 95%																	

Sample ID Location Sample Date Monitoring Round

Env Stds Comments
#1:Very High Reliability DGV may not protect key test species from chro
#2:Very High Reliability Recommended for application for slightly to mo
#3:Very High Reliability Recommended for application for slightly to mo
#4:Low Reliability Recommended for application for slightly to moderate
#5:Very High Reliability DGV may not protect key test species from chro
#6:Very High Reliability. The DGVs apply to water with salinity 25–36 ppt
#7:Moderate Reliability DGV may not protect key test species from chro
#8:Unknown Reliability Recommended for application for slightly to mo
#9:Adopted from m-Xylene
#10:Unknown Reliability
#11:Moderate Reliability DGV may not protect key test species from chr
#12:Moderate Reliability
#13:Low Reliability. Check guidelines for more details.
#14:Very Low Reliability Recommended for application for slightly to mo
#15:Moderate Reliability Recommended for application for slightly to m
#16:Unknown Reliability DGV may not protect key test species from chr
#17:Very High Reliability To account for the bioaccumulating nature of th
#18:Very High Reliability Adopted from Chromium (CrVI)
#19:Very High Reliability
#20:Low Reliability
#21:Very High Reliability To account for the bioaccumulating nature of th
#22:Very High Reliability Recommended for application for slightly to mo
#23:Moderate Reliability. Check guidelines for more details.
#24:Unknown Reliability To account for the bioaccumulating nature of th
#25:Moderate Reliability To account for the bioaccumulating nature of th
#26:Very Low Reliability
#27:Unknown Reliability Recommended for application for slightly to mo
#28:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C
#29:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#30:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC &
#31:Trigger value adopted from Chromium VI
#32:Source: NHMRC 2019

Data Comments
#1 Quantification of linear and branched isomers has been conducted as

Table C: Soil Vapour Analytical Results
Project Number: 62110
Project Name: St Peters Due Diligence

			TRHs (NEPC 2013)	BTEXN							Chlorinated Alkanes														
			C6-C10	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene	Epichlorohydrin	Nonane	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-dibromo-3-chloropropan	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Trichlorofluoromethane
			mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL			8.335	0.0833335	0.0833335	0.0833335	0.8335	1.667	0.2500005	0.0833335	0.8335	0.8335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs														230												
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand 0-1m				4	4800	1300			840	3																
Field ID	**Sampled Date**	**Lab Report Number**																								
SV1	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
QVA02 (duplicate of SV01)	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
QVC02 (triplicate of SV01)	10/11/2021	282748-A	<8.34	<0.33	<0.83	<0.83	<0.83	<1.67	-	<0.83	<0.83	<0.83	-	-	-	-	-	-	-	<0.83	-	-	-	-	<0.83	-
SV2	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV3	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV4	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV5	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV6	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV7	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV8	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
QVA01 (duplicate of SV08)	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
QVC01 (triplicate of SV08)	10/11/2021	282748-A	<8.34	<0.33	<0.83	<0.83	<0.83	<1.67	-	<0.83	<0.83	<0.83	-	-	-	-	-	-	-	<0.83	-	-	-	-	<0.83	-
SV9	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV10	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV11	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV12	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV13	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	0.63	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV14	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV15	10/11/2021	842602	-	0.23	<0.08	0.25	-	-	0.87	0.3	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV16	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV17	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV18	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV19	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV20	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV21	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV22	10/11/2021	842602	-	0.13	<0.08	<0.08	-	-	1.02	0.25	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV23	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV24	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV25	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV26	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV27	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV28	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV29	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV30	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV31	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV33	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV35	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV36	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV37	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV38	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV39	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV40	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV41	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SV42	10/11/2021	842602	-	<0.08	<0.08	<0.08	-	-	<0.25	0.12	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

Table C: Soil Vapour Analytical Results
Project Number: 62110
Project Name: St Peters Due Diligence

			Chlorinated Alkenes										Solvents								MAH							
			1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	Decane	Hexane	Cyclohexanone	Acetone	1,4-Dioxane	Ethyl Acetate	Acrylonitrile	Benzyl chloride	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene
			mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL			0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.8335	0.8335	0.8335	0.8335	0.8335	0.8335	0.8335	0.8335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.833335	0.0833335
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs							0.3		8		0.08	0.1																
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand 0-1m																												
Field ID	**Sampled Date**	**Lab Report Number**																										
SV1	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
QVA02 (duplicate of SV01)	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
QVC02 (triplicate of SV01)	10/11/2021	282748-A	-	-	-	-	-	-	<0.83	-	<0.83	-	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	-	-	-	-	-	-	<0.83	-
SV2	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV3	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV4	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV5	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV6	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV7	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV8	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
QVA01 (duplicate of SV08)	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
QVC01 (triplicate of SV08)	10/11/2021	282748-A	-	-	-	-	-	-	<0.83	-	<0.83	-	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	-	-	-	-	-	-	<0.83	-
SV9	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV10	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV11	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV12	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV13	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	0.1	<0.08	0.1	<0.08	<0.08	<0.83	<0.08
SV14	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV15	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	0.12	0.32	1.65	<0.08	0.17	<0.83	<0.08
SV16	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	0.12	3.5	<0.08	0.33	<0.83	<0.08
SV17	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV18	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV19	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV20	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV21	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV22	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	0.38	<0.08	0.083	0.4	<0.08	<0.08	<0.83	<0.08
SV23	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV24	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.1500003	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV25	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV26	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV27	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.166667	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV28	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV29	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV30	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV31	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV33	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV35	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV36	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV37	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV38	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV39	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV40	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV41	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08
SV42	10/11/2021	842602	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	<0.08	0.1	<0.08	<0.08	<0.08	<0.08	<0.83	<0.08

Table C: Soil Vapour Analytical Results
Project Number: 62110
Project Name: St Peters Due Diligence

			Miscellaneous Hydrocarbons						Chlorinated Benzenes															
			Isopropylbenzene	1,2-dibromoethane	Cyclohexane	Dibromomethane	4-Methyl-2-pentanone	Methyl Ethyl Ketone	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	2-Propanol	Hexachlorobutadiene	Ethyl acrylate	Methyl styrene (alpha)	1,2-butylacetate	Di-isobutyl Ketone	Dodecane	Propylene oxide
			mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL			0.0833335	0.0833335	0.8335	0.0833335	0.8335	0.8335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	1.66667	0.0833335	0.8335	0.8335	0.8335	0.8335	0.8335	1.667
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs																										
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand 0-1m																										
Field ID	**Sampled Date**	**Lab Report Number**																								
SV1	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
QVA02 (duplicate of SV01)	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
QVC02 (triplicate of SV01)	10/11/2021	282748-A	<0.83	-	<0.83	-	<0.83	<0.83	-	-	-	-	-	<0.83	-	-	-	-	-	-	<0.83	<0.83	<0.83	<0.83	<0.83	<1.67
SV2	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV3	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV4	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV5	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV6	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV7	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV8	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
QVA01 (duplicate of SV08)	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
QVC01 (triplicate of SV08)	10/11/2021	282748-A	<0.83	-	<0.83	-	<0.83	<0.83	-	-	-	-	-	<0.83	-	-	-	-	-	-	<0.83	<0.83	<0.83	<0.83	<0.83	<1.67
SV9	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV10	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV11	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV12	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV13	10/11/2021	842602	0.2	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV14	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV15	10/11/2021	842602	0.68	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV16	10/11/2021	842602	2.17	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV17	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV18	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV19	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV20	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV21	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV22	10/11/2021	842602	0.37	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	0.48	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV23	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV24	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV25	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV26	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV27	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV28	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV29	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV30	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV31	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV33	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV35	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV36	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV37	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV38	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV39	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV40	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV41	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-
SV42	10/11/2021	842602	<0.08	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1.67	<0.08	-	-	-	-	-	-

Document Distribution

Rev No.	Copies	Recipient	Date
A	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	8 June 2022
B	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	17 June 2022
0	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	2 August 2022
1	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	7 September 2022
2	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	19 September 2022
3	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	19 September 2022
4	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	30 September 2022
5	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	5 October 2022
6	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	26 October 2022
7	1 x electronic	Athlene Kyle – Logos Australia (via email: athlenekyle@logosproperty.com)	26 October 2022

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	Chris Bielby	Matthew Parkinson	Draft for client review		8/06/2022
B	Chris Bielby	Matthew Parkinson	Draft		17/06/2022
0	Chris Bielby	Matthew Parkinson			2/08/2022
1	Chris Bielby	Matthew Parkinson			7/09/2022
2	Chris Bielby	Matthew Parkinson			19/09/2022
3	Chris Bielby	Matthew Parkinson			19/09/2022
4	Chris Bielby	Matthew Parkinson			30/09/2022
5	Chris Bielby	Matthew Parkinson			5/10/2022
6	Chris Bielby	Matthew Parkinson			26/10/2022
7	Chris Bielby	Matthew Parkinson			26/10/2022