Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on Remediation Action Plan

Proposed Multi-Trades and Digital Technology Hub
See Street, Meadowbank

Prepared for
TAFE NSW

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Executive Summary

This report presents a remediation action plan (RAP) prepared for the proposed multi-trades and digital technology hub (the site) located in the north eastern portion of TAFE NSW Meadowbank Campus, See Street, Meadowbank. The proposed development relates to an approximately 0.8 ha area within the larger Meadowbank TAFE campus. The site boundary of the proposed development is shown on Drawing 1 of Appendix A.

Preparation of the RAP was commissioned by TAFE NSW and was undertaken in accordance with Douglas Partners Pty Ltd (DP) email (ref. SYD190898) dated 23 August 2019. It is understood that the proposed development (with application no. SSD-10349) will involve, but not limited to, the following:

- Construction of a new, six-storey multi-trades and digital technology hub with basement carpark; and
- Construction of a new, internal road covering the footprint of the existing Ausgrid easement.

The primary objectives of the RAP are to establish the following:

- Data gap investigation(s) to comply with the NSW EPA, *Sampling Design Guidelines* (EPA, 1995);
- Requirements to undertake waste classification for the disposal of fill/soils; and
- An unexpected finds protocol (UFP) for implementation during civil and construction works such that any finds of suspected contamination are appropriately investigated and managed.

The RAP also addresses the following measures to be implemented in the event of finding significant site contamination in the subsequent data gap investigation(s) and/or during civil and construction works:

- Appropriate remedial options (if required) to render the site suitable, from a site contamination perspective, for the proposed development;
- The remediation acceptance criteria (if required) to be adopted for the remediation of the site and the validation requirements (if required) to verify the successful implementation of the remediation strategy;
- Appropriate environmental safeguards required to complete the remediation works (if required) in an environmentally acceptable manner; and
- Appropriate occupational, health and safety procedures required to complete the remediation works (if required) in a manner that would not pose a threat to the health of site workers or users.

It is considered that the site can be made suitable for the proposed redevelopment subject to meeting of the above objectives.

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1. Introduction

1.1 Background

This report presents a remediation action plan (RAP) prepared for the proposed multi-trades and digital technology hub (the site), located in the north eastern portion of TAFE NSW Meadowbank Campus, See Street, Meadowbank. The proposed development relates to an approximately 0.8 ha area within the larger Meadowbank TAFE campus. The site boundary of the proposed development is shown on Drawing 1 of Appendix A.

Preparation of the RAP was commissioned by TAFE NSW and was undertaken in accordance with Douglas Partners Pty Ltd (DP) email (ref. SYD190898) dated 23 August 2019. It is understood that the proposed development (with application no. SSD-10349) will involve, but be not limited to, the following:

- Construction of a new, six-storey multi-trades and digital technology hub with basement carpark; and
- Construction of a new, internal road covering the footprint of the existing Ausgrid easement. The location of the Ausgrid easement is presented on Drawing 3 of Appendix A.

Greencap Pty Ltd (Greencap) undertook a preliminary site (contamination desktop study) investigation (PSI) in 2018 on the entire Meadowbank TAFE campus, including the subject site. The PSI identified several areas of potential environmental concern based on current and historical land uses; and recommended a detailed site investigation (DSI). The key findings of the PSI are presented in Section 4 of the report.

DP carried out a limited DSI in May 2019 to assess and identify soil and groundwater contamination (or potential contamination) issues which may impact the proposed development. A provisional waste classification was also incorporated in the limited DSI to assist with the planning of disposal of fill/soils. The key issues outlined in the limited DSI are presented in Section 4 of this report.

1.2 Objectives

The primary objectives of the RAP are to establish the following:

- Data gap investigation(s) to comply with the NSW EPA, *Sampling Design Guidelines* (EPA, 1995);
- Requirements to undertake waste classification for the disposal of fill/soils; and
- An unexpected finds protocol (UFP) for implementation during civil and construction works such that any finds of suspected contamination are appropriately investigated and managed.

The RAP will also address the following measures to be implemented in the event of finding significant soil and groundwater contamination in the subsequent data gap investigation(s) and/or during civil and construction works.

- Appropriate remedial options (if required) to render the site suitable, from a site contamination perspective, for the proposed development;
- The remediation acceptance criteria (if required) to be adopted for the remediation of the site and the validation requirements (if required) to verify the successful implementation of the remediation strategy;
- Appropriate environmental safeguards required to complete the remediation works (if required) in an environmentally acceptable manner; and
- Appropriate occupational, health and safety procedures required to complete the remediation works (if required) in a manner that would not pose a threat to the health of site workers or users.

1.3 Relevant Guidelines

The following guidelines have been adopted or referenced in the RAP and are in line with the Planning Secretary's Environmental Assessment Requirements (SEARs):

- NSW EPA, *Sampling Design Guidelines* (EPA, 1995);
- Managing Land Contamination: Planning Guidelines - SEPP55 Remediation of Land (DUAP, 1998);
- NSW OEH, *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011);
- National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended in 2013), (NEPC, 2013);
- NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (EPA, 2014a);
- NSW EPA *Waste Classification Guidelines Part 2: Immobilisation of Waste* (EPA, 2014b); and
- NSW EPA (2017) *Contaminated Sites Guidelines for the NSW Site Auditor Scheme* 3rd Edition (EPA, 2017).

2. Site Information

2.1 Site Identification and Description

The site is in the north eastern portion of Lot 11 Deposited Plan 1232584 and is within the larger Meadowbank TAFE campus. The site is a trapezium-shaped area and is bounded by See Street to the south east, an electricity substation to the north east, and existing multi-storey TAFE buildings to the south west and vacant land (currently under construction) to the north west as shown on Drawing 1 in Appendix A.

The local government authority is City of Ryde Council.

The site is an asphalt-surfaced on grade carpark with numerous large eucalypts around the perimeter and between designated carparking areas. The site surface levels fall from See Street at approximately reduced level RL 24 m relative to the Australian Height Datum (AHD) to the west with the north western boundary at approximately RL 16 m AHD.

3. Regional Topography, Geology and Hydrogeology

Reference to the Sydney 1:100 000 Geological Sheet indicates that the site is underlain by Hawkesbury Sandstone of Triassic Age. The Hawkesbury Sandstone comprises medium to coarse grained quartz sandstone, very minor shale and laminite lenses. The See Street boundary is close to a geological boundary with Ashfield Shale which comprises black to dark-grey shale and laminite.

Reference to the Sydney Soil Landscape 1:100 000 Map Sheet the site is within an area of Lucas Heights soil. This soil type is characterised by moderately hard setting Yellow Podzolic Soils and Yellow Soloths, and Yellow Earths on outer edges of crests.

The NSW Acid Sulphate Soil (ASS) Risk Map indicates that the site is not within an area of known acid sulfate soil occurrence.

A search of the NSW Department of Primary Industries Office of Water database was undertaken for water bearing bores within a 500 m radius of the site. Three registered groundwater bores were identified within the 500 m radius of the site. These bores were registered for monitoring purposes. Shallow standing water level was reported in the range of 2-4 m below ground level (bgl).

Two groundwater monitoring wells were installed on the site as part of the limited DSI. Water levels were measured in the wells at depths approximately 5 m below ground level (RL 17 m AHD at the lower part of the site and RL 17 m AHD at the upper part of site).

Based on regional topography, and water levels measured in the on-site wells, groundwater flow directions are expected to be south, towards Parramatta River, while surface water is likely to discharge to the unnamed creek on the western campus boundary and flow via Charity Creek ultimately to the Parramatta River.

4. Review of Previous Reports

Previous reports reviewed as part of this RAP include:

- *Report on Preliminary Site Investigation, Meadowbank Campus- See Street, Meadowbank NSW*, Report J154876 dated 10 October 2018 (Greencap, 2018);
- *Report on Limited Detailed Site (Contamination) Investigation, Proposed Multi-Trades Hub, TAFE NSW Meadowbank Campus, See Street, Meadowbank NSW*, Report 86469.04.R.001.Rev0 dated 9 May 2019 (DP, 2019a); and

- *Report on Preliminary Geotechnical Investigation, Proposed Combined Multi-Trades and Digital Technology Hub, See Street, Meadowbank TAFE*, Report 86469.05.R.001.Rev1 dated 30 August 2019 (DP, 2019b).

4.1 Greencap (2018)

The PSI (desktop study) was undertaken at (the entire) Meadowbank TAFE campus by Greencap in October 2018 for TAFE NSW. The PSI comprised a site walkover and review of: historical aerial photographs, regulatory notices, SafeWork NSW records, historical title deeds and Section 10.7(2) planning certificate.

The walkover undertaken by Greencap identified the following pertinent features of the campus:

- The site consists of 32 buildings, including multi story buildings, sheds, demountable buildings and warehouses. The footprint of the buildings covered approximately 40% of the campus, an additional 20% is covered in hardstand including footpaths, car parking and small internal roads. The remainder of the campus is covered in grass, garden beds and a small amount of dense vegetation;
- The buildings generally consist of seminar rooms, educational spaces, industrial skills workshops, administration offices, utilities and amenities;
- Anecdotal information provided during the campus walkover indicated that the campus was previously used for military use in the past;
- On the western boundary, adjacent the train line, a small ravine was identified covered in dense vegetation. A small amount of waste was identified in the vegetation area. A small creek at the base of the ravine was identified running north to south, the feeder for the creek was not identified indicating it was a stormwater channel;
- Chemical stores were identified in multiple spaces across the campus;
- Waste bins and skip bins were identified in various locations across the campus, all bins were well maintained;
- There was no visual / olfactory evidence of:
    - Underground storage tanks (e.g. fill points, dip points, breather lines) or above ground storage tanks;
    - Potential asbestos containing materials (ACM) observed on the surface of the campus or within the structures;
    - Phytotoxic impact (i.e. plant stress or dieback) observed on the campus;
    - Contamination detected on the campus; and
    - Surface staining observed on the campus.

The following potential sources of contamination were identified within the general area of the campus:

- A power sub-station is located on the north-eastern boundary of the campus;
- Meadowbank train station and train line is located on the western boundary;
- Multiple mechanics/smash repairs 15 m north of the campus; and

- Sydney water treatment facility 25 m north of campus.

Within 500 m of the campus four petrol stations were identified:

- BP Petrol Station, 220 m north-west of the campus;
- Caltex West Ryde Petrol Station, 230 m north of the campus;
- Speedway Petrol Station, 280 m north of the campus; and
- 7/11 Petrol Station, 390 m north of the campus.

Within 500 m of the campus three laundry services were identified:

- Meadowbank Laundry 35 m south of the campus;
- Neat and Fit Dry Cleaner, 277 m south of the campus; and
- Elegance Dry Cleaning, 29 0m south of the campus.

A review of the site history and relevant searches indicated the campus previously consisted of multiple smaller lots that were used for industrial, educational and residential use. The majority of the campus area was owned by a company that manufactured agricultural machinery in the 1930s, the warehouses were demolished before 1943. The land was acquired under the Public Work Act 1981 on behalf of the Minister for Public Instruction.

Anecdotal evidence ideates that the campus was used as a military based during the world war, a large portion of the campus was clear of development between 1943 and 1951. Multiple residential buildings were located on the eastern boundary of the campus prior to 1986; the buildings were demolished following the Minister of Education acquiring properties in the late 1970s. The lot was fully acquired by the Minister of Education and the Minister Administering the Technical and Further Education in 2016.

The campus was not reported to be on any NSW EPA published databases, had no record of the storage of hazardous chemicals on the current investigation site and not declared in the planning certificates to be significantly contaminated or subject to any management order. There were however numerous depots with licenced goods stored across the TAFE campus. No evidence, either from the Dangerous Goods search, site walkover or other, indicated the presence of any historical or current underground storage tanks (UST) or above ground storage tanks (AST) used for petroleum fuel storage. No dangerous goods storage was noted for the campus.

The most significant risks associated with contamination at the campus were considered by Greencap to be associated military use, chemical storage, historical filling and manufacturing. The most significant off-site risks were considered by Greencap to be associated with the adjoining sub-station, the water treatment facility further north, and the adjoining train line. Contaminants of concern were identified as metals, hydrocarbons, pesticides, solvents, volatile compounds and asbestos.

The report states that a *detailed site assessment is recommended across the full site prior to future development or utility works involving disturbance of site soils*.

4.2 DP (2019a)

A limited DSI was carried out at the subject site by DP for TAFE NSW in May 2019. The investigation comprised a review of previous investigations (including adjacent sites) and sampling and testing of soil and groundwater samples from seven boreholes (BH1-BH7), two of the boreholes were converted into groundwater wells (BH1 and BH5). The bore locations are shown on Drawing 2, Appendix A. Given that the proposed development will involve bulk excavation of soils over virtually the entire footprint (with the excavation and disposal of soils to be appropriately managed), and the relatively low potential for contamination at the site, a total of seven sampling locations were selected to provide reasonable coverage of the site.

Taking into consideration the results of the previous investigations both on site and the adjacent sites within the TAFE campus (discussed in detail in DP, 2019a), the following potential sources of contamination and associated contaminants of potential concern (COPC) were identified in DP (2019a):

- Imported fill, previous site uses impacting fill/ surficial soils and demolition of former buildings impacting fill/ surficial soil. COPC include: heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP, VOC, phenols and asbestos;
- Surrounding site uses (past and present) including flammable liquids stores, existing car parking, sub-station. COPC include: heavy metals, TRH, PAH, BTEX, PCB, total petroleum hydrocarbons and VOC; and
- Pest control; Pesticides (such as OCP and OPP) used beneath ground slabs.

The subsurface conditions encountered in the bores are summarised below:

Table 1 – Summary of Subsurface Profile of the Site

PAVEMENT	Asphalt 30 – 50 mm thick over roadbase gravel to depths in the range 0.2 - 0.4 m;
FILLING	Sand and gravel filling to depths in the range 0.6 - 1.4 m;
CLAYEY SAND and IRONSTONE	Clayey sand and ironstone gravel layers in BH2, BH3 and BH4 to depths in the range 0.8 – 1.25 m;
SANDSTONE	Extremely low to very low strength increasing to medium to high strength with depth. All three cored boreholes were terminated in high strength sandstone at depths in the range 6.0 - 12.0 m.

There were no visual or olfactory indicators (i.e. staining or odours) to suggest the presence of contamination within the boreholes.

No free groundwater was observed during augering. Groundwater was measured in the two wells at depths of 5.5 m bgl (BH1) and 5.0 m bgl (BH5).

The site assessment criteria (SAC) adopted for the assessment of soil and groundwater were as described in Section 11.0 of this report.

Analytical results of soil and groundwater samples were generally within the adopted SAC apart from copper, lead, nickel and zinc exceedances identified in groundwater sample, BH1. Metal exceedances in BH1 were considered to represent regional groundwater quality, common in urban environments, and therefore no further assessment of the metals in BH1 was considered necessary. The concentrations of potential contaminants in groundwater should be considered in determining treatment requirements for dewatering or disposal of groundwater. The analytical results are presented in Tables E1 to E3, Appendix B.

It was considered that there were not likely to be any significant contamination risks to human health or the ecology associated with the site. The site was considered to be suitable, from a contamination perspective, for the proposed development and continued use as part of the Meadowbank TAFE campus. It was recommended, however, that an unexpected finds protocol (UFP) be developed for implementation during the future civil, and construction works such that any finds of suspected contamination were approximately investigated and management.

Furthermore, it was recommended that additional soil sampling and testing be conducted once the site is more easily accessible (i.e. following the removal of the child care centre) to confirm the waste classification of soils prior to off-site disposal. As part of the waste classification process, the existing asphalt surfacing and underlying road base should be considered and assessed against appropriate Resource Recovery Orders (as issued by the NSW EPA), which may allow off-site reuse. Alternatively, the waste classification is to consider these materials separately.

4.3 DP, 2019b

The results of the boreholes are consistent with DP (2018a) investigation, as the investigations were undertaken concurrently.

The results of the monitoring of water levels in the standpipes indicate groundwater may be encountered from approximately 5 m below ground level (RL 17 m AHD at the lower part of the site and RL 17 m AHD at the upper part of site). Groundwater inflows may occur above these depths with seepage along the soil and bedrock interface or in rock excavation from bedding planes and defects. Based on the topography of the local area and observations in recent years of several basement excavations on the Meadowbank peninsula, it is inferred that the regional groundwater table is likely to be well below the likely BEL and the observed water in the standpipes is perched ephemeral water related to infiltration from rainfall and stormwater.

Based on previous experience, any inflow into the excavation should be readily controlled using sumps and pumps.

Inflow into the basement excavation should be monitored during the early stages of construction to provide detailed information for the design of the basement drainage system. A subfloor drainage system should be sufficient to control and direct the expected relatively minor inflows to the permanent basement structure.

4.4 Nearby Sites

The following reports prepared by DP, for the southern portion of the Meadowbank TAFE campus (to the south of the subject site), were reviewed as part of DP (2019a) to provide an understanding of the local soil and groundwater conditions and the potential contaminants of concern, that may also be present on the site.

Previous reports reviewed:

- DP *Report on Detailed Site Investigation, TAFE NSW Meadowbank Campus, See Street, Meadowbank,* Report 86469.01.R.001.Rev1 dated 3 August 2018 (DP, 2018c);
- *DP Report on Geotechnical Investigation Proposed Lift and Stores Building prepared for TAFE NSW,* Project 86469.01 dated 3 August 2018 (DP, 2018d); and
- DP *Remediation Action Plan, Proposed Lift and Stores Building, See Street, Meadowbank,* Report 84549.02.R001.DftA dated 28 August 2018 (the 'RAP') (DP, 2018e).

Reference can be made to DP (2019a) for a full review. The identified potential contaminant sources and contaminants of concern are noted in Section 4.2 above.

5. Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated, what the contamination sources area, and how potential receptors may be exposed to contamination either in the present or in the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

5.1 Potential Contamination Sources

Based on current and previous site uses and the previous investigations summarised in Section 4, the potential sources of contamination and associated contaminants are summarised in Table 3.

Table 3: Potential Sources of Contamination

Potential Source of Contamination	Contaminants of Concern
Imported fill: previous site uses impacting fill/ surficial soils and demolition of former buildings impacting fill/ surficial soil.	Heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP, phenols and asbestos.
Surrounding site uses (past and present): including flammable liquids stores, existing car parking, sub-station.	Heavy metals, TRH, PAH, BTEX, PCB, total petroleum hydrocarbons and VOC.
Pest control: Pesticides used beneath ground slabs	OCP and OPP.

5.2 Potential Receptors

- R1 – Future site users (including workers, students and visitors);
- R2 – Future construction workers (for development of the site);
- R3 - Future maintenance workers (post-development); and
- R4 – In ground building structures.

5.2.1 Potential Pathways

Potential pathways for the identified contamination to impact on the receptors include the following:

- P1 – Ingestion and dermal contact with soil;
- P2 – Inhalation of dust;
- P3 – Direct contact of contaminated ground with in ground structures; and
- P4 – Surface water runoff

5.3 Conceptual Site Model

A 'source-pathway-receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or near the site, via exposure pathways (complete pathways). The possible pathways between the above listed sources and receptors are provided in Table 4.

Table 4: Conceptual Site Model

Source	Transport Pathway	Receptor	Comments and Risk Management Action Recommended
S1 Historical imported fill	P1: Ingestion and dermal contact P2: Inhalation of dust	R1: Future site users R2: Future construction workers R3 : Future maintenance workers	Investigations to date have not identified contaminants in the fill that would compromise the suitability of the site for the proposed development. Potential contaminants between sample locations can be managed through implementation of this RAP. No groundwater contamination issues have been identified at the site.
	P6: Contact with contaminated ground	R7: In ground building structures	
S2 Historical and Current Surrounding site uses	P1: Ingestion and dermal contact P2: Inhalation of dust	R2: Construction workers	
S3 Pest control	P1: Ingestion and dermal contact P2: Inhalation of dust	R1: Future site users R2: Future construction workers	

6. Data Quality Objectives and Indicators

The following seven step data quality objective (DQO) process, as defined in Australian Standard *Guide to the investigation and sampling of sites with potentially contaminated soil Part 1: Non-volatile*

and semi-volatile compounds (AS 4482.1 – 2005) has been adopted. The DQO process is outlined as follows:

(a) State the Problem

The 'problem' under consideration is the implementation of an appropriate remediation action plan to ensure any previously identified contamination and/or unexpected finds and waste classification/disposal procedures are managed appropriately to ensure that the remediated site will be suitable for the proposed development and that the remedial works pose no unacceptable risks to human health or to the environment.

The various parties involved in this decision process, include:

- The site owner (TAFE NSW);
- The principal's representative (Contractors to be confirmed);
- The planning authority (City of Ryde Council); and
- The environmental consultant (to be confirmed) for the investigation and remediation planning works.

(b) Identify the Decision

Based on the findings of the previous assessments, site observations and the proposed development details, the principal decision is to adopt an appropriate remediation strategy to achieve the objectives stated in Section 1. Assessment and classification requirements for imported soil (if required) are also outlined in this RAP.

(c) Identify Inputs to the Decision

The primary inputs in adopting a remediation strategy are as follows:

- The areas of potential contamination derived from known historical site activities identified from the site history review outlined in previous reports;
- The investigation findings reported previously, as outlined in Section 4;
- The findings of the data gap analysis as outlined in Section 7;
- Published guidelines appropriate to the proposed future land use;
- Published soil guidelines appropriate to the proposed future land use (hospital and educational facilities) and published guidelines for protection of the environment;
- Field investigation techniques to assess contamination as per DP's standard field procedures;
- Field observations and analytical results; and
- Proposed land use and design of the proposed development.

(d) Define the Boundary of the Assessment

The site is defined on Drawing 1, Appendix A.

(e) Develop a Decision Rule

The decision rule is the comparison of the analytical results against the relevant guidelines and background concentrations (remediation acceptance criteria) where relevant.

(f) Specify Acceptable Limits on Decision Errors

Appropriate and adequate quality assurance and quality control (QA/QC) measures and evaluations will be incorporated into the supplementary contamination and validation sampling and testing regime to confirm the accuracy and reproducibility of the analytical results.

(g) Optimize the Design for Obtaining Data

QA/QC procedures will be followed as part of the validation requirements to attain to an acceptable level of data quality.

6.1 Data Quality Indicators

DP's quality assurance (QA) and quality control (QC) procedures will be adopted throughout the field sampling programme to ensure sampling precision and accuracy and prevent cross contamination.

The quality controls of documentation completeness, data completeness, data comparability, data representativeness, precision and accuracy for sampling and analysis, if required, are described in Table 5.

Table 5: Data Quality Indicators

Quality Control	Achievement Evaluation Procedure
Documentation completeness	Completion of field and laboratory chain of custody documentation, completion of validation sample plans.
Data completeness	Sampling density according to provisions in the approved RAP, and analysis of appropriate determinants based on site history and on-site observation.
Data comparability and representativeness	Use of NATA accredited laboratories, use of consistent sampling technique.
Precision and accuracy for sampling and analysis	Achievement of 30-50% RPD for heavy metals and organics respectively for replicate analysis, acceptable levels for laboratory QC criteria.

7. Data Gap Analysis

It is understood that the data gap analysis would be carried out as part of a separate Part 5 approval process (early works subject to an REF) and prior to the commencement of works associated with the SSD application.

Based on the recommendations of DP (2019a) a data gap analysis is required to address the following:

- The footprint of the existing child care centre, which has not to date been investigated; and
- Additional waste classification confirmation for soils to be excavated and removed from site as part of the proposed development.

The data gaps analysis includes the following scope. The works would be undertaken following the demolition of the child care centre and the removal of the asphalt surface of the carpark.

- Preparation of safe work method statements (SWMS) and field work safety environmental plan (FWSEP);
- Undertake a dial-before-you-dig services search and electronic services scan prior to drilling to clear the proposed test locations of underground services and UPSS. Dial-Before-You-Dig (DBYD) checks and underground service location will be conducted prior to drilling to locate detectable services as a precautionary measure;
- Excavate thirteen (13) test pits [to comply with (EPA 1995)] to a depth of approximately 0.5 m bgl into natural soil or prior refusal (whichever is the lesser). The proposed sampling locations are shown on Drawing 4, Appendix A;
- Soil samples will be collected at regular intervals (surface and then every 0.5 m) and analysed for contaminants of potential concern as per the CSM: heavy metals, PAH, TRH, BTEX, phenols, OCP, OPP, PCB and asbestos;
- Screening of all soil samples for VOCs using a photoionisation detector (PID);
- QA/QC Analysis:
  - Soil samples including: one intra-laboratory duplicate (metals, PAH and TRH/BTEX), one inter-laboratory duplicate (metals, PAH and TRH/BTEX), one trip blanks (TRH/BTEX) and one trip spike (BTEX).
- Provision of a data gap analysis report. The report will include an *in situ* waste classification assessment.

Upon completion of the works, an amendment to this RAP may be required to incorporate specific areas identified for remediation.

8. Waste Classification Requirements

8.1 Waste Classification and Off-Site Disposal

All off-site disposal of soils will be undertaken in accordance with the POEO Act. A waste classification report must be available prior to disposing of soils off-site.

The waste classification assigned following the data gap analysis may be appropriate for the purpose of off site disposal of soils. However, depending on variability of soils and test results, an *ex situ* classification (in stockpile) may be recommended. Any stockpiled soils removed from the site will be classified in accordance with either:

- The NSW EPA *Waste Classification Guidelines 2014*; or
- A General or Specific Exemption under the *Protection of the Environment Operations (Waste) Regulation* 2005.

Soil samples should be analysed for contaminants of potential concern: heavy metals, TRH, PAH, BTEX, OCP, OPP, PCB, phenols and asbestos as per the CSM.

In general, if required, one sample will be taken per 25 m^3 – 250 m^3 depending on the total volume and homogeneity of the material with a minimum of three samples per stockpile. The following sampling rate is to be adopted:

- ≤ 50 m^3 : minimum of three samples;
- 50 m^3 – 250 m^3 : One sample per 50 m^3, minimum of three samples; and
- > 250 m^3: One sample per 250 m^3, minimum of three samples.

The existing, asphalt pavement and underlying road base should be considered and assessed against the appropriate Resource Recovery Orders (as issued by the NSW EPA), which may allow off-site reuse. The appropriate Orders are as follows:

- The reclaimed asphalt pavement order 2014; and
- The reclaimed asphalt pavement order 2014.

It is understood that the asphalt pavement will be stripped as part of the early works package, separate to the SSD scope.

Both orders have compliance requirements that must be met to allow land application off site.

Alternatively, the waste classification is to consider these materials separately.

No soils will leave the site without a formal waste classification.

All transport of waste and disposal of materials must be conducted in accordance with the requirements of the POEO Act. All licences and approvals required for disposal of the material will be obtained prior to removal of the materials from the site.

Removal of waste materials from the site shall only be carried out by a licensed contractor holding appropriate licence, consent and/ or approvals to dispose of the waste materials according to the

assigned waste classification and the corresponding requirements outlined in the NSW EPA *Waste Classification Guidelines 2014*, and with the appropriate approvals obtained from the EPA, if required.

Details of all soils removed from the site (including Virgin Excavated Natural Material - VENM) shall be documented by the Contractor with copies of: weighbridge slips, trip tickets and consignment disposal confirmation (where appropriate) provided to the Environmental Consultant. A site log shall be maintained by the Contractor to track disposed loads against on-site origin.

Transport of spoil shall be via a clearly delineated, pre-defined haul route. The proposed waste transport route will be notified to the local Council and truck dispatch shall be logged and recorded by the Contractor for each load leaving the Site.

8.2 QA / QC Analysis

QA/QC testing including:

- Inter-laboratory duplicate samples for the full analytical suite of the primary sample at a rate of 10% of the primary sampling or a minimum of one sample per sampling day / source material;
- Intra-laboratory duplicate samples for the full analytical suite of the primary sample at a rate of 10% of the primary sampling or a minimum of one sample per sampling day / source material;
- One trip spike (BTEX) and trip blank (TRH/BTEX) per sampling day; and
- One rinsate sample per sampling day (heavy metals, PAH and TRH/BTEX), if non-disposable sampling equipment is used.

8.3 Stockpiling of Contaminated Material

It is anticipated that stockpiles will be temporarily placed on the site during remediation works prior to any of the materials being loaded onto trucks for disposal. Any stockpiles placed on the site must be managed to minimise the risk of dust generation, erosion and leaching. The measures required to achieve this will depend on the stockpile material and the amount of time the stockpile remains on site. Measures should include:

- Restriction of the height of stockpiles (less than 3 m) to reduce dust generation;
- Implementation of control measures for sediment and erosion; and
- Temporary stockpiles should be kept moist by using water spray (where required).

8.4 Imported Materials

Materials imported to the site to backfill the site (where required) must be virgin excavated natural material (VENM), excavated natural material (ENM) or other certified materials (complying with a relevant Resource Recovery Order (RRO) as issued by the NSW EPA) such as topsoil (preferably not recycled or blended product), mulch (preferably not recycled or blended product) or quarry won products (such as gravel) from a reputable supplier.

The source site must provide reports showing compliance of the materials with any of the above. These reports must be provided to the environmental consultant for review and approval prior to importation of the material. If the reports do not meet the satisfaction of the Environmental Consultant the source site may be rejected or additional analysis requested.

Upon receipt of the material a minimum of three check samples (per source site) of the imported material must be collected and analysed for: heavy metals, TRH, PAH, BTEX, OCP, OPP, PCB, phenols and asbestos (as a minimum).

In addition to VENM or RRO definitions, the analytical results must also meet the RAC provided in Section 11.

It is highly recommended that no recycled or blended product is used given the risk of asbestos containing materials in such products. Should such products be proposed for use, apart from being required to comply with a RRO, the Environmental Consultant will conduct a more rigorous validation process including:

- A visit to the source site;
- Thorough review of the reports provided confirming compliance with a RRO;
- Inspection of the imported product;
- Verification sampling of the imported product at a rate of at least 1 sample per 25 m^3; and
- Analysis of the verification samples for the contaminants of concern (determine by the source and the information provided in the RRO compliance documentation). Asbestos will be analysed as a minimum for all incoming products.

QA/QC testing must be undertaken in accordance with Section 8.2.

9. Unexpected Finds Protocol

The unexpected finds protocol includes the following items:

- Potential asbestos contamination in fill/soil during excavation;
- Potential contaminants (general) in fill/soil during excavation; and
- Disposal of potentially hazardous waste.

Should monitoring and remediation of groundwater be required then a revised RAP assessing various options will be required to address groundwater contamination.

All site personnel will be inducted into their responsibilities under the Unexpected Finds Protocol (UFP). The UFP should be incorporated in the Construction Environment Management Plan (CEMP) as prepared by the appointed main contractor.

All site personnel are required to report to the Site Manager if the following signs of unexpected environmental concern are encountered:

- Presence of unexpected fibre cement;

- Petroleum, or other chemical odours;
- Unnatural staining;
- Buried drums or tanks; and/or
- Chemical spills.

Should signs of concern be observed, the Contractor will, as soon as practical:

- Place barricades around the affected area (the potential area of environmental concern – PAEC) and cease work in that area;
- Notify authorities needed to obtain emergency response for any health or environmental concerns (e.g. fire brigade);
- Notify the client of the occurrence;
- Notify any of the authorities that the Contractor is legally required to notify (e.g. EPA, Council);
- Notify the Environmental Consultant;
- The client will notify any of the authorities which the Principal is legally required to notify (e.g. EPA, Council); and
- Following the immediate response in the UFP, one of the following contingency plans may be implemented.

9.1 General

The general procedure to be followed in the event of an unexpected find is as follows:

1. Cease work at that location and contact the client;
2. Place barricades around the affected area (the potential area of environmental concern – PAEC);
3. Notify authorities needed to obtain emergency response for any health or environmental concerns, if required;
4. Notify any of the authorities that the contractor is legally required to notify (e.g. EPA, Council);
5. Notify the Environmental Consultant;
6. The Environmental Consultant will inspect the find and if deemed necessary, design and implement an investigation to assess the risk of hazard:
    - If no hazard is identified, the Environmental Consultant will advise the client who will instruct the contractor to remove the barricades and continue works in that area;
    - If a potential hazard is identified, the Environmental Consultant will outline a procedure to remediate and/or manage the find, which may form an addendum to the RAP; and
    - The contractor will undertake the remediation / management works which will be validated by the Environmental Consultant generally in accordance with the RAP, or any other procedural document produced in response to the find.

9.2 Asbestos

It is possible that asbestos-based materials may be uncovered. In the event that this occurs the following unexpected asbestos finds protocol has been established:

1. Upon discovery of suspected asbestos containing material, the site manager is to be notified and the affected area closed off by the use of barrier tape and warning signs. Warning signs shall be specific to asbestos hazards and shall comply with the Australian Standard 1319-1994 – Safety Signs for the occupational environment;
2. An occupational hygienist or Environmental Consultant with appropriate competency to NEPC (2013) is to be notified to inspect the area and confirm the presence of asbestos (and type of asbestos) and determine extent of investigation and/or remediation works to be undertaken. A report detailing this information will be compiled by the occupational hygienist or Environmental Consultant and provided to the site manager;
3. Should asbestos impacted soils require off-site disposal, the impacted soil will be stockpiled for waste classification purposes (including sampling and chemical analysis) and will be disposed of, as a minimum, as asbestos waste at an appropriately licensed solid waste landfill site. In dry and windy conditions, the stockpile will be lightly wetted and covered with plastic sheet whilst awaiting disposal;
4. All work associated with asbestos in soil will be undertaken by a contractor holding a class AS1 Licence and all workers working in the asbestos impacted zone must meet the following minimum PPE requirement (unless otherwise advised by the hygienist);
5. Steel-capped lace-less boots;
6. Hard hat meeting AS1801-1981 and AS/NZS 1801:1997/Amdt 1:1999 requirements;
7. High visibility clothing;
8. Half-face P2 rated respirator or similar;
9. Disposable full-length body coveralls with elasticated hood and cuffs (Tyvek suit or equivalent);
10. Gloves;
11. Monitoring for airborne asbestos fibres is to be carried out during the soil excavation, if deemed necessary by the Occupational Hygienist. Asbestos air monitoring will be undertaken in accordance with *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC: 3003 (2005)] and sampling density and locations will be determined by the Occupational Hygienist. All filters will be submitted to a NATA accredited laboratory for analysis. Air samples will be collected from the breathing zone of a person, over a minimum of four hours duration;
12. At the completion of the excavation, a clearance inspection is to be carried out and written certification is to be provided by the occupational hygienist that the area is safe to be accessed and worked. Clearance will include soil samples and asbestos analysis;
13. Details of the incident are to be recorded in the site record system; and
14. The area may be reopened for further excavation or construction work.

9.3 Hazardous Waste

This plan caters for the storage, treatment and disposal of excavated spoil which fails to meet the criteria for direct disposal to a landfill (i.e. Hazardous Waste). Any suspected Hazardous Waste materials should have the classification confirmed by the Environmental Consultant, including additional sampling and analysis as appropriate, prior to implementing this contingency plan.

Hazardous Waste will be handled as follows:

- Materials of the same spoil category/ contamination issue will be carefully excavated and placed as separate stockpiles at demarcated and contained locations. The categorisation would be done based on on-site observations and the contaminant exceedances detected;
- Stockpiles of excavated materials will be appropriately bunded with hay bales/sandbags and covered with anchored geotextile or impermeable plastic sheeting, or alternatively placed in an appropriate container e.g. waste skip, with appropriate cover. Materials considered to have the potential to produce contaminated leachate will be stockpiled in an area with an appropriate leachate collection system;
- Sampling and analysis of segregated stockpiles will be conducted to determine the concentrations of the target parameters in the excavated materials (e.g. leachability of the contaminants of concern, treatability studies);
- Should the sampling and testing confirm the Hazardous Waste category, an off-site treatment/disposal facility will be considered;
- If the material is to be disposed of at a specific landfill site, appropriate applications will be made to the EPA. It is foreseen that treatment and management of Hazardous Wastes prior to off-site disposal would be conducted by a specialised contractor. Agreement as to the appropriateness of the treatment and disposal method for materials must be obtained from the EPA, and disposal consent must be sought from the Hazardous Waste Regulation Unit of the EPA prior to the removal of such wastes from the site; and
- An appropriately licensed Hazardous Waste remediation contractor will be appointed to manage the waste and remove from site in accordance with the methodology agreed with the EPA.

If no General Immobilisation Approval is applicable to the material, the NSW DECC *Waste Classification Guidelines Part 2: Immobilisation of Waste* (2008) will apply, and on-site or off-site treatment will be conducted. Treatment will most likely involve the solidification/stabilisation (microencapsulation) of hazardous material to allow re-classification and off-site disposal of the treated soil as general solid waste (GSW). Given the relatively small volumes it is likely that off-site treatment by an appropriately licensed contractor will be conducted.

10. Remedial Action Plan

Where remedial action is required, the following plan (Sections 10 to 13) should be considered. Some modifications to Section 10-13 may be necessary to tailor the remedial/validation plan for specific contaminant(s) of concern as identified through the proposed data gap analysis or as an unexpected find.

10.1 Remediation Goals

Generally, site remediation works have been designed such that the remediated site will be suitable for the proposed development and that the works will pose:

- No unacceptable risk to human health; and
- No unacceptable risk to the environment.

10.2 Typical Remedial Options

Possible remedial options to achieve the remedial goals are identified as follows:

- No action;
- Treatment (on- or off-site);
- Off-site disposal to an approved/ licensed site/ waste facility;
- Physical barrier systems; and
- Natural attenuation.

The following table presents a review of remediation options.

Table 6: Evaluation of Remedial Options

Remedial Options	Assessment of Options
No Action Required	The "No Action" option involves no remedial response to the contamination identified on the subject site. The investigations conducted on the site to date have shown that no specific remediation action is required. Where site contamination is identified, a no action approach would be rejected for the following reasons: • The risks to human health and/or the environment from the identified soil contamination would be unacceptable under the proposed development; and • It does not provide any means to improve the current condition of the site.

Remedial Options	Assessment of Options
On-Site Treatment of Contaminated Soil	Some of the on-site soil treatment options include: • Bio-remediation: Addition of oxygen and nutrient compounds to accelerate the natural process of organic compound decay within the environment. Not suitable for all contaminants. • Soil Washing: Soil is stripped of contaminants via a leaching process and the concentrated contaminated liquid product retained for disposal or treatment. • Air Sparging and Extraction: Air is forced through the contaminated soil to volatilise organic contaminants. The air is then extracted and captured for treatment leaving reduced contaminant concentrations. • Thermal Desorption: Contaminated soils are heated within an incinerator to volatilise or combust the contaminants. Contaminants are trapped within an air filtration system. Should contaminants be identified on the site, it is not likely that the concentrations and/or volume of impacted soils would be conducive to on-site treatment in general. An exception may be small scale bio-remediation (land farming) of hydrocarbon impacted soils.
Off-Site Disposal of Contaminated Soil	Off-site disposal of contaminated material is considered a suitable option for managing human health and environmental impacts from the contaminated materials. Off-site disposal comprises the excavation of soil, classification of spoil, and disposal to a facility which can legally receive it. It is noted that soil classified as hazardous waste identified during *ex situ* classification will require treatment. Given that the proposed development involves a deep basement excavation, off-site disposal of contaminated soils (if identified) will be the primary remediation approach adopted.
Containment of Contaminated Soil	This would include the placement of an impermeable barrier such as concrete, warning barrier, non-contaminated soil material over existing ground surface to isolate contaminated material. The advantage of this option includes the reduction of transport contaminants via wind and water mechanisms. The disadvantage of this option includes the implementation of an environmental management plan which is required to be documented in the council planning certificate and/or title deeds which would in turn impact future land development and value. Given that the proposed development will involve basement excavation, capping and containment will not generally be feasible for this project.

10.3 Extent of Remediation

The investigations completed to date have not identified any specific site remediation requirements. Remediation may be required as a result of the proposed data gap analysis or through the identification of an unexpected find.

11. Remediation Acceptance Criteria

11.1 RAC for Soils

The RAC adopted for the remediation process are the site assessment criteria (SAC) as listed in DP (2018b).

The following guidelines will be adopted for evaluation of soil results:

- NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Measure (as amended 2013*);
- CRC CARE (2011) *Health Screening Levels for petroleum hydrocarbons in soil and groundwater, Technical report series No. 10*; and
- WA DoH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*.

The investigation and screening levels are applicable to generic land use settings and include consideration of, where relevant, the soil type and the depth of contamination. They are intentionally conservative and are based on a reasonable worst-case scenario.

11.2 Health Investigation and Screening Levels

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HILs are applicable to assessing health risk arising *via* all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface. Site-specific conditions may determine the depth to which HILs apply for other land uses.

Commercial/Industrial (HILs D) and Commercial /Industrial (HSLs D) soil assessment criteria were adopted based on the proposed multi-trades and digital technology hub (continued use as part of the TAFE) with approximately 200 spaces of basement carpark.

As soil types encountered were variable, the most conservative HSL for the different soil types (sand, silt and clay) have been adopted. HSL for a depth of 0 m to < 1 m have been adopted as these are more conservative than those for greater depths.
The adopted HIL and HSL for the COPC are shown in Table 7.

Table 7: HIL and HSL for Soil Contaminants

Contaminant	HIL D (mg/kg)	HSL D for vapour intrusion (mg/kg)
Metals and Inorganics		
Arsenic	3000	-
Cadmium	900	-
Chromium (VI)	3600	-
Copper	240 000	-
Lead	1500	-
Mercury (inorganic)	730	-
Nickel	6000	-
Zinc	400 000	-
Phenols (Pentachlorophenol as initial screen)	660	-
TRH		
$C_6 – C_{10}$ (less BTEX)	-	260
$>C_{10}-C_{16}$ (less Naphthalene)	-	NL
BTEX		
Benzene	-	3
Toluene	-	NL
Ethylbenzene	-	NL
Xylenes	-	230
PAH		
Benzo(a)pyrene TEQ	40	-
Naphthalene	-	NL
Total PAHs	4000	-
OCP		
DDT+DDE+DDD	3600	-
Aldrin + Dieldrin	45	-
Chlordane	530	-
Endosulfan (total)	2000	-
Endrin	100	-
Heptachlor	50	-
HCB	80	-
Methoxychlor	2500	-
OPP		
Chlorpyrifos	2000	-
Other Organics		
PCBs (non dioxin- like PCB only)	7	-

Note: TEQ is Toxic Equivalency Quotient.

NL is 'Not Limiting'. If the derived soil HSL exceeds the soil saturation concentration, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, the HSL is given as NL.

11.2.1 Ecological Investigation and Screening Levels

Ecological Investigation Levels (EIL) and ecological screening levels (ESL) to be determined in accordance with NEPC (2013), if ultimately deemed appropriate.

Schedule B5A of NEPC (2013) states that the aim *of the EILs is that varying levels of protection will be provided to the following ecological receptors at all sites:*

- *Biota supporting ecological processes, including microorganisms and soil invertebrates;*
- *Native flora and fauna;*
- *Introduced flora and fauna; and*
- *Transitory or permanent wildlife.*

Furthermore, Schedule B5A of NEPC (2013) states that *Commercial and industrial land, particularly in long-established industrial areas, is often heavily contaminated by past activities or fill materials used to level the area. In these cases, jurisdictions may determine that HILs are the most appropriate soil quality criteria and that EILs are not applicable. In many cases, the only generic ecological value for this land use will be 'transitory wildlife'.*

It is noted that the value of the site for soil organisms and the risk of exposure of soil contamination to transitory wildlife are considered very low, given that the commercial / industrial setting; the current hard covered site and surrounding area; and the proposed building and hardstand will occupy the entire site footprint.

Therefore, it is considered that human health risk screening levels are more appropriate and EIL and ESL are not relevant to the current assessment.

11.2.2 Management Limits – Petroleum Hydrocarbons

In addition to appropriate consideration and application of the HSL there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSLs (F1 to F4). The adopted Management Limits, from Table 1B(7), Schedule B1 of NEPC (2013) are shown in Table 8. The following site-specific data and assumptions have been used to determine the Management Limits:

- The Management Limits will apply to any depth within the soil profile;
- The Management Limits for commercial and industrial apply; and
- The soils encountered at the site comprised various types including sand and clay. A "coarse" soil texture (being the most conservative soil type) has been adopted.

Table 8: Management Limits

Contaminant	Management Limit – Residential, Parkland and Open Space (mg/kg)
TRH C_6 – C_{10}	700
TRH >C_{10}-C_{16}	1000
TRH >C_{16}-C_{34}	3500
TRH >C_{34}-C_{40}	10 000

11.2.3 Asbestos in Soil

Bonded asbestos-containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising fibrous asbestos (FA) and/or asbestos fines (AF).

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

A detailed asbestos assessment was not undertaken as part of these works as it was unknown at the time of preparing the proposal if asbestos was a likely contaminant. As an initial screen, the site assessment criteria for asbestos are as follows:

- No visible asbestos-containing materials (ACM) at the sampling locations; and
- No asbestos detected at the laboratory reporting limit of 0.1 g/kg.

11.3 Groundwater

The further assessment of groundwater may be required as part of a dewatering licence application. In the event that further assessment is required, the threshold outlined in this section will be adopted.

The groundwater investigation levels (GIL) used for interpretation of the groundwater results are based on the risks posed by contaminated groundwater, at or down-gradient of the site, as well as the potential uses of groundwater, as follows:

- Risk to aquatic ecosystems - based on general site topography and interpolated groundwater flow direction, groundwater that flows beneath the site is anticipated to discharge to Parramatta River. The 'marine water' guidelines have therefore been applied for the protection of aquatic ecosystems, consistent with the marine / brackish discharge point, of the Parramatta River;
- Potential potable use - it is considered unlikely that groundwater will be used for drinking. Therefore, drinking water criteria have not been considered; and
- HSL for sand adopted as this the most conservative a depth range of 2 m to <4 m has been used as an initial conservative screen based on the proposed site design.

As of 29 August 2018, the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) revoked the documents listed below, formerly used in deriving the NEPC (2013) groundwater investigation levels

- The Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, November 1992); and
- The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, October 2000).

Consequently, the groundwater site assessment criteria are based on the water quality default guideline values (DGVs) from *the Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) for the protection of aquatic ecosystems.

It should be noted that the DGVs has been updated on the (ANZG 2018) website, dated 23 August 2019, since the DP (2019a) investigation. The updated changes made to the DGVs have been reflected in the table below.

Table 9: Groundwater Investigation Levels (in µg/L unless stated otherwise)

Analyte		GIL – Marine Water	Comments
Metals	Arsenic (III)	24[a]	95% species protection level applies to the adopted GILs unless stated otherwise.
	Cadmium	0.7[b]	
	Chromium (III)	27	
	Copper	1.3	
	Lead	4.4	
	Mercury (total)	0.1[b]	
	Nickel	7[b]	
	Zinc	15	
PAH	Benzo(a)pyrene	0.1[b&c]	
	Naphthalene	50[b]	
BTEX	Benzene	500[b]	
	Toluene	180	
	Ethylbenzene	80	
	Xylene (m)	75	
OCP			
	Chlordane	0.001	
	DDT	0.0004	
	Endosulfan	0.005[b]	
	Endrin	0.004[b]	
	Heptachlor	0.0004[c]	
	Aldrin	0.003[c]	
	Methoxychlor	0.004[c]	
	Mirex	0.04[a&c]	
OPP	Chlorpyifos	0.009	
	Fenitrothion	0.001[c]	
PCB	-	-	Laboratory reporting limits used as initial screening levels. Reference to national or international standards adopted if concentrations exceed the reporting limits.
VOC	-	-	Laboratory reporting limits used as initial screening levels. Reference to national or international standards adopted if concentrations exceed the reporting limits.
Phenols	Phenol	400	

Notes:

[a] Freshwater DGV applied

[b] 99% level of species protection level

[c] Unknown level of protection

11.3.1 Health Screening Levels – Petroleum Hydrocarbons

The proposed development will continue to be used as part of Meadowbank TAFE. Therefore, as noted in the footnotes to Table 1A (4) of NEPC (2013), the relevant and adopted HSLs for groundwater are HSL D, commercial/industrial.

In addition, the HSLs adopted are predicted on the following inputs prescribed in Table 10.

Table 10: Inputs to the Derivation of HSLs

Variable	Input	Comment
Potential exposure pathway	Groundwater vapour intrusion	Exposure pathway via groundwater vapour intrusion affects the adopted HSL.
Soil type	Sand (based on the test bore logs)	Soil properties including soil saturation porosity affect risk of exposure and are therefore factored into HSLs. A conservative soil type should be selected where the soil profile is not uniform (NEPC, 2013).
Depth to contamination	2 m to <4 m	Groundwater occurs at approximately 5 m depth below the current surface level. Given that the final excavation depth has yet been confirmed, DP has adopted the most conservative depth to contamination.

The adopted groundwater HSL for vapour intrusion, from Table 1A(4), Schedule B1 of NEPC (2013) are shown in the following table.

Table 11: Groundwater Health Screening Levels (HSL) for Vapour Intrusion (µg/L)

Analyte		HSL D	Comments
TRH	C6 – C10 (less BTEX) [F1]	6000	Sand profile depth to contamination 2 m to <4 m
	>C10 – C16 (less naphthalene) [F2]	NL	
BTEX	Benzene	5000	
	Toluene	NL	
	Ethylbenzene	NL	
	Xylenes	NL	
PAH	Naphthalene	NL	

Note:
NL – the solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil-vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as 'NL'.

11.4 Classification Assessment for Off-Site Disposal

All wastes will be assessed in accordance with the POEO Act (1997).

For disposal to landfill, this will comprise assessment in accordance with the NSW Environment Protection Authority (EPA) *Waste Classification Guidelines* (2014).

For re-use off-site, soil will be assessed in accordance with other EPA guidance or licences under the POEO Act, and may include:

- Resource recovery orders issued by EPA under the *Protection of the Environment Operations (Waste) Regulation* 2014; and
- Guidance on assessment of virgin excavated natural material (VENM).

12. Site Validation Report

A site validation report will be prepared by an Environmental Consultant in accordance with the relevant NSW EPA endorsed guidelines. The validation report should include: the remedial methods used (if required), assess the results of the post-remediation testing against the RAC (if required) and that all relevant licence conditions and approvals have been met. The report will also document the waste classification and tracking of soils removed from the site and imported to the site.

The following documentary evidence will need to be reviewed by an Environmental Consultant as part of the validation process:

- Any licences and approvals required for the remediation works;
- Transportation record: this will comprise a record of all truckloads of soil entering or leaving the site, including truck identification (e.g. registration number), date, time, load characteristics (i.e. classification, on-site source, destination);
- Disposal dockets: for any soil materials disposed off-site, the contractor will supply records of: transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility (where available), a record of receipt from the receiving site will be supplied (i.e. the receiving sites transportation records, including EPL for the disposal site and written confirmation that they can take the waste consignment);
- Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records;
- Records relating to any unexpected finds and contingency plans implemented;
- Incident reports: any WHS Environmental Incidents which occur during the works will be documented and the PR and appropriate regulatory authority will be informed in accordance with regulatory requirements;
- Laboratory certificates and chain-of-custody documentation; and
- Letters/ memos as required to provide instruction or information to the Principal and Contractor.

12.1 Principal

The Principal will prepare / obtain the following documents:

- Any Licences and Approvals required for the Works which are not the responsibility of the Contractor to provide.

12.2 Principal Contractor

The Principal Contractor will prepare / obtain the following documents:

- Any Licences and Approvals required for the Works which are the responsibility of the Contractor to provide;
- Excavation and Stockpiling Records: these will record the source of any stockpiled material, the date of excavation and any issues of concern;
- Transportation Record: this will comprise a record of any truckloads of soil entering or leaving the site, including truck identification (e.g. registration number), date, time, load characteristics (i.e. classification, on-site source, destination);
- Tip dockets: these comprise dockets of receipt provided by the receiving waste facility;
- Survey drawings showing the extent of remedial excavations; and
- Incident Reports: any WHS or Environmental Incidents which occur during the works will be documented and the PR and appropriate regulatory authority will be informed in accordance with regulatory requirements.

Licences and approvals include the following (but not limited to):

- Notify the Council (consent authority) 30 days prior to commencement of remediation works. The client should check with the Council regarding this; and
- Removal of waste materials from the site shall only be carried out by a licensed contractor holding appropriate licence.

12.3 Environmental Consultant

The Environmental Consultant will prepare/ obtain the following documents:

- Waste classification reports, including records of sampling and analysis;
- Validation reports associated with imported materials; and
- Validation report, including records of inspections, sampling and analysis.

12.4 Occupational Hygienist

The Occupational Hygienist will prepare/ obtain the following documents (if asbestos contaminated materials are encountered):

- Airborne asbestos monitoring records;
- Interim visual clearances of asbestos removal (if any undertaken);
- A written final clearance certificate (included in the validation) stating that:
  - The assessor or competent person found no visible asbestos residue from asbestos removal work on the surface of the works area, or on the surface near the area where the work was carried out, and
  - If air monitoring was carried out by the assessor or competent person as part of the clearance inspection - the airborne asbestos fibre level was less than 0.01 asbestos fibres/mL.

13. General Environmental Management Plan

13.1 General

The Contractors will undertake the work with due regard to the minimisation of environmental effects and to meet regulatory and statutory requirements.

The Contractors should have in place an over-arching construction environmental management plan that incorporates this RAP so that work on the site complies with, but not limited to, the following:

- *Protection of the Environment Operations Act* 1997;
- *Contaminated Land Management Act* 1997;
- *Work Health and Safety Act* 2016; and
- *Work Health and Safety Regulation* 2017.

The following general measures outlined below should be implemented during the remediation phase. All personnel should be made familiar with the following section prior to the commencement of site works as required.

13.2 Vibration Control

The use of any plant and/or machinery should not cause unacceptable vibrations to nearby properties and should meet Council requirements.

13.3 Dust Control

Dust emissions should be confined within the site boundary. The following dust control procedures will be employed to comply with this requirement as necessary:

- Erection of dust screens around the perimeter of the site;
- Securely covering all loads entering or exiting the site;

- Use of water sprays across the site to suppress dust;
- Covering of all stockpiles of contaminated soil remaining onsite more than 48 hours;
- Dust monitoring as may be required by the Council DA consent; and
- Keeping excavation and stockpile surfaces moist.

13.4 Odour Control

No odours should be detected at any boundary of the site during remediation works by an authorised Council Officer relying solely on sense of smell. The following procedures should be employed to comply with this requirement as required:

- Use of appropriate covering techniques such as plastic sheeting, polythene or geotextile membranes to cover excavation faces or stockpiles;
- Fine spray of water and/or hydrocarbon mitigating agent on the impacted areas/materials;
- The use of water spray, as and when appropriate, to eliminate wind-blown dust;
- Use of sprays or sprinklers on stockpiles or loads to lightly condition the material;
- Restriction of stockpile heights to 5 m above surrounding site level. If required, restrict uncovered stockpiles to appropriate sizes to minimise odour generation;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues to ensure compliance. Undertake immediate remediation measures to rectify any cases of excessive dust or odour (e.g. use of misting sprays or odour masking agent); and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

13.5 Stormwater Management and Control

As necessary, the remediation contractor shall take appropriate measures to ensure that potentially contaminated water does not leave the site. Stormwater management for the duration of the remediation works shall be utilised and monitored to minimise stormwater flow into adjacent waterways.

13.6 Occupational Health and Safety

The Contractors shall develop a site emergency response plan (ERP) and occupational health and safety plan (OHSP). This will ensure the safety of the personnel working on site, given any likely incident/accident which may occur. The OHSP and ERP should include emergency phone numbers and details of local emergency facilities.

Appropriate fencing and signage should be installed around and within the site to prevent unauthorised access to the site, restricted access remediation areas and/or deep excavations.

All site personnel should be required to wear the following personnel protective equipment (PPE):

- Steel-capped boots;
- High visibility clothing; and
- Hard hat meeting AS1801-1981 requirements.

The following additional PPE will be worn, as required:

- Hearing protection meeting AS1270-1988 requirements when working around machinery or plant equipment if noise levels exceed exposure standards;
- Safety glasses or safety goggles with side shields meeting AS1337-1992 requirements (as necessary, particularly during any demolition);
- Disposable coveralls (if necessary) to prevent contact with splashed contaminated soil, materials or water;
- Nitrile work gloves meeting AS2161-1978 requirements or heavy-duty gauntlet gloves; and
- Any additional protection identified by the Environmental Consultant.

Where the site personnel are required to work in areas of potential contact with asbestos, the following special PPE (in addition to the standard PPE) should be worn during works involving the handling and/or removal of soils impacted by asbestos:

- Disposable coveralls (rated type 5, cat 3 or equivalent);
- Half-face P1/P2 respirator or equivalent;
- Gloves; and
- Safety footwear which should be laceless.

Excavation, handling, stockpiling, transport etc. of materials containing asbestos should be undertaken by a licensed contractor in accordance with relevant regulatory requirements.

13.7 Hours of Operation

All remediation work should be conducted within the hours specified by the City of Ryde.

13.8 Contingency Plans to Respond to Site Incidents

The key to effective management of incidents is the timely action taken before any situation reaches a reportable or critical level. Therefore, surveillance activities are extremely important, and should be conducted for the measures prescribed herein and any other measures as seen appropriate by the Principal's representative. During work activities on the site, the following inspection or preventative actions must be performed by the main Contractor and carefully documented:

- Regular inspection of works;
- Completion of routine environmental checklists and follow-up of non-compliance situations;
- Maintenance of supervision on-site; and

- An induction process for site personnel involved in the remediation works that includes relevant information on environmental requirements; and ensure that all site personnel are familiar with the site emergency procedures.

The Contractor's site foreman should be responsible for initiating an immediate emergency response using the resources available on the site. Where external assistance is required, the relevant emergency services should be contacted. A list containing contact details for key personnel who may be involved in an environmental emergency response should be completed and be made available to site workers.

13.9 Identify Regulatory Compliance

The work should be undertaken with all due regard to the minimisation of environmental effects and to meet all statutory requirements, including, inter alia, provisions specified in:

- *Protection of the Environment Operations Act* 1997;
- *Contaminated Land Management Act* 1997;
- *Dangerous Goods Act* 2008;
- *Work Health and Safety Act* 2016;
- *Work Health and Safety Regulation* 2017; and
- DUAP NSW EPA (1998) *State Environmental Planning Policy No. 55* (SEPP 55).

13.10 Community Engagement

The Contractor must affix a sign to the main entrance of the site displaying contact details of the Contractor, Environmental Consultant and Principal Contractor. Each party must keep a log of any communications received by the public. A summary of any communications received will be included in the validation report.

13.11 Contact Details

The following table provides a list of personnel and contact details relevant to the remediation. The list should be filled in as relevant personnel are appointed to the remediation project.

Table 12: Contact Details

Role	Personnel / Contact	Contact Details (phone)
Principal	TAFE NSW	
Principal's Representative		
Site Manager		
Environmental Consultant		

Role	Personnel / Contact	Contact Details (phone)
Regulator	NSW EPA (pollution line)	131 555
Regulator	NSW EPA (general enquiries)	131 555
Consent Authority	City of Ryde	(02) 9952 8222
Utility Provider	Sydney Water	13 20 92
Utility Provider	Power	
Utility Provider	Gas	

Notes to table: Table to be completed when the contact details are known.

14. Conclusions

It is considered that the site can be rendered suitable for the proposed development subject to the following:

- Completion and finding of the data gap analysis;
- Appropriate management of off-site disposal of fill/soil in accordance with the RAP;
- Proper implementation of unexpected finds protocols during basement excavation and other civil works on the site; and
- Consideration of remedial options and procedures in the event of finding significant site contamination as per Sections 10 to 13 of this RAP.

Significant contamination identified during the data gap analysis and/or addressing unexpected finds may warrant an amendment or addendum to this RAP such that appropriate actions are managed and documented.

15. Limitations

Douglas Partners (DP) has prepared this report for the proposed Multi-Trades and Digital Technology Hub at part of the Meadowbank TAFE campus, See Street, Meadowbank in accordance with DP's email (ref: SYD190898) dated 23 August 2019 and acceptance received from TAFE NSW dated 27 August 2019. The work was carried out under a TAFE Professional Services Agreement dated 25 February 2019). This report is provided for the exclusive use of TAFE NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological

processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (geotechnical / environmental / groundwater) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About This Report

Drawings

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	NSW TAFE		
OFFICE:	Sydney	DRAWN BY:	CL
SCALE:	Not to Scale	DATE:	09.05.2019

TITLE: **Detailed Site Investigation Borehole Locations**
Proposed Multi Trades Hub
See Street, Meadowbank TAFE

N

PROJECT No: 86469.10
DRAWING No: 1
REVISION: 0

Douglas Partners
Geotechnics / Environment / Groundwater

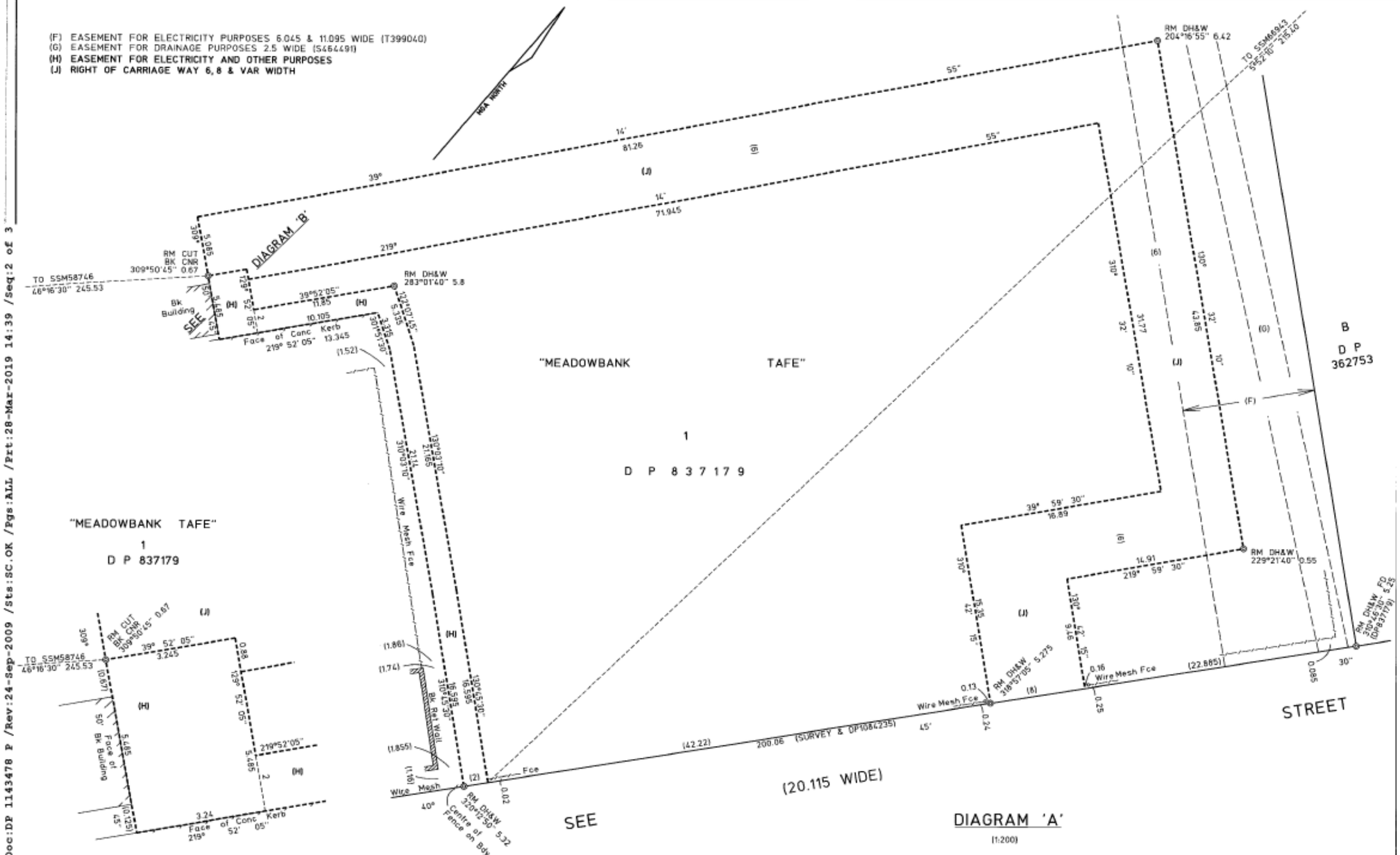
CLIENT:	NSW TAFE		
OFFICE:	Sydney	DRAWN BY:	CL
SCALE:	Not to Scale	DATE:	09.05.2019

TITLE: **Detailed Site Investigation Borehole Locations**
Proposed Multi Trades Hub
See Street, Meadowbank TAFE

N

PROJECT No: 86469.10
DRAWING No: 2
REVISION: 0

(F) EASEMENT FOR ELECTRICITY PURPOSES 6.045 & 11.095 WIDE (T399040)
(G) EASEMENT FOR DRAINAGE PURPOSES 2.5 WIDE (S464491)
(H) EASEMENT FOR ELECTRICITY AND OTHER PURPOSES
(J) RIGHT OF CARRIAGE WAY 6, 8 & VAR WIDTH



Surveyor: DAVID CHI Date of Survey: 27/05/2008 Surveyor's Ref: B.55850	PLAN OF EASEMENTS AFFECTING LOT 1 DP837179	LGA: RYDE Locality: MEADOWBANK Subdivision No: —— Lengths are in metres. Reduction Ratio 1: 200	Registered: 24.9.2009	DP1143478

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: TAFE NSW		TITLE: **Location of Ausgrid Easement [denoted as (F)]** **Proposed Multi-Trades and Digital Technology Hub** **Part of Meadowbank TAFE, See Street, Meadowbank**	NORTH	PROJECT No: 86469.10
	OFFICE: Sydney	DRAWN BY: WFY			DRAWING No: 3
	SCALE: NTS	DATE: 3.09.2019			REVISION: 1

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	TAFE NSW		
OFFICE:	Sydney	DRAWN BY:	WFY
SCALE:	NTS	DATE:	5.09.2019

TITLE: **Location of Current and Proposed Sampling Points**
Proposed Multi-Trades and Digital Technology Hub
Part of Meadowbank TAFE, See Street, Meadowbank

NORTH

PROJECT No:	86469.10
DRAWING No:	4
REVISION:	0

Appendix B

Tables E1-E3

Douglas Partners
Geotechnics | Environment | Groundwater

Table E1: Summary of Laboratory Results – OCP, OPP, PCB

		OCP								OPP	PCB
		DDT+DDE+DDD	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyriphos	Total PCB
	PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH01/0.4-0.5	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC
BH01/0.9-1.0	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC
BH02/0.1-0.2	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC
BH02/0.4-0.5	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC
BH03/0.1-0.2	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC
BH03/0.4-0.5	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC
BH04/0.1-0.2	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC
BH04/0.4-0.5	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC
BH05/0.1-0.2	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC
BH05/0.4-0.5	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC
BH06/0.1-0.2	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	**0.2** 7 NC
BH07/0.1-0.2	01/01/0001	<0.1 3600 NC	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC
BH07/0.4-0.5	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC
BD1/20190316	01/01/0001	NT 3600 NC	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC

HIL / HSL EIL / ESL exceedance ML exceedance HIL/HSL and EIL/ESL exceedance **Bold** = Lab detections Key: Lab result (HIL/HSL value | EIL/ESL value)

ML and HIL/HSL/EIL/ESL **red** = DC exceedance NT = Not tested NL = Non limiting NC = No criteria NAD = No asbestos detected

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report

Notes:

a

HIL/HSL

Table E2 - Summary of Analytical Results - Groundwater (All results in µg/L unless otherwise stated)

Monitoring Well ID	Date Sampled	Metals								TRH			BTEX				
		Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C10 less BTEX (F1)	F2-NAPHTHALENE	Total TRH >C10-C40	Benzene	Toluene	Ethylbenzene	Xylene (m&p)	Xylene (o)
PQL		1	0.1	1	1	1	0.05	1	1	10	50	PQL	1	1	1	2	1
Site Assessment Criteria (SAC)																	
HSL D, 2m<4m , Sand		-	-	-	-	-	-	-	-	6000	NL	-	5000	NL	NL	NL	NL
DGV[2] for slightly to moderately disturbed marine waters		13[a]	0.7[b]	27.4 (Cr III) 4.4 (Cr VI)	1.3	4.4	0.1[b]	7[b]	15	-	-	-	500[b]	180[c]	5[c]	75[c] (m xylene) 200[c] (p xylene)	350[c]
Inerim marine water guideline [3], 95% species protection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH01	27/03/2019	<1	0.1	2	13	26	<0.05	13	100	<10	<50	<PQL	<1	<1	<1	<2	<1

Monitoring Well ID	OCP											OPP											PAH			Phenols	PCB	
	Alpha+gamma chlordane	DDE	DDT	Endosulfan (I+II)	Endrin	Heptachlor	Aldrin	Dieldrin	Methoxychlor	Mirex	Heprachlor+heptachlor epoxide	Azinphos-methyl	Bromophos-ethyl	Chlorpyifos	Diazinon	Dichlorovos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Mrthyl Parathion	Benzo(a) pyrene	Naphthalene	Total PAH	Phenol (mg/L)	Aroclor 1242	Aroclor 1254
PQL	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1	1	1	0.05	2	2
HSL D, 2m<4m , Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-
DGV[2] for slightly to moderately disturbed marine waters	0.002	0.0005	0.0004	0.005	0.004	0.0004	0.003	0.01	0.004	0.04	-	0.01	-	0.09	0.01	-	0.15	-	0.001	0.05	0.004	-	0.1[c]	50[b]	-	0.4	0.3[c]	0.01[c]
Inerim marine water guideline [3], 95% species protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<PQL	<0.05	<2	<2

Notes

2	Groundwater Default Guideline Values obtained from (ANZG 2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality
3	Table 5 HEPA (2018) PFAS NEPM (2018)
a	Freshwater DGV applied
b	Based on 99 % level of species protection
c	Unknown level of protection
BOLD	Values over the PQL
PQL	Practical Quantitation Limit

Table E3: Summary of Analytical Results - Waste Classification

	Metals										Phenols	Asbestos	OCPs																					
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Lead in TCCLP	Mercury	Nickel	Nickel in TCLP	Zinc	Phenolics Total	Asbestos	4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	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
PQL	4	0.4	1	1	1	0.03	0.1	1	0.02	1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NSW EPA 2014 General Solid Waste (CT1)	100	20	100	-	100		4	40		-	288	-																						
NSW EPA 2014 General Solid Waste SCC1	500	100	1900	-	1500	5	50	1050	2	-	518	-																						
NSW EPA 2014 Restricted Solid Waste (CT2)	400	80	400	-	400		16	160		-	1152	-																						
NSW EPA 2014 Restricted Solid Waste SCC2	2000	400	7600	-	6000	20	200	4200	8	-	2073	-																						
Field	**Sample Date**	**Matrix**																																
BH01/0.4-0.5	19/03/2019	Filling	<4	<0.4	18	14	36		0.1	20		63	<5	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH01/0.4-0.5	19/03/2019	Filling	<4	<0.4	19	13	30		0.1	18		53	-	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH01/0.9-1.0	19/03/2019	Filling	6	<0.4	39	37	120	<0.03	0.1	36		200	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02/0.1-0.2	19/03/2019	Filling	<4	<0.4	7	64	2		<0.1	100	0.2	38	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02/0.4-0.5	19/03/2019	Filling	5	<0.4	44	43	120	<0.03	0.8	50		280	<5	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH03/0.1-0.2	19/03/2019	Filling	<4	<0.4	8	49	3		<0.1	95		36	<5	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03/0.4-0.5	19/03/2019	Filling	4	<0.4	16	3	10		<0.1	6		9	<5	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04/0.1-0.2	19/03/2019	Filling	<4	<0.4	13	31	10		<0.1	50		32	<5	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04/0.4-0.5	19/03/2019	Filling	8	<0.4	26	10	20		<0.1	15		34	<5	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05/0.1-0.2	19/03/2019	Filling	<4	<0.4	8	68	3		<0.1	100	0.2	39	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05/0.4-0.5	19/03/2019	Filling	<4	<0.4	10	34	61		0.2	14		190	<5	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH06/0.1-0.2	19/03/2019	Filling	5	<0.4	16	22	77		0.2	10		250	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07/0.1-0.2	19/03/2019	Filling	<4	<0.4	11	17	21		<0.1	29		43	-	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH07/0.4-0.5	19/03/2019	Filling	<4	<0.4	17	24	35		0.3	11		67	<5	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BD1/20190316	19/03/2019	Filling	<4	<0.4	15	11	23		<0.1	15		38	<5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes

NAD- No asbestos detected

BD1/20190316 Taken at BH04/0.4-0.5

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Table E3: Summary of Analytical Results - Waste

			OPPs												PAHs																PCBs							
			Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(a) pyrene in TCLP	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
			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/L	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
PQL			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NSW EPA 2014 General Solid Waste (CT1)					4														0.8											200							
NSW EPA 2014 General Solid Waste SCC1					7.5														10											200							
NSW EPA 2014 Restricted Solid Waste (CT2)					16														3.2											800							
NSW EPA 2014 Restricted Solid Waste SCC2					30														23											800							
Field	**Sample Date**	**Matrix**																																				
BH01/0.4-0.5	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	**0.3**		**0.2**	**0.4**	<0.1	**0.6**	<0.1	**0.2**	<0.1	**0.3**	**0.6**	**3.3**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH01/0.4-0.5	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.5	**0.4**		**0.2**	**0.6**	<0.1	**1**	<0.1	**0.2**	<0.1	**0.6**	**1**	**5.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH01/0.9-1.0	19/03/2019	Filling	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.4	**0.4**		**0.3**	**0.4**	<0.1	**0.6**	<0.1	**0.2**	<0.1	**0.2**	**0.7**	**3.8**	-	-	-	-	-	-	-
BH02/0.1-0.2	19/03/2019	Filling	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-
BH02/0.4-0.5	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.3**	**0.5**	2.2	2.5	<0.001	**1.5**	**2.6**	**0.3**	**4.5**	0.1	**1.3**	**0.4**	**2.3**	**4.5**	**27**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH03/0.1-0.2	19/03/2019	Filling	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-
BH03/0.4-0.5	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04/0.1-0.2	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04/0.4-0.5	19/03/2019	Filling	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-
BH05/0.1-0.2	19/03/2019	Filling	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-
BH05/0.4-0.5	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	**0.1**		<0.1	**0.2**	<0.1	**0.2**	<0.1	<0.1	<0.1	<0.1	**0.2**	**0.98**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH06/0.1-0.2	19/03/2019	Filling	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.1	**0.1**		<0.1	**0.2**	<0.1	**0.2**	<0.1	<0.1	<0.1	<0.1	**0.2**	**0.99**	-	-	-	-	-	-	-
BH07/0.1-0.2	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	<0.1
BH07/0.4-0.5	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
BD1/20190316	19/03/2019	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes

NAD- No asbestos detected

BD1/20190316 Taken at BH04/0.4-0.5

Table E3: Summary of Analytical Results - Waste

		TRHs																BTEX										
	PCBs (Sum of total)	C10-C16	C16-C34	C34-C40	F2-NAPHTHALENE	C10 - C14	C15 - C28	C29-C36	C10 - C40 (Sum of total)	Toluene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichlorofluoromethane	Vinyl chloride	Xylene (m & p)	Xylene (o)	Benzene	Ethylbenzene	Naphthalene	Toluene	C6 - C9	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 less BTEX (F1)	C6-C10
	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
PQL	0.1	50	100	100	50	50	100	100	50	0.5	1	1	1	1	2	1	0.2	1	1	0.5	25	2	1	1	25	25
NSW EPA 2014 General Solid Waste (CT1)	50									288				4			10	600		288	650			1000		
NSW EPA 2014 General Solid Waste SCC1	50									518				7.2			18	1080		518	650			1800		
NSW EPA 2014 Restricted Solid Waste (CT2)	50									1152				16			40	2400		1152	2600			4000		
NSW EPA 2014 Restricted Solid Waste SCC2	50									1152				16			72	4320		2073	2600			7200		
Field	**Sample Date**	**Matrix**																										
BH01/0.4-0.5	19/03/2019	Filling	<0.1	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH01/0.4-0.5	19/03/2019	Filling	<0.1	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH01/0.9-1.0	19/03/2019	Filling	-	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH02/0.1-0.2	19/03/2019	Filling	-	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH02/0.4-0.5	19/03/2019	Filling	<0.1	<50	**200**	100	<50	<50	<100	**140**	**300**	<0.5	**-**	-	**-**	-	**-**	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH03/0.1-0.2	19/03/2019	Filling	-	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	<1	<1	<1	<1	<1	<1	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH03/0.4-0.5	19/03/2019	Filling	<0.1	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH04/0.1-0.2	19/03/2019	Filling	<0.1	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH04/0.4-0.5	19/03/2019	Filling	-	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	<1	<1	<1	<1	<1	<1	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH05/0.1-0.2	19/03/2019	Filling	-	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH05/0.4-0.5	19/03/2019	Filling	<0.1	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH06/0.1-0.2	19/03/2019	Filling	-	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH07/0.1-0.2	19/03/2019	Filling	**0.2**	<50	<100	<100	<50	<50	<100	<100	<50	<0.5	-	-	-	-	-	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BH07/0.4-0.5	19/03/2019	Filling	0.1	<50	<100	**110**	<50	<50	<100	<100	**110**	<0.5	**-**	-	**-**	-	**-**	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25
BD1/20190316	19/03/2019	Filling	<0.1	<50	<100	**<100**	<50	<50	<100	<100	**<50**	<0.5	**-**	-	**-**	-	**-**	-	<0.2	<1	<1	<0.5	<25	<2	<1	<1	<25	<25

Notes

NAD- No asbestos detected

BD1/20190316 Taken at BH04/0.4-0.5