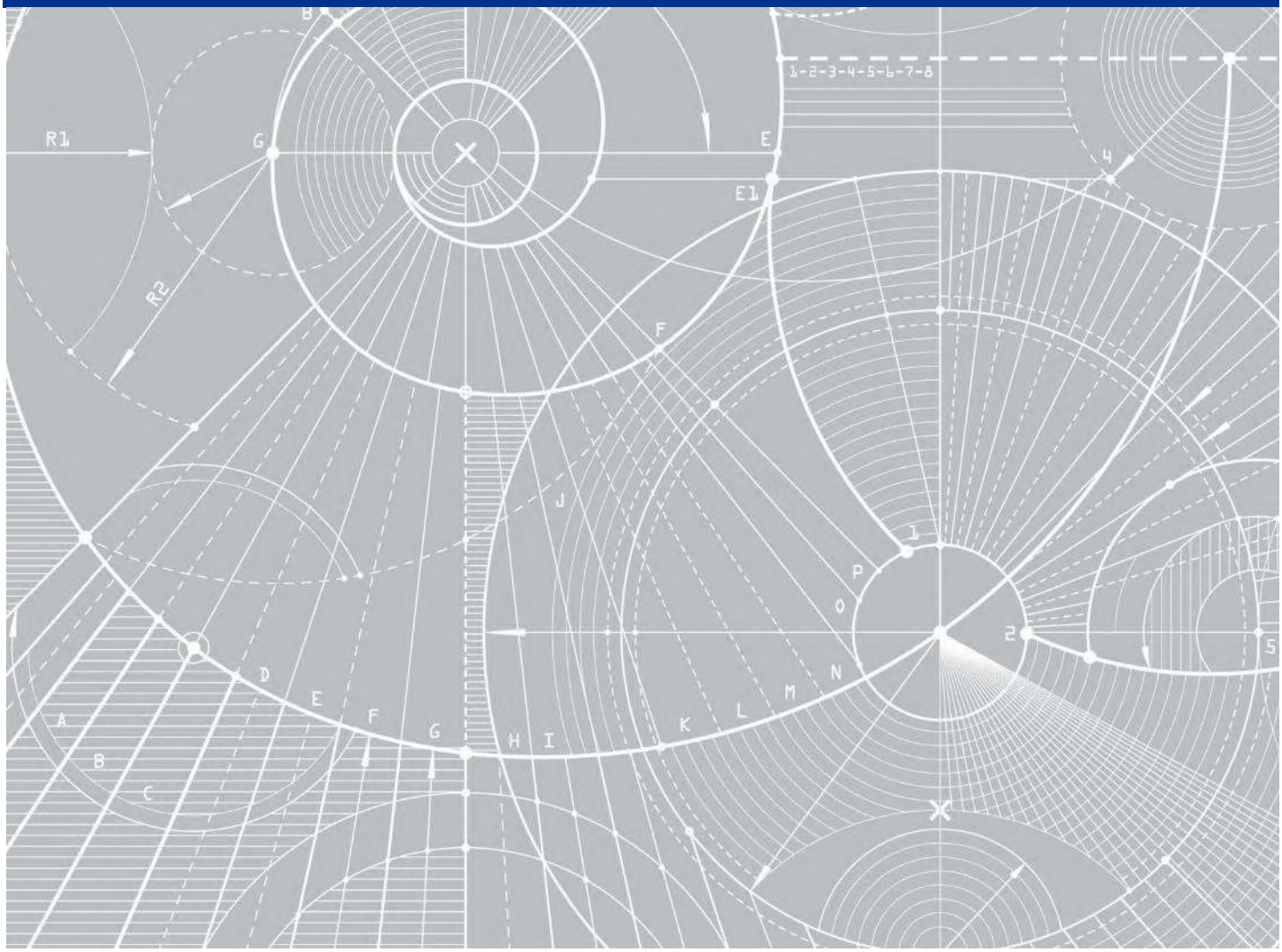
Site Audit Report 278_Northcote by Dr Ian Swane

WESTCONNEX STAGE 3A NORTHCOTE COMPOUND, HABERFIELD (AREA C3A)

Final | 28 NOVEMBER 2022



IAN SWANE & ASSOCIATES

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Ian Swane & Associates Pty Ltd
ABN 51 102 396 565
PO Box 359 Mortdale NSW 2223
Australia

Tel: +61 (0) 418 867 112
Email: iswane@bigpond.com

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1. Introduction

1.1 Background Information

WestConnex is a 33 km predominately underground motorway scheme that encompassed widening of the M4 Western Motorway, an eastern extension of the M4 (**M4 East**), a new section for the M5 Motorway (**New M5**), and a new inner western bypass of the Sydney CBD connecting the M4 and New M5 (M4-M5 link). The WestConnex Stage 3A project consisted of a group of underground tunnels connecting the M4-M5 Link with Victoria Road (just east of the Iron Cove Bridge) and The Crescent, the Anzac Bridge, and the City West Link **Figure 1-1**).

There were four worksites / compounds where construction work for the WestConnex Stage 3A project occurred at the ground surface, these being:

- The St Peters Interchange (**SPI**) worksite (Area C10) at St Peters;
- The Pyrmont Bridge Road (**PBR**) worksite (Area C9) at Annandale;
- The Parramatta Road East West (**PREW**) worksite (Areas C1b and C3b) at Ashfield; and
- The Northcote Compound (Area C3a) at Haberfield.

The locations of these areas are shown in **Figure 1-1**.

The land at each of these worksite compounds was the subject of a Statutory Site Audit, as defined by the NSW Contaminated Lands Management (**CLM**) Act 1997. The outcome of the site audit for each property was documented in its own site audit report (**SAR**). This SAR documents the outcome of the site audit for the Northcote Compound, which consisted of one area (C3a) located on either side of Northcote Street in the Ashfield local government area **(LGA**). The total size of the Northcote Compound was 12,165 m^2 (1.2165 ha), with a layout plan provided in **Figure 1-2**.

The Northcote Compound was established by CPB Samsung John Holland as part of the WestConnex M4 East Project, which commenced several years before work on the WestConnex Stage 3A Project commenced. Fieldwork for a detailed site investigation (**DSI**) for the Northcote Compound was undertaken in 2016, with a draft report issued on 7/12/16.

The Northcote Compound consisted of 12 parcels of land, comprising:

- Site 006: 269 Parramatta Rd, Haberfield (Lots 63 & 64 in DP4612;
- Site 012: 2-4 Wattle Street, Haberfield (Lots 1 & 2 in DP239458);
- Site 026: 257 Parramatta Rd, Haberfield (Lots 51-52 in DP719977);
- Site 027: 255 Parramatta Rd, Haberfield (Lots 53 & 54 in DP719977);
- Site 028: 249-251 Parramatta Rd, Haberfield (Lots 56-58 in DP719977);
- Site 046: Northcote Street
- Site 136: 3 Wolseley St, Haberfield (Lot 114 in DP4612);
- Site 137: 1 Wolseley St, Haberfield (Lot 115 in DP4612);
- Site 138: 4 Northcote St, Haberfield (Lot 1 in DP933407);
- Site 139: 2 Northcote St, Haberfield (Lot 1 in DP933225);
- Site 140: 1 Northcote St, Haberfield (Lot B in DP391272); and
- Site 141: 3 Northcote St, Haberfield (Lot A in DP391272).

Figure 1-1 Overview of WestConnex Stage 3A Project Footprint and Construction Ancillary Facilities

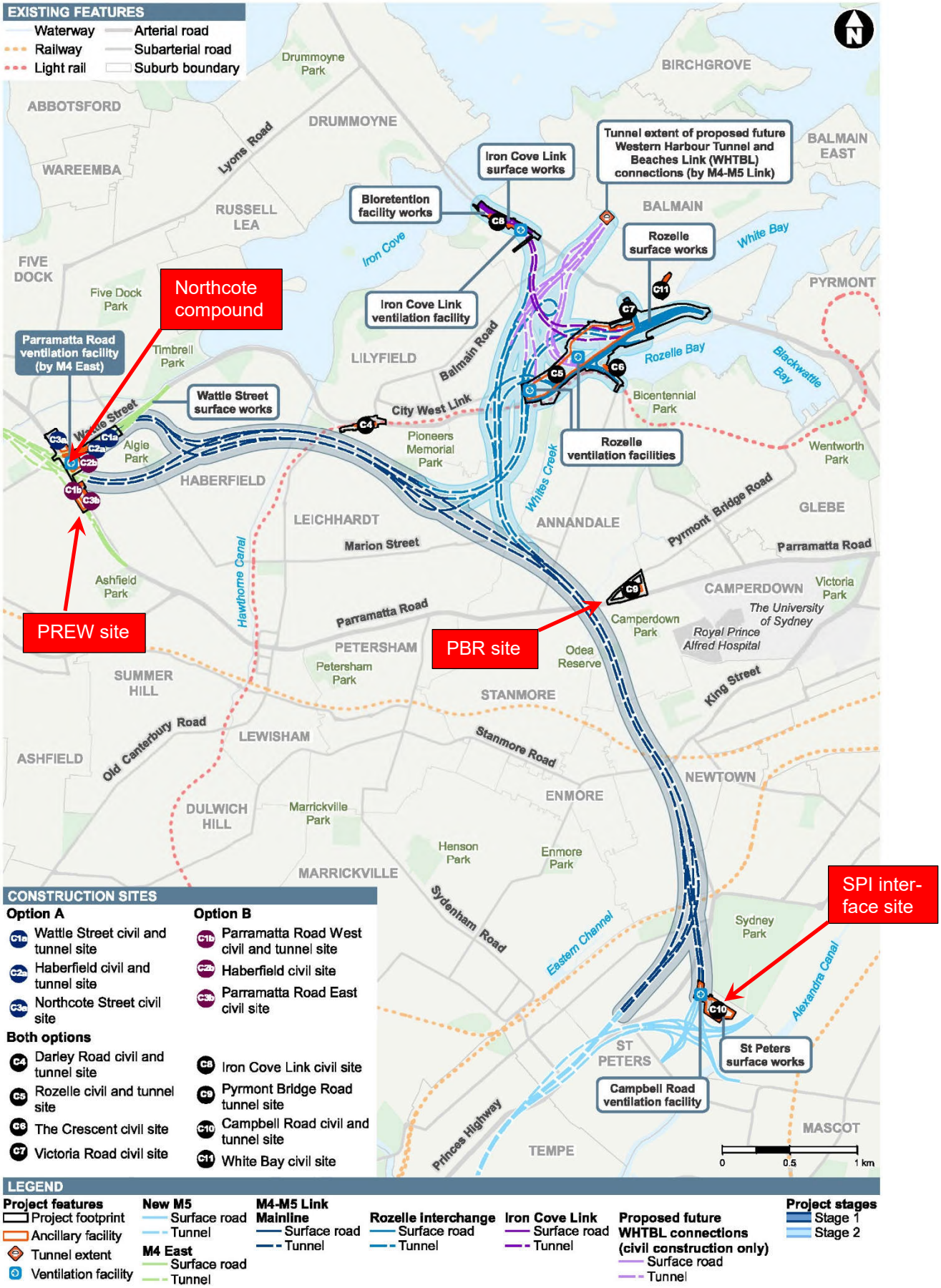


Figure 1-2 Location Plan for Northcote Compound (Site C3a) (Source: Ref [50])

When the WestConnex M4 East Project was practically completed in 2019, responsibility for the Northcote Compound was transferred to the WestConnex Stage 3A Project. This meant that:

- The DSI for the Northcote Compound was not conducted as part of this Project:
- The Site Auditor this SAR was not involved in auditing the planning, conduct or documentation of the investigation; and
- The Site Auditor for this SAR was only able to review the DSI report after the Northcote Compound had been constructed and was being used by the WestConnex Stage 3A contractor.

The Site Auditor considered the delayed timing of the review of the DSI was not a significant matter for the purpose of this site audit because its purpose was to determine the suitability of the final condition of the Project site towards the end of the WestConnex Stage 3A Project.

The Northcote Compound was located on the corner of Wolseley Street and extended south along Parramatta Road, comprising partially of Northcote Street and finishing at the corner of Wattle Street. During construction of the M4 East Motorway, the Northcote Compound was used for a dive structure providing access for roadheaders, a laydown area, temporary ventilation plant, acoustic shed for stockpiled soils, water treatment plant, sedimentation pond, electrical and mechanical workshops, offices, and an electrical substation. This use was continued by ASBJV for the WestConnex Stage 3A project, with a layout plan of the Site for operations 2019 – 2022 provided in **Figure 1.3**.

The future use of the land was to be determined in accordance with the Residual Land Management Plan that was to be prepared for the project.

The audit was undertaken by Dr Ian Swane, a NSW Environment Protection Authority (**EPA**) Site Auditor Accreditation No. 9821. The audit was undertaken in accordance with the CLM Act. For annual return purposes to the EPA, the audit is number 278 in the records of the Site Auditor. The site audit was commissioned by [redacted] from the Acciona Samsung Bouygues Joint Venture (**ASBJV**), formerly the Lendlease Samsung Bouygues Joint Venture (**LSBJV**) on 20/07/18. The audit was conducted in accordance with a proposal dated 15/07/18.

All site audit work reported in this SAR was undertaken by the Site Auditor, since all matters that needed to be audited and documented herein were within the expertise of the Site Auditor and no assistance was required from the Audit Support Team.

The Site Auditor checked the EPA website[1] at the beginning and during the audit and found that the Northcote Compound and land within 200 m of the Site were not recorded by the EPA as having been 'Declared' land or a notified site.

This report is the second statutory SAR/SAS issued for the Northcote Compound. The first SAR/SAS (Refs [55] and [56]) was issued by Brad Eismen, another EPA-accredited Site Auditor, from AECOM. The first SAR/SAS was dated 26/02/19, numbered BE136 and covered an area of only 0.14 ha in the central part of the Northcote Compound, which had a total area of 1.22 ha area. The land that was the subject of the Eismen site audit had the address of 257 Parramatta Road, which is referred to in this report to Site 026 as shown in **Figure 2-1**.

[1] www.epa.nsw.gov.au/clm

Figure 1-3 WestConnex Stage 3A Layout for Northcote Compound (2019-2022) (Source: Ref [51])

1.2 Purpose and Scope of the Audit

1.2.1 Purpose

The purpose and scope of the site audit was based on requirements specified in three documents:

- A contract made on or about June 2018 between the ASBJV and the NSW Government, which required ASBJV to deliver most of the work required by the WestConnex Stage 3A Project as described in the Planning Consent. Some work required by the Planning Consent may also have been outside the scope of work to be undertaken by ASBJV;
- The Department of Planning Consent State Significant Infrastructure (**SSI**) 7485 ('**Planning Consent**') issued for the WestConnex Stage 3A Project on 17/04/18 (Ref [50]). The proponent for the Project was Transport for NSW (**TfNSW**) formerly Roads and Maritime Services from the NSW Government; and
- An Environmental Protection Licence (**EPL**).

Contractual Requirements

With regards to site contamination, the Site Auditor understood that ASBJV was responsible for:

a) Complying with NSW Government environmental legislation regarding contaminated site and waste management;

b) Managing contamination that ASBJV interfered or disturbed during the course of carrying out its work;

c) Not generating contamination at the Project site or generating contamination that may cause an increase in contamination migrating from the Project site;

d) Returning the Northcote Compound to a condition suitable for a road construction worksite; and

e) Complying with EPL 21149 (Ref [52]).

With regards to site contamination, the Site Auditor understood that ASBJV was not responsible for engaging the Site Auditor to determine whether:

f) Any part of the Project site had been remediated and made suitable for a specified use other than as a road construction worksite; and

g) Contamination that existed at the Project site prior to the commencement of the Project continued to migrate off-site.

The Site Auditor was understood to be responsible for:

h) Reviewing site environmental management plans that dealt with contamination at the Project site and to check whether these plans met Condition C22 of the Planning Consent as relevant to this site audit;

i) Reviewing contamination assessments for the Project site and whether they met Condition E181 of the Planning Consent;

j) Reviewing waste classifications and documentation on the management of waste removed from the Project site[2];

k) Reviewing reports on the management of contamination at the Project site throughout the period construction activities were undertaken by ASBJV and to determine whether:

   i. No additional contamination was generated by the construction work;

   ii. The land was maintained in a condition suitable for a road construction worksite and compliance was achieved with Conditions E182 to E185 of the Planning Consent;

[2] A requirement under Section 4.3.7, EPA (October 2017) Site Auditor Guidelines

iii. Waste generated by construction activities at the Project site was managed in accordance with EPA guidance and Conditions E202 to E204 of the Planning Consent; and

iv. The requirements of Conditions O5.10 and O5.11 of EPL 21149 were met.

l) Notifying ASBJV, TfNSW and the EPA if the Site Auditor concluded that a part of the Project site should be notified to the EPA under the CLM Act[3];

m) Issuing a Section A site audit statement (**SAS**) for each part of the Project site where the ground surface was disturbed by construction work undertaken by ASBJV. Each SAS was to be issued at the completion of ASBJV sitework and needed to determine whether the land was suitable for a road construction worksite at the end of construction period and prior to landscaping by TfNSW.

With regards to site contamination, the Site Auditor understood that the NSW Government was responsible for separately engaging a Site Auditor to:

n) Determine whether land within the Project site was suitable for a specified use other than as a road construction worksite at the end of construction and prior to landscaping by TfNSW;

o) Review documentation prepared by environmental consultants that determined whether contamination migrating from the Project site not caused by ASBJV was posing an unacceptable risk to off-site receptors and needed to be remediated; and

p) Review work undertaken at the Project site in addition to that required by the EPA under Conditions O5.10 and O5.11 of EPL 21149.

Interim advice report #19 containing the Site Auditor's understanding of the purpose and scope of the site audit, as described above, was issued to ASBJV on 26/11/18 (**Appendix C**).

Planning Consent

The site audit was undertaken in accordance with the requirements of the Conditions of Approval for the WestConnex M4-M5 Link SSI 7485 Project issued by the Department of Planning and Environment dated 17/04/18 (Ref [50]). Relevant conditions of the Planning Consent for the purpose of this site audit were:

Contaminated Sites

E181 A Site Contamination Report, documenting the outcomes of Phase 1 and Phase 2 contamination assessments of land upon which the Critical State Significance Infrastructure (**CSSI**) is to be carried out, that is suspected, or known to be, contaminated must be prepared by a suitably qualified and experienced person in accordance with guidelines made or approved under the Contaminated Land Management Act 1997 (NSW).

E182 If a Site Contamination Report prepared under Condition E181 finds such land contains contamination, a site audit is required to determine the suitability of a site for a specified use. If a site audit is required, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor. Contaminated land must not be used for the purpose approved under the terms of this approval until a Site Audit Statement is obtained that declares the land is suitable for that purpose and any conditions on the Site Audit Statement have been complied with.

E183 A copy of the Site Audit Statement and Site Audit Report must be submitted to the Secretary and relevant council for information no later than one (1) month prior to the commencement of operation.

E184 An Unexpected Contaminated Land and Asbestos Finds Procedure must be prepared and must be followed should unexpected contaminated land or asbestos be excavated or otherwise discovered during construction.

E185 The Unexpected Contaminated Land and Asbestos Finds Procedure must be implemented throughout construction.

[3] A requirement under Sections 3.8.2, 4.3.11 & 4.3.12, EPA (October 2017) Site Auditor Guidelines

Waste

E202 Waste generated during delivery of the CSSI is to be dealt with in accordance with the following priorities:

(a) waste generation is to be avoided and where avoidance is not reasonably practicable, waste generation is to be reduced;

(b) where avoiding or reducing waste is not possible, waste is to be re-used, recycled, or recovered; and

(c) where re-using, recycling or recovering waste is not possible, waste is to be treated or disposed of at a waste management facility or premise lawfully permitted to accept the materials or in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, or to any other place that can lawfully accept such waste.

E203 Waste generated outside the site must not be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence or waste exemption under the Protection of the Environment Operations Act 1997, if such a licence is required in relation to that waste.

E204 All waste generated during construction and operation must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.

Environmental Protection Licence 21149

The EPA issued EPL 21149 for the WestConnex Stage 3A Project dated 9/10/19 (Ref [52]). Relevant conditions of the EPL for the purpose of the Project site audit were:

O5.11 Notwithstanding condition O5.10, construction activities may be undertaken following development of an Environmental Management Plan or similar, subject to written approval from a NSW EPA accredited site auditor.

1.2.2 Scope of Work

The scope of work undertaken for this SAR comprised the following tasks:

- Review a preliminary site investigation report (**PSI**) and a DSI prepared by environmental consultants engaged by the earlier WestConnex M4 East Project, which commenced several years before work on the WestConnex Stage 3A Project commenced;
- Review an earlier SAS/SAR prepared for a 0.14ha area of land at Site 026 located within the central part of the Northcote Compound;
- Review plans for the management of contamination during the period of construction work, provide interim advice (as may be required), and obtain additional information from the ASBJV environmental team;
- Inspect the Project site prior to, during and at the end of construction work and provide interim advice (as may be required);
- Review a close-out report prepared by ASBJV documenting the final site condition and how contamination was managed during the construction work; and
- Prepare a Section A SAS and SAR that determined whether the land disturbed by ASBJV was suitable for a road construction worksite at the end of the construction period and prior to landscaping by TfNSW.

1.3 Standards & Methodology

1.3.1 EPA Approved Guidelines

The site audit was undertaken in accordance with the provisions of the CLM Act and EPA requirements as specified in their endorsed documents as they existed at the time of this SAR, as listed on the EPA website[4].

1.3.2 Decision Process

The EPA[5] decision process for assessing the risks posed by ground contamination at an urban redevelopment site involved ten issues.

The first issue in the EPA decision process was that:

> *'all site assessment, remediation and validation reports follow applicable guidelines'.*

The Data Quality Indicators (**DQI's**) and assessment criteria that the Site Auditor commonly adopted for environmental assessments conducted at an urban redevelopment site are summarised in **Table 1-1**. The Site Auditor used these DQI's and criteria to assess the reliability and adequacy of the data provided by Environmental Consultants and to identify documentation where the level of non-compliance was considered to be significant.

Table 1-1 Data Quality Indicators and Evaluation Criteria

DQI	Evaluation Criteria
Documentation completeness	• DQO process properly described • Site properly identified • Site history adequately known • The conceptual site contamination model for the site is known to a high level of confidence • The site conditions adequately known • Completion of field calibration records, borehole logs, chain of custody documentation, laboratory test certificates from NATA-registered laboratories
Data completeness	• Sampling density comparison meets EPA (1996) *'Sampling Design Guidelines'* for all potential contaminants of concern at all areas of environmental concern • Use of systematic and judgemental sampling to provide sufficient data representative of all AECs
Data comparability	• Use of appropriate techniques for the sampling, storage and transportation of samples • Use of NATA certified laboratory using NEPM procedures
Data representativeness	• Good sampling coverage of all areas of environmental concern at the site, and selection of representative samples • Location, distribution & extent of samples appropriate to characterise contamination at all AECs
Precision and accuracy for sampling and analysis	• Use properly trained and qualified field personnel • Blind field duplicates to be collected at a minimum rate of 1 in 10 • RPD's < 30% for inorganic and 50% for organic analyses • Acceptable levels for equipment rinsate blanks • Achieve laboratory QC criteria

[4] www.epa.nsw.gov.au/clm/guidelines.htm
[5] Appendix A, EPA (October 2017) '*Contaminated Land Management, Guidelines for the NSW Site Auditor Scheme (3rd edition)'*

The remaining issues in the EPA decision process were:

- *'any aesthetic issues relating to site soils have been adequately addressed';*
- *soils have been assessed against relevant health-based investigation levels and potential for migration of contamination from soils to groundwater has been considered';*
- *groundwater (where relevant) has been assessed against relevant health-based investigation levels and, if required, any potential impacts to buildings and structures from the presence of contaminants considered.'*
- *hazardous ground gases (where relevant) have been assessed against relevant health-based investigation levels and screening values'*
- *any issues relating to local area background soil concentrations that exceed relevant investigation levels have been adequately addressed in the site assessment report(s);*
- *the impacts of chemical mixtures have been assessed;*
- *any potential ecological risks have been assessed;*
- *any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier; and*
- *the site management strategy (where relevant) is appropriate including post-remediation environmental plans.'*

The contract made between ASBJV and the NSW Government described the Northcote Compound as a road construction worksite. The Site Auditor considered this land use did not correspond to an urban redevelopment site as defined by the EPA (2017) Site Auditor Guidelines because:

- A road construction worksite did not correspond to one of the four land uses considered by the EPA 10-step decision process;
- A road construction worksite is covered by permanent concrete pavements and structures so there is no significant physical contact with underlying soils or groundwater;
- Future activities at a road construction worksite would be managed in accordance with a site-specific management plan;
- The contract only required the site audit to consider contamination risks where the ground surface was disturbed by construction work undertaken by ASBJV;
- The Contract only required the site audit to consider contamination risks where the ground surface was disturbed by construction work undertaken by ASBJV;
- The Contract did not require ASBJV to remediate contamination but to undertake their work so that no additional contamination was generated by construction work;
- The migration of contamination from the Northcote Compound was not an issue if pre-construction levels were not increased; and
- The Northcote Compound was land owned by the NSW Government on which public infrastructure was to be constructed.

Given these circumstances, the Site Auditor applied the EPA decision process in a manner consistent with the ASBJB contractual requirements. This was done by adopting appropriate Data Quality Objectives (**DQOs**) that are described in the following section.

1.4 Data Quality Objectives

DQOs are performance and acceptance criteria developed during the planning of a site assessment. They are used to evaluate whether there is enough data of a high enough quality to support decision making[6].

The DQO process is a seven-step systematic planning approach used to prepare plans for environmental data collection activities. The DQO process was specified in the NEPM and provides a systematic approach for defining the criteria that a data collection design should satisfy, including: when, where and how to collect samples or measurements; determination of tolerable decision error rates; and the number of samples or measurements that should be collected.

The Site Auditor assessed the appropriateness of the environmental site assessments (**ESAs**) using the following DQO process, which is considered to meet EPA requirements consistent with ASBJB contractual requirements:

- **Step 1: State the Problem** – Contamination at the Northcote Compound needed to be managed consistent with its use as a road construction worksite in accordance with a contract between the ASBJV and the NSW Government.
- **Step 2: Identify the Decisions** – These decisions reflect the purpose and scope of the site audit described in **Section 1.2**. These decisions were:
  - Determine if the Northcote Compound at the end of the construction period was suitable for a road construction worksite and compliance was achieved with Conditions E182 to E185 of the Planning Consent;
  - Determine whether ASBJV managed contamination it interfered or disturbed during the course of carrying out its work;
  - Determine whether operations at the Northcote Compound may have generated contamination or caused an increase in contamination migrating from the site;
  - Recommend management strategies which may be required at the Northcote Compound, including additional investigations and/or remediation works;
  - Determine whether there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the contamination management plan was feasible and would enable the specified use of the Northcote Compound and prevent an increase in contamination migrating from the site;
  - Assess compliance with Condition E181 of the Planning Consent and Condition O5.11 of EPL 21149 (Ref [52]) and NSW Government environmental legislation regarding contaminated site and waste management; and
  - Waste generated by construction activities at the Project site was to be managed in accordance with EPA guidance and Conditions E202 to E204 of the Planning Consent.
- **Step 3: Identify Inputs to the Decisions** – These included:
  - Existing site information, site history, regional geology, topography, hydrogeology and background conditions;
  - The use of proper investigation techniques;
  - Data collected by investigations and monitoring programs implemented during the project;
  - Development of an appropriate conceptual site model (**CSM**) for assessing contamination risks;
  - The use of appropriate site assessment criteria and compare results as measured against these criteria; and
  - The use of EPA-approved risk assessment methodologies.

[6] Section 1.2, EPA (May 2020) '*Consultants reporting on contaminated land, Contaminated land guidelines*'

- **Step 4: Define the Study Boundaries** – As defined by the contract between ASBJV and the NSW Government comprising:
  - The boundaries of the Northcote Compound; and
  - The condition of the Northcote Compound at the end of the construction works.
- **Step 5: Develop a Decision Rule** – The decision rules in characterising contamination at the Northcote Compound were:
  - Data used in contamination assessments were to be of a sufficient quality that allowed decisions to be made regarding contamination risks at the site and compliance with regulatory requirements;
  - Field and laboratory test results measured against EPA-approved criteria; and
  - The site was suitable for ongoing use as a road construction worksite if soil, groundwater and soil vapour contamination did not pose an unacceptable risk to users of the motorway, workers stationed at the facilities and maintenance workers.
- **Step 6: Specify Limits on Decision Errors** – These included:
  - The acceptable limits for inter/intra laboratory duplicate sample comparisons are laid out within the fieldwork protocols; and
  - The acceptable limits for laboratory quality assurance / quality control (**QA/QC**) parameters are based upon the laboratory reported acceptable limits and those stated within the NEPM 2013 guidelines.
- **Step 7: Optimise the Design for Obtaining Data** – Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs. This may involve the use of field screening tests and use of biased sampling.

A summary of the DQI's for the field and laboratory testing programs are specified in **Table 1-1**.

1.5 Information Reviewed

The environmental reports reviewed for this audit (in approximate chronological order) comprised:

1. Transport for NSW (August 2017) "*M4-M5 Link Environmental Impact Statement, WestConnex*"
2. Ramboll (19 February 2019) "*Northcote Compound, WestConnex M4 East, Phase 2 Environmental Site Assessment*". Document No: 318000122_Final prepared for CPB Samsung John Holland
3. JM Environmental (4 March 2019) "*JME18057-49 Preconstruction Land Condition Assessment, Northcote Street Compound – Revision 2*". Document No: JME18057-49 prepared for LSBJV
4. Ramboll (November 2016) "*Underground Petroleum Storage System Validation Report, 269 Parramatta Road, Haberfield*". Prepared for CPB Samsung John Holland

Other information reviewed for this audit comprised:

50. Department of Planning and Environment (17 April 2018) "*Infrastructure Approval, Section 5.19 of the Environmental Planning & Assessment Act 1979, Application No: SSI 7485, Conditions of Approval for WestConnex M4-M5 Link SSI 7485". 76 pages*
51. LSBJV (6 June 2018) PowerPoint Presentation "*WestConnex Design and Construct, M4 – M5 Link Main Tunnel Works, Compounds*". 18 pages
52. NSW EPA (9 October 2018) '*Environmental Protection Licence Number 21149, WestConnex Stage 3A – M4-M5 Mainline Tunnels, WestConnex between M4 East at Haberfield and the New M5 at St Peters, Marrickville NSW 2204'. 30 pages*
53. Inner West Council (11 November 2016) "*Land Zoning Map – Sheet LZN_001, Ashfield Environmental Plan 2013 (Amendment No. 3)*"
54. Higinbotham & Robinson (1889 – 1894) Map "*Fivedock, Parish of Concord*". Atlas of the Suburbs of Sydney, https://dictionaryofsydney.org/media/3907

55. AECOM (26 February 2019) "*Site Audit Report, Northcote Compound, Site 026, WestConnex M4 East*". Document No: 60437339 prepared by Brad Eismen for CPB Samsung John Holland JV
56. AECOM (26 February 2019) "*Site Audit Statement, BE136 for Northcote Compound, Site 026, WestConnex M4 East*". Prepared by Brad Eismen for CPB Samsung John Holland JV
57. LSBJV (10 October 2018) "*Site Establishment Management Plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0018-07
58. LSBJV (23 October 2018) "*Appendix B, Contaminated Land Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0021-01 Rev01
59. LSBJV (23 October 2018) "*Unexpected Contaminated Land and Asbestos Finds Procedure, M4-M5 Link Mainline Tunnels*". Appendix A of Ref [58]
60. LSBJV (17 April 2020) "*Appendix B5, Soil and Surface Water Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0005-09 Rev09
61. LSBJV (22 June 2020) "*Appendix B9, Waste Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0009-07 Rev08
62. LSBJV (28 April 2021) "*Appendix B6 Groundwater Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0006-13 Rev13 (revision 1 dated 17 September 2018)
63. ASBJV (27 June 2022) Drawings "*M4M5 Link Main Tunnel Works, Package: Project Wide M4M5-RBGP-PRW-CIV-CW02-DPK-0001, Construction Site Reinstatement*". 51 drawings prepared for Sydney Motorway Corporation WestConnex
64. PSM (9 April 2020) Drawings "*M4-M5 Link Main Tunnel Works, Northcote Street Construction Access Backfill and Stub Wall*". Document No: M4M5-PSML-NCS-STR-IS22-DPK-0001 comprising 14 drawings prepared for Sydney Motorway Corporation WestConnex

Additional information was obtained by the Site Auditor when a site inspection was conducted at the Northcote Compound on 2/06/21 and 4/11/22, with photographs taken by the Site Auditor provided in **Appendix D**.

1.6 Chronology of Site Audit Program

A chronology of the main activities relevant to the site audit work is provided below:

- 30 November 2016 – A site remediation and validation report (**SRVR**) was issued by Ramboll for the removal of UPSS infrastructure at Site 006 (Ref [4]);
- December 2016 – The fieldwork for the DSI at the Northcote Compound was undertaken by Ramboll for the WestConnex M4 East contractor and documented in a draft report;
- 20 July 2018 – The Site Auditor for the WestConnex Stage 3A Project was engaged and issued formal notification for the commencement of the site audit to the EPA;
- 19 February 2019 – The Ramboll DSI report for the Northcote Compound was finalised (Ref [2]);
- 4 March 2019 – A preconstruction assessment of the Northcote Compound was issued by JM Environments to the ASBJV (Ref [3]);
- 2 June 2021 - The Site Auditor inspected the Northcote Compound while it was being used by the WestConnex Stage 3A contractor, with copies of photos provided in **Appendix D**;
- 18 February 2022 – The Site Auditor reviewed the available documentation on the Northcote Compound and issued a draft SAR to ASBJV that covered Sections 1 to 3. The draft SAR provided ASBJV with interim audit advice on contamination issues that needed to be addressed;
- 4 November 2021 - The Site Auditor conducted a final site inspection of the Northcote Compound, with copies of photos provided in **Appendix D**;
- 28 November 2022 – ASBJV approved the draft SAS / SAR and provided an interim environmental management plan (**EMP**) for contamination assessment work that needed to be completed prior to a

Section A2 SAS being issued for the Northcote Compound. The Site Auditor then finalised the documents and issued the signed Section B SAS and this SAR to ASBJV, TfNSW, the EPA and Council. Copies of the Section B SAS and the interim plan are provided in **Appendix E**.

1.7 Abbreviations

ABC	Ambient background concentration
ACL	Added contaminant limit
ACM	Asbestos containing material
ADWG	Australian Drinking Water Guideline
AF	Asbestos fines
AHD	Australian Height Datum
ALF	Alexandria Landfill
AMP	Asbestos management plan
ANZECC	Australia and New Zealand Environment and Conservation Council
ANZG	Australian New Zealand 2018 water quality guidelines
APEC	Area of potential environmental concern
ARIS	Australian Soil Resource Information System
ASBJV	Acciona Samsung Bouygues Joint Venture
ASRIS	Australian Soil Resource Information System
ASS	Acid sulphate soil
AST	Above ground storage tank
B&D waste	Building and demolition waste
BaP TEQ	Benzo(a)pyrene toxicity equivalent
bgl	Below ground level
BOM	Bureau of Meteorology
BTEX	Benzene, toluene, ethyl benzene, xylenes
BTEXN	BTEX and naphthalene
C&D	Construction and demolition
CCA	Copper chrome arsenate
CEC	Cation exchange capacity
CEMP	Construction environmental management plan
CLM Act	Contaminated Land Management Act 1997 (NSW)
CLMP	Contaminated land management plan
COC	Chain of custody
COV	Coefficient of variation
CQA	Construction quality assurance
CQAR	Construction Quality Assurance Report
CS	Characteristic gas situation
CSI	Contaminated site investigation

CSSI	Critical State Significant Infrastructure
DBYD	Dial-before-you-dig
DCP	Development control plan
DEC	Department of Environment and Conservation NSW
DECC	Department of Environment and Climate Change NSW
DECCW	Department of Environment, Climate Change and Water NSW
DOH	Department of Health (WA)
DPE	Department of Planning and Environment (NSW)
DQI	Data quality indicator
DQO	Data quality objective
DSI	Detailed site investigation
EFCP	Electrical friction cone penetrometer
EIL	Ecological investigation level
EIS	Environmental impact statement
EMP	Environmental management plan
EPA	Environment Protection Authority (NSW)
EPL	Environmental Protection License
ERP	Emergency response plan
ES	Environmental Strategies
ESA	Environmental site assessment
ESD	Ecologically sustainable development
FA	Fibrous asbestos
FSL	Finished surface level
GIL	Groundwater investigation level
GME	Groundwater monitoring event
GPS	Global positioning system
GSV	Gas screening value
GSW	General Solid Waste
GTA	Geotechnical Testing Authority
HAZMAT	Hazardous materials assessment
HC	Hydrocarbon
HDPE	High density polyethylene
HEIC	High energy impact compaction
HGG	Hazardous ground gas
HGGRA	Hazardous ground gas risk assessment
HHERA	Human health and ecological risk assessment
HIL	Health investigation level
ISEMP	Interim Site Environmental Management Plan

ITP	Inspection and Test Plan
JME	JM Environments
Kg	Kilograms
L	Litres
LCMP	Landfill closure management plan
LCS	Laboratory control sample
LFG	Landfill gas
LFGMS	Landfill gas mitigation system
LGA	Local Government Area
LNAPL	Light non-aqueous phase liquid
LOP	Level of protection
LOR	Limit of reporting
LSBJV	Lendlease Samsung Bouygues Joint Venture
LTEMP	Long Term Environmental Management Plan
M	Metres
MAHs	Monocyclic aromatic hydrocarbons
Mg	Milligrams
MIP	Membrane interface probe
nd	Non-detectible
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NIOSH	National Institute for Occupational Safety and Health (USA)
NMOC	Non-methane organic compounds
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
OCP	Organochlorine pesticides
OHSP	Occupational health and safety plan
OSD	On-site detention basin
PAH	Polycyclic aromatic hydrocarbons
PASS	Potential acid sulphate soil
PBR	Pyrmont Bridge Road
PCBs	Polychlorinated Biphenyls
PCOC	Potential contaminant of concern
PFAS	Perfluoroalkyl and polyfluroalkyl substances
PID	Photoionisation detector
POEO	Protection of the Environment Operations (Act) 1997 (NSW)
PPE	Personal Protective Equipment
ppm	parts per million

PQL	Practical quantification limit
PREW	Parramatta Road East West worksite, Ashfield
PSI	Preliminary site investigation
QA	Quality assurance
QC	Quality control
QRA	Qualitative risk assessment
RAC	Remediation Acceptance Criteria
RAP	Remediation Action Plan
RMS	Roads and Maritime Services
RPD	Relative percent difference
RL	Reduced level
RRE	Resource Recovery Exemption
RRO	Resource Recovery Order
RSL	US EPA Regional Soil Level
RSW	Restricted Solid Waste
SAC	Soil acceptance criteria
SAQP	Sampling and analysis quality plan
SAR	Site audit report
SAS	Site audit statement
SD	Standard deviation
SEARs	Secretary's Environmental Assessment Requirements
SEMP	Site Establishment Management Plan
SEPP	State environment planning policy
SIL	Soil investigation level
SMDD	Standard maximum dry density
SOMC	Standard optimum moisture content
SMF	Synthetic mineral fibre
SMP	Site management plan
SOP	Standard operating procedure
SPI	St Peters Interchange
SPIR	Submissions and Preferred Infrastructure Report
SRVR	Site remediation and validation report
SSI	State Significant Infrastructure
SVOCs	Semi volatile organic compounds
SWL	Standing water level
SWMP	Soil and water management plan
SWMS	Site work method statement
TCLP	Toxicity Characteristic Leaching Procedure

TDS	Total dissolved solids
TfNSW	Transport for NSW (formerly RMS)
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
TSEMP	Task Specific Excavation Management Plan
TSS	Total suspended solids
UCL	Upper confidence limit
UFP	Unexpected Finds Protocol
USA	United States of America
US EPA	United States Environmental Protection Agency
UST	Underground storage tank
VB	Vertical barrier
VENM	Virgin excavated natural material
VHCs	Volatile halogenated compounds
VMP	Voluntary Management Proposal
VOCs	Volatile organic compounds
WCR	Waste classification report
WCX M5	WestConnex New M5
WHS	Worker health safety
WMP	Waste management plan
µg	micrograms

2. Review of Site Conditions in 2019 Pre-ASBJV Work

This section of the SAR assesses the adequacy of data provided by ESAs on the condition of the Northcote Compound and the contamination risks that existed in 2019 when the WestConnex Stage 3A Project took possession of the Site from the WestConnex M4 East contractor. The available ESAs were:

- *A DSI prepared by Ramboll dated 19/02/19 (Ref [2]);*
- *A preconstruction land condition assessment prepared by JM Environments dated 4/03/19 (Ref [3]); and*
- *A validation report for the NW part of the Northcote Compound at 269 Parramatta Road (Site 006) prepared by Ramboll dated 30/11/16 (Ref [4]).*

2.1 Site Identification

The Ramboll 2019 DSI subdivided the Northcote Compound into 12 sites numbered 006, 012, 026 – 028, 046, 136 – 141. A summary of the Northcote Compound location details provided by the Ramboll 2019 DSI is presented in **Table 2-1**. A plan showing the 12 sites that formed the Northcote Compound is provided in **Figure 2-1**. A Sixmaps subdivision plan for the Northcote Compound is provided in **Figure 2-2**, with an extract of the zoning map provided in **Figure 2-3.**

Table 2-1: Summary of Site Location Details

Site Location Detail	Detail	References
Site name	WestConnex Stage 3A site C3a	Ref [51]
Address/location	Site 006: 269 Parramatta Rd, Haberfield Site 012: 2-4 Wattle Street, Haberfield Site 026: 257 Parramatta Rd, Haberfield Site 027: 255 Parramatta Rd, Haberfield Site 028: 249-251 Parramatta Rd, Haberfield Site 046: Northcote Street Site 136: 3 Wolseley St, Haberfield Site 137: 1 Wolseley St, Haberfield Site 138: 4 Northcote St, Haberfield Site 139: 2 Northcote St, Haberfield Site 140: 1 Northcote St, Haberfield Site 141: 3 Northcote St, Haberfield	Sectn 3.1 & Appns B - F, Ref [2]
Legal property description	Site 006: Lots 63 & 64 DP4612 Site 012: Lots 1 & 2 DP239458 Site 026: Lots 51 – 52 DP719977 Site 027: Lots 53 & 54 DP719977 **Site 028: Lot 56 - 58 DP719977** Site 046: Northcote Street Site 136: Lot 114 DP4612 Site 137: Lot 115 DP4612 Site 138: Lot 1 DP933407 Site 139: Lot 1 DP933225 Site 140: Lot B DP391272 Site 141: Lot A DP391272	Sectn 3.1 & Appns B - F, Ref [2]; Six Maps NSW
Local Government Area	Inner West Council	Appn B – F, Ref [2]; Ref [53]
Site area	Northcote Compound = 1.2165 ha Site 006: 0.13 ha Site 012: 0.059 ha Site 026: 0.14 ha Site 027: 0.12 ha Site 028: 0.20 ha	Sectn 3.1 & Appn B - F, Ref [2]; Ref [51]

Site Location Detail	Detail	References
Owner	TfNSW (formerly Roads and Maritime Services)	Sectn 1 & Appns B - F, Ref [2]
Contractor	ASBJV (formerly LSBJV)	Ref [3]
Past Zoning	Commercial/industrial zoning along Parramatta Road and Wattle Street; Low density residential for remainder	Sectn 3.1, Ref [2]; Ref [53]
Current zoning	B6 – Enterprise corridor for the sites adjacent to Parramatta Road and Wattle Street, namely, Sites 006, 012, 026 - 028	
	R2 – Low density residential for the other sites, namely, Sites 136 - 141	
Future zoning	No known change	
Surrounding land use	North: Wolseley Street then commercial/ industrial; East: Low density residential properties; South: Low density residential and commercial/industrial properties West Parramatta Road then commercial/ industrial	Sectn 4.3, Ref [3]

Legend:
Inadequate information provided in ESAs

The Site Auditor assessed the accuracy of the site location information provided in the ESAs by:

- Comparing the multiple lines of evidence provided by the source data;
- Comparing the supplied data with other publicly available data obtained from NSW Government and other websites;
- Examining Google and SixMaps aerial photos on several occasions throughout the audit period**;** and
- Inspecting the Northcote Compound throughout the audit period, with a photographic record provided in **Appendix D**.

The Site Auditor considered the information on site location details provided in the ESAs was close to meeting the documentation completeness DQO. One error in the Ramboll 2019 DSI was that Site 028 included not only Lot 56 but also Lots 57 and 58 in DP719977. The Site Auditor considered this error was not significant for the purpose of this SAR because the error was identified and it had no influence on the contamination risk assessment.

2.2 Site History

The Ramboll 2019 DSI[7] advised that historical data on the land occupied by the Northcote Compound was provided by several reports. Copies of these reports were not available for this site audit, with the Ramboll 2019 DSI providing a summary of the available data, with a copy of this summary provided in **Table 2-2.** Additional historical information was provided for the five B6 Enterprise corridor zoned properties in Appendices B – F of the DSI.

[7] Section 4, Ref [2]

Figure 2-1 Areas Forming the Northcote Compound (Source: Figure 3, Ref [2])

Figure 2-2 Six Maps Subdivision Plan for Northcote Compound (Area C3a)

Figure 2-3 Land Zoning Plan for Northcote Compound (Area C3a) (Source: Ref [53])

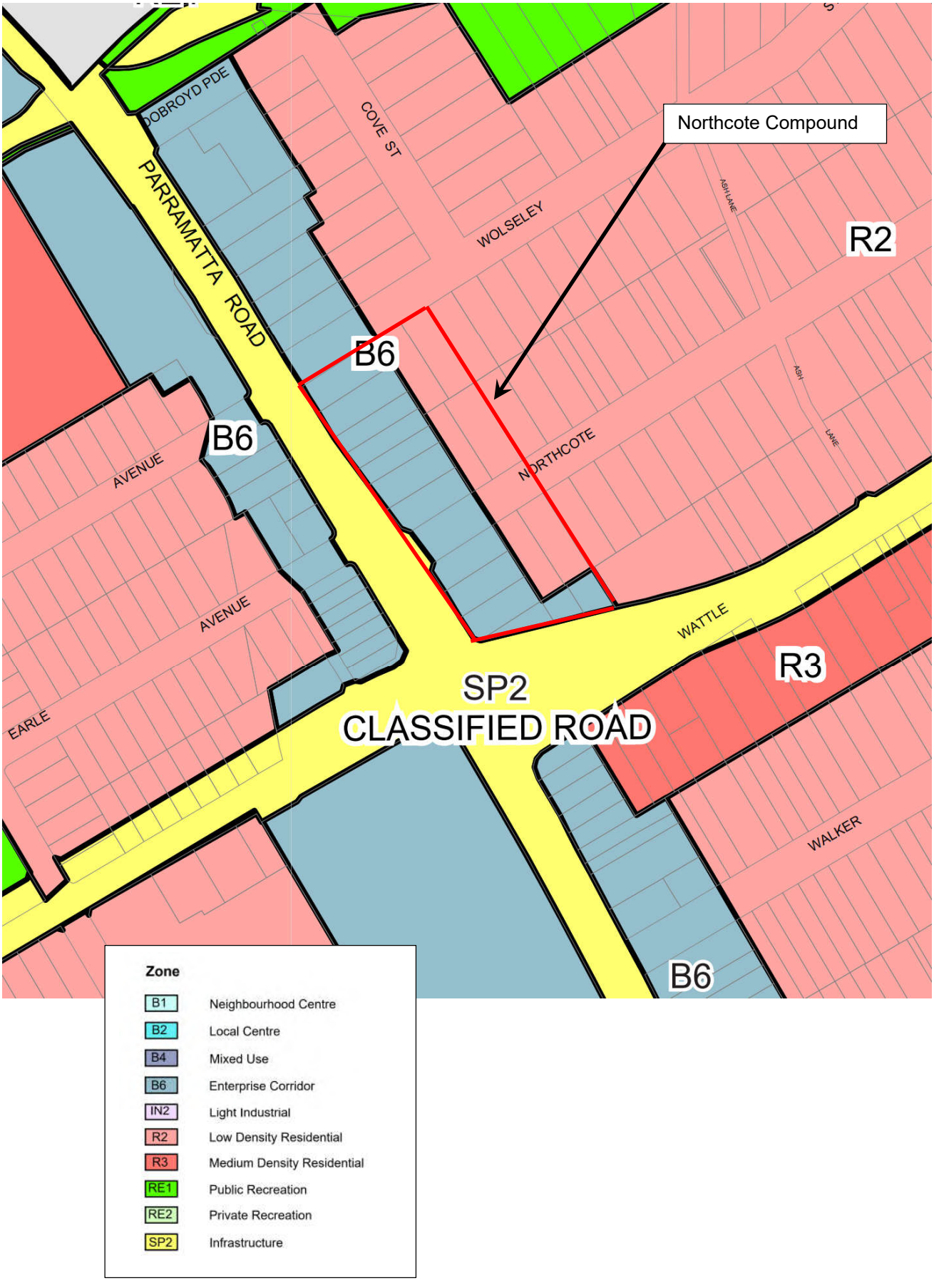


Table 2-2 Summary of Historical Data Provided by Ramboll 2019 DSI (Source: Table 4-1, Ref [2])

Site	GHD Risk	Review of Documents Completed	Revised Contamination Status	Notes
006	Low	Yes	High	The site was likely a former service station site based on the combination of historical aerial photographs and the historical title deeds indicating Amoco (Oil company) being a former site owner between the 1960-1980s.
012	Moderate	Yes	Moderate	The site was likely used as a mechanical workshop. Title search in GHD's EIS indicates former motor car dealer.
026	Moderate	Yes	Moderate	The site was likely used as a tyre workshop. Identified as potentially contaminated land in ENVIRON 2014 from use as a commercial/industrial property and potential fill. Detailed site inspection carried out by Ramboll 11/11/15, indicated minimal potential of contamination from current site use (no significant staining, USTs etc)
027	Moderate	Yes	Moderate	The site was likely a car yard and identified as potentially contaminated land in ENVIRON 2014 from use as a commercial/industrial property and potential fill.
028	Low	Yes	Moderate	The site was likely used as a liquor store. Detailed site inspection carried out by Ramboll 11/11/15, indicated no current contaminating activities (liquorland) for last 10 years at least. The additional information indicated that the site may have been potentially a former service station (site layout) which could pose a risk to construction workers through soil and groundwater vapour intrusion due to the potential of having onsite construction buildings. Also potential for contamination from uncontrolled filling including asbestos.
046	N/A	Yes	Low	Northcote Street. Initially classified as moderate because of potential filling beneath roadway and caryard to the north. Site 027 and Site 028 is already being investigated separately and migration of contamination unlikely unless significant. In addition, no excavation works are proposed for site 046 and review of historical aerials indicates long historical use of site as Northcote Street as far back as 1943. Re-classified from moderate to low risk as it is considered that investigation of adjacent sites 027 and 028 will be sufficiently representative of filling/regional contamination. Further investigation not considered necessary.
136	Low	Yes	Low	Residential property. Residential in 1943 photo.
137	Low	Yes	Low	Residential property. Residential in 1943 photo.
138	Low	Yes	Low	Residential property. Residential in 1943 photo.
139	Low	Yes	Low	Residential property. Historical Title Deeds from 1907-to present. Residential in 1943 photo.
140	Low	Yes	Low	Residential property.
141	Low	Yes	Low	Residential property. Residential in 1943 photo.

Additional historical information regarding underground storage tanks (USTs) and associated infrastructure at Site 006 (269 Parramatta Road) on the NW side of the Northcote Compound was provided in the Ramboll 2016 site remediation and validation report (**SRVR**), which is reviewed in **Section 2.3**.

The Site Auditor considered the historical data provided by the Ramboll 2019 DSI and Ramboll 2016 SRVR for the Northcote Compound did not meet the documentation completeness DQO as specified in the EPA (2020) reporting guidelines. The main data gaps included:

- Copies of aerial photographs;
- Data provided by former owners/tenants/local Council;
- Historic site layout plans;
- Sewer and underground service plans;
- Extent of any filling or dumping at the site;
- Copies of SafeWork NSW searches of the Stored Chemical Information Database;
- Details and locations of former USTs and above ground storage tanks (**ASTs**) except for Site 006;
- Local site knowledge of residents and staff – both present and former;
- Summary of local literature about the site, including newspaper articles; and
- Details of building and related permits, licences, approval and trade waste agreements.

The Site Auditor sought to address these data gaps by reviewing historical data available from public sources. These included:

- Historical data provided in the 2017 Environmental Impact Statement (EIS)[8], with a copy of the data provided in **Table 2-3**;
- The 1889 – 1894 Fivedock Map (Ref [54]), with an extract showing the Project site provided in **Figure 2-4**; and
- An extract of the 1943 aerial photo of the Project site available from the SixMaps NSW website (**Figure 2-5**).

Table 2-3 Historical Data Provided by 2017 EIS in Northcote Compound (C3a) (Source: Appn R, Ref [1])

Property	Site history summary
C3a-A Six residential houses	• The six houses appeared to be present since the 1930 historical aerial photograph until 2016.
C3a-B Garden shop and service station	• The property was owned by various private owners (1907 to 1963 and 2000 to 2015), Amoco Australia Pty Ltd (a petroleum company) (1963 to 1980) and Garden Art Foundations (1980 to 2000) • Based on the historical aerials the property was formerly residential, and contained a corner shop or hotel which was demolished, and an Amoco service station constructed in the 1960s • The service station was then used as a garden shop from 1980 until 2016.

[8] Section 4.3.3in Appendix R, Ref [1]

Table 2-3 (cont'd) Historical Data Provided by 2017 EIS in Northcote Compound (C3a)

C3a-C Car Mechanic Workshop	• According to historical titles the property was previously owned by The Northcotstate Company Ltd (1907 to 1911), various private owners (1911 to 1973 and 1981 to 1998), Cousins Truck Sales (NSW) Pty Ltd, Moranda Pty Ltd (1979 to 1981) and Bill and Tina Hatzivasiloiou H Jax Quickfit Properties (1998 to 2015) • Based on the historical aerials the property was previously three residential properties until they were demolished and a truck dealership constructed in the late 1970s/early 1980s • The property was then used as a wheel alignment and tyre workshop until 2016.
C3a-D Car Dealership	• According to historical titles the property was previously owned by The Northcote Estate Company Ltd (1907 to 1914) and various private owners (1911 to 2015) • Based on the historical aerials the property was previously two residential properties that were demolished and converted into a commercial business in the 1970s • In the 1980s there was an additional commercial rectangular building in the centre of the site and cars parked across the site. The additional building was demolished by the mid-1990s • Based on the historical aerials it appears that the site has been used as a car dealership and a possible mechanics until 2016.
C3a-E Liquor store	• According to historical titles the property was owned by The Northcote Estate Company Ltd (1907 to 1911), various private owners (1907 to 1988), Pesutu Pty Ltd (liquor retailer) (1988 to 2009) and Reo Costi lease to Liquorland (2009 to 2015) • Based on the historical aerials it appears that the site was formerly part of four residential houses that were demolished in the late 1960s/early 1970s. The site was then used as a liquor shop and car park since 1988 • The use of the property between the 1970s and 1988 is unknown • The property was used as a Liquor store until 2016.
C3a-F Automotive Workshop	• According to historical titles the property was previously owned by The Northcote Estate Company Ltd (1910 to 1912), various private owners (1912 to 1965, 1970 to 1977 and 2011 to 2015), the Commissioner of Main Roads (1965 to 1970), and British and Continental Cars (Haberfield) Pty Ltd (1977 to 2011) • Based on the historical aerials the property was previously part of three residential properties that were acquired and demolished for the widening of Wattle Street in the 1960s • The property was then used as a car dealership until 2011 and was then converted for use as a mechanics workshop until 2016.

Figure 2-4 1889 – 1894 Fivedock Map (Source: Ref [54])

Figure 2-5 1943 Historic Aerial Photo of Northcote Compound (Source: Sixmaps NSW)

The Site Auditor considered the available historical data provided by the ESAs and publicly available sources was sufficient for developing a CSM for the Northcote Compound. This is because the available data showed:

- The historical data provided by the Ramboll 2019 DSI was consistent with the data provided by the earlier 2017 EIS;
- The data provided by the 2017 EIS would have been reviewed by the EPA and DPE;
- A planning consent for construction work at the Northcote Compound was provided on 17/04/18 (Ref [50]);
- The data showed that the Northcote Compound land together with the surrounding area was used for low density residential use up to the 1940's; and
- After the 1940's, the part of the Northcote Compound land along Parramatta Road was redeveloped for a range of commercial / light industrial land uses mainly associated with car workshops / car yards (i.e. Sites 006, 012, 026 – 028, 046). Site 006 was a former service station site until 1980 when it's use changed to a garden shop. The land use across the remainder of the Site remained low density residential (i.e. Sites 136 – 141).

2.3 Site Condition and Surrounding Environment

During construction of the M4 East Motorway, the Northcote Compound was used for a dive structure providing access for roadheaders, a laydown area, temporary ventilation plant, acoustic shed for stockpiled soils, water treatment plant, sedimentation pond, electrical and mechanical workshops, offices and an electrical substation. A 2016 layout plan for the Northcote Compound that was to be constructed by the M4 East Motorway Project is provided in **Figure 2-6**. The uses of the Northcote Compound remained largely unchanged when the WestConnex Stage 3A Project took possession in March 2019, as shown by the layout plan in **Figure 2-7**.

A land condition assessment of the Northcote Compound was undertaken on 22/02/19 by JM Environments (**JME**) and documented in a report dated 4/03/19 (Ref [3]). The purpose of the assessment was to observe the condition of the Site just prior to the WestConnex Stage 3A project taking possession. The JME assessment consisted of a walkover inspection by an environmental consultant and the documentation of the site condition by 57 photos taken at various points across the Northcote Compound that were included in their report. The Site Auditor considered these photos showed the Northcote Compound was covered by recently constructed buildings, concrete ground slabs and tunnel excavations consistent with the layout plans in **Figure 2-6** and **2-7**. No physical evidence of contamination or stockpiled waste appeared to remain at the Northcote Compound.

The data on site conditions and the surrounding environment provided by the ESAs relevant to the assessment of contamination risks at the Northcote Compound are summarised below:

- **Topography**: The Northcote Compound area was generally flat with the ground surface ranging from 11 mAHD in the SE (towards Wolseley Street) to 9 mAHD to the NW (towards Parramatta Road).
- **On-site developments and surface conditions**: Refer above description and **Figures 2-6** and **2-7**.
- **USTs / ASTs**: Site demolition and clearing work undertaken by the WestConnex M4 East Contractor identified two USTs at the former service station at Site 006 labelled UST1 and UST2 that were removed together with contaminated soil in the vicinity of the USTs as shown in **Figure 2-8**. The location of these USTs corresponded to the footprint of the tunnel dive structure subsequently constructed by the M4 East contractor prior to the commencement of the WestConnex Stage 3A project. The Ramboll 2019 DSI also considered there was a risk that Site 028 may also have been a service station that had USTs.

Figure 2-6 WestConnex M4 East Layout for Northcote Compound (2016-2019) (Source: Figure 2, Ref [2])

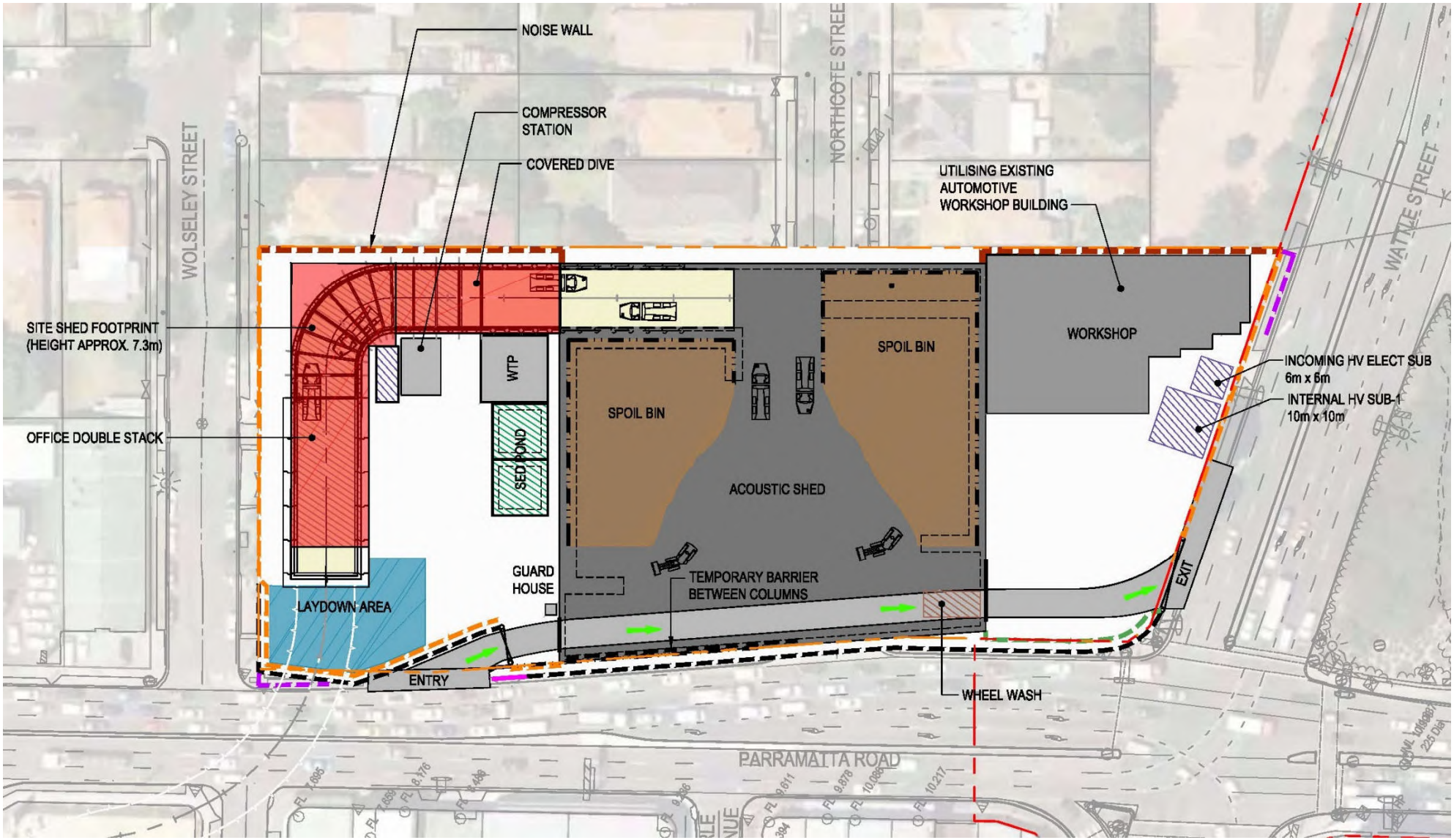


Figure 2-7 WestConnex Stage 3a Layout for Northcote Compound (2019-2022) (Source: Ref [51])

Figure 2-8 Location of USTs and Contaminated Soil Removed in 2016 (Source: Figure 3, Ref [4])

- **Physical evidence of contamination:** Site demolition and clearing work undertaken by the WestConnex M4 East Contractor identified physical evidence of contamination at:
  - The backfill sands exposed when the two USTs were removed from the former service station at Site 006. Ramboll described the backfill sands as slightly odorous with no signs of free phase liquid. Two USTs (labelled UST1 and UST2) were identified and removed;
  - An ACM fragment in fill at borehole 026_GW001 (Site 026); and
  - Asbestos pipe at 0.5 mbgl[9] at Site 027.
- **Geology and location and extent of fill**: The depth of fill varied considerably across the Site, but in general the geology encountered in the area consisted of:
  - Concrete or hardstand at ground level, then
  - FILL; gravelly silty clay, grey/brown, from ground level to a thickness of 0.25 – 0.7 m, underlain by,
  - SILTY CLAY/CLAY orange/brown (residual clay with traces of gravel) from 0.25 to 2.5 m – thickness 1.1 to 1.9 m, underlain by,
  - Highly weathered SHALE orange/white mottled from 1.5 to 2.5 m – thickness not determined, then
  - SANDSTONE, mostly white, medium grained from 2.3 m.
- **Acid sulfate soil (ASS):** The ASS risk map showed the Site was within Class 5 mapped land with Class 2 land located 150 m north and 430 m to the NE. Areas mapped as Class 5 had no known occurrence of ASS. Works within 500 m of adjacent Class 1, 2, 3 or 4 land below 1 mAHD presented an environmental risk if the water table was lowered.
- **Hydrogeology**: Shallow groundwater in the surrounding area was at between 2.5 and 5 mbgl in sandstone and weathered shale.

  A search of the NSW Groundwater Database was undertaken by GHD on 26/05/15 and 9/09/14 and identified a registered groundwater well (GW112144) situated 200m NW of the Site. Fill was encountered from the ground surface to 2.2 mbgl then silty clay to 5.5 mbgl and sandstone to 57.1mbgl. GHD installed two groundwater wells in the general area. Well BH1365 was screened within the sandstone aquifer with a standing water level of 4.98 mbtoc[10] and well BH1369 was screened within the weathered shale aquifer, with a standing water level of 2.595 mbtoc.

  Based on local topography, groundwater was anticipated to flow in a northerly direction towards Iron Cove Creek.
- **Background water quality**: Slightly elevated metal concentrations associated with background water quality that were not considered to be of concern. The hydrogeology is dominated by shale and siltstone with salinity levels greater than 14,000 mg/L and low potential for groundwater movement.
- **Surrounding Land Use**: (Refer **Table 2-1**).
- **Local sensitive environments**: Iron Cove Creek that flows into Iron Cove, which forms part of the Parramatta River. The Development Consent[11] also advised that the Project would have no impacts on biodiversity, soil and water.
- **Nearest groundwater and surface water receptors**: The nearest groundwater and surface water receptors were in Iron Cove Creek located 200 – 300 m to the north of the Site.
- **Surrounding areas that may pose a pollution hazard to the Site**: Ramboll considered there was a risk that Site 505 to the SW of the Site may have been used as a service station, mechanical workshop and radiator manufacturing facility.

[9] mbgl = metres below ground level
[10] mbtoc = metres below top of collar (of the groundwater monitoring well)
[11] Condition C24, Ref [50]

The Site Auditor considered the weight of evidence supported these conclusions. This evidence included:

- Topographic plan of Sydney provided at topographic-map.com, with an extract of the contour plan for the Northcote Compound and surrounding area provided in **Figure 2-9**[12];
- Logs of boreholes drilled in the area and provided in the Ramboll 2019 DSI;
- Geological cross-sections provided by the 2017 EIS[13], with a copy of the cross section closest to the Northcote Compound provided in **Figure 2-10**;
- The ASS risk map provided in the EIS, which is copied in **Figure 2-11**;
- Licensed groundwater bores provided by the NSW Water website as shown in **Figure 2-12**[14];
- Interviews with employees at some of the properties that made up the Northcote Compound; and
- Information provided in the Development Consent.

The Site Auditor assessed the accuracy of the site condition assessment provided in the ESAs by:

- Comparing the multiple lines of evidence provided by the source data;
- Comparing the supplied data with publicly available data provided by a topographical plan of the local area, the 1:100,000 geological map of Sydney[15], the Australian Soil Resource Information System (ASRIS), the WaterNSW website for groundwater bore information[16];
- Checking that the conclusions were consistent with the site history data (**Section 2.2**);
- Inspecting the Northcote Compound throughout the WestConnex Stage 3A project, with a photographic record provided in **Appendix D**; and
- There was a low risk of surrounding areas posing a pollution hazard to the Site because:
  - EPA databases showed there were no regulated or reported sites within 200 m of the Northcote Compound;
  - The closest petrol station was located to the north of Iron Cove Creek along Parramatta Road; and
  - Current land uses in the local area were commercial / light industrial along Parramatta Road, with low-density residential behind.

The Site Auditor considered the site condition and surrounding area data provided by the ESAs for the Northcote Compound generally met the documentation completeness DQO as specified in the EPA (2020) reporting guidelines. The main data gaps identified were:

- Flood potential;
- Regional and site drainage patterns;
- Boundary fencing;
- Hazardous building materials;
- Sewer and underground services; and
- Surrounding areas that may pose a pollution hazard to the site.

12 https://en-au.topographic-map.com/maps/janv/Sydney/
13 Appendix E, Ref [1]
14 https://realtimedata.waternsw.com.au/water.stm
15 https://gmaps.geoscience.nsw.gov.au/100K/Sydney/
16 https://realtimedata.waternsw.com.au/water.stm

Figure 2-9 Topographical plan of Northcote Compound and surrounding area (Source: https://en-au.topographic-map.com/maps/janv/Sydney/)

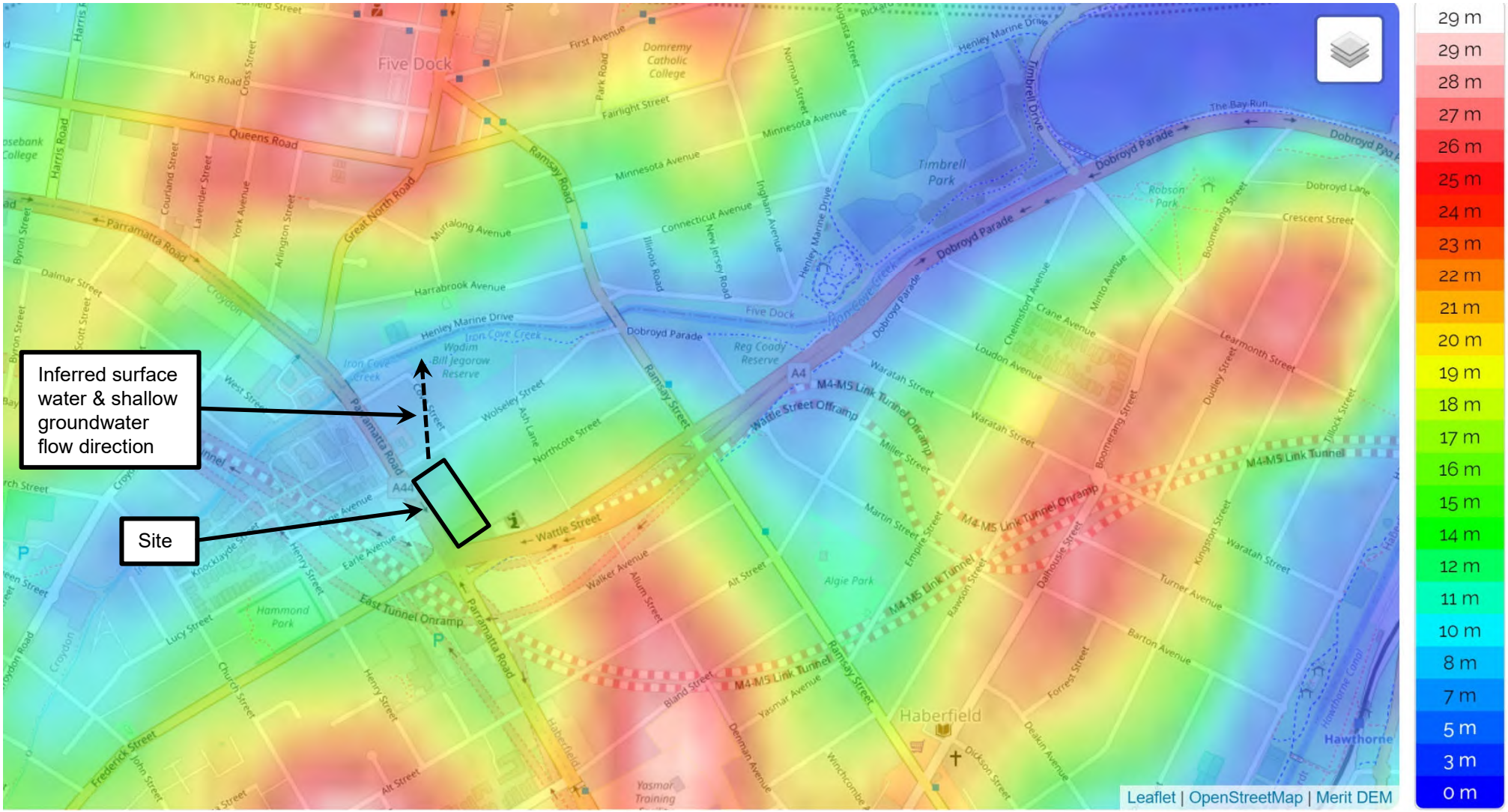


Figure 2-10 Geological Cross Section along Tunnel Alignment Nearest Northcote Compound (Source: Appn E, Ref [1])

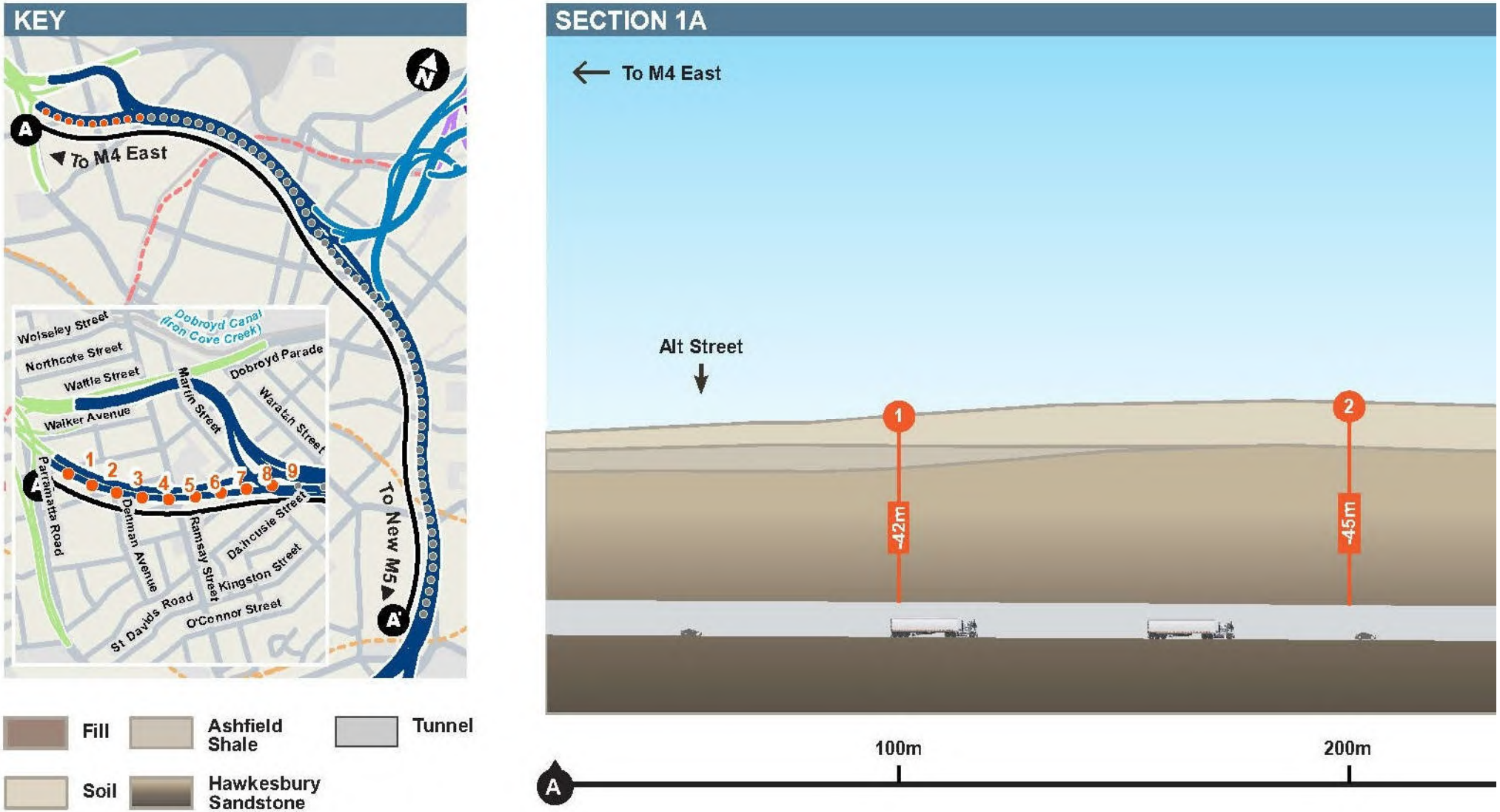
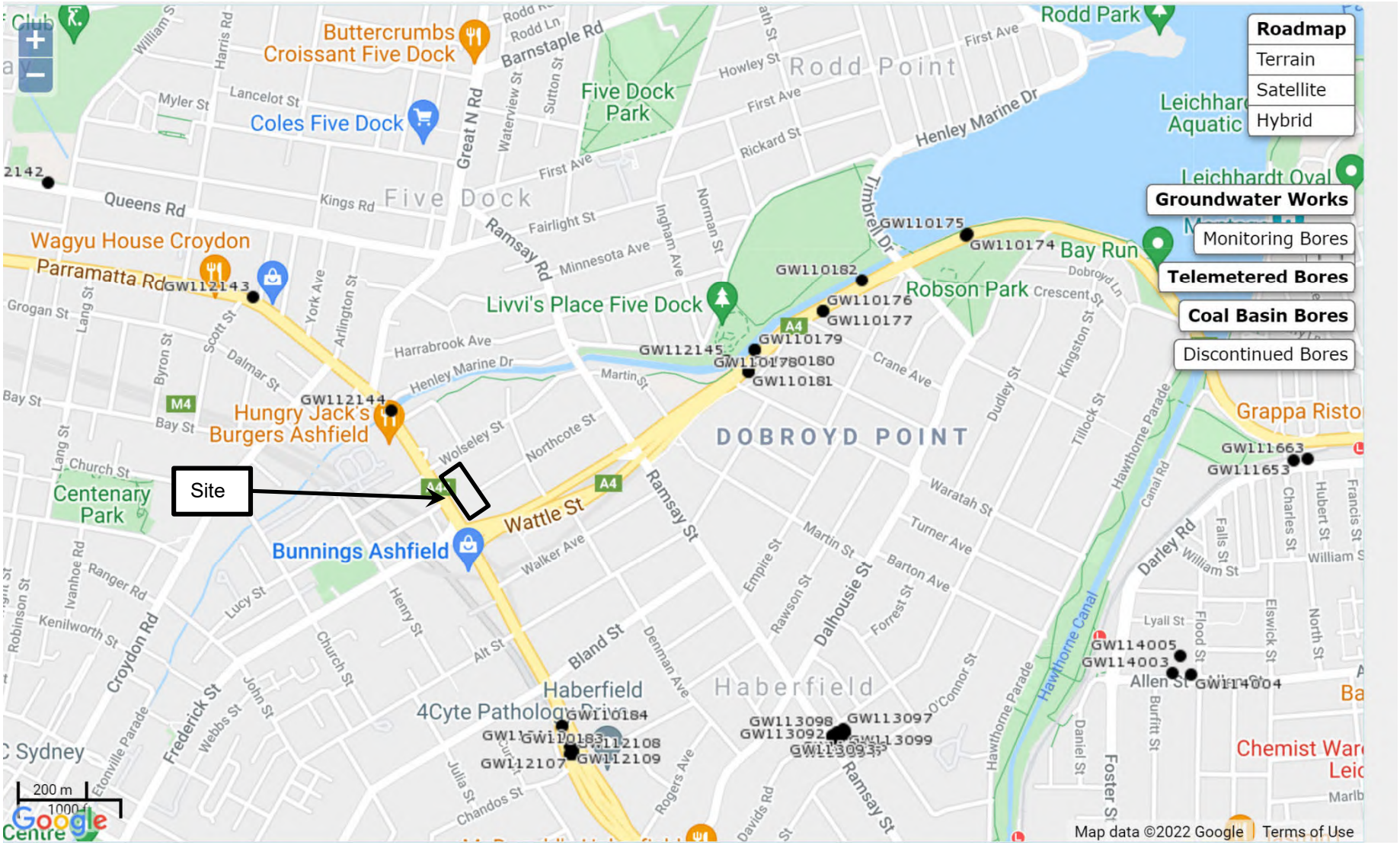


Figure 2-11 ASS Risk Map for Northcote Compound (Source: Appn E, Ref [1])

Figure 2-12 Licensed groundwater bore locations (Source: WaterNSW website)



The Site Auditor addressed these data gaps by reviewing available data from public sources. This data indicated:

- **Flood potential**: The Development Consent[17] advised that there was minimal environmental impact at the Northcote Compound from flooding;
- **Regional and site drainage patterns**: The topographical data indicated that surface water drainage from the Site was in a northerly direction via the local stormwater system to Iron Cove Creek;
- **Boundary fencing**: The Development Consent[18] required boundary fencing to be constructed and maintained by the Project;
- **Hazardous building materials**: It was reasonable to conclude that all structures existing at the Northcote Compound prior to the commencement of the earlier WestConnex M4 East Project were demolished and hazardous building materials removed from the Site, since the work was subject to strict environmental controls and a statutory site audit; and
- **Sewer and underground services**: It was reasonable to conclude that underground services existing at the Northcote Compound prior to the commencement of the WestConnex M4 East Project were removed and relocated where required prior to the commencement of construction work. However, there was a risk that underground services that did not need to be removed remained at the Site.

2.4 Preliminary Conceptual Site Model for Contamination

2.4.1 Potential Sources, Contaminants of Concern & APECs

The preliminary CSM provided by the Ramboll 2019 DSI[19] identified main contamination risks at the Northcote Compound and Areas of Potential Environmental Concern (**APECs**) posed by the former activities as those listed in **Table 2-4**.

The Site Auditor considered the weight of evidence provided by the historical and site condition data reviewed in **Sections 2.2** and **2.3** supported the potential sources of contamination and the contaminants of potential concern (**CoPCs**) identified by the Ramboll 2019 DSI together with:

- **All Sites**:
  - Potential for asbestos fragments to have been spilt on the ground and not removed when former structures were demolished in the early stage of the WestConnex M4 East Project; and
  - Spraying of pesticides / herbicides to control termites and weeds.
- **Site 012**: Potential use of imported fill contaminated by metals, TPH/BTEX, OCPs/OPPs, PCBs, PAHs, asbestos.
- **Site 026**: Potential use of imported fill contaminated by metals, TPH, BTEX, OCPs/OPPs, PCBs, PAHs, asbestos.
- **Site 028**: Potential USTs that caused contamination by metals, TPH, BTEX, PAHs.
- **Site 046**:
  - The use by Council of coal tar to construct the road at Northcote Street
  - Potential use of imported fill contaminated by metals, TPH, BTEX, OCPs/OPPs, PCBs, PAHs, asbestos.

The Site Auditor addressed these data gaps by amending the preliminary CSM to include these additional APECs and CoPCs.

[17] Condition C24, Ref [50]
[18] Condition C25, Ref [50]
[19] Section 4.4, Ref [2]

Table 2-4 Potential Areas and Contaminants of Concern Identified by Ramboll (Source: Table 4-3, Ref [2])

Site	Former Use	Potential Activities of Environmental Concern	Chemicals of Potential Concern (CoPC)
006	Garden sculpture shop (former service station)	Potential existing or former infrastructure associated with storage and distribution of fuels and/or oils (related to service station and/or possible vehicle maintenance) Potential use of imported fill on the site Potential off-site contamination source identified on adjacent buffer Site 505	Metals, TPH, BTEX, OCPs/OPPs, PCBs, PAHs, phenols, asbestos, solvents (VOCs)
012	Eurotech Automotive	Inspection of site during Land Condition Assessment identified a washdown bay with an in ground interceptor pit (at the same approximate location as the proposed Northcote Compound Mechanical/Welding workshop)	TRH, BTEX PAH, metals, asbestos, phenols, VOCs
026	Jax Tyres	Initially low risk as site was covered in concrete for the period of use as a truck sales yard and as a tyre workshop. Review of historical aerial photographs and historical titles for assumed hydraulically up-gradient buffer Site 505 indicated that Site 505 had potentially been used as a service station and mechanical workshop(s) and a radiator manufacturing facility and therefore represents a potential off-site source of contamination (via groundwater migration). Site 026 re-classified as having a moderate risk.	Metals, TRH, BTEX, PAH, asbestos
027	Ken Carroll Motors	Use of imported fill on site. Spillage and storage of waste oils, lubricants and various auto fluids in drums and tanks, Parts degreasing, Solvent based paints Potential off-site contamination source from Site 505.	Metals, TRH, BTEX, PAH, Phenols, asbestos SVOCs, VOCs
028	First Choice Liquor	There is potential for contamination from uncontrolled filling and asbestos from house demolition based on a review of historical aerial photographs. In addition, there is the potential for contamination from the use of the site historically as a service station and radio manufacturing.	TRH, BTEX PAH, PCBs, metals, asbestos, phenols, VOCs, SVOCs

Table 2-5 Exposure Pathways Assessment by Ramboll (Source: Table 5-1, Ref [2])

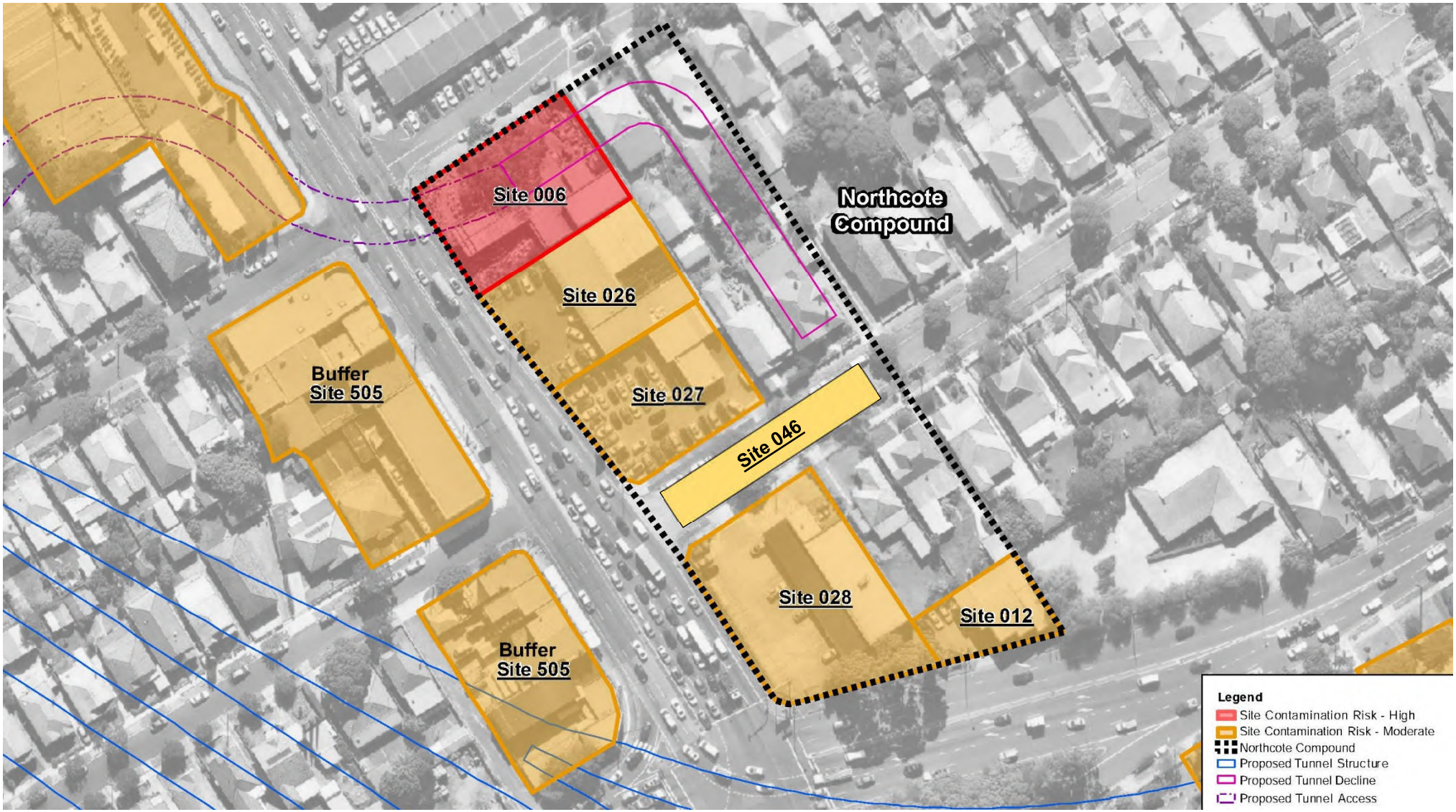
Media	Potentially Complete On-site ? (Y/N)			Justification
	Site[1] users	Construction workers [2]	Ecological	
Soil				
Direct / Dermal contact	**Y**	**Y**	**Y**	Site end users may have contact with soils in residential areas and limited contact in commercial/industrial areas. Construction workers may have direct contact with soils during construction works. Ecological receptors within vegetated areas can contact soils.
Incidental ingestion / Plant uptake	**Y**	**Y**	**Y**	Site end users may incidentally ingest soils in residential areas but are unlikley to incidentally ingest soils under a commercial/industrial site end use. Construction workers may incidentally ingest soils during construction works. Ecological receptors within vegetated areas can incidentally ingest or uptake soils.
Outdoor inhalation of dust, vapours or fibres	**Y**	**Y**	**Y**	Site end users could inhale vapours, dust or fibres from surface soils in uncontrolled conditions. Construction workers could be exposed to dust, vapours and fibres during the construction activities. Ecological receptors within vegetated areas could be exposed to vapour in soils.
Indoor inhalation of vapours	**Y**	**Y**	n/a	Site end users could inhale indoor soil vapours depending on final site use (including retained structures). Construction workers could be exposed to soil vapours if temporary tunnel construction related buildings are proposed within the site footprint if slab on grade.
Groundwater				
Direct / Dermal contact	N	**Y**	**Y**	Site end users are unlikely to be able to contact groundwater. Construction workers may incidentally contact groundwater generated by construction works of the tunnel decline. Ecological receptors may uptake or incidentally ingest groundwater in landscaped areas if groundwater depth is less than 2.5m.

Table 2-5 (cont'd) Exposure Pathways Assessment by Ramboll

Table 5-1: Exposure Pathways Assessment				
Media	**Potentially Complete On-site ? (Y/N)**			**Justification**
	Site[1] users	**Construction workers [2]**	**Ecological**	
Incidental ingestion/ Plant Uptake	N	**Y**	**Y**	Site end users are unlikely to be able to ingest groundwater. Construction workers may incidentally ingest groundwater generated by construction works of tunnel decline. Ecological receptors may uptake or incidentally ingest groundwater in landscaped areas if groundwater depth is less than 2.5m bgl.
Potable ingestion	n/a	n/a	n/a	Groundwater is not used for potable water.
Outdoor inhalation of vapours	**Y**	**Y**	**Y**	Site end users could be exposed to outdoor vapours depending on final site use. Construction workers could be exposed to vapours during construction activities. Ecological receptors within vegetated areas could be exposed to vapour in soils.
Indoor inhalation of vapours	**Y**	**Y**	n/a	Site end users could inhale indoor vapours depending on final site use. Construction workers could be exposed to indoor vapours related to temporary and permanant slab on grade buildings.
Migration to surface water bodies	n/a	n/a	**Y**	Contaminated groundwater has the potential to migrate to Iron Cove Creek located approximately 300m north from the northern site compound boundary.

1. Includes all site occupants of post-construction land use.
2. Includes road construction and future road maintenance workers.

Figure 2-13 Ramboll Risk Ranking of Northcote Compound Sites (Source: Figure 4, Ref [2])



2.4.2 Exposure Pathways and Potential Receptors

The exposure pathways and potential human / ecological receptors identified by the Ramboll 2019 DSI are summarised in **Table 2-5**.

The Site Auditor considered the weight of evidence supported the exposure pathways and receptors identified by the Ramboll 2019 DSI. The Site Auditor considered the end users of the Northcote Compound needed to include:

- Commercial/industrial workers and trench workers at Sites 006, 012, 026, 027 and 028;
- Road maintenance and trench workers at Site 046; and
- Low density residential users at Sites 136 – 141.

2.4.3 Preliminary Risk Assessment

The Ramboll 2019 DSI made a preliminary assessment of potential contamination risks at the 12 sites making up the Northcote Compound, with the results shown in **Figure 2-13**. The Site Auditor considered the weight of evidence supported the sites identified by Ramboll as Moderate and High risk, together with Northcote Street (Site 046) that needed to be classified as having a Moderate risk due to potential coal tar contamination associated with historic road making practices as described in the RMS (2015) "*Technical Direction, Coal tar asphalt handling and disposal*".

In their 2015 Technical Direction, RMS advised that "*Between about 1973 and 1977 coal tar was commonly used as a binder instead of bitumen in asphalt mixes, particularly in the Sydney and Newcastle areas. Coal tar continued to be used in roads in very small quantities up until about 1989 in some asphalt mixes and some pre-coated aggregate for sealing. It has also on occasions been inadvertently used in recycled asphalt mixes. Coal tar asphalts may still exist as a road surface layer but is more commonly found as a discreet subsurface layer overlaid by more modern bitumen asphalt.*"

2.5 Investigation Criteria

2.5.1 Aesthetic

The second check in the EPA decision process was that '*any aesthetic issues relating to site soils have been adequately addressed*'.

NEPM 2013 further clarified that "*Care should be taken to ensure adequate site characterisation, particularly when there is a diverse range of foreign material and associated fill and an appreciable risk inferred from site history (or lack thereof) for the presence of hazardous contaminants. For example, some ash fill may contain PAHs and metals, while other ash deposits may contain no contaminants of concern.*"

No aesthetic criteria were specified for the Northcote Compound by the ESAs. The Site Auditor addressed this data gap by reviewing the available data and identifying aesthetic criteria relevant to the preliminary CSM and a future land use as a road construction worksite. The Site Auditor considered the potential aesthetic issues for the Northcote Compound comprised:

- The presence of stained / discoloured, odorous soil conditions;
- Fill containing a significant amount of anthropogenic material;
- Visible ACM fragments in fill material; and
- The presence of buried putrescible waste that had the potential to degrade and generate methane and other types of hazardous gas.

Appropriate criteria that were adopted by the Site Auditor to assess these aesthetic issues comprised:

- No odorous or stained materials were to remain near the groundsurface (say upper 0.3 m);

- Fill material remaining near the groundsurface (upper 0.3 m) was not to contain demolition rubble or other types of anthropogenic material greater than trace quantities (>5%). This criterion was considered to reflect a common condition placed in Development Consents[20], such as '*Contaminated soil, soil for which the contamination status is unknown, waste (including but not limited to concrete/ bricks/ demolition material) is prohibited from being buried, capped, contained or similar onsite as part of any proposed Remediation Action Plan (including under public or private roads and land which will be dedicated or acquired for any other public purpose)'*; and
- No visible asbestos was to remain near the groundsurface (upper 0.1 m), as specified by NEPM (2013) guidelines.

2.5.2 Soil

The third check in the EPA decision process was that '*soils have been assessed against relevant health-based investigation levels and potential for migration of contamination from soils to groundwater has been considered*'.

The sixth check in the EPA decision process was that '*any issues relating to local area background soil concentrations that exceed relevant investigation levels have been adequately addressed in the site assessment report(s).'*

The seventh check in the EPA decision process was that '*the impacts of chemical mixtures have been assessed'*.

The Site Auditor reviewed contamination risks at the Northcote Compound using the NEPM (2013) guidelines, given that they provided the currently EPA-endorsed investigation levels. Where soil investigation levels (**SILs**) were not provided by these guidelines for potential contaminants of concern, reference was made to the CRC-CARE guidelines, the latest US EPA Regional Soil Levels (**RSLs**) or Canadian guidelines.

SILs were given in the NEPM (2013) guideline for four types of land uses:

A residential with garden / accessible soil (home-grown produce < 10% of fruit and vegetable intake; no poultry), also includes children's day care centres, preschools and primary schools

B residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats

C public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate

D commercial/industrial such as shops, offices, factories and industrial sites.

The land use considered most appropriate for a road construction worksite was Category D commercial/ industrial.

The HILs and EILs provided by the Ramboll 2019 DSI were NEPM (2013) Category D commercial/industrial levels. The adopted soil properties for site soils used to derive the SILs were:

- Soil type: Coarse soil;
- Soil depth = 0 - <1m;
- pH = 5.1;
- Cation Exchange Capacity (**CEC**) = 5 cmol/kg;
- Average total organic carbon (**TOC**) = 0.085 %; and
- Clay content 1%.

[20] The Hills Shire Council (24 June 2019) '*Notice of Determination of a Development Application No: 2312/2018/ZB'*

The Site Auditor considered these HILs / EILs were appropriate because:

- The criteria were consistent with the intended land use as a road construction worksite;
- They were derived in accordance with EPA guidance; and
- The soil specific parameters provided conservative criteria.

The Ramboll 2019 DSI did not derive background heavy metal concentrations to be used to define the EIL D criteria for chromium (III), copper, nickel and zinc at the Northcote Compound, as required by the NEPM (2013) guidelines. The Site Auditor addressed this data gap by deriving representative background concentrations based on the laboratory tests on natural soil samples collected and tested by the Ramboll 2019 DSI at Site 006. These concentrations and the resultant EILs are summarised in **Table 2-6**.

Table 2-6 Background Heavy Metal Concentrations in Natural Soils at Site 006 & EIL D

Sample Location	Depth (m)	Soil Type	Cr III	Cu	Ni	Zn
006_TP001	0.50	Clay	4	<5	<2	<5
	1.20	Clay	<2	<5	<2	<5
006_TP003	0.30	Sand	11	<5	<2	<5
	0.60	Sand	4	<5	<2	<5
006_TP004	0.40	Clay	19	<5	<2	<5
	1.00	Clay	8	<5	<2	<5
006_GW005	0.70	Clay	2	<5	<2	<5
006_GW006	0.50	Clay	26	<5	2	6
	Background Concentration		**30**	**5**	**5**	**10**
	Table 2-6 EIL D		**310**	**150**	**60**	**300**
	EIL D		**330**	**155**	**65**	**310**

Units: mg/kg

Two amendments were made to the Ramboll 2019 DSI criteria, these being the use of:

- The HIL D F1 silt criteria of 250 mg/kg because it was slightly less than the F1 sand criteria of 260mg/kg; and
- The use of the NEPM (2013) EIL D criteria for BaP of 1.4 mg/kg, since it remains specified in the NEPM and the use of an alternate criteria needs more detailed justification than given by Ramboll.

A summary of the SILs used by the Site Auditor for assessing contamination risks at the Northcote Compound is provided in **Table 2-7**.

2.5.3 Surface and Groundwater

The fourth check in the EPA decision process was that *'groundwater (where relevant) has been assessed against relevant health-based investigation levels and, if required, any potential impacts to buildings and structures from the presence of contaminants considered.'*

The ninth check in the EPA decision process was that '*any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier'.*

Table 2-7: Soil Investigation Levels for Northcote Compound

Substances	HILs (mg/kg)			Commercial/ Industrial D EILs (mg/kg)
	Residential A	Recreational C	Commercial/ Industrial D	
Metals / Metalloids (in clay)				
Arsenic (total)	100	300	3,000	160
Cadmium	20	90	900	--
Chromium (III)	--	--	--	330
Chromium (VI)	100	300	3,600	--
Copper	6,000	17,000	240,000	155
Lead	300	600	1,500	1,800
Mercury (inorganic)	40	80	730	--
Nickel	400	1,200	6,000	65
Zinc	7,400	30,000	400,000	310
Other Organics				
Aldrin + Dieldrin	6	10	45	--
Chlordane	50	70	530	--
Chlorpyriphos	160	250	2,000	--
DDT+DDD+DDE	240	400	3,600	640
Heptachlor	6	10	50	--
PAHs (total)	300	300	4,000	--
Benzo(a)pyrene	3 (BaP TEQ)	3 (BaP TEQ)	40 (BaP TEQ)	1.4 (1)
Phenol (as pentachlorophenol)	100	120	660	--
PCBs (total)	1	1	7	--
Petroleum Hydrocarbons (in sand or silt 0 to <1m)				
TRH F1	40		250	215
TRH F2	110		NL	170
TRH F3	2,500		3,500	1,700
TRH F4	6,300 (2)	7,400 (2)	10,000	3,300
Benzene	0.5		3	75
Toluene	160		NL	135
Ethyl Benzene	55		NL	165
Xylenes (total)	40		230	95
Naphthalene	3		NL	370
Asbestos				
FA & AF (friable asbestos)	0.001% w/w			--
Bonded ACM	0.01% w/w	0.02% w/w	0.05% w/w	--
All forms of asbestos	No visible asbestos for surface soil			--

Legend:

Applicable SILs for Northcote Compound

Notes:

(1) As given in NEPM erratum at http://nepc.gov.au/system/files/pages/622ffd38-f121-4daf-9ef3-ed7d40af68f2/files/asc-nepm-errata-30april2014.pdf

(2) Direct contact criteria given in Table 4, CRC CARE Technical Report No. 10

The Ramboll 2019 DSI derived Groundwater Investigation Levels (**GILs**) to protect the following potential receptors:

- Marine aquatic ecosystems;
- Vapour intrusion for a commercial/industrial land use (Note: the Site Auditor reviews soil vapour criteria in **Section 2.5.4**); and

- Recreational water use.

Drinking water criteria were not adopted since the area was supplied by potable water. The Site Auditor considered the potential receptors used by the Ramboll 2019 DSI for groundwater and surface water were generally appropriate for the end users of the land that made up the Northcote Compound. The Site Auditor also considered there was a future potential for groundwater to be used for irrigation water. The Site Auditor addressed this data gap by included long-term irrigation criteria in the assessment.

The Ramboll 2019 DSI derived GILs based on the:

- NEPM 2013 guidelines;
- National Health and Medical Research Council (**NHMRC**) 2011 Australian Drinking Water Guidelines 6, Version 3.2 Updated February 2016;
- NHMRC 2008 Guidelines for Managing Risks in Recreational Water; and
- ANZECC & ARMCANZ 2000 Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

The Site Auditor considered the NEPM (2013) guidelines[21] provided appropriate guidance with respect to groundwater contamination risks such as:

- *"At the point of use or exposure, GILs may be considered as response levels: the response may include further investigation or management as appropriate. Contaminant levels marginally in excess of the GILs do not imply unacceptability or that a significant human health or ecosystem risk is likely to be present. The decision on whether clean-up is required (and, if so, to what extent) should be based on site-specific assessment. Risk assessment is one aspect of making the decision though other considerations such as practicality, timescale, effectiveness, cost, durability, relevant regulatory policy, and community acceptance are also important"*; and
- Recreational water criteria are derived by multiplying the NHMRC (August 2018) Australian Drinking Water Guideline (**ADWG**) criteria by a factor of 10, as recommended by the NEPM (2013) guidelines[22].

However, the criteria provided by the NEPM (2013) guidelines together with the other guidelines used by the Ramboll 2019 DSI had been superseded by the:

- Australian New Zealand 2018 water quality guidelines (**ANZG**) for fresh and marine water, which were published on the web and regularly updated;
- The ADWG were updated in 2018 and then again in 2021; and
- US EPA RSLs provide criteria for some analytes not listed in Australian guidance, with these criteria being regularly updated.

The Site Auditor addressed this deficiency by adopting GILs based on the most recent criteria endorsed by the EPA at the time this SAR was prepared. A summary of the criteria used by the Site Auditor for assessing groundwater quality at the Northcote Compound is provided in **Table 2-8**. Note that freshwater criteria provided by the ANZG criteria were used where marine water criteria were not available.

2.5.4 Soil Vapour Criteria

The fifth check in the EPA decision process was that '*hazardous ground gases (where relevant) have been assessed against relevant health-based investigation levels and screening values.*

The ninth check in the EPA decision process was that '*any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier'*.

[21] Refer Section 3.5 in NEPM (2013) "*Schedule B6 Guideline on The Framework for Risk-Based Assessment of Groundwater Contamination*"
[22] Section 2.8 in Schedule B1, NEPM (2013)

Table 2-8: Groundwater Investigation Levels

Substances	Marine water protection levels [1] (µg/L)	Irrigation criteria [6] (µg/L)	Recreational water criteria [5] (µg/L)
Metals			
Arsenic (V)	13	100	100
Cadmium	0.7	10	20
Chromium (III)	27	100	220,000 [3]
Chromium (IV)	4.4		500
Copper	1.3	200	20,000
Lead	4.4	2,000	100
Mercury (inorganic)	0.1	2	10
Nickel	70	200	200
Zinc	15	2,000	na
Petroleum Hydrocarbons			
TRH (C6-C9)	150 [2]	--	--
TRH (C10-C36)	600 [2]	--	--
Benzene	700	--	10
Toluene	180	--	8,000
Ethylbenzene	80	--	3,000
Xylenes	75 - 350	--	6,000
PAHs			
Naphthalene	70	--	1.2 [3]
Anthracene	PQL (0.1)	--	18,000 [3]
Fluoranthene	1.0	--	8,000 [3]
Phenanthrene	0.6	--	--
Benzo(a)pyrene	0.1	--	PQL (0.01)
Organochlorine Pesticides			
Aldrin	PQL (0.01)	--	PQL (0.01)
Chlordane	PQL (0.01)	--	20
DDT	PQL (0.01)	--	90
Dieldrin	0.01	--	PQL (0.01)
Heptachlor	PQL (0.01)	--	PQL (0.01)
Organophosphate Pesticides			
Chlorpyrifos	PQL (0.01)	--	100
Fenitrothion	PQL (0.01)	--	70
Glyphosate	PQL (0.01)	--	10,000
Malathion	0.05	--	700
Parathion	PQL (0.01)	--	200
Nutrients			
Ammonia (as NH3)	910	--	5,000
Chlorine	na	--	6,000
Nitrate	na	--	50,000
Total phosphorus [2]	na	--	--
Other Chemicals			
PCBs	0.01-0.3		PQL (0.01)
Chloroethylene (vinyl chloride)	100	--	0.19 [3]
1,1,2-Trichloroethylene	330	--	4.9 [3]
1,1,2,2-Tetrachloroethylene	70		110 [3]

Notes

(1) Marine water protection levels from ANZG guidelines wherever available, otherwise freshwater criteria were used

(2) Dutch (2000) Intervention Level

(3) US EPA (May 2021) RSLs – tapwater criteria (with target cancer risk $1x10^{-6}$ and hazard quotient of 1) multiplied by 10
(4) NHMRC (March 2021) drinking water criteria (health) used wherever possible. Aesthetic criteria not considered since the water use was recreational
(5) Recreational criteria = ADWC x 10
(6) ANZECC (2000) LTVs for long-term use (up to 100 years) used for irrigation water criteria where possible

The EPA endorsed the use of the soil vapour criteria provided in Schedule B1 of the NEPM (2013) guidelines. These guidelines provided a range of criteria for the four main land use types, comprising:

- Interim soil vapour HILs for volatile chlorinated organic compounds based on soil vapour measurements (NEPM Table 1A(2) in mg/m^3);
- Soil HSLs for vapour intrusion based on soil concentrations (NEPM Table 1A(3) in mg/kg);
- Groundwater HSLs for vapour intrusion based on groundwater concentrations (NEPM Table 1A(4) in mg/L); and
- Soil vapour HSLs for vapour intrusion based on soil vapour measurements (NEPM Table 1A(5) in mg/m^3).

The NEPM (2013) guidelines also referred to the CRC CARE source documents[23], which provided additional soil vapour criteria for protecting an intrusive maintenance worker in a shallow trench.

The vapour criteria provided by the Ramboll 2019 DSI were NEPM (2013) Category D commercial/industrial levels for petroleum hydrocarbons for sand and a groundwater depth of 2 to <4m. The Site Auditor considered these parameters were appropriate because:

- There was a low risk of petroleum hydrocarbon soil vapours at the R2 low density residential zoned land, with the main risk being at the B6 Enterprise corridor zoned land along Parramatta Road and Wattle Street; and
- Sand and groundwater at the shallowest depth gives the lowest soil vapour criteria.

The Site Auditor identified errors in the groundwater vapour criteria presented in Table 7-6 in the Ramboll 2019 DSI, these being:

- The unit of measure should have been mg/L not mg/kg;
- Benzene = 5 mg/L not “Not Limiting” (NL); and
- F1 = 6 mg/L not NL.

The Site Auditor addressed these errors by summarising the correct soil vapour criteria in **Table 2-9**, together with summaries of vapour criteria for direct measurement, soil and intrusive maintenance workers in a shallow trench.

[23] Friebel E and Nadebaum P (September 2011) “*Technical report No. 10, Health screening levels for petroleum hydrocarbons in soil and groundwater, Part 1: Technical development document*”. CRC CARE

Table 2-9: Soil Vapour Criteria from NEPM & CRC CARE Guidelines

Contaminant	Commercial/ Industrial D	Intrusive Maintenance Worker (Shallow Trench)
Soil vapour (mg/m^3)		
Toluene	4,800	NL
Ethylbenzene	1,300	NL
Xylenes	840	NL
Benzene	4	3,900
Naphthalene	3	NL
F1	680	NL
F2	500	NL
Soil (mg/kg)		
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	230	NL
Benzene	3	77
Naphthalene	NL	NL
F1	250	NL
F2	NL	NL
Groundwater (mg/L)		
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
Benzene	5	NL
Naphthalene	NL	NL
F1	6	NL
F2	NL	NL

Legend: NL = No limit

2.6 Review of Investigation Data Quality

2.6.1 Overview

The Ramboll 2019 DSI advised that an intrusive site investigation was undertaken in May 2016 at the five properties zoned B6 Enterprise corridor, namely, Sites 006, 012, 026 – 028. The scope of field and laboratory work undertaken by the DSI is summarised in **Table 2-10**.

No investigations were undertaken for the five properties zoned R2 low density residential (Sites 136 – 141) and Northcote Street (Site 046). The Site Auditor has assessed the significance of this data gap in **Section 2.9.1**.

Table 2-10 Scope of Work for Ramboll 2016 Site Investigation (Source: Table 6-1, Ref [2])

Site	Fieldwork dates	Fieldwork completed	Investigations are in accordance with SAQP
006	4/5/2016 to 24/5/2016	6 Test pits 3 Boreholes converted into Groundwater wells	Yes.
012	10/5/2016 to 24/5/2016	1 Borehole converted into a Groundwater well	Yes.
026	4/5/2016 to 24/5/2016	1 Test pit 1 Borehole converted into a Groundwater well	Yes. A test pit was substituted for one groundwater well, as the installation of one well was considered to determine the groundwater conditions at the site and assess any up-gradient impact from Site 505. In addition, observation of the underlying geology and any CoPCs was able to be determined more accurately using a test pit.
027	4/5/2016 to 24/5/2016	2 Test pits 1 Borehole converted into a Groundwater well	Yes. Two test pits were substituted for two groundwater wells, as it was considered one groundwater well would be used to determine the groundwater conditions at the site and assess any up-gradient impact from Site 505. In addition, observation of the underlying geology and any CoPCs was able to be determined more accurately using a test pit.
028	5/5/2016	3 Test pits	Yes. The three soil bores were replaced with three test pits as no groundwater wells were to be installed onsite and the source of contamination was likely associated with the fill material onsite. Observation of the underlying geology and any CoPCs was able to be determined more accurately using a test pit.

2.6.2 Documentation Completeness DQO

Documentation provided in the Ramboll 2019 DSI regarding fieldwork and laboratory testing for the five B6 Enterprise corridor zoned sites was provided in Appendices B to F, I and J of their report. The documentation comprised:

- DQOs and DQIs;
- Site inspection conducted on 10 - 11/11/15 and photos taken;
- Soil and groundwater sample location plans;
- Description of field screening protocols for soil samples;
- Description of field screening protocols for groundwater samples;
- Soil investigation and sampling techniques; decontamination procedures; sample preservation methods; field QA/QC; sample management, use of a NATA-registered chemical laboratory/ies;
- Groundwater investigation and sampling techniques; decontamination procedures; sample preservation methods; field QA/QC; sample management, use of a NATA-registered chemical laboratory/ies;

- Borehole and well construction logs;
- LFG, PID and water quality calibration sheets;
- Groundwater testing field sheets;
- A copy of the chain-of-custody (**COC**) forms acknowledging receipt of date and time, and identity of samples included in shipments;
- Analytical test methods used by the NATA-registered laboratory; laboratory accreditation for analytical methods used; laboratory test certificates;
- QA/QC assessment of the field and laboratory data; description of the surrogates and spikes used; record of holding times and a comparison with method specifications (Section 7);
- Summary of all soil chemical test results in a table that showed sample numbers, sample depth, soil assessment criteria;
- Summary of all groundwater test results; and
- DQO assessment.

Checkprints of the borelogs and figures provided in the Ramboll 2019 DSI were prepared by the Site Auditor to check the accuracy of the summarised data and no errors / omissions were identified.

The Site Auditor considered that the documentation provided by the Ramboll 2019 DSI met or was close to meeting the documentation completeness DQO for the 5 of 12 sites that made up the Northcote Compound and were zoned B6 Enterprise Corridor.

2.6.3 Data Completeness and Representativeness - Soils

The Ramboll 2019 DSI collected and chemically tested soil samples from 5 of the 12 sites that made up the Northcote Compound. These five sites corresponded to the properties zoned B6 Enterprise Corridor and were located along Parramatta Road and Wattle Street. The locations where soil samples were collected are shown in **Figures 2-14** to **2-18**.

Figure 2-14 Sample Locations at Site 006

(Source: Figure B-1, Ref [2])

Figure 2-15 Sample Locations at Site 012

(Source: Figure C-1, Ref [2])

Figure 2-16 Sample Locations at Site 026

(Source: Figure D-1, Ref [2])

Figure 2-17 Sample Locations at Site 027 (Source: Figure E-1, Ref [2])

Figure 2-18 Sample Locations at Site 028

(Source: Figure F-1, Ref [2])

The Site Auditor summarised the laboratory test results conducted on soil samples according to the AECs included in the preliminary CSM reviewed in **Section 2.4**. These AECs comprised:

- **Surface soils across all 12 sites**: Potential for asbestos fragments to have been spilt by the demolition of buildings conducted by the WestConnex M4 East Project and the historic spraying of pesticides / herbicides. With the Northcote Compound having an area of 1.2165 ha, the EPA (Sept. 1995) '*Contaminated Sites Sampling Guidelines'* recommended that contamination be characterised using a minimum of 23 sampling locations.
- **Fill layer at the 5 sites zoned B6 Enterprise corridor**: The EPA (Sept. 1995) *'Contaminated Sites Sampling Guidelines'* recommended that contamination at each of these sites be characterised using the following number of sampling locations:
  - Site 006: 0.13 ha = 7 locations
  - Site 012: 0.059 ha = 6 locations
  - Site 026: 0.14 ha = 7 locations
  - Site 027: 0.12 ha = 9 locations
  - Site 028: 0.20 ha = 7 locations
- **Subbase and fill layer at Northcote Street**: The EPA (Sept. 1995) *'Contaminated Sites Sampling Guidelines'* recommended that contamination across a 0.145 ha area be characterised using a minimum of 7 sampling locations.
- **Natural soils**: Natural soils underlying the fill layer could be validated at a lower frequency than that given by the EPA (Sept. 1995) *'Contaminated Sites Sampling Guidelines'* provided there was a low risk of migration of contamination from the overlying fill layer, no buried structures were present (e.g. USTs, buried pipes) that could be potential contaminant sources, and groundwater was not contaminated at levels that could impact soils.
- **USTs at Site 006 and possibly 028**: The EPA (April 2014) "*Technical Note – Investigation of Service Station Sites*" recommended a minimum two samples per tank with samples taken from each tank wall and floor. Samples to be taken at or below the base of the tanks.
- **Dispenser at Sites 006 and possibly 028**: The EPA (April 2014) "*Technical Note – Investigation of Service Station Sites*" recommended one sample per dispenser backfill and one per natural soil (if needed)
- **Fuel feed lines to dispensers at Sites 006 and possibly 028**: The EPA (April 2014) "*Technical Note – Investigation of Service Station Sites*" recommended one sample every 5 m of line. The Ramboll 2019 DSI shows the fuel line at Site 006 was 30 m.
- **Remote fill points at Site 006 and possibly 028**: The EPA (April 2014) "*Technical Note – Investigation of Service Station Sites*" recommended one sample per fill point.
- **Below-ground waste oil/wastewater tank at Site 012**: The EPA (April 2014) "*Technical Note – Investigation of Service Station Sites*" recommended two samples per tank.
- **Mechanical workshops at Sites 006, 012, 026 - 028**: The EPA (April 2014) "*Technical Note – Investigation of Service Station Sites*" recommended judgemental sampling in accordance with EPA (Sept. 1995) *'Contaminated Sites Sampling Guidelines'*

Site 006

A summary of the laboratory tests conducted on fill and natural soil samples from Site 006 is provided in **Table 2-11**.

Table 2-11: Summary of Lab Tests on Soil Samples from Site 006 - Ramboll 2019 DSI

Location	Sample Depth (m)	Heavy metals (1)	TRH	BTEX	PAHs	Phenols	OCPs	OPPs	PCBs	Asbestos	VOCs/VHCs
Site 006 - Fill											
006_TP001	0.20	✓	✓	✓	✓		✓	✓	✓	✓	
006_TP002	0.10, 0.70, 1.20	✓	✓	✓	✓		✓	✓	✓	✓	
006_TP003	0.10	✓	✓	✓	✓				✓	✓	
006_TP004	0.20	✓	✓	✓	✓		✓	✓	✓	✓	
006_TP005											
006_TP006											
006_GW004/ 006_QC004	0.20, 0.50, 2.50	✓	✓	✓	✓	✓			✓	✓	✓
006_GW005/ 006_QC003	0.20, 0.60	✓	✓	✓	✓				✓	✓	✓
006_GW006	0.20	✓	✓	✓	✓				✓	✓	✓
TOTALS		**7**	**7**	**7**	**7**	**1**	**3**	**3**	**7**	**7**	**3**
Site 006 - Natural soil											
006_TP001	0.50, 1.20	✓	✓	✓	✓				✓		
006_TP003	0.30, 0.60	✓	✓	✓	✓				✓		
006_TP004	0.40, 1.00	✓	✓	✓	✓				✓		
006_GW005	0.70, 4.00	✓	✓	✓	✓		✓	✓	✓		✓
006_GW006	0.50	✓	✓	✓	✓		✓	✓	✓	✓	✓
TOTALS		**5**	**5**	**5**	**5**		**2**	**2**	**5**	**1**	**2**
Site 006 – Stockpiled soil from UST excavations											
006_GS001		✓	✓	✓	✓					✓	
006_GS002		✓	✓	✓	✓					✓	
006_GS003		✓	✓	✓	✓	✓	✓	✓	✓	✓	
006_GS004		✓	✓	✓	✓	✓	✓	✓	✓	✓	
006_GS005		✓	✓	✓	✓					✓	
006_GS006		✓	✓	✓	✓	✓	✓	✓	✓	✓	
006_GS007		✓	✓	✓	✓					✓	
006_GS008		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
006_GS009		✓	✓	✓	✓					✓	
006_GS010		✓	✓	✓	✓	✓	✓	✓	✓	✓	
006_GS011/ 006_QC022		✓	✓	✓	✓					✓	
TOTALS		**11**	**11**	**11**	**11**	**5**	**5**	**5**	**5**	**11**	**1**
Site 006 – UST 1											
006_TP006											
TOTALS		**0**	**0**	**0**	**0**						
Site 006 – UST 2											
TOTALS		**0**	**0**	**0**	**0**						

Location	Sample Depth (m)	Heavy metals (1)	TRH	BTEX	PAHs	Phenols	OCPs	OPPs	PCBs	Asbestos	VOCs/VHCs
Site 006 – Fuel line											
006_TP002	0.10, 0.70, 1.20	✓	✓	✓	✓		✓	✓	✓	✓	
TOTALS		**1**	**1**	**1**	**1**		**1**	**1**	**1**	**1**	
Site 006 - Dispenser											
TOTALS		**0**	**0**	**0**	**0**						

Note: 1. The heavy metals comprise As, Cd, Cr, Cu, Hg, Ni, Pb & Zn.

Legend:

Sampling frequency less than EPA guidance

The Site Auditor considered the available laboratory test data for Site 006 met or was close to meeting the minimum soil sampling requirements for:

- Fill layer: Fill was investigated and tested at 7 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs, PCBs, asbestos), with the locations spread across the area;
- Natural soil: Natural soil was investigated and tested at 5 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs), with the locations spread across the area; and
- Stockpiled soil: 11 samples of 275 m^3 of stockpiled soil[24] was tested, which corresponded to a sampling frequency of 1 per 25 m^3 that met EPA guidance as given by the NEPM (2013) guidelines.

The Site Auditor considered the available laboratory test data for Site 006 did not meet the minimum soil sampling requirements for:

- Fill layer: OCPs / OPPs were tested at only 3 locations, which was well below the 7 locations recommended by EPA guidance;
- UST1 and UST2: No samples were collected close to the USTs and tested for the contaminants of concern; and
- Dispenser and fuel line: No samples were collected from the soils along the dispenser or fuel line.

The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.2**.

Site 012

A summary of the laboratory tests conducted on fill and natural soil samples from Site 012 is provided in **Table 2-12**.

[24] Section B-6.3, Ref [2]

Table 2-12: Summary of Lab Tests on Soil Samples from Site 012 - Ramboll 2019 DSI

Location	Sample Depth (m)	Heavy metals (1)	TRH	BTEX	PAHs	Phenols	OCPs	OPPs	PCBs	Asbestos	VOCs/ VHCs
Site 012 - Fill											
012_GW001	0.2	✓	✓	✓	✓	✓				✓	✓
TOTALS		**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**
Site 012 - Natural soil											
012_GW001	0.5	✓	✓	✓	✓	✓				✓	✓
TOTALS		**1**	**1**	**1**	**1**	**1**				**1**	**1**
Site 012 – Interceptor pit / washdown bay											
012_GW001	0.2	✓	✓	✓	✓	✓				✓	✓
TOTALS		**1**	**1**	**1**	**1**	**1**				**1**	**1**

Note: 1. The heavy metals comprise As, Cd, Cr, Cu, Hg, Ni, Pb & Zn.

Legend:

Sampling frequency less than EPA guidance

The Site Auditor considered the available laboratory test data for Site 012 met or was close to meeting the minimum soil sampling requirements for:

- Natural soil: Natural soil was investigated and tested at 1 sample location for the main contaminants of concern (metals, TRH, BTEX, PAHs, phenols, asbestos, VOCs/VHCs), with the location targeting the interceptor pit / washdown bay.

The Site Auditor considered the available laboratory test data for Site 012 did not meet the minimum soil sampling requirements for:

- Fill layer: Fill was investigated and tested at only 1 sample location for the main contaminants of concern (metals, TRH, BTEX, PAHs, PCBs, asbestos, VOCs/VHCs), which was well below the 6 locations recommended by EPA guidance; and
- Interceptor pit / washdown bay: Near-surface soil was investigated and tested at only 1 sample location for the main contaminants of concern (metals, TRH, BTEX, PAHs, asbestos, VOCs/VHCs), which was well below the 2 locations recommended by EPA guidance.

The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.3**.

Site 026

A summary of the laboratory tests conducted on fill and natural soil samples from Site 026 is provided in **Table 2-13**.

Table 2-13: Summary of Lab Tests on Soil Samples from Site 026 - Ramboll 2019 DSI

Location	Sample Depth (m)	Heavy metals (1)	TRH	BTEX	PAHs	Phenols	OCPs	OPPs	PCBs	Asbestos	VOCs/ VHCs
Site 026 - Fill											
026_TP001/ 026_QC001	0.10, 0.50	✓	✓	✓	✓					✓	
026_GW001	0.20, 0.50	✓	✓	✓	✓					✓	
TOTALS		**2**	**2**	**2**	**2**	**0**	**0**	**0**	**0**	**2**	**0**
Site 026 - Natural soil											
026_TP001	1.00	✓	✓	✓	✓						
TOTALS		**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**

Note: 1. The heavy metals comprise As, Cd, Cr, Cu, Hg, Ni, Pb & Zn.

Legend:

Sampling frequency less than EPA guidance

The Site Auditor considered the available laboratory test data for Site 026 met or was close to meeting the minimum soil sampling requirements for:

- Natural soil: Natural soil was investigated and tested at 1 sample location for the main contaminants of concern (metals, TRH, BTEX, PAHs).

The Site Auditor considered the available laboratory test data for Site 026 did not meet the minimum soil sampling requirements for:

- Fill layer: Fill was investigated and tested at only 2 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs, asbestos), which was well below the 7 locations recommended by EPA guidance. No fill samples were tested for OCPs, OPPs and PCBs.

The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.3**.

Site 027

A summary of the laboratory tests conducted on fill and natural soil samples from Site 027 is provided in **Table 2-14**.

Table 2-14: Summary of Lab Tests on Soil Samples from Site 027 - Ramboll 2019 DSI

Location	Sample Depth (m)	Heavy metals (1)	TRH	BTEX	PAHs	Phenols	OCPs	OPPs	PCBs	Asbestos	VOCs/ VHCs
Site 027 - Fill											
027_TP001	0.20, 0.50	✓	✓	✓	✓	✓	✓	✓	✓	✓	
027_TP002	0.15, 0.25	✓	✓	✓	✓					✓	
TOTALS		**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**2**	**0**
Site 027 - Natural soil											
027_GW003/ 027_QC001/ 027_QC002	0.20, 0.50, 1.00	✓	✓	✓	✓	✓				✓	✓
027_TP001	0.80	✓	✓	✓	✓						
027_TP002/	1.30	✓	✓	✓	✓						
TOTALS		**3**	**3**	**3**	**3**	**1**	**0**	**0**	**0**	**1**	**1**

Note: 1. The heavy metals comprise As, Cd, Cr, Cu, Hg, Ni, Pb & Zn.

Legend:

Sampling frequency less than EPA guidance

The Site Auditor considered the available laboratory test data for Site 027 met or was close to meeting the minimum soil sampling requirements for:

- Natural soil: Natural soil was investigated and tested at 3 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs).

The Site Auditor considered the available laboratory test data for Site 027 did not meet the minimum soil sampling requirements for:

- Fill layer: Fill was investigated and tested at only 2 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs, asbestos), which was well below the 9 locations recommended by EPA guidance. Only one fill sample was tested for OCPs, OPPs and PCBs.

The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.3**.

Site 028

A summary of the laboratory tests conducted on fill and natural soil samples from Site 028 is provided in **Table 2-15**.

The Site Auditor considered the available laboratory test data for Site 028 met or was close to meeting the minimum soil sampling requirements for:

- Natural soil: Natural soil was investigated and tested at 3 sampling locations for the main contaminants of concern (metals, TRH, BTEX, PAHs), with the locations spread across the area.

Table 2-15: Summary of Lab Tests on Soil Samples from Site 028 - Ramboll 2019 DSI

Location	Sample Depth (m)	Heavy metals [1]	TRH	BTEX	PAHs	Phenols	OCPs	OPPs	PCBs	Asbestos	VOCs/VHCs
Site 028 - Fill											
028_TP001/ 028_QC001	0.10, 0.50	✓	✓	✓	✓	✓	✓	✓	✓	✓	
028_TP002	0.20	✓	✓	✓	✓	✓	✓	✓		✓	
028_TP003	0.40	✓	✓	✓	✓	✓	✓	✓		✓	
TOTALS		**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**3**	**0**
Site 028 - Natural soil											
028_TP001	0.70, 0.90	✓	✓	✓	✓						
028_TP002	0.50, 1.00	✓	✓	✓	✓						
028_TP003	0.60	✓	✓	✓	✓						
TOTALS		**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**
Site 028 – Possible UST											
TOTALS		**0**	**0**	**0**	**0**						
Site 028 – Possible Fuel line											
TOTALS		**0**	**0**	**0**	**0**						
Site 028 - Dispenser											
TOTALS		**0**	**0**	**0**	**0**						

Note: 1. The heavy metals comprise As, Cd, Cr, Cu, Hg, Ni, Pb & Zn.

Legend:

Sampling frequency less than EPA guidance

The Site Auditor considered the available laboratory test data for Site 028 did not meet the minimum soil sampling requirements for:

- Fill layer: Fill was investigated and tested at 3 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs), which was well below the 7 locations recommended by EPA guidance; and
- UPSS Infrastructure: No investigation for potential USTs and other UPSS infrastructure was undertaken.

The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.3**.

Site 046 (Northcote Street)

No soil samples were collected from the subbase, fill and natural soil underlying the asphalt pavement within Northcote Street. The Site Auditor considered there was a risk of contamination from Council's possible use of coal tar to construct the road, as well as contamination associated with imported fill.

The EPA (Sept. 1995) *'Contaminated Sites Sampling Guidelines'* recommended that contamination across a 0.145 ha area be characterised using a minimum of 7 sampling locations. The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.4**.

Sites 136 – 141 (Residential land use)

No soil samples were collected from near-surface soil and possible fill within the 5 residentially zoned properties forming the eastern part of the Site. The Site Auditor considered there was a risk of contamination from:

- Asbestos fragments split during demolition work undertaken by the WestConnex M4 East contractor near the beginning of the project; and
- Spraying of pesticides / herbicides to control termites and weeds.

The five residentially zoned properties had a combined area of 0.504 ha. The EPA (Sept. 1995) *'Contaminated Sites Sampling Guidelines'* recommended that contamination across a 0.504 ha area be characterised using a minimum of 14 sampling locations. The Site Auditor assessed the significance of the deficiencies in soil sample testing when reviewing soil contamination risks in **Section 2.9.1**.

2.6.4 Data Completeness and Representativeness – Surface Water

No sampling or testing of surface water was undertaken by the Ramboll 2019 DSI since no surface water bodies were presence at or near the Northcote Compound.

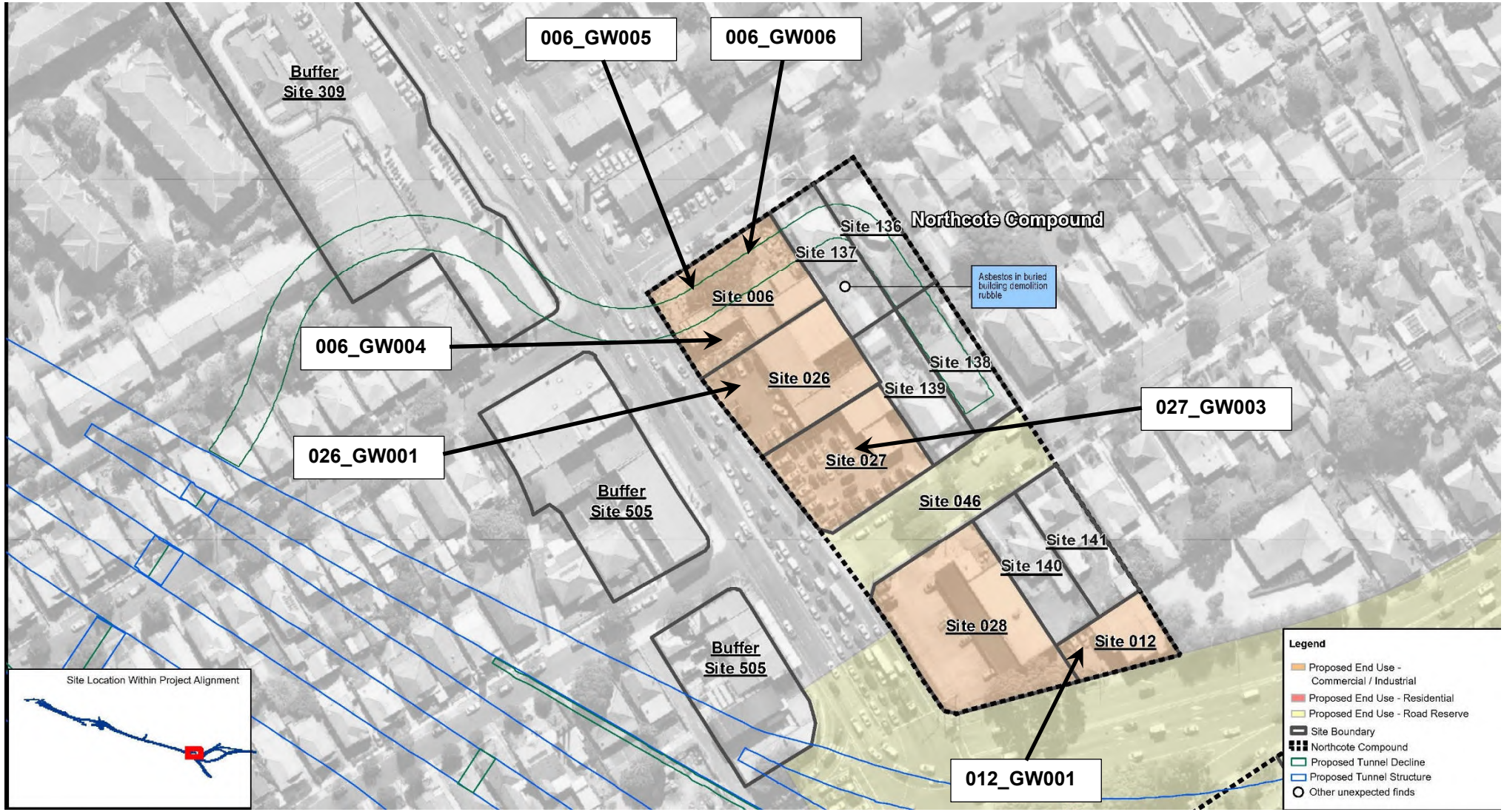
2.6.5 Data Completeness and Representativeness – Groundwater

The Ramboll 2019 DSI conducted laboratory tests on samples of groundwater from 6 locations spread across the Northcote Compound, as shown in **Figure 2-19**. A summary of the number of groundwater samples (excluding QA samples) chemically tested by Ramboll is provided in **Table 2-16**.

Table 2-16: Summary of Lab Tests on Groundwater Samples

Site	Well	Sampling Date	Field parameters	Metals	TPH / BTEX	PAHs	Phenols	VOCs / VHCs	PCBs, OCPs, OPPs
006	006_GW004	24/05/16	✓	✓	✓	✓	✓	✓	✓
	006_GW005/ 006_QC100/ 006_QC101	24/05/16	✓	✓	✓	✓	✓	✓	✓
	006_GW006	24/05/16	✓	✓	✓	✓	✓	✓	✓
012	012_GW001	24/05/16	✓	✓	✓	✓	✓	✓	
026	026_GW001	24/05/16	✓	✓	✓	✓	✓	✓	
027	027_GW003	24/05/16	✓	✓	✓	✓	✓	✓	

Figure 2-19 Groundwater Monitoring Wells at Northcote Compound (Source: Figure 3, Ref [2])



The Site Auditor considered the minimum sampling requirements meeting EPA guidance were:

- Installation of a sufficient number of monitoring bores (minimum of 3) to enable triangulation of water levels across the site;
- All bores should penetrate the regional water table to an extent that will allow representative discrete samples to be collected from both shallow and deep groundwater, due to the potential for DNAPLs to be present;
- A minimum of one well should be located up-gradient of potential contaminant sources in order to provide information on background conditions;
- A minimum of one well should be located at or immediately down-gradient of each likely contamination source in order to provide information on the groundwater quality at the likely contaminant source;
- A minimum of one well should be located down-gradient of the potential source zone and near the property boundary in order to provide information on migration potential of contamination, the quality of groundwater leaving the site and the likely presence of a groundwater plume;
- If contamination is found, then install and test a sufficient number of groundwater wells so that the extent of any groundwater plume can be defined;
- Testing a minimum of one round of groundwater samples for the potential contaminants of concern. If contamination is found, then test a sufficient number of monitoring rounds to allow trends to be established for the potential contaminants of concern;
- If groundwater contamination is found and there is a risk to off-site receptors, then conduct sufficient testing to allow the risks to these receptors to be determined;
- Collect and test groundwater samples from a range of depths if a potential contaminant of concern has a density greater than water;
- If a fate-and-transport assessment is required for assessing contamination risks, additional sampling rounds tested over a sufficient period of time need to be undertaken to establish trends and the plume behaviour;
- MNA parameters need to be tested to support a Monitored Natural Attenuation (**MNA**) assessment, if required; and
- Field tests to determine the hydraulic properties of the strata that form the hydrogeological system.

The Site Auditor considered the test data from the Ramboll 2019 DSI met or was close to meeting the minimum sampling requirements for groundwater at Northcote Compound because:

- A sufficient number of wells (6) were installed across the area that allowed the extent of on-site plumes and groundwater levels to be defined, if present;
- All wells penetrated the regional water table to an extent that allowed representative discrete samples to be collected;
- One well (012_GW001) was located up-gradient of potential contaminant sources and provided information on background conditions;
- Two wells (006_GW005 and 006_GW006) were located around and down-gradient of the UST located at Site 006 and along the down-gradient (northern) boundary;
- Three wells (006_GW004, 026_GW001, 027_GW003) were spread out in the main body of the Northcote Compound;
- One sampling round was conducted for the potential contaminants of concern; and
- The monitoring found no evidence of groundwater contamination from on-site sources, which meant there was no need for additional testing.

2.6.6 Data Completeness and Representativeness – Ground Gas

The Ramboll 2019 DSI did not collect and test soil vapour samples from sampling locations at the Northcote Compound. The Site Auditor considered the absence of such testing was not a significant matter for the purpose of this site audit since the available data indicated there was a low risk of widespread volatile hydrocarbon contamination at the site. This is because:

- The borelogs reported no widespread odorous or stained soil, the few exceptions being:
  - 006_TP002: Very slight hydrocarbon odour in fill to the base of the test pit at 1.2 mbgl; and
  - 007_TP001: Very slight hydrocarbon odour in fill to 0.5 mbgl.
- PID headspace tests conducted in the field on soil samples measured low to non-detectible concentrations consistent with background conditions (i.e. <10 ppm) at all locations
- The investigation tested fill and natural soil samples across the B6 Enterprise corridor zoned land for TRH (C6-C9), BTEX, naphthalene, VHCs and other VOCs at 15 locations
- All soil samples measured volatile hydrocarbon concentrations at non-detectible concentrations
- The investigation tested groundwater for TRH (C6-C9), BTEX and naphthalene at 6 locations spread across the Northcote Compound
- All groundwater samples were described as having no sheen;
- All groundwater samples were recorded as showing no physical signs of petroleum hydrocarbon contamination; and
- All groundwater samples measured non-detectible volatile hydrocarbon concentrations.

The Ramboll 2019 DSI[25] advised that petroleum hydrocarbon vapours were subsequently encountered in backfill sand when the underground petroleum storage system (**UPSS**) was removed from Site 006. The data indicated:

- **UST 1**: PID readings ranged from 6.5 - 153.7 ppm. Strong hydrocarbon odours indicated a moderate potential for hydrocarbon contamination within the fill; and
- **UST 2**: PID readings ranged from 7.8 - 15.58 ppm. Moderately strong hydrocarbon odours indicated a moderate potential for hydrocarbon contamination within the fill; and
- **Fuel Lines**: PID readings were 0 ppm with no obvious signs of contamination in the excavation.

The Site Auditor has reviewed this remediation work in **Section 2.9.2**.

2.6.7 Data Comparability

Soils

The documentation provided in the Ramboll 2019 DSI indicated that the data comparability DQO was met or close to being met for the soil samples collected at the Northcote Compound because:

- Photographs were provided that showed the condition of the site at the time of the investigation;
- Boreholes and test pits were used to assess the fill stratigraphy, the extent of fill across the site, physical presence of contamination including ACM fragments;
- The stratigraphic conditions at the sample locations were properly described by the test pit logs;
- Appropriate soil sampling method;
- Appropriate containers (including preservation) used for soil samples;
- Appropriate sample storage and transportation;
- Appropriate management of chain of custody forms;

[25] Section B-6.1.2, Ref [2]

- Samples tested within recommended holding times;
- The laboratory test methods complied with NEPM (2013) guidelines; and
- Appropriate PQL's for the analytes tested.

Groundwater

The documentation provided in the Ramboll 2019 DSI indicated that the data comparability DQO was met or close to being met for the groundwater samples collected at the Northcote Compound because:

- Groundwater well construction logs were provided that showed the wells installed by the investigation were likely to have been properly designed and constructed;
- Data provided by the groundwater sampling field sheets indicated that an appropriate groundwater sampling method was used;
- Appropriate containers (including preservation) used for groundwater samples;
- Appropriate sample storage and transportation;
- Appropriate management of chain of custody forms;
- Samples tested within recommended holding times;
- The laboratory test methods complied with NEPM (2013) guidelines; and
- Appropriate PQL's for the analytes tested.

2.6.8 Precision & Accuracy

The Ramboll 2019 DSI[26] considered the results of the QA/QC programme provided an acceptable degree of confidence in the analytical program completed and that there were no issues that would preclude using the analytical data.

The documentation provided in the Ramboll 2019 DSI indicated that the precision and accuracy DQIs were met or close to being met for the soil and groundwater samples tested because:

- Use of properly trained and qualified field personnel;
- Blind field duplicate soil samples were inter- and intra-laboratory tested for the contaminants of concern, which was close to meeting the 10% sampling frequency;
- Blind field duplicate groundwater samples were inter- and intra-laboratory tested for the contaminants of concern, which met the 10% sampling frequency;
- Trip blanks and rinsate blanks were tested;
- Laboratory QC criteria were achieved; and
- Field data was consistent with laboratory data.

[26] Section 8, Ref [2]

2.7 Aesthetic Issues

The second check in the EPA decision process was that '*any aesthetic issues relating to site soils have been adequately addressed'*.

The Ramboll 2019 DSI provided no assessment of aesthetic issues relating to site soils. The Site Auditor addressed this data gap by reviewing the available data.

Data on the aesthetic condition of soils in the commercial/industrial part of the Northcote Compound was provided by the borehole and test pit logs undertaken in May 2016 prior to the commencement of the M4 East Project. This data was documented in the Ramboll 2019 DSI. A plot of this data is provided in **Figure 2-20** (extent of fill) and **Figure 2-21** (aesthetic impacts). No investigation was available for the former residential part along the eastern side of the Northcote Compound.

2.7.1 Extent of Fill

The data indicated that in 2016 prior to the commencement of the earlier M4 East Project, the fill layer in the commercial/industrial part of the Northcote Compound was generally thin and between 0 and 0.70 m. The exceptions were localised deeper fill at the two USTs at Site 006 and at other possible locations where unknown underground tanks / pits may be present. At these localised areas, the fill depth was likely to be between 1.0 and 3.0 m.

For the former residential part along the eastern side of the Northcote Compound, the Site Auditor considered it was reasonable to assume that the fill layer was likely to be thinner than at the

2.7.2 Type and Location of Aesthetic Impacts

The Site Auditor considered the data indicated that in 2016 prior to the commencement of the earlier M4 East Project, for the commercial/industrial part of the Northcote Compound:

- There was no evidence of broadscale aesthetic impacts in soil;
- Two USTs and associated UPSS infrastructure was present at Site 006 that was removed in 2016;
- Localised aesthetic impacts were present in backfill sands at the two known USTs at Site 006, which was presumably removed in 2016;
- There was potential for unknown USTs to be present at Site 028 and pits in the commercial/industrial part of the Northcote Compound, as indicated by the historic and site condition data reviewed in **Sections 2.2** and **2.3**;
- There was potential for small quantities of ACM fragments to be present in the fill layer, as shown by the observation made at Sites 026 and 137 and the demolition of old structures that occurred as part of the M4 East early work;
- There was potential for buried asbestos pipes to be present, as shown by the buried pipe found at Site 027; and
- There was potential for localised areas of slag / building demolition waste in the fill layer, as shown by the observation made at Site 028.

Along the part of the Northcote Compound formed by Northcote Street (Site 047), the Site Auditor considered there was potential for odorous coal tar to be present in the subbase layer that formed the road pavement due to potential coal tar contamination associated with historic road making practices, as described in the RMS (2015) "*Technical Direction, Coal tar asphalt handling and disposal"*.

For the former residential part along the eastern side of the Northcote Compound, the Site Auditor considered it was reasonable to assume there was a low risk of aesthetic impacts from contaminated soils prior to the commencement of the M4 East Project in 2016.

The Site Auditor further considered these issues in the review of the site management strategy in **Section 2.14**.

Figure 2-20 Depth (m) and Extent of Fill Along Western Part of Northcote Compound in 2016

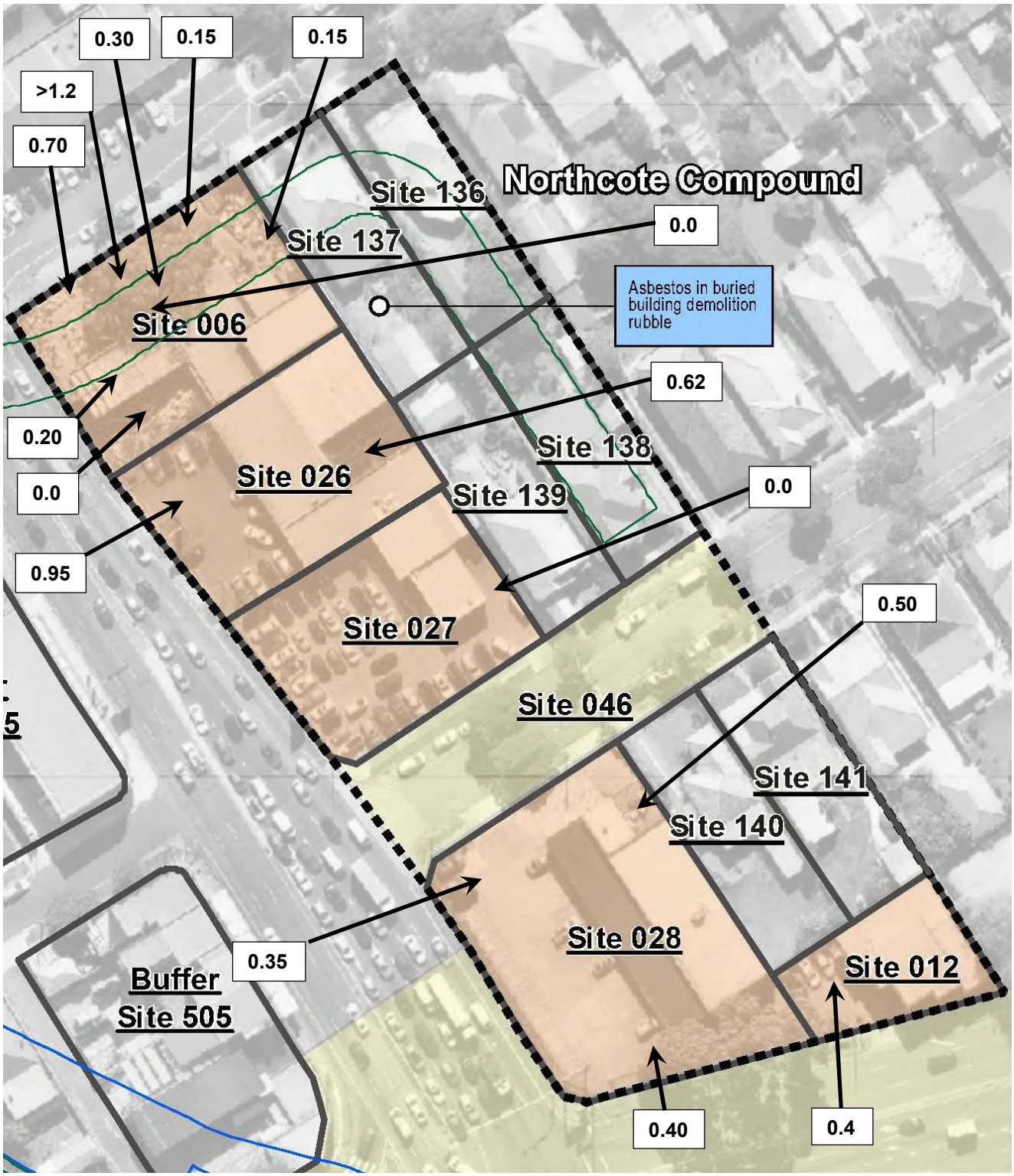
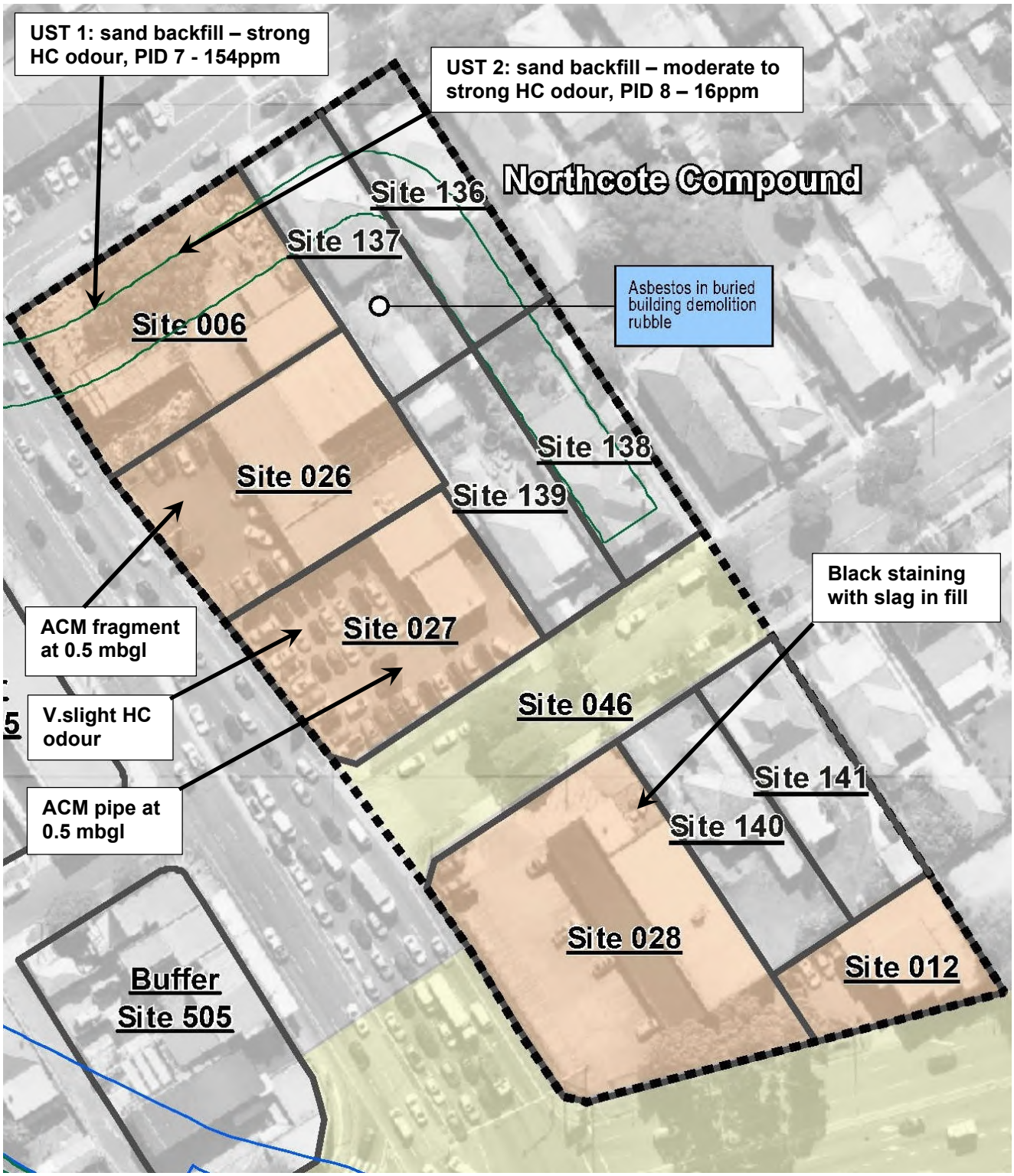


Figure 2-21 Aesthetic Impacts in Soils along Western Part of Northcote Compound in 2016



2.8 Background Contaminant Levels

The sixth check in the EPA decision process was that '*any issues relating to local area background soil concentrations that exceed relevant investigation levels have been adequately addressed in the site assessment report(s).'*

2.8.1 Soil

The Ramboll 2019 DSI provided no assessment of background contaminant levels for soils at the Northcote Compound in 2016 prior to the commencement of the M4 East Project. The Site Auditor addressed this deficiency by adopting the conservative assumption that all contamination at the Site was from past activities and needed to be considered in the contamination risk assessment.

The natural soil samples that were laboratory tested in 2016 were used to derive background heavy metal concentrations, with a summary of the data provided in **Table 2-6**. These background levels were used to derive the EILs adopted in **Table 2-7**.

2.8.2 Groundwater

The Ramboll 2019 DSI provided no assessment of background contaminant levels for groundwater at the Northcote Compound in 2016 prior to the commencement of the M4 East Project. The Site Auditor addressed this deficiency by reviewing the available data provided by the site condition data and the laboratory test results provided by the upgradient well sample 012_GW001 at Site 12.

Ramboll[27] advised that the geology of the Northcote Compound was dominated by shale and siltstone fractured rock aquifers that had salinity levels greater than 14,000 mg/L and a low potential for movement. The Site Auditor considered the published hydrogeological reported supported this conclusion.

The intrinsic groundwater quality data for the upgradient well 012_GW001 showed that in 2016:

- pH measurements indicated slightly acidic conditions;
- Electrical conductivity measurements indicated fresh water conditions;
- Redox potential measurements indicated mildly oxidising conditions; and
- Dissolved oxygen measurements indicated slightly oxygenated water.

The Site Auditor considered this data indicated there was a low risk that the background quality of groundwater in the local area in 2016 was typical of groundwater in the local geology and was unlikely to have been impacted by hydrocarbon contamination.

The contaminant concentrations measured in the upgradient well 012_GW001 in 2016 were:

- Arsenic, chromium, copper and nickel <1 µg/L;
- Mercury <0.1 µg/L;
- Lead 84 µg/L (Marine GIL 4.4 µg/L);
- Zinc 554 µg/L (Marine GIL 15 µg/L); and
- TRH, BTEX, PAHs, phenols, VOCs/VHCs non-detect.

The Site Auditor considered the available data indicated that the background quality of groundwater in the Northcote Compound in 2016 prior to the commencement of the M4 East Project was not contaminated by anthropogenic hydrocarbon compounds. Some heavy metals (e.g. lead, zinc and possibly copper) had elevated concentrations consistent with the urban environment of the local area, which needed to be considered when assessing contamination risks posed by past activities at the Northcote Compound prior to the commencement of the M4 East Project in 2016.

[27] Section 4.3, Ref [2]

2.9 Soil Contamination

The third check in the EPA decision process was that '*soils have been assessed against relevant health-based investigation levels and potential for migration of contamination from soils to groundwater has been considered*'.

The Site Auditor reviewed the soil contamination data obtained in 2016 prior to the commencement of the M4 East Project by dividing the Northcote Compound into four areas based on their historical land use, these being:

- The six former residential properties on the eastern side of the Compound (Sites 136 – 141);
- The former service station at Site 006;
- The other former commercial/industrial properties on the western side of the Compound (Sites 012, 026 - 028); and
- Northcote Street.

2.9.1 Former Residential Properties

No intrusive investigations were undertaken in 2016 for the six properties zoned R2 low density residential (Sites 136 – 141) that were located along the eastern side of Northcote Compound. The only investigation work undertaken by Ramboll was a site inspection, which found asbestos buried in building demolition rubble at Site 137, as shown in **Figure 2-22**.

The Site Auditor considered historical data supported the conclusion that there was a low risk of gross soil contamination from imported fill, chemical spills and leakage of fuels from USTs. However, there was a risk of contamination in shallow soils exceeding commercial/industrial SILs from:

- Spills of ACM fragments due to the likelihood that structures at the Site had used ACM building materials and likely historic demolition as indicated by the ACM fragment found at Site 137; and
- Abandoned buried services.

The Site Auditor assessed the significance of this contamination risk when reviewing the site management strategy in **Section 2.14**.

Risks posed by flaking lead-based paint due to the age of residential houses and spraying of OCPs to control termites / ants / weeds were considered to be low because the 2016 data provided by the Ramboll 2019 DSI found no evidence of elevated lead or OCPs in shallow soils.

2.9.2 Former Service Station at Site 006

Investigation Work

Investigations conducted by Ramboll in 2016 found evidence of petroleum hydrocarbon and heavy metal contamination at the former service station Site 006, as shown in **Figure 2-22**.

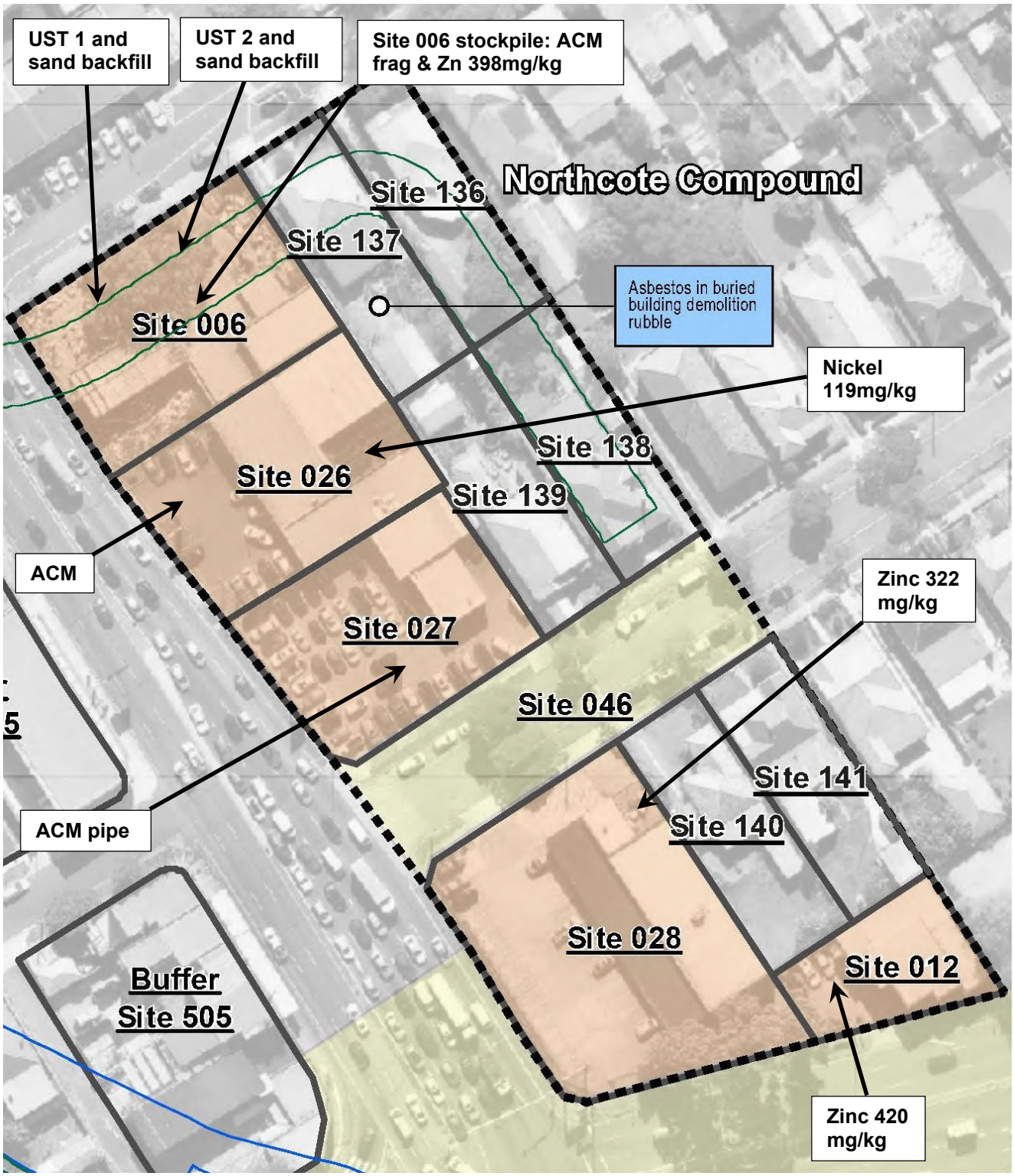
Remediation Work

In their 2016 SRVR, Ramboll[28] advised that the remediation of UPSS infrastructure at Site 006 involved:

- Underground utility clearance of the site;
- Disconnection of services at the property and associated UPSS;
- Demolition and off-site disposal of all property structures and hardstand surfaces;
- Evacuation and disposal of all remaining liquids from the USTs and other fuel related infrastructure. Liquid waste was transported by Remondis to No Fuss Liquid Waste at Penrith;

[28] Section 7.1, Ref [4]

Figure 2-22 Exceedances of SILs at Commercial/Industrial Land at Northcote Compound



Note: No intrusive investigations were undertaken by the Ramboll 2019 DSI at the six former residential properties

- Removal and disposal of two USTs and associated pipework. The USTs were degassed prior to their removal and transported to Fosters & Sons at Mortlake for disposal;
- Excavation and management of excavated tankpit backfill materials from around the UPSS infrastructure prior to their disposal at a licenced facility. Tank backfill sands were returned to the tank pit to await waste classification followed by off-site disposal to a licensed landfill; and
- Excavation and off-site disposal of backfill sands found to contain asbestos from the tankpit of UST2 by a licensed asbestos sub-contractor with appropriate disposal to landfill.

The Site Auditor considered the weight of evidence supported the conclusion that:

- The decommissioning and removal of the UPSS infrastructure was likely to have been undertaken in general compliance with EPA guidance;
- The former UPSS infrastructure at Site 006 was excavated and removed from the site; and
- Asbestos contaminated UPSS tank pit backfill material was waste classified, excavated and then disposed off-site as asbestos waste.

This is because:

- Ramboll advised that they observed the removal of the two USTs (i.e. UST 1 and UST 2) on 4/05/16;
- Liquid waste disposal dockets showed that 20,000 L of waste oil / hydrocarbon mixtures / emulsions in water were removed by the licensed liquid waste contractor Remondis on 10/05/16 and received by Worth Recycling South Windsor on the same day;
- Two USTs were received from the Northcote Compound by A.N.C. Forster on 14/05/16. The tanks were 15 kL and 2 kL in size;
- Tip dockets from Dial a Dump Industries indicated at a total of 97.76 T of asbestos contaminated soil was received in four loads on 24 and 26/05/16;
- UPSS validation sampling was undertaken by Ramboll on 10/05/16;
- A copy of a waste classification report prepared by Ramboll was included in the report; and
- Site photos of the remediation work were provided.

The data indicated that:

- Contamination at UST 1 was remediated by excavation and off-site disposal of the excavated spoil. The excavation was 3.2 m deep and rectangular in shape measuring 6.5 x 7.1 m (147 m^3 in-situ). The excavation pit was validated by two base samples (006_UST1_001 and 006-UST1_002) and four wall samples (one per side) taken at 2 mbgl (006_UST1_003 to 006_UST1_006);
- Contamination at UST 2 was remediated by excavation and off-site disposal of the excavated spoil. The excavation was 1.5 m deep and rectangular in shape measuring 3.7 x 5.4 m (30 m^3 in-situ). Contamination was chased out in three stages, with the final set of validation samples comprising one base sample (006_UST2_001) and four wall samples (one per side) taken at 0.8 mbgl (006_UST2_003, 006_UST2_004, 006_UST2_008 and 006_UST2_009); and
- Contamination along the fuel lines was remediated by excavation and off-site disposal of the excavated spoil. The excavation was 0.5 m deep and rectangular in shape measuring 13.4 x 0.9 m (12 m^3 in-situ). The excavation was validated by two base samples (006_UST2_006, 006_UST2_007).

The total amount of excavated spoil that was meant to have been disposed off-site was 189 m^3 or 340 t (1.8t/m^3 unit weight). With 97.76 t of contaminated soil classified as asbestos waste, this meant that 242 t of petroleum hydrocarbon contaminated soil was meant to have been disposed off-site.

One data gap identified by the Site Auditor was that no copies of waste disposal dockets were provided for the petroleum hydrocarbon contaminated soil that was excavated and reported by Ramboll as having been disposed offsite. The Site Auditor considered this data gap was not significant for the purpose of this site audit because:

- **Figures 2-6** and **2-7** show the UPSS infrastructure at Site 006 was located where the tunnel dive structure was excavated, which would have involved a large excavation down into bedrock;
- The 11 waste classification samples (006_GS001 to 006_GS011) measured low TRH and BTEX concentrations below the HIL D and EIL D criteria;
- There was a low risk that excavated spoil was backfilled at the Northcote Compound given the extremely large volume of materials that were excavated and removed from the Project site; and
- The Site Auditor for the earlier WestConnex M4 East Project was responsible for reviewing waste disposal and validation testing for the remediation of UPSS infrastructure at Site 006 in 2016.

Validation

Ramboll advised that validation soil sampling involved the collection of grab samples from an excavation bucket during the excavation of the UPSS infrastructure. The sample locations are shown in **Figure 2-23**, with a summary of the field data collected provided in **Table 2-17**. Ramboll[29] concluded that following the completion of the UPSS remediation work, Site 006 had been validated as suitable for use in the context of commercial/ industrial use land use.

The Site Auditor considered the weight of evidence supported this conclusion because:

- The validation sampling met or was close to meeting DQOs prepared in accordance with EPA guidance;
- PID headspace results for the validation samples measured low concentrations below 10 ppm;
- Soil validation results were reported below the SILs;
- Groundwater in the vicinity of the site does not appear to have been impacted by historical operation of the UPSS; and
- The M4 East project involved the construction of a large tunnel dive structure, which would have resulted in the excavation of a large quantity of soil and rock from the former UST area and other parts of Site 006, as shown by **Figures 2-6** and **2-7**.

2.9.3 Other Former Commercial/Industrial Properties

The Ramboll 2019 DSI[30] concluded that in 2016 prior to the commencement of the M4 East Project there was a low risk of soil contamination exceeding commercial/industrial criteria at the other former commercial/industrial properties for most contaminants of concern. The one exception was asbestos.

The 2016 data provided by the Ramboll 2019 DSI showed that low to non-detectible concentrations of the contaminants of concern were measured in practically all fill, natural and excavated soil samples collected from the five sites zoned B6 Enterprise corridor. The main findings were:

- All samples measured concentrations below the HIL D criteria;
- Practically all samples measured concentrations below the EIL D criteria, with the few exceedances not representing hot-spots;
- All 95% upper confidence limit (**UCL**) mean concentrations were below the HIL D and EIL D criteria.

[29] Section 11, Ref [4]
[30] Sections 9 and 10, Ref [2]

Figure 2-23 Validation Sample Locations (Source: Figure 3, Ref [4])

Table 2-17 Summary of Validation Field Data (Source: Appn B, Ref [4])

Area of Investigation	Sample ID	Sampling Rationale	Sample Depth (m bgl)	Sampling Date	QC Sample	PID (ppm)	Soil Description
UST1 Excavation	006_UST1_001	Tankpit NW base validation sample	3.2	24/05/2016	-	0.0	Weathered sandstone, no observed staining/odour/ACM
	006_UST1_002	Tankpit SE base validation sample	3.2	24/05/2016	006_QC024	1.2	Weathered sandstone, slight hydrocarbon odour, no observed staining or ACM
	006_UST1_003	Tankpit NE wall validation sample	2.0	24/05/2016	-	0.2	Weathered sandstone, very slight hydrocarbon odour, no observed staining or ACM
	006_UST1_004	Tankpit SE wall validation sample	2.0	24/05/2016	-	0.0	Weathered sandstone, no observed contamination (staining, odour or ACM)
	006_UST1_005	Tankpit SW wall validation sample	2.0	24/05/2016	-	0.7	Weathered sandstone, slight hydrocarbon odour, no observed staining or ACM
	006_UST1_006	Tankpit NW wall validation sample	2.0	24/05/2016	006_QC023	0.8	Weathered sandstone, slight hydrocarbon odour, no observed staining or ACM
UST2 Excavation	006_UST2_001	Tankpit base validation sample	1.5	10/05/2016	-	16.4	Weathered sandstone / clayey sand, orange and light grey, moderate hydrocarbon odour, no staining observed
	~~006_UST2_002~~	Tankpit E wall validation sample	0.8	10/05/2016	006_QC020 006_QC021	11.1	Weathered sandstone / clayey sand, orange and light grey, moderate hydrocarbon odour, no staining observed
	006_UST2_003	Tankpit S wall validation sample	0.8	10/05/2016	-	1.8	Sand (FILL), cream, loose, uniform, very moist, mild hydrocarbon odour, no staining observed. Unable to excavate beyond sand fill to natural on this wall as extends below concrete
	006_UST2_004	Tankpit W wall validation sample	0.8	10/05/2016	-	0.2	Weathered sandstone / clayey sand, very moist, medium dense, light grey, mild hydrocarbon odour, no staining observed
	~~006_UST2_005~~	Tankpit N wall validation sample	0.8	10/05/2016	-	0.1	Weathered sandstone, very mild hydrocarbon odour, no staining observed
	006_UST2_008	Tankpit wall validation sample	0.8	24/05/2016	-	0.0	Wearhered sandstone, mottled light grey and red/brown, no observed staining/odour/ACM
	006_UST2_009	Tankpit wall validation sample	0.8	24/05/2016	-	0.0	Wearhered sandstone, mottled light grey and red/brown, no observed staining/odour/ACM
Fuel Lines and Dispensing Pump	006_UST2_006	Fuel line trench and fuel pump base validation sample	0.5	10/05/2016	-	0.0	Weathered sandstone / clayey sand, light grey and orange brown, saturated, soft, no observed staining/odour/ACM
	006_UST2_007	Fuel line trench base validation sample	0.5	10/05/2016	-	0.0	Weathered sandstone / clayey sand, light grey and orange brown, saturated, soft, no observed staining/odour/ACM
UST1 Excavated Material	~~006_GS004~~	Backfill Waste Classification	n/a	10/05/2016	-	103.4	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Moderate hydrocarbon odour
	~~006_GS005~~	Backfill Waste Classification	n/a	10/05/2016	-	6.5	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Moderate hydrocarbon odour
	~~006_GS006~~	Backfill Waste Classification	n/a	10/05/2016	-	153.7	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Strong hydrocarbon odour
	~~006_GS007~~	Backfill Waste Classification	n/a	10/05/2016	-	14.3	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Moderate hydrocarbon odour
	~~006_GS008~~	Backfill Waste Classification	n/a	10/05/2016	006_QC022	131.4	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Strong hydrocarbon odour
UST2 Excavated Material	~~006_GS001~~	Backfill Waste Classification	n/a	10/05/2016	-	7.8	Sand (FILL), cream, medium grained, uniform, loose, saturated, moderate hydrocarbon odour.
	~~006_GS002~~	Backfill Waste Classification	n/a	10/05/2016	-	9.4	Sand (FILL), cream, medium grained, uniform, loose, saturated, moderate hydrocarbon odour.
	~~006_GS003~~	Backfill Waste Classification	n/a	10/05/2016	-	15.6	Sand (FILL), cream, medium grained, uniform, loose, saturated, strong hydrocarbon odour.
Fuel Line Trench Excavated Material	~~006_GS009~~	Backfill Waste Classification	n/a	10/05/2016	-	0.0	Silty Sand (FILL), brown, moist, uniform, includes some brick, concrete, wires, sandstone, no observed staining/odour/ACM
	~~006_GS010~~	Backfill Waste Classification	n/a	10/05/2016	-	0.0	Silty Sand (FILL), brown, moist, uniform, includes some brick, concrete, wires, sandstone, no observed staining/odour/ACM
	~~006_GS011~~	Backfill Waste Classification	n/a	10/05/2016	-	0.0	Silty Sand (FILL), brown, moist, uniform, includes some brick, concrete, wires, sandstone, no observed staining/odour/ACM

Notes
ppm = parts per million
m bgl = metres below ground level
ACM - asbestos containing materials
N - north, S - south, E - east, W - west
~~sample has been excavated and disposed of off site~~

For the contaminants of concern:

- **Metals**: Practically all samples measured concentrations consistent with typical background concentrations. A few isolated and minor exceedances of the EIL D criteria were measured, these being:
  - Fill sample 026_TP001_0.10: Nickel 119 mg/kg (EIL D 65 mg/kg);
  - Fill sample 028_TP001_0.50: Zinc 322 mg/kg (EIL D 310 mg/kg);
  - Natural soil sample 012_GW001_0.5: Zinc 420 mg/kg; and
  - Stockpiled soil sample 006_GS009: Zinc 398 mg/kg.
- **TRH**: All samples measured non-detectible concentrations.
- **BTEX**: All samples measured non-detectible concentrations.
- **PAHs**: Practically all samples measured non-detectible concentrations, with the few detections at low concentrations well below the SILs.
- **Other organics**: Phenols, OCPs, OPPs, PCBs, VOCs/VHCs were measured at non-detectible concentrations in all samples.
- **Asbestos**: Isolated ACM fragments or buried pipes were found at a few locations, these being: Sample 006_GS001 lab test, Site 026 ACM fragment identified during drilling at 0.5 mbgl and in 026_GW001_0.5 lab test, Site 027: Asbestos pipe at 0.5 mbgl; Site 137 asbestos in buried demolition rubble.

The locations of these exceedances are shown in **Figure 2-22**.

For the other commercial/industrial zoned land at Northcote Compound, the Site Auditor identified data gaps in the 2016 soil investigation documented in the Ramboll 2019 DSI (**Sections 2.3** & **2.4.1**), these being:

- **All Sites**:
  - Potential for asbestos fragments to have been spilt on the ground and not removed when former structures were demolished in the early stage of the WestConnex M4 East Project; and
  - Spraying of pesticides / herbicides to control termites and weeds.
- **Site 012**: Potential use of imported fill contaminated by metals, TPH/BTEX, OCPs/OPPs, PCBs, PAHs, asbestos.
- **Site 026**: Potential use of imported fill contaminated by metals, TPH, BTEX, OCPs/OPPs, PCBs, PAHs, asbestos.
- **Site 028**: Potential UST/s that caused contamination by metals, TPH, BTEX, PAHs.

In **Section 2.6.3**, the Site Auditor also considered that the Ramboll 2019 DSI did not meet the data completeness and data representativeness DQOs for the other commercial/industrial zoned land because:

- At **Site 012**:
  - Fill layer: Fill was investigated and tested at only 1 sample location for the main contaminants of concern (metals, TRH, BTEX, PAHs, PCBs, asbestos, VOCs/VHCs), which was well below the 6 locations recommended by EPA guidance; and
  - Interceptor pit / washdown bay: Near-surface soil was investigated and tested at only 1 sample location for the main contaminants of concern (metals, TRH, BTEX, PAHs, asbestos, VOCs/VHCs), which was well below the 2 locations recommended by EPA guidance.
- At **Site 026**:
  - Fill layer: Fill was investigated and tested at only 2 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs, asbestos), which was well below the 7 locations recommended by EPA guidance. No fill samples were tested for OCPs, OPPs and PCBs.

- At **Site 027**:
  - Fill layer: Fill was investigated and tested at only 2 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs, asbestos), which was well below the 9 locations recommended by EPA guidance. Only one fill sample was tested for OCPs, OPPs and PCBs.
- At **Site 028**:
  - Fill layer: Fill was investigated and tested at 3 sample locations for the main contaminants of concern (metals, TRH, BTEX, PAHs), which was well below the 7 locations recommended by EPA guidance; and
  - UPSS Infrastructure: No investigation for potential USTs and other UPSS infrastructure was undertaken.

The Site Auditor considered the weight of evidence supported the conclusion that there was a low contamination risk from heavy metal contamination at the other commercial/industrial zoned land at the Northcote Compound because:

- The borehole / test pits investigated by Ramboll found no evidence of odorous, stained or soils with PID exceeding 10 ppm. The only locations where petroleum odours and elevated PID levels were found were in the UST backfill sand and stockpiled soil from the UST excavations made at Site 006; and
- All 26 fill samples measured low heavy metal concentrations below the HIL A and D criteria, with practically all samples measuring concentrations below the EIL D criteria.

The Site Auditor considered the weight of evidence supported the conclusion that there was a low contamination risk from petroleum hydrocarbon contamination at the other commercial/industrial zoned land at the Northcote Compound because:

- The borehole / test pits investigated by Ramboll found no evidence of odorous, stained or soils with PID exceeding 10 ppm;
- All 26 fill samples measured low TRH below the SILs, with all samples measured non-detectible BTEX concentrations; and
- All groundwater samples from 6 wells measured non-detectible TRH and BTEX concentrations.

The Site Auditor considered the weight of evidence supported the conclusion that there was a low contamination risk from non-petroleum contaminants at the other commercial/industrial zoned land at the Northcote Compound because:

- The borehole / test pits investigated by Ramboll found no evidence of odorous, stained or soils with PID exceeding 10 ppm;
- All 12 fill samples measured non-detectible OCPs and OPPs concentrations;
- All 10 fill samples measured non-detectible phenol concentrations;
- All 14 fill samples measured non-detectible PCB concentrations;
- All 10 fill samples measured non-detectible phenol concentrations;
- All 5 fill samples measured non-detectible VOC/VHC concentrations;
- All groundwater samples from 6 wells measured non-detectible phenol, VOC/VHC concentrations; and
- All groundwater samples from 3 wells measured non-detectible OCP, OPP and PCB concentrations.

The Site Auditor considered the data provided by the Ramboll 2019 DSI indicated that the main contamination risks at the other commercial/industrial zoned land at the Northcote Compound were associated with:

- The possibility of UPSS infrastructure at Site 028;
- ACM fragments in fill across the Northcote Compound; and
- Abandoned buried services.

The Site Auditor assessed the significance of this contamination risk when reviewing the site management strategy in **Section 2.14**.

2.9.4 Northcote Street at Site 046

No intrusive investigation was undertaken at Northcote Street (Site 046) in 2016 and documented in the Ramboll 2019 DSI.

The Site Auditor considered the historical and site condition data (**Sections 2.2** and **2.3**) supported the conclusion that there was a risk of soil contamination in the Northcote Street road corridor from:

- The use by Council of coal tar to construct the road pavement and subbase at Northcote Street;
- Potential use of imported fill contaminated by metals, TPH, BTEX, OCPs/OPPs, PCBs, PAHs and asbestos in the road subbase and subgrade; and
- Abandoned buried services/pits.

The Site Auditor assessed the significance of this contamination risk when reviewing the site management strategy in **Section 2.14**.

2.10 Chemical Mixtures

The seventh check in the EPA decision process was that '*the impacts of chemical mixtures have been assessed'*.

The Ramboll 2019 DSI did not provide any assessment of risks posed by chemical mixtures. The main contaminants of concern, in terms of additive risks posed by chemical mixtures, were contaminants considered to be carcinogenic. These contaminants of concern at the Northcote Compound comprised benzene, PCBs, OCPs, PAHs (principally BaP) and chlorinated solvents.

The Site Auditor assessed the available data and considered there was a low risk of additional health risks posed by chemical mixtures because all samples measured low (below HIL D criteria) to non-detectible concentrations for these contaminants.

2.11 Surface Water & Groundwater Contamination

The fourth check in the EPA decision process was that *'groundwater (where relevant) has been assessed against relevant health-based investigation levels and, if required, any potential impacts to buildings and structures from the presence of contaminants considered.'*

The ninth check in the EPA decision process was that '*any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier'.*

2.11.1 Surface Water

Contamination risks to surface water was not an issue for the Northcote Compound since no surface water bodies were located at or near the site.

2.11.2 Groundwater

Groundwater Levels & Flow Direction

The Ramboll 2019 DSI[31] advised that:

- The average depth to groundwater was at 3 – 5 mbgl; and

[31] Sections 4.3 and 9, Ref [2]

- Groundwater flowed in a northerly to north-westerly direction towards Iron Cove Creek some 200 – 300m north of the Site.

The Site Auditor considered the weight of evidence supported this conclusion because of:

- The topography of the Site;
- The stratigraphic data provided by the Ramboll 2019 DSI; and
- The data provided by the groundwater monitoring undertaken by Ramboll. A plot of the groundwater equipotential data is provided in **Figure 2-24**.

Intrinsic Groundwater Quality

The Ramboll 2019 DSI measured field water quality parameters during well purging. The results at all wells indicated that:

- pH measurements indicated slightly acidic conditions;
- Electrical conductivity measurements indicated fresh to brackish water conditions;
- Redox potential measurements indicated mildly oxidising conditions; and
- Dissolved oxygen measurements indicated slightly oxygenated water.

The Site Auditor considered this data indicated there was a low risk that the groundwater quality at the Northcote Compound had been impacted by contamination above background conditions.

Groundwater Contamination

The Ramboll 2019 DSI[32] concluded that:

- Groundwater in the vicinity of Site 006 did not appear to have been impacted by past operation of the service station and associated UPSS infrastructure; and
- Elevated heavy metal concentrations (i.e. copper, lead and zinc) above marine GILs was not considered to represent a risk to the environment as these were considered to be typical of elevated background conditions in the highly disturbed urban setting.

The Site Auditor considered the weight of evidence supported these conclusions because:

- The groundwater investigations undertaken by the Ramboll 2019 DSI met or was close to meeting the DQOs for the reasons given in **Section 2.6**;
- The intrinsic water quality data indicated there was a low risk that the groundwater quality at the Northcote Compound was impacted by contamination above background conditions;
- The contaminant concentrations measured in the groundwater monitoring wells were generally low. Hydrocarbon contaminants[33] were measured at non-detectible concentrations, with heavy metal concentrations consistent with background conditions;
- The absence of any major physical evidence of gross contamination reported by the Ramboll 2019 DSI;
- The fill layer at the Site was relatively thin in most places, so the volume of fill was not considered to be a potential large source of leachable contamination; and
- The low permeability of natural soils and bedrock at and downgradient of the Site.

[32] Sections B-7.2, C-7.2, D-7.2 and E-7.2, Ref [2]
[33] TRH, BTEX, PAHs, phenols, VOCs/VHCs

Figure 2-24 Groundwater Equipotential Plot

(Source: Figure 5, Ref [2])

2.12 Soil Vapours

The fifth check in the EPA decision process was that '*hazardous ground gases (where relevant) have been assessed against relevant health-based investigation levels and screening values.*

The ninth check in the EPA decision process was that '*any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier'*.

In 2016 prior to the commencement of the M4 East Project, Ramboll[34] did not consider soil vapours posed a contamination risk for the future road construction worksite use of the Northcote Compound following removal of UPSS infrastructure at Site 006. The Site Auditor considered the weight of evidence supported this conclusion because:

- The Ramboll 2019 DSI met most DQOs;
- There was no evidence of broadscale aesthetic impacts in soil at the Northcote Compound;
- The borehole / test pits investigated by Ramboll found no evidence of odorous, stained or soils with PID exceeding 10 ppm. The only locations where petroleum odours and elevated PID levels were found were in the UST backfill sand and stockpiled soil from the UST excavations made at Site 006;
- Two USTs and associated UPSS infrastructure was present at Site 006 that needed to be removed;
- The investigation tested fill and natural soil samples for TRH (C6-C9), BTEX, naphthalene, VHCs and other VOCs at suspect areas across the site;
- Practically all soil samples measured volatile hydrocarbon concentrations at non-detectible concentrations, with the few detections having low concentrations well below HILs D criteria;
- The investigation tested groundwater for TRH (C6-C9), BTEX, naphthalene and VOCs/VHCs at 6 locations spread across the Site;
- All groundwater samples were described as having no sheen;
- All groundwater samples were recorded as showing no physical signs of petroleum hydrocarbon contamination; and
- All groundwater samples from 6 wells measured non-detectible TRH and BTEX concentrations.

2.13 Ecological Risks

The eighth check in the EPA decision process was that '*any potential ecological risks have been assessed'*.

The ecological risks posed by soil contamination are reviewed in **Section 2.9**, where they were assessed as low.

The ecological risks posed by groundwater contamination are reviewed in **Section 2.11**, where they were assessed as low.

[34] Sections 9 and 10, Ref [2]

2.14 Site Management Strategy

The tenth check in the EPA decision process was that '*the site management strategy (where relevant) is appropriate including post-remediation environmental plans.'*

UPSS infrastructure and petroleum contaminated soil were removed from the former Service station land at Site 006 in 2016. The Ramboll 2019 DSI[35] considered the main contamination risk that remained at the Northcote Compound was asbestos contamination in fill and across the ground surface.

After the DSI fieldwork was completed by Ramboll in 2016, the Northcote Compound was constructed by the M4 East Project. Construction work for the Northcote Compound included, among other things:

- Demolition of above ground structures from across the Site;
- The excavation and removal of the UPSS infrastructure at the northern end of the Site at Site 006;
- Deep and extensive excavations for the tunnel dive structure located at the northern end of the Site. This work would have resulted in the excavation of a large quantity of soil and rock from the former UST area and other parts of Site 006;
- The excavation and removal of the road pavement at Northcote Street;
- Cut to fill bulk earthworks to achieve final surface levels (**FSLs**); and
- Construction of thick reinforced concrete pavements across the Site.

The Northcote Compound was then used to support construction work for the M4 East Project between 2016 and 2019. When the Northcote Compound was handed over to the WestConnex Stage 3A project 2019, operations at the Site appeared to have remained largely unchanged, as shown by a comparison between site layouts in **Figures 2-6** and **2-7**.

The Site Auditor considered the weight of evidence provided in **Sections 2.7** and **2.9** supported the conclusion that unknown contamination risks remained at the Site when the Northcote Compound was constructed in 2016. These risks comprised:

- At the former residential properties (sites 136 – 141):
  - Spills of ACM fragments due to the likelihood that structures had used ACM building materials and likely historic demolition as indicated by the ACM fragment found at Site 137;
  - Flaking lead-based paint due to the age of residential houses;
  - Spraying of OCPs to control termites, ants and weeds; and
  - Abandoned buried services/pits.
- At the former commercial/industrial zoned properties (sites 006, 012, 026 – 028):
  - The possibility of UPSS infrastructure at Site 028;
  - ACM fragments in fill; and
  - Abandoned buried services / pits.
- At the former Northcote Street road corridor (site 046):
  - The potential for coal tar to be present in the subbase layer that formed the road pavement;
  - Potential use of imported fill contaminated by metals, TPH, BTEX, OCPs/OPPs, PCBs, PAHs and asbestos in the road subbase and subgrade; and
  - Abandoned buried services / pits.

The Site Auditor understood that the strategy adopted by ASBJV to manage contamination risks at the Northcote Compound during the WestConnex Stage 3A project involved:

[35] Sections 9 and 10.1, Ref [2]

- Maintain the integrity of the concrete ground slab covering the Site and prevent the exposure of underlying soils and infiltration of water into the ground;
- Operate the Site in a manner that would prevent interference or disturbance of contamination, if any, that remained below the concrete ground slab;
- Operate the Site in a manner that would not generate contamination at the Site; and
- Returning the Site at the end of the Project to a condition suitable for a road construction worksite.

The Site Auditor has reviewed data on ASBJV operations at the Northcote Compound in **Section 3**.

3. Contamination Management During ASBJV Work

This section of the SAR reviews documentation provided by ASBJV concerning how contamination risks were managed by ASBJV at the Northcote Compound during the WestConnex Stage 3A Project. The reviews comprise:

- *Review of management plans (Section 3.1);*
- *Compliance with EPA notification requirements (Section 3.2);*
- *Construction activities at Site (Section 3.3);*
- *Imported fill (Section 3.4);*
- *Final site condition (Section 3.5); and*
- *Review of LTEMP (Section 3.6).*

3.1 Review of Management Plans

As previously discussed in **Section 1.2.1**, the Site Auditor understood that the site audit needed to review:

- Site environmental management plans that dealt with contamination at the Northcote Compound and to check whether these plans met the aspects of Condition C22 of the Planning Consent and Condition O5.11 of EPL 21149, as relevant to this site audit; and
- An Unexpected Contaminated Land and Asbestos Finds Procedure that met Condition E185 of the Planning Consent.

3.1.1 Site Environmental Management Plan

The documentation provided by ASBJV included a site environmental management plan (**SEMP**) prepared by LSBJV for the Project dated 10/10/18 (Ref [57]). The purpose of the plan was to describe how the Contractor proposed to manage site establishment works at the various surface area worksites. However, the SEMP was not relevant for the Northcote Compound since:

- The Compound had already been established by the earlier M4 East Project; and
- The Northcote Compound was not identified as potentially contaminated land[36].

3.1.2 Contaminated Land Management Sub-plan

The documentation provided by ASBJV included a contaminated land management sub-plan (**CLMP**) prepared by LSBJV for the Project dated October 2018 (Ref [58]). The plan formed part of the Soil and Surface Water Management sub-plan (Ref [60]), which in turn formed Appendix B5 of the CEMP.

The purpose of the CLMP was to:

- Describe how the Contractor proposed to manage contaminated land during construction of the Project;
- Establish a set of best practice procedures for the identification and management of contaminated land and materials if encountered during construction work; and
- Address a contractual condition that required a CLMP to be included in the CEMP that needed to comply with the CLM Act, Roads and Maritime publication "*Contaminated Land Management Guideline*", Roads and Maritime "*Environmental Incident Classification and Reporting Procedure*", and EPA guidelines on contaminated land management.

The CLMP described:

[36] Sections 4.8.2 & 5.2.11, Ref [53]

- **Environmental requirements**: Relevant legislation and guidelines, Minister's Conditions of Approval, Revised environmental management measures;
- **Existing environment**: Previous investigations, further investigations;
- **Environmental aspects and impacts:** Construction activities, impacts;
- **Management process**: Phase 1 environmental site assessment, phase 2 sampling, analytical and quality plan, phase 2 environmental site assessment, remediation action plan, remediation validation report, long-term site environmental management plan, site audit report and site audit statements;
- **Environmental control measures**;
- **Compliance management**: Roles and responsibilities; training, monitoring and inspections, auditing, reporting;
- **Review and improvement**: Continuous improvement, CLMP update and amendment;
- **Unexpected contaminated lands and asbestos finds procedure** (Ref [59]); and
- **Asbestos management plan**.

The Site Auditor considered the CLMP provided a comprehensive set of obligations and procedures capable of protecting the Northcote Compound from generating contamination and returning the Site at the end of the Project to a condition suitable for a road construction worksite.

3.1.3 Waste Management Plan

LSBJV prepared a waste management plan (**WMP**) for the project (Ref [61]). The purpose of the plan was to describe how LSBJV proposed to manage waste during construction of the Project. The Plan also explored relevant aspects of resource management and sustainability requirements for the Project. The plan was first issued on 25/07/18, with 8 revisions made up to 22/06/20.

The WMP[37] advised that its key objective was to ensure all planning conditions, licence and permit requirements relevant to waste management were described, scheduled and assigned responsibility as outlined in:

- The EIS prepared for WestConnex M4-M5 Link;
- The Submissions and Preferred Infrastructure Report prepared for WestConnex M4-M5 Link;
- The Modification report for WestConnex M4-M5 Link Mainline Tunnel (September 2018);
- Conditions of Approval granted to the Project on 17 April 2018 and as modified on 25 February 2019;
- Roads and Maritime Services (Roads and Maritime) QA Specifications G36 and G40;
- The Project's EPL; and
- All relevant legislation and other requirements.

The WMP[38] advised that waste streams generated during construction of the Project were likely to include construction and demolition waste, vegetation waste, packaging materials and liquid wastes. There was the potential for special, hazardous and otherwise contaminated waste and spoil to be encountered during tunnelling and surface works. However, construction waste management activities were not considered likely to pose a significant risk to the environment or human health, with the implementation of standard mitigation and management measures.

The WMP advised that some 550,000 t of tunnel spoil was to be transported through the Northcote Compound but there was to be no waste generated by demolition or construction work at the Site since that work had been completed under the earlier M4 East Project.

[37] Section 2.2, Ref [61]
[38] Section 5.1, Ref [61]

The Site Auditor considered the WMP provided a comprehensive set of obligations and procedures capable of protecting the Northcote Compound from generating contamination and returning the Site at the end of the Project to a condition suitable for a road construction worksite.

3.2 Compliance with EPA Notification Requirements

As previously discussed in **Section 1.2.1**, the Site Auditor understood that the site audit needed to determine whether contamination at the Northcote Compound was present and needed to be notified to ASBJV, TfNSW and the EPA under the CLM Act.

The Site Auditor considered that the available data indicated there was a low risk that contamination at the Site, if present, needed to be notified because:

- The available data indicated that all known contamination exceeding commercial/industrial criteria had been removed;
- There was a low risk of unknown contamination being present at the Site that needed to be notified; and
- A concrete capping layer covered the Site.

3.3 Construction Activities at Site

3.3.1 Unexpected Finds

ASBJV[39] provided an Unexpected Finds register that recorded no unexpected finds during ASBJV activities at the Northcote Compound.

The Site Auditor considered the weight of evidence supported this outcome because:

- An Unexpected Finds Register was kept by the Project;
- ASBJV had an environmental professional manage environmental issues at each worksite;
- The Site Auditor found the various worksites well managed and organised, as shown by the photos of the Northcote Compound in **Appendix D**; and
- The Site Auditor found no physical evidence of contamination at the Northcote Compound during site inspections.

3.3.2 Environmental Management and Incidents

Figures 2-6 and **2-7** show that most operational activities that occurred at the Northcote Compound during the earlier M4 East Project and the WestConnex Stage 3A Project posed a low contamination risk. The few exceptions were:

- Chemical storage and operations at the wastewater treatment plant; and
- Diesel tank and refuelling bay.

The Site Auditor considered that the weight of evidence indicated that environmental conditions at the Northcote Compound were likely to have been well managed and there was a low risk of environmental incidents having occurred that posed a contamination risk to the suitability of the Site for its intended road construction worksite land use. This is because:

- Construction activities at the Site were required to follow detailed environmental management plans that had been approved by independent environmental auditors and regulatory authorities;
- An extensive arrays of management plans and on-site training occurred as evidenced by the documentation provided to the Site Auditor for review and the protocols that the Site Auditor needed to follow when inspecting the Project site;

[39] ASBJ 18/11/22 email

- Construction activities at the Site were well managed by site personnel and the Site Auditor found no evidence of poor environmental management practices when inspecting the Site, as shown by photos provided in **Appendix D**;
- Two annual reports that ASBJV issued to the EPA for the periods October 18-19 and October 19-20 recorded no significant environmental incidents;
- The Site was sealed by thick concrete slabs and most of the Site was covered by an enclosure that would have reduced risks posed by spills, leaks, accidents, etc;
- Construction activities at the Site did not involve the bulk storage of large quantities of fuel or chemicals, with tanks and chemicals used by the wastewater treatment plant contained within bunds; and
- The Site Auditor received no complaints from regulatory authorities regarding construction activities that occurred at the Site during the period of the site audit.

To further support this conclusion, the Site Auditor considered that data needed to be provided on:

- Any environmental incidents that occurred at the Northcote Compound during the WestConnex Stage 3A project;
- Chemical storage and operations at the wastewater treatment plant; and
- Diesel tank and refuelling bay.

The Site Auditor addressed the need for this additional data by issuing a Section B SAS, which is further discussed in **Section 4**.

3.3.3 Potential for Construction Activities to Have Contaminated the Site

The Site Auditor considered the weight of evidence supported the conclusion that:

- ASBJV did not interfere or disturb contamination during the course of carrying out its work at the Northcote Compound during the WestConnex Stage 3A project;
- Contamination was not generated by activities undertaken by ASBJV at the Northcote Compound; and
- Contamination was not generated at the Northcote Compound that caused an increase in contamination migrating from the Project site.

This is because:

- The USTs and associated infrastructure and contaminated soils at the former service station property at Site 006 were reported to have been removed by the earlier M4 East Project in 2016;
- After the completion of bulk earthworks at the Site in 2016, the M4 East Project constructed a thick reinforced concrete slab across the Site that prevented further contact with the underlying soils and groundwater at the Site;
- Operations conducted at the Site by ASBJV did not involve interference or disturbance to soils or groundwater below the concrete ground slab;
- Environmental conditions at the Northcote Compound were likely to have been well managed and there was a low risk of environmental incidents having occurred that posed a contamination risk to the suitability of the Site for its intended road construction worksite land use for the reasons given in **Section 3.3.2**; and
- The Site Auditor found no physical evidence of contaminated soils or chemicals remaining at the Site at the end of the project.

3.4 Imported Fill

At the end of tunnelling work, the tunnel dive that occupied the northern part of the Northcote Compound needed to be backfilled with a large amount of soil that was to be geotechnically and environmentally acceptable, as shown in **Figure 3-1** and other plans in **Appendix B**. The specification required the fill to be:

- Inorganic, non-perishable;
- General filling: graded material from site, maximum particle size 50mm;
- Selected filling: Granular material, maximum particle size 50 mm, not more than 50% passing 0.075 mm sieve, Plasticity Index not greater than 14% and not less than 2%; CBR (4 day soaked) not less than 15%; and
- Fill subgrades: Use material in the top 150 mm which has a maximum particle size of 75 mm.

The design of the tunnel backfill at the PBR site is shown in **Figure 3-2**.

To facilitate ASBJV sourcing supplies of suitable material in an environmentally sustainable manner, on 24/12/21 the EPA issued '*The WestConnex imported tunnel backfill material exemption 2021*' ('Backfill Exemption') and the '*The WestConnex imported tunnel backfill material order 2021*' (Backfill Order') under a Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014. The Backfill Exemption applied to:

- The Northcote Ancillary Facility (Haberfield) – 269 Parramatta Road, Haberfield;
- The PBR site – 176 Parramatta Road, Annandale; and
- The SPI site – 2 Albert Street, St Peters.

Some of the features of the Backfill Order were:

- The backfill material was to be naturally occurring rock and soil (including but not limited to materials such as sandstone, shale and clay) that:
  - had been excavated from the ground;
  - did not contain chlorinated hydrocarbons, OCPs, PFASs and PCBs;
  - contained at least 98% (by weight) natural material; and
  - did not meet the definition of VENM
- The was not include material located in a hotspot; that had been processed; or that contained asbestos, ASS, PASS or sulfidic ores.
- The Backfill Order commenced on 24 December 2021 and was valid until 24 December 2023 or until revoked by the EPA by notice in writing at an earlier date.
- Prior to sampling the backfill material, the generator must:
  - Engage an environmental practitioner to undertake a desktop assessment of the source site in which the backfill material was generated to determine the likelihood for PCBs, PFASs, OCPS, and chlorinated hydrocarbons to be present; and
  - Where the environmental practitioner determined that there was a likelihood of PCBs, PFASs, OCPS, and chlorinated hydrocarbons being present at the source site, the backfill material must be sampled and tested for that contaminant.
- For backfill material in stockpiles, the number and type of samples and tested needing to be done by the generator were:
  - Composite samples for attributes 1 to 10 and 18 in Column 1 of Table 4;
  - Discrete samples for attributes 11 to 17 in Column 1 of Table 4;
  - The generator must carry out sampling in a way ensuring that the samples taken are representative of the material from the entire stockpile;

Figure 3-1 Pavement Plan for Reinstatement of Northcote Compound (Source: Drg No: M4M5 -RBGP-PRW- CIV - CW02-DRG- 1103, Ref [63])

Figure 3-2 Design of Northcote Backfill and Stub Walls (sheet 1 of 2) (Source: Ref [64]

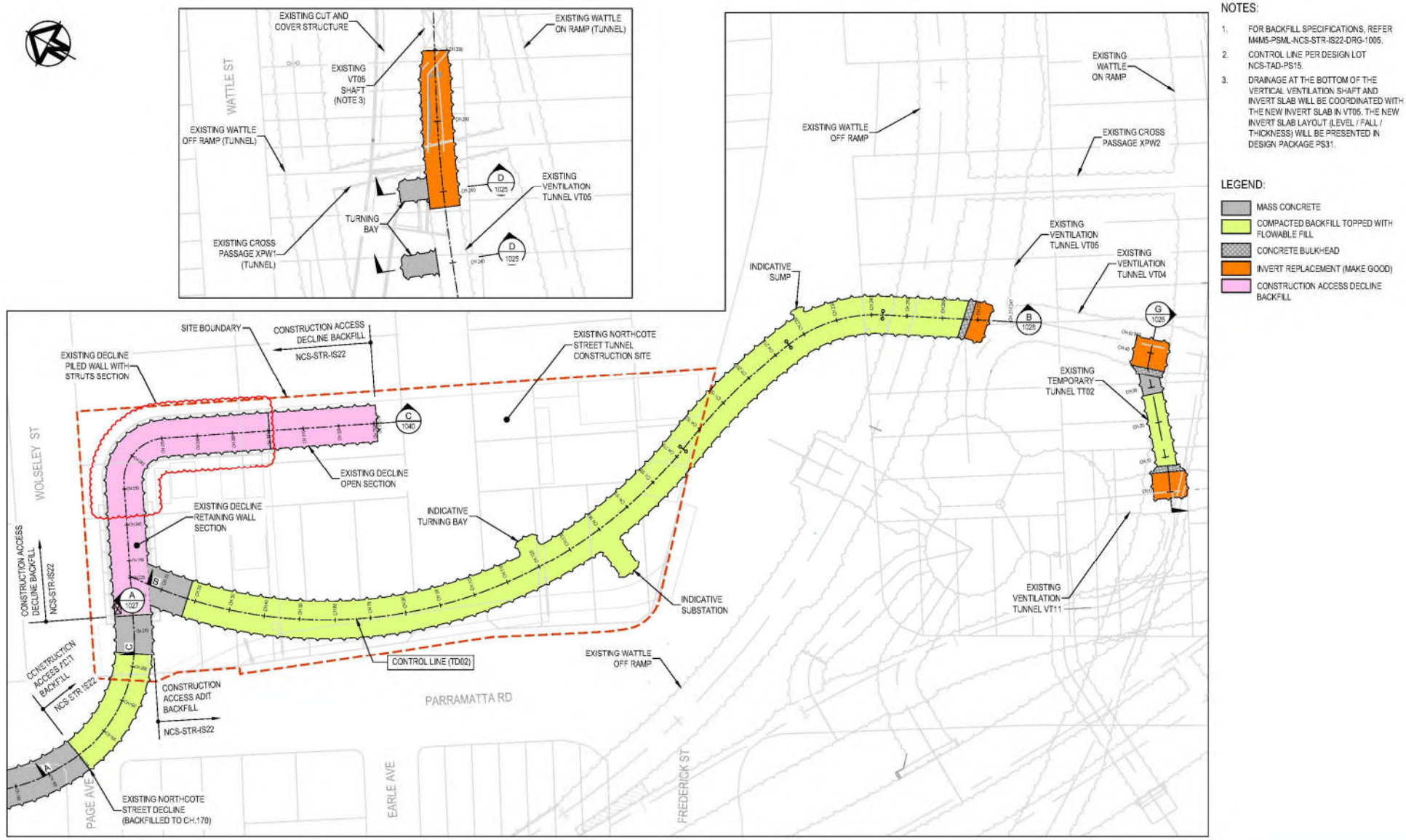
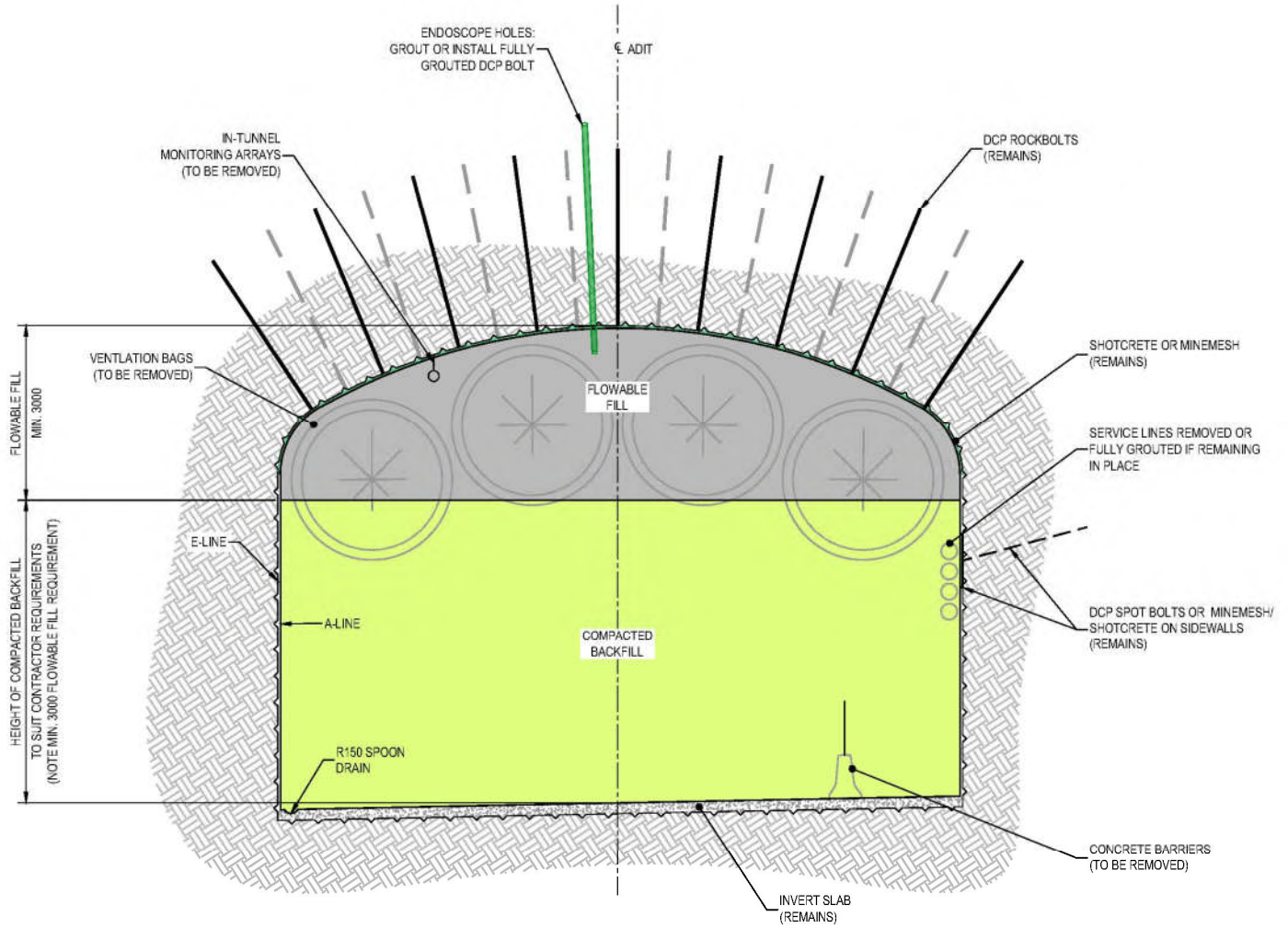


Figure 3-2 Design of Northcote Backfill and Stub Walls (sheet 2 of 2) (Source: Ref [64]



TYPICAL TUNNEL PROFILE
REQUIREMENTS PRIOR TO BACKFILLING
NTS

- All parts of the stockpile must be equally accessible for sampling;
- For stockpiles greater than 4,000 t the number of samples described in Table 1 must be repeated.

Table 1

Sampling of Stockpiled Material		
Column 1	**Column 2**	**Column 3**
Quantity (tonnes)	**Number of samples**	**Validation**
<500	3	Required
500 – 1,000	4	
1,000 – 2,000	5	
2,000 – 3,000	7	
3,000 – 4,000	10	

- For sampling backfill material in-situ, the generator must:
  - Undertake sampling by collecting discrete samples. Compositing of samples was not permitted for in situ materials;
  - Undertake characterisation sampling for the range of chemicals and other attributes listed in Column 1 of Table 4 according to the requirements listed in Columns 1, 2 and 3 of Table 2. When the ground surface was not comprised of soil (e.g. concrete slab), samples must be taken at the depth at which the soil commenced;
  - Undertake sampling at depth according to Column 1 of Table 3;
  - Collect additional soil samples (and analyse them for the range of chemicals and other attributes listed in Column 1 of Table 4), at any depth exhibiting discolouration, staining, odour or other indicators of contamination inconsistent with soil samples collected at the depth intervals indicated in Table 3;
  - Segregate and exclude hotspots identified in accordance with Table 2, from material excavated for reuse; and
  - Subdivide sites larger than 50,000 m² into smaller areas and sample each area as per Table 2.
- Backfill material must not be supplied to WestConnex if:
  - A sample concentration exceeded the absolute maximum concentration or other value listed in Column 3 of Table 4; or
  - The average concentration exceeded the maximum average concentration or other value listed in Column 2 of Table 4.
- The generator must keep a written record of the following for a period of six years:
  - the sampling plan required to be prepared;
  - all characterisation sampling results in relation to the WestConnex imported tunnel backfill material supplied;
  - the volume of detected hotspot material and the location;
  - the quantity of the WestConnex imported tunnel backfill material supplied; and
  - the name and address of each person to whom the generator supplied the WestConnex imported tunnel backfill material.

Table 2

In Situ Sampling at surface				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Size of *in situ* area (m^2)	**Number of systematic sampling points recommended**	**Distance between two sampling points** (m)	**Diameter of the hot spot that can be detected with 95% confidence** (m)	**Validation**
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

Table 2 has been taken from NSW EPA 1995, *Contaminated Sites Sampling Design Guidelines*, NSW Environment Protection Authority.

Table 3

In Situ Sampling at Depth	
Column 1	**Column 2**
Sampling Requirements *	**Validation**
1 soil sample at 1.0 m bgl from each surface sampling point followed by 1 soil sample for every metre thereafter. From 1.0 m bgl, sample at the next metre interval until the proposed depth of excavation of the material is reached. If the proposed depth of excavation is between 0.5 to 0.9 m after the last metre interval, sample at the base of the proposed depth of excavation.	Required if the depth of excavation is equal to or greater than 1.0 m bgl

* Refer to Notes for examples

Table 4

Column 1	Column 2	Column 3
Chemicals and other attributes	**Maximum average concentration for characterisation** (mg/kg 'dry weight' unless otherwise specified)	**Absolute maximum concentration** (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	1.0	1.5
2. Cadmium	5	8
3. Lead	300	500
4. Arsenic	40	60
5. Chromium (total)	75	150
6. Copper	150	300
7. Nickel	80	150
8. Zinc	350	920
9. Electrical Conductivity	N/A	N/A
10. pH[1]	5 to 10	5 to 10
11. Total Polycyclic Aromatic Hydrocarbons (PAHs)	40	80
12. Benzo(a)pyrene	3	5
13. Benzene	N/A	1
14. Toluene	N/A	65
15. Ethyl-benzene	N/A	25
16. Xylene	N/A	15
17. Total Recoverable Hydrocarbons (TRH) C_6- C_{10} or F1 [2, 3]	N/A	50
18. TRH C_{10} – C_{16} or F2 [2, 4]	100	185
19. TRH C_{17} – C_{34} or F3 [2]	200	380
20. TRH C_{35} – C_{40} or F4 [2]	270	380
21. Asbestos	N/A	No asbestos found[5]
22. Foreign materials – Rubber, plastic, bitumen, paper, cloth, paint and engineered wood products and preservative treated or coated wood residues.	0.05%	0.1%

Notes:

1. The ranges given for pH are for the minimum and maximum acceptable pH values in the material.
2. The TRH test may include silica gel clean-up. The absolute maximum concentration and the maximum average concentration may include silica gel clean-up. TRH silica gel clean-up may be undertaken if the initial TRH test (without silica gel clean-up) exceeds the absolute maximum concentration or the maximum average concentration.
3. To obtain F1, subtract the sum of BTEX concentrations from the F1 fraction.
4. To obtain F2, subtract naphthalene from the F2 fraction.
5. See test method.

Proposed landscaping works in the Northcote Street road corridor would also involve importing landscaping soils.

The Site Auditor considered that data on the type of fill used to backfill the tunnel decline and other parts of the Site needed to be provided so the Site Auditor could verify that the backfill was suitable for the intended road construction worksite land use.

The Site Auditor addressed the need for this additional data by issuing a Section B SAS, which is further discussed in **Section 4**.

3.5 Final Site Condition

ASBJV[40] design drawings show that final site conditions at the Northcote Compound would consist of:

- Demolition and removal of the acoustic shed, buildings, electrical substation, wastewater treatment plant, workshops and tunnel support infrastructure as shown in **Figure 3-3**;
- Landscaping of the former Northcote Street road corridor to include a grass verge, planter boxes and new pavements as shown in **Figure 3-4**; and
- New pavements as shown in **Figures 3-1, 3-4** and **3-5**.

Copies of final site condition design drawings are provided in **Appendix B**.

During the site inspection conducted on 4/11/22, demobilisation work was in its early stage, with the facilities still to be removed including the acoustic shed and the switchyard, as shown by photos in **Appendix D**.

The Site Auditor addressed the need for this additional construction work to be completed by issuing a Section B SAS, which is further discussed in **Section 4**.

3.6 Review of LTEMP

The Site Auditor considered the approach adopted by the ASBJV environment team for managing contamination at the Northcote Compound met the requirements of their contract, the planning consent and EPL, as described in **Section 1.2.1**, provided residual contamination risks were managed by a **LTEMP**. The contamination risks that remained at the Site (**Sections 2.7 & 2.9**) and required long-term management comprised:

- Unknown ACM fragments in fill;
- Unknown buried services/pits remaining at the Site;
- The possibility of UPSS infrastructure at Site 028; and
- At the former Northcote Street road corridor (site 046): The potential for coal tar to be present in the subbase layer that formed the road pavement and the use of contaminated fill used when Council first constructed the road.

[40] Refs [64] & [65]

Figure 3-3 General Arrangement for Reinstatement of Northcote Compound (Source: Drg No: M4M5 -RBGP-PRW- CIV - CW02-DRG- 1101, Ref [63])

Figure 3-4 Reinstatement Design for Northcote Street (Source: Drg No: M4M5 -RBGP-PRW- CIV - CW02-DRG- 1102, Ref [63])

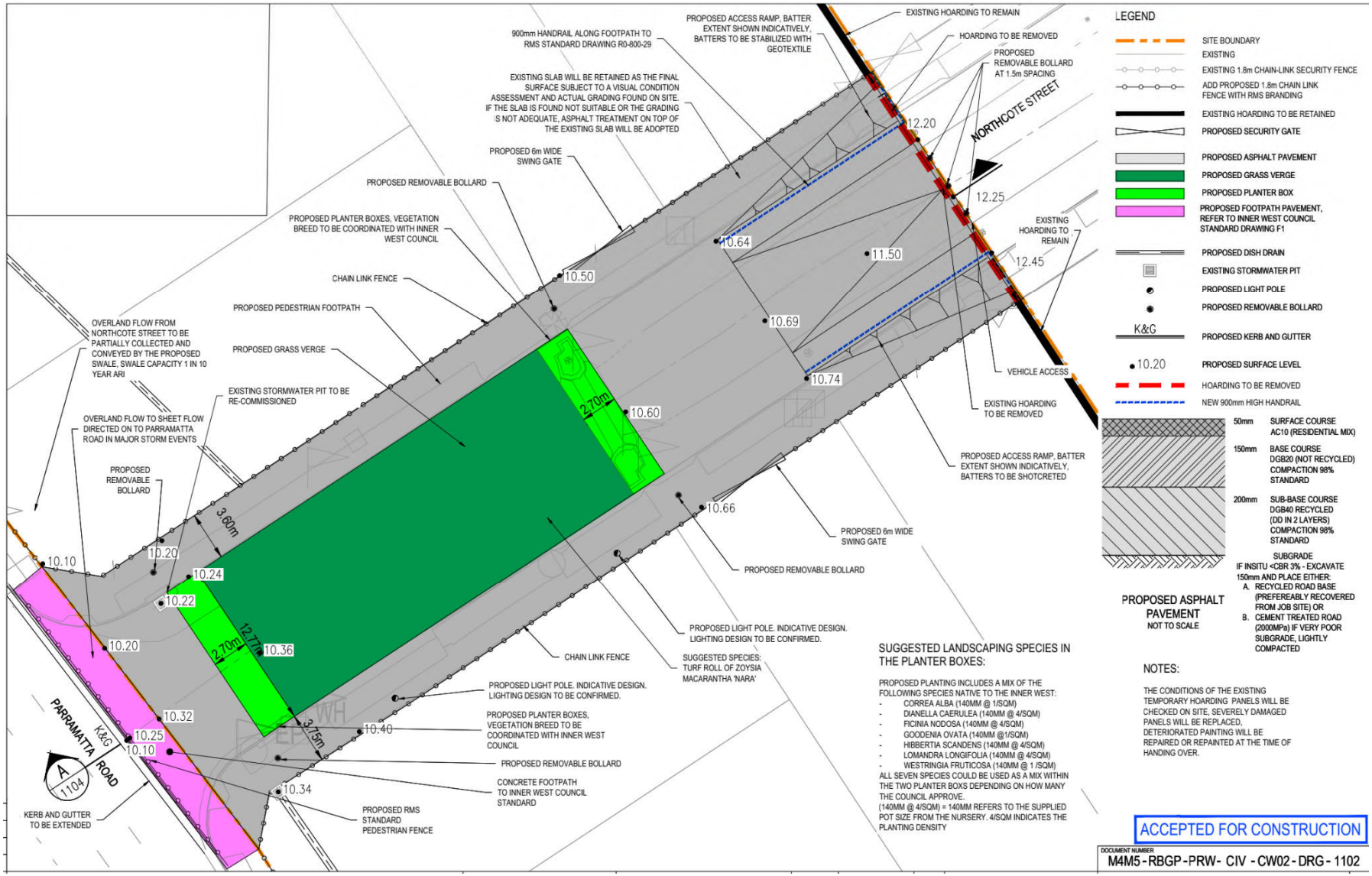
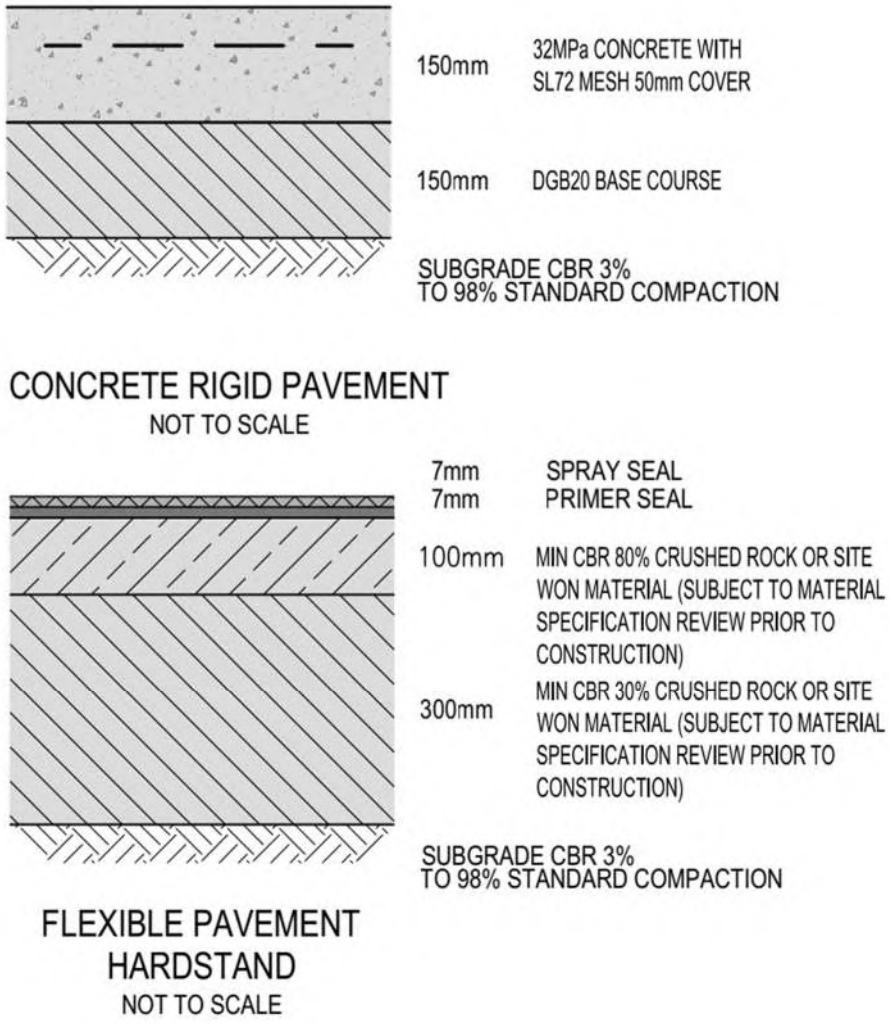


Figure 3-5 Pavement Design Details for Reinstatement of Northcote Compound



(Source: Drg No: M4M5 -RBGP-PRW- CIV - CW02-DRG- 1103, Ref [63])

4. Conclusions

The Site Auditor considered the approach adopted by the ASBJV environment team for managing unknown contamination at the Northcote Compound met the requirements of their contract, the planning consent and EPL, as described in **Section 1.2.1**, for the reasons given in **Section 3**.

The Site Auditor considered that the weight of evidence supported the conclusions that:

- ASBJV did not interfere or disturb contamination during the course of carrying out its work at the Northcote Compound during the WestConnex Stage 3A project;
- Contamination was not generated by activities undertaken by ASBJV at the Northcote Compound;
- Contamination was not generated at the Northcote Compound that caused an increase in contamination migrating from the Project site;
- The Northcote Compound was returned to a condition suitable for a road construction worksite provided residual contamination risks were managed in accordance with an LTEMP prepared by an experienced environmental consultant that met EPA guidelines and was approved in writing by the Site Auditor and TfNSW; and
- The work generally complied with the requirements of EPL 21149 in relation to the management of site contamination.

The Site Auditor identified data gaps that needed to be addressed by ASBJV concerning:

- Operational information as described in **Section 3.3.2**, comprising:
  - Any environmental incidents that occurred at the Northcote Compound during the WestConnex Stage 3A project;
  - Chemical storage and operations at the wastewater treatment plant;
  - Operations of the diesel tank and refuelling bay.
- The type of fill used to backfill the tunnel decline and other parts of the Site as described in **Section 3.4**
- Demobilisation work and reinstatement of the Northcote Compound to its final condition at hand over was a work-in-progress at the time this SAR was prepared, as described in **Section 3.5**.

The Site Auditor considered the issuing of a Section B SAS would allow these data gaps to be addressed prior to a Section A2 SAS being issued.

The contamination risks that remained at the Site and required long-term management by means of an LTEMP comprised:

- Unknown ACM fragments in fill;
- Unknown buried services/pits remaining at the Site;
- The possibility of UPSS infrastructure at Site 028; and
- At the former Northcote Street road corridor (site 046): The potential for coal tar to be present in the subbase layer that formed the road pavement and the use of contaminated fill used when Council first constructed the road.

The Site Auditor addressed the need for an LTEMP to be prepared, for data gaps to be addressed, and for minor construction work to be completed at the Northcote Compound by:

- Having ASBJV issue an interim plan outlining the additional work that needed to be undertaken prior to the issuing of a Section A2 SAS; and
- Issuing a Section B SAS.

Copies of the Section B SAS and the ASBJV interim plan are provided in **Appendix E**.

5. Other Relevant Information

This SAR and the accompanying SAS relates to the WestConnex Stage 3A Northcote Compound (Area C3a). This SAR was prepared in accordance with the CLM Act 1997. Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

The audit report and statement have been prepared for ASBJV (the 'Client') for the purposes nominated in the audit report. It is acknowledged that the audit report and statement may be used by TfNSW, the Department of Planning and the EPA in reaching their conclusions about the Site. The scope of work performed in connection with the audit review may not be appropriate to satisfy the needs of any other person. Any other person's use of, or reliance on, the audit report and statement, or the findings, conclusions, recommendations or any other material presented in them, is at that person's sole risk.

The audit was, and this report is, limited by and relies on the scope of work undertaken for this audit, the information made available to the Site Auditor by the Client and their environmental consultants through the documents provided to us, and also on our observations of the site made during the audit period. The Site Auditor has taken this information to represent a fair and reasonable characterisation of the status of the land. Whilst all reasonable care was taken, to the extent practical under normal auditing procedures, to assure adequacy of the information, the Site Auditor and Ian Swane & Associates cannot warrant that this is the case. If the information is subsequently determined to be false, inaccurate or incomplete, it is possible that the Site Auditor's conclusions, as expressed in the audit report and statement may change.

This Site Audit applies to the condition of the Northcote Compound at the time the audit was undertaken. The Site Auditor and Ian Swane & Associates cannot be responsible for future activities that may result in changes to the site conditions. In the event that site conditions have since changed or are likely to change in the future, the Site Auditor recommends that the property owner engage an environmental consultant to confirm that the SPI site is being properly maintained to a condition suitable for its proposed land uses.

It must also be recognised that sub-surface conditions, including groundwater levels and contaminant concentrations, can change in a limited time. This should be borne in mind if the audit report and statement is used after a protracted delay.

There are always some variations in sub-surface conditions across a site that cannot be fully defined by investigation. No investigation, in practice, can be thorough enough to preclude the presence of materials on the subject property that presently, or in the future, may be considered hazardous. Hence it is possible that the measurements and values obtained from the sampling and testing presented do not represent the extremes of conditions which exist within the site.

Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable at the time of this audit report and statement, may in the future become subject to different regulatory standards and require reassessment. It is not possible in a Site Audit Report to present all data that could be of interest to all readers of this report. Readers are therefore referred to the referenced documentation for further data.

Yours faithfully

Dr Ian C Swane (CPEng, CEnvP & CSCS)
Accredited EPA Site Auditor
Director, Ian Swane & Associates
Phone: 0418 867 112 Email: iswane@bigpond.com

Appendix A. Figures & Tables from M4 East Work

Ramboll (February 2019)
DSI

Legend

Northcote Compound

RAMBOLL

DRAFTED BY: TP	Date: 22/11/2016	A3

0 2,000

m

1 cm = 177 m

Figure 1 - Northcote Compound Location
Phase 2 ESA - Northcote Compound
Client: CPB Samsung John Holland JV, WestConnex M4 East

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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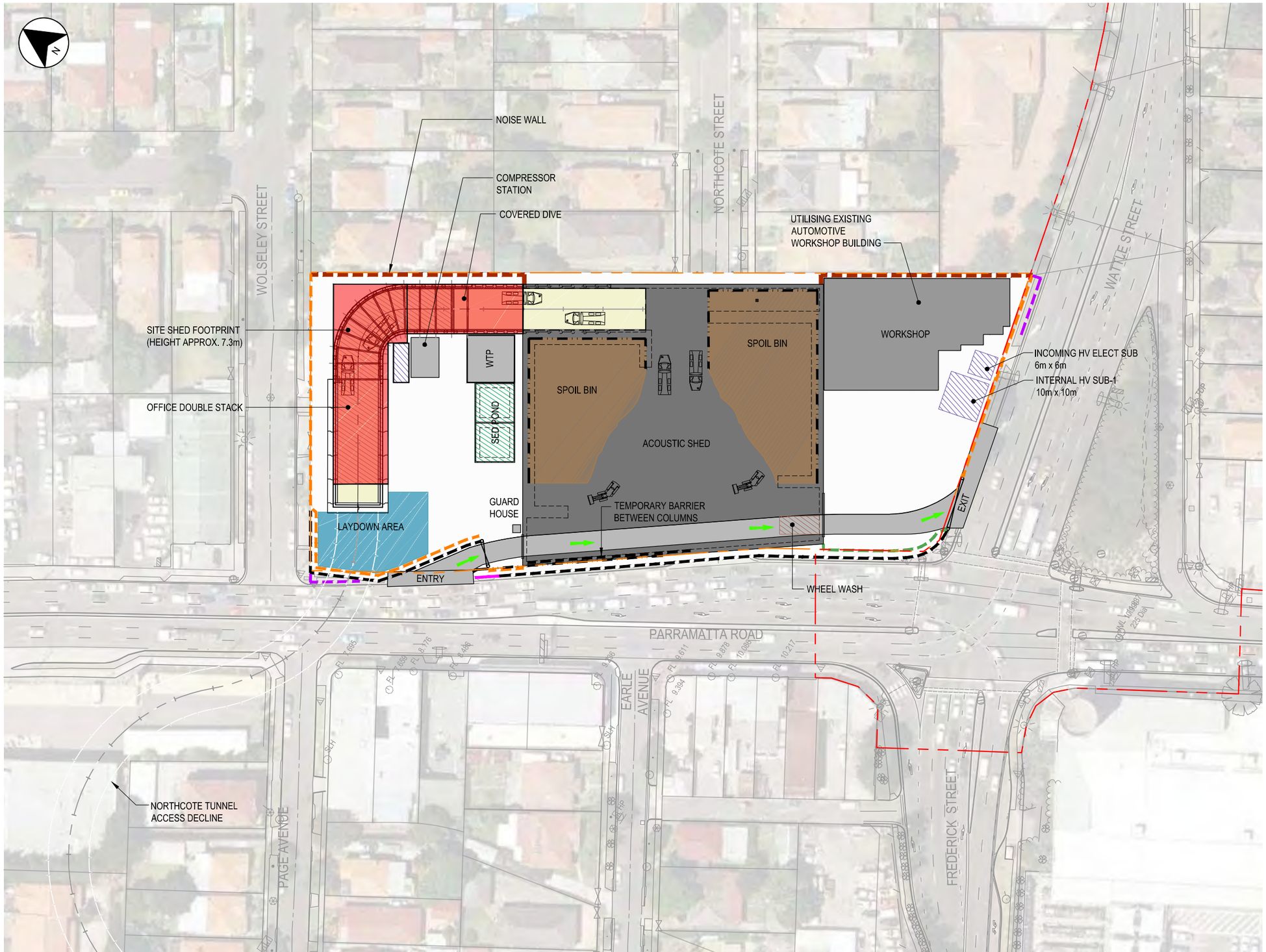
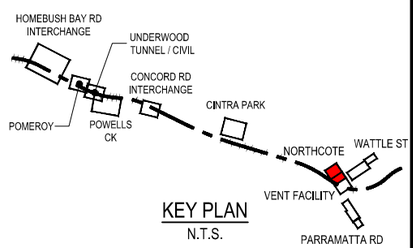


LEGEND

- SECURITY FENCE 1.8m HIGH (CHAINWIRE W/ MESH SCREEN)
- TIMBER FENCE 2.4m HIGH
- CONCRETE BARRIER
- BARRIER HOARDING (BARRIER WITH 1.2m FENCE)
- PLASTIC BARRIER SYSTEM
- NOISE WALL
- NOISE WALL 3.0m HIGH
- RETAINING WALL
- CONCRETE FOOTPATH (WITHIN WORKSITE)
- VEGETATION TO BE RETAINED WHERE POSSIBLE
- ENTRY / EXIT GATE
- BOOM GATE
- GRAVEL PAD
- SEALED GRAVEL ACCESS TRACK
- CONCRETE / ASPHALT ROAD
- CONCRETE SLAB
- LAYDOWN AREA
- SEDIMENTATION POND - SHOTCRETE LINED
- WHEEL WASH
- EXCAVATED SPOIL
- EXISTING STRUCTURES MAINTAINED
- EXCLUSION ZONE
- CONSTRUCTION TRAFFIC DIRECTION (HEAVY VEHICLE)
- CONSTRUCTION TRAFFIC DIRECTION (LIGHT VEHICLE)
- GENERAL TRAFFIC DIRECTION



KEY PLAN
N.T.S.

RAMBOLL

DRAFTED BY: TP	Date: 2/11/2016	A3

SCALE 1:1000

Figure 2 Proposed Compound Layout Plan
Phase 2 ESA - Northcote Street Tunnel Compound Client: CPB
Samsung John Holland JV, WestConnex M4 East

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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RAMBOLL

DRAFTED BY: TP	Date: 09/11/2018	A3

0 50 100
m

1 cm = 12 m

Figure 3 - Northcote Compound - Proposed End Use and Site Layout Plan
Phase 2 ESA - Northcote Compound
Client: CPB Samsung John Holland JV, WestConnex M4 East

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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RAMBOLL

DRAFTED BY: TP	Date: 2/12/2016	A3

0 80

m

1 cm = 11 m

Figure 4 - Risk Ranking of Sites
Phase 2 ESA - Northcote Compound
Client: CPB Samsung John Holland JV, WestConnex M4 East

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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RAMBOLL

DRAFTED BY: TP	Date: 22/11/2016	A3

0 80

m

1 cm = 7 m

Figure 5 - Groundwater Contours
Phase 2 ESA - Northcote Compound
Client: CPB Samsung John Holland JV, WestConnex M4 East

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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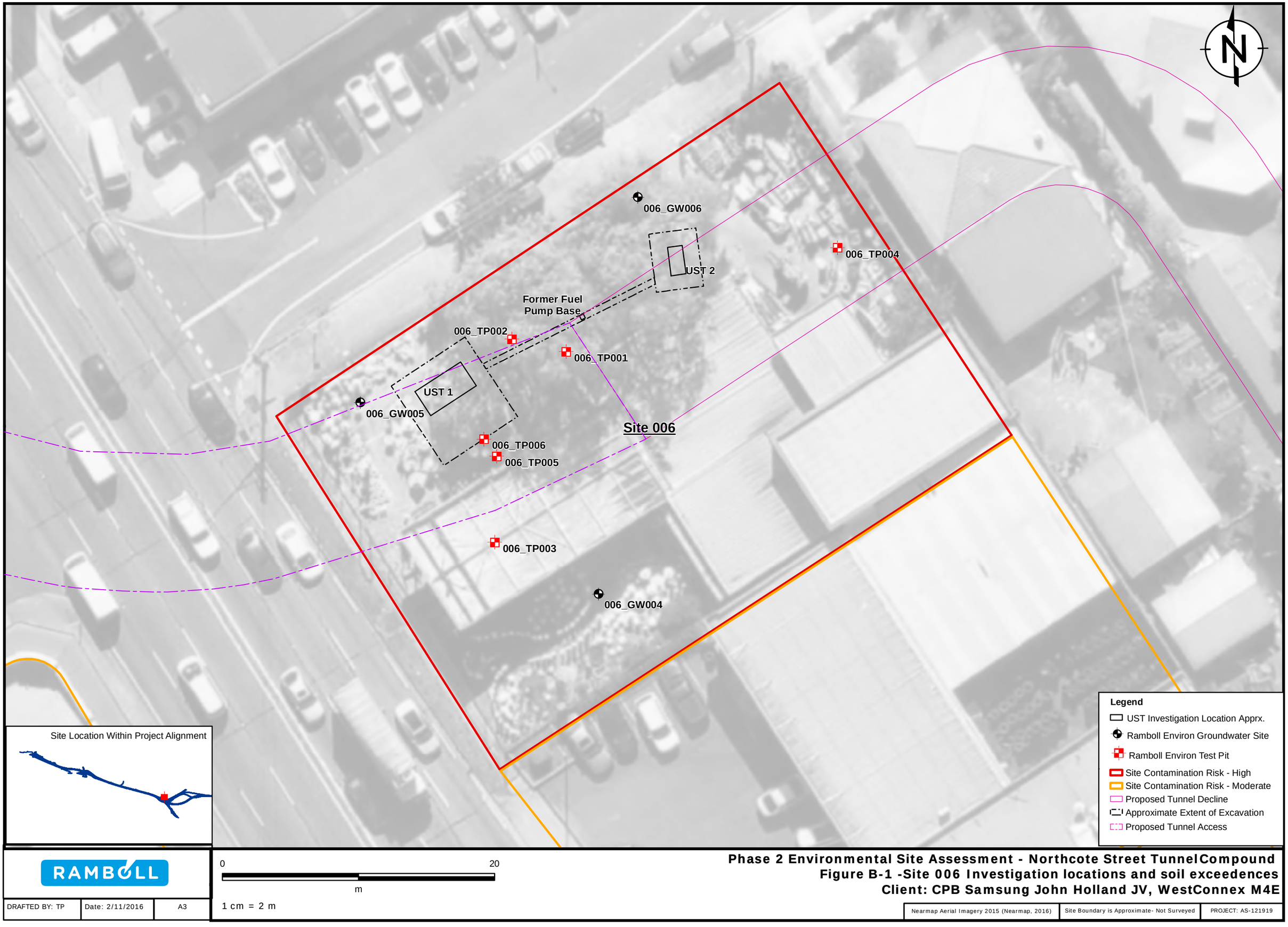

RAMBOLL

DRAFTED BY: TP	Date: 2/11/2016	A3

0 20

m

1 cm = 2 m

Phase 2 Environmental Site Assessment - Northcote Street TunnelCompound
Figure B-1 -Site 006 Investigation locations and soil exceedences
Client: CPB Samsung John Holland JV, WestConnex M4E

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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Table 6-4 Groundwater Exceedances

Sample Location and Depth	Contaminant	Guideline Exceeded	Guideline Value	Concentration (mg/kg)
006_GW005	Nickel	95% Marine Water Protection for Aquatic Ecosystems	7 µg/L	32 µg/L
006_GW005	Zinc	95% Marine Water Protection for Aquatic Ecosystems	15 µg/L	52 µg/L*
006_GW005	Lead	95% Marine Water Protection for Aquatic Ecosystems	4.4 µg/L	33 µg/L*

*Duplicate result indicated highest concentration, substituted as the primary sample concentration for completeness.

Table 6-4 Groundwater Exceedances

Sample Location and Depth	Contaminant	Guideline Exceeded	Guideline Value	Concentration (mg/kg)
006_GW006	Cadmium	95% Marine Water Protection for Aquatic Ecosystems	0.7 µg/L	0.9 µg/L
006_GW006	Copper	95% Marine Water Protection for Aquatic Ecosystems	1.3 µg/L	6 µg/L
006_GW006	Nickel	95% Marine Water Protection for Aquatic Ecosystems	7 µg/L	65 µg/L
006_GW006	Zinc	95% Marine Water Protection for Aquatic Ecosystems	15 µg/L	96 µg/L
006_GW006	Lead	95% Marine Water Protection for Aquatic Ecosystems	4.4 µg/L	65 µg/L

006_GW006

UST 2

Former Fuel Pump Base

UST 1

006_GW005

Site 006

Site 026

006_GW004

Table 6-4 Groundwater Exceedances

Sample Location and Depth	Contaminant	Guideline Exceeded	Guideline Value	Concentration (mg/kg)
006_GW004	Copper	95% Marine Water Protection for Aquatic Ecosystems	1.3 µg/L	2 µg/L
006_GW004	Nickel	95% Marine Water Protection for Aquatic Ecosystems	7 µg/L	14 µg/L
006_GW004	Zinc	95% Marine Water Protection for Aquatic Ecosystems	15 µg/L	53 µg/L
006_GW004	Lead	95% Marine Water Protection for Aquatic Ecosystems	4.4 µg/L	14 µg/L

Site Location Within Project Alignment

Legend

- Ramboll Environ Groundwater Site
- Site Contamination Risk - High
- Site Contamination Risk - Moderate
- Proposed Tunnel Decline
- Approximate Extent of Excavation
- Proposed Tunnel Access

RAMBOLL

0 20

m

1 cm = 2 m

Phase 2 Environmental Site Assessment - Northcote Street Tunnel Compound
Figure B-2 – Site 006 Groundwater exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

DRAFTED BY: TP	Date: 2/11/2016	A3

Nearmap Aerial Imagery 2015 (Nearmap, 2016) | Site Boundary is Approximate- Not Surveyed | PROJECT: AS-121919

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RAMBOLL ENVIRON

Table 1 - Groundwater Gauging Data

Project No: AS121919
Client Name: CSJ
Project Name: Phase 1 2 ESA
Project Site: 006

Well ID	Easting	Northing	Gauging Date	Total Well Depth	SWL	TOC Elevation	Groundwater Elevation
				(m btoc)	(m btoc)	(mAHD)	(mAHD)
006_GW004	326965.04	6250050.50	24/05/2016	10.03	5.03	8.75	3.72
006_GW005	326947.55	6250064.53	24/05/2016	10.07	3.07	8.39	5.32
006_GW006	326967.92	6250079.60	24/05/2016	10.68	3.77	9.06	5.29

Notes

m = Metres
btoc = Below Top of Casing
SWL = Standing Water Level
TOC = Top of Casing
AHD = Australian Height Datum
Easting projection MGA94: Map Grid of Australia 1994

Table 2 - Groundwater Geochemical Data

Well ID	Purge Date	Purge Vol (L)	DO (ppm)	EC (µScm-¹)	pH	Eh (mV)	Temperature (°C)	Comments
006_GW004	24/05/2016	3.5	1.20	1107	5.16	108	21.0	moderately turbid, brown, no sheen, no odour, no PSH
006_GW005	24/05/2016	2.5	0.62	4350	5.34	136	22.0	slightly turbid, brown, no sheen, no odour, no PSH
006_GW006	24/05/2016	2.5	1.39	2180	5.85	74	22.5	slightly turbid, brown, no sheen, no odour, no PSH

Notes

L = Litre

DO = Dissolved Oxygen

ppm = parts per million

EC = Electrical Conductivity

µScm-¹ = microSiemens per centimetre

Eh = Redox

mV = milli Volts

TABLE 3:
Commercial/Industrial D - Soil Sampling Results
Northcote Compound
Site 006

Analyte grouping/Analyte	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial [3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact[4] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[1]	Units	LOR
EA001: pH in soil using 0.01M CaCl extract													
pH (CaCl2)												pH units	0.1
EA055: Moisture Content													
Moisture Content (dried @ 103°C)												%	--
ED006: Exchangeable Cations on Alkaline Soils													
Exchangeable Calcium												meq/100g	0.1
Exchangeable Magnesium												meq/100g	0.1
Exchangeable Potassium												meq/100g	0.1
Exchangeable Sodium												meq/100g	0.1
Cation Exchange Capacity												meq/100g	0.1
EP003: Total Organic Carbon (TOC) in Soil													
Total Organic Carbon												%	--
EA200: AS 4964 - 2004 Identification of Asbestos in Soils													
Asbestos Detected												g/kg	0.1
Asbestos Type												--	--
Sample weight (dry)												g	0.1
Description												--	--
APPROVED IDENTIFIER:												--	--
EG005T: Total Metals by ICP-AES													
Arsenic	**3000**					**160**						mg/kg	5
Cadmium	**900**											mg/kg	1
Chromium	**3600**					**310**						mg/kg	2
Copper	**240000**					***150***						mg/kg	5
Iron												%	0.005
Lead	**1500**					**1800**						mg/kg	5
Nickel	**6000**					***60***						mg/kg	2
Zinc	**400000**					***300***						mg/kg	5
EG035T: Total Recoverable Mercury by FIMS													
Mercury	**730**											mg/kg	0.1
EP066: Polychlorinated Biphenyls (PCB)													
Total Polychlorinated biphenyls	**7**											mg/kg	0.1
EP068A: Organochlorine Pesticides (OC)													
alpha-BHC												mg/kg	0.05
Hexachlorobenzene (HCB)	**80**											mg/kg	0.05
beta-BHC												mg/kg	0.05
gamma-BHC												mg/kg	0.05
delta-BHC												mg/kg	0.05
Heptachlor	**50**											mg/kg	0.05
Aldrin												mg/kg	0.05
Heptachlor epoxide												mg/kg	0.05
Total Chlordane (sum)	**530**											mg/kg	0.05
trans-Chlordane												mg/kg	0.05
alpha-Endosulfan												mg/kg	0.05
cis-Chlordane												mg/kg	0.05
Dieldrin												mg/kg	0.05
4.4`-DDE												mg/kg	0.05
Endrin	**100**											mg/kg	0.05
Endosulfan (sum)	**2000**											mg/kg	0.05
beta-Endosulfan												mg/kg	0.05
4.4`-DDD												mg/kg	0.05
Endrin aldehyde												mg/kg	0.05
Endosulfan sulfate												mg/kg	0.05
4.4`-DDT						**640**						mg/kg	0.2
Endrin ketone												mg/kg	0.05
Methoxychlor	**2500**											mg/kg	0.2
Sum of DDD + DDE + DDT	**3600**											mg/kg	0.05
Sum of Aldrin + Dieldrin	**45**											mg/kg	0.05
EP068B: Organophosphorus Pesticides (OP)													
Dichlorvos												mg/kg	0.05
Demeton-S-methyl												mg/kg	0.05
Monocrotophos												mg/kg	0.2
Dimethoate												mg/kg	0.05
Diazinon												mg/kg	0.05
Chlorpyrifos-methyl												mg/kg	0.05
Parathion-methyl												mg/kg	0.2
Malathion												mg/kg	0.05
Fenthion												mg/kg	0.05
Chlorpyrifos	**2000**											mg/kg	0.05
Parathion												mg/kg	0.2
Pirimphos-ethyl												mg/kg	0.05
Chlorfenvinphos												mg/kg	0.05
Bromophos-ethyl												mg/kg	0.05
Fenamiphos												mg/kg	0.05
Prothiofos												mg/kg	0.05
Ethion												mg/kg	0.05
Carbophenothion												mg/kg	0.05
Azinphos Methyl												mg/kg	0.05
EP075(SIM)A: Phenolic Compounds													
Phenol	**240000**											mg/kg	0.5
2-Chlorophenol												mg/kg	0.5
2-Methylphenol												mg/kg	0.5
3- & 4-Methylphenol	**25000**											mg/kg	1
2-Nitrophenol												mg/kg	0.5
2.4-Dimethylphenol												mg/kg	0.5
2.4-Dichlorophenol												mg/kg	0.5
2.6-Dichlorophenol												mg/kg	0.5
4-Chloro-3-methylphenol												mg/kg	0.5
2.4.6-Trichlorophenol												mg/kg	0.5
2.4.5-Trichlorophenol												mg/kg	0.5
Pentachlorophenol	**660**											mg/kg	2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons													
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	**NL**	mg/kg	0.5
Acenaphthylene												mg/kg	0.5
Acenaphthene												mg/kg	0.5
Fluorene												mg/kg	0.5
Phenanthrene												mg/kg	0.5
Anthracene												mg/kg	0.5
Fluoranthene												mg/kg	0.5
Pyrene												mg/kg	0.5
Benz(a)anthracene												mg/kg	0.5
Chrysene												mg/kg	0.5
Benzo(b+j)fluoranthene												mg/kg	0.5
Benzo(k)fluoranthene												mg/kg	0.5
Benzo(a)pyrene							**72**					mg/kg	0.5
Indeno(1.2.3.cd)pyrene												mg/kg	0.5
Dibenz(a.h)anthracene												mg/kg	0.5
Benzo(g.h.i)perylene												mg/kg	0.5
Sum of polycyclic aromatic hydrocarbons	**4000**											mg/kg	0.5
Benzo(a)pyrene TEQ (zero)												mg/kg	0.5
Benzo(a)pyrene TEQ (half LOR)												mg/kg	0.6
Benzo(a)pyrene TEQ (LOR)	**40**											mg/kg	1.2
EP080/071: Total Petroleum Hydrocarbons													
C6 - C9 Fraction												mg/kg	10
C10 - C14 Fraction												mg/kg	50
C15 - C28 Fraction												mg/kg	100
C29 - C36 Fraction												mg/kg	100
C10 - C36 Fraction (sum)												mg/kg	50

Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ALS Sample number:	ES1609685001	ES1609685002	ES1609685003	ES1609685004	ES1609685005	ES1609685006	ES1609685007	ES1609685008	ES1609685009	ES1609685010	ES1609685011	ES1609685012
Sample date:	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016
Sample ID:	006_TP001_0.10	006_TP001_0.50	006_TP001_1.20	006_TP002_0.10	006_TP002_0.70	006_TP002_1.20	006_TP003_0.10	006_TP003_0.30	006_TP003_0.60	006_TP004_0.20	006_TP004_0.40	006_TP004_1.00
Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
Site:	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
Sampling Method:	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting
Sample Description	FILL; Silty sand, moist, medium grained, uniform, grey/brown, no observed contamination, contains srushed concrete, roots, crushed sandstone	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	FILL; Silty sand, possible backfill sands, grey/orange, saturated, medium grained, perhaps very slight hydrocarbon odour, loose, no asbestos containing material observed, brick	FILL; Gravelly sandy clay, saturated, orange/brown, ironstone gravels, soft, high plasticity, no observed contamination	One wall of Test Pit becomes highly weathered sandstone/clayey sand, white, loose, very moist, medium grained, very slight hydrocarbon odour (other side of wall still fill), keeps filling with irrigation water	FILL; Silty sand, brown, moist, contains bricks, blue metal, lots of PVC conduits and wire and ag pipe, medium dense, no observed contaminatoin, broken glass	Clayey SAND; highly weathered sandstone, orange/red, medium stiff, ironstone, high plasticity clay, sand is fine grained, no observed contamination	Clayey SAND; highly weathered sandstone, orange/red, medium stiff, ironstone, high plasticity clay, sand is fine grained, no observed contamination	FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense
EA001: pH in soil using 0.01M CaCl extract												
pH (CaCl2)	----	----	----	----	----	----	----	----	----	----	----	----
EA055: Moisture Content												
Moisture Content (dried @ 103°C)	7.9	15.2	14.4	13.3	14.6	14.8	8.9	14.1	17	11.5	16	12.2
ED006: Exchangeable Cations on Alkaline Soils												
Exchangeable Calcium	----	----	----	----	----	----	----	----	----	----	----	----
Exchangeable Magnesium	----	----	----	----	----	----	----	----	----	----	----	----
Exchangeable Potassium	----	----	----	----	----	----	----	----	----	----	----	----
Exchangeable Sodium	----	----	----	----	----	----	----	----	----	----	----	----
Cation Exchange Capacity		----	----	----	----	----	----	----	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil												
Total Organic Carbon	----	----	----	----	----	----	----	----	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected	No	----	----	No	No	----	No	----	----	No	----	----
Asbestos Type	-	----	----	-	-	----	-	----	----	-	----	----
Sample weight (dry)	40.1	----	----	39.7	21.7	----	44.9	----	----	45.7	----	----
Description	Mid brown sandy soil.	----	----	Mid brown sandy soil with grey rocks.	Mid brown clay soil with grey rocks.	----	Mid brown sandy soil.	----	----	Pale brown sandy soil.	----	----
APPROVED IDENTIFIER:	G.MORGAN	----	----	G.MORGAN	G.MORGAN	----	G.MORGAN	----	----	G.MORGAN	----	----
EG005T: Total Metals by ICP-AES												
Arsenic	<5	<5	<5	46	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	4	4	<2	19	15	2	4	11	4	12	19	8
Copper	7	<5	<5	20	<5	<5	<5	<5	<5	6	<5	<5
Iron	----	----	----	----	----	----	----	----	----	----	----	----
Lead	22	6	<5	39	11	9	13	6	10	10	6	6
Nickel	<2	<2	<2	4	<2	<2	7	<2	<2	2	<2	<2
Zinc	46	<5	<5	228	24	<5	34	<5	<5	14	<5	<5
EG035T: Total Recoverable Mercury by FIMS												
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)												
Total Polychlorinated biphenyls	0.2	----	----	<0.1	----	----	----	----	----	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)												
alpha-BHC	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Hexachlorobenzene (HCB)	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
beta-BHC	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
gamma-BHC	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
delta-BHC	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Heptachlor	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Aldrin	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Heptachlor epoxide	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Total Chlordane (sum)	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
trans-Chlordane	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
alpha-Endosulfan	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
cis-Chlordane	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Dieldrin	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
4.4`-DDE	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Endrin	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Endosulfan (sum)	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
beta-Endosulfan	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
4.4`-DDD	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Endrin aldehyde	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Endosulfan sulfate	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
4.4`-DDT	<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----
Endrin ketone	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Methoxychlor	<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----
Sum of DDD + DDE + DDT	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Sum of Aldrin + Dieldrin	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)												
Dichlorvos	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Demeton-S-methyl	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Monocrotophos	<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----
Dimethoate	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Diazinon	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Chlorpyrifos-methyl	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Parathion-methyl	<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----
Malathion	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Fenthion	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Chlorpyrifos	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Parathion	<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----
Pirimphos-ethyl	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Chlorfenvinphos	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Bromophos-ethyl	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Fenamiphos	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Prothiofos	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Ethion	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Carbophenothion	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
Azinphos Methyl	<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----
EP075(SIM)A: Phenolic Compounds												
Phenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2-Chlorophenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2-Methylphenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
3- & 4-Methylphenol	<1	----	----	<1	----	----	----	----	----	<1	----	----
2-Nitrophenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2.4-Dimethylphenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2.4-Dichlorophenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2.6-Dichlorophenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
4-Chloro-3-methylphenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2.4.6-Trichlorophenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
2.4.5-Trichlorophenol	<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----
Pentachlorophenol	<2	----	----	<2	----	----	----	----	----	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ALS Sample number:	ES1610404001	ES1610406011	ES1610404002	ES1610404004	ES1610404005	ES1610406010	ES1610404006	ES1610404007	ES1610404008	ES1610404009	ES1610404010
Sample date:	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	10/05/2016	10/05/2016
Sample ID:	006_GW004_0.2	006_QC004	006_GW004_0.5	006_GW004_2.5	006_GW005_0.2	006_QC003	006_GW005_0.6	006_GW005_0.7	006_GW005_4.0	006_GW006_0.2	006_GW006_0.5
Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
Site:	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
Sampling Method:	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling
Sample Description	CLAY; red and grey mottled, low plasticity, moist	Duplicate of 006_GW004_0.2	CLAY; red and grey mottled, low plasticity, moist	SANDSTONE; light grey/orange mottled	FILL; Clayey sand, black, fine to medium grained, moist	Duplicate of 006_GW005_0.2	FILL; Sandy clay with gravel, grey, low plasticity, wet (possible staining)	CLAY; red and grey mottled, wet	SANDSTONE	FILL; Clayey sand, light brown, moist	CLAY; brown with red (sandstone) mottling, low to medium plasticity, moist
EA001: pH in soil using 0.01M CaCl extract											
pH (CaCl2)	4.2	----	3.8	4.3	----	----	----	----	4.6	----	----
EA055: Moisture Content											
Moisture Content (dried @ 103°C)	10.8	11.3	13.2	3.6	27.4	17.6	17	21.4	10.4	11	16.7
ED006: Exchangeable Cations on Alkaline Soils											
Exchangeable Calcium	1.9	----	0.8	<0.1	----	----	----	----	0.2	----	----
Exchangeable Magnesium	1	----	1.2	0.4	----	----	----	----	1.1	----	----
Exchangeable Potassium	<0.1	----	0.1	0.1	----	----	----	----	<0.1	----	----
Exchangeable Sodium	0.1	----	0.2	<0.1	----	----	----	----	0.3	----	----
Cation Exchange Capacity	10.8	----	4.2	0.7	----	----	----	----	1.7	----	----
EP003: Total Organic Carbon (TOC) in Soil											
Total Organic Carbon	0.07	----	0.2	0.02	----	----	----	----	0.05	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils											
Asbestos Detected	No	No	No	----	No	No	No	No	----	No	No
Asbestos Type	-	-	-	----	-	-	-	-	----	-	-
Sample weight (dry)	111	89.3	115	----	110	128	65.2	51.1	----	194	190
Description	Mid brown clay soil.	Pale brown clay soil.	Pale brown clay soil.	----	Mid brown sandy soil.	Mid grey - brown sandy soil with grey rocks.	Mid brown clay soil.	Pale brown clay soil with grey rocks.	----	Pale brown sandy soil.	Mid orange - brown clay soil with grey rocks.
APPROVED IDENTIFIER:	G.MORGAN	G.MORGAN	G.MORGAN	----	G.MORGAN	S.SPOONER	G.MORGAN	G.MORGAN	----	G.MORGAN	S.SPOONER
EG005T: Total Metals by ICP-AES											
Arsenic	<5	<5	<5	<5	<5	<5	6	<5	<5	13	6
Cadmium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	6	11	3	14	21	8	69	2	8	23	26
Copper	<5	<5	<5	<5	12	16	24	<5	<5	<5	<5
Iron	0.076	----	0.138	0.64	----	----	----	----	0.749	----	----
Lead	6	6	5	6	21	31	33	10	10	14	12
Nickel	<2	<2	<2	3	11	6	60	<2	5	<2	2
Zinc	<5	<5	<5	8	40	56	76	<5	17	10	6
EG035T: Total Recoverable Mercury by FIMS											
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)											
Total Polychlorinated biphenyls	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)											
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Chlordane (sum)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan (sum)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sum of DDD + DDE + DDT	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sum of Aldrin + Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)											
Dichlorvos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds											
Phenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Nitrophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons											
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

TABLE 3:
Commercial/Industrial D - Soil Sampling Results
Northcote Compound
Site 006

Analyte grouping/Analyte	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial/Industrial [3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact[4] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[1]	Units	LOR
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction								**700**	**26000**	**82000**	**NL**	mg/kg	10
C6 - C10 Fraction minus BTEX (F1)		**260**	**370**	**630**	**NL**		**215**					mg/kg	10
>C10 - C16 Fraction							**170**	**1000**	**20000**	**62000**	**NL**	mg/kg	50
>C16 - C34 Fraction (F3)							**1700**	**3500**	**27000**	**85000**		mg/kg	100
>C34 - C40 Fraction (F4)							**3300**	**10000**	**38000**	**120000**		mg/kg	100
>C10 - C40 Fraction (sum)												mg/kg	50
>C10 - C16 Fraction minus Naphthalene (F2)		**NL**	**NL**	**NL**	**NL**							mg/kg	50
EP080: BTEXN													
Benzene		**3**	**3**	**3**	**3**		**75**		**430**	**1100**	**77**	mg/kg	0.2
Toluene		**NL**	**NL**	**NL**	**NL**		**135**		**99000**	**120000**	**NL**	mg/kg	0.5
Ethylbenzene		**NL**	**NL**	**NL**	**NL**		**165**		**27000**	**85000**	**NL**	mg/kg	0.5
meta- & para-Xylene												mg/kg	0.5
ortho-Xylene												mg/kg	0.5
Total Xylenes		**230**	**NL**	**NL**	**NL**		**95**		**81000**	**130000**	**NL**	mg/kg	0.5
Sum of BTEX												mg/kg	0.2
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	**NL**	mg/kg	1
EP074A: Monocyclic Aromatic Hydrocarbons													
Styrene												mg/kg	0.5
Isopropylbenzene												mg/kg	0.5
n-Propylbenzene												mg/kg	0.5
1.3.5-Trimethylbenzene												mg/kg	0.5
sec-Butylbenzene												mg/kg	0.5
1.2.4-Trimethylbenzene												mg/kg	0.5
tert-Butylbenzene												mg/kg	0.5
p-Isopropyltoluene												mg/kg	0.5
n-Butylbenzene												mg/kg	0.5
EP074B: Oxygenated Compounds													
Vinyl Acetate												mg/kg	5
2-Butanone (MEK)												mg/kg	5
4-Methyl-2-pentanone (MIBK)												mg/kg	5
2-Hexanone (MBK)												mg/kg	5
EP074C: Sulfonated Compounds													
Carbon disulfide												mg/kg	0.5
EP074D: Fumigants													
2.2-Dichloropropane												mg/kg	0.5
1.2-Dichloropropane												mg/kg	0.5
cis-1.3-Dichloropropylene												mg/kg	0.5
trans-1.3-Dichloropropylene												mg/kg	0.5
1.2-Dibromoethane (EDB)												mg/kg	0.5
EP074E: Halogenated Aliphatic Compounds													
Dichlorodifluoromethane												mg/kg	5
Chloromethane												mg/kg	5
Vinyl chloride												mg/kg	5
Bromomethane												mg/kg	5
Chloroethane												mg/kg	5
Trichlorofluoromethane												mg/kg	5
1.1-Dichloroethene												mg/kg	0.5
Iodomethane												mg/kg	0.5
trans-1.2-Dichloroethene												mg/kg	0.5
1.1-Dichloroethane												mg/kg	0.5
cis-1.2-Dichloroethene												mg/kg	0.5
1.1.1-Trichloroethane												mg/kg	0.5
1.1-Dichloropropylene												mg/kg	0.5
Carbon Tetrachloride												mg/kg	0.5
1.2-Dichloroethane												mg/kg	0.5
Trichloroethene												mg/kg	0.5
Dibromomethane												mg/kg	0.5
1.1.2-Trichloroethane												mg/kg	0.5
1.3-Dichloropropane												mg/kg	0.5
Tetrachloroethene												mg/kg	0.5
1.1.1.2-Tetrachloroethane												mg/kg	0.5
trans-1.4-Dichloro-2-butene												mg/kg	0.5
cis-1.4-Dichloro-2-butene												mg/kg	0.5
1.1.2.2-Tetrachloroethane												mg/kg	0.5
1.2.3-Trichloropropane												mg/kg	0.5
Pentachloroethane												mg/kg	0.5
1.2-Dibromo-3-chloropropane												mg/kg	0.5
Hexachlorobutadiene												mg/kg	0.5
EP074F: Halogenated Aromatic Compounds													
Chlorobenzene												mg/kg	0.5
Bromobenzene												mg/kg	0.5
2-Chlorotoluene												mg/kg	0.5
4-Chlorotoluene												mg/kg	0.5
1.3-Dichlorobenzene												mg/kg	0.5
1.4-Dichlorobenzene												mg/kg	0.5
1.2-Dichlorobenzene												mg/kg	0.5
1.2.4-Trichlorobenzene												mg/kg	0.5
1.2.3-Trichlorobenzene												mg/kg	0.5
EP074G: Trihalomethanes													
Chloroform												mg/kg	0.5
Bromodichloromethane												mg/kg	0.5
Dibromochloromethane												mg/kg	0.5
Bromoform												mg/kg	0.5
EP074H: Naphthalene													
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	**NL**	mg/kg	1

Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ALS Sample number:	ES1609685001	ES1609685002	ES1609685003	ES1609685004	ES1609685005	ES1609685006	ES1609685007	ES1609685008	ES1609685009	ES1609685010	ES1609685011	ES1609685012
Sample date:	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016
Sample ID:	006_TP001_0.10	006_TP001_0.50	006_TP001_1.20	006_TP002_0.10	006_TP002_0.70	006_TP002_1.20	006_TP003_0.10	006_TP003_0.30	006_TP003_0.60	006_TP004_0.20	006_TP004_0.40	006_TP004_1.00
Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
Site:	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
Sampling Method:	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting
Sample Description	FILL; Silty sand, moist, medium grained, uniform, grey/brown, no observed contamination, contains srushed concrete, roots, crushed sandstone	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	FILL; Silty sand, possible backfill sands, grey/orange, saturated, medium grained, perhaps very slight hydrocarbon odour, loose, no asbestos containing material observed, brick	FILL; Gravelly sandy clay, saturated, orange/brown, ironstone gravels, soft, high plasticity, no observed contamination	One wall of Test Pit becomes highly weathered sandstone/clayey sand, white, loose, very moist, medium grained, very slight hydrocarbon odour (other side of wall still fill), keeps filling with irrigation water	FILL; Silty sand, brown, moist, contains bricks, blue metal, lots of PVC conduits and wire and ag pipe, medium dense, no observed contaminatoin, broken glass	Clayey SAND; highly weathered sandstone, orange/red, medium stiff, ironstone, high plasticity clay, sand is fine grained, no observed contamination	Clayey SAND; highly weathered sandstone, orange/red, medium stiff, ironstone, high plasticity clay, sand is fine grained, no observed contamination	FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction (F3)	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction (F4)	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
EP080: BTEXN												
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
EP074A: Monocyclic Aromatic Hydrocarbons												
Styrene	----	----	----	----	----	----	----	----	----	----	----	----
Isopropylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
n-Propylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
1.3.5-Trimethylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
sec-Butylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
1.2.4-Trimethylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
tert-Butylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
p-Isopropyltoluene	----	----	----	----	----	----	----	----	----	----	----	----
n-Butylbenzene	----	----	----	----	----	----	----	----	----	----	----	----
EP074B: Oxygenated Compounds												
Vinyl Acetate	----	----	----	----	----	----	----	----	----	----	----	----
2-Butanone (MEK)	----	----	----	----	----	----	----	----	----	----	----	----
4-Methyl-2-pentanone (MIBK)	----	----	----	----	----	----	----	----	----	----	----	----
2-Hexanone (MBK)	----	----	----	----	----	----	----	----	----	----	----	----
EP074C: Sulfonated Compounds												
Carbon disulfide	----	----	----	----	----	----	----	----	----	----	----	----
EP074D: Fumigants												
2.2-Dichloropropane	----	----	----	----	----	----	----	----	----	----	----	----
1.2-Dichloropropane	----	----	----	----	----	----	----	----	----	----	----	----
cis-1.3-Dichloropropylene	----	----	----	----	----	----	----	----	----	----	----	----
trans-1.3-Dichloropropylene	----	----	----	----	----	----	----	----	----	----	----	----
1.2-Dibromoethane (EDB)	----	----	----	----	----	----	----	----	----	----	----	----
EP074E: Halogenated Aliphatic Compounds												
Dichlorodifluoromethane	----	----	----	----	----	----	----	----	----	----	----	----
Chloromethane	----	----	----	----	----	----	----	----	----	----	----	----
Vinyl chloride	----	----	----	----	----	----	----	----	----	----	----	----
Bromomethane	----	----	----	----	----	----	----	----	----	----	----	----
Chloroethane	----	----	----	----	----	----	----	----	----	----	----	----
Trichlorofluoromethane	----	----	----	----	----	----	----	----	----	----	----	----
1.1-Dichloroethene	----	----	----	----	----	----	----	----	----	----	----	----
Iodomethane	----	----	----	----	----	----	----	----	----	----	----	----
trans-1.2-Dichloroethene	----	----	----	----	----	----	----	----	----	----	----	----
1.1-Dichloroethane	----	----	----	----	----	----	----	----	----	----	----	----
cis-1.2-Dichloroethene	----	----	----	----	----	----	----	----	----	----	----	----
1.1.1-Trichloroethane	----	----	----	----	----	----	----	----	----	----	----	----
1.1-Dichloropropylene	----	----	----	----	----	----	----	----	----	----	----	----
Carbon Tetrachloride	----	----	----	----	----	----	----	----	----	----	----	----
1.2-Dichloroethane	----	----	----	----	----	----	----	----	----	----	----	----
Trichloroethene	----	----	----	----	----	----	----	----	----	----	----	----
Dibromomethane	----	----	----	----	----	----	----	----	----	----	----	----
1.1.2-Trichloroethane	----	----	----	----	----	----	----	----	----	----	----	----
1.3-Dichloropropane	----	----	----	----	----	----	----	----	----	----	----	----
Tetrachloroethene	----	----	----	----	----	----	----	----	----	----	----	----
1.1.1.2-Tetrachloroethane	----	----	----	----	----	----	----	----	----	----	----	----
trans-1.4-Dichloro-2-butene	----	----	----	----	----	----	----	----	----	----	----	----
cis-1.4-Dichloro-2-butene	----	----	----	----	----	----	----	----	----	----	----	----
1.1.2.2-Tetrachloroethane	----	----	----	----	----	----	----	----	----	----	----	----
1.2.3-Trichloropropane	----	----	----	----	----	----	----	----	----	----	----	----
Pentachloroethane	----	----	----	----	----	----	----	----	----	----	----	----
1.2-Dibromo-3-chloropropane	----	----	----	----	----	----	----	----	----	----	----	----
Hexachlorobutadiene	----	----	----	----	----	----	----	----	----	----	----	----
EP074F: Halogenated Aromatic Compounds												
Chlorobenzene	----	----	----	----	----	----	----	----	----	----	----	----
Bromobenzene	----	----	----	----	----	----	----	----	----	----	----	----
2-Chlorotoluene	----	----	----	----	----	----	----	----	----	----	----	----
4-Chlorotoluene	----	----	----	----	----	----	----	----	----	----	----	----
1.3-Dichlorobenzene	----	----	----	----	----	----	----	----	----	----	----	----
1.4-Dichlorobenzene	----	----	----	----	----	----	----	----	----	----	----	----
1.2-Dichlorobenzene	----	----	----	----	----	----	----	----	----	----	----	----
1.2.4-Trichlorobenzene	----	----	----	----	----	----	----	----	----	----	----	----
1.2.3-Trichlorobenzene	----	----	----	----	----	----	----	----	----	----	----	----
EP074G: Trihalomethanes												
Chloroform	----	----	----	----	----	----	----	----	----	----	----	----
Bromodichloromethane	----	----	----	----	----	----	----	----	----	----	----	----
Dibromochloromethane	----	----	----	----	----	----	----	----	----	----	----	----
Bromoform	----	----	----	----	----	----	----	----	----	----	----	----
EP074H: Naphthalene												
Naphthalene	----	----	----	----	----	----	----	----	----	----	----	----

Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ALS Sample number:	ES1610404001	ES1610406011	ES1610404002	ES1610404004	ES1610404005	ES1610406010	ES1610404006	ES1610404007	ES1610404008	ES1610404009	ES1610404010
Sample date:	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	10/05/2016	10/05/2016
Sample ID:	006_GW004_0.2	006_QC004	006_GW004_0.5	006_GW004_2.5	006_GW005_0.2	006_QC003	006_GW005_0.6	006_GW005_0.7	006_GW005_4.0	006_GW006_0.2	006_GW006_0.5
Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
Site:	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
Sampling Method:	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling	Drilling
Sample Description	CLAY; red and grey mottled, low plasticity, moist	Duplicate of 006_GW004_0.2	CLAY; red and grey mottled, low plasticity, moist	SANDSTONE; light grey/orange mottled	FILL; Clayey sand, black, fine to medium grained, moist	Duplicate of 006_GW005_0.2	FILL; Sandy clay with gravel, grey, low plasticity, wet (possible staining)	CLAY; red and grey mottled, wet	SANDSTONE	FILL; Clayey sand, light brown, moist	CLAY; brown with red (sandstone) mottling, low to medium plasticity, moist
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions											
C6 - C10 Fraction	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction (F3)	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction (F4)	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
EP080: BTEXN											
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
EP074A: Monocyclic Aromatic Hydrocarbons											
Styrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Isopropylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-Propylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.3.5-Trimethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
sec-Butylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2.4-Trimethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tert-Butylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
p-Isopropyltoluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-Butylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EP074B: Oxygenated Compounds											
Vinyl Acetate	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone (MIBK)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone (MBK)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
EP074C: Sulfonated Compounds											
Carbon disulfide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EP074D: Fumigants											
2.2-Dichloropropane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2-Dichloropropane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1.3-Dichloropropylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1.3-Dichloropropylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2-Dibromoethane (EDB)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EP074E: Halogenated Aliphatic Compounds											
Dichlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1.1-Dichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iodomethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1.2-Dichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.1-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1.2-Dichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.1.1-Trichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.1-Dichloropropylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.1.2-Trichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.3-Dichloropropane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.1.1.2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1.4-Dichloro-2-butene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1.4-Dichloro-2-butene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.1.2.2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2.3-Trichloropropane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2-Dibromo-3-chloropropane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobutadiene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EP074F: Halogenated Aromatic Compounds											
Chlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorotoluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chlorotoluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.3-Dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.4-Dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2-Dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2.4-Trichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1.2.3-Trichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EP074G: Trihalomethanes											
Chloroform	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EP074H: Naphthalene											
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Blank Cell indicates no criterion available
LOR = Limit of Reporting
National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).
CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011
[1] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.
[2] The most conservative ESL guideline value has been adopted for all analytes
[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.
[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.
NL = Non Limiting. No HSL is presented for these chemicals as 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.
Health Investigation Levels for chromium based on chromium (VI)
Chromium (III) EIL, based on a low clay content (% clay) of 1%
Site specific EILs for copper *in italics* are based on the average of soil pH, cation exchange capacity and organic content
Site specific EILs for nickel *in italics* are based on the average of soil cation exchange capacity
Site specific EILs for zinc *in italics* are based on the average of soil pH and cation exchange capacity
To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
To obtain F2 subtract naphthalene from the >C10-C16 fraction.
Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.
Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for commercial/industrial use
Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for commercial/industrial use
Concentration in **blue** font and grey box exceed the adopted management limits for commercial/industrial use
Concentration in **green** and grey box exceed the adopted HSL 'D' direct contact for commercial/industrial use
Concentration in **light blue** and grey box exceed the adopted HSL direct contact for Intrusive Maintenance Workers
Concentration in **pink** and grey box exceed the adopted HSL vapour intrusion for Intrusive Maintenance Workers
Concentrations in box exceed the screening value >2.5 times
Where one or more guideline value is exceeded, the highest guidline value will be highlighted
Concentrations below the LOR noted as <value
'Ch' Chrysotile (white asbestos)
'Am' Amosite (brown asbestos)
Cr' Crocidolite (blue asbestos)
NOC = No Observed Contamination

TABLE 4:
Risk to Construction Workers - Soil Sampling Results
Northcote Compound
Site 006

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial [3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]																
Sample Type:							SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ALS Sample number:							ES1609685010	ES1609685011	ES1609685012	ES1610122001	ES1610122002	ES1610122003	ES1610122004	ES1610122005	ES1610122006	ES1610122007	ES1610122008	ES1610122009	ES1610122010	ES1610122011	ES1610122012
Sample date:							04/05/2016	04/05/2016	04/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016
Sample ID:							006_TP004_0.20	006_TP004_0.40	006_TP004_1.00	006_GS001	006_GS002	006_GS003	006_GS004	006_GS005	006_GS006	006_GS007	006_GS008	006_GS009	006_GS010	006_GS011	006_QC022
Project Name:							M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:							Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
Site:							Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
Sampling Method:							Test Pitting	Test Pitting	Test Pitting	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands
Sample Description							FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	Silty Sand (FILL), brown	Silty Sand (FILL), brown	Silty Sand (FILL), brown	Duplicate of 006_GS008
Analyte grouping / Analyte					**Units**	**LOR**															
EA001: pH in soil using 0.01M CaCl extract																					
pH (CaCl2)					pH units	0.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
EA055: Moisture Content																					
Moisture Content (dried @ 103°C)					%		11.5	16	12.2	18	18.7	15.7	14.8	16.2	18.6	17.6	21.9	10.8	9.1	10.4	19.8
ED006: Exchangeable Cations on Alkaline Soils																					
Exchangeable Calcium					meq/100g	0.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Exchangeable Magnesium					meq/100g	0.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Exchangeable Potassium					meq/100g	0.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Exchangeable Sodium					meq/100g	0.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Cation Exchange Capacity					meq/100g	0.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil																					
Total Organic Carbon					%		----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples																					
Asbestos Detected					g/kg		----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Asbestos Type					--	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Sample weight (dry)					g		----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Description					--	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
APPROVED IDENTIFIER:					--	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																					
Asbestos Detected					g/kg		No	----	----	Yes	No	No	No	No	No	No	No	No	No	No	----
Asbestos Type					--	--	-	----	----	Ch	-	-	-	-	-	-	-	-	-	-	----
Sample weight (dry)					g		45.7	----	----	34.7	22.7	17.3	29.5	28.9	22.6	20.4	34.8	40.1	36.9	29.1	----
Description					--	--	Pale brown sandy soil.	----	----	Mid brown sandy soil with red rocks plus one small friable asbestos fibre bundle approx 3 x 1 x 1 mm	Mid brown sandy soil with red rocks.	Mid brown sandy soil with red rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Pale brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----
APPROVED IDENTIFIER:					--	--	G.MORGAN	----	----	C.OWLER	C.OWLER	C.OWLER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	C.OWLER	C.OWLER	----
EG005T: Total Metals by ICP-AES																					
Arsenic	**3000**				mg/kg	5	<5	<5	<5	<5	<5	<5	5	6	<5	<5	<5	<5	<5	<5	7
Cadmium	**900**				mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	**3600**				mg/kg	2	12	19	8	<2	<2	<2	7	8	6	4	6	5	8	8	11
Copper	**240000**				mg/kg	5	6	<5	<5	<5	<5	<5	8	12	10	<5	9	32	6	12	18
Iron					%	0.005	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Lead	**1500**				mg/kg	5	10	6	6	<5	<5	<5	26	26	18	8	23	43	15	27	36
Nickel	**6000**				mg/kg	2	2	<2	<2	<2	<2	<2	2	3	2	<2	2	4	2	4	3
Zinc	**400000**				mg/kg	5	14	<5	<5	53	55	42	59	117	62	46	80	398	77	30	126
EG035T: Total Recoverable Mercury by FIMS																					
Mercury	**730**				mg/kg	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
EP066: Polychlorinated Biphenyls (PCB)																					
Total Polychlorinated biphenyls	**7**				mg/kg	0.1	<0.1	----	----	----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)																					
alpha-BHC					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Hexachlorobenzene (HCB)	**80**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
beta-BHC					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
gamma-BHC					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
delta-BHC					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Heptachlor	**50**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Aldrin					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Heptachlor epoxide					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Total Chlordane (sum)	**530**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
trans-Chlordane					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
alpha-Endosulfan					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
cis-Chlordane					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Dieldrin					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
4.4`-DDE					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endrin	**100**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endosulfan (sum)	**2000**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
beta-Endosulfan					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
4.4`-DDD					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endrin aldehyde					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endosulfan sulfate					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
4.4`-DDT					mg/kg	0.2	<0.2	----	----	----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Endrin ketone					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Methoxychlor	**2500**				mg/kg	0.2	<0.2	----	----	----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Sum of DDD + DDE + DDT	**3600**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Sum of Aldrin + Dieldrin	**45**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)																					
Dichlorvos					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Demeton-S-methyl					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Monocrotophos					mg/kg	0.2	<0.2	----	----	----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Dimethoate					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Diazinon					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chlorpyrifos-methyl					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Parathion-methyl					mg/kg	0.2	<0.2	----	----	----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Malathion					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Fenthion					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chlorpyrifos	**2000**				mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Parathion					mg/kg	0.2	<0.2	----	----	----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Pirimphos-ethyl					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chlorfenvinphos					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Bromophos-ethyl					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Fenamiphos					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Prothiofos					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Ethion					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----

TABLE 4:
Risk to Construction Workers - Soil Sampling Results
Northcote Compound
Site 006

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial [3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					ALS Sample number:		ES1609685010	ES1609685011	ES1609685012	ES1610122001	ES1610122002	ES1610122003	ES1610122004	ES1610122005	ES1610122006	ES1610122007	ES1610122008	ES1610122009	ES1610122010	ES1610122011	ES1610122012
					Sample date:		04/05/2016	04/05/2016	04/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016
					Sample ID:		006_TP004_0.20	006_TP004_0.40	006_TP004_1.00	006_GS001	006_GS002	006_GS003	006_GS004	006_GS005	006_GS006	006_GS007	006_GS008	006_GS009	006_GS010	006_GS011	006_QC022
					Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
					Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
					Site:		Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
					Sampling Method:		Test Pitting	Test Pitting	Test Pitting	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands
					Sample Description		FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	Silty Sand (FILL), brown	Silty Sand (FILL), brown	Silty Sand (FILL), brown	Duplicate of 006_GS008
Analyte grouping / Analyte					**Units**	**LOR**															
Carbophenothion					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Azinphos Methyl					mg/kg	0.05	<0.05	----	----	----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
EP075(SIM)A: Phenolic Compounds																					
Phenol	**240000**				mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2-Chlorophenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2-Methylphenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
3- & 4-Methylphenol	**25000**				mg/kg	1	<1	----	----	----	----	<1	<1	----	<1	----	<1	----	<1	----	----
2-Nitrophenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4-Dimethylphenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4-Dichlorophenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.6-Dichlorophenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
4-Chloro-3-methylphenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4.6-Trichlorophenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4.5-Trichlorophenol					mg/kg	0.5	<0.5	----	----	----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
Pentachlorophenol	**660**				mg/kg	2	<2	----	----	----	----	<2	<2	----	<2	----	<2	----	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																					
Naphthalene			**11000**	**29000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	**4000**				mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)					mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	**40**				mg/kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons																					
C6 - C9 Fraction					mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	21	<10	35	<10	<10	<10	56
C10 - C14 Fraction					mg/kg	50	<50	<50	<50	250	250	310	<50	<50	<50	<50	60	<50	<50	<50	<50
C15 - C28 Fraction					mg/kg	100	<100	<100	<100	360	390	420	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction					mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)					mg/kg	50	<50	<50	<50	610	640	730	<50	<50	<50	<50	60	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																					
C6 - C10 Fraction		**700**	**26000**	**82000**	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	30	<10	49	<10	<10	<10	70
C6 - C10 Fraction minus BTEX (F1)					mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	30	<10	49	<10	<10	<10	70
>C10 - C16 Fraction		**1000**	**20000**	**62000**	mg/kg	50	<50	<50	<50	380	400	470	<50	<50	<50	<50	60	<50	<50	<50	<50
>C16 - C34 Fraction (F3)		**3500**	**27000**	**85000**	mg/kg	100	<100	<100	<100	280	300	320	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction (F4)		**10000**	**38000**	**120000**	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)					mg/kg	50	<50	<50	<50	660	700	790	<50	<50	<50	<50	60	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)					mg/kg	50	<50	<50	<50	380	400	470	<50	<50	<50	<50	60	<50	<50	<50	<50
EP080: BTEXN																					
Benzene			**430**	**1100**	mg/kg	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
Toluene			**99000**	**120000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene			**27000**	**85000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes			**81000**	**130000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX					mg/kg	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
Naphthalene			**11000**	**29000**	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
EP074A: Monocyclic Aromatic Hydrocarbons																					
Styrene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Isopropylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
n-Propylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.3.5-Trimethylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
sec-Butylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2.4-Trimethylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
tert-Butylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
p-Isopropyltoluene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
n-Butylbenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
EP074B: Oxygenated Compounds																					
Vinyl Acetate					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
2-Butanone (MEK)					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
4-Methyl-2-pentanone (MIBK)					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
2-Hexanone (MBK)					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
EP074C: Sulfonated Compounds																					
Carbon disulfide					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
EP074D: Fumigants																					
2.2-Dichloropropane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2-Dichloropropane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
cis-1.3-Dichloropropylene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
trans-1.3-Dichloropropylene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2-Dibromoethane (EDB)					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds																					
Dichlorodifluoromethane					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
Chloromethane					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
Vinyl chloride					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
Bromomethane					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
Chloroethane					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----

TABLE 4:
Risk to Construction Workers - Soil Sampling Results
Northcote Compound
Site 006

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial [3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					ALS Sample number:		ES1609685010	ES1609685011	ES1609685012	ES1610122001	ES1610122002	ES1610122003	ES1610122004	ES1610122005	ES1610122006	ES1610122007	ES1610122008	ES1610122009	ES1610122010	ES1610122011	ES1610122012
					Sample date:		04/05/2016	04/05/2016	04/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016
					Sample ID:		006_TP004_0.20	006_TP004_0.40	006_TP004_1.00	006_GS001	006_GS002	006_GS003	006_GS004	006_GS005	006_GS006	006_GS007	006_GS008	006_GS009	006_GS010	006_GS011	006_QC022
					Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
					Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
					Site:		Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
					Sampling Method:		Test Pitting	Test Pitting	Test Pitting	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands	Waste Class Backfill Sands
					Sample Description		FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), medium grained, slightly moist	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	orange/brown gravelly, sand clay (Fill), soft, high plasticity	Silty Sand (FILL), brown	Silty Sand (FILL), brown	Silty Sand (FILL), brown	Duplicate of 006_GS008
Analyte grouping / Analyte					**Units**	**LOR**															
Trichlorofluoromethane					mg/kg	5	----	----	----	----	----	----	----	----	----	----	<5	----	----	----	----
1.1-Dichloroethene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Iodomethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
trans-1.2-Dichloroethene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.1-Dichloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
cis-1.2-Dichloroethene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.1.1-Trichloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.1-Dichloropropylene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Carbon Tetrachloride					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2-Dichloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Trichloroethene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Dibromomethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.1.2-Trichloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.3-Dichloropropane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Tetrachloroethene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.1.1.2-Tetrachloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
trans-1.4-Dichloro-2-butene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
cis-1.4-Dichloro-2-butene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.1.2.2-Tetrachloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2.3-Trichloropropane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Pentachloroethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2-Dibromo-3-chloropropane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Hexachlorobutadiene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
EP074F: Halogenated Aromatic Compounds																					
Chlorobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Bromobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
2-Chlorotoluene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
4-Chlorotoluene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.3-Dichlorobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.4-Dichlorobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2-Dichlorobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2.4-Trichlorobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
1.2.3-Trichlorobenzene					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
EP074G: Trihalomethanes																					
Chloroform					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Bromodichloromethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Dibromochloromethane					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
Bromoform					mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	<0.5	----	----	----	----
EP074H: Naphthalene																					
Naphthalene			**11000**	**29000**	mg/kg	1	----	----	----	----	----	----	----	----	----	----	<1	----	----	----	----

Blank Cell indicates no criterion available

LOR = Limit of Reporting

CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'D' (Commercial/Industrial)

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

[1] (For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL value has been adopted for all analytes

[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.

Health Investigation Levels for chromium based on chromium (VI)

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Concentration in **red** font and grey box exceed the adopted health screening value

Concentration in **blue** font and grey box exceed the adopted management limits

Concentration in **green** and grey box exceed the direct contact for HSL D screening value

Concentration in **light blue** and grey box exceed the direct contact for workers screening value

concentrations in box exceed the screening value >2.5 times

Where there is one or more guideline value is exceeded, the highest guidleline value will be highlighted

Concentrations below the LOR noted as <value

'Ch' Chrysotile (white asbestos)

'Am' Amosite (brown asbestos)

Cr' Crocidolite (blue asbestos)

TABLE 5:
Groundwater Sampling Results
Northcote Compound
Site - 006

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]							
Sample Type:							Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
ALS Sample number:							ES1611420001	ES1611420002	ES1611420003	ES1611420007	S16-My28529 502339
Sample date:							24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016
Sample ID:							006_GW004	006_GW005	006_GW006	006_QC100	006_QC101
Project Name:							M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:							NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME
Site:							SITE 006	SITE 006	SITE 006	SITE 006	SITE 006
Sampling Method:							Bailer	Bailer	Bailer	Bailer	Bailer
Guidelines	2 to <4m	4m to<8m	8m+			**Sample Description**	moderately turbid, brown, no sheen, no odour, no PSH	slightly turbid, brown, no sheen, no odour, no PSH	slightly turbid, brown, no sheen, no odour, no PSH	DUPLICATE OF 006_GW005	TRIPLICATE OF 006_GW005
Analyte grouping / Analyte						**Units**	**LOR**					
EG020T: Dissolved Metals by ICP-MS											
Arsenic				***2.3***	**100**	µg/L	1	<1	<1	2	<1	<1
Cadmium				**0.7**	**20**	µg/L	0.1	<0.1	<0.1	**0.9**	<0.1	0.2
Chromium				**4.4**	**500**	µg/L	1	<1	<1	<1	<1	<1
Copper				**1.3**	**20000**	µg/L	1	**2**	<1	**6**	<1	1
Lead				**4.4**	**100**	µg/L	1	**14**	**32**	**65**	**33**	**30**
Nickel				**7**	**200**	µg/L	1	<1	<1	<1	<1	<1
Zinc				**15**		µg/L	1	**53**	**50**	**96**	**52**	**48**
EG035F: Dissolved Mercury by FIMS											
Mercury				**0.1**	**10**	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)											
Total Polychlorinated biphenyls						µg/L	1	<1	<1	<1	<1	----
EP068A: Organochlorine Pesticides (OC)											
alpha-BHC						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Hexachlorobenzene (HCB)						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
beta-BHC						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
gamma-BHC					**100**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
delta-BHC						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Heptachlor				***0.0004***	**3**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Aldrin				***0.003***		µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Heptachlor epoxide						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
trans-Chlordane						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
alpha-Endosulfan				***0.0002***		µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
cis-Chlordane						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Dieldrin				***0.01***		µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
4.4`-DDE				***0.0005***		µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Endrin				**0.008**		µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
beta-Endosulfan				***0.007***		µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
4.4`-DDD						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Endrin aldehyde						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Endosulfan sulfate						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
4.4`-DDT				***0.0004***	**90**	µg/L	2	**<2.0**	**<2.0**	**<2.0**	**<2.0**	----
Endrin ketone						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Methoxychlor				***0.004***	**3000**	µg/L	2	**<2.0**	**<2.0**	**<2.0**	**<2.0**	----
^ Total Chlordane (sum)				***0.001***	**20**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
^ Sum of DDD + DDE + DDT						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
^ Sum of Aldrin + Dieldrin					**3**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
EP068B: Organophosphorus Pesticides (OP)											
Dichlorvos					**50**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Demeton-S-methyl				***4***		µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Monocrotophos						µg/L	2	<2.0	<2.0	<2.0	<2.0	----
Dimethoate				***0.15***	**70**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Diazinon				***0.01***	**40**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Chlorpyrifos-methyl						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Parathion-methyl					**7**	µg/L	2	<2.0	<2.0	<2.0	<2.0	----
Malathion				***0.05***	**700**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Fenthion					**70**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Chlorpyrifos				**0.009**	**100**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Parathion				***0.004***	**200**	µg/L	2	**<2.0**	**<2.0**	**<2.0**	**<2.0**	----
Pirimphos-ethyl						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Chlorfenvinphos					**20**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Bromophos-ethyl						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Fenamiphos					**5**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Prothiofos						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Ethion					**40**	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Carbophenothion						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Azinphos Methyl				***0.01***	**300**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
VOCs											
Styrene						µg/L	5	<5	<5	<5	----	----
Isopropylbenzene						µg/L	5	<5	<5	<5	----	----
n-Propylbenzene						µg/L	5	<5	<5	<5	----	----
1.3.5-Trimethylbenzene						µg/L	5	<5	<5	<5	----	----
sec-Butylbenzene						µg/L	5	<5	<5	<5	----	----
1.2.4-Trimethylbenzene						µg/L	5	<5	<5	<5	----	----
tert-Butylbenzene						µg/L	5	<5	<5	<5	----	----
p-Isopropyltoluene						µg/L	5	<5	<5	<5	----	----
n-Butylbenzene						µg/L	5	<5	<5	<5	----	----
Vinyl Acetate						µg/L	50	<50	<50	<50	----	----
2-Butanone (MEK)						µg/L	50	<50	<50	<50	----	----
4-Methyl-2-pentanone (MIBK)						µg/L	50	<50	<50	<50	----	----
2-Hexanone (MBK)						µg/L	50	<50	<50	<50	----	----
Carbon disulfide						µg/L	5	<5	<5	<5	----	----
2.2-Dichloropropane						µg/L	5	<5	<5	<5	----	----
1.2-Dichloropropane						µg/L	5	<5	<5	<5	----	----
cis-1.3-Dichloropropylene						µg/L	5	<5	<5	<5	----	----
trans-1.3-Dichloropropylene						µg/L	5	<5	<5	<5	----	----
1.2-Dibromoethane (EDB)						µg/L	5	<5	<5	<5	----	----
Dichlorodifluoromethane						µg/L	50	<50	<50	<50	----	----
Chloromethane						µg/L	50	<50	<50	<50	----	----
Vinyl chloride					**3**	µg/L	50	**<50**	**<50**	**<50**	----	----
Bromomethane						µg/L	50	<50	<50	<50	----	----
Chloroethane						µg/L	50	<50	<50	<50	----	----
Trichlorofluoromethane						µg/L	50	<50	<50	<50	----	----
1.1-Dichloroethene					**300**	µg/L	5	<5	<5	<5	----	----
Iodomethane						µg/L	5	<5	<5	<5	----	----
trans-1.2-Dichloroethene						µg/L	5	<5	<5	<5	----	----
1.1-Dichloroethane						µg/L	5	<5	<5	<5	----	----
cis-1.2-Dichloroethene						µg/L	5	<5	<5	<5	----	----
1.1.1-Trichloroethane						µg/L	5	<5	<5	<5	----	----
1.1-Dichloropropylene						µg/L	5	<5	<5	<5	----	----
Carbon Tetrachloride						µg/L	5	<5	<5	<5	----	----
1.2-Dichloroethane					**30**	µg/L	5	<5	<5	<5	----	----
Trichloroethene						µg/L	5	<5	<5	<5	----	----
Dibromomethane						µg/L	5	<5	<5	<5	----	----
1.1.2-Trichloroethane				**1900**		µg/L	5	<5	<5	<5	----	----
1.3-Dichloropropane						µg/L	5	<5	<5	<5	----	----
Tetrachloroethene					**500**	µg/L	5	<5	<5	<5	----	----
1.1.1.2-Tetrachloroethane						µg/L	5	<5	<5	<5	----	----
trans-1.4-Dichloro-2-butene						µg/L	5	<5	<5	<5	----	----
cis-1.4-Dichloro-2-butene						µg/L	5	<5	<5	<5	----	----
1.1.2.2-Tetrachloroethane						µg/L	5	<5	<5	<5	----	----

TABLE 5:
Groundwater Sampling Results
Northcote Compound
Site - 006

RAMBOLL ENVIRON

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]							
Sample Type:							Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	
ALS Sample number:							ES1611420001	ES1611420002	ES1611420003	ES1611420007	S16-My28529 502339	
Sample date:							24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016	
Sample ID:							006_GW004	006_GW005	006_GW006	006_QC100	006_QC101	
Project Name:							M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	
Compound:							NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	
Site:							SITE 006	SITE 006	SITE 006	SITE 006	SITE 006	
Sampling Method:							Bailer	Bailer	Bailer	Bailer	Bailer	
Guidelines	**2 to <4m**	**4m to<8m**	**8m+**			**Sample Description**	moderately turbid, brown, no sheen, no odour, no PSH	slightly turbid, brown, no sheen, no odour, no PSH	slightly turbid, brown, no sheen, no odour, no PSH	DUPLICATE OF 006_GW005	TRIPLICATE OF 006_GW005	
Analyte grouping / Analyte						**Units**	**LOR**					
1.2.3-Trichloropropane						µg/L	5	<5	<5	<5	----	----
Pentachloroethane						µg/L	5	<5	<5	<5	----	----
1.2-Dibromo-3-chloropropane						µg/L	5	<5	<5	<5	----	----
Hexachlorobutadiene						µg/L	5	<5	<5	<5	----	----
Chlorobenzene				***55***	**3000**	µg/L	5	<5	<5	<5	----	----
Bromobenzene						µg/L	5	<5	<5	<5	----	----
2-Chlorotoluene						µg/L	5	<5	<5	<5	----	----
4-Chlorotoluene						µg/L	5	<5	<5	<5	----	----
1.3-Dichlorobenzene				***260***		µg/L	5	<5	<5	<5	----	----
1.4-Dichlorobenzene				***60***	**400**	µg/L	5	<5	<5	<5	----	----
1.2-Dichlorobenzene				***160***	**15000**	µg/L	5	<5	<5	<5	----	----
1.2.4-Trichlorobenzene				**20**	**300**	µg/L	5	<5	<5	<5	----	----
1.2.3-Trichlorobenzene				***3***	**300**	µg/L	5	**<5**	**<5**	**<5**	----	----
Chloroform						µg/L	5	<5	<5	<5	----	----
Bromodichloromethane						µg/L	5	<5	<5	<5	----	----
Dibromochloromethane						µg/L	5	<5	<5	<5	----	----
Bromoform						µg/L	5	<5	<5	<5	----	----
Naphthalene				**50**		µg/L	5	<5	<5	<5	----	----
EP075(SIM)A: Phenolic Compounds												
Phenol				**400**		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2-Methylphenol						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
3- & 4-Methylphenol						µg/L	2	<2.0	<2.0	<2.0	<2.0	----
2-Nitrophenol				***2***		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2.4-Dimethylphenol				***2***		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2.6-Dichlorophenol				***34***		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
4-Chloro-3-methylphenol						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0	<1.0	<1.0	<1.0	----
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Pentachlorophenol				**22**	**100**	µg/L	2	<2.0	<2.0	<2.0	<2.0	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene				**50**		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Acenaphthylene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Acenaphthene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Fluorene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Phenanthrene				***0.6***		µg/L	1	**<1.0**	**<1.0**	**<1.0**	**<1.0**	----
Anthracene				***0.01***		µg/L	1	**<1.0**	**<1.0**	**<1.0**	**<1.0**	----
Fluoranthene				***1***		µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Pyrene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Benz(a)anthracene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Chrysene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Benzo(b+j)fluoranthene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Benzo(k)fluoranthene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	----
Indeno(1.2.3.cd)pyrene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Dibenz(a.h)anthracene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Benzo(g.h.i)perylene						µg/L	1	<1.0	<1.0	<1.0	<1.0	----
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene TEQ (zero)						µg/L	0.5	<0.5	<0.5	<0.5	<0.5	----
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction						µg/L	20	<20	<20	<20	<20	20
C10 - C14 Fraction						µg/L	50	<50	<50	<50	<50	----
C15 - C28 Fraction						µg/L	100	<100	<100	<100	<100	----
C29 - C36 Fraction						µg/L	50	<50	<50	<50	<50	----
C10 - C36 Fraction (sum)						µg/L	50	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction						µg/L	20	<20	<20	<20	<20	----
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20	<20	<20	<20	<20	----
>C10 - C16 Fraction						µg/L	100	<100	<100	<100	<100	----
>C16 - C34 Fraction						µg/L	100	<100	<100	<100	<100	----
>C34 - C40 Fraction						µg/L	100	<100	<100	<100	<100	----
>C10 - C40 Fraction (sum)						µg/L	100	<100	<100	<100	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)	**NL**	**NL**	**NL**			µg/L	100	<100	<100	<100	<100	----
EP080: BTEXN												
Benzene	**4900**	**5100**	**5400**	**500**	**8000**	µg/L	1	<1	<1	<1	<1	<1
Toluene	**NL**	**NL**	**NL**	***180***	**3000**	µg/L	2	<2	<2	<2	<2	<1
Ethylbenzene	**NL**	**NL**	**NL**	**5**	**8000**	µg/L	2	<2	<2	<2	<2	<1
meta- & para-Xylene				***275***		µg/L	2	<2	<2	<2	<2	2
ortho-Xylene				***350***		µg/L	2	<2	<2	<2	<2	<1
Total Xylenes	**NL**	**NL**	**NL**		**6000**	µg/L	2	<2	<2	<2	<2	<3
Sum of BTEX						µg/L	1	<1	<1	<1	<1	----
Naphthalene	**NL**	**NL**	**NL**	**50**		µg/L	5	<5	<5	<5	<5	----

Blank Cell indicates no criterion available
All results are in µg/L unless stated
LOR = Limit of Reporting
[A] NEPM 2013 HSL 'D' (Commercial/Industrial)
[B] ANZECC 2000 % Protection Level for Receiving Water Type
[C] NHMRC Australian Drinking Water Guidelines, 2011
ANZECC guidelines in *italics* are low level reliability guidelines
ANZECC arsenic guideline based on As (III) for marine and As (V) for fresh, the lowest of presented guidelines.
NHMRC arsenic guidelines are based on total arsenic
ANZECC and NHMRC guidelines for chromium are based on Cr (VI)
ANZECC guidelines for mercury are based on inorganic mercury.
NHMRC guidelines for mercury are based on total mercury.
In instances where there was no marine guideline values, the freshwater guidelines have been adopted
In instances where there was no health drinking water guideline value, the aesthetic value has been adopted
Concentration in **red** font and grey box exceed the adopted ecosystem guideline value
Concentration in **orange** font and grey box exceed the adopted recreational drinking water guideline value
Concentrations in **blue** indicate the LOR is greater than the guideline value
Concentrations below the LOR noted as <value
no HSL is presented for recreational use (HSL C) as all these chemicals are not limiting (NL)

Table 5:
QA/QC Soil Sampling Results
Northcote Compound
Site 006

	Sample Type:		ALS	ALS		ALS	MGT		ALS	ALS		ALS	ALS		ALS	ALS		ALS	ALS	
	ALS Sample number:		ES1609685004	ES1609685013		ES1609685004	S16-My06722 499536		ES1609680002	ES1609680004		ES1609686002	ES1609686010		ES1610404001	ES1610406011		ES1610404005	ES1610406010	
	Sample date:		04/05/2016	04/05/2016		04/05/2016	04/05/2016		04/05/2016	04/05/2016		05/05/2016	05/05/2016		11/05/2016	11/05/2016		11/05/2016	11/05/2016	
	Sample ID:		006_TP002_0.10	006_QC001		006_TP002_0.10	006_QC002		026_TP001_0.50	026_QC001		028_TP001_0.50	028_QC001		006_GW004_0.2	006_QC004		006_GW005_0.2	006_QC003	
	Project Name:		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	
	Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD	Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD	Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD	Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD	Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD	Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD
	Site:		Site 006	Site 006		Site 006	Site 006		Site 026	Site 026		Site 028	Site 028		Site 006	Site 006		Site 006	Site 006	
	Sampling Method:		Test Pitting	Test Pitting		Test Pitting	Test Pitting		Test Pitting	Test Pitting		Test Pitting	Test Pitting		Drilling	Drilling		Drilling	Drilling	
	Sample Description		PRIMARY	Duplicate of 006_TP002_0.1		PRIMARY	Triplicate of 006_TP002_0.1		PRIMARY	Duplicate of 026_TP001_0.5		PRIMARY	Duplicate of 028_TP001_0.5		PRIMARY	Duplicate of 006_GW004_0.2		PRIMARY	Duplicate of 006_GW005_0.2	
Analyte grouping / Analyte	**Units**	**LOR**																		
EA055: Moisture Content																				
Moisture Content (dried @ 103°C)	%		13.3	13.9	*4.4*	13.3			12.7	11.8		15.3	12.8	*17.8*	10.8	11.3	*4.5*	27.4	17.6	
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																				
Asbestos Detected	g/kg		No	No	----	No	----	----	No	----	----	No	No	----	No	No	----	No	No	----
Asbestos Type	--		-	-	----	-	----	----	-	----	----	-		----	-		----	-		----
Sample weight (dry)	g		39.7	31.3	----	39.7	----	----	70	----	----	70.1	31.7	----	111	89.3	----	110	128	----
Description	--		Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	----	Mid brown sandy soil with grey rocks.	----	----	Mid brown clay soil with grey rocks.	----	----	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----	Mid brown clay soil.	Pale brown clay soil.	----	Mid brown sandy soil.	Mid grey - brown sandy soil with grey rocks.	----
APPROVED IDENTIFIER:	--		G.MORGAN	G.MORGAN	----	G.MORGAN	----	----	G.MORGAN	----	----	G.MORGAN	G.MORGAN	----	G.MORGAN	G.MORGAN	----	G.MORGAN	S.SPOONER	----
EG005T: Total Metals by ICP-AES																				
Arsenic	mg/kg	5	46	32	*35.9*	46	36	*24.4*	16	14	*13.3*	18	6	*100.0*	<5	<5	*nc*	<5	<5	*nc*
Cadmium	mg/kg	1	<1	<1	*nc*	<1	< 0.4	*nc*	1	1	*0.0*	1	<1	*nc*	<1	<1	*nc*	<1	<1	*nc*
Chromium	mg/kg	2	19	9	*71.4*	19	10	*62.1*	24	26	*8.0*	30	20	*40.0*	6	11	*58.8*	21	8	*89.7*
Copper	mg/kg	5	20	14	*35.3*	20	13	*42.4*	20	28	*33.3*	32	25	*24.6*	<5	<5	*nc*	12	16	*28.6*
Lead	mg/kg	5	39	47	*18.6*	39	42	*7.4*	75	82	*8.9*	158	128	*21.0*	6	6	*0.0*	21	31	*38.5*
Nickel	mg/kg	2	4	4	*0.0*	4	< 5	*nc*	2	5	*85.7*	9	3	*100.0*	<2	<2	*nc*	11	6	*58.8*
Zinc	mg/kg	5	228	52	*125.7*	228	64	*112.3*	215	229	*6.3*	322	200	*46.7*	<5	<5	*nc*	40	56	*33.3*
EG035T: Total Recoverable Mercury by FIMS																				
Mercury	mg/kg	0.1	<0.1	<0.1	*nc*	<0.1	< 0.05	*nc*	0.1	<0.1	*nc*	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*
EP066: Polychlorinated Biphenyls (PCB)																				
Total Polychlorinated biphenyls	mg/kg	0.1	<0.1	<0.1	*nc*	<0.1	< 0.5	*nc*	----	----	----	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*
EP068A: Organochlorine Pesticides (OC)																				
alpha-BHC	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Hexachlorobenzene (HCB)	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
beta-BHC	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
gamma-BHC	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
delta-BHC	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Heptachlor	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Aldrin	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Total Chlordane (sum)	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	< 0.1	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
trans-Chlordane	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	----	----	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
alpha-Endosulfan	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
cis-Chlordane	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	----	----	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Dieldrin	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
4.4´-DDE	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Endrin	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Endosulfan (sum)	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
beta-Endosulfan	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
4.4´-DDD	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	0.06	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Endrin aldehyde	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Endosulfan sulfate	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
4.4´-DDT	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	<0.05	*nc*	----	----	----	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Endrin ketone	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Methoxychlor	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	< 0.2	*nc*	----	----	----	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Sum of DDD + DDE + DDT	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	----	----	----	----	----	0.06	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Sum of Aldrin + Dieldrin	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	----	----	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
EP068B: Organophosphorus Pesticides (OP)																				
Dichlorvos	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Demeton-S-methyl	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Monocrotophos	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	<2	*nc*	----	----	----	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Dimethoate	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Diazinon	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Chlorpyrifos-methyl	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Parathion-methyl	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	----	----	----	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Malathion	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Fenthion	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Chlorpyrifos	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Parathion	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	----	----	----	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Pirimphos-ethyl	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Chlorfenvinphos	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Bromophos-ethyl	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Fenamiphos	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Prothiofos	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Ethion	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Carbophenothion	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
Azinphos Methyl	mg/kg	0.05	<0.05	<0.05	*nc*	<0.05	<0.2	*nc*	----	----	----	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*	<0.05	<0.05	*nc*
EP075(SIM)A: Phenolic Compounds																				
Phenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2-Chlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2-Methylphenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
3- & 4-Methylphenol	mg/kg	1	<1	<1	*nc*	<1	< 1	*nc*	----	----	----	<1	<1	*nc*	<1	<1	*nc*	<1	<1	*nc*
2-Nitrophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4-Dimethylphenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.6-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
4-Chloro-3-methylphenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4.6-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4.5-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Pentachlorophenol	mg/kg	2	<2	<2	*nc*	<2	< 1	*nc*	----	----	----	<2	<2	*nc*	<2	<2	*nc*	<2	<2	*nc*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																				
Naphthalene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Acenaphthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Fluorene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Phenanthrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Chrysene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.6	0.6	0.6	*0.0*	0.6	0.6	*0.0*	0.6	0.6	*0.0*	0.6	0.6	*0.0*	0.6	0.6	*0.0*	0.6	0.6	*0.0*
Benzo(a)pyrene TEQ (LOR)	mg/kg	1.2	1.2	1.2	*0.0*	1.2	1.2	*0.0*	1.2	1.2	*0.0*	1.2	1.2	*0.0*	1.2	1.2	*0.0*	1.2	1.2	*0.0*

Table 5:
QA/QC Soil Sampling Results
Northcote Compound
Site 006

	Sample Type:		ALS	ALS	RPD	ALS	MGT	RPD	ALS	ALS	RPD	ALS	ALS	RPD	ALS	ALS	RPD	ALS	ALS	RPD
	ALS Sample number:		ES1609685004	ES1609685013		ES1609685004	S16-My06722 499536		ES1609680002	ES1609680004		ES1609686002	ES1609686010		ES1610404001	ES1610406011		ES1610404005	ES1610406010	
	Sample date:		04/05/2016	04/05/2016		04/05/2016	04/05/2016		04/05/2016	04/05/2016		05/05/2016	05/05/2016		11/05/2016	11/05/2016		11/05/2016	11/05/2016	
	Sample ID:		006_TP002_0.10	006_QC001		006_TP002_0.10	006_QC002		026_TP001_0.50	026_QC001		028_TP001_0.50	028_QC001		006_GW004_0.2	006_QC004		006_GW005_0.2	006_QC003	
	Project Name:		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	
	Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site	
	Site:		Site 006	Site 006		Site 006	Site 006		Site 026	Site 026		Site 028	Site 028		Site 006	Site 006		Site 006	Site 006	
	Sampling Method:		Test Pitting	Test Pitting		Test Pitting	Test Pitting		Test Pitting	Test Pitting		Test Pitting	Test Pitting		Drilling	Drilling		Drilling	Drilling	
	Sample Description		PRIMARY	Duplicate of 006_TP002_0.1		PRIMARY	Triplicate of 006_TP002_0.1		PRIMARY	Duplicate of 026_TP001_0.5		PRIMARY	Duplicate of 028_TP001_0.5		PRIMARY	Duplicate of 006_GW004_0.2		PRIMARY	Duplicate of 006_GW005_0.2	
EP080/071: Total Petroleum Hydrocarbons																				
C6 - C9 Fraction	mg/kg	10	<10	<10	*nc*	<10	< 20	*nc*	<10	<10	*nc*	<10	<10	*nc*	<10	<10	*nc*	<10	<10	*nc*
C10 - C14 Fraction	mg/kg	50	<50	<50	*nc*	<50	< 20	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*
C15 - C28 Fraction	mg/kg	100	<100	<100	*nc*	<100	<50	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*
C29 - C36 Fraction	mg/kg	100	<100	<100	*nc*	<100	<50	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*
C10 - C36 Fraction (sum)	mg/kg	50	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																				
C6 - C10 Fraction	mg/kg	10	<10	<10	*nc*	<10	< 20	*nc*	<10	<10	*nc*	<10	<10	*nc*	<10	<10	*nc*	<10	<10	*nc*
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	*nc*	<10	< 20	*nc*	<10	<10	*nc*	<10	<10	*nc*	<10	<10	*nc*	<10	<10	*nc*
>C10 - C16 Fraction	mg/kg	50	<50	<50	*nc*	<50	< 50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*
>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	*nc*	<100	< 100	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*
>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	*nc*	<100	< 100	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*	<100	<100	*nc*
>C10 - C40 Fraction (sum)	mg/kg	50	<50	<50	*nc*	<50	----	----	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	*nc*	<50	< 50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*	<50	<50	*nc*
EP080: BTEXN																				
Benzene	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	< 0.1	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Toluene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.2	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Total Xylenes	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.3	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	----	----	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*
Naphthalene	mg/kg	1	<1	<1	*nc*	<1	<0.5	*nc*	<1	<1	*nc*	<1	<1	*nc*	<1	<1	*nc*	<1	<1	*nc*
EP074A: Monocyclic Aromatic Hydrocarbons																				
Styrene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Isopropylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
n-Propylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.3.5-Trimethylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
sec-Butylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2.4-Trimethylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
tert-Butylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
p-Isopropyltoluene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
n-Butylbenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074B: Oxygenated Compounds																				
Vinyl Acetate	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
2-Butanone (MEK)	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
4-Methyl-2-pentanone (MIBK)	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
2-Hexanone (MBK)	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
EP074C: Sulfonated Compounds																				
Carbon disulfide	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074D: Fumigants																				
2.2-Dichloropropane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dichloropropane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
cis-1.3-Dichloropropylene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
trans-1.3-Dichloropropylene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dibromoethane (EDB)	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074E: Halogenated Aliphatic Compounds																				
Dichlorodifluoromethane	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
Chloromethane	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
Vinyl chloride	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
Bromomethane	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
Chloroethane	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
Trichlorofluoromethane	mg/kg	5	----	----	----	----	----	----	----	----	----	----	----	----	<5	<5	*nc*	<5	<5	*nc*
1.1-Dichloroethene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Iodomethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
trans-1.2-Dichloroethene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1-Dichloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
cis-1.2-Dichloroethene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.1-Trichloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1-Dichloropropylene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Carbon Tetrachloride	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dichloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Trichloroethene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Dibromomethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.2-Trichloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.3-Dichloropropane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Tetrachloroethene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.1.2-Tetrachloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
trans-1.4-Dichloro-2-butene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
cis-1.4-Dichloro-2-butene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.2.2-Tetrachloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2.3-Trichloropropane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Pentachloroethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dibromo-3-chloropropane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Hexachlorobutadiene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074F: Halogenated Aromatic Compounds																				
Chlorobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Bromobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2-Chlorotoluene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
4-Chlorotoluene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.3-Dichlorobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.4-Dichlorobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dichlorobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2.4-Trichlorobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2.3-Trichlorobenzene	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074G: Trihalomethanes																				
Chloroform	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Bromodichloromethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Dibromochloromethane	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Bromoform	mg/kg	0.5	----	----	----	----	----	----	----	----	----	----	----	----	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074H: Naphthalene																				
Naphthalene	mg/kg	1	----	----	----	----	----	----	----	----	----	----	----	----	<1	<1	*nc*	<1	<1	*nc*

nc = not calculated since results < LOR

LOR = Laboratory Limit of Reporting

BOLD identifies where RPD results

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
Absolute Difference>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Table 6:
QA/QC Groundwater Sampling Results
Northcote Compound
Site 006

	Sample Type:		ALS	ALS		ALS	MGT		ALS	ALS	ALS
	ALS Sample number:		ES1611420002	ES1611420007		ES1611420002	S16-My28529 502339		ES1611420009	ES1611420010	ES1611421010
	Sample date:		24/05/2016	24/05/2016		24/05/2016	24/05/2016		23/05/2016	24/05/2016	24/05/2016
	Sample ID:		006_GW005	006_QC100		006_GW005	006_QC101		000_QA003	000_QA004	000_QA002
	Project Name:		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	M4E-WCX
	Compound:		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	RPD	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	RPD	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
	Site:		SITE 006	SITE 006		SITE 006	SITE 006		SITE 006 / 012/ 026/ 027	SITE 006 / 012/ 026/ 027	SITE 006 / 012/ 026/ 027
	Sampling Method:		Bailer	Bailer		Bailer	Bailer				
	Sample Description		PRIMARY	DUPLICATE OF 006_GW005		PRIMARY	TRIPLICATE OF 006_GW005		TRIP SPIKE	TRIP BLANK	TRIP BLANK
Analyte grouping/Analyte	**Units**	**LOR**									
EG020T: Dissolved Metals by ICP-MS											
Arsenic	µg/L	1	<1	<1	*nc*	<1	<1	*nc*	----	----	----
Cadmium	µg/L	0.1	<0.1	<0.1	*nc*	<0.1	0.2	*nc*	----	----	----
Chromium	µg/L	1	<1	<1	*nc*	<1	<1	*nc*	----	----	----
Copper	µg/L	1	<1	<1	*nc*	<1	1	*nc*	----	----	----
Nickel	µg/L	1	<1	<1	*nc*	<1	<1	*nc*	----	----	----
Lead	µg/L	1	32	33	*3.1*	32	30	*6.5*	----	----	----
Zinc	µg/L	1	50	52	*3.9*	50	48	*4.1*	----	----	----
EG035F: Dissolved Mercury by FIMS											
Mercury	µg/L	0.1	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*	----	----	----
EP066: Polychlorinated Biphenyls (PCB)											
Total Polychlorinated biphenyls	µg/L	1	<1	<1	*nc*	<1	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)											
alpha-BHC	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Hexachlorobenzene (HCB)	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
beta-BHC	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
gamma-BHC	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
delta-BHC	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Heptachlor	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Aldrin	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Heptachlor epoxide	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
trans-Chlordane	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
alpha-Endosulfan	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
cis-Chlordane	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Dieldrin	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
4.4`-DDE	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Endrin	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
beta-Endosulfan	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
4.4`-DDD	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Endrin aldehyde	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Endosulfan sulfate	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
4.4`-DDT	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Endrin ketone	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Methoxychlor	µg/L	2	2	2	*nc*	2	----	----	----	----	----
^ Total Chlordane (sum)	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
^ Sum of DDD + DDE + DDT	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)											
Dichlorvos	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Demeton-S-methyl	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Monocrotophos	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Dimethoate	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Diazinon	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Chlorpyrifos-methyl	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Parathion-methyl	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Malathion	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Fenthion	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Chlorpyrifos	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Parathion	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Pirimphos-ethyl	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Chlorfenvinphos	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Bromophos-ethyl	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Fenamiphos	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Prothiofos	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Ethion	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Carbophenothion	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Azinphos Methyl	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
VOCs											
Styrene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Isopropylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
n-Propylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.3.5-Trimethylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
sec-Butylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.4-Trimethylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
tert-Butylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
p-Isopropyltoluene	µg/L	5	<5	----	----	<5	----	----	----	----	----
n-Butylbenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Vinyl Acetate	µg/L	50	<50	----	----	<50	----	----	----	----	----
2-Butanone (MEK)	µg/L	50	<50	----	----	<50	----	----	----	----	----
4-Methyl-2-pentanone (MIBK)	µg/L	50	<50	----	----	<50	----	----	----	----	----
2-Hexanone (MBK)	µg/L	50	<50	----	----	<50	----	----	----	----	----
Carbon disulfide	µg/L	5	<5	----	----	<5	----	----	----	----	----
2.2-Dichloropropane	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dichloropropane	µg/L	5	<5	----	----	<5	----	----	----	----	----
cis-1.3-Dichloropropylene	µg/L	5	<5	----	----	<5	----	----	----	----	----
trans-1.3-Dichloropropylene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dibromoethane (EDB)	µg/L	5	<5	----	----	<5	----	----	----	----	----
Dichlorodifluoromethane	µg/L	50	<50	----	----	<50	----	----	----	----	----
Chloromethane	µg/L	50	<50	----	----	<50	----	----	----	----	----
Vinyl chloride	µg/L	50	<50	----	----	<50	----	----	----	----	----
Bromomethane	µg/L	50	<50	----	----	<50	----	----	----	----	----
Chloroethane	µg/L	50	<50	----	----	<50	----	----	----	----	----
Trichlorofluoromethane	µg/L	50	<50	----	----	<50	----	----	----	----	----
1.1-Dichloroethene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Iodomethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
trans-1.2-Dichloroethene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1-Dichloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
cis-1.2-Dichloroethene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.1-Trichloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1-Dichloropropylene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Carbon Tetrachloride	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dichloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
Trichloroethene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Dibromomethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.2-Trichloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.3-Dichloropropane	µg/L	5	<5	----	----	<5	----	----	----	----	----
Tetrachloroethene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.1.2-Tetrachloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
trans-1.4-Dichloro-2-butene	µg/L	5	<5	----	----	<5	----	----	----	----	----
cis-1.4-Dichloro-2-butene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.2.2-Tetrachloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.3-Trichloropropane	µg/L	5	<5	----	----	<5	----	----	----	----	----
Pentachloroethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dibromo-3-chloropropane	µg/L	5	<5	----	----	<5	----	----	----	----	----
Hexachlorobutadiene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Chlorobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Bromobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
2-Chlorotoluene	µg/L	5	<5	----	----	<5	----	----	----	----	----
4-Chlorotoluene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.3-Dichlorobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.4-Dichlorobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dichlorobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.4-Trichlorobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.3-Trichlorobenzene	µg/L	5	<5	----	----	<5	----	----	----	----	----
Chloroform	µg/L	5	<5	----	----	<5	----	----	----	----	----
Bromodichloromethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
Dibromochloromethane	µg/L	5	<5	----	----	<5	----	----	----	----	----
Bromoform	µg/L	5	<5	----	----	<5	----	----	----	----	----
Naphthalene	µg/L	5	<5	----	----	<5	----	----	----	----	----
EP075(SIM)A: Phenolic Compounds											
Phenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2-Chlorophenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2-Methylphenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
3- & 4-Methylphenol	µg/L	2	2	2	*0.0*	2	----	----	----	----	----
2-Nitrophenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2.4-Dimethylphenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2.4-Dichlorophenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2.6-Dichlorophenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
4-Chloro-3-methylphenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2.4.6-Trichlorophenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
2.4.5-Trichlorophenol	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Pentachlorophenol	µg/L	2	2	2	*0.0*	2	----	----	----	----	----

Table 6:
QA/QC Groundwater Sampling Results
Northcote Compound
Site 006

	Sample Type:		ALS	ALS	RPD	ALS	MGT	RPD	ALS	ALS	ALS
	ALS Sample number:		ES1611420002	ES1611420007		ES1611420002	S16-My28529 502339		ES1611420009	ES1611420010	ES1611421010
	Sample date:		24/05/2016	24/05/2016		24/05/2016	24/05/2016		23/05/2016	24/05/2016	24/05/2016
	Sample ID:		006_GW005	006_QC100		006_GW005	006_QC101		000_QA003	000_QA004	000_QA002
	Project Name:		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	M4E-WCX
	Compound:		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
	Site:		SITE 006	SITE 006		SITE 006	SITE 006		SITE 006 / 012/ 026/ 027	SITE 006 / 012/ 026/ 027	SITE 006 / 012/ 026/ 027
	Sampling Method:		Bailer	Bailer		Bailer	Bailer				
	Sample Description		PRIMARY	DUPLICATE OF 006_GW005		PRIMARY	TRIPLICATE OF 006_GW005		TRIP SPIKE	TRIP BLANK	TRIP BLANK
Analyte grouping / Analyte	**Units**	**LOR**									
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons											
Naphthalene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Acenaphthylene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Acenaphthene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Fluorene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Phenanthrene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Anthracene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Fluoranthene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Pyrene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benz(a)anthracene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Chrysene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(b+j)fluoranthene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(k)fluoranthene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(a)pyrene	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Dibenz(a.h)anthracene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(g.h.i)perylene	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	µg/L	20	20	20	*0.0*	20	20	*nc*	190	20	20
C10 - C14 Fraction	µg/L	50	<50	<50	*nc*	<50	----	----	----	<50	----
C15 - C28 Fraction	µg/L	100	<100	<100	*nc*	<100	----	----	----	<100	----
C29 - C36 Fraction	µg/L	50	<50	<50	*nc*	<50	----	----	----	<50	----
C10 - C36 Fraction (sum)	µg/L	50	<50	<50	*nc*	<50	----	----	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions											
C6 - C10 Fraction	µg/L	20	20	20	*0.0*	20	----	----	210	20	20
C6 - C10 Fraction minus BTEX (F1)	µg/L	20	20	20	*0.0*	20	----	----	130	20	20
>C10 - C16 Fraction	µg/L	100	<100	<100	*nc*	<100	----	----	----	<100	----
>C16 - C34 Fraction	µg/L	100	<100	<100	*nc*	<100	----	----	----	<100	----
>C34 - C40 Fraction	µg/L	100	----	<100	----	----	----	----	----	<100	----
>C10 - C40 Fraction (sum)	µg/L	100	----	<100	----	----	----	----	----	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	----	<100	----	----	----	----	----	<100	----
EP080: BTEXN											
Benzene	µg/L	1	----	<1	----	----	<1	----	15	<1	<1
Toluene	µg/L	2	----	2	----	----	<1	----	14	2	2
Ethylbenzene	µg/L	2	----	2	----	----	<1	----	16	2	2
meta- & para-Xylene	µg/L	2	----	2	----	----	2	----	16	2	2
ortho-Xylene	µg/L	2	----	2	----	----	<1	----	16	2	2
Total Xylenes	µg/L	2	----	2	----	----	<3	----	32	2	2
Sum of BTEX	µg/L	1	----	<1	----	----	----	----	77	<1	<1
Naphthalene	µg/L	5	----	<5	----	----	----	----	17	<5	<5

nc = not calculated since results < LOR
LOR = Laboratory Limit of Reporting
BOLD identifies where RPD results

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
Absolute Difference	>2.5 * PQL	where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Table 6-2 Soil Exceedances				
Sample Location and Depth	**Contaminant**	**Guideline Exceeded**	**Guideline Value**	**Concentration (mg/kg)**
012_GW001_0.5	Zinc	NEPM 2013 EIL D	300 mg/kg	420 mg/kg

012_GW001

Site 012

Site 028

Site Location Within Project Alignment

Legend

- Ramboll Environ Groundwater Well
- Ramboll Environ Test Pit
- Site Contamination Risk - Moderate

RAMBOLL

0 20

m

1 cm = 1 m

Phase 2 Environmental Site Assessment - Northcote Compound
Figure C-1 – Site 012 Investigation locations and soil exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

DRAFTED BY: TP	Date: 2/11/2016	A3

Nearmap Aerial Imagery 2015 (Nearmap, 2016) | Site Boundary is Approximate- Not Surveyed | PROJECT: AS-121919

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Table 6-3 Groundwater Exceedances				
Sample Location and Depth	**Contaminant**	**Guideline Exceeded**	**Guideline Value**	**Concentration (µg/l)**
012_GW001	Lead	95% Marine Water Protection for Aquatic Ecosystems	4.4 µg/l	84 µg/l
012_GW001	Zinc	95% Marine Water Protection for Aquatic Ecosystems	15 µg/l	554 µg/l

012_GW001

Site 012

Site 028

Site Location Within Project Alignment

Legend

- Ramboll Environ Groundwater Well
- Site Contamination Risk - Moderate

RAMBOLL

DRAFTED BY: TP	Date: 2/11/2016	A3

0 20

m

1 cm = 1 m

Phase 2 Environmental Site Assessment - Northcote Compound
Figure C-2 – Site 012 Groundwater exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

Nearmap Aerial Imagery 2015 (Nearmap, 2016) | Site Boundary is Approximate- Not Surveyed | PROJECT: AS-121919

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Table 1 - Groundwater Gauging Data

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 012

Well ID	Easting	Northing	Gauging Date	Total Well Depth	SWL	TOC Elevation	Groundwater Elevation
				(m btoc)	(m btoc)	(mAHD)	(mAHD)
012_GW001	327076.13	6249959.79	5/24/2016	9.49	4.59	15.05	10.46

Notes

m = Metres
btoc = Below Top of Casing
SWL = Standing Water Level
TOC = Top of Casing
AHD = Australian Height Datum
Easting projection MGA94: Map Grid of Australia 1994

Table 2 - Groundwater Gauging Data

Well ID	Purge Date	Purge Vol (L)	DO (ppm)	EC (mScm-¹)	pH	Eh (mV)	Temperature (°C)	Comments
012_GW001	24/05/2016	2.5	0.37	5.78	5.35	90	20.7	moderately turbid, no observed contamination

Notes

L = Litre

DO = Dissolved Oxygen

ppm = parts per million

EC = Electrical Conductivity

mScm-¹ = milliSiemens per centimetre

Eh = Redox

mV = milli Volts

TABLE 4:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 012

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial [3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]	Sample Type:		SOIL	SOIL
											ALS Sample number:		ES1610404013	ES1610404014
											Sample date:		10/05/2016	10/05/2016
											Sample ID:		012_GW001_0.2	012_GW001_0.5
											Project Name:		M4E-WCX	M4E-WCX
											Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site
											Site:		Site 012	Site 012
											Sampling Method:		Drilling	Drilling
											Sample Description		FILL; sandy clay, brown	CLAY, light brown/grey mottled, low plasticity, dry
Analyte grouping / Analyte												**Units**	**LOR**	
EA055: Moisture Content														
Moisture Content (dried @ 103°C)												%		15.7	12.7
EA200: AS 4964 - 2004 Identification of Asbestos in Soils														
Asbestos Detected												g/kg		No	No
Asbestos Type												--		-	-
Sample weight (dry)												g		209	173
Description												--		Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.
APPROVED IDENTIFIER:												--		S.SPOONER	S.SPOONER
EG005T: Total Metals by ICP-AES														
Arsenic	3000					160						mg/kg	5	14	21
Cadmium	900											mg/kg	1	<1	<1
Chromium	3600					310						mg/kg	2	29	32
Copper	240000					***150***						mg/kg	5	21	153
Lead	1500					1800						mg/kg	5	228	438
Nickel	6000					***60***						mg/kg	2	5	6
Zinc	400000					***300***						mg/kg	5	66	420
EG035T: Total Recoverable Mercury by FIMS														
Mercury	730											mg/kg	0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)														
Total Polychlorinated biphenyls	7											mg/kg	0.1	----	----
EP075(SIM)A: Phenolic Compounds														
Phenol	240000											mg/kg	0.5	<0.5	<0.5
2-Chlorophenol												mg/kg	0.5	<0.5	<0.5
2-Methylphenol												mg/kg	0.5	<0.5	<0.5
3- & 4-Methylphenol	25000											mg/kg	1	<1	<1
2-Nitrophenol												mg/kg	0.5	<0.5	<0.5
2.4-Dimethylphenol												mg/kg	0.5	<0.5	<0.5
2.4-Dichlorophenol												mg/kg	0.5	<0.5	<0.5
2.6-Dichlorophenol												mg/kg	0.5	<0.5	<0.5
4-Chloro-3-methylphenol												mg/kg	0.5	<0.5	<0.5
2.4.6-Trichlorophenol												mg/kg	0.5	<0.5	<0.5
2.4.5-Trichlorophenol												mg/kg	0.5	<0.5	<0.5
Pentachlorophenol	660											mg/kg	2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons														
Naphthalene		NL	NL	NL	NL	370			11000	29000		mg/kg	0.5	<0.5	<0.5
Acenaphthylene												mg/kg	0.5	<0.5	<0.5
Acenaphthene												mg/kg	0.5	<0.5	<0.5
Fluorene												mg/kg	0.5	<0.5	<0.5
Phenanthrene												mg/kg	0.5	<0.5	<0.5
Anthracene												mg/kg	0.5	<0.5	<0.5
Fluoranthene												mg/kg	0.5	<0.5	1.2
Pyrene												mg/kg	0.5	<0.5	1.4
Benz(a)anthracene												mg/kg	0.5	<0.5	0.8
Chrysene												mg/kg	0.5	<0.5	0.8
Benzo(b+j)fluoranthene												mg/kg	0.5	<0.5	1
Benzo(k)fluoranthene												mg/kg	0.5	<0.5	<0.5
Benzo(a)pyrene							72					mg/kg	0.5	<0.5	0.9
Indeno(1.2.3.cd)pyrene												mg/kg	0.5	<0.5	<0.5
Dibenz(a.h)anthracene												mg/kg	0.5	<0.5	<0.5
Benzo(g.h.i)perylene												mg/kg	0.5	<0.5	0.6
Sum of polycyclic aromatic hydrocarbons	4000											mg/kg	0.5	<0.5	6.7
Benzo(a)pyrene TEQ (zero)												mg/kg	0.5	<0.5	1.1
Benzo(a)pyrene TEQ (half LOR)												mg/kg	0.6	0.6	1.4
Benzo(a)pyrene TEQ (LOR)	40											mg/kg	1.2	1.2	1.7
EP080/071: Total Petroleum Hydrocarbons														
C6 - C9 Fraction												mg/kg	10	<10	<10
C10 - C14 Fraction												mg/kg	50	<50	<50
C15 - C28 Fraction												mg/kg	100	<100	<100
C29 - C36 Fraction												mg/kg	100	<100	<100
C10 - C36 Fraction (sum)												mg/kg	50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions														
C6 - C10 Fraction								700	26000	82000		mg/kg	10	<10	<10
C6 - C10 Fraction minus BTEX (F1)		260	370	630	NL		215					mg/kg	10	<10	<10
>C10 - C16 Fraction		NL	NL	NL	NL		170	1000	20000	62000		mg/kg	50	<50	<50
>C16 - C34 Fraction (F3)							1700	3500	27000	85000		mg/kg	100	<100	<100
>C34 - C40 Fraction (F4)							3300	10000	38000	120000		mg/kg	100	<100	<100
>C10 - C40 Fraction (sum)												mg/kg	50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)		NL	NL	NL	NL							mg/kg	50	<50	<50
EP080: BTEXN														
Benzene		3	NL	NL	NL		75		430	1100		mg/kg	0.2	<0.2	<0.2
Toluene		NL	NL	NL	NL		135		99000	120000		mg/kg	0.5	<0.5	<0.5
Ethylbenzene		NL	NL	NL	NL		165		27000	85000		mg/kg	0.5	<0.5	<0.5
meta- & para-Xylene							95					mg/kg	0.5	<0.5	<0.5
ortho-Xylene												mg/kg	0.5	<0.5	<0.5
Total Xylenes		230	NL	NL	NL				81000	130000		mg/kg	0.5	<0.5	<0.5
Sum of BTEX												mg/kg	0.2	<0.2	<0.2
Naphthalene		NL	NL	NL	NL	370			11000	29000		mg/kg	1	<1	<1
EP074A: Monocyclic Aromatic Hydrocarbons														
Styrene												mg/kg	0.5	<0.5	<0.5
Isopropylbenzene												mg/kg	0.5	<0.5	<0.5
n-Propylbenzene												mg/kg	0.5	<0.5	<0.5
1.3.5-Trimethylbenzene												mg/kg	0.5	<0.5	<0.5
sec-Butylbenzene												mg/kg	0.5	<0.5	<0.5
1.2.4-Trimethylbenzene												mg/kg	0.5	<0.5	<0.5
tert-Butylbenzene												mg/kg	0.5	<0.5	<0.5
p-Isopropyltoluene												mg/kg	0.5	<0.5	<0.5
n-Butylbenzene												mg/kg	0.5	<0.5	<0.5
EP074B: Oxygenated Compounds														
Vinyl Acetate												mg/kg	5	<5	<5
2-Butanone (MEK)												mg/kg	5	<5	<5
4-Methyl-2-pentanone (MIBK)												mg/kg	5	<5	<5
2-Hexanone (MBK)												mg/kg	5	<5	<5
EP074C: Sulfonated Compounds														
Carbon disulfide												mg/kg	0.5	<0.5	<0.5
EP074D: Fumigants														
2.2-Dichloropropane												mg/kg	0.5	<0.5	<0.5
1.2-Dichloropropane												mg/kg	0.5	<0.5	<0.5
cis-1.3-Dichloropropylene												mg/kg	0.5	<0.5	<0.5
trans-1.3-Dichloropropylene												mg/kg	0.5	<0.5	<0.5
1.2-Dibromoethane (EDB)												mg/kg	0.5	<0.5	<0.5
EP074E: Halogenated Aliphatic Compounds														
Dichlorodifluoromethane												mg/kg	5	<5	<5
Chloromethane												mg/kg	5	<5	<5
Vinyl chloride												mg/kg	5	<5	<5
Bromomethane												mg/kg	5	<5	<5
Chloroethane												mg/kg	5	<5	<5
Trichlorofluoromethane												mg/kg	5	<5	<5
1.1-Dichloroethene												mg/kg	0.5	<0.5	<0.5
Iodomethane												mg/kg	0.5	<0.5	<0.5
trans-1.2-Dichloroethene												mg/kg	0.5	<0.5	<0.5
1.1-Dichloroethane												mg/kg	0.5	<0.5	<0.5
cis-1.2-Dichloroethene												mg/kg	0.5	<0.5	<0.5
1.1.1-Trichloroethane												mg/kg	0.5	<0.5	<0.5
1.1-Dichloropropylene												mg/kg	0.5	<0.5	<0.5
Carbon Tetrachloride												mg/kg	0.5	<0.5	<0.5
1.2-Dichloroethane												mg/kg	0.5	<0.5	<0.5
Trichloroethene												mg/kg	0.5	<0.5	<0.5
Dibromomethane												mg/kg	0.5	<0.5	<0.5
1.1.2-Trichloroethane												mg/kg	0.5	<0.5	<0.5
1.3-Dichloropropane												mg/kg	0.5	<0.5	<0.5
Tetrachloroethene												mg/kg	0.5	<0.5	<0.5
1.1.1.2-Tetrachloroethane												mg/kg	0.5	<0.5	<0.5
trans-1.4-Dichloro-2-butene												mg/kg	0.5	<0.5	<0.5
cis-1.4-Dichloro-2-butene												mg/kg	0.5	<0.5	<0.5
1.1.2.2-Tetrachloroethane												mg/kg	0.5	<0.5	<0.5
1.2.3-Trichloropropane												mg/kg	0.5	<0.5	<0.5
Pentachloroethane												mg/kg	0.5	<0.5	<0.5

TABLE 4:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 012

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial [3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]	Sample Type:			SOIL	SOIL
											ALS Sample number:			ES1610404013	ES1610404014
											Sample date:			10/05/2016	10/05/2016
											Sample ID:			012_GW001_0.2	012_GW001_0.5
											Project Name:			M4E-WCX	M4E-WCX
											Compound:			Northcote Street Tunnel Site	Northcote Street Tunnel Site
											Site:			Site 012	Site 012
											Sampling Method:			Drilling	Drilling
											Sample Description			FILL; sandy clay, brown	CLAY, light brown/grey mottled, low plasticity, dry
Analyte grouping / Analyte												**Units**	**LOR**		
1.2-Dibromo-3-chloropropane												mg/kg	0.5	<0.5	<0.5
Hexachlorobutadiene												mg/kg	0.5	<0.5	<0.5
EP074F: Halogenated Aromatic Compounds															
Chlorobenzene												mg/kg	0.5	<0.5	<0.5
Bromobenzene												mg/kg	0.5	<0.5	<0.5
2-Chlorotoluene												mg/kg	0.5	<0.5	<0.5
4-Chlorotoluene												mg/kg	0.5	<0.5	<0.5
1.3-Dichlorobenzene												mg/kg	0.5	<0.5	<0.5
1.4-Dichlorobenzene												mg/kg	0.5	<0.5	<0.5
1.2-Dichlorobenzene												mg/kg	0.5	<0.5	<0.5
1.2.4-Trichlorobenzene												mg/kg	0.5	<0.5	<0.5
1.2.3-Trichlorobenzene												mg/kg	0.5	<0.5	<0.5
EP074G: Trihalomethanes															
Chloroform												mg/kg	0.5	<0.5	<0.5
Bromodichloromethane												mg/kg	0.5	<0.5	<0.5
Dibromochloromethane												mg/kg	0.5	<0.5	<0.5
Bromoform												mg/kg	0.5	<0.5	<0.5
EP074H: Naphthalene															
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**		mg/kg	1	<1	<1

Blank Cell indicates no criterion available

LOR = Limit of Reporting

CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'D' (Commercial/Industrial)

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

[1] (For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL value has been adopted for all analytes

[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Site specific EILs for copper *in italics* are based on the average of soil pH, cation exchange capacity and organic content

Site specific EILs for nickel *in italics* are based on the average of soil cation exchange capacity

Site specific EILs for zinc *in italics* are based on the average of soil pH and cation exchange capacity

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted health screening value

Concentration in **orange** font and grey box exceed the adopted ecological screening value

Concentration in **blue** font and grey box exceed the adopted management limits

Concentration in **green** and grey box exceed the direct contact for HSL D screening value

Concentration in **light blue** and grey box exceed the direct contact for workers screening value

concentrations in box exceed the screening value >2.5 times

Where there is one or more guideline value is exceeded, the highest guidleline value will be highlighted

Concentrations below the LOR noted as <value

'Ch' Chrysotile (white asbestos)

'Am' Amosite (brown asbestos)

Cr' Crocidolite (blue asbestos)

TABLE 5:
Groundwater Sampling Results
Northcote Compound
Site - 012

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]	Sample Type:	Groundwater
						ALS Sample number:	ES1611420006
						Sample date:	24/05/2016
						Sample ID:	012_GW001
						Project Name:	M4E-WCX
						Compound:	NORTHCOTE STREET TUNNEL SITE GME
						Site:	SITE 012
Guidelines	2 to <4m	4m to<8m	8m+			Sampling Method:	micro purge pump
						Sample Description	PRIMARY
Analyte grouping / Analyte						Units	LOR
EG020T: Dissolved Metals by ICP-MS							
Arsenic				***2.3***	**100**	µg/L	1	<1
Cadmium				**0.7**	**20**	µg/L	0.1	0.6
Chromium				**4.4**	**500**	µg/L	1	<1
Copper				**1.3**	**20000**	µg/L	1	<1
Nickel				**7**	**200**	µg/L	1	<1
Lead				**4.4**	**100**	µg/L	1	**84**
Zinc				**15**		µg/L	1	**554**
EG035F: Dissolved Mercury by FIMS							
Mercury				**0.1**	**10**	µg/L	0.1	<0.1
VOCs							
Styrene						µg/L	5	<5
Isopropylbenzene						µg/L	5	<5
n-Propylbenzene						µg/L	5	<5
1.3.5-Trimethylbenzene						µg/L	5	<5
sec-Butylbenzene						µg/L	5	<5
1.2.4-Trimethylbenzene						µg/L	5	<5
tert-Butylbenzene						µg/L	5	<5
p-Isopropyltoluene						µg/L	5	<5
n-Butylbenzene						µg/L	5	<5
Vinyl Acetate						µg/L	50	<50
2-Butanone (MEK)						µg/L	50	<50
4-Methyl-2-pentanone (MIBK)						µg/L	50	<50
2-Hexanone (MBK)						µg/L	50	<50
Carbon disulfide						µg/L	5	<5
2.2-Dichloropropane						µg/L	5	<5
1.2-Dichloropropane						µg/L	5	<5
cis-1.3-Dichloropropylene						µg/L	5	<5
trans-1.3-Dichloropropylene						µg/L	5	<5
1.2-Dibromoethane (EDB)						µg/L	5	<5
Dichlorodifluoromethane						µg/L	50	<50
Chloromethane						µg/L	50	<50
Vinyl chloride					**3**	µg/L	50	**<50**
Bromomethane						µg/L	50	<50
Chloroethane						µg/L	50	<50
Trichlorofluoromethane						µg/L	50	<50
1.1-Dichloroethene					**300**	µg/L	5	<5
Iodomethane						µg/L	5	<5
trans-1.2-Dichloroethene						µg/L	5	<5
1.1-Dichloroethane						µg/L	5	<5
cis-1.2-Dichloroethene						µg/L	5	<5
1.1.1-Trichloroethane						µg/L	5	<5
1.1-Dichloropropylene						µg/L	5	<5
Carbon Tetrachloride						µg/L	5	<5
1.2-Dichloroethane					**30**	µg/L	5	<5
Trichloroethene						µg/L	5	<5
Dibromomethane						µg/L	5	<5
1.1.2-Trichloroethane				**1900**		µg/L	5	<5
1.3-Dichloropropane						µg/L	5	<5
Tetrachloroethene					**500**	µg/L	5	<5
1.1.1.2-Tetrachloroethane						µg/L	5	<5
trans-1.4-Dichloro-2-butene						µg/L	5	<5
cis-1.4-Dichloro-2-butene						µg/L	5	<5
1.1.2.2-Tetrachloroethane						µg/L	5	<5
1.2.3-Trichloropropane						µg/L	5	<5
Pentachloroethane						µg/L	5	<5
1.2-Dibromo-3-chloropropane						µg/L	5	<5
Hexachlorobutadiene						µg/L	5	<5
Chlorobenzene				***55***	**3000**	µg/L	5	<5
Bromobenzene						µg/L	5	<5
2-Chlorotoluene						µg/L	5	<5
4-Chlorotoluene						µg/L	5	<5
1.3-Dichlorobenzene				***260***		µg/L	5	<5
1.4-Dichlorobenzene				***60***	**400**	µg/L	5	<5
1.2-Dichlorobenzene				***160***	**15000**	µg/L	5	<5
1.2.4-Trichlorobenzene				**20**	**300**	µg/L	5	<5
1.2.3-Trichlorobenzene				***3***	**300**	µg/L	5	**<5**
Chloroform						µg/L	5	<5
Bromodichloromethane						µg/L	5	<5
Dibromochloromethane						µg/L	5	<5
Bromoform						µg/L	5	<5
Naphthalene				**50**		µg/L	5	<5
EP075(SIM)A: Phenolic Compounds							
Phenol				**400**		µg/L	1	<1.0
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0
2-Methylphenol						µg/L	1	<1.0
3- & 4-Methylphenol						µg/L	2	<2.0
2-Nitrophenol				***2***		µg/L	1	<1.0
2.4-Dimethylphenol				***2***		µg/L	1	<1.0
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0
2.6-Dichlorophenol				***34***		µg/L	1	<1.0
4-Chloro-3-methylphenol						µg/L	1	<1.0
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0
Pentachlorophenol				**22**	**100**	µg/L	2	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Naphthalene				**50**		µg/L	1	<1.0
Acenaphthylene						µg/L	1	<1.0
Acenaphthene						µg/L	1	<1.0
Fluorene						µg/L	1	<1.0
Phenanthrene				***0.6***		µg/L	1	**<1.0**
Anthracene				***0.01***		µg/L	1	**<1.0**
Fluoranthene				***1***		µg/L	1	<1.0
Pyrene						µg/L	1	<1.0
Benz(a)anthracene						µg/L	1	<1.0
Chrysene						µg/L	1	<1.0
Benzo(b+j)fluoranthene						µg/L	1	<1.0
Benzo(k)fluoranthene						µg/L	1	<1.0
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5	**<0.5**
Indeno(1.2.3.cd)pyrene						µg/L	1	<1.0
Dibenz(a.h)anthracene						µg/L	1	<1.0
Benzo(g.h.i)perylene						µg/L	1	<1.0
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	<0.5
Benzo(a)pyrene TEQ (zero)						µg/L	0.5	<0.5

TABLE 5:
Groundwater Sampling Results
Northcote Compound
Site - 012

	HSL D – Commercial/ Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]	Sample Type:	Groundwater
						ALS Sample number:	ES1611420006
						Sample date:	24/05/2016
						Sample ID:	012_GW001
						Project Name:	M4E-WCX
						Compound:	NORTHCOTE STREET TUNNEL SITE GME
						Site:	SITE 012
Guidelines	2 to <4m	4m to<8m	8m+			Sampling Method:	micro purge pump
						Sample Description	PRIMARY
Analyte grouping/Analyte						**Units**	**LOR**	
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction						µg/L	20	<20
C10 - C14 Fraction						µg/L	50	<50
C15 - C28 Fraction						µg/L	100	<100
C29 - C36 Fraction						µg/L	50	<50
C10 - C36 Fraction (sum)						µg/L	50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction						µg/L	20	<20
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20	<20
>C10 - C16 Fraction						µg/L	100	<100
>C16 - C34 Fraction						µg/L	100	<100
>C34 - C40 Fraction						µg/L	100	<100
>C10 - C40 Fraction (sum)						µg/L	100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	**NL**	**NL**	**NL**			µg/L	100	<100
EP080: BTEXN								
Benzene	**4900**	**5100**	**5400**	**500**	**8000**	µg/L	1	<1
Toluene	**NL**	**NL**	**NL**	***180***	**3000**	µg/L	2	<2
Ethylbenzene	**NL**	**NL**	**NL**	**5**	**8000**	µg/L	2	<2
meta- & para-Xylene				***275***		µg/L	2	<2
ortho-Xylene				***350***		µg/L	2	<2
Total Xylenes	**NL**	**NL**	**NL**		**6000**	µg/L	2	<2
Sum of BTEX						µg/L	1	<1
Naphthalene	**NL**	**NL**	**NL**	**50**			5	<5

Blank Cell indicates no criterion available
All results are in µg/L unless stated
LOR = Limit of Reporting
[A] NEPM 2013 HSL 'D' (Commercial/Industrial)
[B] ANZECC 2000 % Protection Level for Receiving Water Type
[C] NHMRC Australian Drinking Water Guidelines, 2011
ANZECC guidelines in *italics* are low level reliability guidelines
ANZECC arsenic guideline based on As (III) for marine and As (V) for fresh, the lowest of presented guidelines.
NHMRC arsenic guidelines are based on total arsenic
ANZECC and NHMRC guidelines for chromium are based on Cr (VI)
ANZECC guidelines for mercury are based on inorganic mercury.
NHMRC guidelines for mercury are based on total mercury.
In instances where there was no marine guideline values, the freshwater guidelines have been adopted
In instances wehre there was no health drinking water guideline value, the aesthetic value has been adopted
Concentration in **red** font and grey box exceed the adopted ecosystem guideline value
Concentration in **orange** font and grey box exceed the adopted recreational drinking water guideline
Concentrations in **blue** indicate the LOR is greater than the guideline value
Concentrations below the LOR noted as <value
no HSL is presented for recreational use (HSL C) as all these chemicals are not limiting (NL)

Table 6:
QA / QC Groundwater Sampling Results
Northcote Compound
Site 012

	Sample Type:	ALS	ALS	ALS
	ALS Sample number:	ES1611420009	ES1611420010	ES1611421010
	Sample date:	23/05/2016	24/05/2016	24/05/2016
	Sample ID:	000_QA003	000_QA004	000_QA002
	Project Name:	M4E-WCX	M4E-WCX	M4E-WCX
	Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
	Site:	SITE 006/ 012 / 026 /027	SITE 006/ 012 / 026 /027	SITE 006/ 012 / 026 /027
	Sampling Method:	----	----	----
	Sample Description	TRIP SPIKE	TRIP BLANK	TRIP BLANK
Analyte grouping / Analyte	**Units**	**LOR**		
EP080 / 071: Total Petroleum Hydrocarbons				
C6 - C9 Fraction	µg/L	20	190	20	20
C10 - C14 Fraction	µg/L	50	----	<50	----
C15 - C28 Fraction	µg/L	100	----	<100	----
C29 - C36 Fraction	µg/L	50	----	<50	----
C10 - C36 Fraction (sum)	µg/L	50	----	<50	----
EP080 / 071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions				
C6 - C10 Fraction	µg/L	20	210	20	20
C6 - C10 Fraction minus BTEX (F1)	µg/L	20	130	20	20
>C10 - C16 Fraction	µg/L	100	----	<100	----
>C16 - C34 Fraction	µg/L	100	----	<100	----
>C34 - C40 Fraction	µg/L	100	----	<100	----
>C10 - C40 Fraction (sum)	µg/L	100	----	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	----	<100	----
EP080: BTEXN				
Benzene	µg/L	1	15	<1	<1
Toluene	µg/L	2	14	2	2
Ethylbenzene	µg/L	2	16	2	2
meta- & para-Xylene	µg/L	2	16	2	2
ortho-Xylene	µg/L	2	16	2	2
Total Xylenes	µg/L	2	32	2	2
Sum of BTEX	µg/L	1	77	<1	<1
Naphthalene	µg/L	5	17	<5	<5

nc = not calculated since results < LOR
LOR = Laboratory Limit of Reporting
BOLD identifies where RPD results

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performar

Table 6-2 Soil Exceedances				
Sample Location and Depth	**Contaminant**	**Guideline Exceeded**	**Guideline Value**	**Concentration (mg/kg)**
026_TP001_0.1	Nickel	NEPM 2013 EIL D	60 mg/kg	119 mg/kg

Table 6-3 Asbestos Results		
Asbestos Present	**Sample**	**Asbestos Type**
YES	026_GW001_0.5 (ACM)	1 piece of ACM - crocodolite and chrysotile

026_TP001

026_GW001

Site 026

Site 027

Site Location Within Project Alignment

Legend

- Ramboll Environ Groundwater Well
- Ramboll Environ Test Pit
- Site Contamination Risk - High
- Site Contamination Risk - Moderate

RAMBOLL

0 20

m

1 cm = 2 m

DRAFTED BY: TP | Date: 2/11/2016 | A3

Phase 2 Environmental Site Assessment - Northcote Compound
Figure D-1 – Site 026 Investigation locations and soil exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

Nearmap Aerial Imagery 2015 (Nearmap, 2016) | Site Boundary is Approximate- Not Surveyed | PROJECT: AS-121919

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Table 6-4 Groundwater Exceedances				
Sample Location and Depth	**Contaminant**	**Guideline Exceeded**	**Guideline Value**	**Concentration (µg/l)**
026_GW001	Copper	95% Marine Water Protection for Aquatic Ecosystems	1.3 µg/l	6 µg/l
026_GW001	Lead	95% Marine Water Protection for Aquatic Ecosystems	4.4 µg/l	51 µg/l
026_GW001	Zinc	95% Marine Water Protection for Aquatic Ecosystems	15 µg/l	153 µg/l

N

Site 026

026_GW001

Site 027

Site Location Within Project Alignment

Legend

- Ramboll Environ Groundwater Well
- Site Contamination Risk - High
- Site Contamination Risk - Moderate

RAMBOLL

0 20

m

1 cm = 2 m

Phase 2 Environmental Site Assessment - Northcote Compound
Figure D-2 – Site 026 Groundwater exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

DRAFTED BY: TP	Date: 2/11/2016	A3

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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RAMBOLL ENVIRON

Table 1 - Groundwater Gauging Data

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 026

Well ID	Easting	Northing	Gauging Date	Total Well Depth	SWL	TOC Elevation	Groundwater Elevation
				(m btoc)	(m btoc)	(mAHD)	(mAHD)
026_GW001	326968.70	6250035.60	24/05/2016	11.12	2.96	9.58	6.62

Notes

m = Metres
btoc = Below Top of Casing
SWL = Standing Water Level
TOC = Top of Casing
AHD = Australian Height Datum
Easting projection MGA94: Map Grid of Australia 1994

Table 2 - Groundwater Geochemical Parameters

Well ID	Purge Date	Purge Vol (L)	DO (ppm)	EC (µScm-¹)	pH	Eh (mV)	Temperature (°C)	Comments
026_GW001	24/05/2016	3.0	1.33	1710	5.03	167	22.8	clear, no sheen, no odour

Notes

L = Litre

DO = Dissolved Oxygen

ppm = parts per million

EC = Electrical Conductivity

µScm-¹ = microSiemens per centimetre

Eh = Redox

mV = milli Volts

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 026
21/02/18

TABLE 3:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 026

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial[2]	CRC CARE 2011 Direct Contact[3] HSL D	CRC CARE 2011 Direct Contact HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0.-<2m 4	Sample Typ							
												ALS Sample number:			ES1609680001	ES1609680002	ES1609680004	ES1609680003	ES1610406001	ES1610406002	ES1610406003
												Sample dat			04/05/2016	04/05/2016	04/05/2016	04/05/2016	11/05/2016	11/05/2016	11/05/2016
												Sample ID:			026_TP001_0.10	026_TP001_0.50	026_QC001	026_TP001_1.00	026_GW001_0.2	026_GW001_0.5	026_GW001_0.5
												Project Name:			M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:			Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:			Site 026	Site 026	Site 026	Site 026	Site 026	Site 026	Site 026
												Sampling Method:			Test Pitting	Test Pitting	Test Pitting	Test Pitting	Drilling	Drilling	Drilling
												Sample Description			FILL; Sandy silty gravel, dark grey/brown, gravel is basalt, moist, medium density, no observed contamination	FILL; Silty clay, possibly reworked natural, moist, grey/brown with orange and white pockets, sandstone, some charcoal inclusions, no observed contamination	Duplicate of 026_TP001_0.5	Silty CLAY; orange with red ironstone pockets, soft, moist, high plasticity, no observed contamination	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	One piece of bonded asbestos cement sheeting approximately 50 x 30 x 5mm
Analyte grouping / Analyte												**Units**	**LOR**								
EA001: pH in soil using 0.01M CaCl extract																					
pH (CaCl2)												%			----	----	----	----	----	----	----
EA055: Moisture Content																					
Moisture Content (dried @ 103°C)												%			6.4	12.7	11.8	22.3	14.2	15.9	
ED006: Exchangeable Cations on Alkaline Soils																					
Exchangeable Calcium															----	----	----	----	----	----	----
Exchangeable Magnesium															----	----	----	----	----	----	----
Exchangeable Potassium															----	----	----	----	----	----	----
Exchangeable Sodium															----	----	----	----	----	----	----
Cation Exchange Capacity															----	----	----	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil																					
Total Organic Carbon												%			----	----	----	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples																					
Asbestos Detected												g/kg			----	----	----	----	----	----	Yes
Asbestos Type												--			----	----	----	----	----	----	Ch + Cr
Sample weight (dry)												g			----	----	----	----	----	----	9.08
Description												--			----	----	----	----	----	----	One piece of bonded asbestos cement sheeting approximately 50 x 30 x 5mm
APPROVED IDENTIFIER:												--			----	----	----	----	----	----	N.WEBB
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																					
Asbestos Detected												g/kg			No	No	----	----	No	No	----
Asbestos Type												--			-	-	----	----	-	-	----
Sample weight (dry)												g			60.4	70	----	----	149	99.3	----
Description												--			Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----	----	Pale brown sandy soil.	Mid brown clay soil.	----
APPROVED IDENTIFIER:												--			G.MORGAN	G.MORGAN	----	----	G.MORGAN	G.MORGAN	----
EG005T: Total Metals by ICP-AES																					
Arsenic	**3000**					**160**						mg/kg	5		<5	16	14	11	<5	<5	----
Cadmium	**900**											mg/kg	1		1	1	1	1	<1	<1	----
Chromium	**3600**					**310**						mg/kg	2		12	24	26	42	9	6	----
Copper	**240000**					***150***						mg/kg	2		80	20	28	<5	13	<5	----
Lead	**1500**					**1800**						mg/kg	2		<5	75	82	18	9	6	----
Nickel	**6000**					***60***						mg/kg	2		119	2	5	2	45	<2	----
Zinc	**400000**					***300***						mg/kg	2		40	215	229	65	22	<5	----
EG035T: Total Recoverable Mercury by FIMS																					
Mercury	**730**											mg/kg	0.1		<0.1	0.1	<0.1	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																					
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	**NL**	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Acenaphthene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Fluorene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Phenanthrene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Anthracene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Fluoranthene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Pyrene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Chrysene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene												mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene							**72**					mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 026
21/02/18

TABLE 3:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 026

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial [3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m 4	Sample Typ		SOIL	SOIL	ALS	SOIL	SOIL	SOIL	SOIL
												ALS Sample number:		ES1609680001	ES1609680002	ES1609680004	ES1609680003	ES1610406001	ES1610406002	ES1610406003
												Sample dat		04/05/2016	04/05/2016	04/05/2016	04/05/2016	11/05/2016	11/05/2016	11/05/2016
												Sample ID:		026_TP001_0.10	026_TP001_0.50	026_QC001	026_TP001_1.00	026_GW001_0.2	026_GW001_0.5	026_GW001_0.5
												Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:		Site 026	Site 026	Site 026	Site 026	Site 026	Site 026	Site 026
												Sampling Method:		Test Pitting	Test Pitting	Test Pitting	Test Pitting	Drilling	Drilling	Drilling
												Sample Description		FILL; Sandy silty gravel, dark grey/brown, gravel is basalt, moist, medium density, no observed contamination	FILL; Silty clay, possibly reworked natural, moist, grey/brown with orange and white pockets, sandstone, some charcoal inclusions, no observed contamination	Duplicate of 026_TP001_0.5	Silty CLAY; orange with red ironstone pockets, soft, moist, high plasticity, no observed contamination	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	One piece of bonded asbestos cement sheeting approximately 50 x 30 x 5mm
Analyte grouping / Analyte												Units	LOR							
Indeno(1,2,3,cd)pyrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Dibenz(a,h)anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(g,h,i)perylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Sum of polycyclic aromatic hydrocarbons	4000											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene TEQ (zero)												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene TEQ (half LOR)												mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	----
Benzo(a)pyrene TEQ (LOR)	40											mg/kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	----
EP080/071: Total Petroleum Hydrocarbons																				
C6 - C9 Fraction												mg/kg	10	<10	<10	<10	<10	<10	<10	----
C10 - C14 Fraction												mg/kg	50	<50	<50	<50	<50	<50	<50	----
C15 - C28 Fraction												mg/kg	100	<100	<100	<100	<100	<100	<100	----
C29 - C36 Fraction												mg/kg	100	<100	<100	<100	<100	<100	<100	----
C10 - C36 Fraction (sum)												mg/kg	50	<50	<50	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																				
C6 - C10 Fraction								700	26000	82000	NL	mg/kg	10	<10	<10	<10	<10	<10	<10	----
C6 - C10 Fraction minus BTEX (F1)		260	370	630	NL		215					mg/kg	10	<10	<10	<10	<10	<10	<10	----
>C10 - C16 Fraction							170	1000	20000	62000	NL	mg/kg	50	<50	<50	<50	<50	<50	<50	----
>C16 - C34 Fraction (F3)							1700	3500	27000	85000		mg/kg	100	<100	<100	<100	<100	<100	<100	----
>C34 - C40 Fraction (F4)							3300	10000	38000	120000		mg/kg	100	<100	<100	<100	<100	<100	<100	----
>C10 - C40 Fraction (sum)												mg/kg	50	<50	<50	<50	<50	<50	<50	----
>C10 - C16 Fraction minus Naphthalene (F2)		NL	NL	NL	NL							mg/kg	50	<50	<50	<50	<50	<50	<50	----
EP080: BTEXN																				
Benzene		3	3	3	3		75		430	1100	77	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	----
Toluene		NL	NL	NL	NL		135		99000	120000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene		NL	NL	NL	NL		165		27000	85000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Total Xylenes		230	NL	NL	NL		95		81000	130000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----
Sum of BTEX												mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	----
Naphthalene		NL	NL	NL	NL	370			11000	29000	NL	mg/kg	1	<1	<1	<1	<1	<1	<1	----

Blank Cell indicates no criterion available

LOR = Limit of Reporting

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[1] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL guideline value has been adopted for all analytes

[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.

NL = Non Limiting. No HSL is presented for these chemicals as 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.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL based on a low clay content (% clay) of 1%

Site specific EILs for copper *in italics* are based on the average of soil pH, cation exchange capacity and organic content

Site specific EILs for nickel *in italics* are based on the average of soil cation exchange capacity

Site specific EILs for zinc *in italics* are based on the average of soil pH and cation exchange capacity

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for commercial/industrial use

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for commercial/industrial use

Concentration in **blue** font and grey box exceed the adopted management limits for commercial/industrial use

Concentration in **green** and grey box exceed the adopted HSL 'D' direct contact for commercial/industrial use

Concentration in **light blue** and grey box exceed the adopted HSL direct contact for Intrusive Maintenance Workers

Concentration in **pink** and grey box exceed the adopted HSL vapour intrusion for Intrusive Maintenance Workers

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guidleline value will be highlighted

Concentrations below the LOR noted as <value

'Ch' Chrysotile (white asbestos)

'Am' Amosite (brown asbestos)

Cr' Crocidolite (blue asbestos)

TABLE 4:
Groundwater Sampling Results
Northcote Compound
Site - 026

RAMBOLL ENVIRON

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]			
						Sample Type:		REG
						ALS Sample number:		ES1611420004
						Sample date:		24/05/2016
						Sample ID:		026_GW001
						Project Name:		M4E-WCX
						Compound:		NORTHCOTE STREET TUNNEL SITE GME
						Site:		Site 026
	2 to <4m	4m to<8m	8m+			**Sampling Method:**		low flow micro-purge
Guidelines						**Sample Description**		PRIMARY
Analyte grouping / Analyte						**Units**	**LOR**	
EG020T: Dissolved Metals by ICP-MS								
Arsenic				***2.3***	**100**	µg/L	1	1
Cadmium				**0.7**	**20**	µg/L	0.1	0.3
Chromium				**4.4**	**500**	µg/L	1	<1
Copper				**1.3**	**20000**	µg/L	1	**6**
Nickel				**7**	**200**	µg/L	1	1
Lead				**4.4**	**100**	µg/L	1	**51**
Zinc				**15**		µg/L	1	**153**
EG035F: Dissolved Mercury by FIMS								
Mercury				**0.1**	**10**	µg/L	0.1	<0.1
VOCs								
Styrene						µg/L	5	<5
Isopropylbenzene						µg/L	5	<5
n-Propylbenzene						µg/L	5	<5
1.3.5-Trimethylbenzene						µg/L	5	<5
sec-Butylbenzene						µg/L	5	<5
1.2.4-Trimethylbenzene						µg/L	5	<5
tert-Butylbenzene						µg/L	5	<5
p-Isopropyltoluene						µg/L	5	<5
n-Butylbenzene						µg/L	5	<5
Vinyl Acetate						µg/L	50	<50
2-Butanone (MEK)						µg/L	50	<50
4-Methyl-2-pentanone (MIBK)						µg/L	50	<50
2-Hexanone (MBK)						µg/L	50	<50
Carbon disulfide						µg/L	5	<5
2.2-Dichloropropane						µg/L	5	<5
1.2-Dichloropropane						µg/L	5	<5
cis-1.3-Dichloropropylene						µg/L	5	<5
trans-1.3-Dichloropropylene						µg/L	5	<5
1.2-Dibromoethane (EDB)						µg/L	5	<5
Dichlorodifluoromethane						µg/L	50	<50
Chloromethane						µg/L	50	<50
Vinyl chloride					**3**	µg/L	50	**<50**
Bromomethane						µg/L	50	<50
Chloroethane						µg/L	50	<50
Trichlorofluoromethane						µg/L	50	<50
1.1-Dichloroethene					**300**	µg/L	5	<5
Iodomethane						µg/L	5	<5
trans-1.2-Dichloroethene						µg/L	5	<5
1.1-Dichloroethane						µg/L	5	<5
cis-1.2-Dichloroethene						µg/L	5	<5
1.1.1-Trichloroethane						µg/L	5	<5
1.1-Dichloropropylene						µg/L	5	<5
Carbon Tetrachloride						µg/L	5	<5
1.2-Dichloroethane					**30**	µg/L	5	<5
Trichloroethene						µg/L	5	<5
Dibromomethane						µg/L	5	<5
1.1.2-Trichloroethane				**1900**		µg/L	5	<5
1.3-Dichloropropane						µg/L	5	<5
Tetrachloroethene					**500**	µg/L	5	<5
1.1.1.2-Tetrachloroethane						µg/L	5	<5
trans-1.4-Dichloro-2-butene						µg/L	5	<5
cis-1.4-Dichloro-2-butene						µg/L	5	<5
1.1.2.2-Tetrachloroethane						µg/L	5	<5
1.2.3-Trichloropropane						µg/L	5	<5
Pentachloroethane						µg/L	5	<5
1.2-Dibromo-3-chloropropane						µg/L	5	<5
Hexachlorobutadiene						µg/L	5	<5
Chlorobenzene				***55***	**3000**	µg/L	5	<5
Bromobenzene						µg/L	5	<5
2-Chlorotoluene						µg/L	5	<5
4-Chlorotoluene						µg/L	5	<5
1.3-Dichlorobenzene				***260***		µg/L	5	<5
1.4-Dichlorobenzene				***60***	**400**	µg/L	5	<5
1.2-Dichlorobenzene				***160***	**15000**	µg/L	5	<5
1.2.4-Trichlorobenzene				**20**	**300**	µg/L	5	<5
1.2.3-Trichlorobenzene				***3***	**300**	µg/L	5	**<5**
Chloroform						µg/L	5	<5
Bromodichloromethane						µg/L	5	<5
Dibromochloromethane						µg/L	5	<5
Bromoform						µg/L	5	<5
Naphthalene				**50**		µg/L	5	<5
EP075(SIM)A: Phenolic Compounds								
Phenol				**400**		µg/L	1	<1.0
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0
2-Methylphenol						µg/L	1	<1.0

TABLE 4:
Groundwater Sampling Results
Northcote Compound
Site - 026

RAMBOLL ENVIRON

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]		
						Sample Type:	REG
						ALS Sample number:	ES1611420004
						Sample date:	24/05/2016
						Sample ID:	026_GW001
						Project Name:	M4E-WCX
						Compound:	NORTHCOTE STREET TUNNEL SITE GME
						Site:	Site 026
	2 to <4m	4m to<8m	8m+			**Sampling Method:**	low flow micro-purge
Guidelines						**Sample Description**	PRIMARY

Analyte grouping / Analyte						Units	LOR	
3- & 4-Methylphenol						µg/L	2	<2.0
2-Nitrophenol				***2***		µg/L	1	<1.0
2.4-Dimethylphenol				***2***		µg/L	1	<1.0
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0
2.6-Dichlorophenol				***34***		µg/L	1	<1.0
4-Chloro-3-methylphenol						µg/L	1	<1.0
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0
Pentachlorophenol				**22**	**100**	µg/L	2	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene				**50**		µg/L	1	<1.0
Acenaphthylene						µg/L	1	<1.0
Acenaphthene						µg/L	1	<1.0
Fluorene						µg/L	1	<1.0
Phenanthrene				***0.6***		µg/L	1	**<1.0**
Anthracene				***0.01***		µg/L	1	**<1.0**
Fluoranthene				***1***		µg/L	1	<1.0
Pyrene						µg/L	1	<1.0
Benz(a)anthracene						µg/L	1	<1.0
Chrysene						µg/L	1	<1.0
Benzo(b+j)fluoranthene						µg/L	1	<1.0
Benzo(k)fluoranthene						µg/L	1	<1.0
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5	**<0.5**
Indeno(1.2.3.cd)pyrene						µg/L	1	<1.0
Dibenz(a.h)anthracene						µg/L	1	<1.0
Benzo(g.h.i)perylene						µg/L	1	<1.0
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	<0.5
Benzo(a)pyrene TEQ (zero)						µg/L	0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction						µg/L	20	<20
C10 - C14 Fraction						µg/L	50	<50
C15 - C28 Fraction						µg/L	100	<100
C29 - C36 Fraction						µg/L	50	<50
C10 - C36 Fraction (sum)						µg/L	50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction						µg/L	20	<20
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20	<20
>C10 - C16 Fraction						µg/L	100	<100
>C16 - C34 Fraction						µg/L	100	<100
>C34 - C40 Fraction						µg/L	100	<100
>C10 - C40 Fraction (sum)						µg/L	100	<100
>C10 - C16 Fraction minus Naphthalene (F2	**NL**	**NL**	**NL**			µg/L	100	<100
EP080: BTEXN								
Benzene	**4900**	**5100**	**5400**	**500**	**8000**	µg/L	1	<1
Toluene	**NL**	**NL**	**NL**	***180***	**3000**	µg/L	2	<2
Ethylbenzene	**NL**	**NL**	**NL**	**5**	**8000**	µg/L	2	<2
meta- & para-Xylene				***275***		µg/L	2	<2
ortho-Xylene				***350***		µg/L	2	<2
Total Xylenes	**NL**	**NL**	**NL**		**6000**	µg/L	2	<2
Sum of BTEX						µg/L	1	<1
Naphthalene	**NL**	**NL**	**NL**	**50**		µg/L	5	<5

Blank Cell indicates no criterion available
All results are in µg/L unless stated
LOR = Limit of Reporting
[A] NEPM 2013 HSL 'D' (Commercial/Industrial)
[B] ANZECC 2000 % Protection Level for Receiving Water Type
[C] NHMRC Australian Drinking Water Guidelines, 2011
ANZECC guidelines in *italics* are low level reliability guidelines
ANZECC arsenic guideline based on As (III) for marine and As (V) for fresh, the lowest of presented guidelines.
NHMRC arsenic guidelines are based on total arsenic
ANZECC and NHMRC guidelines for chromium are based on Cr (VI)
ANZECC guidelines for mercury are based on inorganic mercury.
NHMRC guidelines for mercury are based on total mercury.
In instances where there was no marine guideline values, the freshwater guidelines have been adopted
In instances wehre there was no health drinking water guideline value, the aesthetic value has been adopted
Concentration in **red** font and grey box exceed the adopted ecosystem guideline value
Concentration in **orange** font and grey box exceed the adopted recreational drinking water guideline value
Concentrations in blue indicate the LOR is greater than the guideline value
Concentrations below the LOR noted as <value
no HSL is presented for recreational use (HSL C) as all these chemicals are not limiting (NL)

Table 5:
QA/QC Soil Sampling Results
Site 026
Northcote Compound

RAMBOLL ENVIRON

	Sample Type:	ALS	ALS	
	ALS Sample number:	ES1609680002	ES1609680004	
	Sample date:	04/05/2016	04/05/2016	
	Sample ID:	026_TP001_0.50	026_QC001	
	Project Name:	M4E-WCX	M4E-WCX	
	Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	RPD
	Site:	Site 026	Site 026	
	Sampling Method:	Test Pitting	Test Pitting	
	Sample Description	PRIMARY	Duplicate of 026_TP001_0.5	

Analyte grouping/Analyte	Units	LOR			
EA055: Moisture Content					
Moisture Content (dried @ 103°C)	%		12.7	11.8	
EA200: AS 4964 - 2004 Identification of Asbestos in Soils					
Asbestos Detected	g/kg		No	----	----
Asbestos Type	--		-	----	----
Sample weight (dry)	g		70	----	----
Description	--		Mid brown clay soil with grey rocks.	----	----
APPROVED IDENTIFIER:	--		G.MORGAN	----	----
EG005T: Total Metals by ICP-AES					
Arsenic	mg/kg	5	16	14	*13.3*
Cadmium	mg/kg	1	1	1	*0.0*
Chromium	mg/kg	2	24	26	*8.0*
Copper	mg/kg	5	20	28	*33.3*
Lead	mg/kg	5	75	82	*8.9*
Nickel	mg/kg	2	2	5	*85.7*
Zinc	mg/kg	5	215	229	*6.3*
EG035T: Total Recoverable Mercury by FIMS					
Mercury	mg/kg	0.1	0.1	<0.1	*nc*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons					
Naphthalene	mg/kg	0.5	<0.5	<0.5	*nc*
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	*nc*
Acenaphthene	mg/kg	0.5	<0.5	<0.5	*nc*
Fluorene	mg/kg	0.5	<0.5	<0.5	*nc*
Phenanthrene	mg/kg	0.5	<0.5	<0.5	*nc*
Anthracene	mg/kg	0.5	<0.5	<0.5	*nc*
Fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*
Pyrene	mg/kg	0.5	<0.5	<0.5	*nc*
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*
Chrysene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	*nc*
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.6	0.6	0.6	*0.0*
Benzo(a)pyrene TEQ (LOR)	mg/kg	1.2	1.2	1.2	*0.0*
EP080/071: Total Petroleum Hydrocarbons					
C6 - C9 Fraction	mg/kg	10	<10	<10	*nc*
C10 - C14 Fraction	mg/kg	50	<50	<50	*nc*
C15 - C28 Fraction	mg/kg	100	<100	<100	*nc*
C29 - C36 Fraction	mg/kg	100	<100	<100	*nc*
C10 - C36 Fraction (sum)	mg/kg	50	<50	<50	*nc*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
C6 - C10 Fraction	mg/kg	10	<10	<10	*nc*
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	*nc*
>C10 - C16 Fraction	mg/kg	50	<50	<50	*nc*
>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	*nc*
>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	*nc*
>C10 - C40 Fraction (sum)	mg/kg	50	<50	<50	*nc*
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	*nc*
EP080: BTEXN					
Benzene	mg/kg	0.2	<0.2	<0.2	*nc*
Toluene	mg/kg	0.5	<0.5	<0.5	*nc*
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*
Total Xylenes	mg/kg	0.5	<0.5	<0.5	*nc*
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	*nc*
Naphthalene	mg/kg	1	<1	<1	*nc*

nc = not calculated since results < LOR

LOR = Laboratory Limit of Reporting

BOLD identifies where RPD results

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Table 6:
QA / QC Groundwater Sampling Results
Site 026
Northcote Compound

	Sample Type:		**ALS**	**ALS**	**ALS**
	ALS Sample number:		ES1611420009	ES1611420010	ES1611421010
	Sample date:		23/05/2016	24/05/2016	24/05/2016
	Sample ID:		000_QA003	000_QA004	000_QA002
	Project Name:		M4E-WCX	M4E-WCX	M4E-WCX
	Compound:		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
	Site:		SITE 006 / 012 / 026 / 027	SITE 006 / 012 / 026 / 027	SITE 006 / 012 / 026 / 027
	Sampling Method:				
	Sample Description		TRIP SPIKE	TRIP BLANK	TRIP BLANK
Analyte grouping / Analyte	**Units**	**LOR**			
EP080 / 071: Total Petroleum Hydrocarbons					
C6 - C9 Fraction	µg/L	20	190	20	20
C10 - C14 Fraction	µg/L	50	----	<50	----
C15 - C28 Fraction	µg/L	100	----	<100	----
C29 - C36 Fraction	µg/L	50	----	<50	----
C10 - C36 Fraction (sum)	µg/L	50	----	<50	----
EP080 / 071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
C6 - C10 Fraction	µg/L	20	210	20	20
C6 - C10 Fraction minus BTEX (F1)	µg/L	20	130	20	20
>C10 - C16 Fraction	µg/L	100	----	<100	----
>C16 - C34 Fraction	µg/L	100	----	<100	----
>C34 - C40 Fraction	µg/L	100	----	<100	----
>C10 - C40 Fraction (sum)	µg/L	100	----	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	----	<100	----
EP080: BTEXN					
Benzene	µg/L	1	15	<1	<1
Toluene	µg/L	2	14	2	2
Ethylbenzene	µg/L	2	16	2	2
meta- & para-Xylene	µg/L	2	16	2	2
ortho-Xylene	µg/L	2	16	2	2
Total Xylenes	µg/L	2	32	2	2
Sum of BTEX	µg/L	1	77	<1	<1
Naphthalene	µg/L	5	17	<5	<5

nc = not calculated since results < LOR

LOR = Laboratory Limit of Reporting

BOLD identifies where RPD results

Intralaboratory	**Interlaboratory**	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to asse

Site 006

Site 026

Site 027

Site 505

UFP-031 - Asbestos pipe within subsurface at 0.5 m bgl

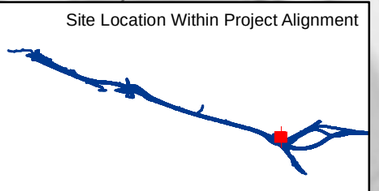
027_GW003

027_TP001

027_TP002

N

Site Location Within Project Alignment



Legend

- Unidentified Finds
- Ramboll Environ Groundwater Well
- Ramboll Environ Test Pit
- Site Contamination Risk - High
- Site Contamination Risk - Moderate

RAMBOLL

0 20

m

1 cm = 2 m

Phase 2 Environmental Site Assessment - Northcote Compound
Figure E-1 – Site 027 Investigation locations and soil exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

DRAFTED BY: TP	Date: 2/11/2016	A3

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate- Not Surveyed	PROJECT: AS-121919

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Table 6-3 Groundwater Exceedances				
Sample Location and Depth	**Contaminant**	**Guideline Exceeded**	**Guideline Value**	**Concentration (µg/l)**
027_GW003	Copper	95% Marine Water Protection for Aquatic Ecosystems	1.3 µg/l	4 µg/l
027_GW003	Lead	95% Marine Water Protection for Aquatic Ecosystems	4.4 µg/l	52 µg/l
027_GW003	Zinc	95% Marine Water Protection for Aquatic Ecosystems	15 µg/l	118 µg/l

N

027_GW003

Site 027

Site 505

Site Location Within Project Alignment

Legend

- Ramboll Environ Groundwater Well
- Site Contamination Risk - High
- Site Contamination Risk - Moderate

RAMBOLL

0 20

m

1 cm = 2 m

Phase 2 Environmental Site Assessment - Northcote Compound
Figure E-2 – Site 027 Groundwater exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

DRAFTED BY: TP	Date: 2/11/2016	A3

Nearmap Aerial Imagery 2015 (Nearmap, 2016) | Site Boundary is Approximate- Not Surveyed | PROJECT: AS-121919

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Table 1 - Groundwater Gauging Data

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 027

Well ID	Easting	Northing	Gauging Date	Total Well Depth	SWL	TOC Elevation	Groundwater Elevation
				(m btoc)	(m btoc)	(mAHD)	(mAHD)
027_GW003	--	--	5/24/2016	10.67	2.825	--	--

Notes

m = Metres
btoc = Below Top of Casing
SWL = Standing Water Level
TOC = Top of Casing
AHD = Australian Height Datum
Easting projection MGA94: Map Grid of Australia 1994

Table 2 - Groundwater Geochemical Data

Well ID	Purge Date	Purge Vol (L)	DO (ppm)	EC (µScm-¹)	pH	Eh (mV)	Temperature (°C)	Comments
027_GW003	5/24/2016	3.0	0.75	1874	5.12	157	23.7	slightly turbid, no odour, sheen or PSH

Notes

L = Litre

DO = Dissolved Oxygen

ppm = parts per million

EC = Electrical Conductivity

µScm-¹ = microSiemens per centimetre

Eh = Redox

mV = milli Volts

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 027
21/02/18

TABLE 3:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 027

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand^a 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand^a 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand^a 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand^a 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL^b Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial^c	CRC CARE 2011 Direct Contact^a HSL D	CRC CARE 2011 Direct Contact^a HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m^a	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	ALS	MQT
												ALS Sample number:		ES1610406005	ES1610406006	ES1610406007	ES1609682001	ES1609682002	ES1609682003	ES1609682004	ES1609682005	ES1609682006	ES1610406012	S16-My15974 500732
												Sample date:		12/05/2016	12/05/2016	12/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	12/05/2016	12/05/2016
												Sample ID:		027_GW003_0.2	027_GW003_0.5	027_GW003_1.0	027_TP001_0.20	027_TP001_0.50	027_TP001_0.80	027_TP002_0.15	027_TP002_0.25	027_TP002_1.30	027 QC001	027 QC002
												Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:		Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027
												Sampling Method:		Drilling	Drilling	Drilling	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Drilling	Drilling
												Sample Description		Sandy CLAY, dark brown, low plasticity, wet	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	FILL: Clayey silt, grey with some dark grey pockets, pieces of bricks, medium-plasticity, moist, moderately stiff, perhaps very slight hydrocarbon odour, no ACM observed	FILL: Clayey silt, grey with some dark grey pockets, pieces of bricks, possibly reworked natural, no anthropogenic inclusions, no observed contamination	Silty CLAY, orange/red, moisture growth, moist, medium-high plasticity, moist, no observed contamination	FILL: Builder's sand, cream, moist, uniform, medium-grained, no observed contamination	FILL: Clayey silt, grey/brown, moist-very moist, soft-moist, no anthropogenic inclusions	Silty CLAY, orange, moist-very moist, soft, moisture growth, no observed contamination	Duplicate of 027_GW003_0.2	Triplicate of 027_GW003_0.2
Analyte grouping / Analyte												**Units**	**LOR**											
EA001: pH in soil using 0.01M CaCl extract																								
pH (CaCl2)												%	--	----	----	----	----	----	----	----	----	----	----	----
EA055: Moisture Content																								
Moisture Content (dried @ 103°C)												%	--	14	15.9	18.1	13.5	12.4	16.3	----	15.9	18	13.2	
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																								
Asbestos Detected												g/kg	--	No	No	No	No	No	----	No	No	----	No	----
Asbestos Type												--	--	--	--	--	--	--	----	--	--	----	----	----
Sample weight (dry)												g	0.1	44.4	85.4	48.5	61.2	69.7	----	72.8	78	----	24.2	----
Description												--	--	Pale brown clay soil.	Pale orange – brown clay soil with grey rocks.	Pale red clay soil with grey rocks.	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----	Pale brown sandy soil.	Mid brown clay soil.	----	Mid brown clay soil with grey rocks.	----
APPROVED IDENTIFIER:												--	--	G.MORGAN	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN	----	G.MORGAN	G.MORGAN	----	G.MORGAN	----
EG005T: Total Metals by ICP-AES																								
Arsenic	3000					160						mg/kg	5	10	<5	8	9	7	5	----	12	14	8	9.5
Cadmium	900											mg/kg	1	<1	<1	<1	1	<1	<1	----	1	<1	<1	< 0.4
Chromium	3600					310						mg/kg	2	31	28	33	17	20	26	----	38	15	22	28
Copper	240000					150						mg/kg	5	6	<5	<5	28	8	<5	----	<5	<5	7	21
Lead	1500					1800						mg/kg	5	38	11	17	158	37	13	----	14	16	39	120
Nickel	6000					60						mg/kg	2	<2	<2	<2	6	3	<2	----	<2	<2	<2	< 5
Zinc	400000					300						mg/kg	5	31	<5	<5	239	42	<5	----	<5	<5	41	140
EG035T: Total Recoverable Mercury by FIMS																								
Mercury	730											mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	----	<0.1	<0.1	<0.1	0.06
EP066: Polychlorinated Biphenyls (PCB)																								
Total Polychlorinated biphenyls	7											mg/kg	0.1	----	----	----	<0.1	----	----	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)																								
alpha-BHC												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Hexachlorobenzene (HCB)	80											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
beta-BHC												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
gamma-BHC												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
delta-BHC												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Heptachlor	50											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Aldrin												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Heptachlor epoxide												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Total Chlordane (sum)	530											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
trans-Chlordane												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
alpha-Endosulfan												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
cis-Chlordane												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Dieldrin												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
4,4`-DDE												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Endrin	100											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Endosulfan (sum)	2000											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
beta-Endosulfan												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
4,4`-DDD												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Endrin aldehyde												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Endosulfan sulfate												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
4,4`-DDT						640						mg/kg	0.2	----	----	----	<0.2	----	----	----	----	----	----	----
Endrin ketone												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Methoxychlor	2500											mg/kg	0.2	----	----	----	<0.2	----	----	----	----	----	----	----
Sum of DDD + DDE + DDT	3600											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Sum of Aldrin + Dieldrin	45											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)																								
Dichlorvos												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Demeton-S-methyl												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Monocrotophos												mg/kg	0.2	----	----	----	<0.2	----	----	----	----	----	----	----
Dimethoate												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Diazinon												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Chlorpyrifos-methyl												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Parathion-methyl												mg/kg	0.2	----	----	----	<0.2	----	----	----	----	----	----	----
Malathion												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Fenthion												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Chlorpyrifos	2000											mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Parathion												mg/kg	0.2	----	----	----	<0.2	----	----	----	----	----	----	----
Pirimphos-ethyl												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Chlorfenvinphos												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Bromophos-ethyl												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Fenamiphos												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Prothiofos												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Ethion												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Carbophenothion												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
Azinphos Methyl												mg/kg	0.05	----	----	----	<0.05	----	----	----	----	----	----	----
EP075(SIM)A: Phenolic Compounds																								
Phenol	240000											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2-Chlorophenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2-Methylphenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
3- & 4-Methylphenol	25000											mg/kg	1	<1	<1	<1	<1	----	----	----	----	----	<1	< 1
2-Nitrophenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2,4-Dimethylphenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2,4-Dichlorophenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2,6-Dichlorophenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----
4-Chloro-3-methylphenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2,4,6-Trichlorophenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
2,4,5-Trichlorophenol												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	<0.5
Pentachlorophenol	660											mg/kg	2	<2	<2	<2	<2	----	----	----	----	----	<2	< 1

TABLE 3:
Commercial/Industrial D - Soil Sampling Results
Northcote Compound
Site 027

Analyte grouping/Analyte	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial [3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact[4] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[1]	Units	LOR	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	ALS	MGT
												ALS Sample number:		ES1610406005	ES1610406006	ES1610406007	ES1609682001	ES1609682002	ES1609682003	ES1609682004	ES1609682005	ES1609682006	ES1610406012	S16-My15974 500732
												Sample date:		12/05/2016	12/05/2016	12/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	12/05/2016	12/05/2016
												Sample ID:		027_GW003_0.2	027_GW003_0.5	027_GW003_1.0	027_TP001_0.20	027_TP001_0.50	027_TP001_0.80	027_TP002_0.15	027_TP002_0.25	027_TP002_1.30	027_QC001	027_QC002
												Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:		Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027
												Sampling Method:		Drilling	Drilling	Drilling	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Drilling	Drilling
												Sample Description		Sandy CLAY, dark brown, low plasticity, wet	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	FILL; Clayey silt, grey wtih some dark grey pockets, pieces of bricks, medium plasticity, moist, moderately stiff, perhaps very slight hydrocarbon odour, no ACM observed	FILL; Clayey silt, grey wtih some dark grey pockets, pieces of bricks, possibly reworked natural, no anthropogenic inclusions, no observed contamination	Silty CLAY; orange/red, ironstone gravels, moist, medium-high plasticity, moist, no observed contamination	FILL; Builder's sand, cream, moist, uniform, medium grained, no observed contamination	FILL; Clayey silt, grey/brown, moist-very moist, soft-moist, no anthropogenic inclusions	Silty CLAY; orange, moist-very moist, soft, ironstone gravels, no observed contamination	Duplicate of 027_GW003_0.2	Triplicate of 027_GW003_0.2
Analyte grouping/Analyte												**Units**	**LOR**											
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																								
Naphthalene		NL	NL	NL	NL	370			11000	29000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Acenaphthylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Acenaphthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Fluorene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Phenanthrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Fluoranthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Pyrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Chrysene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene							72					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	4000											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)												mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	----	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	40											mg/kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	----	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons																								
C6 - C9 Fraction												mg/kg	10	<10	<10	<10	<10	<10	<10	----	<10	<10	<10	< 20
C10 - C14 Fraction												mg/kg	50	<50	<50	<50	<50	<50	<50	----	<50	<50	<50	< 20
C15 - C28 Fraction												mg/kg	100	<100	<100	<100	<100	<100	<100	----	<100	<100	<100	<50
C29 - C36 Fraction												mg/kg	100	<100	<100	<100	140	<100	<100	----	<100	<100	<100	<50
C10 - C36 Fraction (sum)												mg/kg	50	<50	<50	<50	140	<50	<50	----	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																								
C6 - C10 Fraction								700	26000	82000	NL	mg/kg	10	<10	<10	<10	<10	<10	<10	----	<10	<10	<10	< 20
C6 - C10 Fraction minus BTEX (F1)		260	370	630	NL		215					mg/kg	10	<10	<10	<10	<10	<10	<10	----	<10	<10	<10	< 20
>C10 - C16 Fraction							170	1000	20000	62000	NL	mg/kg	50	<50	<50	<50	<50	<50	<50	----	<50	<50	<50	< 50
>C16 - C34 Fraction (F3)							1700	3500	27000	85000		mg/kg	100	<100	<100	<100	120	<100	<100	----	<100	<100	<100	< 100
>C34 - C40 Fraction (F4)							3300	10000	38000	120000		mg/kg	100	<100	<100	<100	180	<100	<100	----	<100	<100	<100	< 100
>C10 - C40 Fraction (sum)												mg/kg	50	<50	<50	<50	300	<50	<50	----	<50	<50	<50	----
>C10 - C16 Fraction minus Naphthalene (F2)		NL	NL	NL	NL							mg/kg	50	<50	<50	<50	<50	<50	<50	----	<50	<50	<50	< 50
EP080: BTEXN																								
Benzene		3	3	3	3		75		430	1100	77	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	----	<0.2	<0.2	<0.2	< 0.1
Toluene		NL	NL	NL	NL		135		99000	120000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	< 0.1
Ethylbenzene		NL	NL	NL	NL		165		27000	85000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	< 0.1
meta- & para-Xylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	<0.2
ortho-Xylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	< 0.1
Total Xylenes		230	NL	NL	NL		95		81000	130000	NL	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	----	<0.5	<0.5	<0.5	< 0.3
Sum of BTEX												mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	----	<0.2	<0.2	<0.2	----
Naphthalene		NL	NL	NL	NL	370			11000	29000	NL	mg/kg	1	<1	<1	<1	<1	<1	<1	----	<1	<1	<1	<0.5
EP074A: Monocyclic Aromatic Hydrocarbons																								
Styrene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Isopropylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
n-Propylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.3.5-Trimethylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
sec-Butylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.2.4-Trimethylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
tert-Butylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
p-Isopropyltoluene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
n-Butylbenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
EP074B: Oxygenated Compounds																								
Vinyl Acetate												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
2-Butanone (MEK)												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
4-Methyl-2-pentanone (MIBK)												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
2-Hexanone (MBK)												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
EP074C: Sulfonated Compounds																								
Carbon disulfide												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
EP074D: Fumigants																								
2.2-Dichloropropane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.2-Dichloropropane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
cis-1.3-Dichloropropylene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
trans-1.3-Dichloropropylene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.2-Dibromoethane (EDB)												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
EP074E: Halogenated Aliphatic Compounds																								
Dichlorodifluoromethane												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
Chloromethane												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
Vinyl chloride												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
Bromomethane												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
Chloroethane												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
Trichlorofluoromethane												mg/kg	5	<5	<5	<5	----	----	----	----	----	----	<5	<5
1.1-Dichloroethene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Iodomethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
trans-1.2-Dichloroethene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.1-Dichloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
cis-1.2-Dichloroethene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.1.1-Trichloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.1-Dichloropropylene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Carbon Tetrachloride												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.2-Dichloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Trichloroethene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Dibromomethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.1.2-Trichloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.3-Dichloropropane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Tetrachloroethene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.1.1.2-Tetrachloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
trans-1.4-Dichloro-2-butene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
cis-1.4-Dichloro-2-butene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.1.2.2-Tetrachloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.2.3-Trichloropropane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Pentachloroethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.2-Dibromo-3-chloropropane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Hexachlorobutadiene												mg/kg	0.5	<0.5	----	----	----	----	----	----	----	----	----	<0.5
EP074F: Halogenated Aromatic Compounds																								
Chlorobenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Bromobenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
2-Chlorotoluene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
4-Chlorotoluene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
1.3-Dichlorobenzene												mg/kg	0.5	<0.5	----	----	----	----	----	----	----	----	----	<0.5
1.4-Dichlorobenzene												mg/kg	0.5	<0.5	----	----	----	----	----	----	----	----	----	<0.5
1.2-Dichlorobenzene												mg/kg	0.5	<0.5	----	----	----	----	----	----	----	----	----	<0.5
1.2.4-Trichlorobenzene												mg/kg	0.5	<0.5	----	----	----	----	----	----	----	----	----	<0.5
1.2.3-Trichlorobenzene												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
EP074G: Trihalomethanes																								
Chloroform												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Bromodichloromethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Dibromochloromethane												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
Bromoform												mg/kg	0.5	<0.5	<0.5	<0.5	----	----	----	----	----	----	<0.5	<0.5
EP074H: Naphthalene																								
Naphthalene		NL	NL	NL	NL	370			11000	29000	NL	mg/kg	1	<1	----	----	----	----	----	----	----	----	----	<1
EP075B: Polynuclear Aromatic Hydrocarbons																								
2-Methylnaphthalene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
2-Chloronaphthalene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-2-Fluorenyl Acetamide												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
7.12-Dimethylbenz(a)anthracene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
3-Methylcholanthrene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
EP075C: Phthalate Esters																								
Dimethyl phthalate												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Diethyl phthalate												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Di-n-butyl phthalate												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Butyl benzyl phthalate												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
bis(2-ethylhexyl) phthalate												mg/kg	5	----	<5.0	<5.0	----	----	----	----	----	----	<5.0	----
Di-n-octylphthalate												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
EP075D: Nitrosamines																								
N-Nitrosomethylethylamine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-Nitrosodiethylamine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-Nitrosopyrrolidine												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----
N-Nitrosomorpholine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-Nitrosodi-n-propylamine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-Nitrosopiperidine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-Nitrosodibutylamine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
N-Nitrosodiphenyl & Diphenylamine												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----
Methapyrilene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
EP075E: Nitroaromatics and Ketones																								
2-Picoline												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Acetophenone												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Nitrobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Isophorone												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
2.6-Dinitrotoluene												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----
2.4-Dinitrotoluene												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----

TABLE 3:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 027

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[a] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[a] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[a] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[a] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[a] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial [b]	CRC CARE 2011 Direct Contact[a] HSL D	CRC CARE 2011 Direct Contact[a] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[a]	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	ALS	MQT
												ALS Sample number:	ES1610406005	ES1610406006	ES1610406007	ES1609682001	ES1609682002	ES1609682003	ES1609682004	ES1609682005	ES1609682006	ES1610406012	S16-My15974 500732
												Sample date:	12/05/2016	12/05/2016	12/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	12/05/2016	12/05/2016
												Sample ID:	027_GW003_0.2	027_GW003_0.5	027_GW003_1.0	027_TP001_0.20	027_TP001_0.50	027_TP001_0.80	027_TP002_0.15	027_TP002_0.25	027_TP002_1.30	027_QC001	027_QC002
												Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027
												Sampling Method:	Drilling	Drilling	Drilling	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Drilling	Drilling
												Sample Description	Sandy CLAY, dark brown, low plasticity, wet	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	FILL: Clayey silt, grey with some dark grey pockets, pieces of bricks, medium-plasticity, moist, moderately stiff, perhaps very slight hydrocarbon odour, no ACM observed	FILL: Clayey silt, grey with some dark grey pockets, pieces of bricks, possibly reworked natural, no anthropogenic inclusions, no observed contamination	Silty CLAY, orange/red, inorganic gravels, moist, medium-high plasticity, moist, no observed contamination	FILL: Builder's sand, cream, moist, uniform, medium-grained, no observed contamination	FILL: Clayey silt, grey/brown, moist-very moist, soft-moist, no anthropogenic inclusions	Silty CLAY, orange, moist-very moist, soft, nonstone gravels, no observed contamination	Duplicate of 027_GW003_0.2	Triplicate of 027_GW003_0.2
Analyte grouping / Analyte												**Units**	**LOR**										
1-Naphthylamine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
4-Nitroquinoline-N-oxide												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
5-Nitro-o-toluidine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Azobenzene												mg/kg	1	----	<1	<1	----	----	----	----	----	----	<1	----
1,3,5-Trinitrobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Phenacetin												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
4-Aminobiphenyl												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Pentachloronitrobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Pronamide												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Dimethylaminoazobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Chlorobenzilate												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----

TABLE 3:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 027

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[2] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[2] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[2] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[2] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial [3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact[4] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[2]	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	ALS	MQT
												ALS Sample number:		ES1610406005	ES1610406006	ES1610406007	ES1609682001	ES1609682002	ES1609682003	ES1609682004	ES1609682005	ES1609682006	ES1610406012	S16-My15974 500732
												Sample date:		12/05/2016	12/05/2016	12/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	12/05/2016	12/05/2016
												Sample ID:		027_GW003_0.2	027_GW003_0.5	027_GW003_1.0	027_TP001_0.20	027_TP001_0.50	027_TP001_0.80	027_TP002_0.15	027_TP002_0.25	027_TP002_1.30	027 QC001	027 QC002
												Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:		Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027
												Sampling Method:		Drilling	Drilling	Drilling	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Drilling	Drilling
												Sample Description		Sandy CLAY, dark brown, low plasticity, wet	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	FILL: Clayey silt, grey with some dark grey pockets, pieces of bricks, medium-plasticity, moist, moderately stiff, perhaps very slight hydrocarbon odour, no ACM observed	FILL: Clayey silt, grey with some dark grey pockets, pieces of bricks, possibly reworked natural, no anthropogenic inclusions, no observed contamination	Silty CLAY, orange/red, moisture growth, moist, medium-high plasticity, moist, no observed contamination	FILL: Builder's sand, cream, moist, uniform, medium-grained, no observed contamination	FILL: Clayey silt, grey/brown, moist-very moist, soft-moist, no anthropogenic inclusions	Silty CLAY, orange, moist-very moist, soft, nonodrous growth, no observed contamination	Duplicate of 027_GW003_0.2	Triplicate of 027_GW003_0.2
Analyte grouping / Analyte												**Units**	**LOR**											
EP075F: Haloethers																								
Bis(2-chloroethyl) ether												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Bis(2-chloroethoxy) methane												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
4-Chlorophenyl phenyl ether												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
4-Bromophenyl phenyl ether												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
EP075G: Chlorinated Hydrocarbons																								
1,3-Dichlorobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
1,4-Dichlorobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
1,2-Dichlorobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Hexachloroethane												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
1,2,4-Trichlorobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Hexachloropropylene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Hexachlorobutadiene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Hexachlorocyclopentadiene												mg/kg	2.5	----	<2.5	<2.5	----	----	----	----	----	----	<2.5	----
Pentachlorobenzene												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Hexachlorobenzene (HCB)												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----
EP075H: Anilines and Benzidines																								
Aniline												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
4-Chloroaniline												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
2-Nitroaniline												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----
3-Nitroaniline												mg/kg	1	----	<1.0	<1.0	----	----	----	----	----	----	<1.0	----
Dibenzofuran												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
4-Nitroaniline												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
Carbazole												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----
3,3`-Dichlorobenzidine												mg/kg	0.5	----	<0.5	<0.5	----	----	----	----	----	----	<0.5	----

Blank Cell indicates no criterion available
LOR = Limit of Reporting
National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).
CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[1] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL guideline value has been adopted for all analytes
[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.
[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.
NL = Non Limiting. No HSL is presented for these chemicals as 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.
Health Investigation Levels for chromium based on chromium (VI)
Chromium (III) EIL, based on a low clay content (% clay) of 1%
Site specific EILs for copper in *italics* are based on the average of soil pH, cation exchange capacity and organic content
Site specific EILs for nickel in *italics* are based on the average of soil cation exchange capacity
Site specific EILs for zinc in *italics* are based on the average of soil pH and cation exchange capacity
To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
To obtain F2 subtract naphthalene from the >C10-C16 fraction.
Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.
Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for commercial/industrial use
Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for commercial/industrial use
Concentration in **blue** font and grey box exceed the adopted management limits for commercial/industrial use
Concentration in **green** and grey box exceed the adopted HSL 'D' direct contact for commercial/industrial use
Concentration in **light blue** and grey box exceed the adopted HSL direct contact for Intrusive Maintenance Workers
Concentration in **pink** and grey box exceed the adopted HSL vapour intrusion for Intrusive Maintenance Workers
Concentrations in box exceed the screening value >2.5 times
Where one or more guideline value is exceeded, the highest guideline value will be highlighted
Concentrations below the LOR noted as <value
'Ch' Chrysotile (white asbestos)
'Am' Amosite (brown asbestos)
Cr' Crocidolite (blue asbestos)

TABLE 4:
Groundwater Sampling Results
Northcote Compound
Site - 027

RAMBOLL ENVIRON

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]	Sample Type:	Groundwater	Groundwater	Groundwater
						ALS Sample number:	ES1611420005	ES1611420010	ES1611421010
						Sample date:	24/05/2016	24/05/2016	24/05/2016
						Sample ID:	027_GW003	000_QA004	000_QA002
						Project Name:	M4E-WCX	M4E-WCX	M4E-WCX
						Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
						Site:	SITE 027	SITE 027	SITE 027
	2 to <4m	4m to<8m	8m+			Sampling Method:	Bailer		
Guidelines						Sample Description	PRIMARY	TRIP BLANK	TRIP BLANK
Analyte grouping / Analyte						**Units**	**LOR**		
EG020T: Dissolved Metals by ICP-MS									
Arsenic				***2.3***	**100**	µg/L	1	<1	----	----
Cadmium				**0.7**	**20**	µg/L	0.1	0.1	----	----
Chromium				**4.4**	**500**	µg/L	1	<1	----	----
Copper				**1.3**	**20000**	µg/L	1	**4**	----	----
Nickel				**7**	**200**	µg/L	1	1	----	----
Lead				**4.4**	**100**	µg/L	1	**52**	----	----
Zinc				**15**		µg/L	5	**118**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury				**0.1**	**10**	µg/L	0.1	<0.1	----	----
VOCs									
Styrene						µg/L	5	<5	----	----
Isopropylbenzene						µg/L	5	<5	----	----
n-Propylbenzene						µg/L	5	<5	----	----
1.3.5-Trimethylbenzene						µg/L	5	<5	----	----
sec-Butylbenzene						µg/L	5	<5	----	----
1.2.4-Trimethylbenzene						µg/L	5	<5	----	----
tert-Butylbenzene						µg/L	5	<5	----	----
p-Isopropyltoluene						µg/L	5	<5	----	----
n-Butylbenzene						µg/L	5	<5	----	----
Vinyl Acetate						µg/L	50	<50	----	----
2-Butanone (MEK)						µg/L	50	<50	----	----
4-Methyl-2-pentanone (MIBK)						µg/L	50	<50	----	----
2-Hexanone (MBK)						µg/L	50	<50	----	----
Carbon disulfide						µg/L	5	<5	----	----
2.2-Dichloropropane						µg/L	5	<5	----	----
1.2-Dichloropropane						µg/L	5	<5	----	----
cis-1.3-Dichloropropylene						µg/L	5	<5	----	----
trans-1.3-Dichloropropylene						µg/L	5	<5	----	----
1.2-Dibromoethane (EDB)						µg/L	5	<5	----	----
Dichlorodifluoromethane						µg/L	50	<50	----	----
Chloromethane						µg/L	50	<50	----	----
Vinyl chloride					**3**	µg/L	50	**<50**	----	----
Bromomethane						µg/L	50	<50	----	----
Chloroethane						µg/L	50	<50	----	----
Trichlorofluoromethane						µg/L	50	<50	----	----
1.1-Dichloroethene					**300**	µg/L	5	<5	----	----
Iodomethane						µg/L	5	<5	----	----
trans-1.2-Dichloroethene						µg/L	5	<5	----	----
1.1-Dichloroethane						µg/L	5	<5	----	----
cis-1.2-Dichloroethene						µg/L	5	<5	----	----
1.1.1-Trichloroethane						µg/L	5	<5	----	----
1.1-Dichloropropylene						µg/L	5	<5	----	----
Carbon Tetrachloride						µg/L	5	<5	----	----
1.2-Dichloroethane					**30**	µg/L	5	<5	----	----
Trichloroethene						µg/L	5	<5	----	----
Dibromomethane						µg/L	5	<5	----	----
1.1.2-Trichloroethane				**1900**		µg/L	5	<5	----	----
1.3-Dichloropropane						µg/L	5	<5	----	----
Tetrachloroethene					**500**	µg/L	5	<5	----	----
1.1.1.2-Tetrachloroethane						µg/L	5	<5	----	----
trans-1.4-Dichloro-2-butene						µg/L	5	<5	----	----
cis-1.4-Dichloro-2-butene						µg/L	5	<5	----	----
1.1.2.2-Tetrachloroethane						µg/L	5	<5	----	----
1.2.3-Trichloropropane						µg/L	5	<5	----	----
Pentachloroethane						µg/L	5	<5	----	----
1.2-Dibromo-3-chloropropane						µg/L	5	<5	----	----
Hexachlorobutadiene						µg/L	5	<5	----	----
Chlorobenzene				***55***	**3000**	µg/L	5	<5	----	----
Bromobenzene						µg/L	5	<5	----	----
2-Chlorotoluene						µg/L	5	<5	----	----
4-Chlorotoluene						µg/L	5	<5	----	----
1.3-Dichlorobenzene				***260***		µg/L	5	<5	----	----
1.4-Dichlorobenzene				***60***	**400**	µg/L	5	<5	----	----
1.2-Dichlorobenzene				***160***	**15000**	µg/L	5	<5	----	----
1.2.4-Trichlorobenzene				**20**	**300**	µg/L	5	<5	----	----
1.2.3-Trichlorobenzene				***3***	**300**	µg/L	5	**<5**	----	----
Chloroform						µg/L	5	<5	----	----
Bromodichloromethane						µg/L	5	<5	----	----
Dibromochloromethane						µg/L	5	<5	----	----
Bromoform						µg/L	5	<5	----	----
Naphthalene				**50**		µg/L	5	<5	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol				**400**		µg/L	1	<1.0	----	----
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0	----	----
2-Methylphenol						µg/L	1	<1.0	----	----
3- & 4-Methylphenol						µg/L	2	<2.0	----	----
2-Nitrophenol				***2***		µg/L	1	<1.0	----	----
2.4-Dimethylphenol				***2***		µg/L	1	<1.0	----	----
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0	----	----
2.6-Dichlorophenol				***34***		µg/L	1	<1.0	----	----
4-Chloro-3-methylphenol						µg/L	1	<1.0	----	----
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0	----	----
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0	----	----

TABLE 4:
Groundwater Sampling Results
Northcote Compound
Site - 027

	HSL D – Commercial / Industrial[A]			95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]	Sample Type:	Groundwater	Groundwater	Groundwater
						ALS Sample number:	ES1611420005	ES1611420010	ES1611421010
						Sample date:	24/05/2016	24/05/2016	24/05/2016
						Sample ID:	027_GW003	000_QA004	000_QA002
						Project Name:	M4E-WCX	M4E-WCX	M4E-WCX
						Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
						Site:	SITE 027	SITE 027	SITE 027
	2 to <4m	4m to<8m	8m+			Sampling Method:	Bailer		
Guidelines						Sample Description	PRIMARY	TRIP BLANK	TRIP BLANK
Analyte grouping / Analyte						**Units**	**LOR**			
Pentachlorophenol				**22**	**100**	µg/L	2	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons										
Naphthalene				**50**		µg/L	1	<1.0	----	----
Acenaphthylene						µg/L	1	<1.0	----	----
Acenaphthene						µg/L	1	<1.0	----	----
Fluorene						µg/L	1	<1.0	----	----
Phenanthrene				***0.6***		µg/L	1	**<1.0**	----	----
Anthracene				***0.01***		µg/L	1	**<1.0**	----	----
Fluoranthene				***1***		µg/L	1	<1.0	----	----
Pyrene						µg/L	1	<1.0	----	----
Benz(a)anthracene						µg/L	1	<1.0	----	----
Chrysene						µg/L	1	<1.0	----	----
Benzo(b+j)fluoranthene						µg/L	1	<1.0	----	----
Benzo(k)fluoranthene						µg/L	1	<1.0	----	----
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5	**<0.5**	----	----
Indeno(1.2.3.cd)pyrene						µg/L	1	<1.0	----	----
Dibenz(a.h)anthracene						µg/L	1	<1.0	----	----
Benzo(g.h.i)perylene						µg/L	1	<1.0	----	----
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	<0.5	----	----
Benzo(a)pyrene TEQ (zero)						µg/L	0.5	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons										
C6 - C9 Fraction						µg/L	20	<20	<20	<20
C10 - C14 Fraction						µg/L	50	<50	<50	----
C15 - C28 Fraction						µg/L	100	<100	<100	----
C29 - C36 Fraction						µg/L	50	<50	<50	----
C10 - C36 Fraction (sum)						µg/L	50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction						µg/L	20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20	<20	<20	<20
>C10 - C16 Fraction						µg/L	100	<100	<100	----
>C16 - C34 Fraction						µg/L	100	<100	<100	----
>C34 - C40 Fraction						µg/L	100	<100	<100	----
>C10 - C40 Fraction (sum)						µg/L	100	<100	<100	----
>C10 - C16 Fraction minus Naphthalene (F2	**NL**	**NL**	**NL**			µg/L	100	<100	<100	----
EP080: BTEXN										
Benzene	**4900**	**5100**	**5400**	**500**	**8000**	µg/L	1	<1	<1	<1
Toluene	**NL**	**NL**	**NL**	***180***	**3000**	µg/L	2	<2	<2	<2
Ethylbenzene	**NL**	**NL**	**NL**	**5**	**8000**	µg/L	2	<2	<2	<2
meta- & para-Xylene				***275***		µg/L	2	<2	<2	<2
ortho-Xylene				***350***		µg/L	2	<2	<2	<2
Total Xylenes	**NL**	**NL**	**NL**		**6000**	µg/L	2	<2	<2	<2
Sum of BTEX						µg/L	1	<1	<1	<1
Naphthalene	**NL**	**NL**	**NL**	**50**			5	<5	<5	<5

Blank Cell indicates no criterion available
All results are in µg/L unless stated
LOR = Limit of Reporting
[A] NEPM 2013 HSL 'D' (Commercial/Industrial)
[B] ANZECC 2000 % Protection Level for Receiving Water Type
[C] NHMRC Australian Drinking Water Guidelines, 2011
ANZECC guidelines in *italics* are low level reliability guidelines
ANZECC arsenic guideline based on As (III) for marine and As (V) for fresh, the lowest of presented guidelines.
NHMRC arsenic guidelines are based on total arsenic
ANZECC and NHMRC guidelines for chromium are based on Cr (VI)
ANZECC guidelines for mercury are based on inorganic mercury.
NHMRC guidelines for mercury are based on total mercury.
In instances where there was no marine guideline values, the freshwater guidelines have been adopted
In instances wehre there was no health drinking water guideline value, the aesthetic value has been adopted
Concentration in **red** font and grey box exceed the adopted ecosystem guideline value
Concentration in **orange** font and grey box exceed the adopted recreational drinking water guideline value
Concentrations in blue indicate the LOR is greater than the guideline value
Concentrations below the LOR noted as <value
no HSL is presented for recreational use (HSL C) as all these chemicals are not limiting (NL)

Table 5:
QA/QC Soil Sampling Results
Northcote Compound
Site 027

RAMBOLL ENVIRON

	Sample Type:		ALS	ALS		ALS	MGT	
	ALS Sample number:		ES1610406005	ES1610406012	RPD	ES1610406005	S16-My15974 500732	RPD
	Sample date:		12/05/2016	12/05/2016		12/05/2016	12/05/2016	
	Sample ID:		027_GW003_0.2	027_QC001		027_GW003_0.2	027_QC002	
	Project Name:		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	
	Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site	
	Site:		Site 027	Site 027		Site 027	Site 027	
	Sampling Method:		Drilling	Drilling		Drilling	Drilling	
	Sample Description		PRIMARY	Duplicate of 027_GW003_0.2		PRIMARY	Triplicate of 027_GW003_0.2	
Analyte grouping/Analyte	**Units**	**LOR**						
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	%		14.0	13.2		14.0		
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	g/kg		No	No	----	No	----	----
Asbestos Type	--		-	-	----	-	----	----
Sample weight (dry)	g		44.4	24.2	----	44.4	----	----
Description	--		Pale brown clay soil.	Mid brown clay soil with grey rocks.	----	Pale brown clay soil.	----	----
APPROVED IDENTIFIER:	--		G.MORGAN	G.MORGAN	----	G.MORGAN	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	mg/kg	5	10	8	*22.2*	10	9.5	*5.1*
Cadmium	mg/kg	1	<1	<1	*nc*	<1	< 0.4	*nc*
Chromium	mg/kg	2	31	22	*34.0*	31	28	*10.2*
Copper	mg/kg	5	6	7	*15.4*	6	21	***111.1***
Lead	mg/kg	5	38	39	*2.6*	38	120	***103.8***
Nickel	mg/kg	2	<2	<2	*nc*	<2	< 5	*nc*
Zinc	mg/kg	5	31	41	*27.8*	31	140	***127.5***
EG035T: Total Recoverable Mercury by FIMS								
Mercury	mg/kg	0.1	<0.1	<0.1	*nc*	<0.1	0.06	*nc*
EP075(SIM)A: Phenolic Compounds								
Phenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2-Chlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2-Methylphenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
3- & 4-Methylphenol	mg/kg	1	<1	<1	*nc*	<1	< 1	*nc*
2-Nitrophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4-Dimethylphenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.6-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	----	----
4-Chloro-3-methylphenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4.6-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2.4.5-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Pentachlorophenol	mg/kg	2	<2	<2	*nc*	<2	< 1	*nc*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Acenaphthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Fluorene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Phenanthrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Chrysene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.6	0.6	0.6	*0.0*	0.6	0.6	*0.0*
Benzo(a)pyrene TEQ (LOR)	mg/kg	1.2	1.2	1.2	*0.0*	1.2	1.2	*0.0*
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	mg/kg	10	<10	<10	*nc*	<10	< 20	*nc*
C10 - C14 Fraction	mg/kg	50	<50	<50	*nc*	<50	< 20	*nc*
C15 - C28 Fraction	mg/kg	100	<100	<100	*nc*	<100	<50	*nc*
C29 - C36 Fraction	mg/kg	100	<100	<100	*nc*	<100	<50	*nc*
C10 - C36 Fraction (sum)	mg/kg	50	<50	<50	*nc*	<50	<50	*nc*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	mg/kg	10	<10	<10	*nc*	<10	< 20	*nc*
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	*nc*	<10	< 20	*nc*
>C10 - C16 Fraction	mg/kg	50	<50	<50	*nc*	<50	< 50	*nc*
>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	*nc*	<100	< 100	*nc*
>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	*nc*	<100	< 100	*nc*
>C10 - C40 Fraction (sum)	mg/kg	50	<50	<50	*nc*	<50	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	*nc*	<50	< 50	*nc*
EP080: BTEXN								
Benzene	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	< 0.1	*nc*
Toluene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.2	*nc*
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*
Total Xylenes	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	< 0.3	*nc*
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	----	----
Naphthalene	mg/kg	1	<1	<1	*nc*	<1	<0.5	*nc*
EP074A: Monocyclic Aromatic Hydrocarbons								
Styrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Isopropylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
n-Propylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.3.5-Trimethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
sec-Butylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2.4-Trimethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
tert-Butylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
p-Isopropyltoluene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
n-Butylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074B: Oxygenated Compounds								
Vinyl Acetate	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
2-Butanone (MEK)	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
4-Methyl-2-pentanone (MIBK)	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
2-Hexanone (MBK)	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
EP074C: Sulfonated Compounds								
Carbon disulfide	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074D: Fumigants								
2.2-Dichloropropane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dichloropropane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
cis-1.3-Dichloropropylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
trans-1.3-Dichloropropylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dibromoethane (EDB)	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
Chloromethane	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
Vinyl chloride	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
Bromomethane	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
Chloroethane	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
Trichlorofluoromethane	mg/kg	5	<5	<5	*nc*	<5	<5	*nc*
1.1-Dichloroethene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Iodomethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
trans-1.2-Dichloroethene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1-Dichloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
cis-1.2-Dichloroethene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.1-Trichloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1-Dichloropropylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Carbon Tetrachloride	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dichloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Trichloroethene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Dibromomethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.2-Trichloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.3-Dichloropropane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Tetrachloroethene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.1.2-Tetrachloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
trans-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
cis-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.1.2.2-Tetrachloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2.3-Trichloropropane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Pentachloroethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.2-Dibromo-3-chloropropane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Hexachlorobutadiene	mg/kg	0.5	<0.5	----	*nc*	<0.5	<0.5	*nc*
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Bromobenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
2-Chlorotoluene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
4-Chlorotoluene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
1.3-Dichlorobenzene	mg/kg	0.5	<0.5	----	----	<0.5	<0.5	*nc*
1.4-Dichlorobenzene	mg/kg	0.5	<0.5	----	----	<0.5	<0.5	*nc*
1.2-Dichlorobenzene	mg/kg	0.5	<0.5	----	----	<0.5	<0.5	*nc*
1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	----	----	<0.5	<0.5	*nc*
1.2.3-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074G: Trihalomethanes								
Chloroform	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Bromodichloromethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Dibromochloromethane	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
Bromoform	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*
EP074H: Naphthalene								
Naphthalene	mg/kg	1	<1	----	----	<1	<1	*nc*

All units in mg/kg except trip spikes (%)

nc = not calculated since results < LOR

LOR = Laboratory Limit of Reporting

BOLD identifies where RPD results

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Table 6:
QA/QC Groundwater Sampling Results
Northcote Compound
Site 027

	HSL D – Commercial/ Industrial			95% Marine Water Protection for Aquatic Ecosystems	Recreational Health (10x ADWG 2011)	Sample Type:	SOIL	SOIL	RPD	SOIL	SOIL	RPD	SOIL	SOIL	SOIL
						ALS Sample number:	ES1611420002	ES1611420007		ES1611420002	S16-My28529 502339		ES1611420009	ES1611420010	ES1611421010
						Sample date:	24/05/2016	24/05/2016		24/05/2016	24/05/2016		23/05/2016	24/05/2016	24/05/2016
						Sample ID:	006_GW005	006_QC100		006_GW005	006_QC101		000_QA003	000_QA004	000_QA002
						Project Name:	M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	M4E-WCX
						Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
						Site:	SITE 006	SITE 006		SITE 006	SITE 006		SITE 006	SITE 006	SITE 006
						Sampling Method:	Bailer	Bailer		Bailer	Bailer				
Guidelines	**2 to <4m**	**4m to<8m**	**8m+**			Sample Description	PRIMARY	DUPLICATE OF 006_GW005		PRIMARY	TRIPLICATE OF 006_GW005		TRIP SPIKE	TRIP BLANK	TRIP BLANK
Analyte grouping/Analyte						**Units**	**LOR**								
EG020T: Dissolved Metals by ICP-MS															
Arsenic				***2.3***	**100**	µg/L	1	<1	<1	*nc*	<1	<1	*nc*	----	----	----
Cadmium				**0.7**	**20**	µg/L	0.1	<0.1	<0.1	*nc*	<0.1	0.2	*nc*	----	----	----
Chromium				**4.4**	**500**	µg/L	1	<1	<1	*nc*	<1	<1	*nc*	----	----	----
Copper				**1.3**	**20000**	µg/L	1	<1	<1	*nc*	<1	1	*nc*	----	----	----
Nickel				**7**	**200**	µg/L	1	<1	<1	*nc*	<1	<1	*nc*	----	----	----
Lead				**4.4**	**100**	µg/L	1	32	33	*3.1*	32	30	*6.5*	----	----	----
Zinc				**15**		µg/L	1	50	52	*3.9*	50	48	*4.1*	----	----	----
EG035F: Dissolved Mercury by FIMS																
Mercury				**0.1**	**10**	µg/L	0.1	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*	----	----	----
EP066: Polychlorinated Biphenyls (PCB)																
Total Polychlorinated biphenyls						µg/L	1	<1	<1	*nc*	<1	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)																
alpha-BHC						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Hexachlorobenzene (HCB)						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
beta-BHC						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
gamma-BHC					**100**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
delta-BHC						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Heptachlor				***0.0004***	**3**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Aldrin				***0.003***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Heptachlor epoxide						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
trans-Chlordane						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
alpha-Endosulfan				***0.0002***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
cis-Chlordane						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Dieldrin				***0.01***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
4.4`-DDE				***0.0005***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Endrin				**0.008**		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
beta-Endosulfan				***0.007***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
4.4`-DDD						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Endrin aldehyde						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Endosulfan sulfate						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
4.4`-DDT				***0.0004***	**90**	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Endrin ketone						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Methoxychlor				***0.004***	**3000**	µg/L	2	2	2	*nc*	2	----	----	----	----	----
^ Total Chlordane (sum)				***0.001***	**20**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
^ Sum of DDD + DDE + DDT						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
^ Sum of Aldrin + Dieldrin					**3**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)																
Dichlorvos					**50**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Demeton-S-methyl				***4***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Monocrotophos						µg/L	2	2	2	*nc*	2	----	----	----	----	----
Dimethoate				***0.15***	**70**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Diazinon				***0.01***	**40**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Chlorpyrifos-methyl						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Parathion-methyl					**7**	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Malathion				***0.05***	**700**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Fenthion					**70**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Chlorpyrifos				**0.009**	**100**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Parathion				***0.004***	**200**	µg/L	2	2	2	*nc*	2	----	----	----	----	----
Pirimphos-ethyl						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Chlorfenvinphos					**20**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Bromophos-ethyl						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Fenamiphos					**5**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Prothiofos						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Ethion					**40**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Carbophenothion						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Azinphos Methyl				***0.01***	**300**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----	----	----	----

Table 6:
QA/QC Groundwater Sampling Results
Northcote Compound
Site 027

	HSL D – Commercial/ Industrial			95% Marine Water Protection for Aquatic Ecosystems	Recreational Health (10x ADWG 2011)												
Sample Type:								SOIL	SOIL	RPD	SOIL	SOIL	RPD	SOIL	SOIL	SOIL
ALS Sample number:								ES1611420002	ES1611420007		ES1611420002	S16-My28529 502339		ES1611420009	ES1611420010	ES1611421010
Sample date:								24/05/2016	24/05/2016		24/05/2016	24/05/2016		23/05/2016	24/05/2016	24/05/2016
Sample ID:								006_GW005	006_QC100		006_GW005	006_QC101		000_QA003	000_QA004	000_QA002
Project Name:								M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	M4E-WCX
Compound:								NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
Site:								SITE 006	SITE 006		SITE 006	SITE 006		SITE 006	SITE 006	SITE 006
Sampling Method:								Bailer	Bailer		Bailer	Bailer				
Sample Description								PRIMARY	DUPLICATE OF 006_GW005		PRIMARY	TRIPLICATE OF 006_GW005		TRIP SPIKE	TRIP BLANK	TRIP BLANK
Guidelines	**2 to <4m**	**4m to<8m**	**8m+**													
VOCs																
Styrene						µg/L	5	<5	----	----	<5	----	----	----	----	----
Isopropylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
n-Propylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.3.5-Trimethylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
sec-Butylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.4-Trimethylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
tert-Butylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
p-Isopropyltoluene						µg/L	5	<5	----	----	<5	----	----	----	----	----
n-Butylbenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
Vinyl Acetate						µg/L	50	<50	----	----	<50	----	----	----	----	----
2-Butanone (MEK)						µg/L	50	<50	----	----	<50	----	----	----	----	----
4-Methyl-2-pentanone (MIBK)						µg/L	50	<50	----	----	<50	----	----	----	----	----
2-Hexanone (MBK)						µg/L	50	<50	----	----	<50	----	----	----	----	----
Carbon disulfide						µg/L	5	<5	----	----	<5	----	----	----	----	----
2.2-Dichloropropane						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dichloropropane						µg/L	5	<5	----	----	<5	----	----	----	----	----
cis-1.3-Dichloropropylene						µg/L	5	<5	----	----	<5	----	----	----	----	----
trans-1.3-Dichloropropylene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dibromoethane (EDB)						µg/L	5	<5	----	----	<5	----	----	----	----	----
Dichlorodifluoromethane						µg/L	50	<50	----	----	<50	----	----	----	----	----
Chloromethane						µg/L	50	<50	----	----	<50	----	----	----	----	----
Vinyl chloride					**3**	µg/L	50	<50	----	----	<50	----	----	----	----	----
Bromomethane						µg/L	50	<50	----	----	<50	----	----	----	----	----
Chloroethane						µg/L	50	<50	----	----	<50	----	----	----	----	----
Trichlorofluoromethane						µg/L	50	<50	----	----	<50	----	----	----	----	----
1.1-Dichloroethene					**300**	µg/L	5	<5	----	----	<5	----	----	----	----	----
Iodomethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
trans-1.2-Dichloroethene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1-Dichloroethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
cis-1.2-Dichloroethene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.1-Trichloroethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1-Dichloropropylene						µg/L	5	<5	----	----	<5	----	----	----	----	----
Carbon Tetrachloride						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dichloroethane					**30**	µg/L	5	<5	----	----	<5	----	----	----	----	----
Trichloroethene						µg/L	5	<5	----	----	<5	----	----	----	----	----
Dibromomethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.2-Trichloroethane				**1900**		µg/L	5	<5	----	----	<5	----	----	----	----	----
1.3-Dichloropropane						µg/L	5	<5	----	----	<5	----	----	----	----	----
Tetrachloroethene					**500**	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.1.2-Tetrachloroethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
trans-1.4-Dichloro-2-butene						µg/L	5	<5	----	----	<5	----	----	----	----	----
cis-1.4-Dichloro-2-butene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.1.2.2-Tetrachloroethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.3-Trichloropropane						µg/L	5	<5	----	----	<5	----	----	----	----	----
Pentachloroethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dibromo-3-chloropropane						µg/L	5	<5	----	----	<5	----	----	----	----	----
Hexachlorobutadiene						µg/L	5	<5	----	----	<5	----	----	----	----	----
Chlorobenzene				***55***	**3000**	µg/L	5	<5	----	----	<5	----	----	----	----	----
Bromobenzene						µg/L	5	<5	----	----	<5	----	----	----	----	----
2-Chlorotoluene						µg/L	5	<5	----	----	<5	----	----	----	----	----
4-Chlorotoluene						µg/L	5	<5	----	----	<5	----	----	----	----	----
1.3-Dichlorobenzene				***260***		µg/L	5	<5	----	----	<5	----	----	----	----	----
1.4-Dichlorobenzene				***60***	**400**	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2-Dichlorobenzene				***160***	**15000**	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.4-Trichlorobenzene				**20**	**300**	µg/L	5	<5	----	----	<5	----	----	----	----	----
1.2.3-Trichlorobenzene				***3***	**300**	µg/L	5	<5	----	----	<5	----	----	----	----	----
Chloroform						µg/L	5	<5	----	----	<5	----	----	----	----	----
Bromodichloromethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
Dibromochloromethane						µg/L	5	<5	----	----	<5	----	----	----	----	----
Bromoform						µg/L	5	<5	----	----	<5	----	----	----	----	----
Naphthalene				**50**		µg/L	5	<5	----	----	<5	----	----	----	----	----
EP075(SIM)A: Phenolic Compounds																
Phenol				**400**		µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2-Methylphenol						µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
3- & 4-Methylphenol						µg/L	2	2	2		2	----	----	----	----	----
2-Nitrophenol				***2***		µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2.4-Dimethylphenol				***2***		µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2.6-Dichlorophenol				***34***		µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
4-Chloro-3-methylphenol						µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0	<1.0		<1.0	----	----	----	----	----
Pentachlorophenol				**22**	**100**	µg/L	2	2	2		2	----	----	----	----	----

Table 6:
QA/QC Groundwater Sampling Results
Northcote Compound
Site 027

	HSL D – Commercial/ Industrial			95% Marine Water Protection for Aquatic Ecosystems	Recreational Health (10x ADWG 2011)			Sample Type:	SOIL	SOIL	RPD	SOIL	SOIL	RPD	SOIL	SOIL	SOIL
								ALS Sample number:	ES1611420002	ES1611420007		ES1611420002	S16-My28529 502339		ES1611420009	ES1611420010	ES1611421010
								Sample date:	24/05/2016	24/05/2016		24/05/2016	24/05/2016		23/05/2016	24/05/2016	24/05/2016
								Sample ID:	006_GW005	006_QC100		006_GW005	006_QC101		000_QA003	000_QA004	000_QA002
								Project Name:	M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	M4E-WCX
								Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE
								Site:	SITE 006	SITE 006		SITE 006	SITE 006		SITE 006	SITE 006	SITE 006
								Sampling Method:	Bailer	Bailer		Bailer	Bailer				
Guidelines	2 to <4m	4m to<8m	8m+					Sample Description	PRIMARY	DUPLICATE OF 006_GW005		PRIMARY	TRIPLICATE OF 006_GW005		TRIP SPIKE	TRIP BLANK	TRIP BLANK
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																		
Naphthalene				**50**		µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Acenaphthylene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Acenaphthene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Fluorene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Phenanthrene				***0.6***		µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Anthracene				***0.01***		µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Fluoranthene				***1***		µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Pyrene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benz(a)anthracene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Chrysene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(b+j)fluoranthene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(k)fluoranthene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5		<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Indeno(1.2.3.cd)pyrene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Dibenz(a.h)anthracene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Benzo(g.h.i)perylene						µg/L	1		<1.0	<1.0	*nc*	<1.0	----	----	----	----	----
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5		<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
Benzo(a)pyrene TEQ (zero)						µg/L	0.5		<0.5	<0.5	*nc*	<0.5	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons																		
C6 - C9 Fraction						µg/L	20		20	20	*nc*	20	20	*nc*	190	20	20
C10 - C14 Fraction						µg/L	50		<50	<50	*nc*	<50	----	----	----	<50	----
C15 - C28 Fraction						µg/L	100		<100	<100	*nc*	<100	----	----	----	<100	----
C29 - C36 Fraction						µg/L	50		<50	<50	*nc*	<50	----	----	----	<50	----
C10 - C36 Fraction (sum)						µg/L	50		<50	<50	*nc*	<50	----	----	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																		
C6 - C10 Fraction						µg/L	20		20	20	*nc*	20	----	----	210	20	20
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20		20	20	*nc*	20	----	----	130	20	20
>C10 - C16 Fraction						µg/L	100		<100	<100	*nc*	<100	----	----	----	<100	----
>C16 - C34 Fraction						µg/L	100		<100	<100	*nc*	<100	----	----	----	<100	----
>C34 - C40 Fraction						µg/L	100		----	<100	----	----	----	----	----	<100	----
>C10 - C40 Fraction (sum)						µg/L	100		----	<100	----	----	----	----	----	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)	**NL**	**NL**	**NL**			µg/L	100		----	<100	----	----	----	----	----	<100	----
EP080: BTEXN																		
Benzene	**4900**	**5100**	**5400**	**500**	**8000**	µg/L	1		----	<1	----	----	<1	----	15	<1	<1
Toluene	**NL**	**NL**	**NL**	***180***	**3000**	µg/L	2		----	2	----	----	<1	----	14	2	2
Ethylbenzene	**NL**	**NL**	**NL**	**5**	**8000**	µg/L	2		----	2	----	----	<1	----	16	2	2
meta- & para-Xylene				***275***		µg/L	2		----	2	----	----	2	----	16	2	2
ortho-Xylene				***350***		µg/L	2		----	2	----	----	<1	----	16	2	2
Total Xylenes	**NL**	**NL**	**NL**		**6000**	µg/L	2		----	2	----	----	<3	----	32	2	2
Sum of BTEX						µg/L	1		----	<1	----	----	----	----	77	<1	<1
Naphthalene	**NL**	**NL**	**NL**	**50**		µg/L	5		----	<5	----	----	----	----	17	<5	<5

All units in µg/L except trip spikes (%)
nc = not calculated since results < LOR
LOR = Laboratory Limit of Reporting
BOLD identifies where RPD results

Intralaborato	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Site 027

Site 028

Site 012

028_TP001

028_TP002

028_TP003

Table 6-2 Soil Exceedances				
Sample Location and Depth	Contaminant	Guideline Exceeded	Guideline Value	Concentration (mg/kg)
028_TP001_0.5	Zinc	NEPM 2013 EIL D	300 mg/kg	322 mg/kg

Site Location Within Project Alignment

Legend

- Ramboll Environ Test Pit
- Site Contamination Risk - Moderate

RAMBOLL

0 20

m

1 cm = 3 m

DRAFTED BY: TP | Date: 2/11/2016 | A3

Phase 2 Environmental Site Assessment - Northcote Compound
Figure F-1 – Site 028 Investigation locations and soil exceedances
Client: CPB Samsung John Holland JV, WestConnex M4E

Nearmap Aerial Imagery 2015 (Nearmap, 2016) | Site Boundary is Approximate- Not Surveyed | PROJECT: AS-121919

Z:\Projects\LSJH\GIS\CPBSJHWCX M4E.mxd

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 028
21/02/18

TABLE 1:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 028

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial[3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact[4] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[1]	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
												ALS Sample number:		ES1609686001	ES1609686002	ES1609686010	ES1609686003	ES1609686004	ES1609686005	ES1609686006	ES1609686007	ES1609686008	ES1609686009
												Sample date:		05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016
												Sample ID:		028_TP001_0.10	028_TP001_0.50	028_QC001	028_TP001_0.70	028_TP001_0.90	028_TP002_0.20	028_TP002_0.50	028_TP002_1.00	028_TP003_0.40	028_TP003_0.60
												Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:		Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028
												Sampling Method:		Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting
												Sample Description		FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	Duplicate of 028_TP001_0.5	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, NOC	Grading to weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, NOC	FILL; Gravelly clayey silt, gravel is ironstone, reworked natural (?), grey/brown, medium stiff, moist, high gravel content	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, no observed contamination	Grading to extremely weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, no observed contamination	FILL; Gravelly clayey silt, gravel is ironstone, stiff, dry-slightly moist, grey/brown, roots, pipe near surface, no observed contamination, minor pockets of sand beneath concrete	Silty CLAY; orange, dry-slightly moist, someironstone gravels, stiff, low plasticity, no observed contamination
Analyte grouping / Analyte												**Units**	**LOR**										
EA055: Moisture Content																							
Moisture Content (dried @ 103°C)												%	--	13	15.3	12.8	15.8	19.1	12.8	23.6	17	7.9	16.1
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																							
Asbestos Detected												g/kg	0.1	No	No	No	----	----	No	----	----	No	----
Asbestos Type												--	--	-	-	-	----	----	-	----	----	-	----
Sample weight (dry)												g	0.1	51.9	70.1	31.7	----	----	43.7	----	----	61	----
Description												--	--	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----	----	Mid brown sandy soil.	----	----	Pale brown clay soil with grey rocks.	----
APPROVED IDENTIFIER:												--	--	G.MORGAN	G.MORGAN	G.MORGAN	----	----	G.MORGAN	----	----	G.MORGAN	----
EG005T: Total Metals by ICP-AES																							
Arsenic	**3000**					**160**						mg/kg	5	13	18	6	<5	9	6	8	8	9	6
Cadmium	**900**											mg/kg	1	1	1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	**3600**					**310**						mg/kg	2	25	30	20	33	33	14	37	19	26	29
Copper	**240000**					***150***						mg/kg	5	35	32	25	<5	<5	18	<5	<5	<5	<5
Lead	**1500**					**1800**						mg/kg	5	141	158	128	11	17	21	14	19	20	19
Nickel	**6000**					***60***						mg/kg	2	4	9	3	<2	<2	3	<2	<2	<2	<2
Zinc	**400000**					***300***						mg/kg	5	226	322	200	6	<5	41	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS																							
Mercury	**730**											mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)																							
Total Polychlorinated biphenyls	**7**											mg/kg	0.1	----	<0.1	<0.1	----	----	<0.1	----	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)																							
alpha-BHC												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Hexachlorobenzene (HCB)	**80**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
beta-BHC												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
gamma-BHC												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
delta-BHC												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Heptachlor	**50**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Aldrin												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Heptachlor epoxide												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Total Chlordane (sum)	**530**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
trans-Chlordane												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
alpha-Endosulfan												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
cis-Chlordane												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Dieldrin												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
4.4`-DDE												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Endrin	**100**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Endosulfan (sum)	**2000**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
beta-Endosulfan												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
4.4`-DDD												mg/kg	0.05	----	0.06	<0.05	----	----	<0.05	----	----	<0.05	----
Endrin aldehyde												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Endosulfan sulfate												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
4.4`-DDT						**640**						mg/kg	0.2	----	<0.2	<0.2	----	----	<0.2	----	----	<0.2	----
Endrin ketone												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Methoxychlor	**2500**											mg/kg	0.2	----	<0.2	<0.2	----	----	<0.2	----	----	<0.2	----
Sum of DDD + DDE + DDT	**3600**											mg/kg	0.05	----	0.06	<0.05	----	----	<0.05	----	----	<0.05	----
Sum of Aldrin + Dieldrin	**45**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
EP068B: Organophosphorus Pesticides (OP)																							
Dichlorvos												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Demeton-S-methyl												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Monocrotophos												mg/kg	0.2	----	<0.2	<0.2	----	----	<0.2	----	----	<0.2	----
Dimethoate												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Diazinon												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Chlorpyrifos-methyl												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Parathion-methyl												mg/kg	0.2	----	<0.2	<0.2	----	----	<0.2	----	----	<0.2	----
Malathion												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Fenthion												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Chlorpyrifos	**2000**											mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Parathion												mg/kg	0.2	----	<0.2	<0.2	----	----	<0.2	----	----	<0.2	----
Pirimphos-ethyl												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Chlorfenvinphos												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Bromophos-ethyl												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Fenamiphos												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Prothiofos												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Ethion												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Carbophenothion												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
Azinphos Methyl												mg/kg	0.05	----	<0.05	<0.05	----	----	<0.05	----	----	<0.05	----
EP075(SIM)A: Phenolic Compounds																							
Phenol	**240000**											mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2-Chlorophenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2-Methylphenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
3- & 4-Methylphenol	**25000**											mg/kg	1	----	<1	<1	----	----	<1	----	----	<1	----
2-Nitrophenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2.4-Dimethylphenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2.4-Dichlorophenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2.6-Dichlorophenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
4-Chloro-3-methylphenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2.4.6-Trichlorophenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
2.4.5-Trichlorophenol												mg/kg	0.5	----	<0.5	<0.5	----	----	<0.5	----	----	<0.5	----
Pentachlorophenol	**660**											mg/kg	2	----	<2	<2	----	----	<2	----	----	<2	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																							
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	**NL**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene							**72**					mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	**4000**											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Project No: AS121919
Client Name: CSJ
Project Name: Phase 2 ESA
Project Site: 028
21/02/18

TABLE 1:
Commercial / Industrial D - Soil Sampling Results
Northcote Compound
Site 028

RAMBOLL ENVIRON

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial[3]	CRC CARE 2011 Direct Contact[4] HSL D	CRC CARE 2011 Direct Contact[4] HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[1]	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
												ALS Sample number:		ES1609686001	ES1609686002	ES1609686010	ES1609686003	ES1609686004	ES1609686005	ES1609686006	ES1609686007	ES1609686008	ES1609686009
												Sample date:		05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016
												Sample ID:		028_TP001_0.10	028_TP001_0.50	028_QC001	028_TP001_0.70	028_TP001_0.90	028_TP002_0.20	028_TP002_0.50	028_TP002_1.00	028_TP003_0.40	028_TP003_0.60
												Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
												Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
												Site:		Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028
												Sampling Method:		Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting	Test Pitting
												Sample Description		FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	Duplicate of 028_TP001_0.5	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, NOC	Grading to weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, NOC	FILL; Gravelly clayey silt, gravel is ironstone, reworked natural (?), grey/brown, medium stiff, moist, high gravel content	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, no observed contamination	Grading to extremely weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, no observed contamination	FILL; Gravelly clayey silt, gravel is ironstone, stiff, dry-slightly moist, grey/brown, roots, pipe near surface, no observed contamination, minor pockets of sand beneath concrete	Silty CLAY; orange, dry-slightly moist, someironstone gravels, stiff, low plasticity, no observed contamination
Analyte grouping / Analyte												**Units**	**LOR**										
Benzo(a)pyrene TEQ (half LOR)												mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	**40**											mg/kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons																							
C6 - C9 Fraction												mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction												mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction												mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction												mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)												mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																							
C6 - C10 Fraction								**700**	**26000**	**82000**	**NL**	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)		**260**	**370**	**630**	**NL**		**215**					mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction							**170**	**1000**	**20000**	**62000**	**NL**	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction (F3)							**1700**	**3500**	**27000**	**85000**		mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction (F4)							**3300**	**10000**	**38000**	**120000**		mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)												mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)		**NL**	**NL**	**NL**	**NL**							mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
EP080: BTEXN																							
Benzene		**3**	**3**	**3**	**3**		**75**		**430**	**1100**	**77**	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene		**NL**	**NL**	**NL**	**NL**		**135**		**99000**	**120000**	**NL**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene		**NL**	**NL**	**NL**	**NL**		**165**		**27000**	**85000**	**NL**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene												mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes		**230**	**NL**	**NL**	**NL**		**95**		**81000**	**130000**	**NL**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX												mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	**NL**	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Blank Cell indicates no criterion available

LOR = Limit of Reporting

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[1] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL guideline value has been adopted for all analytes

[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.

NL = Non Limiting. No HSL is presented for these chemicals as 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.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Site specific EILs for copper *in italics* are based on the average of soil pH, cation exchange capacity and organic content

Site specific EILs for nickel *in italics* are based on the average of soil cation exchange capacity

Site specific EILs for zinc *in italics* are based on the average of soil pH and cation exchange capacity

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for commercial/industrial use

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for commercial/industrial use

Concentration in **blue** font and grey box exceed the adopted management limits for commercial/industrial use

Concentration in **green** and grey box exceed the adopted HSL 'D' direct contact for commercial/industrial use

Concentration in **light blue** and grey box exceed the adopted HSL direct contact for Intrusive Maintenance Workers

Concentration in **pink** and grey box exceed the adopted HSL vapour intrusion for Intrusive Maintenance Workers

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guidleline value will be highlighted

Concentrations below the LOR noted as <value

'Ch' Chrysotile (white asbestos)

'Am' Amosite (brown asbestos)

Cr' Crocidolite (blue asbestos)

Table 2:
QA/QC Soil Sampling Results
Northcote Compound
Site 028

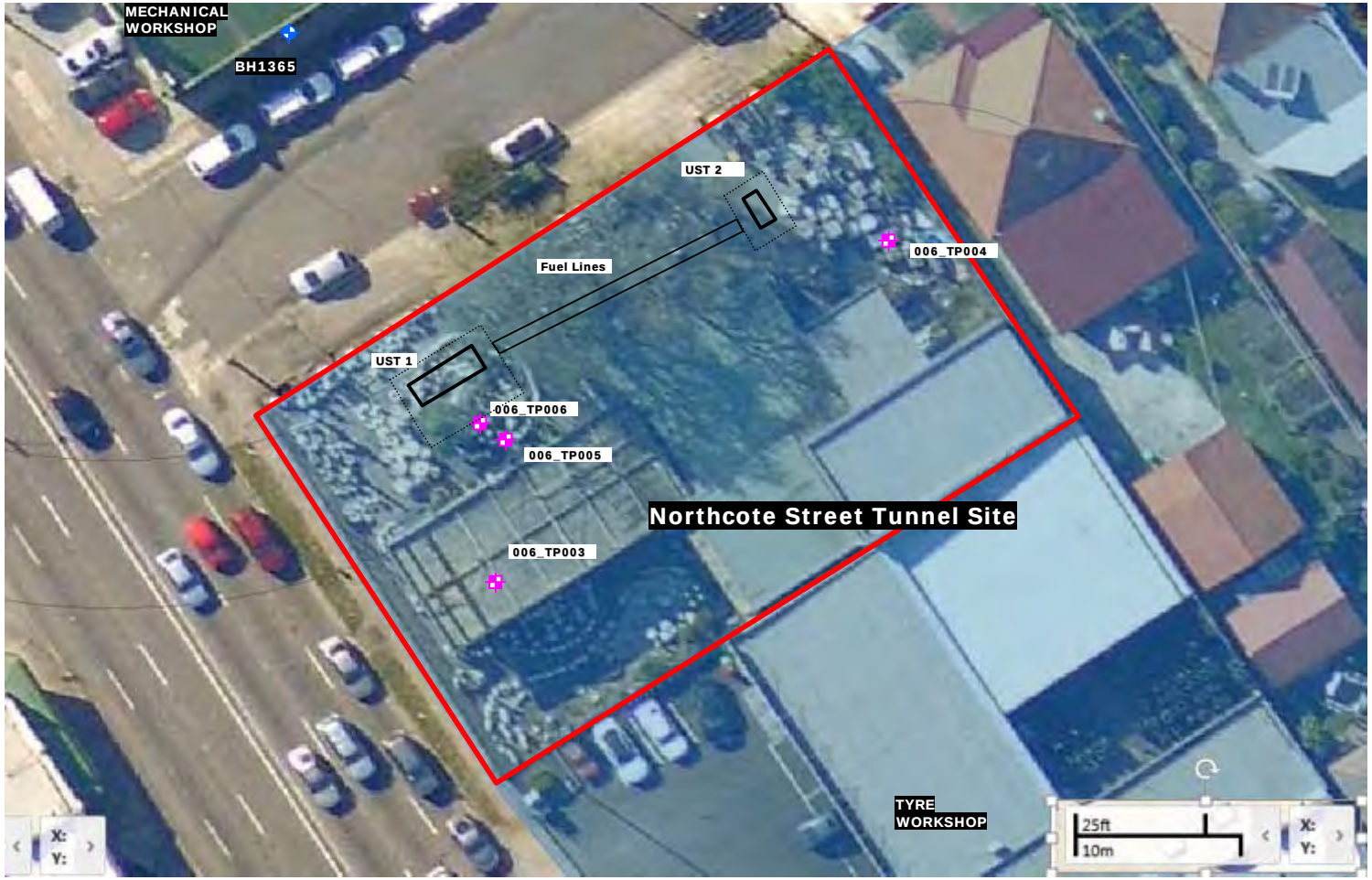
	Sample Type:		ALS	ALS	
	ALS Sample numb		ES1609686002	ES1609686010	
	Sample date:		05/05/2016	05/05/2016	
	Sample ID:		028_TP001_0.50	028_QC001	
	Project Name:		M4E-WCX	M4E-WCX	RPD
	Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	
	Site:		Site 028	Site 028	
	Sampling Method:		Test Pitting	Test Pitting	
	Sample Descriptio		PRIMARY	Duplicate of 028_TP001_0.5	
Analyte grouping / Analyte	**Units**	**LOR**			
EA055: Moisture Content					
Moisture Content (dried @ 103°C)	%		15.3	12.8	*17.8*
EA200: AS 4964 - 2004 Identification of Asbestos in Soils					
Asbestos Detected	g/kg		No	No	----
Asbestos Type	--		-	-	----
Sample weight (dry)	g		70.1	31.7	----
Description	--		Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----
APPROVED IDENTIFIER:	--		G.MORGAN	G.MORGAN	----
EG005T: Total Metals by ICP-AES					
Arsenic	mg/kg	5	18	6	*100.0*
Cadmium	mg/kg	1	1	<1	*nc*
Chromium	mg/kg	2	30	20	*40.0*
Copper	mg/kg	5	32	25	*24.6*
Lead	mg/kg	5	158	128	*21.0*
Nickel	mg/kg	2	9	3	*100.0*
Zinc	mg/kg	5	322	200	*46.7*
EG035T: Total Recoverable Mercury by FIMS					
Mercury	mg/kg	0.1	<0.1	<0.1	*nc*
EP075(SIM)A: Phenolic Compounds					
Phenol	mg/kg	0.5	<0.5	<0.5	*nc*
2-Chlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*
2-Methylphenol	mg/kg	0.5	<0.5	<0.5	*nc*
3- & 4-Methylphenol	mg/kg	1	<1	<1	*nc*
2-Nitrophenol	mg/kg	0.5	<0.5	<0.5	*nc*
2.4-Dimethylphenol	mg/kg	0.5	<0.5	<0.5	*nc*
2.4-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*
2.6-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*
4-Chloro-3-methylphenol	mg/kg	0.5	<0.5	<0.5	*nc*
2.4.6-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*
2.4.5-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	*nc*
Pentachlorophenol	mg/kg	2	<2	<2	*nc*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons					
Naphthalene	mg/kg	0.5	<0.5	<0.5	*nc*
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	*nc*
Acenaphthene	mg/kg	0.5	<0.5	<0.5	*nc*
Fluorene	mg/kg	0.5	<0.5	<0.5	*nc*
Phenanthrene	mg/kg	0.5	<0.5	<0.5	*nc*
Anthracene	mg/kg	0.5	<0.5	<0.5	*nc*
Fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*
Pyrene	mg/kg	0.5	<0.5	<0.5	*nc*
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*
Chrysene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	*nc*
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	*nc*
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.6	0.6	0.6	*0.0*
Benzo(a)pyrene TEQ (LOR)	mg/kg	1.2	1.2	1.2	*0.0*
EP080/071: Total Petroleum Hydrocarbons					
C6 - C9 Fraction	mg/kg	10	<10	<10	*nc*
C10 - C14 Fraction	mg/kg	50	<50	<50	*nc*
C15 - C28 Fraction	mg/kg	100	<100	<100	*nc*
C29 - C36 Fraction	mg/kg	100	<100	<100	*nc*
C10 - C36 Fraction (sum)	mg/kg	50	<50	<50	*nc*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
C6 - C10 Fraction	mg/kg	10	<10	<10	*nc*
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	*nc*
>C10 - C16 Fraction	mg/kg	50	<50	<50	*nc*
>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	*nc*
>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	*nc*
>C10 - C40 Fraction (sum)	mg/kg	50	<50	<50	*nc*
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	*nc*
EP080: BTEXN					
Benzene	mg/kg	0.2	<0.2	<0.2	*nc*
Toluene	mg/kg	0.5	<0.5	<0.5	*nc*
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*
Total Xylenes	mg/kg	0.5	<0.5	<0.5	*nc*
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	*nc*
Naphthalene	mg/kg	1	<1	<1	*nc*

nc = not calculated since results < LOR
LOR = Laboratory Limit of Reporting

BOLD identifies where RPD results

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance



006_TP003 and 006_TP004 were not undertaken for waste classification purposes
006_TP005 and 006_TP006 were undertaken for the purpose of visual delineation of the tankpit excavation for UST 1
No stockpile samples or stockpiles are shown on Figure 1

Legend					
Road Corridor	GHD Groundwater Well (2015)	High Risk Site	REH Testpit Locations	Approximate Location of UST and Fuel Lines	Approximate Location of UST excavation pit

Client: CSJH

UST and Fuel Lines Layout and test pit locations

RAMBOLL ENVIRON

JOB NO: AS121919

DATE: May 2016

FIGURE 1 - Site 006

TABLE 1
Summary of Soil Sampling Results - Site 006 Underground Storage Tanks and Fuel Lines
CSJ M4E WestConnex

	Ramboll Environ Sample ID								006_GS001	006_GS002	006_GS003	006_GS004	006_GS005	006_GS006	006_GS007	006_GS008	006_GS009	006_GS010	006_GS011	006_QC022	RPD
	Location								UST 2	UST 2	UST 2	UST 1	UST 1	UST 1	UST 1	UST 1	Fuel Lines	Fuel Lines	Fuel Lines	Field duplicate of 006_GS008	
	Laboratory Sample Description								Mid brown sandy soil with red rocks plus one small friable asbestos fibre bundle approx 3 x 1 x 1 mm.	Mid brown sandy soil with red rocks.	Mid brown sandy soil with red rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Pale brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----	
			NSW EPA (2014) Waste Classification Guidelines																		
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*													
Asbestos																					
	none	Asbestos **							Yes	No	No	No	No	No	No	No	No	No	No	----	----
		Asbestos Type							Ch****	----	----	----	----	----	----	----	----	----	----	----	----
Metals																					
	mg/kg	Arsenic	100	400	500	2000			<5	<5	<5	5	6	<5	<5	<5	<5	<5	<5	7	nc
	mg/kg	Cadmium	20	80	100	400			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	nc
	mg/kg	Chromium Total***							<2	<2	<2	7	8	6	4	6	5	8	8	11	58.8
	mg/kg	Copper							<5	<5	<5	8	12	10	<5	9	32	6	12	18	66.7
	mg/kg	Lead	100	400	1500	6000			<5	<5	<5	26	26	18	8	23	43	15	27	36	44.1
	mg/kg	Nickel	40	160	1050	4200			<2	<2	<2	2	3	2	<2	2	4	2	4	3	40.0
	mg/kg	Zinc							53	55	42	59	117	62	46	80	398	77	30	126	44.7
	mg/kg	Mercury							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nc
BTEX																					
	mg/kg	Benzene	10	40	18	72			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	nc
	mg/kg	Toluene	288	1150	518	2070			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Ethylbenzene	600	2400	1080	4320			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	meta- & para-Xylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	ortho-Xylene	1000	4000	1800	7200			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Total Xylenes							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Sum of BTEX							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	nc
	mg/kg	Naphthalene							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	nc
TPH (NEPM 1999)																					
	mg/kg	C6 - C9 Fraction	650	2600	650	2600			<10	<10	<10	<10	<10	21	<10	35	<10	<10	<10	56	46.2
	mg/kg	C10 - C14 Fraction							250	250	310	<50	<50	<50	<50	60	<50	<50	<50	<50	nc
	mg/kg	C15 - C28 Fraction							360	390	420	<100	<100	<100	<100	<100	<100	<100	<100	<100	nc
	mg/kg	C29 - C36 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	nc
	mg/kg	C10 - C36 Fraction (sum)	10000	40000	10000	40000			610	640	730	<50	<50	<50	<50	60	<50	<50	<50	<50	nc
TRH (NEPM Amendment 2013)																					
	mg/kg	C6 - C10 Fraction							<10	<10	<10	<10	<10	30	<10	49	<10	<10	<10	70	35.3
	mg/kg	C6 - C10 Fraction minus BTEX (F1)							<10	<10	<10	<10	<10	30	<10	49	<10	<10	<10	70	35.3
	mg/kg	>C10 - C16 Fraction							380	400	470	<50	<50	<50	<50	60	<50	<50	<50	<50	nc
	mg/kg	>C16 - C34 Fraction							280	300	320	<100	<100	<100	<100	<100	<100	<100	<100	<100	nc
	mg/kg	>C34 - C40 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	nc
	mg/kg	>C10 - C40 Fraction (sum)							660	700	790	<50	<50	<50	<50	60	<50	<50	<50	<50	nc
	mg/kg	>C10 - C16 Fraction minus Naphthalene (F2)							380	400	470	<50	<50	<50	<50	60	<50	<50	<50	<50	nc
PAHs																					
	mg/kg	Naphthalene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Acenaphthylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Acenaphthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Fluorene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Phenanthrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Pyrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benz(a)anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Chrysene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benzo(b+j)fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benzo(k)fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benzo(a)pyrene	0.8	3.2	10	23			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Indeno(1.2.3.cd)pyrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Dibenz(a.h)anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benzo(g.h.i)perylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Sum of polycyclic aromatic hydrocarbons							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benzo(a)pyrene TEQ (zero)							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	nc
	mg/kg	Benzo(a)pyrene TEQ (half LOR)							0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	----
	mg/kg	Benzo(a)pyrene TEQ (LOR)							1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	----
Phenols																					
	mg/kg	Phenol	288	1150	518	2070			----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2-Chlorophenol							----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2-Methylphenol	4000	16000	7200	28800			----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	3- & 4-Methylphenol							----	----	<1	<1	----	<1	----	<1	----	<1	----	----	----
	mg/kg	2-Nitrophenol							----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2.4-Dimethylphenol							----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2.4-Dichlorophenol							----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2.6-Dichlorophenol							----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	4-Chloro-3-methylphenol							----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2.4.6-Trichlorophenol	40	160	72	288			----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	2.4.5-Trichlorophenol	8000	32000	14400	57600			----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----	----
	mg/kg	Pentachlorophenol							----	----	<2	<2	----	<2	----	<2	----	<2	----	----	----

TABLE 1
Summary of Soil Sampling Results - Site 006 Underground Storage Tanks and Fuel Lines
CSJ M4E WestConnex

	Ramboll Environ Sample ID								006_GS001	006_GS002	006_GS003	006_GS004	006_GS005	006_GS006	006_GS007	006_GS008	006_GS009	006_GS010	006_GS011	006_QC022	RPD
	Location								UST 2	UST 2	UST 2	UST 1	UST 1	UST 1	UST 1	UST 1	Fuel Lines	Fuel Lines	Fuel Lines	Field duplicate of 006_GS008	
	Laboratory Sample Description								Mid brown sandy soil with red rocks plus one small friable asbestos fibre bundle approx 3 x 1 x 1 mm.	Mid brown sandy soil with red rocks.	Mid brown sandy soil with red rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Pale brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with grey rocks.	Mid brown clay soil with grey rocks.	Mid brown clay soil with grey rocks.	----	
			NSW EPA (2014) Waste Classification Guidelines																		
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*													
PCBs																					
	mg/kg	PCBs (Total)	50	50	50	50			----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----	----
Pesticides																					
	mg/kg	Dichlorvos							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Demeton-S-methyl							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Monocrotophos							----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----	----
	mg/kg	Dimethoate							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Diazinon							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Chlorpyrifos-methyl							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Parathion-methyl							----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----	----
	mg/kg	Malathion							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Fenthion							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Chlorpyrifos	4	16	7.5	30			----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Parathion							----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----	----
	mg/kg	Pirimphos-ethyl							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Chlorfenvinphos							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Bromophos-ethyl							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Fenamiphos							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Prothiofos							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Ethion							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Carbophenothion							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Azinphos Methyl							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	alpha-BHC							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Hexachlorobenzene (HCB)							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	beta-BHC							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	gamma-BHC							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	delta-BHC							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Heptachlor							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Aldrin							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Heptachlor epoxide							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Total Chlordane (sum)							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	trans-Chlordane							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	alpha-Endosulfan							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	cis-Chlordane							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Dieldrin							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	4.4`-DDE							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Endrin							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Endosulfan (sum)	60	240	108	432			----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	beta-Endosulfan							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	4.4`-DDD							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Endrin aldehyde							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Endosulfan sulfate							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	4.4`-DDT							----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----	----
	mg/kg	Endrin ketone							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Methoxychlor							----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----	----
	mg/kg	Sum of DDD + DDE + DDT							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----
	mg/kg	Sum of Aldrin + Dieldrin							----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----	----

*CT1 and CT2 refer to NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
** A confirmed presence of asbestos is pre-classified as Special Waste Asbestos
***These limits apply to Chromium (VI) only. Total Chromium used as a conservative screening level only
****Refers to Chrysotile asbestos detected
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Only compounds with at least one detection are shown.
Concentration in grey box that exceeds the screening value
Concentrations below the LOR noted as <value
RPD = Relative Percent Difference
nc - Not Calculated sinces results < PQL
BOLD identifies where RPD results exceed Ramboll Environ Data Quality Indicators (DQIs) as follows:

Duplicate	Triplicate
>50	>60
>75	>85
>100	>100
Absolute Difference>2.5 * PQL	

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

RAMBOLL ENVIRON

0 40 m

1 cm = 7 m

DRAFTED BY: APB | Date: 23/05/2016 | A3

Waste Classification - Figure 2 - Northcote Site

Sites 006, 012, 026, 027, 028, 136, 137, 138, 139, 140, 141

Site Boundary is Approximate

Nearmap Historical Aerial Imagery 2015 (Nearmap, 2016)

PROJECT: AS-121919

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Figure 2: Proposed depth of excavation. Supplied by CSJ to Ramboll Environ

TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								006_TP001_0.10	006_TP001_0.50	006_TP001_1.20	006_TP002_0.10	006_TP002_0.70	006_TP002_1.20	006_TP003_0.10	006_TP003_0.30	006_TP003_0.60	006_TP004_0.20	006_TP004_0.40	006_TP004_1.00	006_GW004_0.2	006_GW004_0.5	006_GW004_2.5	006_GW005_0.2	006_GW005_0.6	006_GW005_0.7
	Site								Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								FILL; Silty sand, moist, medium grained, uniform, grey/brown, no observed contamination, contains srushed concrete, roots, crushed sandstone	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	FILL; Silty sand, possible backfill sands, grey/orange, saturated, medium grained, perhaps very slight hydrocarbon odour, loose, no asbestos containing material observed, brick	FILL; Gravelly sandy clay, saturated, orange/brown, ironstone gravels, soft, high plasticity, no observed contamination	One wall of test pit - highly weathered sandstone/clayey sand, white, loose, very moist, medium grained, slight HC odour, opposite wall - backfill sands from UST, fills with irrigation water	FILL; Silty sand, brown, moist, contains bricks, blue metal, lots of PVC conduits and wire and ag pipe, medium dense, no observed contaminatoin, broken glass	Clayey SAND; highly weathered sandstone, orange/red, medium stiff, ironstone, high plasticity clay, sand is fine grained, no observed contamination	Clayey SAND; highly weathered sandstone, mostly white, medium grained, less dense, NOC, moist pockets	FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense	CLAY; red and grey mottled, low plasticity, moist	CLAY; red and grey mottled, low plasticity, moist	SANDSTONE; light grey/orange mottled	FILL; Clayey sand, black, fine to medium grained, moist	FILL; Sandy clay with gravel, grey, low plasticity, wet (possible staining)	CLAY; red and grey mottled, wet
	Lab Report ID								ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1610404	ES1610404	ES1610404	ES1610404	ES1610404	ES1610404
	Sampler								AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	MT	MT	MT	MT	MT	MT
	PID Value (ppm)								0	0	0	0.4	0	0.4	0	0	0	0	0	0	--	--	--	0.5	0.5	0
	Sample date:		**NSW EPA (2014) Waste Classification Guidelines**						4/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016
	Units	**Analyte**	**CT1**	**CT2**	**SCC1***	**SCC2***	**TCLP1***	**TCLP2***																		
Asbestos																										
	none	**Asbestos ** **							No	----	----	No	No	----	----	----	----	No	----	----	No	No	----	No	No	No
		Asbestos Type							----	----	----	----	----	----	----	----	----	----	----	----	-	-	----	-	-	-
Metals																										
	mg/kg	**Arsenic**	**100**	**400**	**500**	**2000**			<5	<5	<5	46	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	6	<5
	mg/kg	**Cadmium**	**20**	**80**	**100**	**400**			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	mg/kg	**Chromium Total*** **							4	4	<2	19	15	2	4	11	4	12	19	8	6	3	14	21	69	2
	mg/kg	**Copper**							7	<5	<5	20	<5	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	12	24	<5
	mg/kg	**Iron**																			0.076	0.138	0.640	----	----	----
	mg/kg	**Lead**	**100**	**400**	**1500**	**6000**			22	6	<5	39	11	9	13	6	10	10	6	6	6	5	6	21	33	10
	mg/kg	**Nickel**	**40**	**160**	**1050**	**4200**			<2	<2	<2	4	<2	<2	7	<2	<2	2	<2	<2	<2	<2	3	11	60	<2
	mg/kg	**Zinc**							46	<5	<5	228	24	<5	34	<5	<5	14	<5	<5	<5	<5	8	40	76	<5
	mg/kg	**Mercury**							<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
BTEX																										
	mg/kg	**Benzene**	**10**	**40**	**18**	**72**			<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
	mg/kg	**Toluene**	**288**	**1152**	**518**	**2073**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Ethylbenzene**	**600**	**2400**	**1080**	**4320**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**meta- & para-Xylene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**ortho-Xylene**	**1000**	**4000**	**1800**	**7200**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Total Xylenes**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Sum of BTEX**							<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
	mg/kg	**Naphthalene**							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (NEPM 1999)																										
	mg/kg	**C6 - C9 Fraction**	**650**	**2600**	**650**	**2600**			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	**C10 - C14 Fraction**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	**C15 - C28 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	**C29 - C36 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	**C10 - C36 Fraction (sum)**	**10000**	**40000**	**10000**	**40000**			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH (NEPM Amendment 2013)																										
	mg/kg	**C6 - C10 Fraction**							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	**C6 - C10 Fraction minus BTEX (F1)**							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	**>C10 - C16 Fraction**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	**>C16 - C34 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	**>C34 - C40 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	**>C10 - C40 Fraction (sum)**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	**>C10 - C16 Fraction minus Naphthalene (F2)**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
PAHs																										
	mg/kg	**Naphthalene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Acenaphthylene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Acenaphthene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Fluorene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Phenanthrene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Anthracene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Fluoranthene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Pyrene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benz(a)anthracene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Chrysene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(b+j)fluoranthene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(k)fluoranthene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(a)pyrene**	**0.8**	**3.2**	**10**	**23**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Indeno(1.2.3.cd)pyrene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Dibenz(a.h)anthracene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(g.h.i)perylene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Sum of polycyclic aromatic hydrocarbons**	**200**	**800**	**200**	**800**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(a)pyrene TEQ (zero)**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(a)pyrene TEQ (half LOR)**							0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	mg/kg	**Benzo(a)pyrene TEQ (LOR)**							1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Phenols																										
	mg/kg	**Phenol**	**288**	**1152**	**518**	**2073**			<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**2-Chlorophenol**							<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**2-Methylphenol**	**4000**	**16000**	**7200**	**28800**			<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**3- & 4-Methylphenol**							<1	----	----	<1	----	----	----	----	----	<1	----	----	<1	<1	<1	<1	<1	<1
	mg/kg	**2-Nitrophenol**							<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**2.4-Dimethylphenol**							<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								006_TP001_0.10	006_TP001_0.50	006_TP001_1.20	006_TP002_0.10	006_TP002_0.70	006_TP002_1.20	006_TP003_0.10	006_TP003_0.30	006_TP003_0.60	006_TP004_0.20	006_TP004_0.40	006_TP004_1.00	006_GW004_0.2	006_GW004_0.5	006_GW004_2.5	006_GW005_0.2	006_GW005_0.6	006_GW005_0.7
	Site								Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								FILL; Silty sand, moist, medium grained, uniform, grey/brown, no observed contamination, contains srushed concrete, roots, crushed sandstone	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	Residual CLAY/highly weathered sandstone; mottled grey/red orange, moist, minor very fine sands, soft-moist, no observed contamination	FILL; Silty sand, possible backfill sands, grey/orange, saturated, medium grained, perhaps very slight hydrocarbon odour, loose, no asbestos containing material observed, brick	FILL; Gravelly sandy clay, saturated, orange/brown, ironstone gravels, soft, high plasticity, no observed contamination	One wall of test pit - highly weathered sandstone/clayey sand, white, loose, very moist, medium grained, slight HC odour, opposite wall - backfill sands from UST, fills with irrigation water	FILL; Silty sand, brown, moist, contains bricks, blue metal, lots of PVC conduits and wire and ag pipe, medium dense, no observed contaminatoin, broken glass	Clayey SAND; highly weathered sandstone, orange/red, medium stiff, ironstone, high plasticity clay, sand is fine grained, no observed contamination	Clayey SAND; highly weathered sandstone, mostly white, medium grained, less dense, NOC, moist pockets	FILL; Gravelly clayey sand, reworked natural with pieces of concrete, sandstone mixed in, orange/brown, medium dense-soft, no observed contamination	Gravelly SILT; orange, slightly moist-moist, gravel is ironstone, no observed contamination	Clayey SAND; highly weathered sandstone, orange and white, high plasticity, medium dense	CLAY; red and grey mottled, low plasticity, moist	CLAY; red and grey mottled, low plasticity, moist	SANDSTONE; light grey/orange mottled	FILL; Clayey sand, black, fine to medium grained, moist	FILL; Sandy clay with gravel, grey, low plasticity, wet (possible staining)	CLAY; red and grey mottled, wet
	Lab Report ID								ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1609685	ES1610404	ES1610404	ES1610404	ES1610404	ES1610404	ES1610404
	Sampler								AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	MT	MT	MT	MT	MT	MT
	PID Value (ppm)								0	0	0	0.4	0	0.4	0	0	0	0	0	0	--	--	--	0.5	0.5	0
	Sample date:		**NSW EPA (2014) Waste Classification Guidelines**						4/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016
	Units	**Analyte**	**CT1**	**CT2**	**SCC1***	**SCC2***	**TCLP1***	**TCLP2***																		
	mg/kg	**2.4-Dichlorophenol**							<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**2.6-Dichlorophenol**							<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**4-Chloro-3-methylphenol**							<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**2.4.6-Trichlorophenol**	**40**	**160**	**72**	**288**			<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**2.4.5-Trichlorophenol**	**8000**	**32000**	**14400**	**57600**			<0.5	----	----	<0.5	----	----	----	----	----	<0.5	----	----	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Pentachlorophenol**							<2	----	----	<2	----	----	----	----	----	<2	----	----	<2	<2	<2	<2	<2	<2
PCBs																										
	mg/kg	**PCBs (Total)**	**50**	**50**	**50**	**50**			0.2	----	----	<0.1	----	----	----	----	----	<0.1	----	----	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
Pesticides																										
	mg/kg	**Dichlorvos**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Demeton-S-methyl**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Monocrotophos**							<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	**Dimethoate**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Diazinon**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Chlorpyrifos-methyl**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Parathion-methyl**							<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	**Malathion**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Fenthion**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Chlorpyrifos**	**4**	**16**	**7.5**	**30**			<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Parathion**							<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	**Pirimphos-ethyl**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Chlorfenvinphos**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Bromophos-ethyl**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Fenamiphos**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Prothiofos**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Ethion**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Carbophenothion**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Azinphos Methyl**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**alpha-BHC**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Hexachlorobenzene (HCB)**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**beta-BHC**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**gamma-BHC**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**delta-BHC**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Heptachlor**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Aldrin**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Heptachlor epoxide**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Total Chlordane (sum)**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**trans-Chlordane**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**alpha-Endosulfan**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**cis-Chlordane**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Dieldrin**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**4.4`-DDE**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Endrin**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Endosulfan (sum)**	**60**	**240**	**108**	**432**			<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**beta-Endosulfan**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**4.4`-DDD**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Endrin aldehyde**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Endosulfan sulfate**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**4.4`-DDT**							<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	**Endrin ketone**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Methoxychlor**							<0.2	----	----	<0.2	----	----	----	----	----	<0.2	----	----	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	**Sum of DDD + DDE + DDT**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	mg/kg	**Sum of Aldrin + Dieldrin**							<0.05	----	----	<0.05	----	----	----	----	----	<0.05	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals (TCLP)																										
	mg/L	**Arsenic**					**5**	**20**	----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
	mg/L	**Cadmium**					**1**	**4**	----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
	mg/L	**Chromium, Total**							----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
	mg/L	**Copper**							----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
	mg/L	**Lead**					**5**	**20**	----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
	mg/L	**Nickel**					**2**	**8**	----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
	mg/L	**Zinc**							----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---
PAH TCLP																										
	mg/L	**B(a)P**					**0.04**	**0.16**	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

*CT1 and CT2 refer to NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
** A confirmed presence of asbestos is pre-classified as Special Waste Asbestos
***These limits apply to Chromium (VI) only. Total Chromium used as a conservative screening level only
****Refers to Chrysotile asbestos detected
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Only compounds with at least one detection are shown.
Concentration in grey box that exceeds the screening value
Concentrations below the LOR noted as <value
RPD = Relative Percent Difference
nc - Not Calculated sinces results < PQL

BOLD identifies where RPD results exceed Ramboll Environ Data Quality Indicators (DQIs) as follows:

Duplicate	**Triplicate**
>50	>60
>75	>85
>100	>100
Absolute Difference>2.5 * PQL	

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								006_GW005_4.0	006_GW006_0.2	006_GW006_0.5	012_GW001_0.2	012_GW001_0.5	026_TP001_0.10	026_TP001_0.50	026_TP001_1.00	026_GW001_0.2	026_GW001_0.5	027_TP001_0.20	027_TP001_0.50	027_TP001_0.80	027_TP002_0.25	027_TP002_1.30	027_GW003_0.2	027_GW003_0.5
	Site								Site 006	Site 026	Site 026	Site 012	Site 012	Site 026	Site 026	Site 026	Site 026	Site 026	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								SANDSTONE	FILL; Clayey sand, light brown, moist	CLAY; brown with red (sandstone) mottling, low to medium plasticity, moist	FILL; sandy clay, brown	CLAY, light brown/grey mottled, low plasticity, dry	FILL; Sandy silty gravel, dark grey/brown, gravel is basalt, moist, medium density, no observed contamination	FILL; Silty clay, possibly reworked natural, moist, grey/brown with orange and white pockets, sandstone, some charcoal inclusions, no observed contamination	Silty CLAY; orange with red ironstone pockets, soft, moist, high plasticity, no observed contamination	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	FILL; Clayey silt, grey with some dark grey pockets, pieces of bricks, medium plasticity, moist, moderately stiff, perhaps very slight hydrocarbon odour, no ACM observed	FILL; Clayey silt, grey with some dark grey pockets, pieces of bricks, possibly reworked natural, no anthropogenic inclusions, no observed contamination	Silty CLAY; orange/red, ironstone gravels, moist, medium-high plasticity, moist, no observed contamination	FILL; Clayey silt, grey/brown, moist-very moist, soft-moist, no anthropogenic inclusions	Silty CLAY; orange, moist-very moist, soft, ironstone gravels, no observed contamination	Sandy CLAY, dark brown, low plasticity, wet	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff
	Lab Report ID								ES1610404	ES1610404	ES1610404	ES1610404	ES1610404	ES1609680	ES1609680	ES1609680	ES1610406	ES1610406	ES1609682	ES1609682	ES1609682	ES1609682	ES1609682	ES1610406	ES1610406
	Sampler								MT	MT	MT	MT	MT	AS	AS	AS	MT	MT	AS	AS	AS	AS	AS	MT	MT
	PID Value (ppm)								1.1	0.2	0.2														
	Sample date:		**NSW EPA (2014) Waste Classification Guidelines**						11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	04/05/2016	04/05/2016	04/05/2016	11/05/2016	11/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	12/05/2016	12/05/2016
	Units	**Analyte**	**CT1**	**CT2**	**SCC1***	**SCC2***	**TCLP1***	**TCLP2***																	
Asbestos																									
	none	**Asbestos ** **							----	No	No	No	No	No	No	----	No	No	No	No	----	No	----	No	No
		Asbestos Type							----	-	-	-	-	-	-	----	-	-	-	-	----	-	----	-	-
Metals																									
	mg/kg	**Arsenic**	**100**	**400**	**500**	**2000**			<5	13	6	14	21	<5	16	11	<5	<5	9	7	5	12	14	10	<5
	mg/kg	**Cadmium**	**20**	**80**	**100**	**400**			<1	<1	<1	<1	<1	1	1	1	<1	<1	1	<1	<1	<1	<1	<1	<1
	mg/kg	**Chromium Total*** **							8	23	26	29	32	12	24	42	9	6	17	20	26	38	15	31	28
	mg/kg	**Copper**							<5	<5	<5	21	153	80	20	<5	13	<5	28	8	<5	<5	<5	6	<5
	mg/kg	**Iron**							0.749	----	----	----	----	---	---	---	---	---	---	---	---	---	---	---	---
	mg/kg	**Lead**	**100**	**400**	**1500**	**6000**			10	14	12	228	438	<5	75	18	9	6	158	37	13	14	16	38	11
	mg/kg	**Nickel**	**40**	**160**	**1050**	**4200**			5	<2	2	5	6	119	2	2	45	<2	6	3	<2	<2	<2	<2	<2
	mg/kg	**Zinc**							17	10	6	66	420	40	215	65	22	<5	239	42	<5	<5	<5	31	<5
	mg/kg	**Mercury**							<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
BTEX																									
	mg/kg	**Benzene**	**10**	**40**	**18**	**72**			<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
	mg/kg	**Toluene**	**288**	**1152**	**518**	**2073**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Ethylbenzene**	**600**	**2400**	**1080**	**4320**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**meta- & para-Xylene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**ortho-Xylene**	**1000**	**4000**	**1800**	**7200**			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Total Xylenes**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Sum of BTEX**							<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
	mg/kg	**Naphthalene**							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (NEPM 1999)																									
	mg/kg	**C6 - C9 Fraction**	**650**	**2600**	**650**	**2600**			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	**C10 - C14 Fraction**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	**C15 - C28 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	**C29 - C36 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	140	<100	<100	<100	<100	<100	<100
	mg/kg	**C10 - C36 Fraction (sum)**	**10000**	**40000**	**10000**	**40000**			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	140	<50	<50	<50	<50	<50	<50
TRH (NEPM Amendment 2013)																									
	mg/kg	**C6 - C10 Fraction**							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	**C6 - C10 Fraction minus BTEX (F1)**							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	**>C10 - C16 Fraction**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	**>C16 - C34 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	120	<100	<100	<100	<100	<100	<100
	mg/kg	**>C34 - C40 Fraction**							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	180	<100	<100	<100	<100	<100	<100
	mg/kg	**>C10 - C40 Fraction (sum)**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	300	<50	<50	<50	<50	<50	<50
	mg/kg	**>C10 - C16 Fraction minus Naphthalene (F2)**							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
PAHs																									
	mg/kg	**Naphthalene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Acenaphthylene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Acenaphthene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Fluorene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Phenanthrene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Anthracene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Fluoranthene**							<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Pyrene**							<0.5	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benz(a)anthracene**							<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Chrysene**							<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(b+j)fluoranthene**							<0.5	<0.5	<0.5	<0.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(k)fluoranthene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(a)pyrene**	**0.8**	**3.2**	**10**	**23**			<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Indeno(1.2.3.cd)pyrene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Dibenz(a.h)anthracene**							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(g.h.i)perylene**							<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Sum of polycyclic aromatic hydrocarbons**	**200**	**800**	**200**	**800**			<0.5	<0.5	<0.5	<0.5	6.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(a)pyrene TEQ (zero)**							<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	**Benzo(a)pyrene TEQ (half LOR)**							0.6	0.6	0.6	0.6	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	mg/kg	**Benzo(a)pyrene TEQ (LOR)**							1.2	1.2	1.2	1.2	1.7	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Phenols																									
	mg/kg	**Phenol**	**288**	**1152**	**518**	**2073**			<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	**2-Chlorophenol**							<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	**2-Methylphenol**	**4000**	**16000**	**7200**	**28800**			<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	**3- & 4-Methylphenol**							<1	<1	<1	<1	<1	----	----	----	----	----	<1	----	----	----	----	<1	<1
	mg/kg	**2-Nitrophenol**							<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	**2.4-Dimethylphenol**							<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5

	Ramboll Environ Sample ID								006_GW005_4.0	006_GW006_0.2	006_GW006_0.5	012_GW001_0.2	012_GW001_0.5	026_TP001_0.10	026_TP001_0.50	026_TP001_1.00	026_GW001_0.2	026_GW001_0.5	027_TP001_0.20	027_TP001_0.50	027_TP001_0.80	027_TP002_0.25	027_TP002_1.30	027_GW003_0.2	027_GW003_0.5
	Site								Site 006	Site 026	Site 026	Site 012	Site 012	Site 026	Site 026	Site 026	Site 026	Site 026	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027	Site 027
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								SANDSTONE	FILL; Clayey sand, light brown, moist	CLAY; brown with red (sandstone) mottling, low to medium plasticity, moist	FILL; sandy clay, brown	CLAY, light brown/grey mottled, low plasticity, dry	FILL; Sandy silty gravel, dark grey/brown, gravel is basalt, moist, medium density, no observed contamination	FILL; Silty clay, possibly reworked natural, moist, grey/brown with orange and white pockets, sandstone, some charcoal inclusions, no observed contamination	Silty CLAY; orange with red ironstone pockets, soft, moist, high plasticity, no observed contamination	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	FILL; Sandy Clay, light brown, with cobbles, moist, becoming black	FILL; Clayey silt, grey wtih some dark grey pockets, pieces of bricks, medium plasticity, moist, moderately stiff, perhaps very slight hydrocarbon odour, no ACM observed	FILL; Clayey silt, grey wtih some dark grey pockets, pieces of bricks, possibly reworked natural, no anthropogenic inclusions, no observed contamination	Silty CLAY; orange/red, ironstone gravels, moist, medium-high plasticity, moist, no observed contamination	FILL; Clayey silt, grey/brown, moist-very moist, soft-moist, no anthropogenic inclusions	Silty CLAY; orange, moist-very moist, soft, ironstone gravels, no observed contamination	Sandy CLAY, dark brown, low plasticity, wet	CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff
	Lab Report ID								ES1610404	ES1610404	ES1610404	ES1610404	ES1610404	ES1609680	ES1609680	ES1609680	ES1610406	ES1610406	ES1609682	ES1609682	ES1609682	ES1609682	ES1609682	ES1610406	ES1610406
	Sampler								MT	MT	MT	MT	MT	AS	AS	AS	MT	MT	AS	AS	AS	AS	AS	MT	MT
	PID Value (ppm)								1.1	0.2	0.2														
	Sample date:		NSW EPA (2014) Waste Classification Guidelines						11/05/2016	11/05/2016	11/05/2016	11/05/2016	11/05/2016	04/05/2016	04/05/2016	04/05/2016	11/05/2016	11/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	12/05/2016	12/05/2016
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*																	
	mg/kg	2.4-Dichlorophenol							<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	2.6-Dichlorophenol							<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	4-Chloro-3-methylphenol							<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	2.4.6-Trichlorophenol	40	160	72	288			<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	2.4.5-Trichlorophenol	8000	32000	14400	57600			<0.5	<0.5	<0.5	<0.5	<0.5	----	----	----	----	----	<0.5	----	----	----	----	<0.5	<0.5
	mg/kg	Pentachlorophenol							<2	<2	<2	<2	<2	----	----	----	----	----	<2	----	----	----	----	<2	<2
PCBs																									
	mg/kg	PCBs (Total)	50	50	50	50			<0.1	<0.1	<0.1	----	----	----	----	----	----	----	<0.1	----	----	----	----	----	----
Pesticides																									
	mg/kg	Dichlorvos							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Demeton-S-methyl							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Monocrotophos							<0.2	<0.2	<0.2	----	----	----	----	----	----	----	<0.2	----	----	----	----	----	----
	mg/kg	Dimethoate							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Diazinon							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Chlorpyrifos-methyl							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Parathion-methyl							<0.2	<0.2	<0.2	----	----	----	----	----	----	----	<0.2	----	----	----	----	----	----
	mg/kg	Malathion							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Fenthion							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Chlorpyrifos	4	16	7.5	30			<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Parathion							<0.2	<0.2	<0.2	----	----	----	----	----	----	----	<0.2	----	----	----	----	----	----
	mg/kg	Pirimphos-ethyl							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Chlorfenvinphos							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Bromophos-ethyl							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Fenamiphos							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Prothiofos							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Ethion							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Carbophenothion							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Azinphos Methyl							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	alpha-BHC							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Hexachlorobenzene (HCB)							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	beta-BHC							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	gamma-BHC							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	delta-BHC							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Heptachlor							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Aldrin							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Heptachlor epoxide							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Total Chlordane (sum)							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	trans-Chlordane							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	alpha-Endosulfan							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	cis-Chlordane							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Dieldrin							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	4.4`-DDE							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Endrin							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Endosulfan (sum)	60	240	108	432			<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	beta-Endosulfan							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	4.4`-DDD							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Endrin aldehyde							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Endosulfan sulfate							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	4.4`-DDT							<0.2	<0.2	<0.2	----	----	----	----	----	----	----	<0.2	----	----	----	----	----	----
	mg/kg	Endrin ketone							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Methoxychlor							<0.2	<0.2	<0.2	----	----	----	----	----	----	----	<0.2	----	----	----	----	----	----
	mg/kg	Sum of DDD + DDE + DDT							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
	mg/kg	Sum of Aldrin + Dieldrin							<0.05	<0.05	<0.05	----	----	----	----	----	----	----	<0.05	----	----	----	----	----	----
Metals (TCLP)																									
	mg/L	Arsenic					5	20	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
	mg/L	Cadmium					1	4	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
	mg/L	Chromium, Total							---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
	mg/L	Copper							---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
	mg/L	Lead					5	20	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
	mg/L	Nickel					2	8	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
	mg/L	Zinc							---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----
PAH TCLP																									
	mg/L	B(a)P					0.04	0.16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

*CT1 and CT2 refer to NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
** A confirmed presence of asbestos is pre-classified as Special Waste Asbestos
***These limits apply to Chromium (VI) only. Total Chromium used as a conservative screening level only
****Refers to Chrysotile asbestos detected
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Only compounds with at least one detection are shown.
Concentration in grey box that exceeds the screening value
Concentrations below the LOR noted as <value
RPD = Relative Percent Difference
nc - Not Calculated sinces results < PQL
BOLD identifies where RPD results exceed Ramboll Environ Data Quality Indicators (DQIs) as follows:

Duplicate	Triplicate
>50	>60
>75	>85
>100	>100
Absolute Difference>2.5 * PQL	

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								027_GW003_1.0	028_TP001_0.10	028_TP001_0.50	028_TP001_0.70	028_TP001_0.90	028_TP002_0.20	028_TP002_0.50	028_TP002_1.00	028_TP003_0.40	028_TP003_0.60	136_TP001_0.10	136_TP002_0.20	138_TP001_0.10	138_TP001_0.30	138_TP002_0.20	138_GS001	139_TP001_0.10	139_GS001	140_TP001_0.20
	Site								Site 027	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 136	Site 137	Site 138	Site 138	Site 138	Site 138	Site 139	Site 139	Site 140
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, NOC	Grading to weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, NOC	FILL; Gravelly clayey silt, gravel is ironstone, reworked natural (?), grey/brown, medium stiff, moist, high gravel content	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, no observed contamination	Grading to extremely weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, no observed contamination	FILL; Gravelly clayey silt, gravel is ironstone, stiff, dry-slightly moist, grey/brown, roots, pipe near surface, no observed contamination, minor pockets of sand beneath concrete	Silty CLAY; orange, dry-slightly moist, someironstone gravels, stiff, low plasticity, no observed contamination	FILL; gravelly, sandy SILT, brown, low plasticity, contains, brick, glass, plastic, roots, tile, NOC	FILL; gravelly sandy SILT, brown, moist, soft, contains glass, plastic, timber, brick, wire, concrete, NOC	FILL; Sandy SILT, toposoil, grass, brown, moist, NOC	FILL; Silty CLAY, reworked natural, some pockets of topsoil, yellow/brown, moist, NOC	FILL; gravelly sandy Silt, brown, moist, contains roots, blue metal, pipe, minor crushed brick and concrete	Two pieces of organic fibre board approximately 50 x 35 x 4mm	FILL; gravelly, sandy SILT, brown, very moist, ironstone, contains brick, plastic, gaffer tape, timber, metal pieces, crushed concrete	One piece of organic fibre board approximately 50 x 50 x 3mm	FILL; clayey, sandy SILT, brown, contains plastic, irrigation pipe, quartz gravels, NOC
	Lab Report ID								ES1610406	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867
	Sampler								MT	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS
	PID Value (ppm)								0	0.1	0.2	0	0	0	0	0	0	0	---	---	---	---	---	---	---	---	---
	Sample date:		NSW EPA (2014) Waste Classification Guidelines						12/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*																			
Asbestos																											
	none	Asbestos **							No	No	No	----	----	No	----	----	No	----	No	No	No	No	No	No	No	No	No
		Asbestos Type							-	-	-	----	----	-	----	----	-	----	-	-	-	-	-	-	-	-	-
Metals																											
	mg/kg	Arsenic	100	400	500	2000			8	13	18	<5	9	6	8	8	9	6	9	11	68	10	341	---	11	---	12
	mg/kg	Cadmium	20	80	100	400			<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	---	<1	---	<1
	mg/kg	Chromium Total***							33	25	30	33	33	14	37	19	26	29	18	25	35	20	22	---	39	---	23
	mg/kg	Copper							<5	35	32	<5	<5	18	<5	<5	<5	<5	16	9	116	<5	29	---	30	---	17
	mg/kg	Iron							---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	mg/kg	Lead	100	400	1500	6000			17	141	158	11	17	21	14	19	20	19	151	66	2070	22	290	---	167	---	99
	mg/kg	Nickel	40	160	1050	4200			<2	4	9	<2	<2	3	<2	<2	<2	<2	3	<2	8	<2	4	---	3	---	3
	mg/kg	Zinc							<5	226	322	6	<5	41	<5	<5	<5	<5	105	46	1390	16	455	---	432	---	100
	mg/kg	Mercury							<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	<0.1	0.1	---	<0.1	---	<0.1
BTEX																											
	mg/kg	Benzene	10	40	18	72			<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
	mg/kg	Toluene	288	1152	518	2073			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Ethylbenzene	600	2400	1080	4320			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	meta- & para-Xylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	ortho-Xylene	1000	4000	1800	7200			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Total Xylenes							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Sum of BTEX							<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
	mg/kg	Naphthalene							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	---	<1	---	<1
TPH (NEPM 1999)																											
	mg/kg	C6 - C9 Fraction	650	2600	650	2600			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	---	<10	---	<10
	mg/kg	C10 - C14 Fraction							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	---	<50	---	<50
	mg/kg	C15 - C28 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	120	---	<100	---	<100
	mg/kg	C29 - C36 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	---	<100	---	<100
	mg/kg	C10 - C36 Fraction (sum)	10000	40000	10000	40000			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	120	---	<50	---	<50
TRH (NEPM Amendment 2013)																											
	mg/kg	C6 - C10 Fraction							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	---	<10	---	<10
	mg/kg	C6 - C10 Fraction minus BTEX (F1)							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	---	<10	---	<10
	mg/kg	>C10 - C16 Fraction							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	---	<50	---	<50
	mg/kg	>C16 - C34 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	170	---	<100	---	<100
	mg/kg	>C34 - C40 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	---	<100	---	<100
	mg/kg	>C10 - C40 Fraction (sum)							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	170	---	<50	---	<50
	mg/kg	>C10 - C16 Fraction minus Naphthalene (F2)							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	---	<50	---	<50
PAHs																											
	mg/kg	Naphthalene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Acenaphthylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	---	<0.5	---	<0.5
	mg/kg	Acenaphthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Fluorene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Phenanthrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	2.8	---	<0.5	---	<0.5
	mg/kg	Anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	---	<0.5	---	<0.5
	mg/kg	Fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	1.3	<0.5	5.8	---	0.6	---	0.8
	mg/kg	Pyrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	1.2	<0.5	6	---	0.6	---	0.8
	mg/kg	Benz(a)anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	3.1	---	<0.5	---	<0.5
	mg/kg	Chrysene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	3	---	<0.5	---	<0.5
	mg/kg	Benzo(b+j)fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.8	<0.5	3.8	---	0.6	---	0.6
	mg/kg	Benzo(k)fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	---	<0.5	---	<0.5
	mg/kg	Benzo(a)pyrene	0.8	3.2	10	23			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	3.2	---	<0.5	---	<0.5
	mg/kg	Indeno(1.2.3.cd)pyrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	---	<0.5	---	<0.5
	mg/kg	Dibenz(a.h)anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5
	mg/kg	Benzo(g.h.i)perylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	---	<0.5	---	<0.5
	mg/kg	Sum of polycyclic aromatic hydrocarbons	200	800	200	800			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	<0.5	6.1	<0.5	33.9	---	1.8	---	2.2
	mg/kg	Benzo(a)pyrene TEQ (zero)							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	4.2	---	<0.5	---	<0.5
	mg/kg	Benzo(a)pyrene TEQ (half LOR)							0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.2	0.6	4.5	---	0.6	---	0.6
	mg/kg	Benzo(a)pyrene TEQ (LOR)							1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.2	4.7	---	1.2	---	1.2
Phenols																											
	mg/kg	Phenol	288	1152	518	2073			<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	2-Chlorophenol							<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	2-Methylphenol	4000	16000	7200	28800			<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	3- & 4-Methylphenol							<1	----	<1	----	----	<1	----	----	<1	----	<1	<1	<1	<1	<1		<1	---	<1
	mg/kg	2-Nitrophenol							<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	2.4-Dimethylphenol							<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5

TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								027_GW003_1.0	028_TP001_0.10	028_TP001_0.50	028_TP001_0.70	028_TP001_0.90	028_TP002_0.20	028_TP002_0.50	028_TP002_1.00	028_TP003_0.40	028_TP003_0.60
	Site								Site 027	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028	Site 028
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								CLAY, orange/red/grey mottled, moist, low-med plasticity, becoming stiff	FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	FILL, gravelly, silty Clay, dark brown, black staining, pieces of plastic,	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, NOC	Grading to weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, NOC	FILL; Gravelly clayey silt, gravel is ironstone, reworked natural (?), grey/brown, medium stiff, moist, high gravel content	Silty CLAY; orange, slightly moist-moist, soft, low plasticity, some ironstone gravels, no observed contamination	Grading to extremely weathered SHALE; light grey and red/brown, ironstone cementing, low plasticity, slightly moist, medium stiff, no observed contamination	FILL; Gravelly clayey silt, gravel is ironstone, stiff, dry-slightly moist, grey/brown, roots, pipe near surface, no observed contamination, minor pockets of sand beneath concrete	Silty CLAY; orange, dry-slightly moist, someironstone gravels, stiff, low plasticity, no observed contamination
	Lab Report ID								ES1610406	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686	ES1609686
	Sampler								MT	AS	AS	AS	AS	AS	AS	AS	AS	AS
	PID Value (ppm)									0.1	0.2	0	0	0	0	0	0	0
	Sample date:		NSW EPA (2014) Waste Classification Guidelines						12/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016	05/05/2016
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*										
	mg/kg	2.4-Dichlorophenol							<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----
	mg/kg	2.6-Dichlorophenol							<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----
	mg/kg	4-Chloro-3-methylphenol							<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----
	mg/kg	2.4.6-Trichlorophenol	40	160	72	288			<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----
	mg/kg	2.4.5-Trichlorophenol	8000	32000	14400	57600			<0.5	----	<0.5	----	----	<0.5	----	----	<0.5	----
	mg/kg	Pentachlorophenol							<2	----	<2	----	----	<2	----	----	<2	----
PCBs																		
	mg/kg	PCBs (Total)	50	50	50	50			----	----	<0.1	----	----	<0.1	----	----	<0.1	----
Pesticides																		
	mg/kg	Dichlorvos							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Demeton-S-methyl							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Monocrotophos							----	----	<0.2	----	----	<0.2	----	----	<0.2	----
	mg/kg	Dimethoate							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Diazinon							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Chlorpyrifos-methyl							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Parathion-methyl							----	----	<0.2	----	----	<0.2	----	----	<0.2	----
	mg/kg	Malathion							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Fenthion							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Chlorpyrifos	4	16	7.5	30			----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Parathion							----	----	<0.2	----	----	<0.2	----	----	<0.2	----
	mg/kg	Pirimphos-ethyl							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Chlorfenvinphos							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Bromophos-ethyl							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Fenamiphos							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Prothiofos							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Ethion							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Carbophenothion							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Azinphos Methyl							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	alpha-BHC							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Hexachlorobenzene (HCB)							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	beta-BHC							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	gamma-BHC							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	delta-BHC							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Heptachlor							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Aldrin							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Heptachlor epoxide							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Total Chlordane (sum)							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	trans-Chlordane							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	alpha-Endosulfan							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	cis-Chlordane							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Dieldrin							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	4.4`-DDE							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Endrin							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Endosulfan (sum)	60	240	108	432			----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	beta-Endosulfan							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	4.4`-DDD							----	----	0.06	----	----	<0.05	----	----	<0.05	----
	mg/kg	Endrin aldehyde							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Endosulfan sulfate							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	4.4`-DDT							----	----	<0.2	----	----	<0.2	----	----	<0.2	----
	mg/kg	Endrin ketone							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
	mg/kg	Methoxychlor							----	----	<0.2	----	----	<0.2	----	----	<0.2	----
	mg/kg	Sum of DDD + DDE + DDT							----	----	0.06	----	----	<0.05	----	----	<0.05	----
	mg/kg	Sum of Aldrin + Dieldrin							----	----	<0.05	----	----	<0.05	----	----	<0.05	----
Metals (TCLP)																		
	mg/L	Arsenic					5	20	----	<0.1	<0.1	----	----	----	----	----	----	----
	mg/L	Cadmium					1	4	----	<0.05	<0.05	----	----	----	----	----	----	----
	mg/L	Chromium, Total							----	<0.1	<0.1	----	----	----	----	----	----	----
	mg/L	Copper							----	<0.1	<0.1	----	----	----	----	----	----	----
	mg/L	Lead					5	20	----	<0.1	0.2	----	----	----	----	----	----	----
	mg/L	Nickel					2	8	----	<0.1	<0.1	----	----	----	----	----	----	----
	mg/L	Zinc							----	1	3.2	----	----	----	----	----	----	----
PAH TCLP																		
	mg/L	B(a)P					0.04	0.16	----	<0.001	<0.001	----	----	----	----	----	----	----

	Ramboll Environ Sample ID		136_TP001_0.10	136_TP002_0.20	138_TP001_0.10	138_TP001_0.30	138_TP002_0.20	138_GS001	139_TP001_0.10	139_GS001	140_TP001_0.20
	Site		Site 136	Site 137	Site 138	Site 138	Site 138	Site 138	Site 139	Site 139	Site 140
	Compound		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description		FILL; gravelly, sandy SILT, brown, low plasticity, contains, brick, glass, plastic, roots, tile, NOC	FILL; gravelly sandy SILT, brown, moist, soft, contains glass, plastic, timber, brick, wire, concrete, NOC	FILL; Sandy SILT, toposoil, grass, brown, moist, NOC	FILL; Silty CLAY, reworked natural, some pockets of topsoil, yellow/brown, moist, NOC	FILL; gravelly sandy Silt, brown, moist, contains roots, blue metal, pipe, minor crushed brick and concrete	Two pieces of organic fibre board approximately 50 x 35 x 4mm	FILL; gravelly, sandy SILT, brown, very moist, ironstone, contains brick, plastic, gaffer tape, timber, metal pieces, crushed concrete	One piece of organic fibre board approximately 50 x 50 x 3mm	FILL; clayey, sandy SILT, brown , contains plastic, irrigation pipe, quartz gravels, NOC
	Lab Report ID		ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867	ES1610867
	Sampler		AS	AS	AS	AS	AS	AS	AS	AS	AS
	PID Value (ppm)							----		----	
	Sample date:		19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016	19/05/2016
	Units	Analyte									
	mg/kg	2.4-Dichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	2.6-Dichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	4-Chloro-3-methylphenol	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	2.4.6-Trichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	2.4.5-Trichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	---	<0.5
	mg/kg	Pentachlorophenol	<2	<2	<2	<2	<2		<2	---	<2
PCBs											
	mg/kg	PCBs (Total)	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	---	<0.1
Pesticides											
	mg/kg	Dichlorvos	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Demeton-S-methyl	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Monocrotophos	<0.2	<0.2	<0.2	<0.2	<0.2	---	<0.2	---	<0.2
	mg/kg	Dimethoate	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Diazinon	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Chlorpyrifos-methyl	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Parathion-methyl	<0.2	<0.2	<0.2	<0.2	<0.2	---	<0.2	---	<0.2
	mg/kg	Malathion	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Fenthion	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Chlorpyrifos	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Parathion	<0.2	<0.2	<0.2	<0.2	<0.2	---	<0.2	---	<0.2
	mg/kg	Pirimphos-ethyl	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Chlorfenvinphos	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Bromophos-ethyl	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Fenamiphos	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Prothiofos	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Ethion	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Carbophenothion	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Azinphos Methyl	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Hexachlorobenzene (HCB)	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	gamma-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Total Chlordane (sum)	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	trans-Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	alpha-Endosulfan	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	cis-Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	4.4`-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Endosulfan (sum)	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	beta-Endosulfan	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	4.4`-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Endrin aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Endosulfan sulfate	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	4.4`-DDT	<0.2	<0.2	<0.2	<0.2	<0.2	---	<0.2	---	<0.2
	mg/kg	Endrin ketone	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Methoxychlor	<0.2	<0.2	<0.2	<0.2	<0.2	---	<0.2	---	<0.2
	mg/kg	Sum of DDD + DDE + DDT	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
	mg/kg	Sum of Aldrin + Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	---	<0.05	---	<0.05
Metals (TCLP)											
	mg/L	Arsenic	---	---	---	---	---	---	---	---	---
	mg/L	Cadmium	---	---	---	---	---	---	---	---	---
	mg/L	Chromium, Total	---	---	---	---	---	---	---	---	---
	mg/L	Copper	---	---	---	---	---	---	---	---	---
	mg/L	Lead	0.1	<0.1	1.6	<0.1	0.2	---	<0.1	---	<0.1
	mg/L	Nickel	---	---	---	---	---	---	---	---	---
	mg/L	Zinc	---	---	---	---	---	---	---	---	---
PAH TCLP											
	mg/L	B(a)P	---	---	---	---	---	---	---	---	---

*CT1 and CT2 refer to NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
** A confirmed presence of asbestos is pre-classified as Special Waste Asbestos
***These limits apply to Chromium (VI) only. Total Chromium used as a conservative screening level only
****Refers to Chrysotile asbestos detected
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Only compounds with at least one detection are shown.
Concentration in grey box that exceeds the screening value
Concentrations below the LOR noted as <value
RPD = Relative Percent Difference
nc - Not Calculated sinces results < PQL

BOLD identifies where RPD results exceed Ramboll Environ Data Quality Indicators (DQIs) as follows:

Duplicate	Triplicate
>50	>60
>75	>85
>100	>100
Absolute Difference>2.5 * PQL	

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								140_TP002_0.10	141_TP001_0.10	137_TP001_0.10	137_TP001_0.30	137_TP002_0.10	137_TP002_0.40	137_TP002_0.60	137_TP003_0.20	137_TP003_0.90	137_TP003_1.10
	Site								Site 140	Site 141	Site 137	Site 137	Site 137	Site 137	Site 137	Site 137	Site 137	Site 137
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								FILL; sandy Silt, brown, slightly moist, soft, contains roots, minor brick near surface NOC	FILL, sandy silt, minor ironstone gravels, brown, moist, contains roots, minor brick and concrete on surface, NOC	FILL; Sandy silt, imported topsoil, dry-slightly moist, brown, roots, no anthropogenic material other than one water pipe, no observed contamination, soft, grass on surface	FILL; Sandy silt, imported topsoil, dry-slightly moist, brown, roots, no anthropogenic material other than one water pipe, no observed contamination, soft, grass on surface	FILL; imported topsoil, grass on surface, moist-slightly moist, evidence of some building/ demolition rubble throughout fill soil profile (broken pipe, concrete, plastic, broken tiling, metal pipe), no ACM observed	FILL; imported topsoil, grass on surface, moist-slightly moist, evidence of some building/ demolition rubble throughout fill soil profile (broken pipe, concrete, plastic, broken tiling, metal pipe), no ACM observed	Gravelly sandy SILT; dark brown, moist-slightly moist, no observed contamination	FILL; Sandy silt, imported topsoil, dark brown, very moist, roots, high plasticity, minor gravels (ironstone, sandstone <5mm),	Gravelly silty CLAY; highly weathered sandstone, orange, red ironstone cementing, moist, high plasticity, no observed contamination	Gravelly silty CLAY; highly weathered sandstone, orange, red ironstone cementing, moist, high plasticity, no observed contamination
	Lab Report ID								ES1610867	ES1610867	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681
	Sampler								AS	AS	AS	AS	AS	AS	AS	AS	AS	AS
	PID Value (ppm)								0	0	0	0	0	0	0	0	0	0
	Sample date:		NSW EPA (2014) Waste Classification Guidelines						19/05/2016	19/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*										
Asbestos																		
	none	Asbestos **							No	No	No	No	No	Yes + Trace	----	No	No	----
		Asbestos Type							-	-	-	-	-	Ch + Am + Cr	----	-	-	----
Metals																		
	mg/kg	Arsenic	100	400	500	2000			8	17	7	6	<5	12	8	14	10	6
	mg/kg	Cadmium	20	80	100	400			<1	<1	<1	<1	1	3	<1	2	2	<1
	mg/kg	Chromium Total***							20	49	22	12	16	40	17	39	25	29
	mg/kg	Copper							60	23	26	10	57	185	30	281	49	<5
	mg/kg	Iron							---	---	---	---	---	---	---	---	---	---
	mg/kg	Lead	100	400	1500	6000			151	144	168	76	343	1000	82	482	241	15
	mg/kg	Nickel	40	160	1050	4200			7	3	3	2	7	14	<2	7	4	2
	mg/kg	Zinc							341	155	86	21	346	1950	293	540	222	42
	mg/kg	Mercury							<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	0.1	<0.1
BTEX																		
	mg/kg	Benzene	10	40	18	72			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	Toluene	288	1152	518	2073			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Ethylbenzene	600	2400	1080	4320			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	meta- & para-Xylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	ortho-Xylene	1000	4000	1800	7200			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Total Xylenes							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Sum of BTEX							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	mg/kg	Naphthalene							<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TPH (NEPM 1999)																		
	mg/kg	C6 - C9 Fraction	650	2600	650	2600			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	C10 - C14 Fraction							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	C15 - C28 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	C29 - C36 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	C10 - C36 Fraction (sum)	10000	40000	10000	40000			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH (NEPM Amendment 2013)																		
	mg/kg	C6 - C10 Fraction							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	C6 - C10 Fraction minus BTEX (F1)							<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	mg/kg	>C10 - C16 Fraction							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	>C16 - C34 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	>C34 - C40 Fraction							<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	mg/kg	>C10 - C40 Fraction (sum)							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	mg/kg	>C10 - C16 Fraction minus Naphthalene (F2)							<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
PAHs																		
	mg/kg	Naphthalene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Acenaphthylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Acenaphthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Fluorene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Phenanthrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5
	mg/kg	Pyrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5
	mg/kg	Benz(a)anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Chrysene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Benzo(b+j)fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	mg/kg	Benzo(k)fluoranthene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Benzo(a)pyrene	0.8	3.2	10	23			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5
	mg/kg	Indeno(1.2.3.cd)pyrene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Dibenz(a.h)anthracene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Benzo(g.h.i)perylene							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	mg/kg	Sum of polycyclic aromatic hydrocarbons	200	800	200	800			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.8	<0.5	<0.5
	mg/kg	Benzo(a)pyrene TEQ (zero)							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	mg/kg	Benzo(a)pyrene TEQ (half LOR)							0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.9	0.6	0.6
	mg/kg	Benzo(a)pyrene TEQ (LOR)							1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Phenols																		
	mg/kg	Phenol	288	1152	518	2073			<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	2-Chlorophenol							<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	2-Methylphenol	4000	16000	7200	28800			<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	3- & 4-Methylphenol							<1	<1	----	----	<1	<1	----	----	----	----
	mg/kg	2-Nitrophenol							<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	2.4-Dimethylphenol							<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----

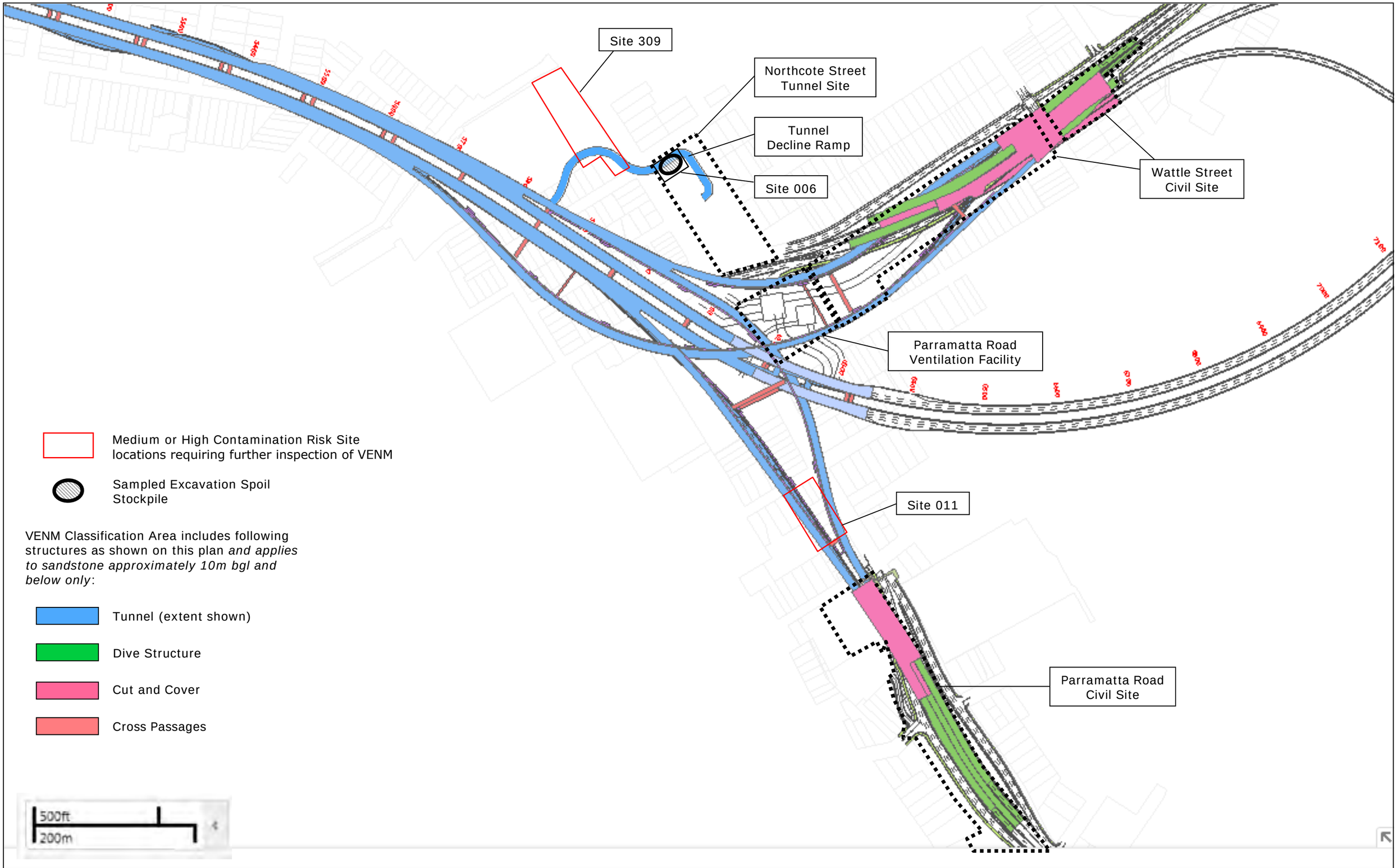
TABLE 1
Summary of Waste Classification Soil Sampling Results - Northcote Street Compound
CSJ M4E WestConnex

	Ramboll Environ Sample ID								140_TP002_0.10	141_TP001_0.10	137_TP001_0.10	137_TP001_0.30	137_TP002_0.10	137_TP002_0.40	137_TP002_0.60	137_TP003_0.20	137_TP003_0.90	137_TP003_1.10
	Site								Site 140	Site 141	Site 137	Site 137	Site 137	Site 137	Site 137	Site 137	Site 137	Site 137
	Compound								Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
	Sample Description								FILL; sandy Silt, brown, slightly moist, soft, contains roots, minor brick near surface NOC	FILL, sandy silt, minor ironstone gravels, brown, moist, contains roots, minor brick and concrete on surface, NOC	FILL; Sandy silt, imported topsoil, dry-slightly moist, brown, roots, no anthropogenic material other than one water pipe, no observed contamination, soft, grass on surface	FILL; Sandy silt, imported topsoil, dry-slightly moist, brown, roots, no anthropogenic material other than one water pipe, no observed contamination, soft, grass on surface	FILL; imported topsoil, grass on surface, moist-slightly moist, evidence of some building/ demolition rubble throughout fill soil profile (broken pipe, concrete, plastic, broken tiling, metal pipe), no ACM observed	FILL; imported topsoil, grass on surface, moist-slightly moist, evidence of some building/ demolition rubble throughout fill soil profile (broken pipe, concrete, plastic, broken tiling, metal pipe), no ACM observed	Gravelly sandy SILT; dark brown, moist-slightly moist, no observed contamination	FILL; Sandy silt, imported topsoil, dark brown, very moist, roots, high plasticity, minor gravels (ironstone, sandstone <5mm),	Gravelly silty CLAY; highly weathered sandstone, orange, red ironstone cementing, moist, high plasticity, no observed contamination	Gravelly silty CLAY; highly weathered sandstone, orange, red ironstone cementing, moist, high plasticity, no observed contamination
	Lab Report ID								ES1610867	ES1610867	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681	ES1609681
	Sampler								AS	AS	AS	AS	AS	AS	AS	AS	AS	AS
	PID Value (ppm)										0	0	0	0	0	0	0	0
	Sample date:		NSW EPA (2014) Waste Classification Guidelines						19/05/2016	19/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016	04/05/2016
	Units	Analyte	CT1	CT2	SCC1*	SCC2*	TCLP1*	TCLP2*										
	mg/kg	2.4-Dichlorophenol							<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	2.6-Dichlorophenol							<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	4-Chloro-3-methylphenol							<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	2.4.6-Trichlorophenol	40	160	72	288			<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	2.4.5-Trichlorophenol	8000	32000	14400	57600			<0.5	<0.5	----	----	<0.5	<0.5	----	----	----	----
	mg/kg	Pentachlorophenol							<2	<2	----	----	<2	<2	----	----	----	----
PCBs																		
	mg/kg	PCBs (Total)	50	50	50	50			<0.1	<0.1	----	----	<0.1	<0.1	----	----	----	----
Pesticides																		
	mg/kg	Dichlorvos							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Demeton-S-methyl							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Monocrotophos							<0.2	<0.2	----	----	<0.2	<0.2	----	----	----	----
	mg/kg	Dimethoate							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Diazinon							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Chlorpyrifos-methyl							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Parathion-methyl							<0.2	<0.2	----	----	<0.2	<0.2	----	----	----	----
	mg/kg	Malathion							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Fenthion							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Chlorpyrifos	4	16	7.5	30			<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Parathion							<0.2	<0.2	----	----	<0.2	<0.2	----	----	----	----
	mg/kg	Pirimphos-ethyl							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Chlorfenvinphos							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Bromophos-ethyl							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Fenamiphos							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Prothiofos							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Ethion							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Carbophenothion							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Azinphos Methyl							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	alpha-BHC							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Hexachlorobenzene (HCB)							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	beta-BHC							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	gamma-BHC							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	delta-BHC							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Heptachlor							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Aldrin							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Heptachlor epoxide							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Total Chlordane (sum)							<0.05	<0.05	----	----	<0.05	0.07	----	----	----	----
	mg/kg	trans-Chlordane							<0.05	<0.05	----	----	<0.05	0.07	----	----	----	----
	mg/kg	alpha-Endosulfan							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	cis-Chlordane							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Dieldrin							<0.05	<0.05	----	----	0.14	0.15	----	----	----	----
	mg/kg	4,4`-DDE							<0.05	<0.05	----	----	0.34	0.44	----	----	----	----
	mg/kg	Endrin							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Endosulfan (sum)	60	240	108	432			<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	beta-Endosulfan							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	4.4`-DDD							<0.05	<0.05	----	----	0.09	0.12	----	----	----	----
	mg/kg	Endrin aldehyde							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Endosulfan sulfate							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	4.4`-DDT							<0.2	<0.2	----	----	0.5	0.5	----	----	----	----
	mg/kg	Endrin ketone							<0.05	<0.05	----	----	<0.05	<0.05	----	----	----	----
	mg/kg	Methoxychlor							<0.2	<0.2	----	----	<0.2	<0.2	----	----	----	----
	mg/kg	Sum of DDD + DDE + DDT							<0.05	<0.05	----	----	0.93	1.06	----	----	----	----
	mg/kg	Sum of Aldrin + Dieldrin							<0.05	<0.05	----	----	0.14	0.15	----	----	----	----
Metals (TCLP)																		
	mg/L	Arsenic					5	20	---	---	----	----	----	----	----	----	----	----
	mg/L	Cadmium					1	4	---	---	----	----	----	----	----	----	----	----
	mg/L	Chromium, Total							---	---	----	----	----	----	----	----	----	----
	mg/L	Copper							---	---	----	----	----	----	----	----	----	----
	mg/L	Lead					5	20	<0.1	<0.1	----	----	----	----	----	----	----	----
	mg/L	Nickel					2	8	---	---	----	----	----	----	----	----	----	----
	mg/L	Zinc							---	---	----	----	----	----	----	----	----	----
PAH TCLP																		
	mg/L	B(a)P					0.04	0.16	---	---	----	----	----	----	----	----	----	----

*CT1 and CT2 refer to NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
** A confirmed presence of asbestos is pre-classified as Special Waste Asbestos
***These limits apply to Chromium (VI) only. Total Chromium used as a conservative screening level only
****Refers to Chrysotile asbestos detected
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Only compounds with at least one detection are shown.
Concentration in grey box that exceeds the screening value
Concentrations below the LOR noted as <value
RPD = Relative Percent Difference
nc - Not Calculated sinces results < PQL
BOLD identifies where RPD results exceed Ramboll Environ Data Quality Indicators (DQIs) as follows:

Duplicate	Triplicate
>50	>60
>75	>85
>100	>100
Absolute Difference>2.5 * PQL	

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance



VENM Classification - Northcote Street Tunnel Site

FIGURE 1: VENM Classification Area

RAMBOLL ENVIRON

Client: CSJ

Project No: AS121919

Date: 20 September 2016

Table 1: Soil Sample Descriptions
Northcote Street Tunnel Site

Sample ID	Sample Depth (m bgl)	Sampling Date	QC Sample	PID (ppm)	Soil Description
006_GS200	0.5	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS201	1.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS202	2.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS203	2.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS204	1.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS205	1.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS206	2.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS207	2.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed
006_GS208	1.0	9/15/2016	-	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed, minor dark grey siltstone cobbles
006_GS209	0.5	9/15/2016	006_QC200	0.0	Sandtone, very light grey, medium to coarse grained, uniform, dense, moist, no observed contamination (staining, odour or ACM), no anthropogenic inclusions observed, minor dark grey siltstone cobbles

m bgl = metres below ground level
ppm = parts per million
PID = photo ionisation detector
QC - quality control
ACM = asbestos containing materials

CSJ
AS121919
9/19/2016

TABLE 2:
VENM Classification Results
Northcote Street Tunnel Site

	VENM Classification[1]	ENM Max Average[2,3]	ENM Absolute Maximum[2,4]	Sample Type:			REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG		
				ALS Sample #:			ES1620678001	ES1620678002	ES1620678003	ES1620678004	ES1620678005	ES1620678006	ES1620678007	ES1620678008	ES1620678009	ES1620678010	ES1620678011		
				Sample date:			15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016	15/09/2016		
				Sample ID:			006_GS200	006_GS200	006_GS201	006_GS202	006_GS203	006_GS204	006_GS205	006_GS206	006_GS207	006_GS208	006_GS209		
				Project Name:			WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E	WCX M4E		
				Compound:			Northcote	Northcote	Northcote	Northcote	Northcote	Northcote	Northcote	Northcote	Northcote	Northcote	Northcote		
				Site:			006	006	006	006	006	006	006	006	006	006	006		
				Sampling Method:			Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab		
				Sample Description			Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Duplicate of 006_GS209	Average	Maximum
Chemicals and other attributes				**Units**	**LOR**														
EA002 : pH (Soils)																			
pH Value		**5 to 9**	**4.5 to 10**	pH Units	0.1		6.6	6.5	8.6	8.5	6.7	6.5	9.2	8.1	9.3	7.4	7.8	**7.7**	**9.3**
EA010: Conductivity																			
Electrical Conductivity @ 25°C		**1.5**	**3**	dS/m	1		0.054	0.059	0.118	0.098	0.05	0.053	0.124	0.084	0.143	0.081	0.08	**0.09**	**0.14**
EA055: Moisture Content																			
Moisture Content (dried @ 103°C)				%	1		5.3	5.6	6.7	6.3	7.0	5.6	6.8	5.8	6.3	6.8	5.9	**6.2**	**7**
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																			
Asbestos Detected				g/kg	0.1		No	No	No	No	No	No	No	No	No	No	----		
Asbestos Type				--			-	-	-	-	-	-	-	-	-	-	----		
Sample weight (dry)				g	0.01		51.0	48.0	50.0	54.0	49.0	48.0	67.0	34.0	51.0	48.0	----	**50.0**	**67**
Description				--			Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	Nisansala Maddage.	----		
APPROVED IDENTIFIER:				--															
EG005T: Total Metals by ICP-AES																			
Arsenic	**1-50**	**20**	**40**	mg/kg	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	**<5**	**<5**
Cadmium	**1**	**0.5**	**1**	mg/kg	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**<1**	**<1**
Chromium (VI)	**5-1000**	**75**	**150**	mg/kg	2		8	8	8	8	8	8	8	8	12	8	8	**8**	**12**
Copper	**2-200**	**100**	**200**	mg/kg	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	22	**<5**	**<5**
Lead	**2-200**	**50**	**100**	mg/kg	5		13	12	12	11	13	12	13	14	14	12	12	**13**	**14**
Nickel	**5-500**	**30**	**60**	mg/kg	2		5	5	5	5	5	5	5	5	5	5	7	**5**	**5**
Zinc	**10-300**	**150**	**300**	mg/kg	5		25	22	27	27	22	23	25	25	27	22	34	**25**	**27**
EG035T: Total Recoverable Mercury by FIMS																			
Mercury	**0.03**[5]	**0.5**	**1**	mg/kg	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**
EP066: Polychlorinated Biphenyls (PCB)																			
Total Polychlorinated biphenyls				mg/kg	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**
EP068A: Organochlorine Pesticides (OC)																			
alpha-BHC				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Hexachlorobenzene (HCB)				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
beta-BHC				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
gamma-BHC				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
delta-BHC				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Heptachlor				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Aldrin				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Heptachlor epoxide				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Total Chlordane (sum)				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
trans-Chlordane				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
alpha-Endosulfan				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
cis-Chlordane				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Dieldrin				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
4.4`-DDE				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Endrin				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Endosulfan (sum)				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
beta-Endosulfan				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
4.4`-DDD				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Endrin aldehyde				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Endosulfan sulfate				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
4.4`-DDT				mg/kg	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**
Endrin ketone				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Methoxychlor				mg/kg	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**
Sum of DDD + DDE + DDT				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
Sum of Aldrin + Dieldrin				mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**	**<0.05**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																			
Naphthalene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Acenaphthylene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Acenaphthene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Fluorene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Phenanthrene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Anthracene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Fluoranthene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Pyrene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benz(a)anthracene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Chrysene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benzo(b+j)fluoranthene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benzo(k)fluoranthene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benzo(a)pyrene		**0.5**	**1**	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Indeno(1.2.3.cd)pyrene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Dibenz(a.h)anthracene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benzo(g.h.i)perylene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Sum of polycyclic aromatic hydrocarbons		**20**	**40**	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benzo(a)pyrene TEQ (zero)				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Benzo(a)pyrene TEQ (half LOR)				mg/kg	0.5		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6		
Benzo(a)pyrene TEQ (LOR)				mg/kg	0.5		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2		
EP080/071: Total Petroleum Hydrocarbons																			
C6 - C9 Fraction				mg/kg	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**<10**	**<10**
C10 - C14 Fraction				mg/kg	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**<50**	**<50**
C15 - C28 Fraction				mg/kg	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	**<100**	**<100**
C29 - C36 Fraction				mg/kg	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	**<100**	**<100**
C10 - C36 Fraction (sum)		**250**	**500**	mg/kg	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**<50**	**<50**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																			
C6 - C10 Fraction				mg/kg	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**<10**	**<10**
C6 - C10 Fraction minus BTEX (F1)				mg/kg	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**<10**	**<10**
>C10 - C16 Fraction				mg/kg	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**<50**	**<50**
>C16 - C34 Fraction				mg/kg	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	**<100**	**<100**
>C34 - C40 Fraction				mg/kg	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	**<100**	**<100**
>C10 - C40 Fraction (sum)				mg/kg	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**<50**	**<50**
>C10 - C16 Fraction minus Naphthalene (F2)				mg/kg	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**<50**	**<50**
EP080: BTEXN																			
Benzene		**N/A**	**0.5**	mg/kg	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**
Toluene		**N/A**	**65**	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Ethylbenzene		**N/A**	**25**	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
meta- & para-Xylene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
ortho-Xylene				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Total Xylenes		**N/A**	**15**	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**<0.5**	**<0.5**
Sum of BTEX				mg/kg	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**
Naphthalene				mg/kg	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**<1**	**<1**

Blank Cell indicates no criterion available
nc = non calculable
LOR = Limit of Reporting
[1] Background ranges, taken from the *Field Geologist's Manual*, compiled by D A Berkman, Third Edition 1989, The Australasian Institute of Mining & Metallurgy.
[2] NSW EPA *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014: The excavated natural material order 2014*.
[3] Maximum average concentration for site characterisation
[4] Absolute maximum concentration
[5] Ramboll Environ notes that the detection limit for mercury exceeds the background concentration as taken from source[1], however no detectable concentrations of mercury were identified, thus this is not considered to be of concern.
Blank cell indicates no screening criterion available
--- Indicates sample not analysed
Concentration in **yellow** font and grey box exceed VENM Classification
Concentration in **red** font and grey box exceed Column 1 - ENM Classification
Concentration in **blue** font and grey box exceed Column 2 - ENM Classification
Concentrations below the LOR noted as <value

Ramboll (November 2016)
UPSS Remediation & Validation Report

RAMBOLL ENVIRON

0 20 40
m

1 cm = 12 m

Figure 1 - Site Location Plan
Tank Excavation Assessment and Site Validation Report
269 Parramatta Road, Haberfield WestConnex M4E
Client: CSJ

DRAFTED BY: TP	Date: 2/09/2016	A3	Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate	PROJECT: AS-121919

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RAMBOLL ENVIRON

0 20
m

1 cm = 3 m

DRAFTED BY: TP	Date: 2/09/2016	A3

Figure 2 - Site Layout Plan
Tank Excavation Assessment and Site Validation Report
269 Parramatta Road, Haberfield WestConnex M4E
Client: CSJ

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate	PROJECT: AS-121919

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N
006_GW006
006_UST2_009
006_UST2_005
006_UST2_008
006_UST2_002
006_UST2_001
006_UST2_004
006_UST2_003
UST 2
006_UST2_006
Former Fuel Pump Base
006_UST2_007
006_UST1_006
Fuel Lines
006_UST1_003
006_UST1_001
006_UST1_002
UST 1
006_GW005
006_UST1_005
006_UST1_004
006_GW004
Site Location Within Project Alignment
Legend
Approximate Location of Former UPSS Infrastrucutre
Approximate Site Boundary
Approximate Extent of Excavation
Ramboll Envion Monitoring Well Location
Base Validation Sample
Wall Validation Sample
RAMBOLL ENVIRON
0
20
m
1 cm = 2 m
DRAFTED BY: TP
Date: 2/09/2016
A3
Figure 3 - Excavation Area and Validation Sampling Locations
Tank Excavation Assessment and Site Validation Report
269 Parramatta Road, Haberfield WestConnex
Client: CSJ M4E
Nearmap Aerial Imagery 2015 (Nearmap, 2016)
Site Boundary is Approximate
PROJECT: AS-121919
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RAMBOLL ENVIRON

0 20
m

1 cm = 2 m

DRAFTED BY: TP	Date: 2/09/2016	A3

Figure 4 - Groundwater Contour Plan
Tank Excavation Assessment and Site Validation Report
269 Parramatta Road, Haberfield WestConnex
Client: CSJ M4E

Nearmap Aerial Imagery 2015 (Nearmap, 2016)	Site Boundary is Approximate	PROJECT: AS-121919

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Table 1: Soil Sample Descriptions

Area of Investigation	Sample ID	Sampling Rationale	Sample Depth (m bgl)	Sampling Date	QC Sample	PID (ppm)	Soil Description
UST1 Excavation	006_UST1_001	Tankpit NW base validation sample	3.2	24/05/2016	-	0.0	Weathered sandstone, no observed staining/odour/ACM
	006_UST1_002	Tankpit SE base validation sample	3.2	24/05/2016	006_QC024	1.2	Weathered sandstone, slight hydrocarbon odour, no observed staining or ACM
	006_UST1_003	Tankpit NE wall validation sample	2.0	24/05/2016	-	0.2	Weathered sandstone, very slight hydrocarbon odour, no observed staining or ACM
	006_UST1_004	Tankpit SE wall validation sample	2.0	24/05/2016	-	0.0	Weathered sandstone, no observed contamination (staining, odour or ACM)
	006_UST1_005	Tankpit SW wall validation sample	2.0	24/05/2016	-	0.7	Weathered sandstone, slight hydrocarbon odour, no observed staining or ACM
	006_UST1_006	Tankpit NW wall validation sample	2.0	24/05/2016	006_QC023	0.8	Weathered sandstone, slight hydrocarbon odour, no observed staining or ACM
UST2 Excavation	006_UST2_001	Tankpit base validation sample	1.5	10/05/2016	-	16.4	Weathered sandstone / clayey sand, orange and light grey, moderate hydrocarbon odour, no staining observed
	~~006_UST2_002~~	Tankpit E wall validation sample	0.8	10/05/2016	006_QC020 006_QC021	11.1	Weathered sandstone / clayey sand, orange and light grey, moderate hydrocarbon odour, no staining observed
	006_UST2_003	Tankpit S wall validation sample	0.8	10/05/2016	-	1.8	Sand (FILL), cream, loose, uniform, very moist, mild hydrocarbon odour, no staining observed. Unable to excavate beyond sand fill to natural on this wall as extends below concrete
	006_UST2_004	Tankpit W wall validation sample	0.8	10/05/2016	-	0.2	Weathered sandstone / clayey sand, very moist, medium dense, light grey, mild hydrocarbon odour, no staining observed
	~~006_UST2_005~~	Tankpit N wall validation sample	0.8	10/05/2016	-	0.1	Weathered sandstone, very mild hydrocarbon odour, no staining observed
	006_UST2_008	Tankpit wall validation sample	0.8	24/05/2016	-	0.0	Wearhered sandstone, mottled light grey and red/brown, no observed staining/odour/ACM
	006_UST2_009	Tankpit wall validation sample	0.8	24/05/2016	-	0.0	Wearhered sandstone, mottled light grey and red/brown, no observed staining/odour/ACM
Fuel Lines and Dispensing Pump	006_UST2_006	Fuel line trench and fuel pump base validation sample	0.5	10/05/2016	-	0.0	Weathered sandstone / clayey sand, light grey and orange brown, saturated, soft, no observed staining/odour/ACM
	006_UST2_007	Fuel line trench base validation sample	0.5	10/05/2016	-	0.0	Weathered sandstone / clayey sand, light grey and orange brown, saturated, soft, no observed staining/odour/ACM
UST1 Excavated Material	~~006_GS004~~	Backfill Waste Classification	n/a	10/05/2016	-	103.4	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Moderate hydrocarbon odour
	~~006_GS005~~	Backfill Waste Classification	n/a	10/05/2016	-	6.5	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Moderate hydrocarbon odour
	~~006_GS006~~	Backfill Waste Classification	n/a	10/05/2016	-	153.7	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Strong hydrocarbon odour
	~~006_GS007~~	Backfill Waste Classification	n/a	10/05/2016	-	14.3	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Moderate hydrocarbon odour
	~~006_GS008~~	Backfill Waste Classification	n/a	10/05/2016	006_QC022	131.4	mix of sand and clayey sand (FILL), saturated, loose, medium grained, uniform, some bricks, wires, sandstone cobbles, timber, roots, PVC pipe, concrete pieces. Strong hydrocarbon odour
UST2 Excavated Material	~~006_GS001~~	Backfill Waste Classification	n/a	10/05/2016	-	7.8	Sand (FILL), cream, medium grained, uniform, loose, saturated, moderate hydrocarbon odour.
	~~006_GS002~~	Backfill Waste Classification	n/a	10/05/2016	-	9.4	Sand (FILL), cream, medium grained, uniform, loose, saturated, moderate hydrocarbon odour.
	~~006_GS003~~	Backfill Waste Classification	n/a	10/05/2016	-	15.6	Sand (FILL), cream, medium grained, uniform, loose, saturated, strong hydrocarbon odour.
Fuel Line Trench Excavated Material	~~006_GS009~~	Backfill Waste Classification	n/a	10/05/2016	-	0.0	Silty Sand (FILL), brown, moist, uniform, includes some brick, concrete, wires, sandstone, no observed staining/odour/ACM
	~~006_GS010~~	Backfill Waste Classification	n/a	10/05/2016	-	0.0	Silty Sand (FILL), brown, moist, uniform, includes some brick, concrete, wires, sandstone, no observed staining/odour/ACM
	~~006_GS011~~	Backfill Waste Classification	n/a	10/05/2016	-	0.0	Silty Sand (FILL), brown, moist, uniform, includes some brick, concrete, wires, sandstone, no observed staining/odour/ACM

Notes
ppm = parts per million
m bgl = metres below ground level
ACM - asbestos containing materials
N - north, S - south, E - east, W - west
~~sample has been excavated and disposed of off-site~~

Table 2: Soil Analytical Results - In Situ Validation Samples

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial/ Industrial[3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]	Sample Type:		REG	REG	REG	REG	REG	REG	REG
											ALS Sample number:		ES1611421001	ES1611421002	ES1611421009	ES1611421003	ES1611421004	ES1611421005	ES1611421006
											Sample date:		24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016
											Sample ID:		006_UST1_001	006_UST1_002	006_QC022	006_UST1_003	006_UST1_004	006_UST1_005	006_UST1_006
											Project Name:		M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
											Compound:		Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
											Site:		Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
											Sample Description		Validation Sampling UST1	Validation Sampling UST1	Duplicate of 006_UST1_002	Validation Sampling UST1	Validation Sampling UST1	Validation Sampling UST1	Validation Sampling UST1
Analyte grouping / Analyte											**Units**	**LOR**							
EG005T: Total Metals by ICP-AES																			
Arsenic	**3000**					**160**					mg/kg	5	<5	<5	<5	<5	<5	5	<5
Cadmium	**900**										mg/kg	1	<1	<1	<1	<1	<1	<1	<1
Chromium	**3600**					**310**					mg/kg	2	4	5	4	4	3	5	2
Copper	**240000**					***25***					mg/kg	5	<5	<5	<5	<5	<5	<5	<5
Iron											%	0.005							
Lead	**1500**					**1800**					mg/kg	5	6	19	19	5	7	14	10
Nickel	**6000**					***45***					mg/kg	2	<2	6	5	<2	2	<2	<2
Zinc	**400000**					***180***					mg/kg	5	<5	27	32	12	16	<5	<5
EG035T: Total Recoverable Mercury by FIMS																			
Mercury	**730**										mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)A: Phenolic Compounds																			
Phenol	**240000**										mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2-Chlorophenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2-Methylphenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
3- & 4-Methylphenol	**25000**										mg/kg	1	----	<1	----	----	----	----	<1
2-Nitrophenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2.4-Dimethylphenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2.4-Dichlorophenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2.6-Dichlorophenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
4-Chloro-3-methylphenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2.4.6-Trichlorophenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
2.4.5-Trichlorophenol											mg/kg	0.5	----	<0.5	----	----	----	----	<0.5
Pentachlorophenol	**660**										mg/kg	2	----	<2	----	----	----	----	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																			
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene							**72**				mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	**4000**										mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)											mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	**40**										mg/kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons																			
C6 - C9 Fraction											mg/kg	10	<10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction											mg/kg	50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction											mg/kg	100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction											mg/kg	100	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)											mg/kg	50	<50	<50	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																			
C6 - C10 Fraction								**700**	**26000**	**82000**	mg/kg	10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)		**260**	**370**	**630**	**NL**		**215**				mg/kg	10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction		**NL**	**NL**	**NL**	**NL**		**170**	**1000**	**20000**	**62000**	mg/kg	50	<50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction (F3)							**1700**	**3500**	**27000**	**85000**	mg/kg	100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction (F4)							**3300**	**10000**	**38000**	**120000**	mg/kg	100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)											mg/kg	50	<50	<50	<50	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)		**NL**	**NL**	**NL**	**NL**						mg/kg	50	<50	<50	<50	<50	<50	<50	<50
EP080: BTEXN																			
Benzene		**3**	**NL**	**NL**	**NL**		**75**		**430**	**1100**	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene		**NL**	**NL**	**NL**	**NL**		**135**		**99000**	**120000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene		**NL**	**NL**	**NL**	**NL**		**165**		**27000**	**85000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene							**95**				mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene											mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes		**230**	**NL**	**NL**	**NL**				**81000**	**130000**	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX											mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene		**NL**	**NL**	**NL**	**NL**	**370**			**11000**	**29000**	mg/kg	1	<1	<1	<1	<1	<1	<1	<1

Blank Cell indicates no criterion available

LOR = Limit of Reporting

CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'D' (Commercial/Industrial)

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

[1] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL value has been adopted for all analytes

[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Site specific EILs for copper *in italics* are based on the average of soil pH, cation exchange capacity and organic content

Site specific EILs for nickel *in italics* are based on the average of soil cation exchange capacity

Site specific EILs for zinc *in italics* are based on the average of soil pH and cation exchange capacity

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted health screening value

Concentration in **orange** font and grey box exceed the adopted ecological screening value

Concentration in **blue** font and grey box exceed the adopted management limits and direct contact screening value

~~sample has been excavated and disposed of off-site~~

Concentrations below the LOR noted as <value

Table 2: Soil Analytical Results - In Situ Validation Samples

RAMBOLL ENVIRON

Analyte grouping / Analyte	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 0-1m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 1-2m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 2-4m	NEPM 2013 Soil Vapour Intrusion HSL D Sand[1] 4+m	NEPM 2013 EIL Commercial / Industrial	NEPM 2013 ESL[2] Commercial / Industrial	NEPM 2013 Management Limits Commercial / Industrial[3]	CRC CARE 2011 Direct Contact HSL D[4]	CRC CARE 2011 Direct Contact HSL for Workers[4]	REG	~~REG~~	~~REG~~	REG	REG	~~REG~~	REG	REG	REG	REG
											ES1610135001	~~ES1610135002~~	~~ES1610135008~~	ES1610135003	ES1610135004	~~ES1610135005~~	ES1610135006	ES1610135007	ES1611421007	ES1611421008
											10/05/2016	~~10/05/2016~~	~~10/05/2016~~	10/05/2016	10/05/2016	~~10/05/2016~~	10/05/2016	10/05/2016	24/05/2016	24/05/2016
											006_UST2_001	~~006_UST2_002~~	~~006_QC020~~	006_UST2_003	006_UST2_004	~~006_UST2_005~~	006_UST2_006	006_UST2_007	006_UST2_008	006_UST2_009
											M4E-WCX	~~M4E-WCX~~	~~M4E-WCX~~	M4E-WCX	M4E-WCX	~~M4E-WCX~~	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
											Northcote Street Tunnel Site	~~Northcote Street Tunnel Site~~	~~Northcote Street Tunnel Site~~	Northcote Street Tunnel Site	Northcote Street Tunnel Site	~~Northcote Street Tunnel Site~~	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
											Site 006	~~Site 006~~	~~Site 006~~	Site 006	Site 006	~~Site 006~~	Site 006	Site 006	Site 006	Site 006
											Validation Sampling UST2	~~Validation Sampling UST2~~	~~Duplicate of 006_UST2_002~~	Validation Sampling UST2	Validation Sampling UST2	~~Validation Sampling UST2~~	Validation Sampling Fuel Lines	Validation Sampling Fuel Lines	Validation Sampling UST1	Validation Sampling UST1
EG005T: Total Metals by ICP-AES																				
Arsenic	3000					160					<5	~~13~~	~~<5~~	<5	<5	~~<5~~	<5	13	7	<5
Cadmium	900										<1	~~<1~~	~~<1~~	<1	<1	~~<1~~	<1	<1	<1	<1
Chromium	3600					310					<2	~~6~~	~~<2~~	<2	<2	~~6~~	5	40	7	6
Copper	240000					*25*					<5	~~<5~~	~~<5~~	<5	<5	~~6~~	<5	<5	<5	<5
Iron																				
Lead	1500					1800					7	~~5~~	~~6~~	<5	6	~~11~~	7	10	5	5
Nickel	6000					*45*					<2	~~<2~~	~~<2~~	<2	<2	~~<2~~	<2	<2	<2	<2
Zinc	400000					*180*					8	~~7~~	~~<5~~	22	<5	~~65~~	7	<5	55	23
EG035T: Total Recoverable Mercury by FIMS																				
Mercury	730										<0.1	~~<0.1~~	~~<0.1~~	<0.1	<0.1	~~<0.1~~	<0.1	<0.1	<0.1	<0.1
EP075(SIM)A: Phenolic Compounds																				
Phenol	240000										<0.5	~~<0.5~~	~~——~~	----	----	~~——~~	----	----	----	----
2-Chlorophenol											<0.5	~~<0.5~~	~~----~~	----	----	~~----~~	----	----	----	----
2-Methylphenol											<0.5	~~<0.5~~	~~——~~	----	----	~~——~~	----	----	----	----
3- & 4-Methylphenol	25000										<1	~~<1~~	~~——~~	----	----	~~——~~	----	----	----	----
2-Nitrophenol											<0.5	~~<0.5~~	~~----~~	----	----	~~----~~	----	----	----	----
2.4-Dimethylphenol											<0.5	~~<0.5~~	~~——~~	----	----	~~——~~	----	----	----	----
2.4-Dichlorophenol											<0.5	~~<0.5~~	~~——~~	----	----	~~——~~	----	----	----	----
2.6-Dichlorophenol											<0.5	~~<0.5~~	~~----~~	----	----	~~----~~	----	----	----	----
4-Chloro-3-methylphenol											<0.5	~~<0.5~~	~~——~~	----	----	~~——~~	----	----	----	----
2.4.6-Trichlorophenol											<0.5	~~<0.5~~	~~——~~	----	----	~~——~~	----	----	----	----
2.4.5-Trichlorophenol											<0.5	~~<0.5~~	~~----~~	----	----	~~----~~	----	----	----	----
Pentachlorophenol	660										<2	~~<2~~	~~——~~	----	----	~~——~~	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																				
Naphthalene		NL	NL	NL	NL	370			11000	29000	<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Acenaphthylene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Acenaphthene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Fluorene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Phenanthrene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Anthracene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Fluoranthene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Pyrene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Chrysene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene							72				<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	4000										<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)											0.6	~~0.6~~	~~0.6~~	0.6	0.6	~~0.6~~	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	40										1.2	~~1.2~~	~~1.2~~	1.2	1.2	~~1.2~~	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons																				
C6 - C9 Fraction											<10	~~<10~~	~~<10~~	<10	<10	~~<10~~	<10	<10	<10	<10
C10 - C14 Fraction											<50	~~50~~	~~<50~~	<50	<50	~~<50~~	<50	<50	<50	<50
C15 - C28 Fraction											<100	~~220~~	~~<100~~	<100	<100	~~240~~	<100	<100	<100	<100
C29 - C36 Fraction											<100	~~<100~~	~~<100~~	<100	<100	~~<100~~	120	<100	<100	<100
C10 - C36 Fraction (sum)											<50	~~270~~	~~<50~~	<50	<50	~~240~~	120	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																				
C6 - C10 Fraction								700	26000	82000	<10	~~<10~~	~~<10~~	<10	<10	~~<10~~	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)		260	370	630	NL		215				<10	~~<10~~	~~<10~~	<10	<10	~~<10~~	<10	<10	<10	<10
>C10 - C16 Fraction		NL	NL	NL	NL		170	1000	20000	62000	<50	~~120~~	~~<50~~	<50	<50	~~80~~	<50	<50	<50	<50
>C16 - C34 Fraction (F3)							1700	3500	27000	85000	<100	~~190~~	~~<100~~	<100	<100	~~210~~	140	<100	<100	<100
>C34 - C40 Fraction (F4)							3300	10000	38000	120000	<100	~~<100~~	~~<100~~	<100	<100	~~<100~~	<100	<100	<100	<100
>C10 - C40 Fraction (sum)											<50	~~310~~	~~<50~~	<50	<50	~~290~~	140	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)		NL	NL	NL	NL						<50	~~120~~	~~<50~~	<50	<50	~~80~~	<50	<50	<50	<50
EP080: BTEXN																				
Benzene		3	NL	NL	NL		75		430	1100	<0.2	~~<0.2~~	~~<0.2~~	<0.2	<0.2	~~<0.2~~	<0.2	<0.2	<0.2	<0.2
Toluene		NL	NL	NL	NL		135		99000	120000	<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Ethylbenzene		NL	NL	NL	NL		165		27000	85000	<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene							95				<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
ortho-Xylene											<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Total Xylenes		230	NL	NL	NL				81000	130000	<0.5	~~<0.5~~	~~<0.5~~	<0.5	<0.5	~~<0.5~~	<0.5	<0.5	<0.5	<0.5
Sum of BTEX											<0.2	~~<0.2~~	~~<0.2~~	<0.2	<0.2	~~<0.2~~	<0.2	<0.2	<0.2	<0.2
Naphthalene		NL	NL	NL	NL	370			11000	29000	<1	~~<1~~	~~<1~~	<1	<1	~~<1~~	<1	<1	<1	<1

Blank Cell indicates no criterion available

LOR = Limit of Reporting

CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'D' (Commercial/Industrial)

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

[1] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] The most conservative ESL value has been adopted for all analytes

[3] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Site specific EILs for copper *in italics* are based on the average of soil pH, cation exchange capacity and organic content

Site specific EILs for nickel *in italics* are based on the average of soil cation exchange capacity

Site specific EILs for zinc *in italics* are based on the average of soil pH and cation exchange capacity

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL adopted values based on Canadian Council of Ministers of the Environment (CCME) 2008 guidelines developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving three soil invertebrate taxa and two plant taxa (14 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted health screening value

Concentration in **orange** font and grey box exceed the adopted ecological screening value

Concentration in **blue** font and grey box exceed the adopted management limits and direct contact screening value

~~sample has been excavated and disposed of off site~~

Concentrations below the LOR noted as <value

Table 3: Soil Analytical Results - Waste Classification Samples

Sample Type:	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
ALS Sample number:	ES1610122001	ES1610122002	ES1610122003	ES1610122004	ES1610122005	ES1610122006	ES1610122007	ES1610122008	ES1610122009	ES1610122010	ES1610122011	ES1610122012
Sample date:	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016	10/05/2016
Sample ID:	006_GS001	006_GS002	006_GS003	006_GS004	006_GS005	006_GS006	006_GS007	006_GS008	006_GS009	006_GS010	006_GS011	006_QC022
Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site	Northcote Street Tunnel Site
Site:	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006	Site 006
Sampling Method:	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Grab Sample Backfill Sands	Duplicate of 006_GS008

Analyte grouping / Analyte	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	SCC1 - General Solid Waste[2]	SCC2 - Restricted Solid Waste[2]	TCLP1 - General Solid Waste[2]	TCLP2 - Restricted Solid Waste[2]	Sample Description	Units	LOR													
EA055: Moisture Content																						
Moisture Content (dried @ 103°C)								%	1		18	18.7	15.7	14.8	16.2	18.6	17.6	21.9	10.8	9.1	10.4	19.8
EG005T: Total Metals by ICP-AES																						
Arsenic	100	400	500	2000				mg/kg	5		<5	<5	<5	5	6	<5	<5	<5	<5	<5	<5	7
Cadmium	20	80	100	400				mg/kg	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (VI)	100	400	1900	7600				mg/kg	2		<2	<2	<2	7	8	6	4	6	5	8	8	11
Copper								mg/kg	5		<5	<5	<5	8	12	10	<5	9	32	6	12	18
Lead	100	400	1500	6000				mg/kg	5		<5	<5	<5	26	26	18	8	23	43	15	27	36
Nickel	40	160	1050	4200				mg/kg	2		<2	<2	<2	2	3	2	<2	2	4	2	4	3
Zinc								mg/kg	5		53	55	42	59	117	62	46	80	398	77	30	126
EG035T: Total Recoverable Mercury by FIMS																						
Mercury	4	16	50	200				mg/kg	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
EP066: Polychlorinated Biphenyls (PCB)																						
Total Polychlorinated biphenyls	50	50	50	50				mg/kg	0.1		----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)																						
alpha-BHC								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Hexachlorobenzene (HCB)								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
beta-BHC								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
gamma-BHC								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
delta-BHC								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Heptachlor								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Aldrin								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Heptachlor epoxide								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Total Chlordane (sum)								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
trans-Chlordane								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
alpha-Endosulfan								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
cis-Chlordane								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Dieldrin								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
4.4`-DDE								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endrin								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endosulfan (sum)	60	240	108	432				mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
beta-Endosulfan								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
4.4`-DDD								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endrin aldehyde								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Endosulfan sulfate								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
4.4`-DDT								mg/kg	0.2		----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Endrin ketone								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Methoxychlor								mg/kg	0.2		----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Sum of DDD + DDE + DDT								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Sum of Aldrin + Dieldrin								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)																						
Dichlorvos								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Demeton-S-methyl								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Monocrotophos								mg/kg	0.2		----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Dimethoate								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Diazinon								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chlorpyrifos-methyl								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Parathion-methyl								mg/kg	0.2		----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Malathion								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Fenthion								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chlorpyrifos	4	16	7.5	30				mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Parathion								mg/kg	0.2		----	----	<0.2	<0.2	----	<0.2	----	<0.2	----	<0.2	----	----
Pirimphos-ethyl								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chlorfenvinphos								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Bromophos-ethyl								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Fenamiphos								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Prothiofos								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Ethion								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Carbophenothion								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Azinphos Methyl								mg/kg	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
EP075(SIM)A: Phenolic Compounds																						
Phenol	288	1152	518	2073				mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2-Chlorophenol								mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2-Methylphenol	4000	16000	7200	28800				mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
3- & 4-Methylphenol	4000	16000	7200	28800				mg/kg	1		----	----	<1	<1	----	<1	----	<1	----	<1	----	----
2-Nitrophenol								mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4-Dimethylphenol								mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4-Dichlorophenol								mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.6-Dichlorophenol								mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
4-Chloro-3-methylphenol								mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4.6-Trichlorophenol	40	160	72	288				mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
2.4.5-Trichlorophenol	8000	32000	14400	57600				mg/kg	0.5		----	----	<0.5	<0.5	----	<0.5	----	<0.5	----	<0.5	----	----
Pentachlorophenol								mg/kg	2		----	----	<2	<2	----	<2	----	<2	----	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																						
Naphthalene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	0.8	3.2	10	23				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbo	200	800	200	800				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)								mg/kg	0.5		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)								mg/kg	0.5		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons																						
C6 - C9 Fraction	650	2600	650	2600				mg/kg	10		<10	<10	<10	<10	<10	21	<10	35	<10	<10	<10	56
C10 - C14 Fraction								mg/kg	50		250	250	310	<50	<50	<50	<50	60	<50	<50	<50	<50
C15 - C28 Fraction								mg/kg	100		360	390	420	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction								mg/kg	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)	10000	40000	10000	40000				mg/kg	50		610	640	730	<50	<50	<50	<50	60	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																						
C6 - C10 Fraction								mg/kg	10		<10	<10	<10	<10	<10	30	<10	49	<10	<10	<10	70
C6 - C10 Fraction minus BTEX (F1)								mg/kg	10		<10	<10	<10	<10	<10	30	<10	49	<10	<10	<10	70
>C10 - C16 Fraction								mg/kg	50		380	400	470	<50	<50	<50	<50	60	<50	<50	<50	<50
>C16 - C34 Fraction								mg/kg	100		280	300	320	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction								mg/kg	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)								mg/kg	50		660	700	790	<50	<50	<50	<50	60	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)								mg/kg	50		380	400	470	<50	<50	<50	<50	60	<50	<50	<50	<50
EP080: BTEXN																						
Benzene	10	40	18	72				mg/kg	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
Toluene	288	1152	518	2073				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	600	2400	1080	4320				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene								mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	1000	4000	1800	7200				mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX								mg/kg	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
Naphthalene								mg/kg	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																						
Asbestos Detected								g/kg	0.1		Yes	No	No	No	No	No	No	No	No	No	No	----
Asbestos Type								--			Ch	-	-	-	-	-	-	-	-	-	-	----
Metals TCLP																						
Arsenic					5	20		mg/L	0.1		----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
Cadmium					1	4		mg/L	0.05		----	----	<0.05	<0.05	----	<0.05	----	<0.05	----	<0.05	----	----
Chromium, Total								mg/L	0.1		----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
Copper								mg/L	0.1		----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
Lead					5	20		mg/L	0.1		----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
Nickel					2	8		mg/L	0.1		----	----	<0.1	<0.1	----	<0.1	----	<0.1	----	<0.1	----	----
Zinc								mg/L	0.1		----	----	1.2	0.7	----	0.6	----	0.8	----	1.4	----	----
Mercury								mg/L	0.001		----	----	<0.0010	<0.0010	----	<0.0010	----	<0.0010	----	<0.0010	----	----

Blank Cell indicates no criterion available
LOR = Limit of Reporting
NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
[1] Maximum values of specific contaminant concentration (SCC) for classification without TCLP
[2] Maximum values for leachable concentration and specific contaminant concentration when used together
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Concentration in red font and grey box exceed CT1 screening value
Concentration in blue font and grey box exceed CT2 screening value
Concentrations below the LOR noted as <value

Table 4: Groundwater Gauging Data

Well ID	Easting	Northing	Gauging Date	Total Well Depth	SWL	Groundwater Elevation
				(m btoc)	(m btoc)	(mAHD)
006_GW004	326965.04	6250050.50	24/05/2016	10.03	5.03	9.575
006_GW005	326947.55	6250064.53	24/05/2016	10.07	3.07	8.391
006_GW006	326967.92	6250079.60	24/05/2016	10.68	3.77	9.061

Notes

m = Metres
btoc = Below Top of Casing
SWL = Standing Water Level
TOC = Top of Casing
AHD = Australian Height Datum
Easting projection MGA94: Map Grid of Australia 1994

Table 5: Groundwater Quality Parameters

Well ID	Purge Date	Purge Vol (L)	DO (ppm)	EC (µScm-¹)	pH	Eh (mV)	Temperature (°C)	Comments
006_GW004	24/05/2016	3.5	1.20	1107	5.16	108	21.0	moderately turbid, brown, no sheen, no odour, no PSH
006_GW005	24/05/2016	2.5	0.62	4350	5.34	136	22.0	slightly turbid, brown, no sheen, no odour, no PSH
006_GW006	24/05/2016	2.5	1.39	2180	5.85	74	22.5	slightly turbid, brown, no sheen, no odour, no PSH

Notes

L = Litre
DO = Dissolved Oxygen
ppm = parts per million
EC = Electrical Conductivity
µScm-¹ = microSiemens per centimetre
Eh = Redox
PSH = phase seperated hydrocarbons
mV = milli Volts

Table 6: Groundwater Analytical Results

RAMBOLL ENVIRON

Guidelines	HSL D – Commercial/ Industrial[A] 2 to <4m	HSL D – Commercial/ Industrial[A] 4m to<8m	HSL D – Commercial/ Industrial[A] 8m+	95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]	Sample Type:	Units	LOR	REG	REG	REG	REG	REG
						ALS Sample number:			ES1611420001	ES1611420002	ES1611420007	S16-My28529 502339	ES1611420003
						Sample date:			24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016
						Sample ID:			006_GW004	006_GW005	006_QC100	006_QC101	006_GW006
						Project Name:			M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
						Compound:			NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME
						Site:			SITE 006	SITE 006	SITE 006	SITE 006	SITE 006
						Sampling Method:			low flow	low flow	low flow	low flow	low flow
											DUPLICATE OF 006_GW005	TRIPLICATE OF 006_GW005	
Analyte grouping / Analyte							**Units**	**LOR**					
EG020T: Dissolved Metals by ICP-MS													
Arsenic				***2.3***	**100**		µg/L	1	<1	<1	<1	<1	2
Cadmium				**0.7**	**20**		µg/L	0.1	<0.1	<0.1	<0.1	0.2	**0.9**
Chromium				**4.4**	**500**		µg/L	1	<1	<1	<1	<1	<1
Copper				**1.3**	**20000**		µg/L	1	**2**	<1	<1	1	**6**
Nickel				**7**	**200**		µg/L	1	<1	<1	<1	<1	<1
Lead				**4.4**	**100**		µg/L	1	**14**	**32**	**33**	30	**65**
Zinc				**15**			µg/L	1	**53**	**50**	**52**	48	**96**
EG035F: Dissolved Mercury by FIMS													
Mercury				**0.1**	**10**		µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)													
Total Polychlorinated biphenyls							µg/L	1	<1	<1	<1	----	<1
EP068A: Organochlorine Pesticides (OC)													
alpha-BHC							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Hexachlorobenzene (HCB)							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
beta-BHC							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
gamma-BHC					**100**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
delta-BHC							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Heptachlor				***0.0004***	**3**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Aldrin				***0.003***			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Heptachlor epoxide							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
trans-Chlordane							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
alpha-Endosulfan				***0.0002***			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
cis-Chlordane							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Dieldrin				***0.01***			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
4.4`-DDE				***0.0005***			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Endrin				**0.008**			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
beta-Endosulfan				***0.007***			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
4.4`-DDD							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Endrin aldehyde							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Endosulfan sulfate							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
4.4`-DDT				***0.0004***	**90**		µg/L	2	<2.0	<2.0	<2.0	----	<2.0
Endrin ketone							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Methoxychlor				***0.004***	**3000**		µg/L	2	<2.0	<2.0	<2.0	----	<2.0
^ Total Chlordane (sum)				***0.001***	**20**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
^ Sum of DDD + DDE + DDT							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
^ Sum of Aldrin + Dieldrin					**3**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
EP068B: Organophosphorus Pesticides (OP)													
Dichlorvos					**50**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Demeton-S-methyl				***4***			µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Monocrotophos							µg/L	2	<2.0	<2.0	<2.0	----	<2.0
Dimethoate				***0.15***	**70**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Diazinon				***0.01***	**40**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Chlorpyrifos-methyl							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Parathion-methyl					**7**		µg/L	2	<2.0	<2.0	<2.0	----	<2.0
Malathion				***0.05***	**700**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Fenthion					**70**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Chlorpyrifos				**0.009**	**100**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Parathion				***0.004***	**200**		µg/L	2	<2.0	<2.0	<2.0	----	<2.0
Pirimphos-ethyl							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Chlorfenvinphos					**20**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Bromophos-ethyl							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Fenamiphos					**5**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Prothiofos							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Ethion					**40**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Carbophenothion							µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Azinphos Methyl				***0.01***	**300**		µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
VOCs													
Styrene							µg/L	5	<5	<5	----	----	<5
Isopropylbenzene							µg/L	5	<5	<5	----	----	<5
n-Propylbenzene							µg/L	5	<5	<5	----	----	<5
1.3.5-Trimethylbenzene							µg/L	5	<5	<5	----	----	<5
sec-Butylbenzene							µg/L	5	<5	<5	----	----	<5
1.2.4-Trimethylbenzene							µg/L	5	<5	<5	----	----	<5
tert-Butylbenzene							µg/L	5	<5	<5	----	----	<5
p-Isopropyltoluene							µg/L	5	<5	<5	----	----	<5
n-Butylbenzene							µg/L	5	<5	<5	----	----	<5
Vinyl Acetate							µg/L	50	<50	<50	----	----	<50
2-Butanone (MEK)							µg/L	50	<50	<50	----	----	<50
4-Methyl-2-pentanone (MIBK)							µg/L	50	<50	<50	----	----	<50
2-Hexanone (MBK)							µg/L	50	<50	<50	----	----	<50
Carbon disulfide							µg/L	5	<5	<5	----	----	<5
2.2-Dichloropropane							µg/L	5	<5	<5	----	----	<5
1.2-Dichloropropane							µg/L	5	<5	<5	----	----	<5
cis-1.3-Dichloropropylene							µg/L	5	<5	<5	----	----	<5
trans-1.3-Dichloropropylene							µg/L	5	<5	<5	----	----	<5
1.2-Dibromoethane (EDB)							µg/L	5	<5	<5	----	----	<5
Dichlorodifluoromethane							µg/L	50	<50	<50	----	----	<50
Chloromethane							µg/L	50	<50	<50	----	----	<50
Vinyl chloride					**3**		µg/L	50	<50	<50	----	----	<50
Bromomethane							µg/L	50	<50	<50	----	----	<50
Chloroethane							µg/L	50	<50	<50	----	----	<50
Trichlorofluoromethane							µg/L	50	<50	<50	----	----	<50
1.1-Dichloroethene					**300**		µg/L	5	<5	<5	----	----	<5
Iodomethane							µg/L	5	<5	<5	----	----	<5
trans-1.2-Dichloroethene							µg/L	5	<5	<5	----	----	<5
1.1-Dichloroethane							µg/L	5	<5	<5	----	----	<5
cis-1.2-Dichloroethene							µg/L	5	<5	<5	----	----	<5
1.1.1-Trichloroethane							µg/L	5	<5	<5	----	----	<5
1.1-Dichloropropylene							µg/L	5	<5	<5	----	----	<5
Carbon Tetrachloride							µg/L	5	<5	<5	----	----	<5
1.2-Dichloroethane					**30**		µg/L	5	<5	<5	----	----	<5
Trichloroethene							µg/L	5	<5	<5	----	----	<5
Dibromomethane							µg/L	5	<5	<5	----	----	<5
1.1.2-Trichloroethane				**1900**			µg/L	5	<5	<5	----	----	<5
1.3-Dichloropropane							µg/L	5	<5	<5	----	----	<5
Tetrachloroethene					**500**		µg/L	5	<5	<5	----	----	<5
1.1.1.2-Tetrachloroethane							µg/L	5	<5	<5	----	----	<5
trans-1.4-Dichloro-2-butene							µg/L	5	<5	<5	----	----	<5
cis-1.4-Dichloro-2-butene							µg/L	5	<5	<5	----	----	<5
1.1.2.2-Tetrachloroethane							µg/L	5	<5	<5	----	----	<5

Table 6: Groundwater Analytical Results

RAMBOLL ENVIRON

Guidelines	HSL D – Commercial/ Industrial[A] 2 to <4m	HSL D – Commercial/ Industrial[A] 4m to<8m	HSL D – Commercial/ Industrial[A] 8m+	95% Marine Water Protection for Aquatic Ecosystems[B]	Recreational Health (10x ADWG 2011)[C]	Sample Type:					
						ALS Sample number:	ES1611420001	ES1611420002	ES1611420007	S16-My28529 502339	ES1611420003
						Sample date:	24/05/2016	24/05/2016	24/05/2016	24/05/2016	24/05/2016
						Sample ID:	006_GW004	006_GW005	006_QC100	006_QC101	006_GW006
						Project Name:	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX	M4E-WCX
						Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME
						Site:	SITE 006	SITE 006	SITE 006	SITE 006	SITE 006
						Sampling Method:	low flow	low flow	low flow	low flow	low flow
									DUPLICATE OF 006_GW005	TRIPLICATE OF 006_GW005	
Analyte grouping / Analyte						Units	LOR				
1.2.3-Trichloropropane						µg/L	5	<5	<5	----	----	<5
Pentachloroethane						µg/L	5	<5	<5	----	----	<5
1.2-Dibromo-3-chloropropane						µg/L	5	<5	<5	----	----	<5
Hexachlorobutadiene						µg/L	5	<5	<5	----	----	<5
Chlorobenzene				***55***	**3000**	µg/L	5	<5	<5	----	----	<5
Bromobenzene						µg/L	5	<5	<5	----	----	<5
2-Chlorotoluene						µg/L	5	<5	<5	----	----	<5
4-Chlorotoluene						µg/L	5	<5	<5	----	----	<5
1.3-Dichlorobenzene				***260***		µg/L	5	<5	<5	----	----	<5
1.4-Dichlorobenzene				***60***	**400**	µg/L	5	<5	<5	----	----	<5
1.2-Dichlorobenzene				***160***	**15000**	µg/L	5	<5	<5	----	----	<5
1.2.4-Trichlorobenzene				**20**	**300**	µg/L	5	<5	<5	----	----	<5
1.2.3-Trichlorobenzene				***3***	**300**	µg/L	5	<5	<5	----	----	<5
Chloroform						µg/L	5	<5	<5	----	----	<5
Bromodichloromethane						µg/L	5	<5	<5	----	----	<5
Dibromochloromethane						µg/L	5	<5	<5	----	----	<5
Bromoform						µg/L	5	<5	<5	----	----	<5
Naphthalene				**50**		µg/L	5	<5	<5	----	----	<5
EP075(SIM)A: Phenolic Compounds												
Phenol				**400**		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2-Methylphenol						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
3- & 4-Methylphenol						µg/L	2	<2.0	<2.0	<2.0	----	<2.0
2-Nitrophenol				***2***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2.4-Dimethylphenol				***2***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2.6-Dichlorophenol				***34***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
4-Chloro-3-methylphenol						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0	<1.0	<1.0	----	<1.0
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Pentachlorophenol				**22**	**100**	µg/L	2	<2.0	<2.0	<2.0	----	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene				**50**		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Acenaphthylene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Acenaphthene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Fluorene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Phenanthrene				***0.6***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Anthracene				***0.01***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Fluoranthene				***1***		µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Pyrene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Benz(a)anthracene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Chrysene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Benzo(b+j)fluoranthene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Benzo(k)fluoranthene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Dibenz(a.h)anthracene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Benzo(g.h.i)perylene						µg/L	1	<1.0	<1.0	<1.0	----	<1.0
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
Benzo(a)pyrene TEQ (zero)						µg/L	0.5	<0.5	<0.5	<0.5	----	<0.5
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction						µg/L	20	<20	<20	<20	20	<20
C10 - C14 Fraction						µg/L	50	<50	<50	<50	----	<50
C15 - C28 Fraction						µg/L	100	<100	<100	<100	----	<100
C29 - C36 Fraction						µg/L	50	<50	<50	<50	----	<50
C10 - C36 Fraction (sum)						µg/L	50	<50	<50	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction						µg/L	20	<20	<20	<20	----	<20
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20	<20	<20	<20	----	<20
>C10 - C16 Fraction						µg/L	100	<100	<100	<100	----	<100
>C16 - C34 Fraction						µg/L	100	<100	<100	<100	----	<100
>C34 - C40 Fraction						µg/L	100	<100	<100	<100	----	<100
>C10 - C40 Fraction (sum)						µg/L	100	<100	<100	<100	----	<100
>C10 - C16 Fraction minus Naphthalene (F2)	**NL**	**NL**	**NL**			µg/L	100	<100	<100	<100	----	<100
EP080: BTEXN												
Benzene	**4900**	**5100**	**5400**	**500**	**8000**	µg/L	1	<1	<1	<1	<1	<1
Toluene	**NL**	**NL**	**NL**	***180***	**3000**	µg/L	2	<2	<2	<2	<1	<2
Ethylbenzene	**NL**	**NL**	**NL**	**5**	**8000**	µg/L	2	<2	<2	<2	<1	<2
meta- & para-Xylene				***275***		µg/L	2	<2	<2	<2	2	<2
ortho-Xylene				***350***		µg/L	2	<2	<2	<2	<1	<2
Total Xylenes	**NL**	**NL**	**NL**		**6000**	µg/L	2	<2	<2	<2	<3	<2
Sum of BTEX						µg/L	1	<1	<1	<1	----	<1
Naphthalene	**NL**	**NL**	**NL**	**50**			5	<5	<5	<5	----	<5

Blank Cell indicates no criterion available
All results are in µg/L unless stated
LOR = Limit of Reporting
[A] NEPM 2013 HSL 'D' (Commercial/Industrial)
[B] ANZECC 2000 % Protection Level for Receiving Water Type
[C] NHMRC Australian Drinking Water Guidelines, 2011
ANZECC guidelines in *italics* are low level reliability guidelines
ANZECC arsenic guideline based on As (III) for marine and As (V) for fresh, the lowest of presented guidelines.
NHMRC arsenic guidelines are based on total arsenic
ANZECC and NHMRC guidelines for chromium are based on Cr (VI)
ANZECC guidelines for mercury are based on inorganic mercury.
NHMRC guidelines for mercury are based on total mercury.
In instances where there was no marine guideline values, the freshwater guidelines have been adopted
In instances wehre there was no health drinking water guideline value, the aesthetic value has been adopted
Concentration in **red** font and grey box exceed the adopted ecosystem guideline value
Concentration in **orange** font and grey box exceed the adopted recreational drinking water guideline value
Concentrations in blue indicate the LOR is greater than the guideline value
Concentrations below the LOR noted as <value
no HSL is presented for recreational use (HSL C) as all these chemicals are not limiting (NL)

Table 7: Soil QA/QC Results

Sample Type:	REG	REG	RPD	REG	REG	RPD	REG	REG	RPD
ALS Sample number:	ES1610122008	ES1610122012		ES1610135002	ES1610135008		ES1610135002	S16-My13432 500403	
Sample date:	10/05/2016	10/05/2016		10/05/2016	10/05/2016		10/05/2016	10/05/2016	
Sample ID:	006_GS008	006_QC022		006_UST2_002	006_QC020		006_UST2_002	006_QC021	
Project Name:	M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	
Compound:	Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site		Northcote Street Tunnel Site	Northcote Street Tunnel Site	
Site:	Site 006	Site 006		Site 006	Site 006		Site 006	Site 006	
Sampling Method:	Grab Sample Backfill Sands	Grab Sample Backfill Sands		Validation Sampling UST2	Validation Sampling UST2		Validation Sampling UST2	Validation Sampling UST2	
Sample Description	PRIMARY	Duplicate of 006_GS008		PRIMARY	Duplicate of 006_UST2_002		PRIMARY	Triplicate of 006_UST2_002	

Analyte grouping/Analyte	Units	LOR									
EG005T: Total Metals by ICP-AES											
Arsenic	mg/kg	5	<5	7	*nc*	13	<5	*nc*	13		
Cadmium	mg/kg	1	<1	<1	*nc*	<1	<1	*nc*	<1		
Chromium	mg/kg	2	6	11	*58.8*	6	<2	*nc*	6		
Copper	mg/kg	5	9	18	*66.7*	<5	<5	*nc*	<5		
Lead	mg/kg	5	23	36	*44.1*	5	6	*18.2*	5	<5	*nc*
Nickel	mg/kg	2	2	3	*40.0*	<2	<2	*nc*	<2		
Zinc	mg/kg	5	80	126	*44.7*	7	<5	*nc*	7		
EG035T: Total Recoverable Mercury by FIMS											
Mercury	mg/kg	0.1	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*	<0.1		
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons											
Naphthalene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Acenaphthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Fluorene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Phenanthrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Chrysene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.5	*nc*
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.6	0.6	0.6	*nc*	0.6	0.6	*nc*	0.6	0.6	*nc*
Benzo(a)pyrene TEQ (LOR)	mg/kg	1.2	1.2	1.2	*nc*	1.2	1.2	*nc*	1.2	1.2	*nc*
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	mg/kg	10	35	56	*46.2*	<10	<10	*nc*	<10	< 20	*nc*
C10 - C14 Fraction	mg/kg	50	60	<50	*nc*	50	<50	*nc*	50	25	*66.7*
C15 - C28 Fraction	mg/kg	100	<100	<100	*nc*	220	<100	*75.0*	220	54	***121.2***
C29 - C36 Fraction	mg/kg	100	<100	<100	*nc*	<100	<100	*nc*	<100	<50	*nc*
C10 - C36 Fraction (sum)	mg/kg	50	60	<50	*nc*	270	50	***137.5***	270	79	***109.5***
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions											
C6 - C10 Fraction	mg/kg	10	49	70	*35.3*	<10	<10	*nc*	<10	< 20	*nc*
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	49	70	*35.3*	<10	<10	*nc*	<10	< 20	*nc*
>C10 - C16 Fraction	mg/kg	50	60	<50	*nc*	120	<50	*82.4*	120	< 50	*82.4*
>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	*nc*	190	<100	*62.1*	190	< 100	*62.1*
>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	*nc*	<100	<100	*nc*	<100	< 100	*nc*
>C10 - C40 Fraction (sum)	mg/kg	50	60	<50	*nc*	310	<50	***144.4***	310	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	60	<50	*nc*	120	<50	*82.4*	120	< 50	*82.4*
EP080: BTEXN											
Benzene	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	< 0.1	*nc*
Toluene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	<0.2	*nc*
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.1	*nc*
Total Xylenes	mg/kg	0.5	<0.5	<0.5	*nc*	<0.5	<0.5	*nc*	<0.5	< 0.3	*nc*
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	*nc*	<0.2	<0.2	*nc*	<0.2	----	----
Naphthalene	mg/kg	1	<1	<1	*nc*	<1	<1	*nc*	<1	<0.5	*nc*

nc = not calculated since results < LOR

LOR = Laboratory Limit of Reporting

BOLD identifies where RPD exceeds

Intralaboratory	Interlaboratory	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Table 8: Groundwater QA/QC Results

RAMBOLL ENVIRON

					Sample Type:	REG	REG	RPD	REG	REG	RPD
					ALS Sample number:	ES1611420002	ES1611420007		ES1611420002	S16-My28529 502339	
					Sample date:	24/05/2016	24/05/2016		24/05/2016	24/05/2016	
					Sample ID:	006_GW005	006_QC100		006_GW005	006_QC101	
					Project Name:	M4E-WCX	M4E-WCX		M4E-WCX	M4E-WCX	
					Compound:	NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME		NORTHCOLE STREET TUNNEL SITE GME	NORTHCOLE STREET TUNNEL SITE GME	
					Site:	SITE 006	SITE 006		SITE 006	SITE 006	
					Sampling Method:	low flow	low flow		low flow	low flow	
Guidelines	**HSL D – Commercial/ Industrial**			**95% Marine Water Protection for Aquatic Ecosystems**	**Recreational Health (10x ADWG 2011)**	**Sample Description**	PRIMARY	DUPLICATE OF 006_GW005		PRIMARY	TRIPLICATE OF 006_GW005	
	2 to <4m	**4m to<8m**	**8m+**									
Analyte grouping/Analyte						**Units**	**LOR**					
EG020T: Dissolved Metals by ICP-MS												
Arsenic				***2.3***	**100**	µg/L	1	<1	<1	*nc*	<1	<1	*nc*
Cadmium				**0.7**	**20**	µg/L	0.1	<0.1	<0.1	*nc*	<0.1	0.2	*nc*
Chromium				**4.4**	**500**	µg/L	1	<1	<1	*nc*	<1	<1	*nc*
Copper				**1.3**	**20000**	µg/L	1	<1	<1	*nc*	<1	1	*nc*
Nickel				**7**	**200**	µg/L	1	<1	<1	*nc*	<1	<1	*nc*
Lead				**4.4**	**100**	µg/L	1	32	33	*3.1*	32	30	*6.5*
Zinc				**15**		µg/L	1	50	52	*3.9*	50	48	*4.1*
EG035F: Dissolved Mercury by FIMS													
Mercury				**0.1**	**10**	µg/L	0.1	<0.1	<0.1	*nc*	<0.1	<0.1	*nc*
EP066: Polychlorinated Biphenyls (PCB)													
Total Polychlorinated biphenyls						µg/L	1	<1	<1	*nc*	<1	----	----
EP068A: Organochlorine Pesticides (OC)													
alpha-BHC						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Hexachlorobenzene (HCB)						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
beta-BHC						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
gamma-BHC					**100**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
delta-BHC						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Heptachlor				***0.0004***	**3**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Aldrin				***0.003***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Heptachlor epoxide						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
trans-Chlordane						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
alpha-Endosulfan				***0.0002***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
cis-Chlordane						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Dieldrin				***0.01***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
4.4`-DDE				***0.0005***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Endrin				**0.008**		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
beta-Endosulfan				***0.007***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
4.4`-DDD						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Endrin aldehyde						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Endosulfan sulfate						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
4.4`-DDT				***0.0004***	**90**	µg/L	2	2	2	*nc*	2	----	----
Endrin ketone						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Methoxychlor				***0.004***	**3000**	µg/L	2	2	2	*nc*	2	----	----
^ Total Chlordane (sum)				***0.001***	**20**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
^ Sum of DDD + DDE + DDT						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
^ Sum of Aldrin + Dieldrin					**3**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
EP068B: Organophosphorus Pesticides (OP)													
Dichlorvos					**50**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Demeton-S-methyl				***4***		µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Monocrotophos						µg/L	2	2	2	*nc*	2	----	----
Dimethoate				***0.15***	**70**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Diazinon				***0.01***	**40**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Chlorpyrifos-methyl						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Parathion-methyl					**7**	µg/L	2	2	2	*nc*	2	----	----
Malathion				***0.05***	**700**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Fenthion					**70**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Chlorpyrifos				**0.009**	**100**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Parathion				***0.004***	**200**	µg/L	2	2	2	*nc*	2	----	----
Pirimphos-ethyl						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Chlorfenvinphos					**20**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Bromophos-ethyl						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Fenamiphos					**5**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Prothiofos						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Ethion					**40**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Carbophenothion						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Azinphos Methyl				***0.01***	**300**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
EP075(SIM)A: Phenolic Compounds													
Phenol				**400**		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2-Chlorophenol				***340***	**3000**	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2-Methylphenol						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
3- & 4-Methylphenol						µg/L	2	2	2	*0.0*	2	----	----
2-Nitrophenol				***2***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2.4-Dimethylphenol				***2***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2.4-Dichlorophenol				***120***	**2000**	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2.6-Dichlorophenol				***34***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
4-Chloro-3-methylphenol						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2.4.6-Trichlorophenol				**3**	**200**	µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
2.4.5-Trichlorophenol				***4***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Pentachlorophenol				**22**	**100**	µg/L	2	2	2	*0.0*	2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons													
Naphthalene				**50**		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Acenaphthylene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Acenaphthene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Fluorene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Phenanthrene				***0.6***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Anthracene				***0.01***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Fluoranthene				***1***		µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Pyrene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Benz(a)anthracene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Chrysene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Benzo(b+j)fluoranthene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Benzo(k)fluoranthene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Benzo(a)pyrene				***0.1***	**0.1**	µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Indeno(1.2.3.cd)pyrene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Dibenz(a.h)anthracene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Benzo(g.h.i)perylene						µg/L	1	<1.0	<1.0	*nc*	<1.0	----	----
Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
Benzo(a)pyrene TEQ (zero)						µg/L	0.5	<0.5	<0.5	*nc*	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons													
C6 - C9 Fraction						µg/L	20	20	20	*nc*	20	20	*nc*
C10 - C14 Fraction						µg/L	50	<50	<50	*nc*	<50	----	----
C15 - C28 Fraction						µg/L	100	<100	<100	*nc*	<100	----	----
C29 - C36 Fraction						µg/L	50	<50	<50	*nc*	<50	----	----
C10 - C36 Fraction (sum)						µg/L	50	<50	<50	*nc*	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction						µg/L	20	20	20	*nc*	20	----	----
C6 - C10 Fraction minus BTEX (F1)	**6200**	**6300**	**6500**			µg/L	20	20	20	*nc*	20	----	----
>C10 - C16 Fraction						µg/L	100	<100	<100	*nc*	<100	----	----
>C16 - C34 Fraction						µg/L	100	<100	<100	*nc*	<100	----	----
>C34 - C40 Fraction						µg/L	100	----	<100	----	----	----	----
>C10 - C40 Fraction (sum)						µg/L	100	----	<100	----	----	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	**NL**	**NL**	**NL**			µg/L	100	----	<100	----	----	----	----

All units in µg/L except trip spikes (%)
nc = not calculated since results < LOR
LOR = Laboratory Limit of Reporting
BOLD identifies where RPD exceeds

Intralab	**Interlab**	
>50	>60	where sample results are >10 x PQL
>75	>85	where sample results are > 5 to ≤10 x PQL
>100	>100	where sample results are >2 to ≤5 x PQL
AD>2.5 * PQL		where sample results are ≤2 x PQL

Appendix B. Figures and Tables from ASBJV Site Work

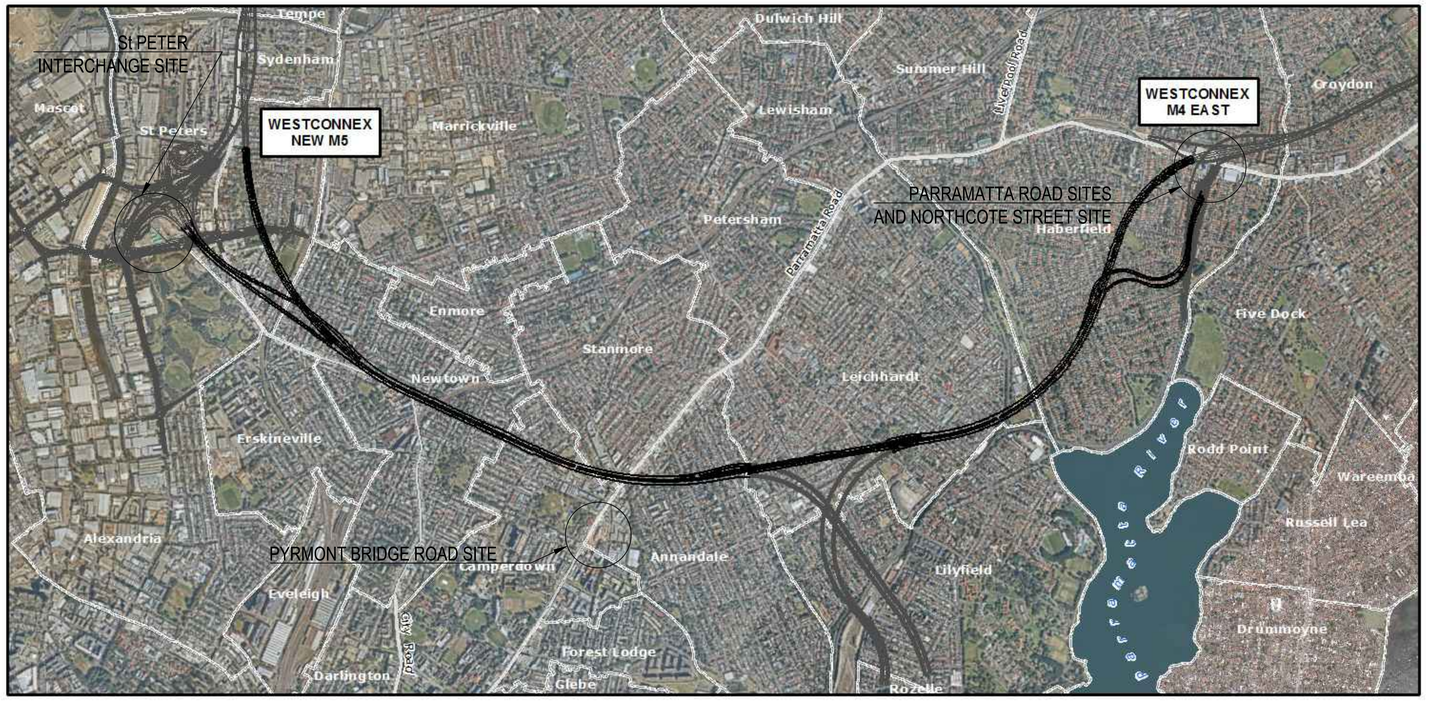
Sydney Motorway Corporation | WestConnex

M4M5 LINK MAIN TUNNEL WORKS

PROJECT WIDE

PACKAGE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001

CONSTRUCTION SITE REINSTATEMENT



LOCALITY PLAN
NTS

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5-RBGP-PRW-CIV-CW02-DRG-1000

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001

SCALES ON THIS A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS — A3
PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT

COVER SHEET

RMS REGISTRATION No. — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	CW02-DRG-1000	00

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

CW02 Drawing Reference	Temporary works element	Temporary works drawing reference
CW02-DRG-1101	Temporary retaining wall installed by M4East near Northcote street dead end	M4E-EIC-DIC-DG-10-660-925-502
CW02-DRG-1101	Temporary hoarding installed by M4East near Northcote street dead end	M4E-EIC-DIC-DG-10-660-900-435
"CW02-DRG-1101 CW02-DRG-1103 CW02-DRG-1105"	Decline piling structures constructed by M4East	"M4E-MJA-DG-10-280-318-002 M4E-MJA-DG-10-280-318-003 M4E-MJA-DG-10-280-318-100 M4E-MJA-DG-10-280-318-101 M4E-MJA-DG-10-280-318-102 M4E-MJA-DG-10-280-318-110 M4E-MJA-DG-10-280-318-150 M4E-MJA-DG-10-280-318-155 M4E-MJA-DG-10-280-318-201 M4E-MJA-DG-10-280-318-301 M4E-MJA-DG-10-280-318-310 M4E-MJA-DG-10-280-318-311 M4E-MJA-DG-10-280-318-320 M4E-MJA-DG-10-280-318-330 M4E-MJA-DG-10-280-318-340 M4E-MJA-DG-10-280-318-360"
"CW02-DRG-1101 CW02-DRG-1103 CW02-DRG-1105"	Temporary ground slab constructed by M4East	"M4E-AEH-DG-10-660-922-111 M4E-AEH-DG-10-660-922-112 M4E-AEH-DG-10-660-925-411 to 416"
"CW02-DRG-1101 CW02-DRG-1103"	Temporary driveways constructed by M4East	"M4E-AEH-DG-10-660-922-101 M4E-EIC-DG-10-660-925-905 M4E-EIC-DG-10-660-925-911 M4E-EIC-DG-10-660-925-912"

GENERAL ARRANGEMENT NOTES:

1. ALL PORTABLE STRUCTURES AND ELECTRICAL EQUIPMENTS ARE TO BE REMOVED AS PART OF THE FINAL REINSTATEMENT PACKAGE.
2. PROPOSED DRAINAGE IS DESIGNED FOR MINOR STORM OF 10 YEARS ARI.
3. WEIGHBRIDGE AND WHEEL WASH TO BE REMOVED AND BACKFILLED AS PER PAVEMENT DETAIL SHOWN M4M5-RBGP-CIV-CW02-DRG-1103.
4. REFER TO M4M5-RBGP-PRW-CIV-CW02-DRG-2032 FOR FENCE AND GATE DETAIL.
5. FILTER BASKET TO BE INSTALLED IN ALL PROPOSED NEW STORMWATER PITS.
6. CLASS D GRATE TO BE PROVIDED OR TO BE INSTALLED FOR ALL PROPOSED STORMWATER PITS.
7. ANY EXISTING DRAINS, PITS, DRAINAGE LINES PROPOSED TO BE LEFT IN PLACE ARE REQUIRED TO BE FLUSHED AND CLEARED OF BLOCKAGES AND EVIDENCED AS FIT FOR PURPOSE WITH MEASURES SUCH AS CCTV PRIOR TO HANDOVER.
8. BRANDING TO BE DIRECTED AND CONFIRMED WITH TFNSW.

PAVEMENT NOTES:

1. BACKFILL MATERIAL AND SPECIFICATION

   FILLING MATERIAL: INORGANIC, NON-PERISHABLE MATERIAL OF THE TYPES SPECIFIED.

   SULPHUR CONTENT: DO NOT USE FILLING HAVING A SULPHUR CONTENT EXCEEDING 0.5% WITHIN 500 MM OF CEMENT BOUND ELEMENTS (FOR EXAMPLE CONCRETE STRUCTURES OR MASONRY) UNLESS SUCH ELEMENTS ARE PROTECTED BY IMPERMEABLE MEMBRANES OR EQUIVALENT MEANS.

2. FILLING TYPES
   GENERAL FILLING: GRADED MATERIAL FROM SITE, MAXIMUM PARTICLE SIZE 50 MM.

   SELECTED FILLING: GRANULAR MATERIAL AS FOLLOWS:
   -MAXIMUM PARTICLE SIZE: 50 MM.
   -PERCENTAGE PASSING .075 MM SIEVE: 50% MAXIMUM.
   -PLASTICITY INDEX: NOT GREATER THAN 14% AND NOT LESS THAN 2%.
   -CBR (4 DAY SOAKED): NOT LESS THAN 15%.

   FILL SUBGRADES: USE MATERIAL IN THE TOP 150 MM WHICH HAS A MAXIMUM PARTICLE SIZE OF 75 MM.

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5-RBGP-PRW-CIV-CW02-DRG-1100

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-	00	27.05.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE
M4M5-RBGP-PRW-CIV-CW02-DPK-0001

SCALES ON THIS A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
TEMPORARY WORKS DRAWINGS REFERENCE LIST & GENERAL NOTES

RMS REGISTRATION No.
PART 1

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	CW02-DRG-1100	00

LEGEND

- TO BE REMOVED
- SITE BOUNDARY
- EXISTING
- EXISTING 1.8m CHAIN-LINK SECURITY FENCE
- ADD PROPOSED 1.8m CHAIN LINK FENCE WITH RMS BRANDING
- EXISTING HOARDING TO BE RETAINED
- PROPOSED SECURITY GATE
- K&G — PROPOSED KERB AND GUTTER
- REFER TO PAVEMENT PLAN
- PROPOSED SWALE DRAIN
- EXISTING STORMWATER PIT
- REFER TO M4M5-RBGP-PRW-CIV-CW02-DRG-1102 FOR PROPOSED PEDESTRIAN LINK DESIGN

NOTES:

1. ALL PORTABLE STRUCTURES AND ELECTRICAL EQUIPMENTS ARE TO BE REMOVED AS PART OF THE FINAL REINSTATEMENT PACKAGE.
2. PROPOSED DRAINAGE IS DESIGNED FOR MINOR STORM OF 10 YEARS ARI
3. WEIGHBRIDGE AND WHEEL WASH TO BE REMOVED AND BACKFILLED AS PER PAVEMENT DETAIL SHOWN M4M5-RBGP-CIV-CW02-DRG-1103
4. REFER TO M4M5-RBGP-PRW-CIV-CW02-DRG-2032 FOR FENCE AND GATE DETAIL
5. FILTER BASKET TO BE INSTALLED IN ALL PROPOSED NEW STORMWATER PITS
6. CLASS D GRATE TO BE PROVIDED OR TO BE INSTALLED FOR ALL PROPOSED STORMWATER PITS
7. ANY EXISTING DRAINS, PITS, DRAINAGE LINES PROPOSED TO BE LEFT IN PLACE ARE REQUIRED TO BE FLUSHED AND CLEARED OF BLOCKAGES AND EVIDENCED AS FIT FOR PURPOSE WITH MEASURES SUCH AS CCTV PRIOR TO HANDOVER
8. BRANDING TO BE DIRECTED AND CONFIRMED WITH TFNSW

ACCEPTED FOR CONSTRUCTION

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001
SCALES ON THIS A3 SIZE DRAWING
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER: M4M5-RBGP-PRW- CIV -CW02- DRG- 1101

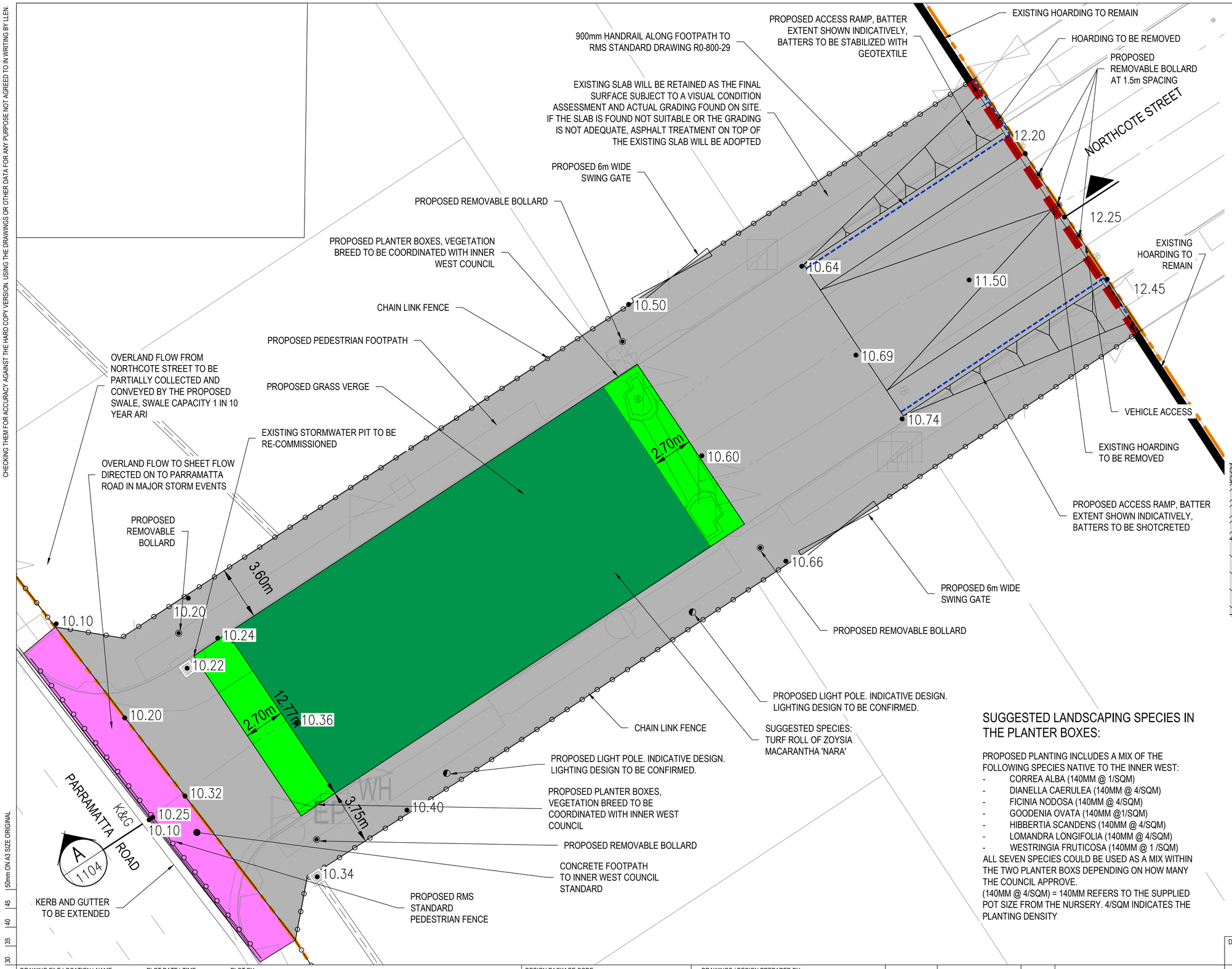
M4-M5 LINK MAIN TUNNEL WORKS

A3

PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
GENERAL ARRANGEMENT PLAN — SHEET 1 OF 1

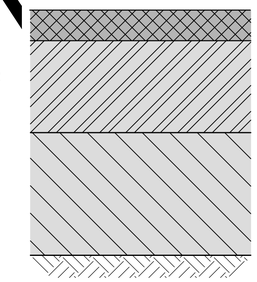
RMS REGISTRATION No. — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	CW02-DRG-1101	00



LEGEND

- SITE BOUNDARY
- EXISTING
- EXISTING 1.8m CHAIN-LINK SECURITY FENCE
- ADD PROPOSED 1.8m CHAIN LINK FENCE WITH RMS BRANDING
- EXISTING HOARDING TO BE RETAINED
- PROPOSED SECURITY GATE
- PROPOSED ASPHALT PAVEMENT
- PROPOSED GRASS VERGE
- PROPOSED PLANTER BOX
- PROPOSED FOOTPATH PAVEMENT, REFER TO INNER WEST COUNCIL STANDARD DRAWING F1
- PROPOSED DISH DRAIN
- EXISTING STORMWATER PIT
- PROPOSED LIGHT POLE
- PROPOSED REMOVABLE BOLLARD
- K&G PROPOSED KERB AND GUTTER
- 10.20 PROPOSED SURFACE LEVEL
- HOARDING TO BE REMOVED
- NEW 900mm HIGH HANDRAIL



50mm	SURFACE COURSE AC10 (RESIDENTIAL MIX)
150mm	BASE COURSE DGB20 (NOT RECYCLED) COMPACTION 98% STANDARD
200mm	SUB-BASE COURSE DGB40 RECYCLED (DD IN 2 LAYERS) COMPACTION 98% STANDARD

SUBGRADE
IF INSITU <CBR 3% - EXCAVATE 150mm AND PLACE EITHER:
A. RECYCLED ROAD BASE (PREFEREABLY RECOVERED FROM JOB SITE) OR
B. CEMENT TREATED ROAD (2000MPa) IF VERY POOR SUBGRADE, LIGHTLY COMPACTED

PROPOSED ASPHALT PAVEMENT
NOT TO SCALE

SUGGESTED LANDSCAPING SPECIES IN THE PLANTER BOXES:

PROPOSED PLANTING INCLUDES A MIX OF THE FOLLOWING SPECIES NATIVE TO THE INNER WEST:
- CORREA ALBA (140MM @ 1/SQM)
- DIANELLA CAERULEA (140MM @ 4/SQM)
- FICINIA NODOSA (140MM @ 4/SQM)
- GOODENIA OVATA (140MM @1/SQM)
- HIBBERTIA SCANDENS (140MM @ 4/SQM)
- LOMANDRA LONGIFOLIA (140MM @ 4/SQM)
- WESTRINGIA FRUTICOSA (140MM @ 1 /SQM)

ALL SEVEN SPECIES COULD BE USED AS A MIX WITHIN THE TWO PLANTER BOXS DEPENDING ON HOW MANY THE COUNCIL APPROVE.
(140MM @ 4/SQM) = 140MM REFERS TO THE SUPPLIED POT SIZE FROM THE NURSERY. 4/SQM INDICATES THE PLANTING DENSITY

NOTES:

THE CONDITIONS OF THE EXISTING TEMPORARY HOARDING PANELS WILL BE CHECKED ON SITE, SEVERELY DAMAGED PANELS WILL BE REPLACED, DETERIORATED PAINTING WILL BE REPAIRED OR REPAINTED AT THE TIME OF HANDING OVER.

ACCEPTED FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

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-	00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE
M4M5-RBGP-PRW-CIV-CW02-DPK-0001

SCALES ON THIS A3 SIZE DRAWING
PLAN 1:250

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | POLYGLUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
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DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M4M5-RBGP-PRW- CIV -CW02-DRG- 1102

M4-M5 LINK MAIN TUNNEL WORKS

A3

PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
PEDESTRIAN LINK PLAN

SHEET 1 OF 1

RMS REGISTRATION No. | PART 1

ISSUE STATUS: ISSUED FOR CONSTRUCTION | EDMS No.: - | SHEET No.: CW02-DRG-1102 | REV: 00

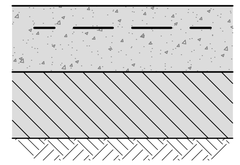
LEGEND

- PAVEMENT TO BE RETAINED
- TEMPORARY SLAB TO BE RETAINED
- PROPOSED HARDSTAND

HARDSTAND DESIGN NOTE:

3% DESIGN SUBGRADE CBR HAS BEEN ASSUMED FOR DESIGN PURPOSES, THE ACTUAL SUBGRADE CBR IS RECOMMENDED TO BE VERIFIED ON SITE.

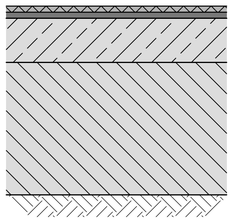
DESIGN TRAFFIC LOADING: 100000 ESA



150mm	32MPa CONCRETE WITH SL72 MESH 50mm COVER
150mm	DGB20 BASE COURSE

SUBGRADE CBR 3%
TO 98% STANDARD COMPACTION

CONCRETE RIGID PAVEMENT
NOT TO SCALE



7mm	SPRAY SEAL
7mm	PRIMER SEAL
100mm	MIN CBR 80% CRUSHED ROCK OR SITE WON MATERIAL (SUBJECT TO MATERIAL SPECIFICATION REVIEW PRIOR TO CONSTRUCTION)
300mm	MIN CBR 30% CRUSHED ROCK OR SITE WON MATERIAL (SUBJECT TO MATERIAL SPECIFICATION REVIEW PRIOR TO CONSTRUCTION)

SUBGRADE CBR 3%
TO 98% STANDARD COMPACTION

FLEXIBLE PAVEMENT HARDSTAND
NOT TO SCALE

BACKFILL MATERIAL AND SPECIFICATION

FILLING MATERIAL: INORGANIC, NON-PERISHABLE MATERIAL OF THE TYPES SPECIFIED.

SULPHUR CONTENT: DO NOT USE FILLING HAVING A SULPHUR CONTENT EXCEEDING 0.5% WITHIN 500 MM OF CEMENT BOUND ELEMENTS (FOR EXAMPLE CONCRETE STRUCTURES OR MASONRY) UNLESS SUCH ELEMENTS ARE PROTECTED BY IMPERMEABLE MEMBRANES OR EQUIVALENT MEANS.

FILLING TYPES

GENERAL FILLING: GRADED MATERIAL FROM SITE, MAXIMUM PARTICLE SIZE 50 MM.

SELECTED FILLING: GRANULAR MATERIAL AS FOLLOWS:
-MAXIMUM PARTICLE SIZE: 50 MM.
-PERCENTAGE PASSING .075 MM SIEVE: 50% MAXIMUM.
-PLASTICITY INDEX: NOT GREATER THAN 14% AND NOT LESS THAN 2%.
-CBR (4 DAY SOAKED): NOT LESS THAN 15%.

FILL SUBGRADES: USE MATERIAL IN THE TOP 150 MM WHICH HAS A MAXIMUM PARTICLE SIZE OF 75 MM.

ACCEPTED FOR CONSTRUCTION

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
C:\Users\chris.waite\Documents\WCX\Drawings\NORTHCOTE\M4M5-RBGP-PRW-CIV-CW02-DRG-1103.dwg-27/06/2022 3:46:38 AM-Chris.Waite

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001
SCALES ON THIS A3 SIZE DRAWING
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	S.MANANDHAR	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	S.SAIARA	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

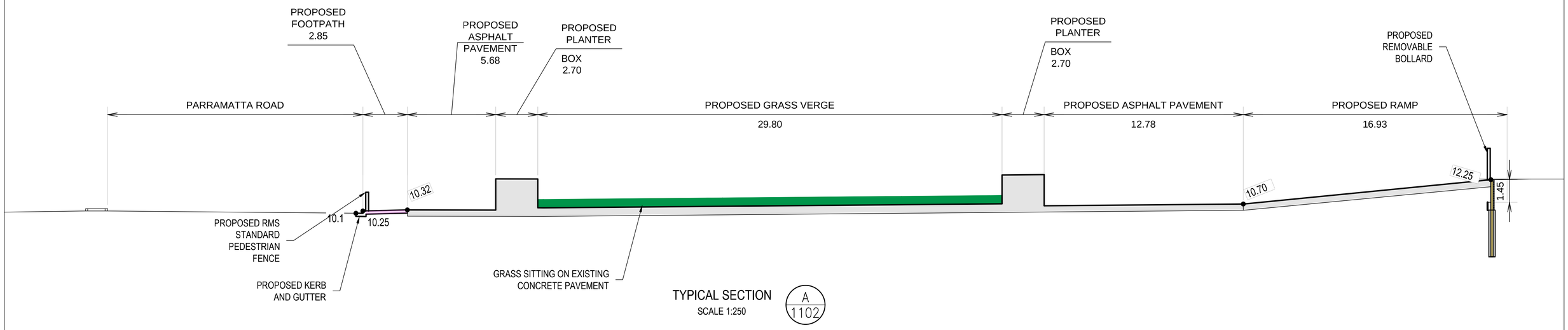
DOCUMENT NUMBER: M4M5-RBGP-PRW- CIV -CW02-DRG- 1103

M4-M5 LINK MAIN TUNNEL WORKS
A3

PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
PAVEMENT PLAN
SHEET 1 OF 1

RMS REGISTRATION No.
PART 1

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	CW02-DRG-1103	00



TYPICAL SECTION
SCALE 1:250

A
1102

ACCEPTED FOR CONSTRUCTION

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001

SCALES ON THIS A3 SIZE DRAWING
PLAN 1:250

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation
WestConnex

DOCUMENT NUMBER
M4M5-RBGP-PRW-CIV-CW02-DRG-1104

M4-M5 LINK MAIN TUNNEL WORKS

A3

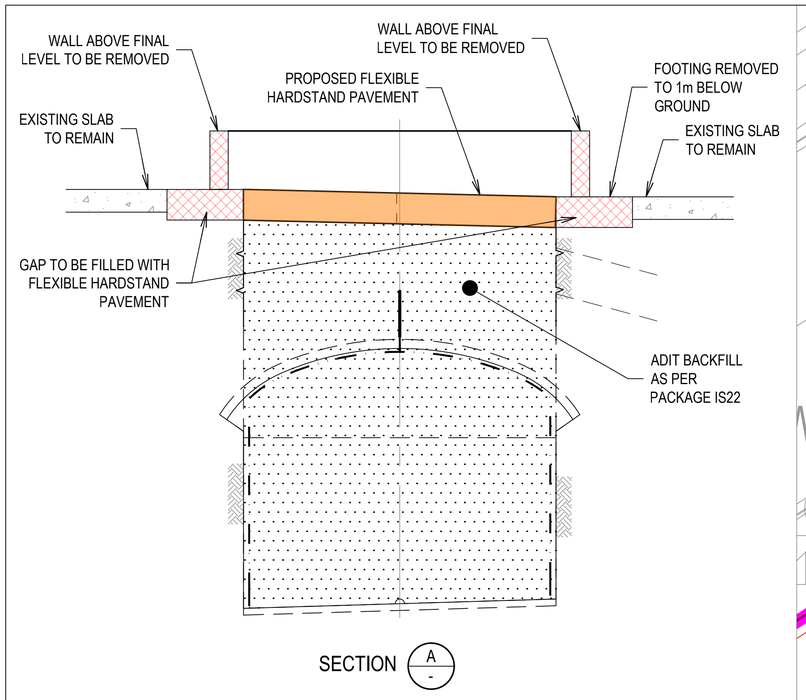
PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
TYPICAL SECTION

SHEET 1 OF 1

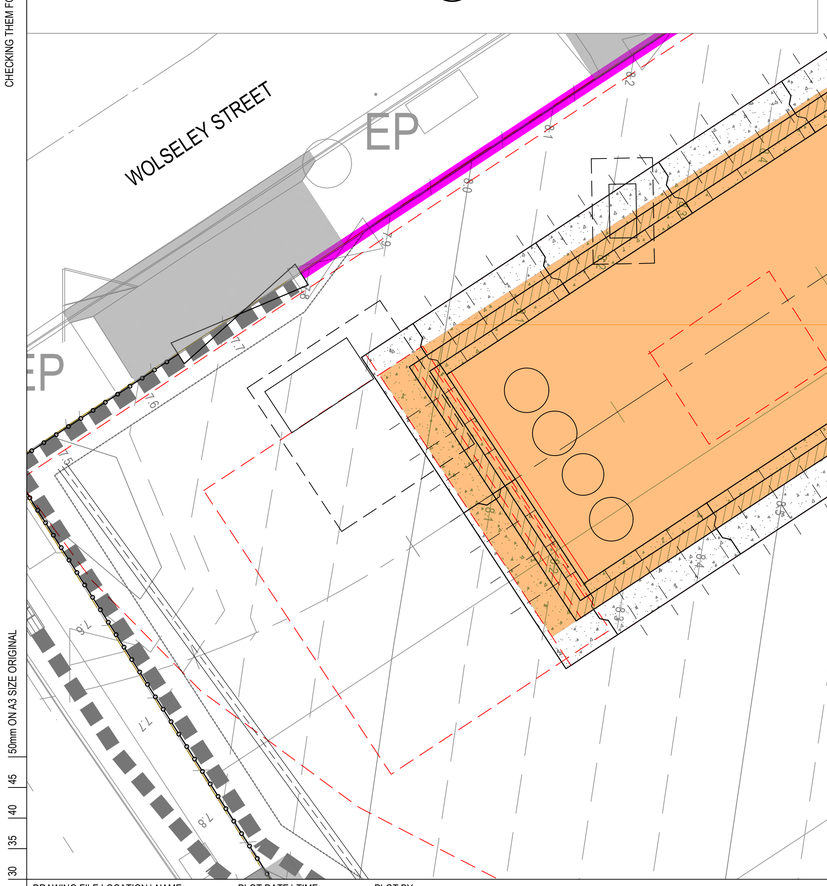
RMS REGISTRATION No.

PART 1

ISSUE STATUS: ISSUED FOR CONSTRUCTION
EDMS No.: -
SHEET No.: CW02-DRG-1104
REV: 00



SECTION A -



LEGEND

- TO BE REMOVED
- ADD PROPOSED 1.8m CHAIN LINK FENCE WITH RMS BRANDING
- PROPOSED HARDSTAND
- EXISTING HOARDING TO BE RETAINED
- PROPOSED SECURITY GATE
- DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 7.8 OR LOWER
- DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 8.0 OR LOWER
- DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 8.5 OR LOWER
- DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 9.0 OR LOWER
- DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL9.5 OR LOWER

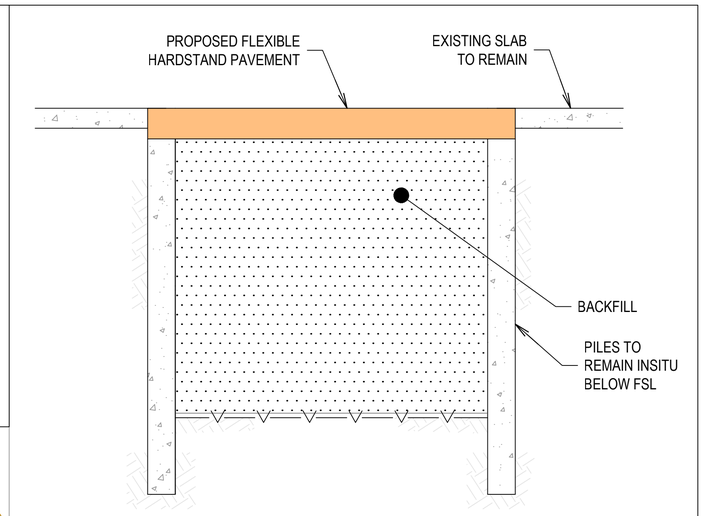
CAPPING BEAM AND DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 7.8

CAPPING BEAM AND DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 8.0

CAPPING BEAM AND DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 8.5

CAPPING BEAM AND DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 9.0

CAPPING BEAM AND DECLINE PILE WALL LEFT IN PLACE TOP TRIMMED TO RL 9.5



SECTION B -

NOTES:

UNDERGROUND SW SYSTEM TO BE RE-COMMISSIONED AND REUSED FOR PEDESTRIAN LINK.

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER M4M5-RBGP-PRW-CIV-CW02-DRG-1105

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001

SCALES ON THIS A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

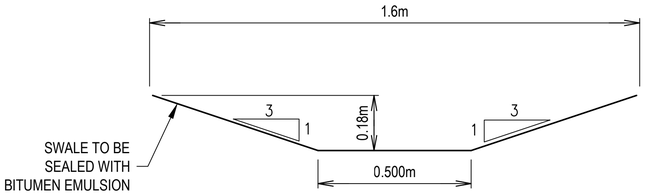
PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
UNDERGROUND STRUCTURES PILES DRAWING

SHEET 1 OF 1

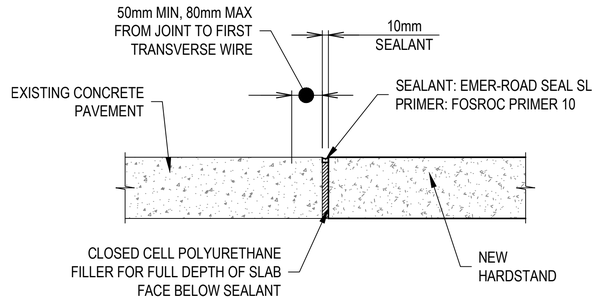
RMS REGISTRATION No. -

PART 1

ISSUE STATUS: ISSUED FOR CONSTRUCTION | EDMS No.: - | SHEET No.: CW02-DRG-1105 | REV: 00



TYPICAL SWALE DETAIL
SCALE 1:20



ISOLATION JOINT (IJ) DETAIL
SCALE 1:20

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5-RBGP-PRW-CIV-CW02-DRG-1115

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DESIGN PACKAGE CODE
M4M5-RBGP-PRW-CIV-CW02-DPK-0001

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acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

SCALES ON THIS A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
CIVIL DETAILS

SHEET 1 OF 1

RMS REGISTRATION No.

PART 1

ISSUE STATUS	EDMS No.	SHEET No.	REV
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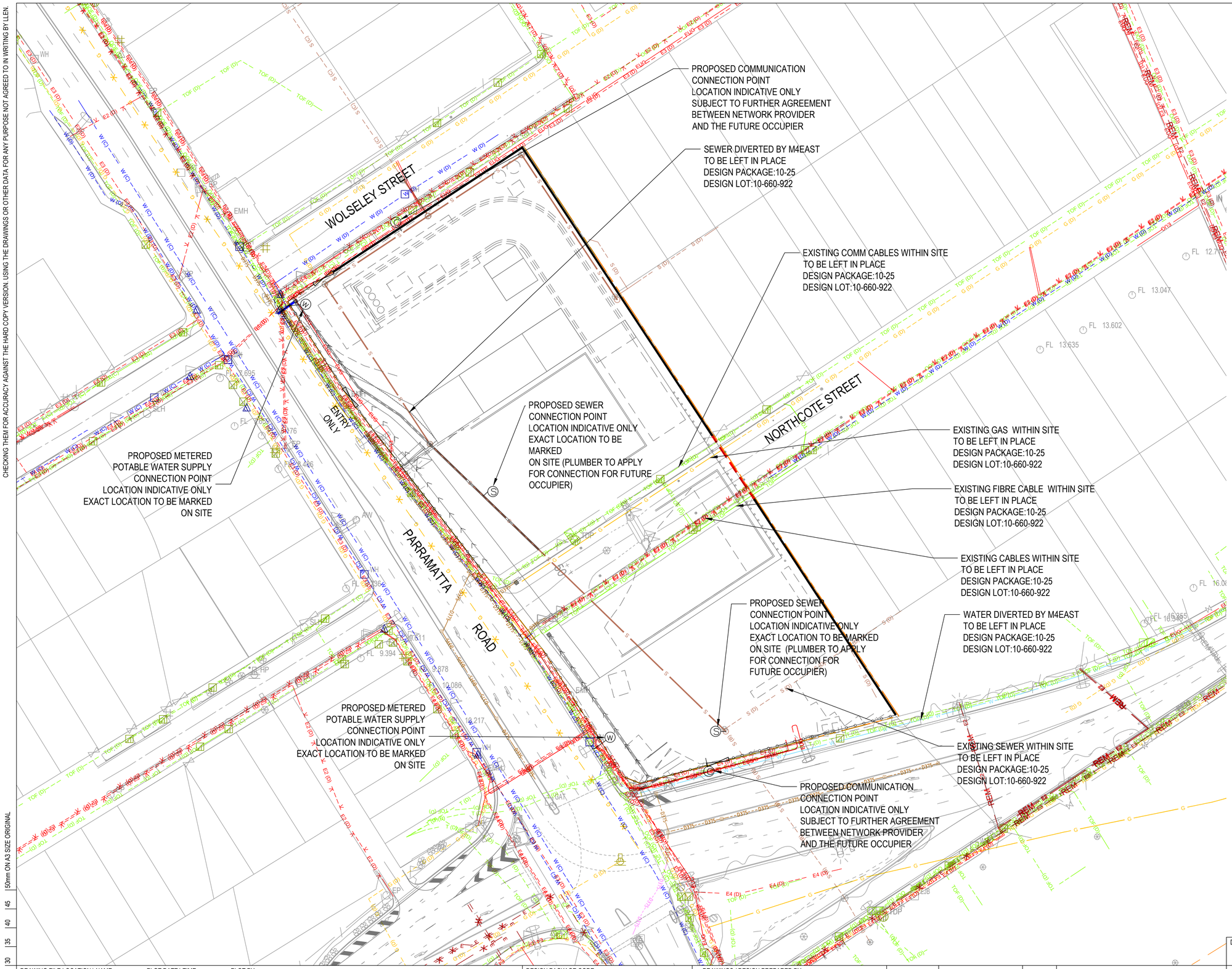

LEGEND

- EXISTING WATER MAIN (X)
- EXISTING WATER MAIN TO BE REMOVED
- EXISTING ELECTRICAL AG HV (X)
- EXISTING ELECTRICAL AG LV (X)
- EXISTING ELECTRICAL UG HV (X)
- EXISTING ELECTRICAL UG LV (X)
- EXISTING ELECTRICAL COU (X)
- EXISTING ELECTRICAL ER (X)
- EXISTING AAPT OPTIC FIBRE (X)
- EXISTING OPTIC FIBRE (X)
- EXISTING COMMS OPTIC FIBRE (X)
- EXISTING COMMS U (X)
- EXISTING COMMS VOC (X)
- EXISTING COMMS T (X)
- EXISTING GAS (X)
- EXISTING GAS O (X)
- EXISTING SEWER (X)
- EXISTING SEWER RISING MAIN (X)
- EXISTING SERVICE TO BE REMOVED
- EXISTING SERVICE TO BE - ABANDONED
- EXISTING DRAINAGE SYSTEM
- EXISTING DRAINAGE (SURVEYED)

NOTES:

1. THIS UTILITIES PLAN SHOWS THE CURRENT KNOWN STATUS OF THE SURROUNDING UTILITIES AND UTILITIES WITHIN THE SITE TO BE LEFT-IN-PLACE AND HANDED OVER.
2. THIS UTILITIES PLAN WILL BE FURTHER UPDATED IN FINAL DESIGN TO INCLUDE THE SEWER, WATER AND COMMUNICATION CONNECTIONS AS PER SWTC APPENDIX B.30.

ACCEPTED FOR CONSTRUCTION

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	27.06.22	ISSUED FOR CONSTRUCTION	C.WAITE

DESIGN PACKAGE CODE: M4M5-RBGP-PRW-CIV-CW02-DPK-0001
SCALES ON THIS A3 SIZE DRAWING
CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
WestConnex M4-M5 Link Tunnels
acciona | SAMSUNG C&T | BOUYGUES CONSTRUCTION AUSTRALIA

TITLE	NAME	DATE
DRAWN	M.ARELLANO	31.03.22
DRG CHECK	J.SUN	31.03.22
DESIGN	J.SUN	31.03.22
DESIGN CHECK	J.SUN	31.03.22
DESIGN VERIFIER	C.WAITE	31.03.22
DESIGN MNGR	C.WAITE	31.03.22
PROJECT MNGR	C.WAITE	31.03.22

Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER: M4M5-RBGP-PRW-CIV-CW02-DRG-1160

M4-M5 LINK MAIN TUNNEL WORKS

A3

PROJECT WIDE
CONSTRUCTION SITE REINSTATEMENT
NORTHCOTE
UTILITIES PLAN

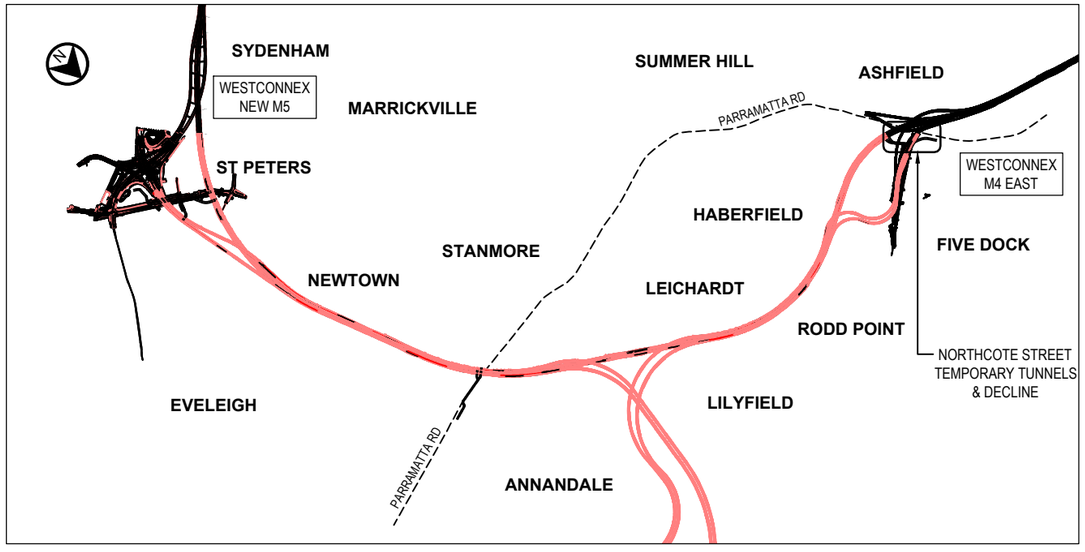
SHEET 1 OF 1

RMS REGISTRATION No. | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	CW02-DRG-1160	00

Sydney Motorway Corporation | WestConnex

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALLS
PACKAGE : M4M5-PSML-NCS-STR-IS22-DPK-0001



LOCALITY PLAN
N.T.S

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1000

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50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS — A3
NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL

COVER SHEET

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1000	00

DRAWING NUMBER	DRAWING TITLE
M4M5-PSML-NCS-STR-IS22-DRG-1000	COVER SHEET
M4M5-PSML-NCS-STR-IS22-DRG-1001	DRAWING SCHEDULE
M4M5-PSML-NCS-STR-IS22-DRG-1005	GENERAL NOTES
M4M5-PSML-NCS-STR-IS22-DRG-1010	GENERAL ARRANGEMENT
M4M5-PSML-NCS-STR-IS22-DRG-1020	TUNNEL REQUIREMENTS PRIOR TO BACKFILL
M4M5-PSML-NCS-STR-IS22-DRG-1025	VT05 TURNING BAYS BACKFILL SECTION
M4M5-PSML-NCS-STR-IS22-DRG-1026	TT02 BACKFILL SECTION
M4M5-PSML-NCS-STR-IS22-DRG-1027	EXISTING NORTHCOTE DECLINE (M131) - DECLINE TUNNEL BACKFILL
M4M5-PSML-NCS-STR-IS22-DRG-1028	TEMPORARY ADIT (TD02) - DECLINE TUNNEL BACKFILL
M4M5-PSML-NCS-STR-IS22-DRG-1030	BACKFILL BULKHEAD DETAILS
M4M5-PSML-NCS-STR-IS22-DRG-1031	BULKHEAD CROWN SHEAR KEY DETAILS
M4M5-PSML-NCS-STR-IS22-DRG-1035	TURNING BAY & SUBSTATION NICHE BACKFILL SEQUENCE
M4M5-PSML-NCS-STR-IS22-DRG-1040	SITE ACCESS RAMP BACKFILL
M4M5-PSML-NCS-STR-IS22-DRG-1041	SITE ACCESS RAMP STRUT REMOVAL SEQUENCE

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 - PSML - NCS - STR - IS22 - DRG - 1001

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL

DRAWING SCHEDULE

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1001	00

CONSTRUCTION ACCESS ADIT AND DECLINE BACKFILL

B1. PRIOR TO BACKFILLING, REMOVE ALL ITEMS FROM THE TUNNEL AND DECLINE SUCH AS MOBILE EQUIPMENT, LIQUIDS, MOBILE TRAFFIC BARRIERS AND SOME TUNNEL CONSTRUCTION SERVICES ETC AS SHOWN ON THE DRAWINGS.

B2. BACKFILL SHALL COMPRISE EITHER IMPORTED OR REUSED EXCAVATED MATERIAL.

B3. REUSED EXCAVATED MATERIAL SHALL COMPRISE FRESH TUNNEL SPOIL WON FROM ROADHEADER OR SURFACE MINER OPERATIONS (HEADING OR BENCHING). DESIGN APPROVAL IS REQUIRED IF MATERIAL OTHER THAN TUNNEL SPOIL IS USED AS BACKFILL. SANDSTONE WON FROM EXCAVATION BY HYDRAULIC ROCK BREAKING SHALL NOT BE USED AS BACKFILL UNLESS PROCESSED TO CONFORM TO TABLE B5.

B4. BACKFILL SHALL NOT COMPRISE UNSUITABLE MATERIAL AS DEFINED IN AS DEFINED BY CLAUSE 4.3 OF AS3798-2007 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS'.

B5. MATERIAL PROPERTIES FOR BACKFILL MUST COMPLY WITH THE FOLLOWING TABLE. TESTING TO CONFIRM MATERIAL COMPLIANCE SHALL BE IN ACCORDANCE WITH NOTES BF7.

PROPERTY	TEST METHODS	REQUIREMENT
MAXIMUM PARTICLE DIMENSION WITHIN 1000 OF SURFACE	RMS T280	100
MAXIMUM PARTICLE DIMENSION GREATER THAN 1000 FROM SURFACE	RMS T280	200
MATERIAL PASSING 37.5 mm AS SIEVE	RMS T106	MAX 40%
PLASTICITY INDEX	RMS T108 AND T109	≤25%

B6. COMPACTION AND CONDITIONING SHALL CONFORM TO THE FOLLOWING TABLE.

PROPERTY	TEST METHODS	REQUIREMENT
MAXIMUM COMPACTED LAYER THICKNESS WITHIN 4000 OF THE BULKHEAD	N/A	150
MAXIMUM COMPACTED LAYER THICKNESS >4000 OF BULKHEAD	N/A	300
DENSITY RATIO OR HILF DENSITY RATI0 (STANDARD)	AS1289.5.4.1, AS1289.5.7.1, AS1289.5.3.1, AS1289.5.8.1	>95%
MOISTURE CONTENT OF THE BACKFILL MATERIAL AT THE TIME OF PLACING	AS1289.2.1.1	OMC +3%

B7. BACKFILL MUST NOT BE PLACED AGAINST CONCRETE MEMBERS UNTIL THEY ACHIEVE THE STRENGTH SPECIFIED IN THE TABLE BELOW.

MEMBER	MINIMUM COMPRESSIVE STRENGTH PRIOR TO BACKFILLING (MPa)
BULKHEAD CONCRETE	N40
MASS CONCRETE PLUG OR BACKFILL	10
FLOWABLE FILL PLUG	1

i. CONCRETE MIX FOR MASS CONCRETE PLUG SHALL BE SHRINKAGE COMPENSATED.

B8. VIBRATING ROLLERS OF MASS EXCEEDING ONE TONNE, OR ANY OTHER EQUIPMENT THAT MAY POTENTIALLY CAUSE DAMAGE TO THE BULKHEAD, ARE NOT TO BE USED TO COMPACT BACKFILL WITHIN 2000 HORIZONTALLY OF THE BULKHEAD.

B9. BACKFILL MATERIAL NOT COMPLYING WITH THE NOTES ON THIS DRAWING MUST BE SUBMITTED TO THE DESIGNER FOR APPROVAL.

B10. CONTAMINATED MATERIAL MUST NOT BE USED FOR BACKFILLING.

B11. IF MATERIAL OTHER THAN SANDSTONE TUNNEL SPOIL IS USED FOR BACKFILL (I.E. IMPORTED MATERIAL), IT SHALL CONFORM TO RMS B30 CLAUSE 6.2.2 CHEMICAL PROPERTIES AS WELL AS ALL OTHER MATERIAL CRITERIA SET OUT IN THIS DRAWING.

BACKFILL INSPECTION, TESTING & SURVEY

BF1. THE FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN THE GREATER OF:

i. TEST PER 150 m^3 OF MATERIAL PLACED.

ii. 2 TESTS PER LAYER.

BF2. A LAYER SHALL BE DEEMED TO BE IN ACCORDANCE WITH THE SPECIFICATION IF ALL THE TESTS UNDERTAKEN WITHIN THE LAYER ARE IN ACCORDANCE WITH THE SPECIFICATION, I.E. ON A 'NONE TO FAIL' BASIS.

BF3. IF ANY ONE TEST UNDERTAKEN WITHIN A LAYER FAILS, AN APPROPRIATE COURSE OF ACTION (I.E. REWORK AND/OR RETEST) TO BE DETERMINED/AGREED BY CONSTRUCTION TEAM AND DESIGNER.

BF4. THE LOCATION OF FIELD DENSITY TESTS SHALL BE RECORDED BY THE CONTRACTOR AND SHOWN ON A PLAN TO AN ACCURACY OF AT LEAST +/-5000 IN PLAN, AND THE ELEVATION SHALL BE SURVEYED TO AN ACCURACY OF +/-100.

BF5. TESTING LOCATIONS SHALL OCCUR OVER THE FULL WIDTH OF THE COMPACTED LOT, NOT ONLY THE CENTRE OF THE TUNNEL.

BF6. THE CONTRACTOR SHALL PRODUCE AT COMPLETION OF FILLING A REPORT PRESENTING THE RESULTS AND LOCATION OF COMPACTION TESTING.

BF7. THE MINIMUM FREQUENCY OF TESTING TO ASSESS CONFORMITY TO THE ITEMS IN TABLE B5 FOR TUNNEL SPOIL SHALL BE AS FOLLOWS:

i. PRIOR TO FIRST USE.

ii. EVERY 5000 m^3 AFTER FIRST USE.

iii. IF THE SOURCE OF THE MATERIAL CHANGES.

FLOWABLE FILL

F1. SHALL MEET THE FOLLOWING SPECIFICATIONS:

i. 28-DAY COMPRESSIVE STRENGTH: f'c = 1.0 MPa MIN

ii. UNIT WEIGHT: 22 kN/m^3 MIN

iii. SLUMP: 175 mm MIN

iv. BLEED: 5% MAX

F2. SHALL BE TESTED WITH THE FOLLOWING TEST PROCEDURES AND FREQUENCY:

i. UNIT WEIGHT: TO BE TESTED EVERY 150 m3 OR MIX CHANGE ACCORDING TO ASTM 1012 - STANDARD TEST METHOD FOR UNIT WEIGHT, YIELD AND AIR CONTENT (GRAVIMETRIC) OF CONTROLLED LOW STRENGTH MATERIAL.

ii. SLUMP: TO BE TESTED EVERY 150 m3 OR MIX CHANGE ACCORDING TO 1012.3.

iii. BLEED: TO BE TESTED AFTER 2 HOURS, ONE TEST PER SHIFT FOR EACH MIX USED ACCORDING TO AS1012.6.

F3. HEIGHT OF FLOWABLE FILL TOTAL THICKNESS PER CONTRACTOR REQUIREMENTS.

F4. MAXIMUM FLOWABLE FILL LIFT HEIGHT IS 2000.

F5. THE CONTRACTOR MUST STAGE AND PLACE FLOWABLE FILL IN A MANNER THAT ENSURES COMPLETE ENCAPSULATION OF THE VOID.

FLOWABLE FILL HOLD POINT SCHEDULE		
PROCESS HELD	SUBMISSION DETAILS/RELEASE CRITERIA	RELEASE BY
PLACEMENT OF FLOWABLE FILL	A WORK METHOD STATEMENT AND APPROPRIATE ITP THAT DETAILS: - STAGING AND METHODOLOGY FOR PLACING FLOWABLE FILL IN A MANNER THAT ENSURES COMPLETE ENCAPSULATION OF THE VOID; AND WITH - AN APPROPRIATE METHOD FOR DEMONSTRATING THAT THE ANNULUS BETWEEN FLOWABLE FILL AND ROCK HAS BEEN COMPLETELY FILLED ALONG THE LENGTH OF THE TUNNEL AND IF A VOID IS FOUND A METHOD OF FILLING THE VOIDS AFTER THE FLOWABLE FILL HAS BEEN PLACED.	IC

HARDSTAND

H1. HARDSTAND MATERIAL TO BE DGB20 OR APPROVED EQUIVALENT FORMING AN ALL-WEATHER, HEAVY-DUTY CONSTRUCTION GRADE SURFACE.

DRAINAGE PIPES

D1. SIZED FOR PEAK GROUNDWATER INFLOWS PREDICTED AT THE DECLINE TUNNEL.

D2. TO BE PLACED 100 ABOVE THE TOP OF ADJACENT INVERT TO DISCHARGE IN THE TUNNEL DRAINAGE SYSTEM.

D3. CONTRACTOR IS RESPONSIBLE FOR ENSURING INTEGRITY OF THE PIPE IS MAINTAINED THROUGHOUT CONSTRUCTION.

D4. PERFORATED PIPES AND FITTINGS MUST COMPLY WITH RMS M4 EAST D&C SPECIFICATION 3552.

D5. PIPES CAST INTO CONCRETE BULKHEAD SHALL BE SUITABLY RESTRAINED TO PREVENT FLOTATION OF THE PIPES DURING PLACEMENT.

ROCK FILL

R1. SHALL BE CLASSIFIED AS "DRAINAGE ZONE MATERIAL" IN ACCORDANCE WITH TABLE B30.4 TO RMS SPECIFICATION B30: EXCAVATION AND BACKFILL FOR BRIDGEWORKS.

R2. TO BE PLACED LOOSE AND ACCORDING TO THE MINIMUM DIMENSIONS AS SHOWN ON THE DRAWINGS.

R3. CONTRACTOR SHALL ENSURE INTEGRITY OF ROCK FILL DURING COMPACTION OF OVERLYING BACKFILL. USE LIGHTWEIGHT / HAND HELD COMPACTION EQUIPMENT FOR THE FIRST TWO LIFTS ABOVE THE ROCK FILL.

GEOTEXTILE AND GEOGRID

G1. SUPPLY AND PLACEMENT OF THE GEOTEXTILE AND GEOGRID WILL BE IN ACCORDANCE WITH RMS R63 AND RMS R67 RESPECTIVELY.

G2. GEOTEXTILE MATERIAL SHALL CONFORM TO RMS 63 GEOTEXTILES:

i. GEOTEXTILE STRENGTH CLASS E

ii. GEOTEXTILE FILTRATION CLASS I PER TABLE R63/E.1.

G3. GEOGRID IS INTENDED TO PROVIDE ADDITIONAL PROTECTION AGAINSTPUNCTURE OF GEOTEXTILE FILTER DURING CONSTRUCTION.

G4. CONTRACTOR IS RESPONSIBLE FOR ENSURING INTEGRITY OF THE GEOTEXTILE IS MAINTAINED THROUGHOUT CONSTRUCTION. IF RUPTURE FROM THE UNDERLYING DRAINAGE LAYER IS OBSERVED, THE GEOTEXTILE SHALL BEREPLACED OR ADDITIONAL LAYERS SHALL BE PLACED.

G5. MAXIMUM GRID SPACING ON GEOGRID SHALL NOT EXCEED 60% OF THE TYPICAL LARGEST DIMENSION OF DRAINAGE LAYER ROCK.

BULKHEAD CONCRETE

C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS5100, AS 3610 AND OTHER RELEVANT AUSTRALIAN STANDARDS.

C2. CONCRETE SHALL COMPLY WITH THE REQUIREMENTS OF AS 1379

C3. UNLESS NOTED OTHERWISE CONCRETE SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 20mm AND A STRENGTH GRADE AS TABULATED BELOW U.N.O.

ELEMENT	STRENGTH GRADE - AS 5100-5
CONCRETE BULKHEAD AND BULKHEAD PLATFORM	N40

C4. PROJECT ASSESSMENT OF CONCRETE STRENGTH IS NOT REQUIRED, EXCEPT IF THE STRUCTURE IS TO BE LOADED PRIOR TO 28 DAYS AFTER CONCRETE PLACEMENT.

C5. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED IN THE FORM TO GIVE MAXIMUM COMPACTION WITHOUT SEGREGATION OF THE CONCRETE. SELF COMPACTING CONCRETE MIX SHALL BE USED WHEN MECHANICAL VIBRATION IS NOT ACHIEVABLE.

C6. LOCATION AND DETAILS OF CONSTRUCTION JOINTS SHALL BE TO DETAILS APPROVED BY THE DESIGNER.

C7. HOLES, CHASES OR PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL NOT BE PLACED IN CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE DESIGNER.

C8. PLACE CONCRETE WITH EQUIPMENT AND FROM A HEIGHT THAT ENSURES THAT SEGREGATION OF THE CONCRETE CANNOT OCCUR.

C9. TO PREVENT EARLY AGE THERMAL CRACKING, ADOPT A CONCRETE MIX THAT LIMITS THE TEMPERATURE DIFFERENCE BETWEEN THE SURFACE AND INTERIOR OF THE BULKHEAD TO LESS THAN 25 DEGREES.

C10. RESTRICT THE EVAPORATION OF WATER FROM THE CONCRETE SURFACE AND PREVENT PLASTIC SHRINKAGE.

C11. CONCRETE SHALL NOT BE PLACED WHEN THE AIR TEMPERATURE IN THE SHADE IS BELOW 5ºC OR ABOVE 38ºC.

CONCRETE HOLD POINT SCHEDULE		
PROCESS HELD	SUBMISSION DETAILS/RELEASE CRITERIA	RELEASE BY
PLACING CONCRETE	CERTIFICATION THAT THE FOLLOWING HAVE BEEN CHECKED AND ARE IN ACCORDANCE WITH THE DRAWINGS: - SET OUT - MEMBER DIMENSIONS - REINFORCEMENT - CONCRETE COVER - SURFACE PREPARATION	SITE ENGINEER
PLACING CONCRETE	METHOD TO RESTRICT WATER EVAPORATION AND PREVENT PLASTIC CRACKING. CURING DETAILS.	SITE ENGINEER
PLACING BACKFILL	- BULKHEAD STRENGTH TESTED - DRAINAGE SYSTEM IN PLACE AND SURVEYED - BULKHEAD MONITORING REVIEWED	SITE ENGINEER
PLACING FLOWABLE FILL	- BACKFILL SURFACE SURVEYED - BREATHER TUBES IN PLACE AND SURVEYED - BULKHEAD MONITORING REVIEWED	SITE ENGINEER

CONSTRUCTION JOINT (BULKHEAD CONCRETE)

J1. CONSTRUCTION JOINTS SHALL COMPLY WITH RMS B80.

J2. THE LOCATION AND DETAILS OF CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS.

J3. THE PLACING OF CONCRETE SHALL PROCEED CONTINUOUSLY FROM JOINT TO JOINT. ANY POINT AT WHICH THE PLACING OF CONCRETE HAS STOPPED AND THE CONCRETE HAS TAKEN ITS INITIAL SET SHALL BE TREATED AS A CONSTRUCTION JOINT.

J4. BEFORE PLACING NEW CONCRETE AGAINST CONCRETE WHICH HAS SET, THE FORMS (WHERE APPLICABLE) SHALL BE RETIGHTENED.

J5. CONCRETE AGAINST WHICH NEW CONCRETE IS TO BE PLACED SHALL BE ROUGHENED BY REMOVING ALL LAITANCE AND SUFFICIENT MORTAR TO EXPOSE THE COARSE AGGREGATE TO A DEPTH OF 3 mm. THE ROUGHENED SURFACE SHALL BE CLEANED OF FOREIGN MATTER, LAITANCE AND LOOSE OR POROUS MATERIAL. THE SURFACE SHALL BE THOROUGHLY MOISTENED WITH WATER AND ANY EXCESS WATER REMOVED IMMEDIATELY PRIOR TO PLACING OF CONCRETE.

MONITORING

M1. MONITORING OF THE BULKHEAD IS REQUIRED TO PROVIDE A MEANS OF ASSESSING THE PERFORMANCE OF THE BULKHEAD DURING AND AFTER PLACEMENT OF BACKFILL / FLOWABLE FILL.

M2. MONITORING SHALL COMPRISE A MIN OF TWO OPTICAL TARGETS PLACED ON THE OUTSIDE OF THE BULKHEAD AND BASELINED PRIOR TO BACKFILLING AGAINST THE BULKHEAD.

M3. DESIGNER TO BE NOTIFIED IF TOTAL HORIZONTAL MOVEMENT INTO THE VOID (VENT TUNNELS) EXCEEDS 10 MM.

ITEMS TO BE REMOVED

I1. PRIOR TO BACKFILLING ADITS AND DECLINES REMOVE THE FOLLOWING:

i. CONCRETE BARRIERS

ii. ALL FLUIDS

iii. VENTILATION INFRASTRUCTURE (REFER NOTE I6)

iv. ALL MACHINERY

v. TUNNEL CONSTRUCTION CONDUITS FOR SERVICES UNLESS USED TO TREMIE FLOWABLE FILL / CONCRETE (IE MUST BE FULLY FILLED WITH CEMENTITIOUS MATERIAL)

I2. ALL TUNNEL SUPPORT SHALL REMAIN IN PLACE FOR BACKFILLING.

I3. CARE MUST BE TAKEN NOT TO DAMAGE TUNNEL SUPPORT (BOLT HEADS, MESH, SHOTCRETE) DURING BACKFILLING OPERATIONS. ANY ROCK BOLTS DAMAGED DURING BACKFILLING SHALL BE REPAIRED.

I4. INVERT SLAB SHALL REMAIN IN PLACE.

I5. ALL MONITORING INCLUDING ENDOSCOPE HOLES SHALL BE DECOMMISSIONED & REMOVED/GROUTED PRIOR TO BACKFILLING.

I6. STEEL VENTILATION CANS AND ASSOCIATED METALLIC SUPPORTS (CHINAS, ANCHORS ETC) MAY BE LEFT IN THE ZONE OF FLOWABLE FILL. IF KEPT IN PLACE, THEY MUST BE FULLY ENCAPSULATED IN THE FLOWABLE FILL AND A WORK METHOD ESTABLISHED TO PREVENT VOIDS FORMING (METHOD TO BE REVIEWED BY THE DESIGNER).

ACCEPTED FOR CONSTRUCTION

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
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DESIGN LOT CODE

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

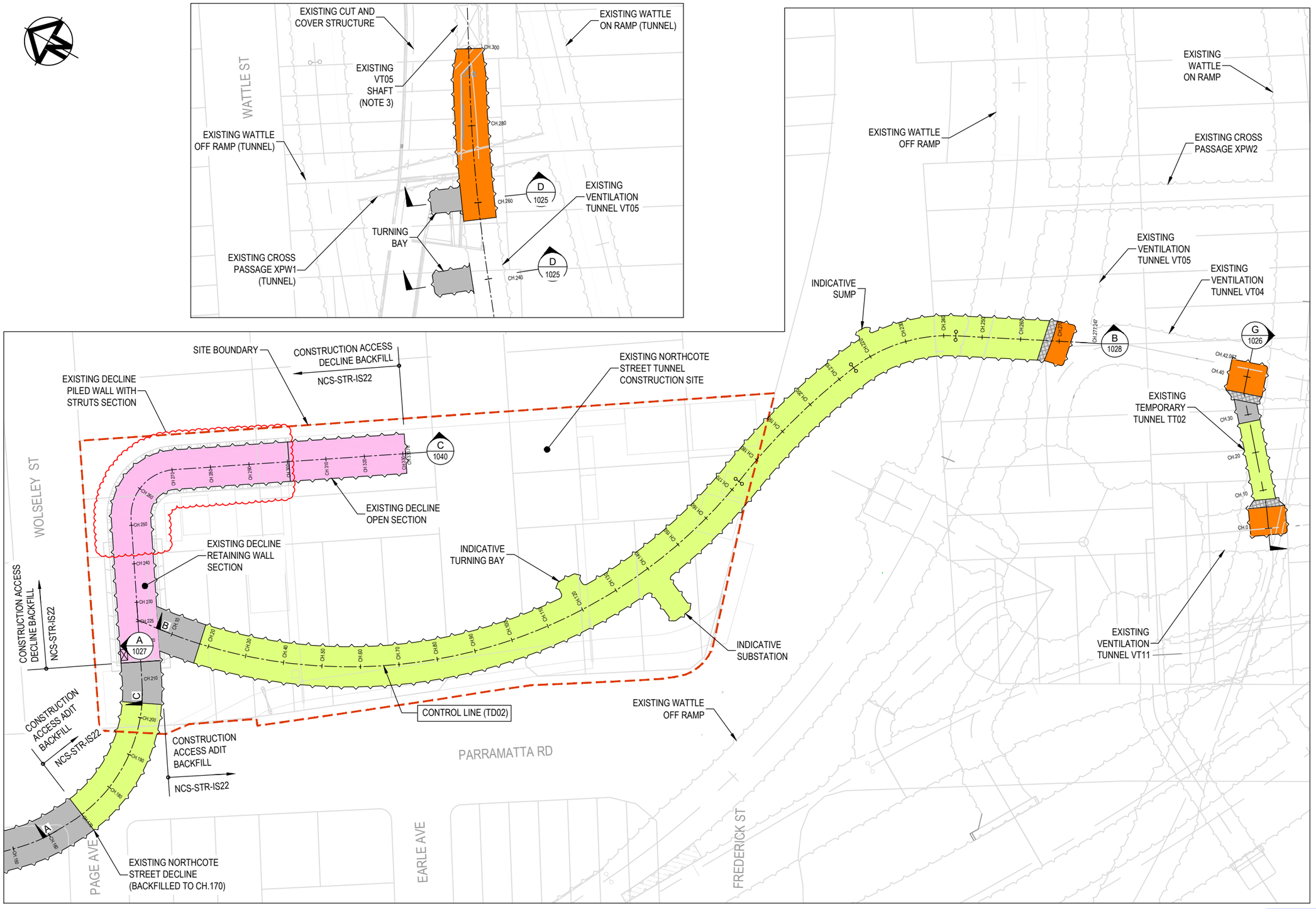
CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1005

M4-M5 LINK MAIN TUNNEL WORKS — A3
NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
GENERAL NOTES

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1005	00



NOTES:

1. FOR BACKFILL SPECIFICATIONS, REFER M4M5-PSML-NCS-STR-IS22-DRG-1005.
2. CONTROL LINE PER DESIGN LOT NCS-TAD-PS15.
3. DRAINAGE AT THE BOTTOM OF THE VERTICAL VENTILATION SHAFT AND INVERT SLAB WILL BE COORDINATED WITH THE NEW INVERT SLAB IN VT05. THE NEW INVERT SLAB LAYOUT (LEVEL / FALL / THICKNESS) WILL BE PRESENTED IN DESIGN PACKAGE PS31.

LEGEND:

- MASS CONCRETE
- COMPACTED BACKFILL TOPPED WITH FLOWABLE FILL
- CONCRETE BULKHEAD
- INVERT REPLACEMENT (MAKE GOOD)
- CONSTRUCTION ACCESS DECLINE BACKFILL

GENERAL ARRANGEMENT - PLAN

SCALE 1:1000

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5-PSML-NCS-STR-IS22-DRG-1010

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL

GENERAL ARRANGEMENT

RMS REGISTRATION No.

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY	DESIGN LOT CODE
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-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

SCALES ON A3 SIZE DRAWING: 5 0 5 10 15 20m — 1 : 1000 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

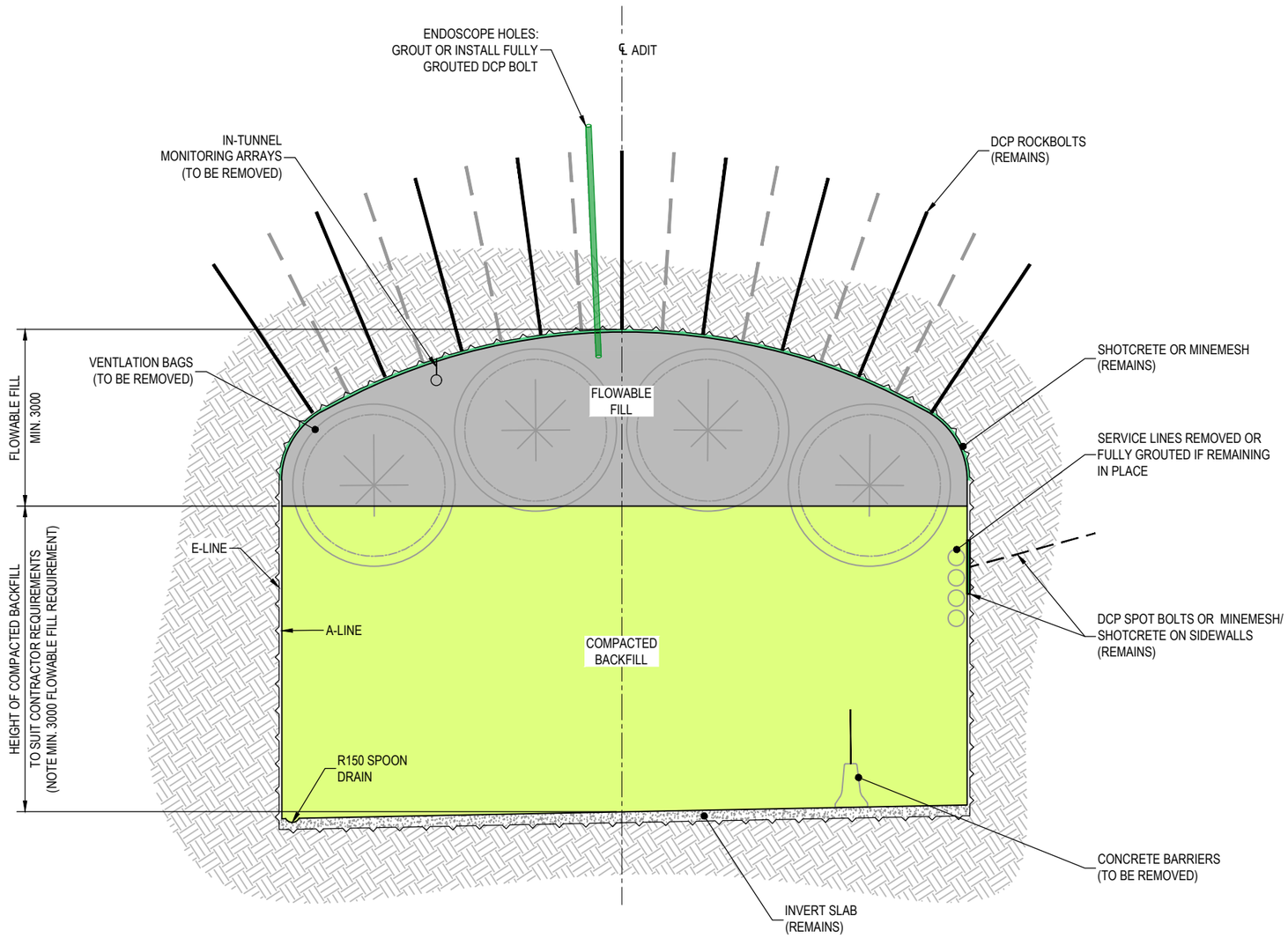
TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

ISSUE STATUS: ISSUED FOR CONSTRUCTION — EDMS No.: - — SHEET No.: IS22-1010 — REV: 00

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1005.



TYPICAL TUNNEL PROFILE
REQUIREMENTS PRIOR TO BACKFILLING
NTS

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1020

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY				
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DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

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TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT

Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

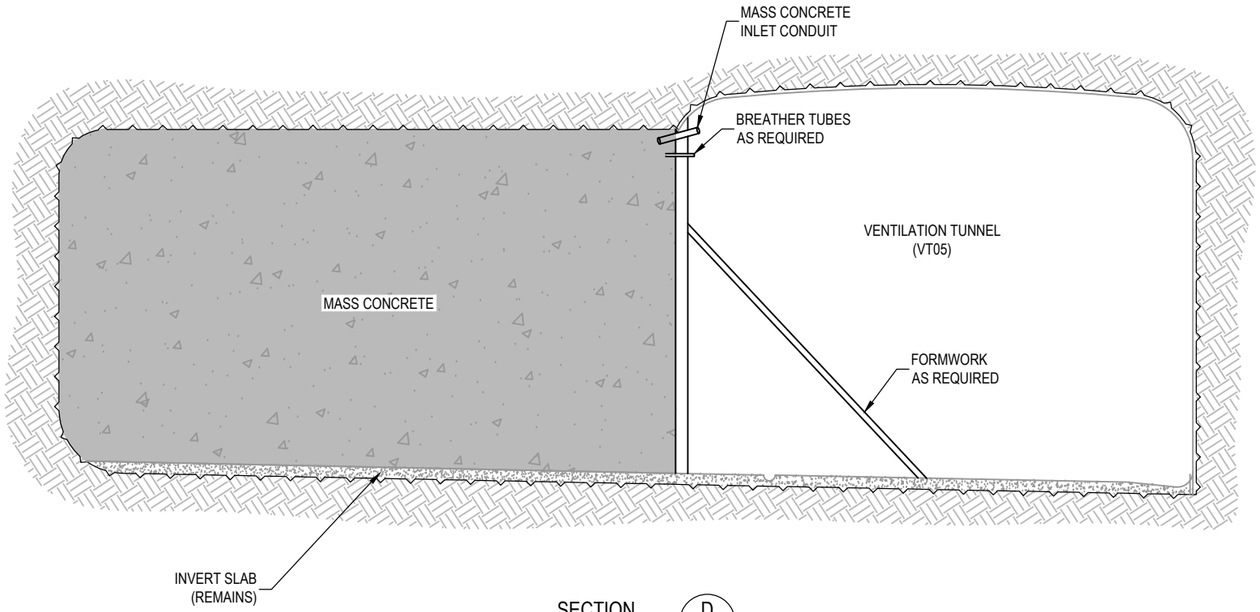
NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL TEMPORARY ADIT
TUNNEL REQUIREMENTS PRIOR TO BACKFILL

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1020	00

NOTES:

1. TUNNEL SUPPORT NOT SHOWN FOR CLARITY.
2. REFER TO M4M5-PSML-NCS-STR-IS22-DRG-1020 FOR TUNNEL ITEMS TO BE REMOVED PRIOR TO BACKFILLING.



SECTION D 1010
NTS

VT05 TURNING BAY BACKFILL SECTION

ACCEPTED FOR CONSTRUCTION

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-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

	NAME	DATE
TITLE		
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1025

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
TEMPORARY ADIT
VT05 TURNING BAY BACKFILL SECTIONS

RMS REGISTRATION No.

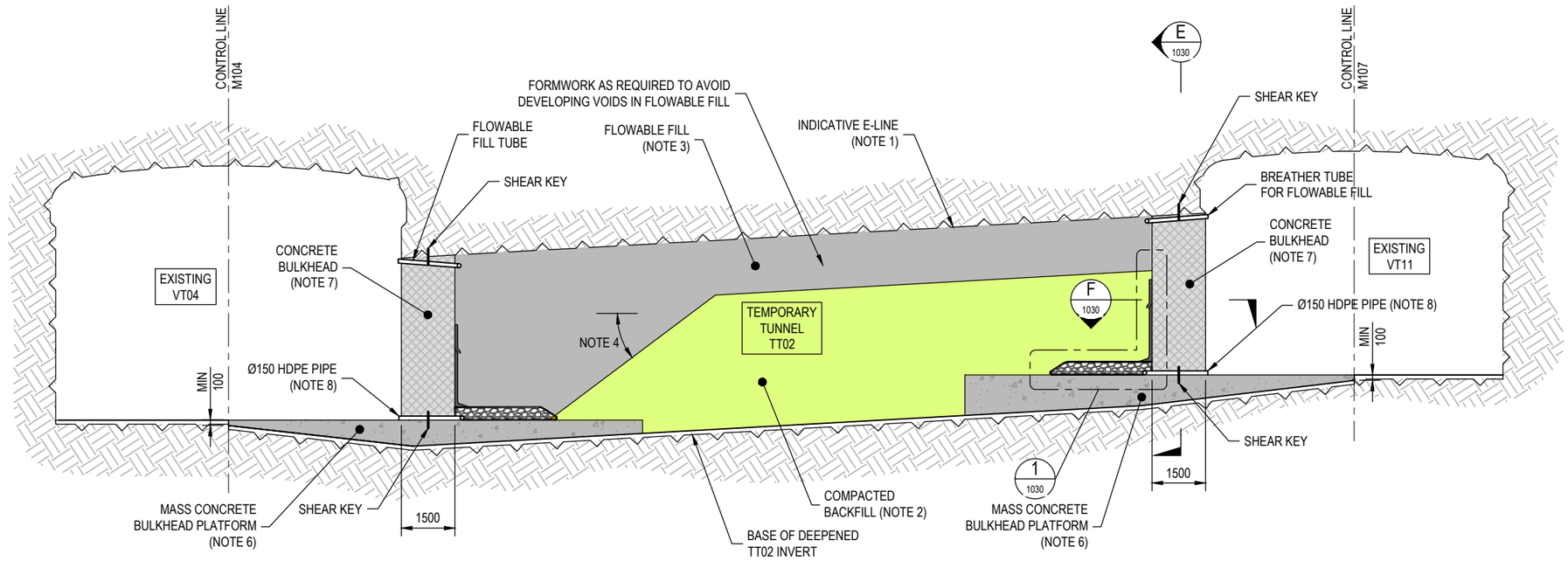
ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1025	00

LEGEND:

- COMPACTED BACKFILL
- FLOWABLE FILL
- MASS CONCRETE
- CONCRETE BULKHEAD AND PLATFORM
- ROCKFILL

NOTES:

1. TUNNEL SUPPORT NOT SHOWN FOR CLARITY.
2. REFER TO DRG 1020 FOR TUNNEL REQUIREMENTS PRIOR TO BACKFILLING.
3. PLUG CAN BE EITHER MASS CONCRETE OR FLOWABLE FILL. REFER TABLE 1 AND DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1005 FOR MINIMUM REQUIREMENTS.
4. OVER COMPACT AND PULL BACKFILL BACK TO HARD TO MAX ANGLE OF 1V:1H (45°). NO LOOSE BACKFILL SHALL REMAIN ON SLOPE.
5. LEVEL TO BE FINAL VT05 INVERT FSL TO FACILITATE DRAINAGE.
6. LOCATION OF BULKHEAD TO BE BASED ON AS-BUILT RAMP LINING, INTRADOS SIDE OF BULKHEAD TO BE FLUSH WITH 'C' LINE IN VT05.
7. THIS ALTERNATIVE BACKFILL ARRANGEMENT CAN BE ADOPTED TO REPLACE THE FULLY MASS CONCRETE FILL ARRANGEMENT FOR TT02 BETWEEN VT04 AND VT11.
8. DRAINAGE FROM TT02 SHALL BE COORDINATED WITH VT04 AND VT11 DRAINAGE IN THE SLAB SUPPORTING THE TUNNEL VENTILATION ATTENUATORS AND DAMPERS.



SECTION G 1010
SCALE 1:200

ACCEPTED FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

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C:\PSM3635 - M4_M5\M4M5-PSML-NCS-STR-IS22-DRG-1026.dwg - 9/04/2020 5:13:58 PM - Edmund Nockolds

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-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING
1 0 1 2 3 4m
1 : 200 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1026

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL

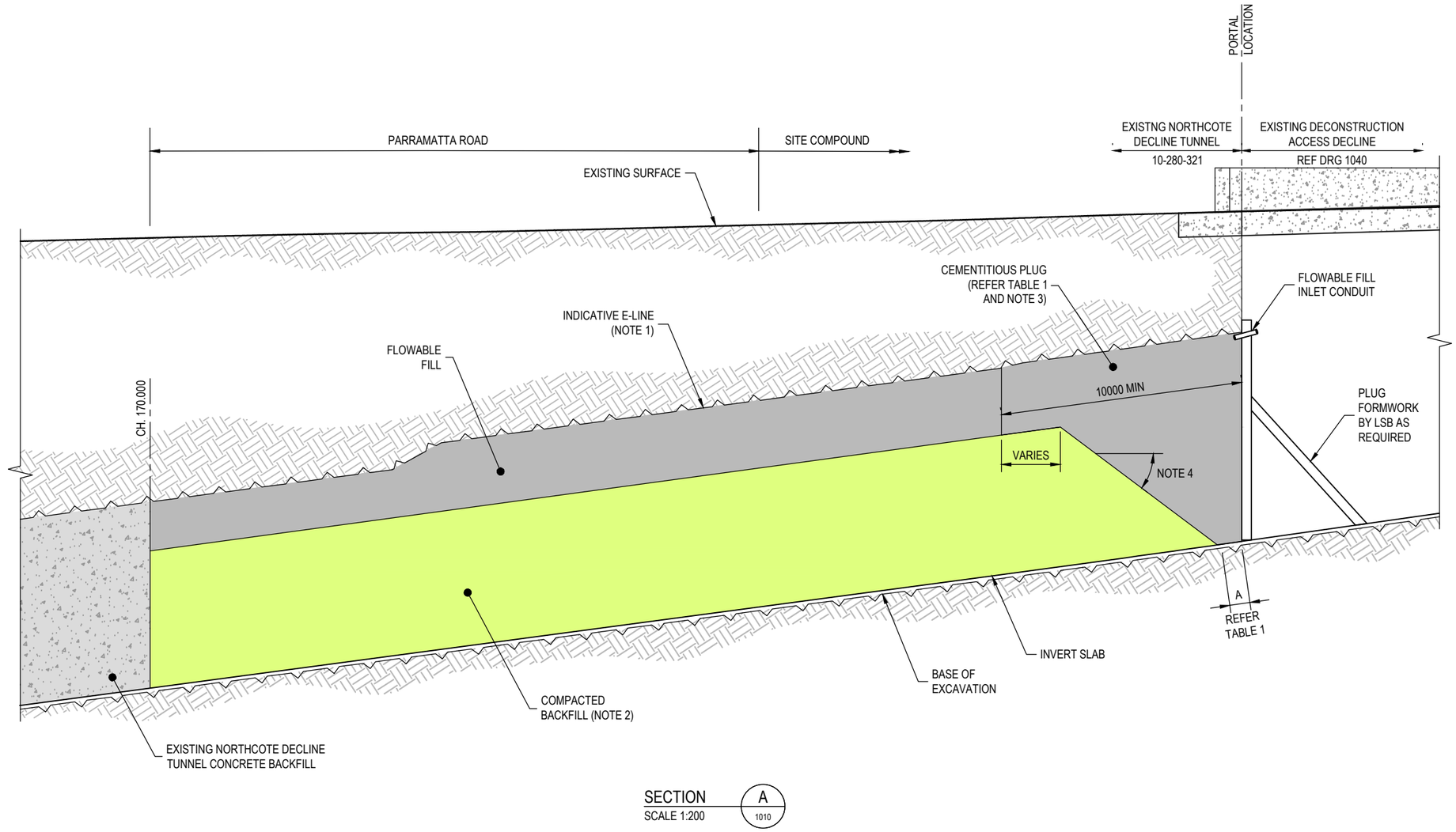
TT02 BACKFILL SECTION

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1026	00

TABLE 1

PLUG TYPE	MIN COMPRESSIVE STRENGTH (UCS)	DIMENSION 'A'
MASS CONCRETE	10 MPa	500 MIN.
FLOWABLE FILL	1 MPa	2000 MIN.



SECTION A
SCALE 1:200 1010

NOTES:

1. TUNNEL SUPPORT NOT SHOWN FOR CLARITY.
2. REFER TO DRG 1100 FOR TUNNEL REQUIREMENTS PRIOR TO BACKFILLING.
3. PLUG CAN BE EITHER MASS CONCRETE OR FLOWABLE FILL. REFER TABLE 1 AND DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1005 FOR MINIMUM REQUIREMENTS.
4. OVER COMPACT BACKFILL AND PULL BACK TO HARD TO MAX ANGLE OF 1V:1H (45°). NO LOOSE BACKFILL SHALL REMAIN ON SLOPE.

LEGEND:

- COMPACTED BACKFILL
- FLOWABLE FILL
- REINFORCED CONCRETE
- MASS CONCRETE

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1027

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING
1 0 1 2 3 4m
1 : 200 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
EXISTING NORTHCOTE DECLINE (M131)
DECLINE TUNNEL BACKFILL

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1027	00

TABLE 1

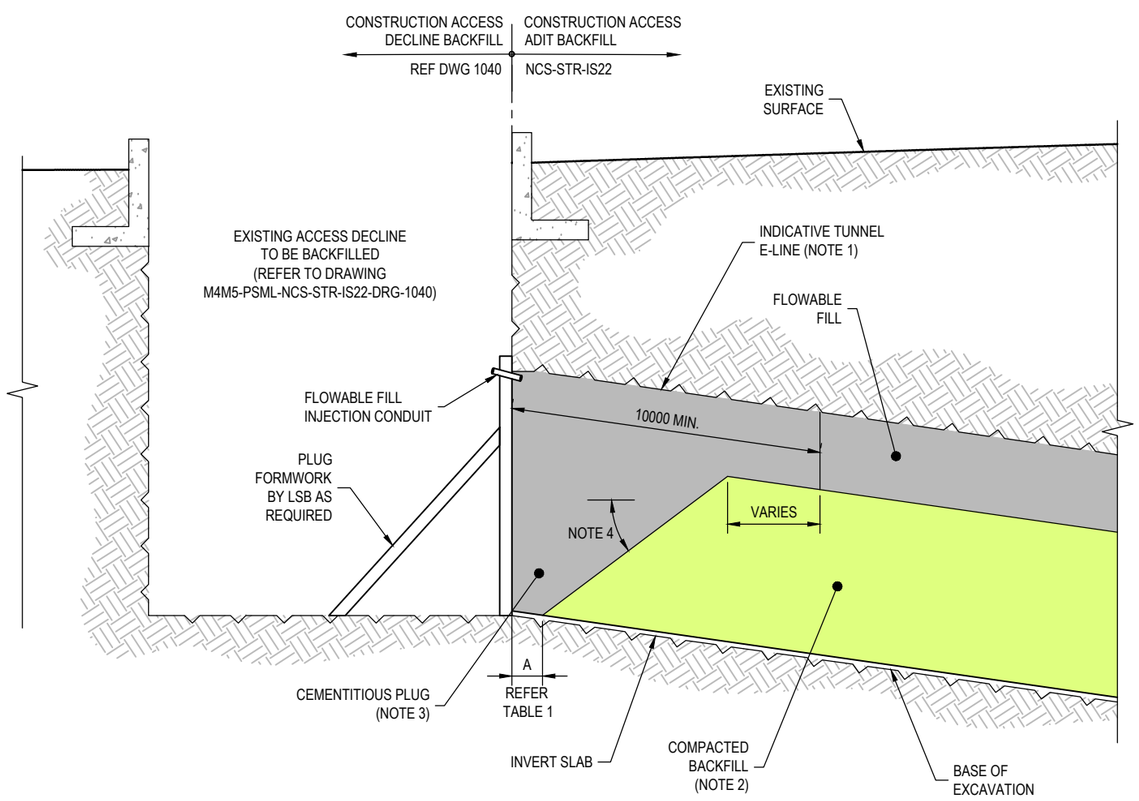
PLUG TYPE	MIN COMPRESSIVE STRENGTH (UCS)	DIMENSION 'A'
MASS CONCRETE	10 MPa	500 MIN.
FLOWABLE FILL	1 MPa	2000 MIN.

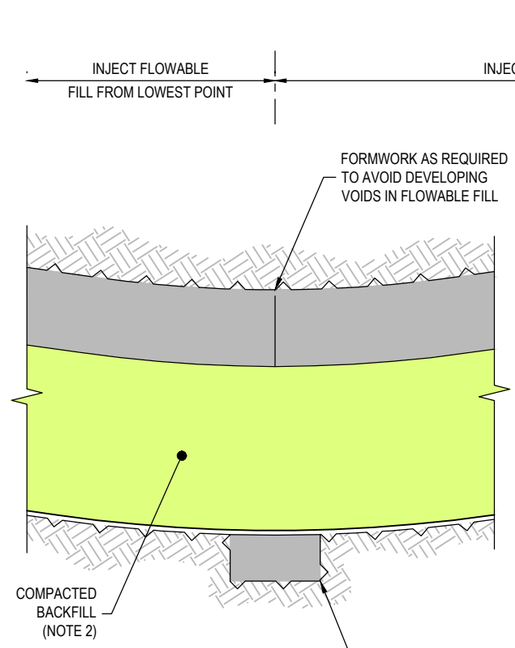
LEGEND:

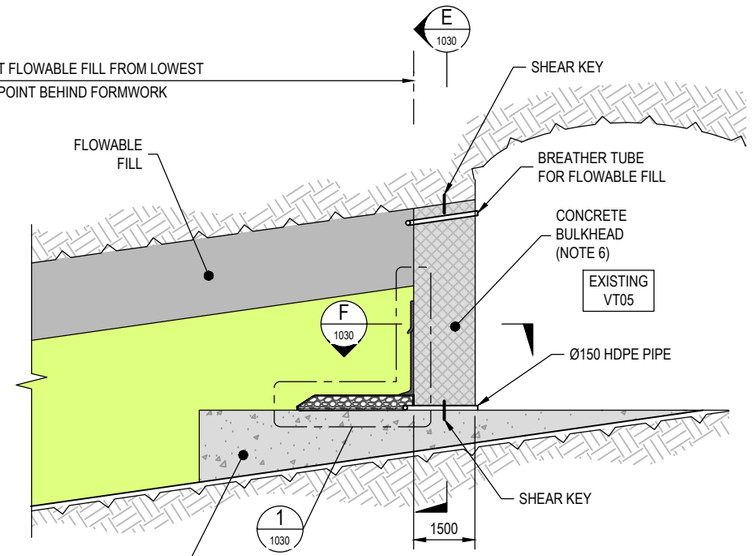
- COMPACTED BACKFILL
- FLOWABLE FILL
- CONCRETE BULKHEAD AND PLATFORM
- ROCKFILL

NOTES:

1. TUNNEL SUPPORT NOT SHOWN FOR CLARITY.
2. REFER TO DRG 1100 FOR TUNNEL REQUIREMENTS PRIOR TO BACKFILLING.
3. PLUG CAN BE EITHER MASS CONCRETE OR FLOWABLE FILL. REFER TABLE 1 AND DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1005 FOR MINIMUM REQUIREMENTS.
4. OVER COMPACT BACKFILL AND PULL BACK TO HARD TO MAX ANGLE OF 1V:1H (45°). NO LOOSE BACKFILL SHALL REMAIN ON SLOPE.
5. LEVEL TO BE FINAL VT05 INVERT FSL TO FACILITATE DRAINAGE.
6. LOCATION OF BULKHEAD TO BE BASED ON AS-BUILT RAMP LINING, INTRADOS SIDE OF BULKHEAD TO BE FLUSH WITH 'C' LINE IN VT05.







SECTION B 1010
SCALE 1:200

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1028

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
TEMPORARY ADIT (TD02)
DECLINE TUNNEL BACKFILL

RMS REGISTRATION No.

ISSUE STATUS: ISSUED FOR CONSTRUCTION
EDMS No.: -
SHEET No.: IS22-1028
REV: 00

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
C:\PSM3635 - M4_M5\M4M5-PSML-NCS-STR-IS22-DRG-1028.dwg - 9/04/2020 5:14:21 PM - Edmund Nockolds

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

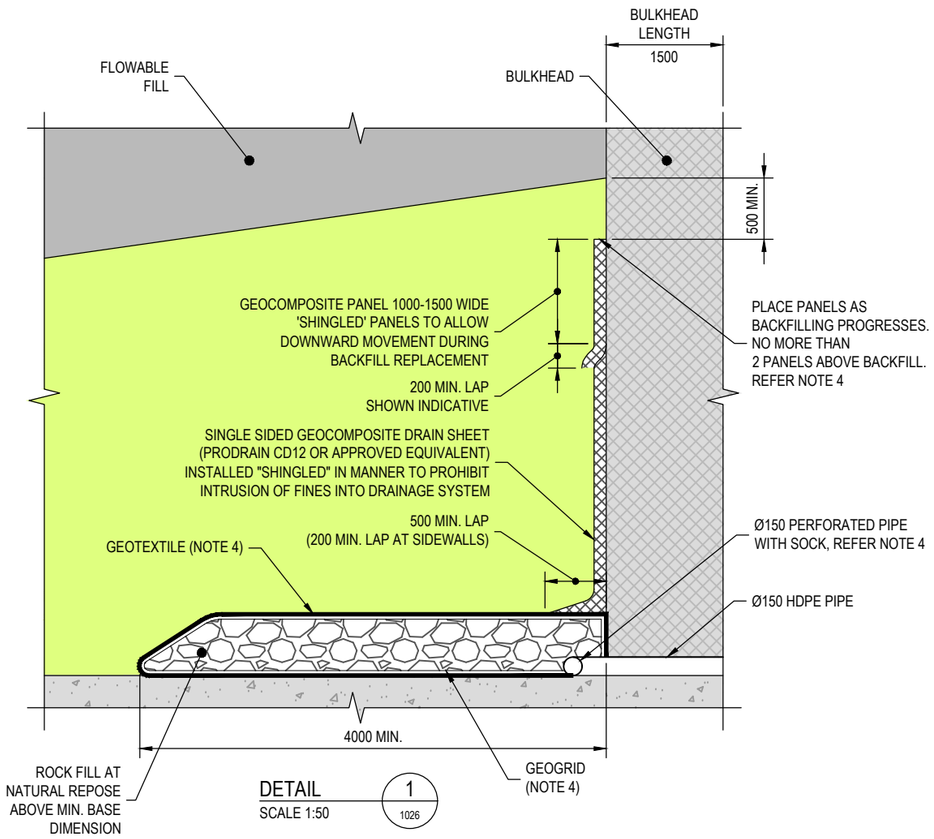
SCALES ON A3 SIZE DRAWING
1 0 1 2 3 4m
1 : 200 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

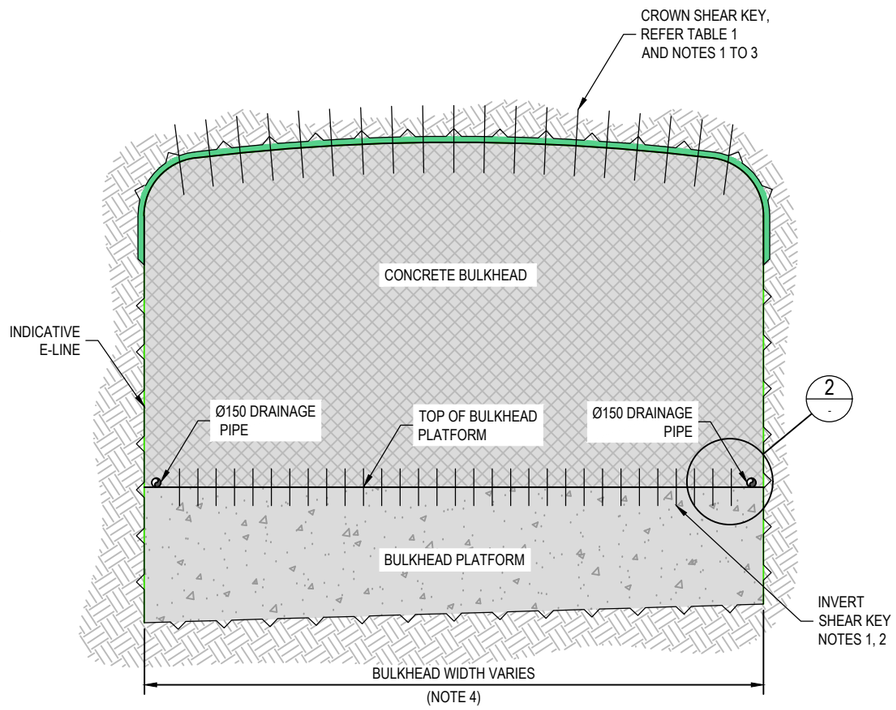
DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex



DETAIL 1 / 1026
SCALE 1:50



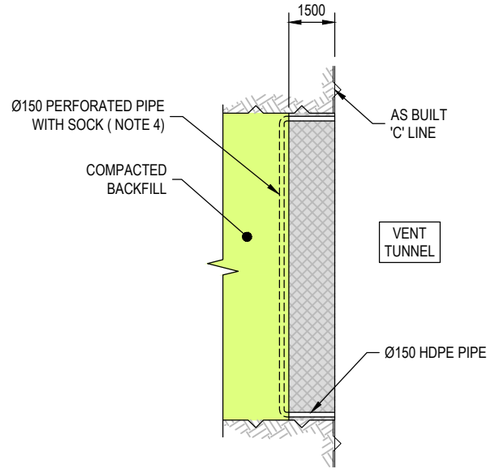
BULKHEAD DETAILED SECTION

NOTES:

1. REFER TO M4M5-PSML-NCS-STR-IS22-DRG-1031 FOR SHEAR KEY OPTIONS.
2. SHEAR KEYS TO BE INSTALLED ALONG CENTRE LINE OF BULKHEAD FOR SPACING REQUIREMENTS REFER TABLE 1. BOLTS TO AVOID CLASH WITH INSTALLED TEMPORARY WORK ROCK REINFORCEMENT.
3. MINIMUM EMBEDMENT DEPTH INTO SANDSTONE CLASS I/II AND BULKHEAD IS SHOWN ON DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1031.
4. FOR DRAINAGE PIPE, BACKFILL, ROCKFILL, FLOWABLE FILL, GEOGRID AND GEOTEXTILE DETAILS, REFER DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1005.
5. ADIT SUPPORT NOT SHOWN FOR CLARITY.
6. ALTERNATIVELY, NO FINES CONCRETE MAY BE USED IN LEIU OF ROCKFILL.

LEGEND:

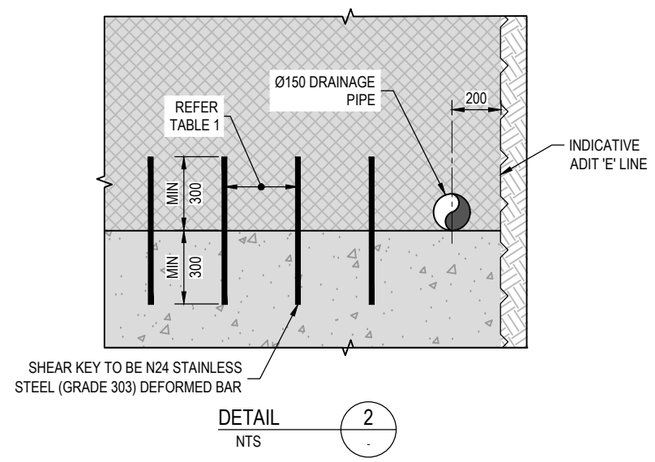
- COMPACTED BACKFILL
- FLOWABLE FILL
- MASS CONCRETE
- CONCRETE BULKHEAD
- ROCKFILL (NOTE 6)



PLAN - DRAINAGE PIPE SETOUT

SECTION F / 1026
SCALE 1:200

SECTION E / 1026
NTS



DETAIL 2 / -
NTS

TABLE 1

MINIMUM SHEAR KEY TRANSVERSE SPACING ALONG BULKHEAD	
BOLT OPTION	SPACING (mm)
1	200
2	300

ACCEPTED FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
C:\PSM3635 - M4_M5\M4M5-PSML-NCS-STR-IS22-DRG-1030.dwg - 9/04/2020 5:15:25 PM - Edmund Nockolds

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING
0.25 0 0.25 0.5 0.75m
1 : 50 FULL SIZE A3
1 0 1 2 3 4m
1 : 200 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1030

M4-M5 LINK MAIN TUNNEL WORKS

A3

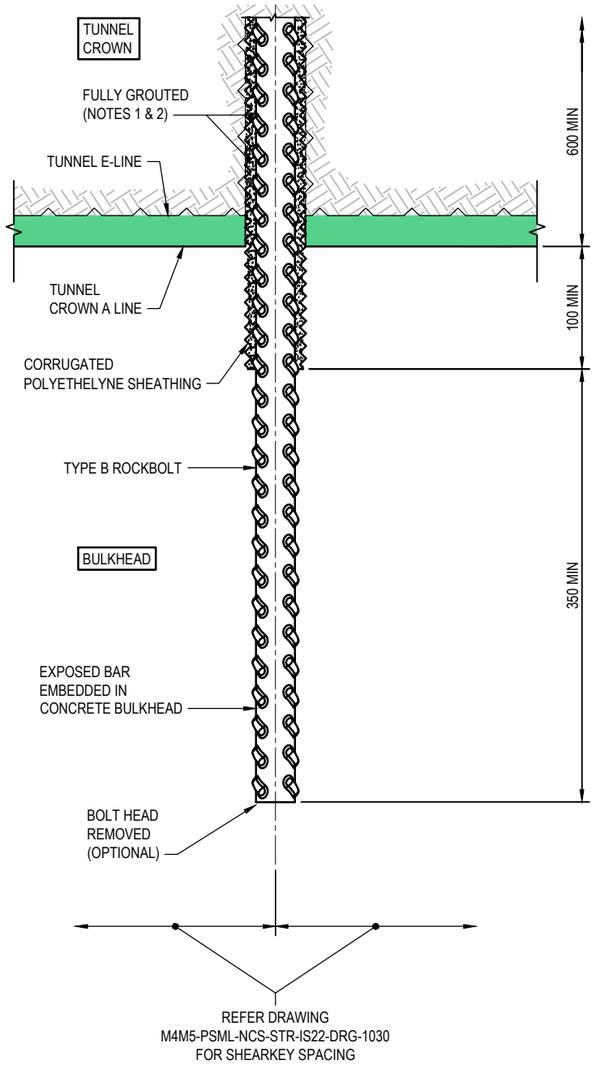
NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
TEMPORARY ADIT
BACKFILL BULKHEAD DETAILS

RMS REGISTRATION No.

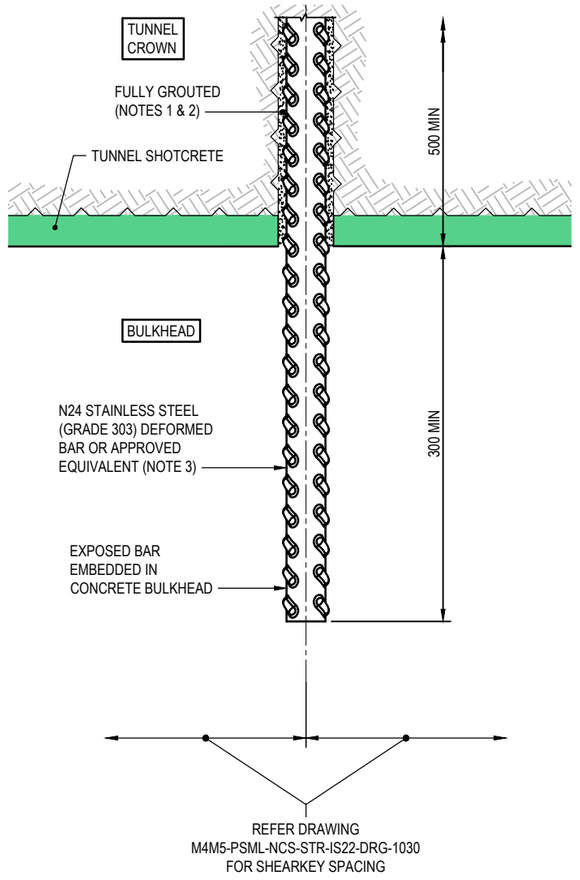
ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1030	00

NOTES:

1. BOLT/BAR TO BE FULLY ENCAPSULATED.
2. BOLTS/BARS TO BE INSTALLED ALONG CENTRELINE OF BULKHEAD. FOR SPACING REQUIREMENTS REFER TABLE 1 ON M4M5-PSML-NCS-STR-IS22-DRG-1030. BOLTS/BARS TO AVOID CLASHING WITH INSTALLED TUNNEL BOLTS.
3. MIN 500 MPa YIELD STRENGTH.



OPTION 1
PERMANENT TYPE B ROCK BOLT
NTS



OPTION 2
N24 STAINLESS STEEL BAR
NTS

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1031

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY				
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-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

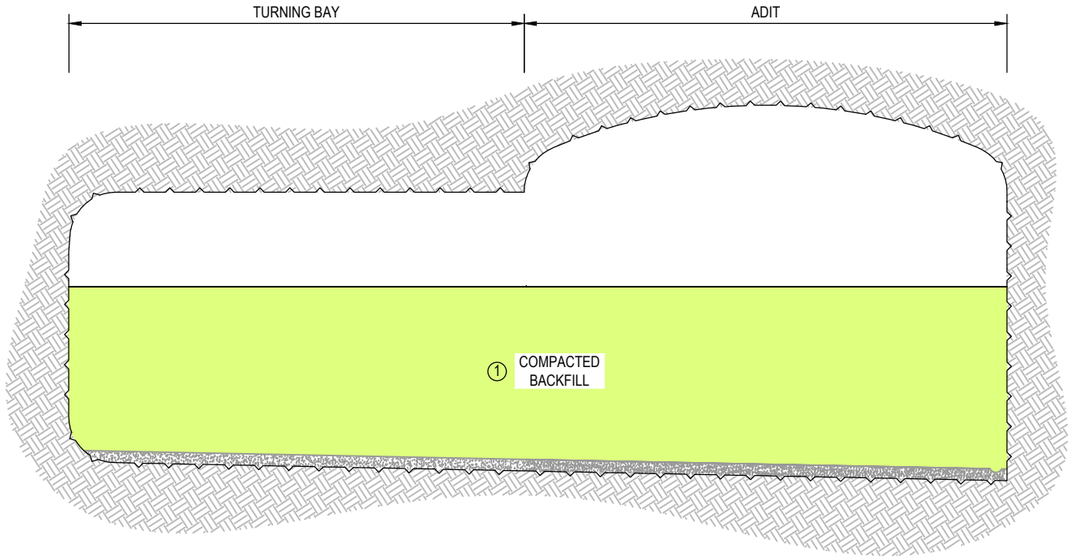
TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS — A3
NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
TEMPORARY ADIT
BULKHEAD CROWN SHEAR KEY DETAILS

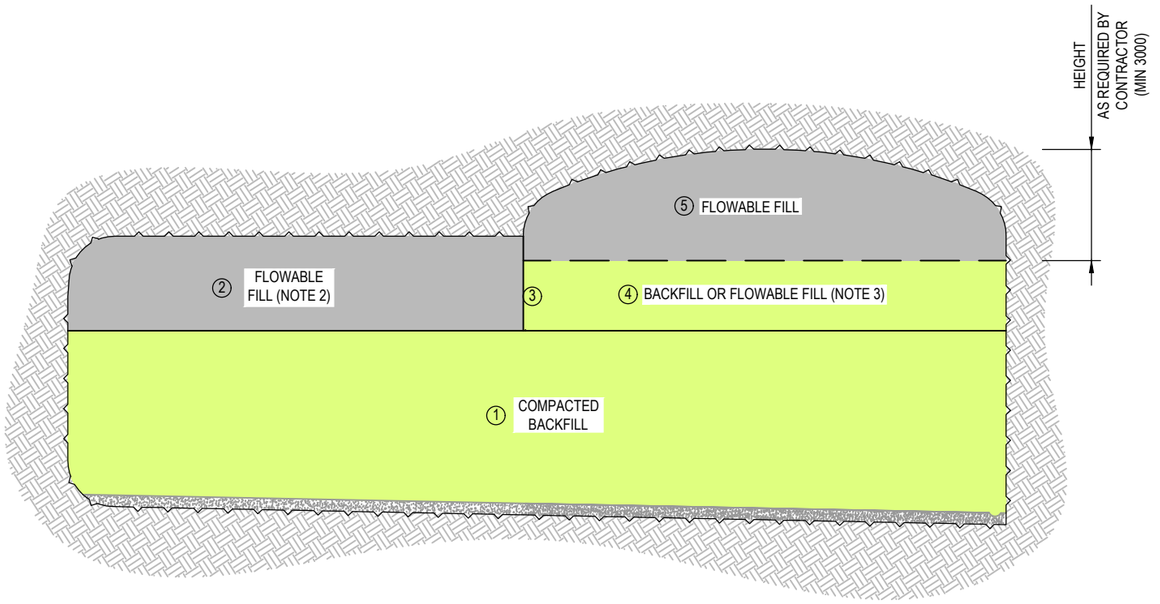
RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1031	00



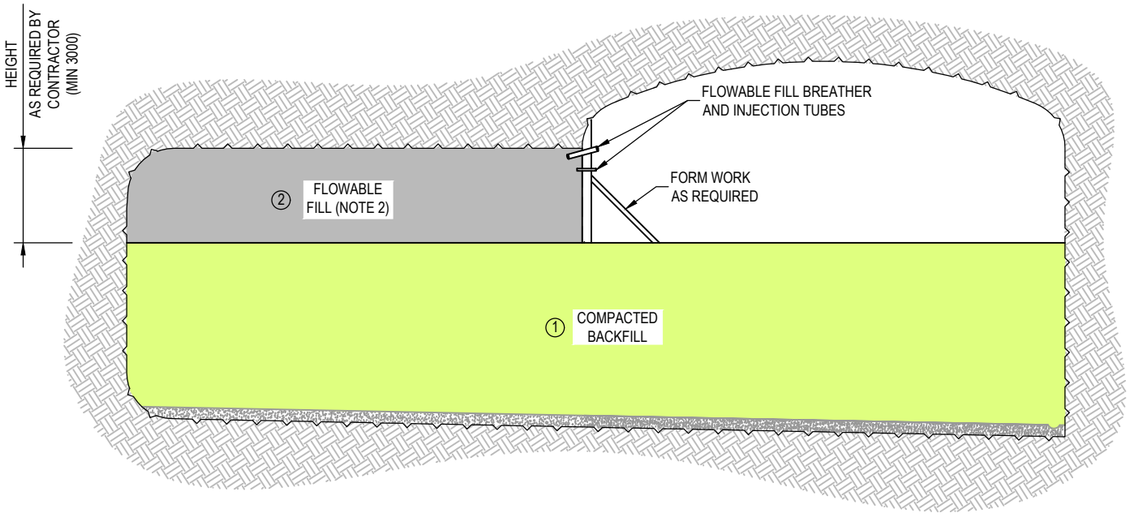
STAGE 1:

1. PLACE COMPACTED BACKFILL



STAGE 3:

3. REMOVE FORMWORK
4. PLACE BACKFILL OR FLOWABLE FILL AS REQUIRED
5. FILL REMAINING VOID WITH FLOWABLE FILL



STAGE 2:

2. PLACE FLOWABLE FILL IN TURNING BAY ABOVE COMPACTED BACKFILL

NOTES:

1. TUNNEL SUPPORT NOT SHOWN FOR CLARITY.
2. FLOWABLE FILL OR MASS CONCRETE PLUG AS REQUIRED (MIN 3000).
3. REFER TO NOTE B7 ON M4M5-PSML-NCS-STR-IS22-DRG-1005 FOR REQUIRED MINIMUM STRENGTH IF BACKFILL IS COMPACTED ADJACENT TO FLOWABLE FILL/MASS CONCRETE PLUG.

LEGEND:

- COMPACTED BACKFILL
- FLOWABLE FILL

TURNING BAYS AND SUBSTATION NICHE BACKFILL SEQUENCE

NTS

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1035

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY	DESIGN LOT CODE	DRAWINGS / DESIGN PREPARED BY
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-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

SCALES ON A3 SIZE DRAWING: 0.5 0 0.5 1 1.5 2m — 1 : 100 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

	TITLE	NAME	DATE
	DRAWN	NM	11/03/2020
	DRG CHECK	YB	11/03/2020
	DESIGN	TRN	11/03/2020
	PKG OWNER	TRN	11/03/2020
	DESIGN CHECK	RB	11/03/2020
	DESIGN MNGR	TRN	11/03/2020
	PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS — A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL

TURNING BAY & SUBSTATION NICHE BACKFILL SEQUENCE

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1035	00

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
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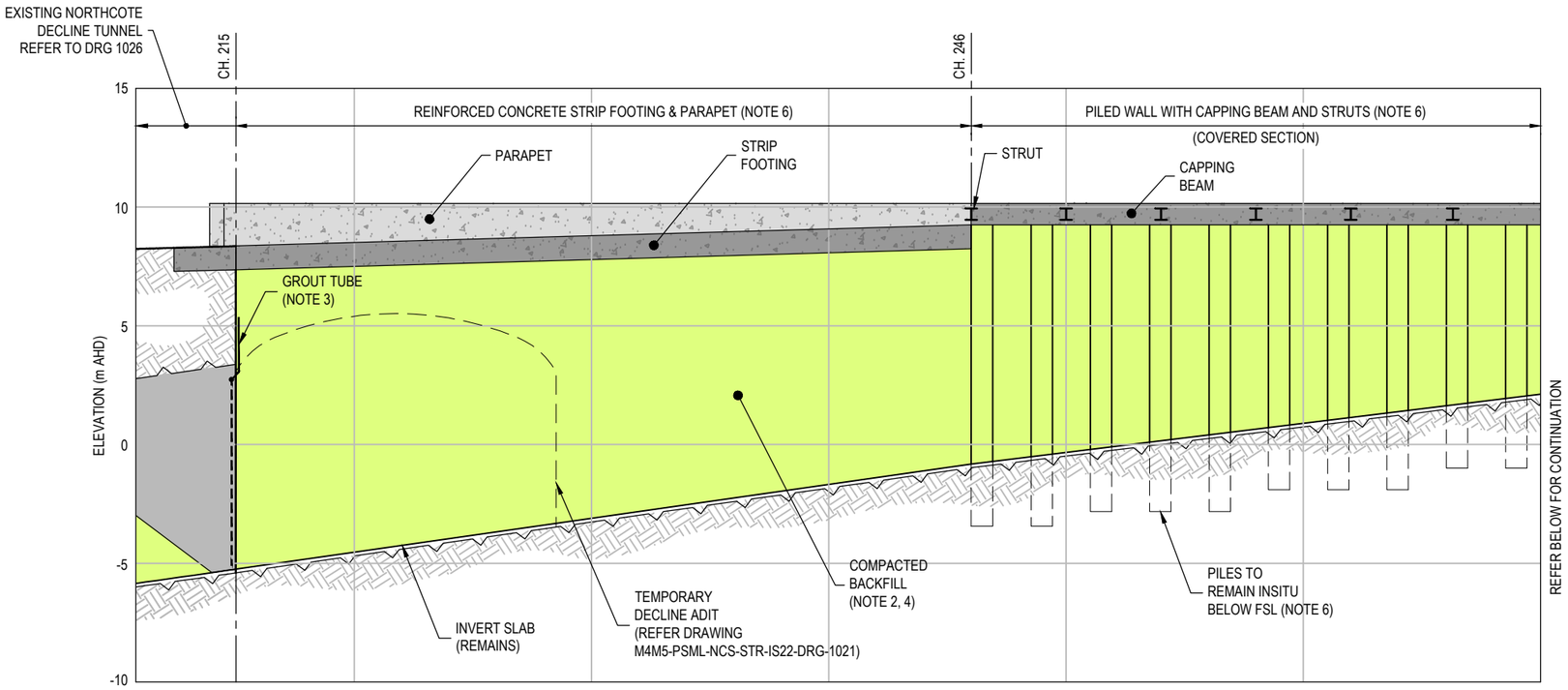

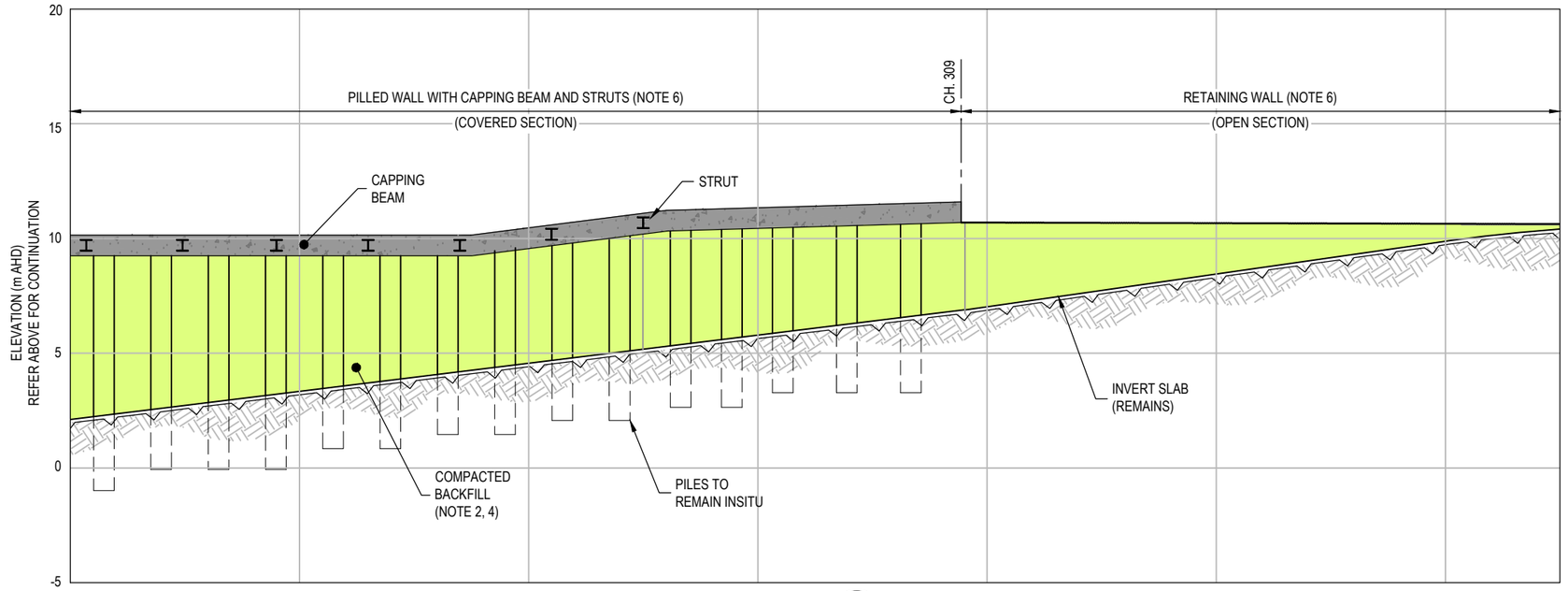

SECTION C (1010)
SCALE 1:250

EXISTING NORTCOTE RAMP
SITE ACCESS RAMP BACKFILL

NOTES:

1. DECLINE AND TUNNEL SUPPORT NOT SHOWN FOR CLARITY.
2. FOR BACKFILLING SEQUENCE REFER TO DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1026.
3. BACKFILL WITHIN RAMP TO BE MINIMUM 1000 ABOVE PLUG PRIOR TO GROUT INJECTION.
4. REFER TO DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1005 FOR DECLINE ITEMS TO BE REMOVED PRIOR TO BACKFILLING.
5. CONTROL LINE M131. REFER M4E DESIGN LOT 10-280-321.
6. TEMPORARY CONCRETE ELEMENTS WITHIN A DISTANCE OF 1 m BELOW THE AGREED FINAL SURFACE LEVEL WILL BE REMOVED. THE EXTENT OF SLAB AND SUBSURFACE BUILT ELEMENTS TO BE REMOVED AT THE END OF THE PROJECT WILL BE SEPARATELY CONSULTED, DISCUSSED AND AGREED WITH WCX/TfNSW WITH THE ACTUAL EXTENT TO BE RECORDED IN WAE DRAWINGS.

LEGEND:

- COMPACTED BACKFILL
- FLOWABLE FILL
- REINFORCED CONCRETE PARAPET
- CAPPING BEAM/STRIP FOOTING

ACCEPTED FOR CONSTRUCTION

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1040

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY					DESIGN LOT CODE
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-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN	1.25 0 1.25 2.5 3.75m 1 : 250 FULL SIZE A3
					CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL
EXISTING NORTHCOTE RAMP
SITE ACCESS RAMP BACKFILL

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1040	00

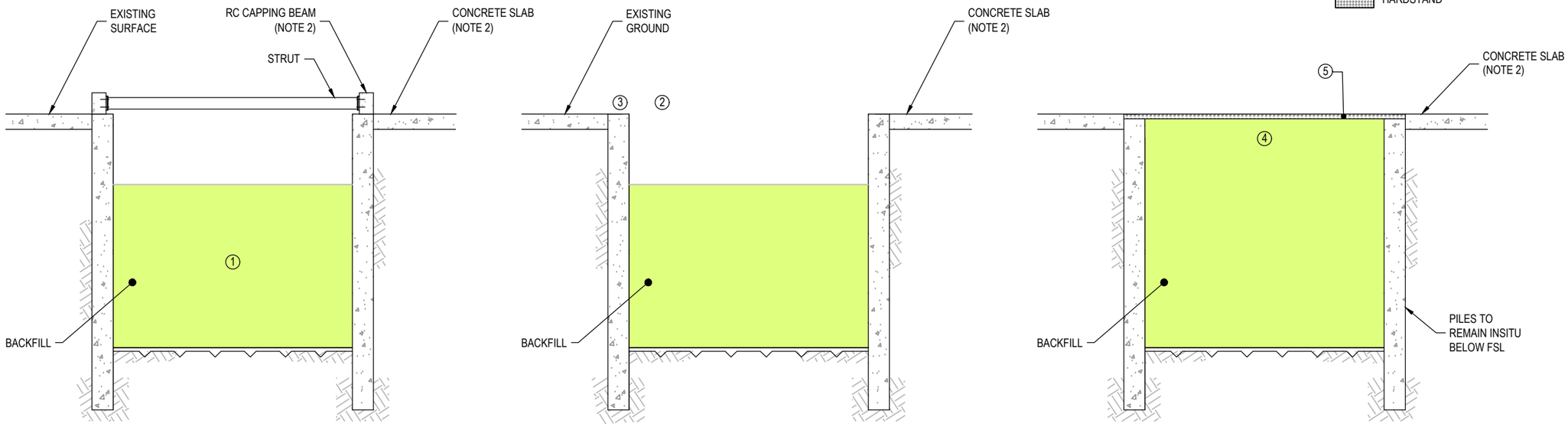
THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

NOTES:

1. FOR BACKFILL AND LANDSCAPING MATERIAL SPECIFICATIONS REFER TO DRAWING M4M5-PSML-NCS-STR-IS22-DRG-1002.
2. TEMPORARY CONCRETE ELEMENTS WITHIN A DISTANCE OF 1 m BELOW THE AGREED FINAL SURFACE LEVEL WILL BE REMOVED. THE EXTENT OF SLAB AND SUBSURFACE BUILT ELEMENTS TO BE REMOVED AT THE END OF THE PROJECT WILL BE SEPARATELY CONSULTED, DISCUSSED AND AGREED WITH WCX/TfNSW WITH THE ACTUAL EXTENT TO BE RECORDED IN WAE DRAWINGS.

LEGEND:

COMPACTED BACKFILL
REINFORCED CONCRETE
HARDSTAND



STAGE 1:

(1) BACKFILL TO 3000 UNDERSIDE OF STRUT. BACKFILL MATERIAL AND COMPACTION SHALL BE AS PER DETAILS ON M4M5-PSML-NCS-STR-IS22-DRG-1005.

STAGE 2:

(2) REMOVE STRUT.
(3) DEMOLISH CONCRETE MEMBERS (NOTE 2).

STAGE 3:

(4) PLACE BACKFILL TO WITHIN 100 OF FSL.
(5) TOP WITH 100 HARDSTAND MATERIAL.

NORTHCOTE DECLINE STRUT REMOVAL SEQUENCE

SCALE 1:200

ACCEPTED FOR CONSTRUCTION

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
-	00	09/04/2020	ISSUED FOR CONSTRUCTION	TRN

DRAWING FILE LOCATION \ NAME - PLOT DATE \ TIME - PLOT BY
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DESIGN LOT CODE

SCALES ON A3 SIZE DRAWING
1 0 1 2 3 4m
1 : 200 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: PSM

TITLE	NAME	DATE
DRAWN	NM	11/03/2020
DRG CHECK	YB	11/03/2020
DESIGN	TRN	11/03/2020
PKG OWNER	TRN	11/03/2020
DESIGN CHECK	RB	11/03/2020
DESIGN MNGR	TRN	11/03/2020
PROJECT MNGR	TRN	11/03/2020

CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M4M5 -PSML- NCS - STR - IS22 - DRG - 1041

M4-M5 LINK MAIN TUNNEL WORKS

A3

NORTHCOTE STREET
CONSTRUCTION ACCESS BACKFILL AND STUB WALL DECLINE
SITE ACCESS RAMP STRUT REMOVAL SEQUENCE

RMS REGISTRATION No.

ISSUE STATUS	EDMS No.	SHEET No.	REV
ISSUED FOR CONSTRUCTION	-	IS22-1041	00

Appendix C. Site Audit Correspondence

IAN SWANE & ASSOCIATES P/L
PO Box 359, MORTDALE NSW 2223

Mob: +61 0418 867 112
Email: iswane@bigpond.com

Lendlease Samsung Bouygues Joint Venture
WestConnex M4-M5 Link Tunnels
Level 7, 189 O'Riordan Street
PO Box 63
MASCOT NSW 1460

Attention: [redacted] - Senior Environmental Coordinator
[redacted]

26/11/2018

IS&A_181126_Interim advice#19
2018_WestConnexStage 3A

Dear [redacted]

INTERIM ADVICE #19 FOR STATUTORY SITE AUDIT No. 278 BY DR IAN SWANE
BASIS FOR SITE AUDIT WORK ON WESTCONNEX STAGE 3A PROJECT

1. Introduction

This letter provides the Lendlease Samsung Bouygues Joint Venture (LSB_JV) with interim advice as part of Statutory Site Audit No. 278 being undertaken by Dr Ian Swane, a NSW EPA Site Auditor accredited under the Contaminated Land Management (CLM) Act. The advice forms part of a statutory site audit for the WestConnex Stage 3A Project (the 'Project').

The purpose of this interim advice is to document the Site Auditor's understanding of the basis for site audit work to be undertaken for the LSB_JV on the Project and the outcomes that the site audit work will need to achieve. This advice should assist the identification of the site audit matters that the LSB_JV will need to meet under their contract with the NSW Government, and identify other site audit matters that may need to be met separately by the NSW Government.

The Site Auditor considers this interim advice is required at this early stage of the Project because statutory site audits can have different objectives, as indicated by the range of options given on the NSW EPA site audit statement proforma, with the objectives required by the LSB_JV being possibly different from those of the NSW Government. The advice provided herein is also limited to site contamination issues and does address any planning or legal matters, which are outside the expertise of the Site Auditor.

This interim advice is considered to be consistent with NSW EPA guidelines and policy and does not pre-empt conclusions to be drawn at the end of the site audit process. This interim advice does not represent a site audit statement (SAS) or a site audit report (SAR). It is intended that a SAS / SAR will be prepared towards the end of the Project for each part of the Project site where the ground surface is disturbed by construction work undertaken by the LSB_JV.

2. Assumptions

The following assumptions have been made for the purpose of this interim advice and site audit work to be undertaken for the LSB_JV:

1. The Department of Planning issued Planning Consent SSI 7485 for the Project on 17/04/18 ('Planning Consent'). The proponent for the Project is Roads and Maritime Services (RMS) from the NSW Government.
2. On or about June 2018, the LSB_JV was awarded a contract with the NSW Government to deliver most of the work required by the Project as described in the Planning Consent. Some work required by the Planning Consent may be outside the scope of work to be undertaken by the LSB_JV.

3. With regards to site contamination, the LSB_JV is understood to be responsible for:
   a) Complying with NSW Government environmental legislation regarding contaminated site and waste management;
   b) Managing contamination it interferes or disturbs during the course of carrying out its work;
   c) Not generating contamination at the Project site or generating contamination that may cause an increase in contamination migrating from the Project site; and
   d) Complying with Environmental Protection Licence 21149.
4. With regards to site contamination, the LSB_JV is understood NOT to be responsible for engaging the Site Auditor to determine whether:
   a) Any part of the Project site has been remediated and is suitable for a specified use other than as a road construction worksite; and
   b) Contamination that existed at the Project site prior to the commencement of the Project continues to migrate off-site.
5. The Site Auditor engaged by the LSB_JV is understood to be responsible for:
   a) Reviewing site environmental management plans that deal with contamination at the Project site and whether these plans meet Condition C22 of the Planning Consent.
   b) Reviewing contamination assessments for the Project site and whether they meet Condition E181 of the Planning Consent.
   c) Reviewing waste classifications and documentation on the management of waste removed from the Project site[1].
   d) Reviewing reports on the management of contamination at the Project site throughout the period construction activities are undertaken by the LSB_JV and to determine whether:
      i. No additional contamination was generated by the construction work;
      ii. The land was maintained in a condition suitable for a road construction worksite and compliance was achieved with Conditions E182 to E185 of the Planning Consent;
      iii. Waste generated by construction activities at the Project site was managed in accordance with NSW EPA guidance and Conditions E202 to E204 of the Planning Consent; and
      iv. The requirements of Conditions O5.10 and O5.11 of EPL 21149 were met.
   e) Notifying the LSB_JV, RMS and the NSW EPA if the Site Auditor concludes that a part of the Project site should be notified to the EPA under the CLM Act[2].
   f) Issuing a Section A1 SAS for each part of the Project site where the ground surface is disturbed by construction work undertaken by the LSB_JV. Each SAS is to be issued at the completion of LSB_JV sitework and needs to determine whether the land is suitable for a road construction worksite at the end of construction period and prior to landscaping by RMS. Each SAS also needs to determine whether:
      i. The site auditor reviewed site environmental management plans that dealt with contamination at the site and considered the plans met Condition C22 of the Planning Consent;

[1] A requirement under Section 4.3.7, NSW EPA (October 2017) Site Auditor Guidelines
[2] A requirement under Sections 3.8.2, 4.3.11 & 4.3.12, NSW EPA (October 2017) Site Auditor Guidelines

ii. The site auditor reviewed contamination assessments for the site and considered they met Condition E181 of the Planning Consent;

iii. The site auditor reviewed reports on the management of contamination at the site throughout construction and considered that:

- No additional contamination was generated by the construction work,
- The land was maintained in a condition suitable for a road construction worksite and compliance was achieved with Conditions E182 to E185 of the Planning Consent;
- Waste generated by construction activities at the site was managed in accordance with NSW EPA guidance and Conditions E202 to E204 of the Planning Consent; and
- The requirements of Conditions O5.10 and O5.11 of EPL 21149 were met.

6. With regards to site contamination, the NSW Government is responsible for engaging the Site Auditor to:

a) Determine whether land within the Project site is suitable for a specified use other than as a road construction worksite at the end of construction and prior to landscaping by RMS;

b) Review documentation prepared by environmental consultants that determines whether contamination migrating from the Project site is posing an unacceptable risk to off-site receptors and needs to be remediated; and

c) Review work undertaken at the Project site in addition to that required by the NSW EPA under Conditions O5.10 and O5.11 of EPL 21149.

O – O - O

The Site Auditor requests that the LSB_JV confirms that the assumptions made in this interim advice letter are correct and that the assumptions form the basis for the site audit work to be undertaken for the LSB_JV and the outcomes that the site audit work need to achieve.

Yours sincerely

Dr Ian C Swane (CPEng & CEnvP)
EPA Site Auditor NSW, WA & NT
Director, Ian Swane & Associates
Phone: 0418 867 112
Email: iswane@bigpond.com

Appendix D. Site Auditor Photographs

Site Inspection 2 June 2021

Photo 1: Truck wash and eastern laydown area

Photo 2: Operation of truck washdown area

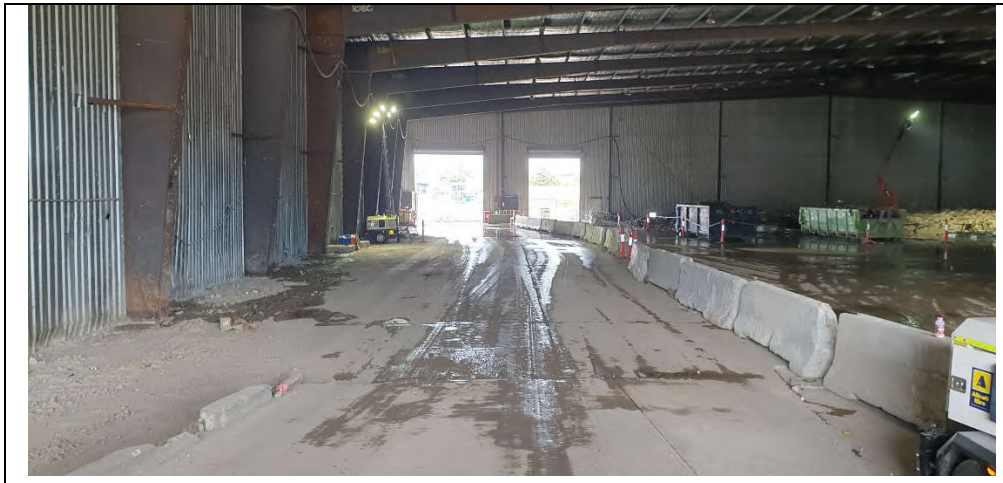
Site Inspection 4 November 2022

Photo 3: Truck washdown area waiting for demolition


SEWER


Onsite

Photo 4: Eastern laydown area during decommissioning



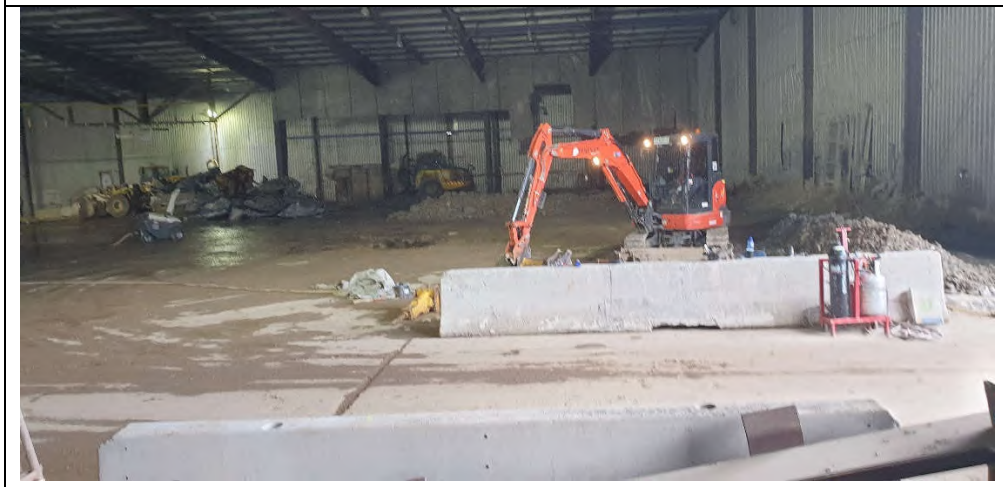


Photo 5: Acoustic shed during decommissioning looking west to north

Photo 6: Acoustic shed during decommissioning looking north to east

Photo 7: Western side of Northcote Compound Showing Demolition of Water Treatment Plant and Laydown Area

Appendix E. Site Audit Statement and Interim Plan

NSW Site Auditor Scheme

Site Audit Statement

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

Part I: Site audit identification

Site audit statement no. **278_Northcote**

This site audit is a:

☑ **statutory audit**

❑ ~~non-statutory audit~~

within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

Name	**Dr Ian C Swane**		
Company	**Ian Swane & Associates**		
Address	**PO Box 359, Mortdale NSW**	Postcode	**2223**
Phone	**0418 867 112**		
Email	**iswane@bigpond.com**		

Site details

Address	**The Northcote Compound was part of the WestConnex Stage 3A Project undertaken by the Acciona Samsung Bouygues Joint Venture (refer Figures 1 & 2). The compound consisted of 12 parcels of land comprising:**
	249-251, 255, 257 and 269 Parramatta Road; 2-4 Wattle Street; part of Northcote Street; 1 and 3 Wolseley Street, 1, 2, 3 and 4 Northcote Street, Haberfield.
	Postcode **2045**

Property description

(Attach a separate list if several properties are included in the site audit.) - **Refer Figure 3**

Lots 63, 64, 114 & 115 in DP4612; Lots 1 & 2 in DP239458; Lots 51-54 in DP719977; Lots 56-58 in DP719977; part of Northcote Street; Lot 1 in DP933407; Lot 1 in DP933225; Lots A and B in DP391272

Local government area **Inner West Council**

Area of site (include units, e.g. hectares) **12,165 m^2 (1.22 ha)**

Current zoning **B6 – Enterprise corridor and R2 – Low density residential**

Regulation and notification

To the best of my knowledge:

❑ ~~**the site is** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*, as follows: (provide the no. if applicable)~~

~~❑ Declaration no.~~

~~❑ Order no.~~

~~❑ Proposal no.~~

~~❑ Notice no.~~

☑ **the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

To the best of my knowledge:

❑ ~~the site **has** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*~~

☑ the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.

Site audit commissioned by

Name [redacted] **Environment & Sustainability Manager**

Company **Acciona Samsung Bouygues Joint Venture (ASBJV) formerly Lendlease Samsung Bouygues Joint Venture**

Address **185 O'Riordan Street, Mascot NSW**

Postcode **2020**

Phone [redacted]

Email [redacted]

Contact details for contact person (if different from above)

Name [redacted]

Phone [redacted]

Email [redacted]

Nature of statutory requirements (not applicable for non-statutory audits)

❑ ~~Requirements under the *Contaminated Land Management Act* 1997 (e.g. management order; please specify, including date of issue)~~

❑ ~~Requirements imposed by an environmental planning instrument (please specify, including date of issue)~~

☑ Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)

Department of Planning and Environment (17 April 2018) "*Infrastructure Approval, Section 5.19 of the Environmental Planning & Assessment Act 1979, Application No: SSI 7485, Conditions of Approval for WestConnex M4-M5 Link SSI 7485*". 76 pages

☑ Requirements under other legislation (please specify, including date of issue)

NSW EPA (9 October 2018) "*Environmental Protection Licence Number 21149*". 30 pages (Ref [52])

Purpose of site audit

❑ ~~**A1** To determine land use suitability~~

~~Intended uses of the land:~~

~~OR~~

~~**A2** To determine land use suitability subject to compliance with either an active or passive environmental management plan~~

~~Intended uses of the land:~~

~~OR~~

(Tick all that apply)

❑ ~~B1 To determine the nature and extent of contamination~~

☑ **B2 To determine the appropriateness of:**

~~❑ an investigation plan~~

~~❑ a remediation plan~~

☑ **a management plan**

❑ ~~**B3** To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

❑ ~~**B4** To determine the compliance with an approved:~~

~~❑ **voluntary management proposal** or~~

~~❑ **management order** under the *Contaminated Land Management Act 1997*~~

☑ **B5 To determine if the land can be made suitable for a particular use (or uses) if the site is ~~remediated or~~ managed in accordance with a specified plan.**

Intended uses of the land: Road construction worksite at the end of construction and prior to landscaping by Transport for NSW (TfNSW) – Figure 4

Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Ramboll and JM Environmental

Titles of reports reviewed:

1. Transport for NSW (August 2017) "*M4-M5 Link Environmental Impact Statement, WestConnex*"
2. Ramboll (19 February 2019) "*Northcote Compound, WestConnex M4 East, Phase 2 Environmental Site Assessment*". Document No: 318000122_Final prepared for CPB Samsung John Holland
3. JM Environmental (4 March 2019) "*JME18057-49 Preconstruction Land Condition Assessment, Northcote Street Compound – Revision 2*". Document No: JME18057-49 prepared for LSBJV
4. Ramboll (November 2016) "*Underground Petroleum Storage System Validation Report, 269 Parramatta Road, Haberfield*". Prepared for CPB Samsung John Holland

Other information reviewed, including previous site audit reports and statements relating to the site:

50. Department of Planning and Environment (17 April 2018) "*Infrastructure Approval, Section 5.19 of the Environmental Planning & Assessment Act 1979, Application No: SSI 7485, Conditions of Approval for WestConnex M4-M5 Link SSI 7485*". 76 pages
51. LSBJV (6 June 2018) PowerPoint Presentation "*WestConnex Design and Construct, M4 – M5 Link Main Tunnel Works, Compounds*". 18 pages
52. NSW EPA (9 October 2018) '*Environmental Protection Licence Number 21149, WestConnex Stage 3A – M4-M5 Mainline Tunnels, WestConnex between M4 East at Haberfield and the New M5 at St Peters, Marrickville NSW 2204'*. 30 pages
53. Inner West Council (11 November 2016) "*Land Zoning Map – Sheet LZN_001, Ashfield Environmental Plan 2013 (Amendment No. 3)"*
54. Higinbotham & Robinson (1889 – 1894) Map "*Fivedock, Parish of Concord*". Atlas of the Suburbs of Sydney, https://dictionaryofsydney.org/media/3907

55. AECOM (26 February 2019) "*Site Audit Report, Northcote Compound, Site 026, WestConnex M4 East"*. Document No: 60437339 prepared by Brad Eismen for CPB Samsung John Holland JV

56. AECOM (26 February 2019) "*Site Audit Statement, BE136 for Northcote Compound, Site 026, WestConnex M4 East*". Prepared by Brad Eismen for CPB Samsung John Holland JV

57. LSBJV (10 October 2018) "*Site Establishment Management Plan, M4-M5 Link Mainline Tunnels"*. Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0018-07

58. LSBJV (23 October 2018) "*Appendix B, Contaminated Land Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0021-01 Rev01

59. LSBJV (23 October 2018) "*Unexpected Contaminated Land and Asbestos Finds Procedure, M4-M5 Link Mainline Tunnels*". Appendix A of Ref [58]

60. LSBJV (17 April 2020) "*Appendix B5, Soil and Surface Water Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0005-09 Rev09

61. LSBJV (22 June 2020) "*Appendix B9, Waste Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0009-07 Rev08

62. LSBJV (28 April 2021) "*Appendix B6 Groundwater Management Sub-plan, M4-M5 Link Mainline Tunnels*". Document No: M4M5-LSBJ-PRW-EN-MP01-PLN-0006-13 Rev13 (revision 1 dated 17 September 2018)

63. ASBJV (27 June 2022) Drawings "*M4M5 Link Main Tunnel Works, Package: Project Wide M4M5-RBGP-PRW-CIV-CW02-DPK-0001, Construction Site Reinstatement*". 51 drawings prepared for Sydney Motorway Corporation WestConnex

64. PSM (9 April 2020) Drawings "*M4-M5 Link Main Tunnel Works, Northcote Street Construction Access Backfill and Stub Wall*". Document No: M4M5-PSML-NCS-STR-IS22-DPK-0001 comprising 14 drawings prepared for Sydney Motorway Corporation WestConnex

Site audit report details

Title **Site Audit Report, Site Audit 278_Northcote by Dr Ian Swane, WestConnex Stage 3A Northcote Compound (Area C3A), Haberfield**

Report no**. 278_Northcote** Date **28 November 2022**

Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section. (Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
  - (B1) the nature and extent of contamination, and/or
  - (B2) the appropriateness of an investigation, remediation or management plan[1], and/or
  - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
  - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
  - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

~~Section A1~~

~~I certify that, in my opinion:~~

~~The **site is suitable** for the following uses:~~

~~(Tick all appropriate uses and strike out those not applicable.)~~

- ❑ ~~Residential, including substantial vegetable garden and poultry~~
- ❑ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ❑ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ❑ ~~Day care centre, preschool, primary school~~
- ❑ ~~Residential with minimal opportunity for soil access, including units~~
- ❑ ~~Secondary school~~
- ❑ ~~Park, recreational open space, playing field~~
- ❑ ~~Commercial/industrial~~
- ❑ ~~Other (please specify):~~

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

OR

❑ I certify that, in my opinion, the **site is not suitable** for any use due to the risk of harm from contamination.

Overall comments:

Section A2

I certify that, in my opinion:

Subject to compliance with the **attached** environmental management plan[2] (EMP), the site is suitable for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

❑ Residential, including substantial vegetable garden and poultry

❑ Residential, including substantial vegetable garden, excluding poultry

❑ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

❑ Day care centre, preschool, primary school

❑ Residential with minimal opportunity for soil access, including units

❑ Secondary school

❑ Park, recreational open space, playing field

❑ Commercial/industrial

❑ Other (please specify):

EMP details

Title

Author

Date No. of pages

EMP summary

This EMP (attached) is required to be implemented to address residual contamination on the site.

The EMP: (Tick appropriate box and strike out the other option.)

❑ requires operation and/or maintenance of **active** control systems[3]

❑ requires maintenance of **passive** control systems only[3].

[2] Refer to Part IV for an explanation of an environmental management plan.
[3] Refer to Part IV for definitions of active and passive control systems.

~~Purpose of the EMP:~~

~~Description of the nature of the residual contamination:~~

~~Summary of the actions required by the EMP:~~

~~How the EMP can reasonably be made to be legally enforceable:~~

~~How there will be appropriate public notification:~~

~~Overall comments:~~

Section B

Purpose of the plan[4] which is the subject of this audit:

To outline the additional work needing to be completed to allow a Section A2 site audit statement to be issued.

I certify that, in my opinion:

~~(B1)~~

- ❑ ~~The nature and extent of the contamination has been appropriately determined~~
- ❑ ~~The nature and extent of the contamination **has not** been appropriately determined~~

~~AND/OR (B2)~~

- ☑ **The ~~investigation,~~ ~~remediation or~~ management plan is appropriate for the purpose stated above**
- ❑ ~~The investigation, remediation or management plan **is not** appropriate for the purpose stated above~~

~~AND/OR (B3)~~

- ❑ ~~The site testing plan:~~
  - ~~❑ **is** appropriate to determine~~
  - ~~❑ **is not** appropriate to determine~~

[4] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

~~if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

~~AND/OR (B4)~~

❑ ~~The terms of the approved voluntary management proposal* or management order** (strike out as appropriate):~~

~~❑ **have** been complied with~~

~~❑ **have not** been complied with.~~

~~*voluntary management proposal no.~~

~~**management order no.~~

AND~~/OR (B5)~~

☑ **The site can be made suitable for the following uses:**

(Tick all appropriate uses and strike out those not applicable.)

~~❑ Residential, including substantial vegetable garden and poultry~~

~~❑ Residential, including substantial vegetable garden, excluding poultry~~

~~❑ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

~~❑ Day care centre, preschool, primary school~~

~~❑ Residential with minimal opportunity for soil access, including units~~

~~❑ Secondary school~~

~~❑ Park, recreational open space, playing field~~

~~❑ Commercial/industrial~~

☑ **Other (please specify): Road construction worksite at the end of construction period and prior to landscaping by TfNSW as approved by Department of Planning and Environment (17 April 2018) "*Infrastructure Approval, Section 5.19 of the Environmental Planning & Assessment Act 1979, Application No: SSI 7485, Conditions of Approval for WestConnex M4-M5 Link SSI 7485*" (Ref [50])**

IF the site is~~ remediated/~~**managed* in accordance with the following plan** (**attached**):

*Strike out as appropriate

Plan title	**Interim Management Plan for Contamination at the Northcote Compound, WestConnex Stage 3 Project**
Plan author	**ASBJV**
Plan date	**28 November 2022** No. of pages **1**

SUBJECT to compliance with the following condition(s):

1. **The long-term environmental management plan (LTEMP) is prepared by a suitably qualified and experienced environmental consultant in accordance with EPA guidance.**

2. **The LTEMP is to manage the residual contamination risks that remain at the Northcote Compound, as described in the site audit report.**
3. **ASBJV is to provide the Site Auditor with further operational information concerning environmental incidents that occurred at the Northcote Compound during the WestConnex Stage 3A project, chemical storage and operations at the wastewater treatment plant, and operations of the diesel tank and refuelling bay.**
4. **ASBJV is to provide the Site Auditor with further information on the type of fill used to backfill the tunnel dive and other parts of the Site.**
5. **ASBJV is to provide the Site Auditor with further information on demobilisation work and reinstatement of the Northcote Compound demonstrating that the final condition of the Northcote Compound has been achieved.**
6. **Following completion of the minor work and after a written approval of the LTEMP has been issued by the Site Auditor and TfNSW, a Section A2 site audit statement is to be prepared and issued.**

Overall comments:

1. **The site auditor reviewed site environmental management plans that dealt with contamination at the Northcote Compound and considered the plans met Condition C22 of the Planning Consent sufficient for the purpose of this site audit.**
2. **The site auditor reviewed contamination assessments for the Northcote Compound and considered they met Condition E181 of the Planning Consent sufficient for the purpose of this site audit.**
3. **The site auditor reviewed reports on the management of contamination at the Northcote Compound and considered that:**
   a) **ASBJV did not interfere or disturb contamination during the course of carrying out its work at the Northcote Compound during the WestConnex Stage 3A project;**
   b) **Contamination was not generated by activities undertaken by ASBJV at the Northcote Compound;**
   c) **Contamination was not generated at the Northcote Compound that caused an increase in contamination migrating from the Project site;**
   d) **The Northcote Compound was returned to a condition suitable for a road construction worksite provided residual contamination risks were managed in accordance with an LTEMP prepared by an experienced environmental consultant that met EPA guidelines and was approved in writing by the Site Auditor and TfNSW; and**
   e) **The requirements of Conditions O5.10 and O5.11 of EPL 21149 were met sufficient for the purpose of this site audit.**

Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997.*

Accreditation no. **9821**

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Signed

Date **28 November 2022**

Part IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remediation plan or management plan which may

enable a particular use. It sets out succinct and definitive information to assist decision-making about the use or uses of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

Environmental management plan

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997* (CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the CLM Act or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of *the Environmental Planning and Assessment Act 1979*.

Active or passive control systems

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an

unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

Auditor's comments

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section B

In Section B the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement. The condition must not specify an individual auditor, only that further audits are required.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

Part III

In **Part III** the auditor certifies their standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to

- the **NSW Environment Protection Authority**: nswauditors@epa.nsw.gov.au or as specified by the EPA

  AND

- the **local council** for the land which is the subject of the audit.

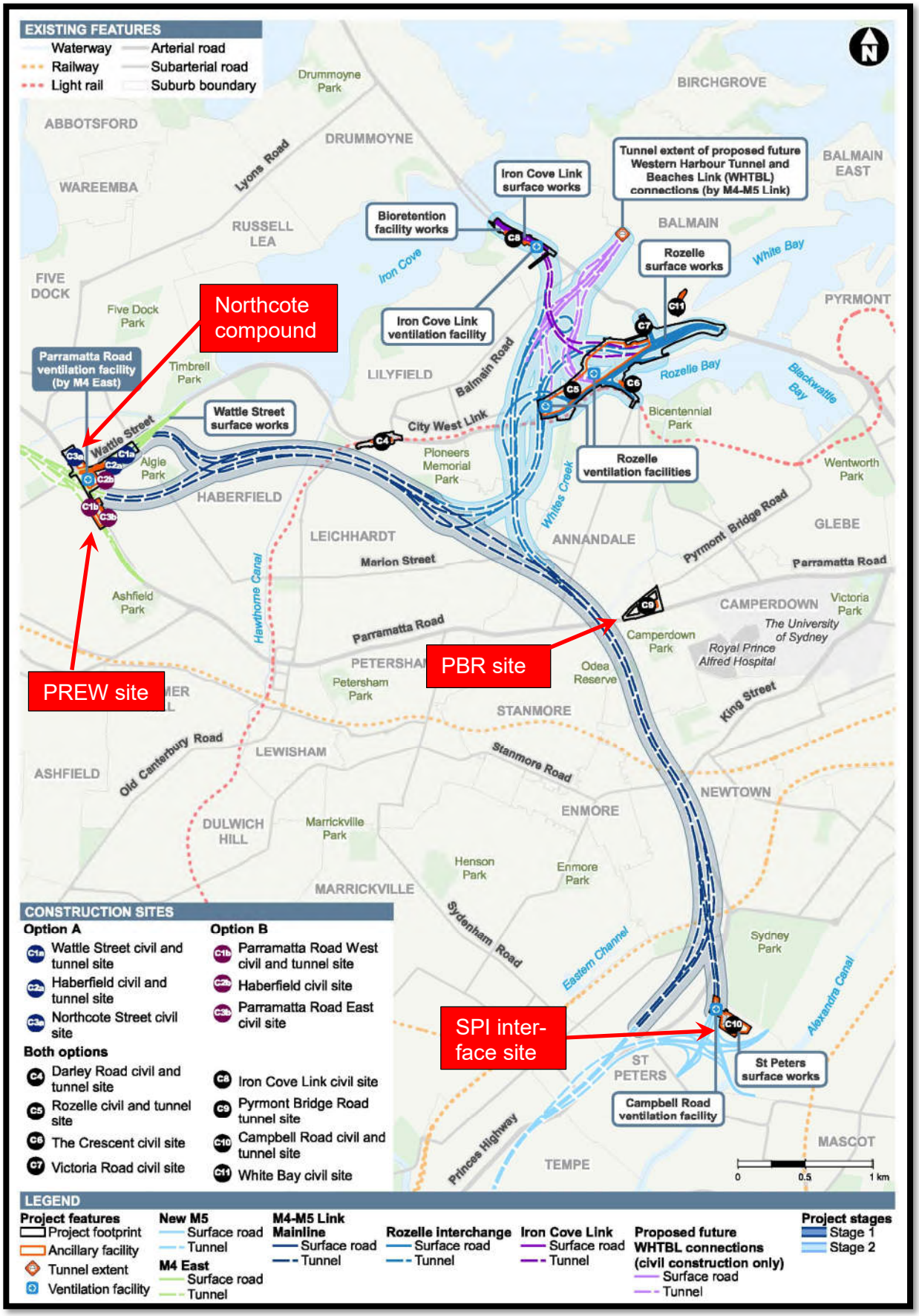


Figure 1 Overview of Project Footprint and Construction Ancillary Facilities (Source: Ref [50])

Figure 2 Location Plan for Northcote Compound (Site C3A) (Source: Ref [50])

Figure 3 Six Maps 2018 Subdivision Plan for Northcote Compound (Area C3a)

Figure 4 General Arrangement for Reinstatement of Northcote Compound (Source: Drg No: M4M5 -RBGP-PRW- CIV - CW02-DRG- 1101, Ref [63])

Interim Management Plan for Contamination at the Northcote Compound, WestConnex Stage 3 Project

The Purpose of this Interim Management Plan is to outline the additional work that needs to be completed at the Northcote Compound to allow a Section A2 Site Audit Statement (SAS) to be issued. This additional work consists of two parts.

Part 1: Long-term Environmental Management Plan (LTEMP)

An LTEMP is currently being prepared by a suitably qualified and experienced environmental consultant in accordance with EPA guidance; this will facilitate the management of any residual contamination risks that remain at the Northcote Compound, as described in the site audit report, associated with the below items:

- Unknown ACM fragments in fill;
- Unknown buried services/pits remaining at the Site;
- The possibility of UPSS infrastructure at Site 028; and
- At the former Northcote Street road corridor (site 046): The potential for coal tar to be present in the subbase layer that formed the road pavement and the use of contaminated fill used when Council first constructed the road.

Part 2: Remaining Site Works

Prior to formal handover of the Northcote Compound there are several works that need to be completed to reach the final condition required under the contract. Activities are described below with the risk of contamination to be managed in accordance with the existing environmental management plan.

<u>Demolition of Acoustic Shed</u>

This work is scheduled to occur over the last four weeks of 2022 and be completed in the first quarter of 2023 at the latest. Shed removal will continue by hand along Parramatta Rd during night shift and at adjacent the Northcote Street houses during standard hours.

<u>Pedestrian Access at Northcote Street</u>

Northcote Street will be closed to traffic with pedestrian access created between Northcote Street and Parramatta Road in the first quarter of 2023. Sections of hoarding will be removed whilst new pedestrian fencing, pathways and a turfed verge bounded by planter boxes will be provided.

<u>Demolition of Decline and Support Structures</u>

Decline retaining walls, piles and capping beam will be removed along with support structures for the construction office starting in the last month of 2022, to be completed by the end of the first quarter in 2023. Contamination in this area was managed during site establishment thus little risk remains.

<u>Removal of LV switchyard</u>

The LV switchyard area is to be removed in early 2023 and completed by the end of the quarter. This area presents little contamination risk following its removal will be capped by way of chip sealing.

<u>Decommission Water Management System</u>

Concrete settlement ponds and associated plumbing will be decommissioned for removal in the first quarter of 2023 and any exposed or damaged areas of site will be leveled and sealed for handover.