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Karimbla Constructions Services

Validation Report

2 Macpherson Street, Warriewood NSW

19 July 2019

Pour trust
into your
foundations
and you
can build
anything

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Validation Report

Prepared for
Karimbla Constructions Services

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Abbreviations

AC	Acceptance Criteria
AHD	Australian Height Datum
ASS	Acid Sulphate Soil
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CMP	Contamination Management Plan
COPC	Chemical of potential concern
DP	Deposited Plan
DQO	Data Quality Objective
DQI	Data Quality Indicators
Eurofins	Eurofins Environment Testing Australia Pty Ltd, trading as Eurofins MGT
HIL	Health Investigation Level
HSL	Health Screening Level
LOR	Limit of Reporting
mg/kg	milligrams per kilogram
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
NSW EPA	New South Wales Environment Protection Authority
NSW OEH	New South Wales Office of Environment and Heritage
PAH	Polycyclic Aromatic Hydrocarbon
PID	Photoionisation Detector
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
SOP	Standard Operating Procedures
TCLP	Toxicity Characteristics Leaching Procedure
TRH	Total Recoverable Hydrocarbons
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compound

Executive Summary

Karimbla Constructions Services (Karimbla) propose to redevelop the property at 2 Macpherson Street, Warriewood, NSW for low density residential use. The location of the property is shown on Figure 1. Coffey Services Australia Pty Ltd (Coffey) has been engaged by Karimbla to provide environmental consultancy services associated with the proposed redevelopment of the property which includes residential land use and perimeter road (herein refereed to the 'site').

Based on information provided by Karimbla, Coffey understands that the Karimbla are submitting a Development Application (DA) to Northern Beaches Council (Council) for a twenty-two (22) lot Torrens Title Subdivision. The proposed development will include demolition of existing structures and importation of construction fill material to raise the proposed residential area of the site by approximately 2.5mabove existing ground level, with final Relative Levels (RLs) ranging between 5.8m Australian Height Datum (mAHD) and 4.6mAHD. Twenty-two dwellings would occupy the middle of the site, leaving a riparian set back along the western, eastern and northern boundaries, which will undergo earth works, including cut and fill and riparian planting. An access road will be constructed around the perimeter of the residential area, joining Macpherson Street at two locations to the south. A retaining wall will be part built around the perimeter of the road. A concept plan of the proposed development provided by Karimbla is included in Appendix A, with the proposed site layout provided in Figure 2.

Council approved DA N0398/17 in mid-2019 for civil works including cut and fill, construction of a private road, drainage works and environmental works for the planned low density residential development located at 2 Macpherson Street, Warriewood NSW. The works proposed under this application include:

- Proposed Lot 1 – Private access loop road;
- Proposed Lots 2 – 23 – future residential lots under community title; and
- Proposed Lot 24 – Land to be dedicated to Council, being the 25-metre inner creek line corridor in accordance with Item 1m in Warriewood Valley Development Contributions Plan Amendment 16, Revision 3, 2018.

Coffey understands that the construction of new dwellings does not form part of this application, Meriton are in the process of lodging a separate Development Application for the subdivision of the future residential dwellings.

As part of the planned redevelopment, Karimbla have implemented a programme of works to remove and manage soil contamination identified at the site in accordance with the following document:

- Coffey (2017d) *Contamination Management Plan – 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R02 Revision 1, dated 20 December 2017).

Karimbla has engaged Ms Rebeka Hall of Zoic Environmental Pty Ltd as the site auditor, to issue a Site Audit Statement (SAS) and associated Site Audit Report (SAR) following completion of site validation activities.

This Validation report relates to the proposed residential area and perimeter road (the site) as shown on Figure 2.

The scope and rationale of validation sampling was outlined within the Revised Contamination Management Plan (Coffey, 2017d) which has not been affected by subsequent changes in details of the proposed design.

Based on site observations and data collected during the validation sampling programme (supplemented with site observations and data obtained during the Coffey (2017a and 2017c) DSI), Coffey concludes that:

- Previously identified asbestos impacted fill at locations TP04, TP13 and TP21 (Coffey DSI, 2017a) has been excavated and disposed to a facility licensed to receive special (asbestos) waste, in

accordance with Coffey's classification under the Waste Classification Guidelines (NSW EPA, 2014).

- Remaining fill material around location TP04, TP13 and TP21 following removal of asbestos impacted fill has been validated as suitable for planned future use in accordance with the CMP (Coffey, 2017d).
- Based on landfill weighbridge dockets provided by Karimbla, asbestos impacted fill totalling approximately 32.80 tonnes was excavated from location TP04, TP13 and TP21 and disposed of appropriately off-site to a landfill licensed to receive special (asbestos) waste.
- Visual inspection confirmed that aesthetically unacceptable soils have been relocated to the footprint of the proposed roadway and that soils identified with chemical impacts slightly above certain HIL-A and EIL/ESL values have also been relocated to beneath the future road where risk potential is considered acceptable.

Based on removal of asbestos impacted soil off-site to an appropriately licensed landfill, the records collected during the validation sampling programme and visual inspection after relocation of certain materials, Coffey considers that unacceptable risk posed by isolated incidence of asbestos impacted fill and HIL-A and EIL/ESL exceedances to future construction workers and other future site occupants has been eliminated, and that the site is considered suitable for the planned future land use, being residential with accessible soils.

Coffey understands that ground levels in the area covered by the proposed road and residential development require raising using imported fill material to reduce the risk of flooding. An addendum to this report will be issued after inspection and validation of imported fill to confirm that the site remains suitable for proposed residential use as a result of these earthworks. We recommend that, if required, the unexpected finds procedure (UFP) outlined in the CMP be implemented during any excavation works. A copy of the UFP (extracted from the Coffey (2017) CMP) is provided in Appendix G.

We draw your attention to the attached sheets titled "Important Information about your Coffey Environmental Report" which should be read in conjunction with this report.

1. Introduction

1.1. General

Karimbla Constructions Services (Karimbla) propose to redevelop the property at 2 Macpherson Street, Warriewood, NSW for low density residential use. The location of the property is shown on Figure 1. Coffey Services Australia Pty Ltd (Coffey) has been engaged by Karimbla to provide environmental consultancy services associated with the proposed redevelopment of the property which includes residential land use and perimeter road (herein refereed to the 'site').

Karimbla are submitting a Development Application (DA) to Northern Beaches Council (Council) for a twenty-two (22) lot Torrens Title Subdivision. Coffey understands that the proposed development will include demolition of existing structures and importation of construction fill material to raise the proposed residential area of the site by approximately 2.5m above existing ground level, with final Relative Levels (RLs) ranging between 5.8m Australian Height Datum (mAHD) and 4.6mAHD. Twenty-two dwellings would occupy the middle of the site, leaving a riparian set back along the western, eastern and northern boundaries, which will be regraded and revegetated to improve stormwater flow. An access road will be constructed around the perimeter of the residential area, joining Macpherson Street at two locations to the south. A retaining wall in part will separate the road from the riparian zone. A concept plan of the proposed development provided by Karimbla is included in Appendix A, and the proposed site layout is illustrated in Figure 2.

Council approved DA N0398/17 in mid-2019 for civil works including cut and fill, construction of a private road, drainage works and environmental works for the planned low density residential development located at 2 Macpherson Street, Warriewood NSW. The works proposed under this application include:

- Proposed Lot 1 – Private access loop road;
- Proposed Lots 2 – 23 – future residential lots under community title; and
- Proposed Lot 24 – Land to be dedicated to Council, being the 25-metre inner creek line corridor in accordance with Item 1m in Warriewood Valley Development Contributions Plan Amendment 16, Revision 3, 2018.

Coffey understands that the construction of new dwellings does not form part of this application, Meriton are in the process of lodging a separate Development Application for the subdivision of the future residential dwellings.

Coffey completed contamination assessments for the proposed development and the following reports describe subsurface conditions at the site:

- Coffey (2016), *Preliminary Site Investigation* (PSI), *2 Macpherson Street, Warriewood NSW* (reference: GEOTLCOV25237AB-AC Rev1, dated 29 October, 2016).
- Coffey (2017a); *Detailed Site Investigation – 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R01; dated 16 August, 2017)
- Coffey (2017b); *Waste Classification for Asbestos Impacted Fill,* 2 *Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R03; dated 15 November, 2017)
- Coffey (2017c); *Addendum to Detailed Site Investigation Report,* 2 *Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R04; dated 16 August, 2017)

As part of the planned redevelopment, Karimbla have implemented a programme of works to remove and manage soil contamination identified at the site in accordance with the following document:

- Coffey (2017d) *Contamination Management Plan – 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R02 Revision 1, dated 20 December 2017).

This Validation report relates to the planned residential area and perimeter road (the site) as shown on Figure 2.

Karimbla has engaged Ms Rebeka Hall of Zoic Environmental Pty Ltd as the site auditor, to issue a Site Audit Statement (SAS) and associated Site Audit Report (SAR) following the completion of the remediation and validation works.

1.2. Planned development

Survey drawings provided by Karimbla (JBW Surveyors Pty Ltd, Plan Ref: 124872 dated 31/10/14, included in Appendix A), show the reduced levels (RLs) of the existing ground surface range from approximately 2.5m AHD along the eastern and western margins to approximately 3.7m AHD in the middle of the southern half of the site. The Subdivision and 000-Series Civil Works Package (AT&LEarly Works Package, dated 29 November 2018, included in Appendix A) indicates that the proposed ground level for the area occupied by townhouses is between RL 5.8 mAHD (southern portion) and 4.8m AHD (northern portion), which is approximately 1.5m to 1.7m above the previous design proposal.

The elevation of the proposed access road is between 4.8mAHD at the southern boundary to 4.6m AHD along the northern boundary, with the road being raised by approximately 1.3m to 2m.

Coffey understands that the proposed development includes:

- Civil works to prepare the site for future residential development, including cut and fill
- Construction of one (1) private access road (which will be dedicated to Council)
- Stormwater drainage works;
- Environmental management works (the disposal of land to Council as a public creek connection (riparian corridor)).
- Associated landscaping and tree removal;
- Establishment of building envelopes to accommodate 22 future dwellings

Coffey was provided with a copy of the approved development plans (Early works 1000-series, civil works package: project number 18-580, issue F, dated 28 Mar 2019 (Appendix A)). Coffey understands that the north eastern portion of the future road area has changed slightly from the original design plans used for Figures 2 and 3 within this report. This change in position of the road was required to flood mitigation purposes at the site. A copy of the subdivision plan (Drawing no. 22053, Rev.G, dated 20/06/2017, which will be submitted as part of the subdivision application is provided in Appendix A.

The location of the residential area, perimeter road and riparian zone is illustrated on Figure 2.

1.3. Validation Objective

The purpose of the validation works was to demonstrate that the site is suitable for the planned use.

The scope and rationale of validation sampling is described in Section 4 of this report and was outlined in:

- Coffey (2017d) *Contamination Management Plan – 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R02 Revision 1, dated 20 December 2017).

2. Site Information

2.1. Site identification

The site location and site plan is shown in Figures 1 and 2 respectively. Key site identification details are provided in Table 2.1.

Table 2.1: Site Identification

Site Address:	2 Macpherson Street, Warriewood NSW
Current Site Ownership	Karimbla Properties No.32
Site Area	Property approximately 2.2 Ha, including 1.0 Ha for the access road and residential area (the site)
Site Identification Details	Property is Lot 25 in Deposited Plan (DP) 5464
Current Zoning	Zone R3: Medium Density Residential under Pittwater Council Local (now Northern Beaches Council) Environmental Plan 2014.
Current Site Use / Property Description	The site was formerly a plant nursery (Foley's Nursery), and was used for the cultivation, storage and retail sale of plants. Infrastructure associated with the former nursery (i.e. sales building, equipment shed, greenhouses and plant storage and display areas) has been partially removed.
Proposed Site Use	Residential with garden and accessible soils in the form of dwellings (approximately 6,500m^2). The residential area will be surrounded by a road (approximately 3,400m^2) and a riparian reserve (approximately 1.2 Ha) following Narrabeen Creek on the northern and eastern sides of the site.

At the time of compiling this report, the site condition had not changed significantly except for the removal of site buildings to ground slab level, except for a large canopy remaining in the south western corner of the site. The concrete slab, across the southern area of the site was largely intact, the approximate location of the slab is shown on Figure 2.

Mature trees are present along the property boundary. Based on conceptual drawings provided in Appendix A, Coffey understands that these trees will be retained within a Riparian set-back.

2.2. Geology and soils

The Sydney 1:100,000 Geological Series Sheet 9130 indicates the locality is underlain by alluvial sediments of Quaternary age. The alluvial soils are typically described as silty to peaty quartz sand, silt and clay, with ferruginous and humic cementation in places and common shell layers. Hawkesbury Sandstone, of Triassic age, underlies the alluvium.

The Sydney Soil Landscape Sheet 9130 indicates that the Warriewood soil landscape is present on the site. This landscape is characterised by deep, well-sorted sandy podsols and dark mottled siliceous sands.

The general stratigraphy encountered during field investigations by Coffey (2017) typically comprised fill material ranging in thickness between 0.2m and greater than 1m, underlain by natural alluvial deposits consisting of sand and firm silts and clays, with the thickness undefined. Copies of boreholes logs from the DSI (Coffey, 2017a) and Addendum DSI (Coffey, 2017c) are provided in Appendix C.

2.3. Acid sulfate soils

The 1:25,000 Acid Sulfate Soil Risk Map, Hornsby and Mona Vale Sheet (edition two, 1997) indicates that the locality is underlain by an Aeolian sand plain (Wa2). The Acid Sulfate Soil Risk Map shows a high probability of acid sulfate soil occurrence between 1m to 3m below ground, which is consistent with Coffey's observation of alluvial sand and firm silts and clays below existing fill material.

A sulfrous odour was identified in the excavation at location TP01 during Coffey's field investigations, indicating a high probability for acid sulfate soils to be present beneath the site. No field screening test for acid sulfate soils was undertaken during the investigation.

2.4. Regional topography and drainage

The site includes a section of Narrabeen Creek, located around the northern and eastern site boundaries. Narrabeen Creek flows to the south, joining Mullet Creek and South Creek which discharge into the Pacific Ocean.

The topography of the site appears to be mounded, with the higher south central portion of site surveyed at 3.71mAHD, with surrounding elevations between 1.87m AHD (north), 1.6m AHD (east) and 1.0m AHD (south). This topography is consistent with the position of Narrabeen Creek.

As the site is predominantly unsealed, it is expected that surface water runoff would percolate into sub-surface soils, except during intense rainfall when surplus water would drain into the stormwater system and/or adjacent Narrabeen Creek.

2.5. Hydrogeology

A search of groundwater bore licences was undertaken on 19 June 2017 using the NSW Department of Primary Industries, Office of Water website (http://allwaterdata.water.nsw.gov.au/water.stm). The results of the search indicated that there are two registered bores (GW106697 and GW106698) within a 500m radius of the site. These bores are located approximately 450m to the North West of the site at 14 Macpherson Street, Warriewood and are used for monitoring purposes.

Groundwater is expected to be present at shallow depths within the underlying Quaternary deposits, discharging into Narrabeen Creek located along the northern and eastern site boundaries. Groundwater flow direction is expected to vary with flow direction ranging from north to east.

The risk of groundwater contamination at the site is discussed further in Section 4.2 below.

2.6. Site history

The Phase 1 Site Contamination Assessment (Coffey PSI report, 2016) presents a summary of the historical uses of the site based on a review of selected aerial photographs, historical land ownership, NSW EPA public registers and Council planning records/certificates.

Information collected on site history indicates that:

- The site appears to have been undeveloped land from at least the 1930s until between 1961 and 1978 when the site was developed for use as a market garden or orchard. The site remained relatively unchanged with the exception of reworking of soils for planting and construction of glass houses within the southern half of the site in 1982. Aerial photographs indicate that these glasshouses were removed between 1982 and 1994. Some smaller buildings were constructed in the southern portion of the site.
- A search of the NSW WorkCover's Stored Chemical Information Database (SCID) identified no licences to store dangerous goods on site. However anecdotal evidence from a former employee of the Nursery (Neil), indicated that an above ground storage tank (AST) was previously located on a concrete loading dock in the southern portion of the site. It is understood that this AST was

used to store diesel for refuelling a tractor used at the nursery. It is noted that storage of diesel fuel previously did not require a Dangerous Goods licence from NSW WorkCover.

The following areas of environmental concern (AEC) and contaminants of potential concern (COPC) were identified:

- Fill of unknown origin and quality distributed across the site;
- Possible use of pesticides / herbicides associated with market garden and nursery operation;
- Potential storage and use of fuels and oils associated with the operation of machinery onsite (e.g. tractor and lawn mowers).
- Potential for weathering of hazardous building materials such as lead paint and fibre cement containing asbestos from former site structures and uncontrolled demolition of former site structures or vandalism of remaining buildings which may have included hazardous building materials.

Based on these findings, Coffey considered that the site could be made suitable for its proposed use in accordance with decision making under planning processes described in SEPP55 (DUAP, 1998); however, it was recommended that a detailed site investigation be completed to assess the potential contamination risk for proposed future residential use with access to soil on the site.

3. Previous Investigation Findings

3.1. Detailed Site Investigation (Coffey, 2017a)

Coffey undertook a Detailed Site Investigation (DSI) on the site in May 2017. Figure 2 shows sampling locations for this investigation.

In summary, this investigation comprised:

- Intrusive investigation of the subsurface for soil type and chemical characteristics using 28 test pits (TP01 to TP28) to depths ranging between 0.6m and 1.2m bgs and five hand augured boreholes (HA01 to HA05) extended to depths ranging between 0.3m to 0.6m bgs with refusal occurring due to underlying concrete slabs and/or hard fill materials.
- Analysis of selected soil samples from each borehole for Contaminants of Potential Concern (COPC) including one or more of:
  - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
  - Total recoverable hydrocarbons (TRH);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Benzene, toluene, ethylbenzene and total xylene (BTEX);
  - Organochlorine / organophosphorus pesticides (OCP/OPP);
  - Polychlorinated Biphenyls (PCB);
  - Herbicides; and
  - Forms of asbestos.

The findings from this investigation were reported in Coffey (2017) *Detailed Site Investigation, 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R01), and key findings were:

- Asbestos Fines, in the form of fibre cement fragments (not visible unaided) and loose fibre bundles, were detected in three shallow samples of fill collected from soil test pits TP04 and TP13 at a depth of 0.05-0.15m and TP21 at a depth of 0.1-0.2m.

- Carcinogenic PAH (as benzo(a)pyrene TEQ) was reported at 5.5mg/kg which is above HIL A of 3mg/kg in fill sample HA02_0.05-0.15. The source of the PAHs is attributed to ash in fill (as noted on the borehole log). TCLP analysis was undertaken which indicated that the PAHs have very low mobility. Delineation of this impact was achieved, with the deeper sample (HA02_0.4-0.5) reporting 0.5mg/kg.

- Exceedances of the EIL/ESLs for nickel, zinc, TRH C16-C34 and benzo(a)pyrene occurred in six soil samples from five sampling locations (HA02, TP11, TP14, TP23 and TP26). However, the risk associated with these impacts is considered to be negligible due to the immobile nature of the nickel and zinc which is associated with the crystalline matrix of terracotta and of TRH C16-C34 and benzo(a)pyrene which is associated with the crystalline matrix of coal ash.

- Groundwater is unlikely to be impacted based on chemical concentrations and practical immobility of chemicals detected in soil samples analysed and depth of identified impacts.

- Available soil data indicates that the fill material on the site would classify as General Solid Waste in accordance with the Waste Classification Guidelines (EPA; 2014), with asbestos impacted fill to be managed as Special (asbestos) waste. Coffey recommended removing asbestos impacted fill prior to commencement of bulk earthworks.

Coffey recommended that the isolated occurrences of asbestos impacts be addressed through implementation of a contamination management plan (CMP), which would require an asbestos removal plan in accordance with WHS Regulation. We also recommended that the CMP include an unexpected contamination finds procedure as a precautionary measure.

A summary of analytical results from the DSI is provided in Table 1, and copies of borehole logs are provided in Appendix C.

3.2. Addendum to DSI (Coffey, 2017c)

Coffey undertook a validation assessment and additional soil investigation at the site to close out data gaps associated with constrained access for subsurface sampling due to presence of a concrete slab and unconfirmed depth of fill material in the southern part of the site. This involved:

- Collection of samples from six test-pits (TP29 to TP34) from areas where buildings and concrete slabs previously limited sub-surface investigation. Samples were collected from fill and natural soils and submitted for laboratory analysis for the contaminants of potential concern (COPCs) including TRH, BTEXN, PAH, OCP, OPP, heavy metals, herbicides, PCBs and asbestos to close the data gap regarding the extent and condition of fill material within the southern portion of the site;
- Excavation and visual inspection of fill and natural soils at test pit location TP35 in the vicinity of TP03 and TP05, which previously were terminated in fill.
- Soil samples (from test pits TP29 to TP34) were screened in the field using a calibrated photo-ionisation detector (PID) to assess the potential presence of volatile organic compounds (VOC).
- One duplicate (QB101) and one triplicate (QT101) were collected on the same day from additional test-pit TP30. Based on our quality assurance assessment, we concluded that the analytical results were representative of the conditions of the sampling locations at the time of sampling and were directly usable for the assessment.

  The investigation concluded the following:

- In samples from additional test pits, asbestos was detected in the form of loose fibre bundles in sample TP33 (2.3-2.4m) however, asbestos was below the reporting limit of 0.001% weight for weight (w/w). In addition, the sample depth was 2.3 to 2.4 m bgs, considering this area of the site will be raised by approximately 1.1m, the depth to this asbestos impact following construction will be 3.4m bgs. Coffey concludes that the risk associated with this asbestos impact during redevelopment and future site use is low and no remediation is warranted.
- An exceedance of the ESL for benzo(a)pyrene was detected in TP31 (0.1-0.2m). However, Coffey notes that this location is beneath the proposed road, making the potential exposure pathway to ecological environments incomplete. In addition, the risk is considered negligible due to the immobile nature of the contamination which is associated with ash. Therefore the risk is considered to be low and no remediation is warranted.
- An exceedance above the HIL criteria for carcinogenic PAH (benzo(a)pyrene TEQ) was detected in sample TP32 (0.5-0.6m). However, Coffey notes that this location is beneath the proposed road, making the potential exposure pathway to future residents incomplete. The reported concentration was well below the HIL-D criterion (40mg/kg) which is applicable for future maintenance workers undertaking excavation. Therefore the risk is considered to be low and no remediation is warranted.

A summary of results is provided in Table 2, with copies of test pit logs are provided in Appendix C.

3.3. Type and extent of contamination

The type and extent of contamination is summarised below:

Based on the available data for the site, the areas requiring remediation include:

- Asbestos impacted fill material at test-pit locations TP04, TP13 and TP21 sampled during the DSI (Coffey, 2017a).
- Carcinogenic PAH (as benzo(a)pyrene TEQ) in fill samples HA02_0.05-0.15.

- Exceedances of the EIL/ESLs for concentrations of nickel, zinc, TRH C16-C34 and benzo(a)pyrene were noted in six soil samples from five sampling locations (HA02, TP11, TP14, TP23 and TP26). However, the risk associated with these impacts is considered to be negligible due to the immobile nature of the contamination which is associated with the crystalline matrix of terracotta (nickel and zinc) or coal ash (TRH C16-C34 and benzo(a)pyrene).

- Aesthetically unacceptable fill material (i.e. crushed terracotta) across the site, but mostly in the northern part.

We note that Carcinogenic PAHs identified at location HA02 were at a concentration below HIL D, and were considered not to pose an unacceptable risk to construction workers during redevelopment nor to future maintenance workers involved in excavation.

4. Data Quality Objectives

The Data Quality Objectives (DQO) process outlined in Appendix B of Schedule B2 of the National Environment Protection (Assessment of Site Contamination) Measure, 1999 (NEPC April 2013) (ASC NEPM), was used to 'define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site'. The DQOs for validation sampling and assessment are summarised in Table 4.1.

Table 4.1: Data Quality Objectives

Step 1 **State the Problem**	Has asbestos impacted fill at three locations (TP04, TP13 and TP21) been removed and remaining soil validated as suitable for future intended site use? Has aesthetically unsuitable fill material from across the site been relocated from the residential area and Riparian reserve within the future road footprint? Has fill material exceeding HIL-A and EIL/ESLs been placed beneath the future road footprint? Is imported material suitable for residential land? Is the site suitable for the proposed low density residential land use, with access to soils?
Step 2 **Identify the Decision**	The decision will be whether or not identified impacts have been removed to mitigate health risk to construction workers during site development and future users of the proposed residential area.
Step 3 **Identify Inputs to the Decision**	The primary inputs to assessing the above include: • data collected during the validation works and DSI • relevant legislation and regulatory guidelines • field observations by a person competent to identify visible asbestos impact • results from laboratory analysis of samples collected • VENM assessment reports and site inspections for intended VENM • Visual inspections following placement of aesthetically unsuitable fill material beneath the future road.
Step 4 **Define the Boundaries of the Study**	The investigation area is defined by the boundaries of the proposed road shown on Figure 2. The vertical boundary for the validation assessment is 3m below the final RL (RL 4.29m AHD) following importation of construction fill used to raise the site.
Step 5 **Develop a Decision Rule**	• If concentrations of analytes are below the investigation levels as listed in Section 4 of the CMP, then the fill material may be retained on site. • If concentration(s) of analyte(s) is/are above the investigation levels, then further assessment of the material in the vicinity of the incidence is required to determine potential for reuse, and disposal as waste otherwise. • Material intended for importing as fill must meet the definition of VENM, or ENM or other RRO/E material if relevant, and be aesthetically suitable for placement on future residential land.

Step 6 **Specify Limits of Decision Error**	There are two types of decision errors: • Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area; and • Measurement errors, which occur during sample collection, handling, preparation, analysis and data reduction. The null hypothesis for this study is: • Contaminant concentrations within the AEC are more than the adopted investigation levels. These errors may lead the decision maker to make the following errors: • Deciding that the soil is not contaminated and, therefore, the area associated with the AEC is deemed suitable for the proposed residential use when the reverse is true; and • Deciding that the soil is contaminated and, therefore, the area associated with the AEC is not suitable for the proposed residential use when the reverse is true. An assessment will be made as to the likelihood of a decision error being made based on the results of a QA/QC assessment and the closeness of the data to assessment criteria. Additionally, statistical methods such as 95% Upper Confidence Limit (UCL) calculations may be utilised, where applicable.
Step 7 **Optimise the Design for Obtaining Data**	Based on the previous Steps 1 to 6 of the DQO process, the design for obtaining the required data is presented in the CMP (Coffey, 2017d), and summarised in the following sections.

4.1. Sampling and analysis plan

4.1.1. Field work plan – Validation Sampling

To meet the validation objectives, three locations in fill material where asbestos impacts had previously been identified (TP04, TP13 and TP21), were excavated and validated in accordance with the procedures outlined in the revised CMP (Coffey, 2017d) which is consistent with Schedule B2 in the ASC NEPM. An area of approximately 5m square and 0.2m depth centred on each test pit location (TP04, TP13 and TP21) was excavated to remove asbestos impacts in fill material identified during the Coffey DSI (Coffey, 2017a) and Addendum DSI (Coffey, 2017c) and each location was validated. The scope and rationale of the validation sampling is summarised in Table 4.2.

A visual inspection was undertaken on 19 February following relocation of the aesthetically unacceptable fill material and the HIL-A and EIL/ESL impacts within the road footprint. .

Validation of imported construction fill will also be included in the addendum/revision to this report once completed.

Table 4.2: Field Work Plan – Validation Sampling Programme

Scope	Contaminant	Rationale
Excavation *TP04, TP13 and TP21* Excavation to remove identified asbestos impacts at sampling locations TP04, TP13, TP21 and validate boundary of excavated area.	Asbestos	• Excavate identified asbestos impacted fill and classify for off-site disposal to a facility licenced to receive asbestos waste. • Visual screening for visible forms of materials suspected to contain asbestos by a licenced asbestos assessor. • Recover representative samples from fill material for validation purposes and chemical analysis for asbestos for validation purposes.
Visual Validation *Aesthetic issues – fill impacted with crushed terracotta* *PAH HIL-A exceedance at TP32* *EIL/ESL exceedances at TP14, TP26 and TP23*	Aesthetically unacceptable fill material Carcinogenic PAH (benzo(a)pyrene TEQ) at TP32 (0.5-0.6m) TP23, nickel in sample from 0.1-0.3m TP14, nickel in sample 0.05-0.15m TP26, zinc in sample 0.1-0.2m	• Visual validation following removal of fill material from residential and riparian areas impacted by crushed terracotta and placement of material within the road footprint, visual validation across the future residential area.
Validation of Imported Construction Fill *Estimated volume of 10,000m^3 of Construction fill will be imported to raise the site level.*	Chemical of Potential Concern including: Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPPs, PCBs, herbicides and asbestos Visual validation of aesthetics.	• Chemical characterisation to demonstrate that it is suitable for the proposed future uses of the site and confirmation by inspection that imported material is aesthetically acceptable. • If imported material is classified as virgin excavated natural material (VENM), then Coffey proposes sampling and chemical analysis for TRH, PAH and heavy metals at a frequency of one sample per 500m^3, with a minimum of 6 samples for any one source site. • If imported material is classified as excavated natural material (ENM), then Coffey would use information on material characterisation required to be reported under the ENM Order 2014 for validation. • If imported material is received under a site specific Resource Recovery Order / Exemption issued by NSW EPA, then validation would follow one of the two methods

Scope	Contaminant	Rationale
		described above, depending on which is the more appropriate. In this situation, the method of validation would require acceptance by the site auditor.

4.2. Soil sampling methodology

The soil sampling methodology is summarised in Table 4.3.

Table 4.3: Soil Validation Sampling Methodology

Activity	Detail / Comments
Soil Sampling	Soil samples were collected in accordance with Coffey's relevant Standard Operating Procedures (SOP) and validation sampling procedure outlined in the CMP. Soils surrounding TP04, TP13 and TP21 were removed using an excavator and placed directly into a truck for transport to an appropriately licensed landfill for disposal as Special (asbestos) waste. Samples were collected from each wall and the base of each excavation. Soil sampling for quantitative analysis of asbestos in soil included a 10L sample of fill, sieved through a 7mm screen in the field to observe for ACM fragments and a 500mL sample of material passing the sieve screen was collected in a zip-lock plastic bag for asbestos analysis. No suspected ACM fragments were retained on the sieve screen for any of the samples. 10L soil samples were collected by hand from the walls and base of excavations. A new clean pair of disposable nitrile gloves was used to transfer material passing the 7mm sieve to laboratory supplied sample jars which were submitted to a NATA accredited laboratory for analysis under chain of custody control.
Soil Logging	Soil samples were logged by a suitably qualified and experienced Coffey scientist/engineer in accordance with Coffey's relevant Standard Operating Practice (SOP), which is consistent with Section 7.3, Field Description of Soils, in Schedule B2 of the ASC NEPM 2013. The presence / absence of potential asbestos containing material, demolition waste, fill and visible and olfactory evidence of contamination was recorded on the field notes.
Soil Screening	As the contaminant of concern was asbestos, soil headspace screening using a PID was not undertaken.
Sample Handling and Transportation	Sample collection, storage and transport were conducted in general accordance with Coffey's relevant SOP. Samples for asbestos analysis were placed into a ziplock bag and double bagged within a second ziplock bag prior to laboratory submission. The samples were dispatched to NATA accredited laboratories under chain of custody control.
Sample Splitting	No Intra-laboratory (blind duplicate) and inter-laboratory (split duplicate) samples of soil materials were collected from the asbestos validation areas.

4.3. Laboratory analysis

Laboratory analyses were carried out by the following laboratories who hold NATA accredited methods for the analyses undertaken at Eurofins | MGT at Lane Cove West, NSW.

5. Acceptance Criteria

5.1. Soil acceptance criteria

Coffey understands that the ground level in the proposed residential area will be raised by approximately 0.6m to 1.0m with imported fill in order to mitigate flood risks. The proposed land-use is low density residential with access to gardens and soil. The investigation levels presented in the following references were adopted as the Acceptance Criteria (AC) for soils remaining on-site:

- NEPC (2013) Schedule B1 Guideline on Investigation Levels for Soil and Groundwater, *National Environment Protection (Assessment of Site Contamination) Measure 1999,* April 2013 (ASC NEPM)

Other references, in particular Schedule B7 of the ASC NEPM, were used to supplement Schedule B1 where appropriate.

The intended future use of the site is considered consistent with the “Residential A” exposure scenario described in Schedule B7 of the ASC NEPM which allows for garden / accessible soils and includes dwellings with home grown produce <10% fruit and vegetable intake, (no poultry).

Schedule B1 also provides health screening levels (HSLs) for volatile hydrocarbons (total recoverable hydrocarbon (TRH), BTEX, and naphthalene) for different types of soil and different soil depths for different land uses.

Schedule B1 also provides health screening levels (HSLs) for asbestos in soil. These HSLs cover a range of land use settings including low density residential use (Residential A) with garden / accessible soils, which has been adopted as representative of this site.

Based on site observations made during the DSI, the site is covered by a layer of fill material that consists predominately of sandy soils above natural alluvial sands, therefore HSLs for sandy soil texture is considered appropriate.

Schedule B1 provides guidance in deriving ecological investigation levels (EILs) for the protection of terrestrial ecosystems for common contaminants in soil for three general land uses. As the proposed land use low-density residential, the land use setting for ‘urban residential and public open space’ is adopted to derive the EILs. ESLs for coarse soil texture are considered applicable. We note our suggested departure from the ESL for benzo(a)pyrene discussed in Table 5.1 D and adoption of the related value Canadian Soil Quality Guidelines for Environmental Health (SQGE) to give an ESL of 20mg/kg. As discussed in the Revised CMP (Coffey, 2017d), Coffey considers that the low reliability ESLs for benzo(a)pyrene listed in Table 1B(6) of Schedule B1 of the ASC NEPM are out dated and the Canadian Soil Quality Guidelines for Environmental Health (SQGE) have been adopted (CCME, 2010). The Canadian SQGE for B(a)P has been derived using a similar methodology to that prescribed in Schedule B5b of the ASC NEPM (i.e. the species sensitivity distribution approach).

The nominated AC for soil impact assessment/validation are included in Tables 5.1 A to Table 5.1 F.

Table 5.1 A – Selected AC related to Human Health Risk by Direct Exposure

Analyte	HILs for Residential A (mg/kg)
Arsenic (total)	100
Cadmium	20
Chromium (VI)[1]	100
Copper	6,000
Lead	300
Mercury (inorganic)	40
Nickel	400
Zinc	7,400
Carcinogenic PAHs as Benzo(a)pyrene TEQ[2]	3
Total PAHs	300
Aldrin + Dieldrin	6
Chlordane	50
DDT+DDD+DDE	240
Endosulfan	270
Endrin	10
Chlorpyrifos	160
Heptachlor	6
HCB	10
Methoxchlor	300
Non-dioxin like PCB	1

[1] Laboratory Total Chromium results (or Total Chromium minus Chromium III) will be assessed against the HIL for Chromium VI as an initial screening assessment.
[2] TEQ = Toxicity Equivalent Quotient

Table 5.1 B - Selected AC related to Health Risk by Vapour Intrusion of Volatile Compounds

Chemical	HSL A & B – Residential (for sandy soils)[1] (mg/kg)			HSL-A Direct Contact[2] (mg/kg)	Intrusive Maintenance Worker[2/3] (mg/kg)
	0m to <1m	1m to <2m	2m to <4m		
Benzene	0.5	0.5	0.5	100	120,000 / NL
Toluene	160	220	310	14,000	85,000 / NL
Ethylbenzene	55	NL	NL	4,500	130,000 / NL
Xylenes	40	60	95	12,000	29,000 / NL
Naphthalene	3	NL	NL	1,400	1100 / 77
F1 (TPH C_6-C_{10} – BTEX)	45	70	110	4,400	82,000 / NL
F2 (TPH >C_{10}-C_{16} – Naphthalene)	110	240	440	3,300	62,000 / NL

Notes:
NL: non-limiting (i.e. contaminant is not considered to pose a risk to human health through vapour inhalation regardless of concentration).
Soil type is assumed to be clayey soils based on previous investigation.
1. *Table 1A(3) – Soil Health Screening Levels for Vapour Intrusion (NEPC, 2013)*
2. *Table B4 - Soil Health Screening levels for Direct Contact for future resident (CRC CARE, 2011)*
3. *Table B3 – Soil Health Screening Levels for Vapour Intrusion (Intrusive Maintenance Worker) (CRC CARE, 2011)*

Table 5.1 C - Selected AC related to Ecological Risk from Metals

Chemical	Urban Residential / Public Open Space (mg/kg)		
	Added Contaminant Limit	Ambient Concentration[4]	EIL[5]
Arsenic	100	5	110
Chromium	190[1]	13	200
Copper	95[2]	28	120
Lead	1,100	163	1,270
Nickel	30[2]	5	40
Zinc	230[3]	122	350

[1] Based on a (conservative) clay content 1%.
[2] Based on a cation exchange capacity of 5cmol$_c$/kg typical of a granular soil with minor clay.
[3] Based on a cation exchange capacity of 5cmol$_c$/kg typical of a granular soil with minor clay and a pH of 6.5.
[4] Derived from Olszowy.H et al (1995) using 25%ile concentrations for an old suburb with high traffic in NSW.
[5] EIL = Contaminant Limit + Ambient Background Concentration, rounded.

Table 5.1 D - Selected AC related to Ecological Risk from Petroleum Compounds

Chemical	ESL – Urban Residential and public open space (for coarse grained soils) (mg/kg)
F1 C_6-C_9	180
F2 C_{10}-C_{16}	120
F3 >C_{16}-C_{34}	300
F4 >C_{34}-C_{40}	2800
Benzene	50
Toluene	85
Ethylbenzene	70
Xylenes	105
Benzo(a)pyrene[1]	20
Naphthalene	170

[1] Canadian Soil Quality Guidelines for Environmental Health (SQGE), 2010

Table 5.1 E - Selected Management Limits for Petroleum Compounds

Chemical	Management Limits – Urban residential and public space (for coarse grained soils) (mg/kg)
TRH F1 C6-C10	700
TRH F2 >C10-C16	1000
TRH F3 >C16-C34	2500
TRH F4 >C34-C40	10,000

Table 5.1 F – Selected Health Screening Levels for Asbestos in Soil

Forms of asbestos	Health Screening Levels (w/w) Residential A
Bonded ACM	0.01%
FA and AF	0.001%
All forms of asbestos	No visible asbestos for surface soils No free asbestos fibres identified

5.2. Soils - aesthetic criteria

Although no quantitative aesthetic guideline values are provided, Schedule B1 in the ASC NEPM requires consideration of aesthetic issues (connected with contamination), arising from soils within the site. The following assessment criteria were adopted when considering soil aesthetics:

- No persistently odorous soils, taking into consideration the natural state of the soil.
- Consistency of existing soil and also of imported fill should be compatible with what a reasonable person would expect for the garden of an urban residence.

5.3. Waste classification thresholds

Waste materials are classified in accordance with *Waste Classification Guidelines* (NSW EPA, 2014).

5.4. Groundwater

Groundwater inflow was observed in test pits TP02, TP03 and TP05 between 0.5m and 0.7m bgs during the Coffey (2017a) DSI. It was considered likely that observed groundwater inflow was representative of localised perched water and is not representative of regional groundwater in Warriewood.

Groundwater assessment was not included in the previous investigation (Coffey, 2017a), but potential impacts to groundwater quality were discussed with reference to the findings of the soil investigation. The current site has been raised by filling and is higher that the surrounding ground. Thus, transport of contamination onto the site by groundwater from an off-site location is extremely unlikely, and groundwater quality beneath the site is reasonably expected to be influenced by the characteristics of fill material currently on the site.

Relatively low concentrations of heavy metals and minimal occurrence of organic compounds were reported for soil samples collected on-site (Coffey, 2017a), and with no likely source on-site, the potential for groundwater impacts sourced from the site is considered to be low. Thus, groundwater beneath the site is considered by Coffey to be unaffected by observed soil characteristics.

Given that the site is proposed to be raised by a further 0.6m to 1.0m with imported construction fill, we expect that groundwater will not be encountered during construction and therefore groundwater assessment criteria for direct human exposure is considered not relevant during remediation. In addition, no volatile hydrocarbon impact was identified in soil beneath the site at a concentration above applicable HSLs. Coffey concludes that no potentially unacceptable vapour inhalation risk likely to be associated with soil or groundwater at the site.

6. Quality Assurance / Quality Control

The following QA/QC assessment addresses data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations and the processes for assessment of data quality provided in Section 19 (Appendix C) of Schedule B2 Guideline on Site Characterisation of the ASC NEPM.

6.1. Data quality indicators

The data quality indicators are based on the analysis of field and laboratory quality control sample results, and in accordance with AS 4482.1-2005. Specific data quality indicators and related control limits for field and laboratory QA/QC samples are shown in Table 6.1.

Table 6.1: Data Quality Indicators

Type of Quality Control Sample	Control Limit
Duplicate Samples	Relative Percentage Difference (RPD) within 50% for samples except when: • the reported concentration is <10 times LOR for which no limit applies; or • one sample reports a detectable concentration and the alternate sample reported a concentration below the LOR.
Spiked samples	Recoveries within the following ranges : • 70 - 130% for inorganics / metals. • 60 - 140% for organics.
Blank Samples	Analytes not detected

6.2. Field quality assurance / quality control

6.2.1. Field sampling – Validation and DSI

Field sampling during the Coffey DSI and addendum DSI (2017a and 2017c) and validation works was carried out by a Coffey environmental scientist with experience in undertaking environmental sampling work, and competent in the identification of materials suspected to contain asbestos. Coffey collected soil samples in accordance with Coffey SOP, which are based on industry guidance including *Schedule B2: Guideline on Site Characterisation* (ASC NEPM) and AS4482; *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil* (Parts 1 (2005) and 2 (1999)).

Following the completion of the field sampling tasks, the Coffey scientist submitted the samples to the primary laboratory for analysis using chain of custody control. The primary laboratory forwarded (triplicate) samples onto the secondary laboratory for analysis.

6.2.2. Quality control samples

Quality control samples were collected as part of sampling activity for the Addendum DSI (Coffey, 2017c) which coincided with validation sampling after removal of asbestos impacted fill. This included intra-laboratory duplicate and inter-laboratory triplicate samples, trip spike and trip blank samples. Results of the quality control samples were reported in the Addendum DSI (Coffey, 2017c). We

concluded that the analytical results were representative of the conditions of the sampling locations at the time of sampling and were directly usable for this assessment.

Coffey notes that due to the nature of asbestos impact, no duplicate or triplicate samples were collected with current validation samples. Each excavation was inspected by a Licensed Asbestos Accessor with a Clearance Certificate issued (Appendix D). It is also noted that no residual ACM or building materials were observed within the excavated areas.

6.3. Laboratory QA/QC

In accordance with quality plans associated with NATA accreditation, the project laboratories performed an internal QA/QC assessment. The assessment is typically described as a multi-level approach whereby standard laboratory control procedures are implemented, including laboratory duplicates, method blanks, matrix spikes and surrogate spikes, for contaminants other than asbestos.

Laboratory QC analytical results are summarised below:

- All samples were extracted and analysed within acceptable holding times.
- No target analytes were detected in any of the method blanks.
- RPDs for the laboratory duplicate samples were within the acceptable range for all samples, except for various TRH, PAH – Benzo(k)fluoranthene, however it the RPDs pass the acceptance criteria defined in the Internal Quality Control Review and Glossary page.
- Percentage recovery results for laboratory control samples were within the acceptable range for all samples.
- Percentage recovery results for surrogate samples were within the acceptable range for all samples.
- Percentage recovery results for matrix spikes were within the acceptable range for all samples, except for TRH >C16-C34 and TRH >C34-C40 which was above the recommended acceptance criteria, it is noted that an acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference. It is noted that this spike is for the additional test-pits sampled during the Addendum DSI which were collected on the same day as validation samples.

6.4. Data quality assessment

Based on an assessment of the field and laboratory QA/QC data obtained during the validation works and addendum DSI (Coffey, 2017c), we consider that the data obtained is representative of subsurface conditions at the sampling locations, and the results are acceptable for the purposes of this assessment.

7. Site Validation Assessment

7.1. Excavation of identified asbestos impacted fill

On 29 November 2017, Coffey guided removal of fill material at locations TP04, TP13 and TP21, where asbestos impacts were detected during the Coffey DSI (Coffey, 2017a). An area of approximately 5m square was excavated to a depth of 0.2m below ground level at locations TP04, TP13 and TP21. Excavated asbestos impacted fill material was placed directly into a truck and removed from site.

The walls and base of each excavation were observed and no asbestos containing material (ACM) was evident. Validation samples were subsequently collected from the walls of the excavation by the Coffey environmental scientist. The base of the excavation was still within fill material, so a base sample was also collected for laboratory analysis. Soil samples were submitted for laboratory analysis for asbestos (quantitative). Photographs of the soil condition following excavation are provided in Appendix B. The walls and base of each excavation was visually inspected by a Licensed Asbestos Accessor[1].

Coffey prepared a waste classification for the asbestos impacted fill (Ref: SYDEN205656-R02, dated 15 November 2017). Based on information provided by Karimbla, excavated asbestos impacted material totalling 32.80 tonnes was disposed of off-site to the Suez Elizabeth Drive Landfill Facility at Kemps Creek, which is licenced to receive asbestos waste (EPL 4068). A copy of the disposal docket is provided in Appendix E.

A Notice of Intent to Remove Friable Asbestos, was issued by EarthWorx Group to SafeWork NSW, for the excavation of material surrounding TP04, TP13 and TP21. A copy of the Notice was not made available to Coffey at the time of writing. Appropriate control measures such as wetting down of material and asbestos air monitoring were undertaken during removal of asbestos impacted fill. A copy of the asbestos clearance certificate prepared by P.Clifton & Associates' licensed asbestos assessor following visual inspection of the excavations described above is provided in Appendix D[1]. Karimbla also provided Coffey with copies of the asbestos air monitoring reports, related to the asbestos removal works and these are presented in Appendix I.

7.2. Validation Sampling

Validation samples were collected for analysis from the walls and base of each excavation following removal of identified asbestos impacts, in accordance with the CMP (Coffey, 2017d). Results from validation samples allowed Coffey to conclude that no further validation sampling from this excavation was required.

The validation sampling and DSI sampling locations are shown on Figures 2 and 3.

7.3. Laboratory Analytical Results

Samples for laboratory analysis were identified as TP04-V1 to TP04-V5, TP13-V1 to TP13-V5 and TP21-V1 to TP21-V5. No suspected ACM was observed within the fill material during collection of 10L samples nor when samples were sieved. Laboratory certificates and chain of custody records for validation samples collected from soil passing a 7mm sieve are presented in Appendix F.

No asbestos was detected at the reporting limit of 0.001% weight for weight (w/w) and no free asbestos fibres were identified in any of the validation samples of material passing the 7mm sieve which were analysed by the laboratory.

7.4. Visual Validation - Aesthetics

Existing fill material across the site typically includes gravel sized crushed terracotta at the surface, with thickness of the terracotta layer increasing towards Narrabeen Creek. Coffey considered that this fill material may be an aesthetic impairment to residential land within the upper 3m of the land.

[1] Coffey notes that the asbestos clearance was undertaken on 19 January 2018 due to prior commitments of the asbestos accessor. The excavations were not backfilled or otherwise changed since the validation works.

Similarly, this material is considered to be aesthetically unacceptable to remain in the proposed riparian reserve.

The following exceedances were identified within fill material which will be relocated to beneath the road.

- Exceedance of HIL-A for Carcinogenic PAH (as benzo(a)pyrene TEQ) in fill samples HA02_0.05-0.15.
- Exceedances of the EIL/ESLs for concentrations of nickel, zinc, TRH C16-C34 and benzo(a)pyrene were noted in six soil samples from five sampling locations (HA02, TP11, TP14, TP23 and TP26).

The CMP (Coffey, 2017d) recommended that the crushed terracotta fill be relocated from residential and riparian reserve areas to within the proposed road footprint, effectively removing the potential sensitive human health and ecological exposure pathways.

An experienced Coffey Environmental Scientist attended the site on 19 February 2018 to visually inspect the site following the relocation of crushed terracotta to the footprint of the future roadway. The following observations were made:

- All site structures had been removed.
- Concrete slab had been removed, with stockpiles of concrete present on site, which were pending removal and off-site disposal.
- The exposed surface following removal of crushed terracotta consisted of a mixture of brown/grey gravelly sands. Natural soils were exposed at the surface in areas outside of the road along the eastern and northern boundaries.
- The majority of the crushed terracotta impacted fill had been relocated to the area of the future roadway. A couple of small pockets of terracotta not beneath the road were observed in places. Coffey subsequently requested this material to be relocated to the roadway. A Meriton Site representative sent photographs to Coffey following the relocation of the material to the roadway. Coffey considered the photographs provided sufficient evidence that the material had been relocated to the road footprint.
- No asbestos fragments or any other evidence of contamination was observed across the site.

Photographs showing the condition of the site following the relocation of material to the road are presented in Appendix J.

7.5. Asbestos at TP33

During the addendum DSI investigation works (Coffey, 2017c), asbestos was identified in test pit TP33 at a depth of 2.3-2.4m bgs. The concentration of asbestos was reported to be below the health screening level of 0.001% weight for weight (w/w). In addition, the sample depth was 2.3 to 2.4 m bgs. Coffey understands that as this area of the site will be raised by approximately 1.1m, the depth to this asbestos impact following construction will be 3.4m bgs. Coffey concluded that the potential health risk associated with this asbestos impact during redevelopment and future site use is low.

It is noted that the Interim Advice 16098 IA4 issued by the Site Auditor on 18 January 2018, stated that the validation report should confirm that placement of sufficient fill material in the southern portion of the site is undertaken to ensure >3m of soil is above the asbestos impact at TP33. Coffey notes that as the concentration of asbestos was found to be below the health screening level (refer Table 5.1 F, Section 5), remediation of this area is not warranted.

7.6. Validation of Imported Construction Fill

As stated within the CMP (Coffey, 2017d), the quality of construction fill imported to raise the site level requires validation to ensure it is suitable for the intended land use. Coffey estimated an average

required thickness of additional fill to be 0.8m, which indicates a volume in place of approximately 8,300m^3. Allowing for loose fill being transported by truck, the imported volume is estimated to be approximately 10,000m^3.

At the time of writing this validation report, the application for redevelopment of the site has not been determined. Consequently, importation of fill material had not commenced.

Chemical characterisation to demonstrate that it is suitable for the proposed future uses of the site and confirmation that imported material is aesthetically acceptable is intended and will be addressed an update of this report following validation.

8. Conclusions & Recommendations

Based on site observations and findings of the validation sampling programme (supplemented with site observations and data obtained during the Coffey (2017a and 2017c) DSI), Coffey concludes that:

- Previously identified asbestos impacted fill at locations TP04, TP13 and TP21 (Coffey DSI, 2017a) has been excavated and disposed to a facility licensed to receive special (asbestos) waste, in accordance with Coffey's classification under the Waste Classification Guidelines (NSW EPA, 2014).
- Remaining fill material around location TP04, TP13 and TP21 following removal of asbestos impacted fill has been validated as suitable for planned future use in accordance with the CMP (Coffey, 2017d).
- Based on landfill weighbridge dockets provided by Karimbla, asbestos impacted fill totalling approximately 32.80 tonnes was excavated from location TP04, TP13 and TP21 and disposed of appropriately off-site to a landfill licensed to receive special (asbestos) waste.

Visual inspection confirmed that aesthetically unacceptable soils have been relocated to the footprint of the proposed roadway and that soils identified with chemical impacts slightly above certain HIL-A and EIL/ESL values have also been relocated to beneath the future road where risk potential is considered acceptable. Given the above, Coffey considers that unacceptable risk posed by isolated incidence of asbestos impacted fill and HIL-A and EIL/ESL exceedances to future construction workers and other future site occupants has been eliminated, and that the site is considered suitable for the planned future land use, being residential with accessible soils.

Coffey understands that ground levels in the area covered by the proposed road and residential development require raising using imported fill material to reduce the risk of flooding. An addendum to this report will be issued after inspection and validation of imported fill to confirm that the site remains suitable for proposed residential use as a result of these earthworks. We recommend that, if required, the unexpected finds procedure (UFP) outlined in the CMP be implemented during bulk earth works, including excavation of the stormwater detention ponds outside the access road. A copy of the UFP (extracted from the Coffey (2017) CMP) is provided in Appendix G.

We draw your attention to the attached sheets titled "Important Information about your Coffey Environmental Report" which should be read in conjunction with this report.

9. References

Coffey (2016), *Preliminary Site Investigation* (PSI), *2 Macpherson Street, Warriewood NSW* (reference: GEOTLCOV25237AB-AC Rev1, dated 29 October, 2016).

Coffey (2017a); *Detailed Site Investigation – 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R01; dated 16 August, 2017)

Coffey (2017b); *Waste Classification for Asbestos Impacted Fill,* 2 *Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R03; dated 15 November, 2017)

Coffey (2017c); *Addendum to Detailed Site Investigation Report,* 2 *Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R04; dated 16 August, 2017)

Coffey (2017d) *Contamination Management Plan – 2 Macpherson Street, Warriewood NSW* (Ref: SYDEN205656-R02 Revision 1, dated 20 December 2017).

NEPC (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013). National Environment Protection Council.

NSW EPA (2014). Waste Classification Guidelines, Part 1: Classifying Waste. New South Wales Environment Protection Authority.

NSW OEH (2011). Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites. NSW Office of Environment and Heritage.

ZOIC (2018). *Site Auditor Interim Advice No. 4 – Endorsement of amended Contamination Management Plan (CMP) for 2 Macpherson Street, Warriewood NSW, 2102*. Dated 18 January 2018, reference: 16098 IA 4 18 Jan 2018_Final.docx

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but

steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

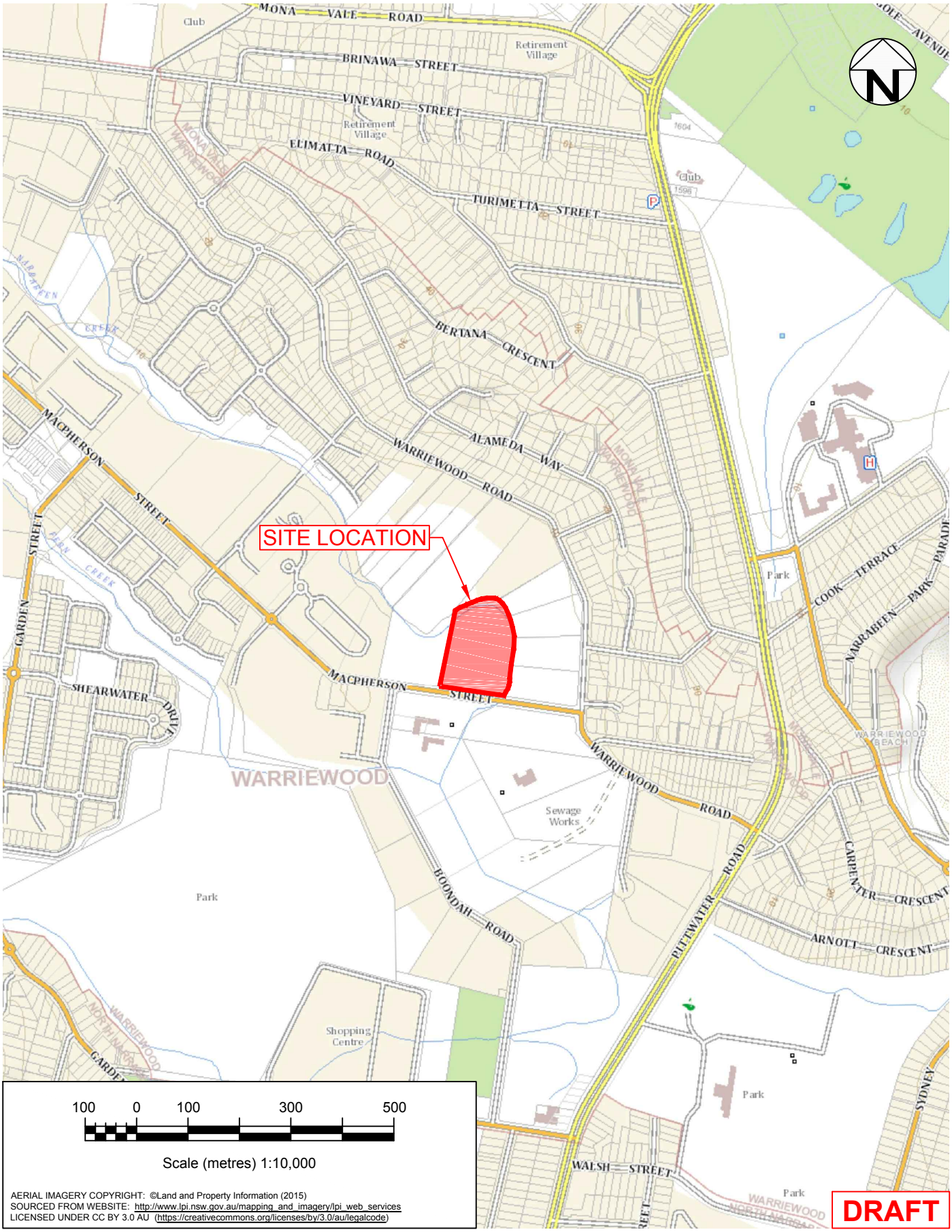
The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

Figures



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approved	-
date	23 / 01 / 18
scale	AS SHOWN
original size	A4

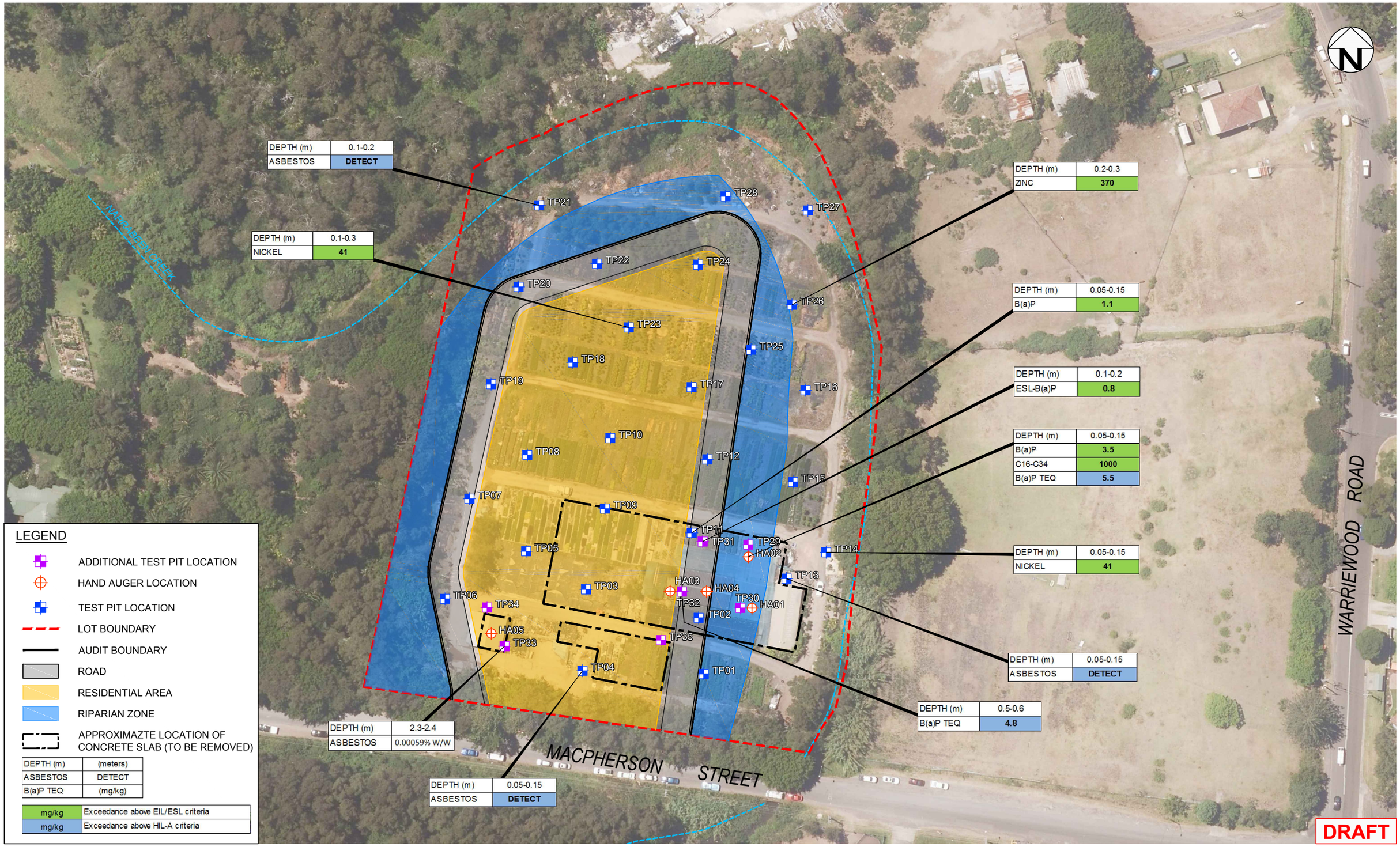
coffey
A TETRA TECH COMPANY

client: KARIMBLA CONSTRUCTIONS SERVICES

project: VALIDATION REPORT
2 MACPHERSON STREET, WARRIEWOOD NSW

title: SITE LOCATION

project no: 754-SYDEN205656-R05 | figure no: FIGURE 1 | rev: A



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	A	ORIGINAL ISSUE			

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Scale (metres) 1:1000

drawn	JS / AW
approved	-
date	30 / 01 / 18
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: KARIMBLA CONSTRUCTIONS SERVICES

project: VALIDATION REPORT
2 MACPHERSON STREET, WARRIEWOOD NSW

title: PREVIOUS SAMPLING LOCATIONS

project no: 754-SYDEN205656-R05 | figure no: FIGURE 2 | rev: A

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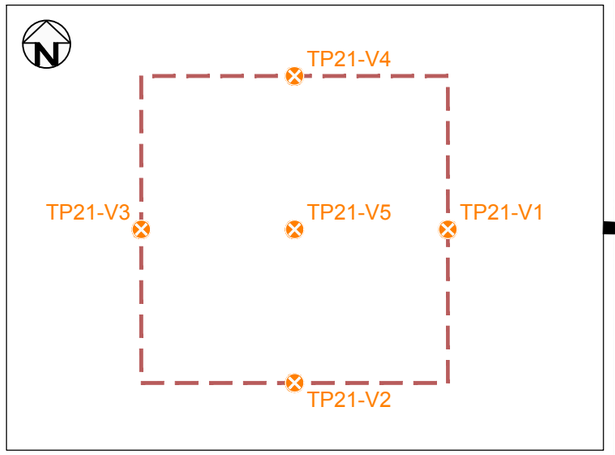

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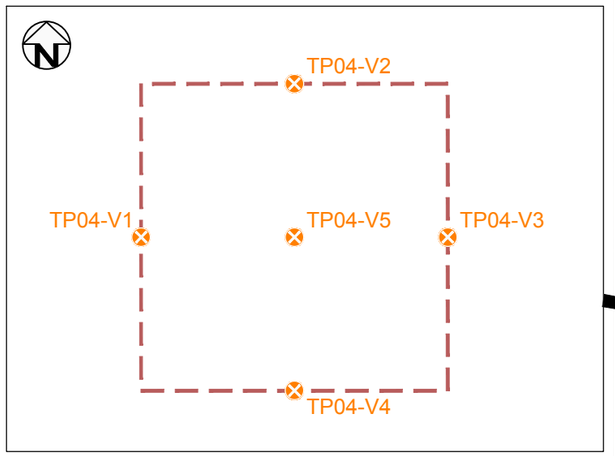

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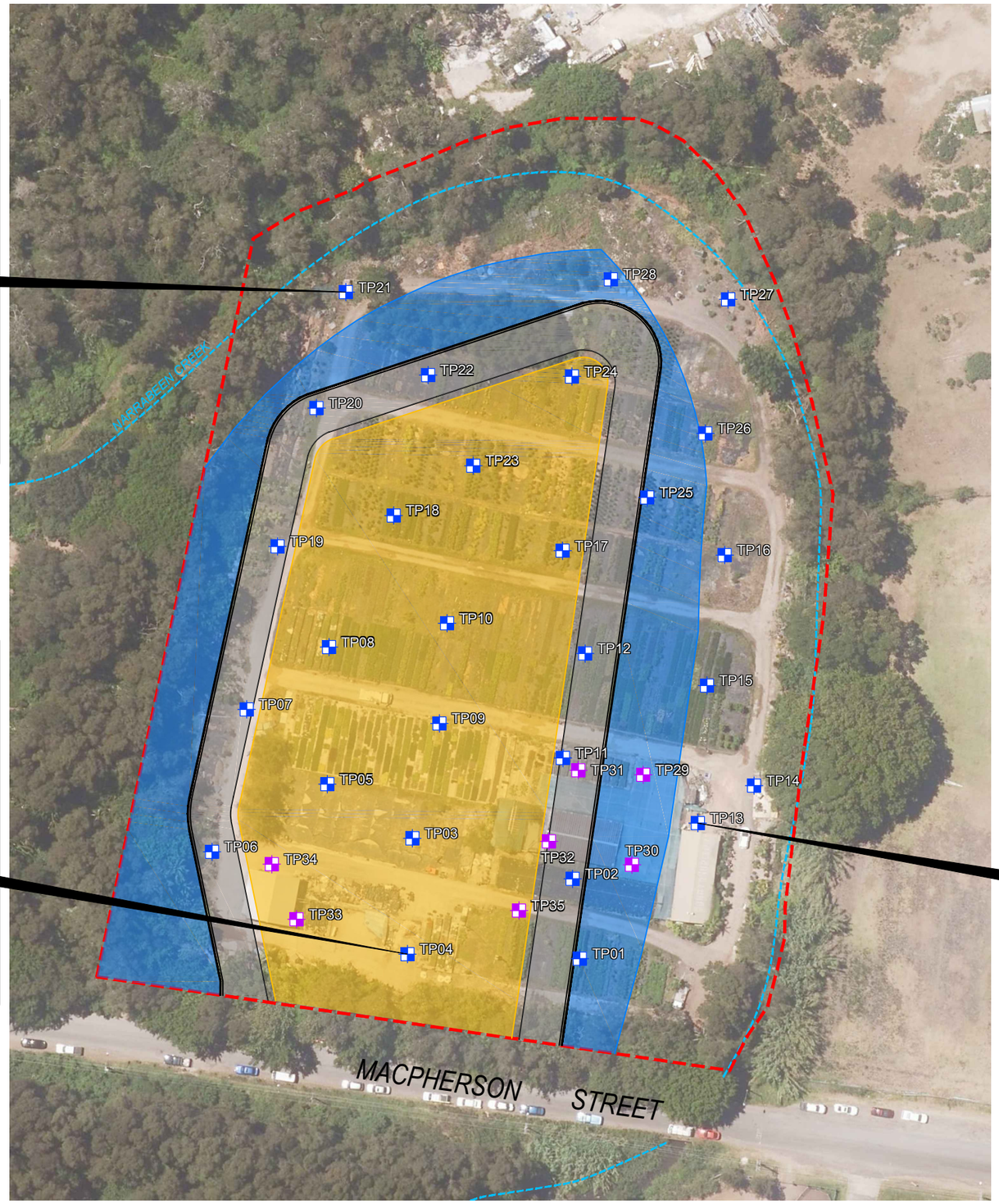

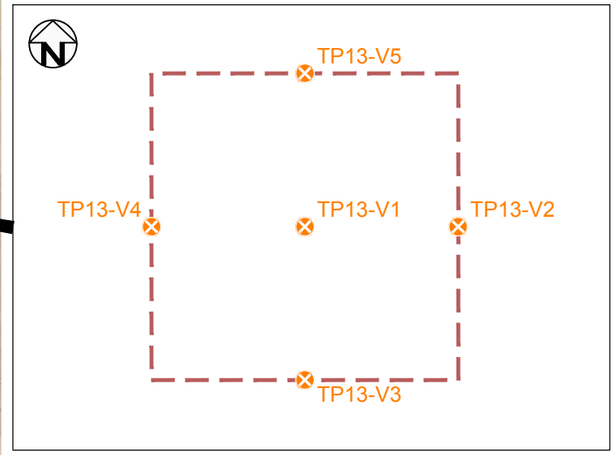

TP13
SCALE 1:100

LEGEND

- VALIDATION SAMPLE LOCATION
- ADDITIONAL TEST PIT LOCATION
- TEST PIT LOCATION
- LOT BOUNDARY
- AUDIT BOUNDARY
- ROAD
- RESIDENTIAL AREA
- RIPARIAN ZONE

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revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

10 0 10 30 50
Scale (metres) 1:1000

drawn	JS / AW
approved	-
date	23 / 01 / 18
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: KARIMBLA CONSTRUCTIONS SERVICES

project: VALIDATION REPORT
2 MACPHERSON STREET, WARRIEWOOD NSW

title: ASBESTOS VALIDATION

project no: 754-SYDEN205656-R05 | figure no: FIGURE 3 | rev: A

Tables

TABLE 1
Soil Analytical Results - DSI 2017a
2 Macpherson Street, Warriewood

						BTEX							Herbicides										Inorganics	Metals										
					Asbestos	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 less BTEX (F1)	2,4,5-Trichlorophenoxy acetic acid	2,4,5-TP (Silvex)	2,4-Dichlorophenoxy acetic acid	2,4-Dichlorprop	4-(2,4-Dichlorophenoxy) butyric acid (2,4-DB)	Actril (loxynil)	Dicamba	2-Methyl-4-chlorophenoxy acetic acid	2-Methyl-4-Chlorophenoxy butanoic acid	Mecoprop	Moisture Content (dried @ 103°C)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	4,4-DDE	a-BHC	Aldrin
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL						0.1	0.1	0.1	0.2	0.1	0.3	20	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	2	0.4	5	5	5	0.1	5	5	0.05	0.05	0.05
NEPM 2013 EIL																								110		200	120	1270		40	350			
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil						50	70	85			105																							
NEPM 2013 HSLs Residential A Soil 0m to <1m						0.5	55	160			40	45																						
NEPM 2013 HILs Residential A Soil					Detect								600		900					600	600	600		100	20		6000	300	40	400	7400			
CRC Care, 2011 - HSL-A Driect Contact						100	4500	14,000			12,000	29,000																						
CRC Care, 2011 - Intrusive Maintenance Worker						120,000	130,000	85,000				82,000																						
NEPM, 2013 Management Limits												700																						
Field_ID	**LocCode**	**Sample_Depth (m)**	**Sampled_Date**	**Matrix_Description**																														
HA01_0.15-0.3	HA01	0.15-0.3	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	2.7	<0.4	11	53	110	<0.1	5.3	53	<0.05	<0.05	<0.05
HA02_0.05-0.15	HA02	0.05-0.15	17/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9.6	<2	<0.4	15	19	22	<0.1	17	22	<0.05	<0.05	<0.05
HA02_0.4-0.5	HA02	0.4-0.5	17/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-
HA03_0.1-0.2	HA03	0.1-0.2	17/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15	3.4	<0.4	39	5.6	59	<0.1	<5	11	<0.05	<0.05	<0.05
HA04_0.0-0.2	HA04	0-0.2	17/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	2.1	<0.4	16	7.6	39	<0.1	<5	66	<0.05	<0.05	<0.05
HA05_0.1-0.3	HA05	0.1-0.3	17/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	2.4	<0.4	14	10	16	<0.1	9.7	46	<0.05	<0.05	<0.05
TP01_0.1-0.2	TP01	0.1-0.2	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	21	<2	<0.4	38	27	23	<0.1	37	100	<0.05	<0.05	<0.05
TP02_0.4-0.5	TP02	0.4-0.5	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	21	3.6	<0.4	12	9.8	96	<0.1	<5	68	<0.05	<0.05	<0.05
TP03_0.05-0.15	TP03	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	-	-	-	-	-	-	-	-	-	-	-
TP03_0.4-0.5	TP03	0.4-0.5	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	-	-	-	-	-	-	-	-	-	-	10	4.3	<0.4	49	23	110	<0.1	32	100	<0.05	<0.05	<0.05
TP03_0.7-0.8	TP03	0.7-0.8	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	-	-	-	-	-	-	-	-	-	-	19	2.2	<0.4	9.2	11	60	<0.1	6.3	25	<0.05	<0.05	<0.05
TP04_0.05-0.15	TP04	0.05-0.15	16/05/2017	Fill	Asbestos detected	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	<2	<0.4	5.1	5.1	11	<0.1	<5	54	<0.05	<0.05	<0.05
TP05_0.05-0.15	TP05	0.05-0.15	16/05/2017	Fill	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP05_0.5-0.6	TP05	0.5-0.6	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15	3.2	<0.4	9.8	11	41	<0.1	5.2	73	<0.05	<0.05	<0.05
TP05_0.9-1.0	TP05	0.9-1	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	-	-	-	-	-	-	-	-	-	-	22	2.5	<0.4	14	<5	13	<0.1	<5	43	<0.05	<0.05	<0.05
TP06_0.05-0.15	TP06	0.05-0.15	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9.2	<2	<0.4	23	15	14	<0.1	23	35	<0.05	<0.05	<0.05
TP07_0.05-0.15	TP07	0.05-0.15	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	3.5	<0.4	14	6.3	13	<0.1	6.9	14	<0.05	<0.05	<0.05
TP08_0.05-0.15	TP08	0.05-0.15	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	<2	<0.4	<5	<5	38	<0.1	<5	58	<0.05	<0.05	<0.05
TP09_0.6-0.8	TP09	0.6-0.8	16/05/2017	Natural	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	25	7.3	<0.4	22	<5	25	<0.1	<5	<5	<0.05	<0.05	<0.05
TP10_0.05-0.15	TP10	0.05-0.15	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	14	4.1	<0.4	12	<5	19	<0.1	<5	10	<0.05	<0.05	<0.05
TP11_0.05-0.15	TP11	0.05-0.15	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9.1	4.1	<0.4	29	7.7	8.8	<0.1	10	14	<0.05	<0.05	<0.05
TP12_0.05-0.15	TP12	0.05-0.15	16/05/2017	Fill	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP12_0.6-0.8	TP12	0.6-0.8	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	22	2.6	<0.4	55	5.6	150	<0.1	7.7	34	<0.05	<0.05	<0.05
TP13_0.05-0.15	TP13	0.05-0.15	16/05/2017	Fill	Asbestos detected	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.6	2.7	<0.4	14	23	15	<0.1	20	76	0.09	<0.05	<0.05
TP14_0.05-0.15	TP14	0.05-0.15	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.6	<2	<0.4	40	53	19	<0.1	41	57	<0.05	<0.05	<0.05
TP15_0.05-0.15	TP15	0.05-0.15	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	<2	<0.4	<5	<5	<5	<0.1	<5	<5	<0.05	<0.05	<0.05
TP16_0.1-0.3	TP16	0.1-0.3	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	33	2.3	<0.4	30	19	18	<0.1	35	90	<0.05	<0.05	<0.05
TP17_0.05-0.15	TP17	0.05-0.15	16/05/2017	Fill	MD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP17_0.5-0.6	TP17	0.5-0.6	16/05/2017	Natural	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	2.2	<0.4	7.6	<5	6.3	<0.1	<5	20	<0.05	<0.05	<0.05
TP18_0.2-0.3	TP18	0.2-0.3	16/05/2017	Fill	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP18_0.4-0.5	TP18	0.4-0.5	16/05/2017	Natural	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	4.3	<0.4	<5	8.2	<5	<0.1	<5	5.8	0.43	<0.05	<0.05
TP19_0.1-0.2	TP19	0.1-0.2	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9.2	<2	<0.4	11	13	11	<0.1	9.9	28	<0.05	<0.05	<0.05
TP20_0.05-0.2	TP20	0.05-0.2	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15	2.5	<0.4	32	16	8.2	<0.1	31	40	0.07	<0.05	<0.05
TP21_0.1-0.2	TP21	0.1-0.2	16/05/2017	Fill	Asbestos detected	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	4.5	<0.4	18	15	23	<0.1	13	35	<0.05	<0.05	<0.05
TP22_0.5-0.6	TP22	0.5-0.6	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	19	2.4	<0.4	<5	<5	<5	<0.1	<5	8.5	<0.05	<0.05	<0.05
TP23_0.1-0.3	TP23	0.1-0.3	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	19	2.1	<0.4	26	18	7.4	<0.1	41	37	0.06	<0.05	<0.05
TP24_0.2-0.4	TP24	0.2-0.4	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	22	2.2	<0.4	6.8	7.7	8.8	<0.1	<5	22	<0.05	<0.05	<0.05
TP24_0.5-0.6	TP24	0.5-0.6	16/05/2017	Natural	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	-	-	-	-	-	-	-	-	-	-	16	4.7	<0.4	7.2	8.5	8	<0.1	<5	16	0.07	<0.05	<0.05
TP25_0.1-0.2	TP25	0.1-0.2	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	20	<2	<0.4	10	26	10	<0.1	8.4	87	<0.05	<0.05	<0.05
TP26_0.2-0.3	TP26	0.2-0.3	16/05/2017	Fill	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	17	<2	<0.4	<5	<5	5.3	<0.1	<5	370	<0.05	<0.05	<0.05
TP27_0.1-0.2	TP27	0.1-0.2	16/05/2017	Fill	ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	3.2	<0.4	19	11	12	<0.1	15	52	<0.05	<0.05	<0.05
TP28_0.1-0.2	TP28	0.1-0.2	16/05/2017	Fill	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-
TP28_0.5-0.6	TP28	0.5-0.6	16/05/2017	Natural	-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	5.1	<0.4	5.7	10	8.6	<0.1	<5	34	0.21	<0.05	<0.05

Notes:
' ND' = Non Detect
' - ' = Not Analysed

Field_ID	LocCode	Sample_Depth (m)	Sampled_Date	Matrix_Description	OCP																															
					b-BHC	Chlordane	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Toxaphene	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1	0.2	0.2	0.2	0.2	0.2	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
NEPM 2013 EIL									3																												
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																																					
NEPM 2013 HSLs Residential A Soil 0m to <1m																																					
NEPM 2013 HILs Residential A Soil						50								10				6		10	300	20				160											
CRC Care, 2011 - HSL-A Driect Contact																																					
CRC Care, 2011 - Intrusive Maintenance Worker																																					
NEPM, 2013 Management Limits																																					
HA01_0.15-0.3	HA01	0.15-0.3	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HA02_0.05-0.15	HA02	0.05-0.15	17/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HA02_0.4-0.5	HA02	0.4-0.5	17/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA03_0.1-0.2	HA03	0.1-0.2	17/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HA04_0.0-0.2	HA04	0-0.2	17/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HA05_0.1-0.3	HA05	0.1-0.3	17/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP01_0.1-0.2	TP01	0.1-0.2	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP02_0.4-0.5	TP02	0.4-0.5	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP03_0.05-0.15	TP03	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP03_0.4-0.5	TP03	0.4-0.5	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP03_0.7-0.8	TP03	0.7-0.8	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	0.41	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP04_0.05-0.15	TP04	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP05_0.05-0.15	TP05	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP05_0.5-0.6	TP05	0.5-0.6	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP05_0.9-1.0	TP05	0.9-1	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP06_0.05-0.15	TP06	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP07_0.05-0.15	TP07	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP08_0.05-0.15	TP08	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP09_0.6-0.8	TP09	0.6-0.8	16/05/2017	Natural	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP10_0.05-0.15	TP10	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP11_0.05-0.15	TP11	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP12_0.05-0.15	TP12	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP12_0.6-0.8	TP12	0.6-0.8	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP13_0.05-0.15	TP13	0.05-0.15	16/05/2017	Fill	<0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP14_0.05-0.15	TP14	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP15_0.05-0.15	TP15	0.05-0.15	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP16_0.1-0.3	TP16	0.1-0.3	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP17_0.05-0.15	TP17	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP17_0.5-0.6	TP17	0.5-0.6	16/05/2017	Natural	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP18_0.2-0.3	TP18	0.2-0.3	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP18_0.4-0.5	TP18	0.4-0.5	16/05/2017	Natural	<0.05	<0.1	<0.05	0.54	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP19_0.1-0.2	TP19	0.1-0.2	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP20_0.05-0.2	TP20	0.05-0.2	16/05/2017	Fill	<0.05	<0.1	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP21_0.1-0.2	TP21	0.1-0.2	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP22_0.5-0.6	TP22	0.5-0.6	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP23_0.1-0.3	TP23	0.1-0.3	16/05/2017	Fill	<0.05	<0.1	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP24_0.2-0.4	TP24	0.2-0.4	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP24_0.5-0.6	TP24	0.5-0.6	16/05/2017	Natural	<0.05	<0.1	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP25_0.1-0.2	TP25	0.1-0.2	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP26_0.2-0.3	TP26	0.2-0.3	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP27_0.1-0.2	TP27	0.1-0.2	16/05/2017	Fill	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP28_0.1-0.2	TP28	0.1-0.2	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP28_0.5-0.6	TP28	0.5-0.6	16/05/2017	Natural	<0.05	<0.1	<0.05	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
' ND' = Non Detect
' - ' = Not Analysed

TABLE 1
Soil Analytical Results - DSI 2017a
2 Macpherson Street, Warriewood

					OPP																				PAH															
					Fensulfothion	Fenthion	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Prothiofos	Pyrazophos	Ronnel	Stirophos	Terbufos	Trichloronate	Tetrachlorvinphos	Tokuthion	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound) *	Benzo(a)pyrene TEQ (medium bound) *	Benzo(a)pyrene TEQ (upper bound) *	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Benzo[b+j]fluoranthene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	MG/KG	MG/KG	MG/KG	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.2	0.2	0.2	0.2	0.2	0.2	2	0.2	2	0.2	0.2	0.5	0.2	0.2	0.5	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL																																									
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																											0.7													
NEPM 2013 HSLs Residential A Soil 0m to <1m																																								
NEPM 2013 HILs Residential A Soil																												3	3	3										
CRC Care, 2011 - HSL-A Driect Contact																																								
CRC Care, 2011 - Intrusive Maintenance Worker																																								
NEPM, 2013 Management Limits																																								
Field_ID	**LocCode**	**Sample_Depth (m)**	**Sampled_Date**	**Matrix_Description**																																				
HA01_0.15-0.3	HA01	0.15-0.3	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA02_0.05-0.15	HA02	0.05-0.15	17/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	0.6	3	3.5	5.5	5.5	5.5	2.2	2.9	3.1	2.7	0.9	5.5	<0.5
HA02_0.4-0.5	HA02	0.4-0.5	17/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	0.5	0.5	0.9	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5
HA03_0.1-0.2	HA03	0.1-0.2	17/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA04_0.0-0.2	HA04	0-0.2	17/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA05_0.1-0.3	HA05	0.1-0.3	17/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
TP01_0.1-0.2	TP01	0.1-0.2	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP02_0.4-0.5	TP02	0.4-0.5	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP03_0.05-0.15	TP03	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP03_0.4-0.5	TP03	0.4-0.5	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	0.7	0.8	1.1	1.4	0.8	<0.5	<0.5	0.8	<0.5	0.6	<0.5
TP03_0.7-0.8	TP03	0.7-0.8	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
TP04_0.05-0.15	TP04	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
TP05_0.05-0.15	TP05	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP05_0.5-0.6	TP05	0.5-0.6	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP05_0.9-1.0	TP05	0.9-1	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP06_0.05-0.15	TP06	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP07_0.05-0.15	TP07	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP08_0.05-0.15	TP08	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP09_0.6-0.8	TP09	0.6-0.8	16/05/2017	Natural	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP10_0.05-0.15	TP10	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP11_0.05-0.15	TP11	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	0.8	1.1	1.5	1.7	2	1.2	0.7	1	1.1	<0.5	1.6	<0.5
TP12_0.05-0.15	TP12	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP12_0.6-0.8	TP12	0.6-0.8	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP13_0.05-0.15	TP13	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP14_0.05-0.15	TP14	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP15_0.05-0.15	TP15	0.05-0.15	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP16_0.1-0.3	TP16	0.1-0.3	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP17_0.05-0.15	TP17	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP17_0.5-0.6	TP17	0.5-0.6	16/05/2017	Natural	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP18_0.2-0.3	TP18	0.2-0.3	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP18_0.4-0.5	TP18	0.4-0.5	16/05/2017	Natural	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP19_0.1-0.2	TP19	0.1-0.2	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP20_0.05-0.2	TP20	0.05-0.2	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP21_0.1-0.2	TP21	0.1-0.2	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP22_0.5-0.6	TP22	0.5-0.6	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP23_0.1-0.3	TP23	0.1-0.3	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP24_0.2-0.4	TP24	0.2-0.4	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP24_0.5-0.6	TP24	0.5-0.6	16/05/2017	Natural	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP25_0.1-0.2	TP25	0.1-0.2	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP26_0.2-0.3	TP26	0.2-0.3	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP27_0.1-0.2	TP27	0.1-0.2	16/05/2017	Fill	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP28_0.1-0.2	TP28	0.1-0.2	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP28_0.5-0.6	TP28	0.5-0.6	16/05/2017	Natural	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:
' ND' = Non Detect
' - ' = Not Analysed

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TABLE 1
Soil Analytical Results - DSI 2017a
2 Macpherson Street, Warriewood

										Pesticides			Phenol		Polychlorinated Biphenyls								SVOCs	TPH									
Field_ID	LocCode	Sample_Depth (m)	Sampled_Date	Matrix_Description	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs	Demeton (total)	Pirimiphos-methyl	Profenofos	4,6-Dinitro-2-methylphenol	Dinoseb	Arochlor 1221	Aroclor 1016	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PCBs (Sum of total)	EPN	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36 (Sum of total)	C10-C16	C16-C34	C34-C40	C6 - C10
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.5	0.5	0.5	0.5	0.5	1	0.2	0.2	0.5	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	50	20	20	50	50	50	50	100	100	20
NEPM 2013 EIL						170																											
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																								120							300	2800	180
NEPM 2013 HSLs Residential A Soil 0m to <1m																								110									
NEPM 2013 HILs Residential A Soil									300													1											
CRC Care, 2011 - HSL-A Driect Contact						1400																		3300									
CRC Care, 2011 - Intrusive Maintenance Worker						1100																		62,000									
NEPM, 2013 Management Limits																								1000							2500	10,000	
HA01_0.15-0.3	HA01	0.15-0.3	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
HA02_0.05-0.15	HA02	0.05-0.15	17/05/2017	Fill	1.9	<0.5	1	5.5	32.8	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	310	760	1070	<50	1000	530	<20
HA02_0.4-0.5	HA02	0.4-0.5	17/05/2017	Fill	<0.5	<0.5	<0.5	0.8	2.1	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	310	760	1070	<50	<100	530	<20
HA03_0.1-0.2	HA03	0.1-0.2	17/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
HA04_0.0-0.2	HA04	0-0.2	17/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
HA05_0.1-0.3	HA05	0.1-0.3	17/05/2017	Fill	<0.5	<0.5	<0.5	0.6	1.2	-	<0.2	-	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	54	54	<50	<100	<100	<20
TP01_0.1-0.2	TP01	0.1-0.2	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP02_0.4-0.5	TP02	0.4-0.5	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP03_0.05-0.15	TP03	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP03_0.4-0.5	TP03	0.4-0.5	16/05/2017	Fill	<0.5	<0.5	<0.5	0.7	3.6	<1	<0.2	<0.2	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	120	190	310	<50	240	170	<20
TP03_0.7-0.8	TP03	0.7-0.8	16/05/2017	Fill	<0.5	<0.5	<0.5	0.7	1.3	<1	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	61	61	<50	<100	<100	<20
TP04_0.05-0.15	TP04	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	0.6	1.3	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	87	130	217	<50	170	<100	<20
TP05_0.05-0.15	TP05	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP05_0.5-0.6	TP05	0.5-0.6	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	100	110	210	<50	170	<100	<20
TP05_0.9-1.0	TP05	0.9-1	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	66	66	<50	<100	<100	<20
TP06_0.05-0.15	TP06	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP07_0.05-0.15	TP07	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP08_0.05-0.15	TP08	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP09_0.6-0.8	TP09	0.6-0.8	16/05/2017	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP10_0.05-0.15	TP10	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP11_0.05-0.15	TP11	0.05-0.15	16/05/2017	Fill	0.8	<0.5	<0.5	1.7	10	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP12_0.05-0.15	TP12	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP12_0.6-0.8	TP12	0.6-0.8	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP13_0.05-0.15	TP13	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP14_0.05-0.15	TP14	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP15_0.05-0.15	TP15	0.05-0.15	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2	<0.2	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	54	54	<50	<100	<100	<20
TP16_0.1-0.3	TP16	0.1-0.3	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP17_0.05-0.15	TP17	0.05-0.15	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP17_0.5-0.6	TP17	0.5-0.6	16/05/2017	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP18_0.2-0.3	TP18	0.2-0.3	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP18_0.4-0.5	TP18	0.4-0.5	16/05/2017	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP19_0.1-0.2	TP19	0.1-0.2	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	22	<50	<50	<50	<50	<100	<100	<20
TP20_0.05-0.2	TP20	0.05-0.2	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP21_0.1-0.2	TP21	0.1-0.2	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP22_0.5-0.6	TP22	0.5-0.6	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP23_0.1-0.3	TP23	0.1-0.3	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP24_0.2-0.4	TP24	0.2-0.4	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP24_0.5-0.6	TP24	0.5-0.6	16/05/2017	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP25_0.1-0.2	TP25	0.1-0.2	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP26_0.2-0.3	TP26	0.2-0.3	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP27_0.1-0.2	TP27	0.1-0.2	16/05/2017	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP28_0.1-0.2	TP28	0.1-0.2	16/05/2017	Fill	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
TP28_0.5-0.6	TP28	0.5-0.6	16/05/2017	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.2	-	<0.5	<0.5	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20

Notes:
' ND' = Non Detect
' - ' = Not Analysed

						BTEX							Herbicides										Inorganics	Metals												
					Asbestos	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 less BTEX (F1)	2,4,5-Trichlorophenoxy acetic acid	2,4,5-TP (Silvex)	2,4-Dichlorophenoxy acetic acid	2,4-Dichlorprop	4-(2,4-Dichlorophenoxy) butyric acid (2,4-DB)	Actril (loxynil)	Dicamba	2-Methyl-4-chlorophenoxy acetic acid	2-Methyl-4-Chlorophenoxy butanoic acid	Mecoprop	Moisture Content (dried @ 103°C)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL						0.1	0.1	0.1	0.2	0.1	0.3	20	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	2	0.4	5	5	5	0.1	5	5	0.05	0.05	0.05	0.05	0.05
NEPM 2013 EIL																								110		200	120	1270		40	350					
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil						50	70	85			105																									
NEPM 2013 HSLs Residential A Soil 0m to <1m						0.5	55	160			40	45																								
NEPM 2013 HILs Residential A Soil					Detect								600		900					600	600	600		100	20		6000	300	40	400	7400					50
CRC Care, 2011 - HSL-A Driect Contact						100	4500	14,000			12,000	29,000																								
CRC Care, 2011 - Intrusive Maintenance Worker						120,000	130,000	85,000				82,000																								
NEPM, 2013 Management Limits												700																								
Field_ID	**LocCode**		**Sample_Depth_**		**Sampled_Date-Time**	**Matrix_Description**																															
TP29_0.1-0.2	TP29_0.1-0.2				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	3.7	<0.4	28	9	22	<0.1	11	46	<0.05	<0.05	<0.05	<0.05	<0.05
TP29_0.8-1.0	TP29_0.8-1.0				29/11/2017		-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	-	-	-	-	-	-	-	-	-	-	24	5.8	<0.4	21	<5	19	<0.1	<5	5.3	<0.05	<0.05	<0.05	<0.05	<0.05
TP30_0.0-0.2	TP30_0.0-0.2				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	<2	<0.4	14	6	26	<0.1	<5	69	<0.05	<0.05	<0.05	<0.05	<0.05
TP30_0.5-0.6	TP30_0.5-0.6				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	19	2.4	<0.4	18	29	50	<0.1	9.1	43	<0.05	<0.05	<0.05	<0.05	<0.05
TP31_0.1-0.2	TP31_0.1-0.2				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	2.8	<0.4	23	13	28	<0.1	14	17	<0.05	<0.05	<0.05	<0.05	<0.05
TP31_1.0-1.1	TP31_1.0-1.1				29/11/2017		-	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	-	-	-	-	-	-	-	-	-	-	13	7.8	<0.4	<5	<5	<5	<0.1	<5	<5	<0.05	<0.05	<0.05	<0.05	<0.05
TP32_0.1-0.2	TP32_0.1-0.2				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	7.7	<2	<0.4	7.8	<5	19	<0.1	<5	17	<0.05	<0.05	<0.05	<0.05	<0.05
TP32_0.5-0.6	TP32_0.5-0.6				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.6	2	<0.4	34	40	28	<0.1	63	68	<0.05	<0.05	<0.05	<0.05	<0.05
TP33_0.1-0.2	TP33_0.1-0.2				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	10	<2	<0.4	5.2	<5	9.1	<0.1	<5	5.3	<0.05	<0.05	<0.05	<0.05	<0.05
TP33_0.5-0.6	TP33_0.5-0.6				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	23	5.5	<0.4	32	5.6	16	<0.1	<5	12	<0.05	<0.05	<0.05	<0.05	<0.05
TP33_2.3-2.4	TP33_2.3-2.4				29/11/2017		0.00059%w/w	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	23	7	<0.4	38	<5	18	<0.1	<5	15	<0.05	<0.05	<0.05	<0.05	<0.05
TP34_0.2-0.3	TP34_0.2-0.3				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	2.8	<0.4	34	22	17	<0.1	29	62	<0.05	<0.05	<0.05	<0.05	<0.05
TP34_0.5-0.7	TP34_0.5-0.7				29/11/2017		ND	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	19	6.5	<0.4	11	28	29	<0.1	<5	120	<0.05	<0.05	<0.05	<0.05	<0.05

					OCP																	
					Chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Toxaphene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1
NEPM 2013 EIL							3															
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																						
NEPM 2013 HSLs Residential A Soil 0m to <1m																						
NEPM 2013 HILs Residential A Soil														10				6			300	20
CRC Care, 2011 - HSL-A Driect Contact																						
CRC Care, 2011 - Intrusive Maintenance Worker																						
NEPM, 2013 Management Limits																						
Field_ID	**LocCode**	**Sample_Depth_**	**Sampled_Date-Time**	**Matrix_Description**																		
TP29_0.1-0.2	TP29_0.1-0.2		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP29_0.8-1.0	TP29_0.8-1.0		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP30_0.0-0.2	TP30_0.0-0.2		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP30_0.5-0.6	TP30_0.5-0.6		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP31_0.1-0.2	TP31_0.1-0.2		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP31_1.0-1.1	TP31_1.0-1.1		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP32_0.1-0.2	TP32_0.1-0.2		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP32_0.5-0.6	TP32_0.5-0.6		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP33_0.1-0.2	TP33_0.1-0.2		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP33_0.5-0.6	TP33_0.5-0.6		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP33_2.3-2.4	TP33_2.3-2.4		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP34_0.2-0.3	TP34_0.2-0.3		29/11/2017		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1
TP34_0.5-0.7	TP34_0.5-0.7		29/11/2017		0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1

	OI															
	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.2	0.2	0.2	0.2	0.2	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
NEPM 2013 EIL																
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																
NEPM 2013 HSLs Residential A Soil 0m to <1m																
NEPM 2013 HILs Residential A Soil				160												
CRC Care, 2011 - HSL-A Driect Contact																
CRC Care, 2011 - Intrusive Maintenance Worker																
NEPM, 2013 Management Limits																
Field_ID																
TP29_0.1-0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP29_0.8-1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP30_0.0-0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP30_0.5-0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP31_0.1-0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP31_1.0-1.1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP32_0.1-0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP32_0.5-0.6	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
TP33_0.1-0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP33_0.5-0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP33_2.3-2.4	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP34_0.2-0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP34_0.5-0.7	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

					OP													PAH																			
					Fenthion	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Tokuthion	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound) *	Benzo(a)pyrene TEQ (medium bound) *	Benzo(a)pyrene TEQ (upper bound) *	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Benzo[b+j]fluoranthene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	MG/KG	MG/KG	MG/KG	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.2	0.2	0.2	0.2	0.2	2	0.2	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL																																				170		
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																								0.7														
NEPM 2013 HSLs Residential A Soil 0m to <1m																																						
NEPM 2013 HILs Residential A Soil																									3	3	3											
CRC Care, 2011 - HSL-A Driect Contact																																				1400		
CRC Care, 2011 - Intrusive Maintenance Worker																																				1100		
NEPM, 2013 Management Limits																																						
Field_ID	**LocCode**	**Sample_Depth_**	**Sampled_Date-Time**	**Matrix_Description**																																		
TP29_0.1-0.2	TP29_0.1-0.2		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	0.6	0.6	1	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	0.8
TP29_0.8-1.0	TP29_0.8-1.0		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP30_0.0-0.2	TP30_0.0-0.2		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP30_0.5-0.6	TP30_0.5-0.6		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP31_0.1-0.2	TP31_0.1-0.2		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	0.8	0.9	1.2	1.5	0.5	0.6	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.5	1
TP31_1.0-1.1	TP31_1.0-1.1		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP32_0.1-0.2	TP32_0.1-0.2		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP32_0.5-0.6	TP32_0.5-0.6		29/11/2017		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<0.5	2.4	4.8	<2	<2	<2	<2	<2	<2	<2	<0.5	<2	<2
TP33_0.1-0.2	TP33_0.1-0.2		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP33_0.5-0.6	TP33_0.5-0.6		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP33_2.3-2.4	TP33_2.3-2.4		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP34_0.2-0.3	TP34_0.2-0.3		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP34_0.5-0.7	TP34_0.5-0.7		29/11/2017		<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

					Pesticides	Phenol		Polychlorinated Biphenyls								SVOCs	TPH									
					Total PAHs	Pirimiphos-methyl	4,6-Dinitro-2-methylphenol	Dinoseb	Arochlor 1221	Aroclor 1016	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PCBs (Sum of total)	EPN	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36 (Sum of total)	C10-C16	C16-C34	C34-C40	C6 - C10
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.5	0.2	0.5	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	50	20	20	50	50	50	50	100	100	20
NEPM 2013 EIL																										
NEPM 2013 ESLs Urban residential and public open space, Coarse Soil																		120							300	2800	180
NEPM 2013 HSLs Residential A Soil 0m to <1m																		110									
NEPM 2013 HILs Residential A Soil					300											1											
CRC Care, 2011 - HSL-A Driect Contact																		3300									
CRC Care, 2011 - Intrusive Maintenance Worker																		62,000									
NEPM, 2013 Management Limits																		1000							2500	10,000	
Field_ID	**LocCode**	**Sample_Depth_**	**Sampled_Date-Time**	**Matrix_Description**																							
TP29_0.1-0.2	TP29_0.1-0.2		29/11/2017		2	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	79	190	269	<50	220	170	<20
TP29_0.8-1.0	TP29_0.8-1.0		29/11/2017		<0.5	<0.2	-	-	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP30_0.0-0.2	TP30_0.0-0.2		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	100	100	<50	110	130	<20
TP30_0.5-0.6	TP30_0.5-0.6		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	140	140	<50	140	170	<20
TP31_0.1-0.2	TP31_0.1-0.2		29/11/2017		4.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	86	170	256	<50	200	120	<20
TP31_1.0-1.1	TP31_1.0-1.1		29/11/2017		<0.5	<0.2	-	-	-	-	-	-	-	-	-	-	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP32_0.1-0.2	TP32_0.1-0.2		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP32_0.5-0.6	TP32_0.5-0.6		29/11/2017		<2	<2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<50	<20	<20	<50	52	52	<50	<100	<100	<20
TP33_0.1-0.2	TP33_0.1-0.2		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP33_0.5-0.6	TP33_0.5-0.6		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP33_2.3-2.4	TP33_2.3-2.4		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	<50	<50	<50	<100	<100	<20
TP34_0.2-0.3	TP34_0.2-0.3		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	<50	62	62	<50	<100	<100	<20
TP34_0.5-0.7	TP34_0.5-0.7		29/11/2017		<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<50	<20	<20	97	210	307	<50	260	<100	<20

Appendix A - Proposed Development Plans and Survey (Provided by Karimbla)

JBW SURVEYORS PTY LTD

CLIENT: MERITON GROUP
PROJECT: MACPHERSON STREET, WARRIEWOOD (DONATO)
AUTOCAD MODEL: 124872 DETAIL & LEVELS 60WG
ISSUED DATE: 27/09/18
REVISION :

GENERAL NOTES

CAD DIGITAL DATA : JBW SURVEYORS PTY LTD

THE INFORMATION SUPPLIED IN THIS DATA FILE IS SUPPLIED ON THE CONDITION THAT THESE GENERAL NOTES ARE ALWAYS STORED WITH THE SUPPLIED CAD DRAWING, & IF THE DATA IS PROVIDED TO ANY PARTY ON ANY FORM OF HARD COPY OR COMPUTER MEDIA THEN THESE GENERAL NOTES WILL ALSO BE A PART OF THAT HARD MEDIA COPY OR COMPUTER MEDIA DATA.

ORIGIN OF LEVELS (SCIMS-DATED 22/11/2017)
SSM 24645 RL 12·360 A.H.D VIDE SCIMS

THE GRID SYSTEM SHOWN RELATES TO THE MAPPING GRID OF AUSTRALIA (MGA), THE ORIGIN OF WHICH IS;
SSM 59232 E=342167·927 N=6270958·978 CLASS B ORDER 2
PM 24645 E=342542·352 N=6271024·118 CLASS B ORDER 2
AS SUPPLIED BY SCIMS DATED 22/11/2017

THE SUBJECT PROPERTY BOUNDARIES HAVE BEEN SURVEYED AND ARE SUBJECT TO LODGEMENT AND REGISTRATION AT THE LPI OF A PLAN OF REDEFINITION

THE BOUNDARIES SHOULD BE SURVEYED AND MARKED PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION WORK

IMPROVEMENTS AND FEATURES SHOWN ON OR NEAR THE BOUNDARIES ARE INDICATIVE ONLY

THE POSITION OF IMPROVEMENTS AND FEATURES HAVE BEEN LOCATED FOR PLOTTING PURPOSES ONLY

VISIBLE SERVICES THAT HAVE BEEN SURVEYED ARE DENOTED BY ABBREVIATIONS THAT ARE REFERENCED IN THE SYMBOLS TABLE

SERVICES THAT ARE DENOTED "OBYD" HAVE BEEN PLOTTED FROM INFORMATION PROVIDED FROM 'DIAL BEFORE YOU DIG' AND HAVE NOT BEEN SURVEYED

UNDERGROUND SERVICES THAT ARE OF A CRITICAL NATURE SHOULD BE EXPOSED AND THEIR POSITION SURVEYED

CONTOURS HAVE BEEN INTERPOLATED FROM SPOT HEIGHTS
CONTOURS ARE AT 0·5 METRE INTERVALS

SYMBOLS

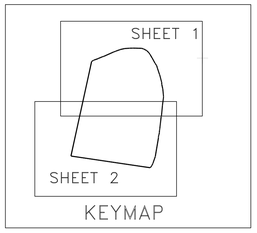
BOB DENOTES BOTTOM OF EMBANKMENT
CO DENOTES CONCRETE
EM DENOTES ELECTRICITY MAIN
EP DENOTES ELECTRICITY POLE
HY DENOTES HYDRANT
INV DENOTES INVERT OF CONCRETE KERB
LIP DENOTES LIP OF KERB
LMK DENOTES LINE MARKING
LP DENOTES LIGHT POLE
MBJ DENOTES METAL BRIDGE JOINT
MHR DENOTES METAL HAND RAIL
PT DENOTES PIT
PU DENOTES PIT UNKNOWN
SI DENOTES SIGN
SV DENOTES STOP VALVE
TC DENOTES TELECOMMUNICATIONS PIT
TK DENOTES TOP OF CONCRETE KERB
TOB DENOTES TOP OF EMBANKMENT

DENOTES THE APPROXIMATE SPREAD & LOCATION OF A TREE

DIAL BEFORE YOU DIG www.1100.com.au

—|—|—|— UNDERGROUND ELECTRICITY CABLES AS APPROXIMATELY SHOWN ON THE DIAL BEFORE DIG SKETCH
—|—|—|— UNDERGROUND GAS MAIN AS APPROXIMATELY SHOWN ON THE DIAL BEFORE DIG SKETCH
—|—|—|— UNDERGROUND WATER MAIN AS APPROXIMATELY SHOWN ON THE DIAL BEFORE DIG SKETCH
—|—|—|— UNDERGROUND TELECOMMUNICATIONS CABLES AS APPROXIMATELY SHOWN N THE DIAL BEFORE DIG SKETCH

THE POSITION OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY BASED ON PLANS RECEIVED FROM DIAL BEFORE YOU DIG.
NOTE: THE SUPPLIED MAPS FROM AUTHORITIES SHOWING THE RELEVANT SERVICES DOES NOT APPEAR TO SHOW THE NEWLY CONSTRUCTED WORKS ALONG MACPHERSON STREET.
JOB REFERENCE No. 15592547 DATED 26/09/2019
WHERE UNDERGROUND SERVICES ARE LOCATED RELATIVE TO CRITICAL DESIGN ELEMENTS, SERVICES SHOULD BE PHYSICALLY EXPOSED AND SURVEYED PRIOR TO DETAILED DESIGN, EXCAVATION AND CONSTRUCTION.



JBW Surveyors Pty Ltd. ACN 001149373 Level 7, 376 Bay Street Brighton-Le-Sands NSW 2216 Phone: (02) 9335 9700 Fax: (02) 9556 3100 www.jbwsurveyors.com.au Liability limited by a scheme approved under Professional Standards Legislation.	CLIENT MERITON GROUP	PLAN SHOWING SELECTED DETAIL AND LEVELS OVER 251 IN DP 1245613 PROJECT: 2 MACPHERSON STREET, WARRIEWOOD (DONATO)	SCALE: 1:200 (A0) DATUM: AHD DATE: 25/09/18	PLAN REF. 124872 DETAIL & LEVELS SHEET 1/2
	THIS DOCUMENT IS THE PROPERTY OF JBW SURVEYORS PTY LTD AND SHALL ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED. UNAUTHORISED USE OF THIS DOCUMENT IS PROHIBITED. ©	LOCALITY: WARRIEWOOD LOCAL GOVERNMENT AREA: NORTHERN BEACHES	AREA: 2·13ha (TITLE)	DESIGNED: BB DRAWN: BB

JBW SURVEYORS PTY LTD

CLIENT: MERITON GROUP
PROJECT: MACHPERSON STREET, WARRIEWOOD (DONATO)
AUTOCAD MODEL: '124872 DETAIL & LEVELS d.DWG'
ISSUED DATE: 27/09/18
REVISION :

GENERAL NOTES

CAD DIGITAL DATA : JBW SURVEYORS PTY LTD

THE INFORMATION SUPPLIED IN THIS DATA FILE IS SUPPLIED ON THE CONDITION THAT THESE GENERAL NOTES ARE ALWAYS STORED WITH THE SUPPLIED CAD DRAWING, & IF THE DATA IS PROVIDED TO ANY PARTY ON ANY FORM OF HARD COPY OR COMPUTER MEDIA THEN THESE GENERAL NOTES WILL ALSO BE A PART OF THAT HARD MEDIA COPY OR COMPUTER MEDIA DATA.

ORIGIN OF LEVELS (SCIMS-DATED 22/11/2017)
SSM 24645 RL 12.360 A.H.D VIDE SCIMS

THE GRID SYSTEM SHOWN RELATES TO THE MAPPING GRID OF AUSTRALIA (MGA), THE ORIGIN OF WHICH IS:
SSM 55212 E=342147·927 N=6270950·978 CLASS B ORDER 2
PM 24645 E=342542·352 N=6271124·178 CLASS B ORDER 2
AS SUPPLIED BY SCIMS DATED 22/11/2017

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CONTOURS HAVE BEEN INTERPOLATED FROM SPOT HEIGHTS
CONTOURS ARE AT 0·5 METRE INTERVALS

SYMBOLS

BOB DENOTES BOTTOM OF EMBANKMENT
CO DENOTES CONCRETE
EM DENOTES ELECTRICITY MAIN
EP DENOTES ELECTRICITY POLE
HY DENOTES HYDRANT
INV DENOTES INVERT OF CONCRETE KERB
LIP DENOTES LIP OF KERB
LMK DENOTES LINE MARKING
LP DENOTES LIGHT POLE
MBJ DENOTES METAL BRIDGE JOINT
MHR DENOTES METAL HAND RAIL
PT DENOTES PIT
PU DENOTES PIT UNKNOWN
SI DENOTES SIGN
SV DENOTES STOP VALVE
TC DENOTES TELECOMMUNICATIONS PIT
TK DENOTES TOP OF CONCRETE KERB
TOB DENOTES TOP OF EMBANKMENT
DENOTES THE APPROXIMATE SPREAD & LOCATION OF A TREE

SHEET 1
SHEET 2
KEYMAP

DIAL BEFORE YOU DIG www.1100.com.au

UNDERGROUND ELECTRICITY CABLES AS APPROXIMATELY SHOWN ON THE DIAL BEFORE DIG SKETCH
UNDERGROUND GAS MAIN AS APPROXIMATELY SHOWN ON THE DIAL BEFORE DIG SKETCH
UNDERGROUND WATER MAIN AS APPROXIMATELY SHOWN ON THE DIAL BEFORE DIG SKETCH
UNDERGROUND TELECOMMUNICATIONS CABLES AS APPROXIMATELY SHOWN N THE DIAL BEFORE DIG SKETCH

THE POSITION OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY BASED ON PLANS RECEIVED FROM DIAL BEFORE YOU DIG.
NOTE: THE SUPPLIED MAPS FROM AUTHORITIES SHOWING THE RELEVANT SERVICES DOES NOT APPEAR TO SHOW THE NEWLY CONSTRUCTED WORKS ALONG MACPHERSON STREET.
JOB REFERENCE No. 19502547 DATED 26/09/2019.
WHERE UNDERGROUND SERVICES ARE LOCATED RELATIVE TO CRITICAL DESIGN ELEMENTS, SERVICES SHOULD BE PHYSICALLY EXPOSED AND SURVEYED PRIOR TO DETAILED DESIGN, EXCAVATION AND CONSTRUCTION.

JBW Surveyors Pty Ltd. ACN 001149373 Level 7, 376 Bay Street Brighton-Le-Sands NSW 2216 Phone: (02) 9335 9700 Fax: (02) 9556 3100 www.jbwsurveyors.com.au Liability limited by a scheme approved under Professional Standards Legislation.	CLIENT MERITON GROUP	PLAN SHOWING SELECTED DETAIL AND LEVELS OVER 251 IN DP 1245613 PROJECT: 2 MACPHERSON STREET, WARRIEWOOD (DONATO)	SCALE: 1:200 (A0) DATUM: AHD DATE: 25/09/18	PLAN REF: 124872 DETAIL & LEVELS SHEET 2/2	
		LOCALITY: WARRIEWOOD	LOCAL GOVERNMENT AREA: NORTHERN BEACHES	AREA: 2·13ha (TITLE)	DESIGNED: BB DRAWN: BB

2 MACPHERSON STREET, WARRIEWOOD

EARLY WORKS

1000-SERIES

CIVIL WORKS PACKAGE

DRAWING LIST

DAC1001 COVER SHEET AND LOCALITY PLAN
DAC1002 GENERAL NOTES

DAC1005 GENERAL ARRANGEMENT PLAN

DAC1006 TYPICAL SECTIONS SHEET 1 OF 2
DAC1007 TYPICAL SECTIONS SHEET 2 OF 2

DAC1010 SITEWORKS AND STORMWATER PLAN SHEET 1
DAC1011 SITEWORKS AND STORMWATER PLAN SHEET 2

DAC1015 BULK EARTHWORKS PLAN

DAC1020 SITEWORKS DETAILS

DAC1021 STORMWATER DETAILS SHEET 1 OF 3
DAC1022 STORMWATER DETAILS SHEET 2 OF 3
DAC1023 STORMWATER DETAILS SHEET 3 OF 3

DAC1030 PAVEMENT PLAN, SIGNAGE AND LINEMARKING PLAN

DAC1040 MC01 LONGITUDINAL SECTION

DAC1050 MC01 CROSS SECTIONS SHEET 1
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DAC1070 SERVICES AND UTILITIES COORDINATION PLAN

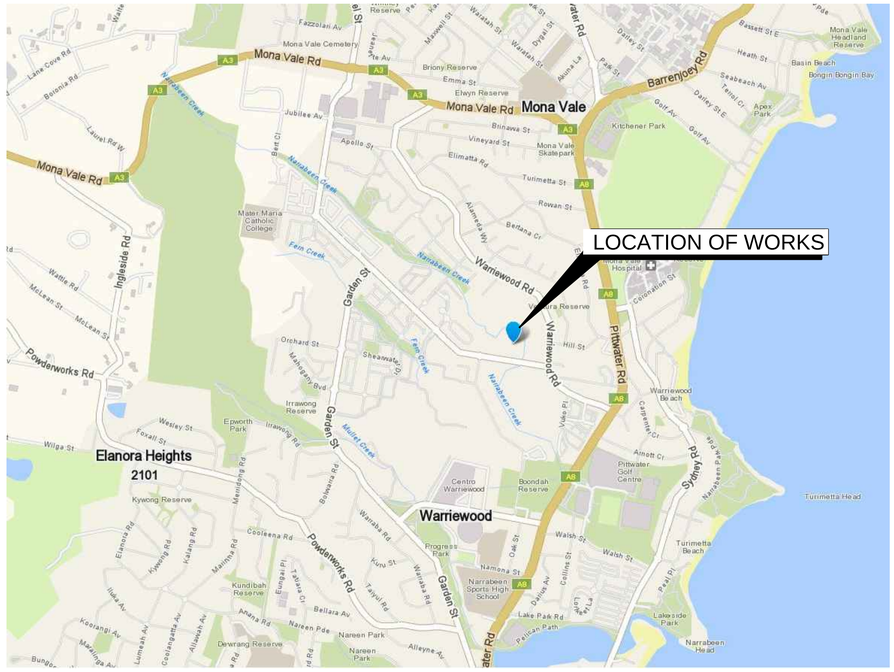
DAC1080 SEDIMENTATION AND EROSION CONTROL PLAN
DAC1081 SEDIMENTATION AND EROSION CONTROL DETAILS
DAC1082 SEDIMENTATION AND EROSION CONTROL CALCULATIONS

DAC1090 INTERNAL STORMWATER CATCHMENT PLAN

DAC1100 TURNING PATH PLAN SHEET 1
DAC1101 TURNING PATH PLAN SHEET 2

DAC1110 NARRABEEN CREEK PLAN

DAC1115 NARRABEEN CREEK LONGITUDINAL SECTION
DAC1116 NARRABEEN CREEK TYPICAL SECTIONS



LOCALITY PLAN

N.T.S

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

100mm on Original

Client

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Scales	NTS
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project

2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title

COVER SHEET AND LOCALITY PLAN

Civil Engineers and Project Managers

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1001	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1001.dwg

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY JBW SURVEYORS, BEING REGISTERED SURVEYORS. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. AT & L DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.

SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT AT & L.

THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM THE ORIGINAL SURVEY DOCUMENTS.

THE INFORMATION SUPPLIED IN THIS DATA FILE IS SUPPLIED ON THE CONDITION THAT THESE GENERAL NOTES ARE ALWAYS STORED WITH THE SUPPLIED CAD DRAWING & IF THE DATA IS PROVIDED TO ANY PARTY ON ANY FORM OF HARD COPY OR COMPUTER MEDIA THEN THESE GENERAL NOTES WILL ALSO BE A PART OF THAT HARD MEDIA COPY OR COMPUTER MEDIA DATA.

THE RECORDS OF THE SERVICE AUTHORITIES HAVE NOT BEEN INVESTIGATED ONLY THOSE SERVICES VISIBLE AT THE TIME OF SURVEY HAVE BEEN SHOWN.

THE RECORDS OF THE SERVICE AUTHORITIES SHOULD BE INVESTIGATED AS TO THE LOCATION OF SERVICES PRIOR TO THE COMMENCEMENT OF ANY DETAILED DESIGN OR CONSTRUCTION WORKS.

THE POSITION OF IMPROVEMENT AND FEATURES HAVE BEEN LOCATED FOR PLOTTING PURPOSES ONLY.

IMPROVEMENTS AND FEATURES SHOWN ON OR NEAR THE BOUNDARIES ARE INDICATIVE ONLY.

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) THE ORIGIN OF WHICH IS PM 55212, RL 4.641 AHD AS SUPPLIED BY SCIMS DATED 9/12/2004.

THE BOUNDARIES HAVE NOT BEEN SURVEYED, DIMENSIONS HAVE BEEN COMPILED FROM THE SUBJECT DEPOSITED PLANS AND ARE SUBJECT TO FINAL SURVEY.

THE BOUNDARIES SHOULD BE SURVEYED AND MARKED PRIOR TO THE COMMENCEMENT OF ANY CONSTRICTION WORK.

CONTOURS SHOWN ARE AT 0.5 METRE INTERVALS.

DIAL 1100 BEFORE YOU DIG

CONTRACTOR SHALL CALL;
DIAL BEFORE YOU DIG 1100
PRIOR TO COMMENCEMENT OF WORK TO OBTAIN ALL CURRENT SERVICE AUTHORITY PLANS

CONCRETE NOTES

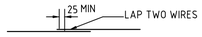
1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY
   ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	AS 3600 F'c MPa AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR BASE	32	60	20
KERBS, PATHS, AND PITS	32	80	20

   - CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
   - PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.
3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY AT & L.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.T.A. SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
   N DENOTES GRADE 450 N BARS TO AS 1302 GRADE N
   R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS 1302
   SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS 1304

   NUMBER OF BARS IN GROUP — BAR GRADE AND TYPE
   17 N 20 250
   NOMINAL BAR SIZE IN mm — SPACING IN mm

   THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS 1304.
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



STORMWATER DRAINAGE NOTES

1. STORMWATER DESIGN CRITERIA:
   (A) AVERAGE RECURRENCE INTERVAL:
   1:100 YEARS ROOFED AREAS TO SURCHARGE PIT
   1:20 YEARS EXTERNAL PAVEMENTS
   (B) RAINFALL INTENSITIES:
   TIME OF CONCENTRATION: 5 MINUTES
   1:100 YEARS= 262.0 mm/hr
   1:20 YEARS= 204.0 mm/hr
   (C) RUNOFF COEFFICIENTS:
   ROOF AREAS: C_{100} =1.0
   EXTERNAL PAVEMENTS: C_{20} =1.0
2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '3' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
4. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED.
5. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
6. PIPES TO BE INSTALLED TO TYPE HS1 SUPPORT IN ACCORDANCE WITH AS 3725 (1989) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (1998) AND AS/NZS 3500 3.2 (1998).
8. PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY AT & L.
9. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
10. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
11. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
12. GRATES AND COVERS SHALL CONFORM TO AS 3996.
13. ALL INTERNAL PIT DIMENSIONS TO CONFORM TO AS3500.3 TABLE 8.2.
14. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
15. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO AT & L.
3. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
4. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
5. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
6. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
7. ASPHALTIC CONCRETE SHALL CONFORM TO RMS SPECIFICATION R116.
8. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS FORM 3051 (UNBOUND), RMS FORM 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m^3 OF BASECOURSE MATERIAL PLACED.
9. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS FORM 3051, 3051.1 AND COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m^3 OF SUB-BASE COURSE MATERIAL PLACED.
10. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH RMS FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF AT & L.
11. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
12. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.
13. CIVIL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH CITY OF BOTANY BAY COUNCIL CIVIL WORKS SPECIFICATIONS 2013. WHERE ANY AMBIGUITY BETWEEN AT&L SPECIFICATIONS AND COUNCIL SPECIFICATIONS EXIST, COUNCIL SPECIFICATIONS TAKES PRECEDENCE.
14. INSPECTIONS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH AN APPROVED INSPECTION REGISTER.

EXISTING UNDERGROUND SERVICES NOTES

THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE.

AT & L CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.

CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.

CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

AL SURFACE LIDS/FITTINGS TO BE ADJUSTED TO SUIT FINISHED SURFACE LEVELS.

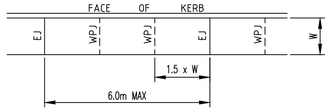
KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32MPa U.N.O IN REINFORCED CONCRETE NOTES.
2. ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON 100mm GRANULAR BASECOURSE COMPACTED TO MINIMUM 98% MODIFIED DRY DENSITY (AS 1289 5.2.1).
3. EXPANSION JOINTS (E.J) TO BE FORMED FROM 10mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
4. WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
5. BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. IN THE REPLACEMENT OF KERB AND GUTTER :-
   EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER NEW BASECOURSE AND SURFACE TO BE LAID 600mm WIDE U.N.O.
7. EXISTING KERB AND GUTTER IS TO BE COMPLETELY REMOVED WHERE NEW KERB AND GUTTER IS SHOWN.

JOINTING NOTES

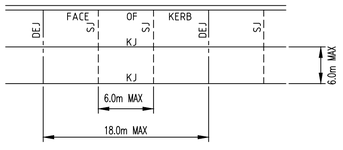
PEDESTRIAN PAVEMENT JOINTS

1. ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS. (U.N.O)
2. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 6.0m CENTRES.
3. WEAKENED PLANE JOINTS ARE TO BE LOCATED AT A MAX. SPACING OF 1.5 x WIDTH OF THE PAVEMENT.
4. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.
5. PEDESTRIAN PAVEMENT JOINT DETAIL.



VEHICULAR PAVEMENT JOINTS

6. ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS. (U.N.O)
7. KEYED CONSTRUCTION JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 6.0m CENTRES
8. SAWN JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 6.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX 18.0m CENTRES
9. VEHICULAR PAVEMENT JOINT DETAIL.



EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   a. LOCAL AUTHORITY REQUIREMENTS
   b. EPA REQUIREMENTS
   c. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

LAND DISTURBANCE

6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   (A) INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
   (B) CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
   (C) INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
   (D) UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

EROSION CONTROL

7. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
8. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

SEDIMENT CONTROL

9. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
10. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
11. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
12. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

OTHER MATTERS

13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
   (A) PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
   (B) ENSURING THAT NOTHING IS NAILED TO THEM
   (C) PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
   (I) ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER
   (II) A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
   (III) CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
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A	ISSUE FOR COMMENT	24-10-18

Bar Scales

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Internet: http://www.meriton.com.au

Scales	NTS
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS PACKAGE

Title
GENERAL NOTES

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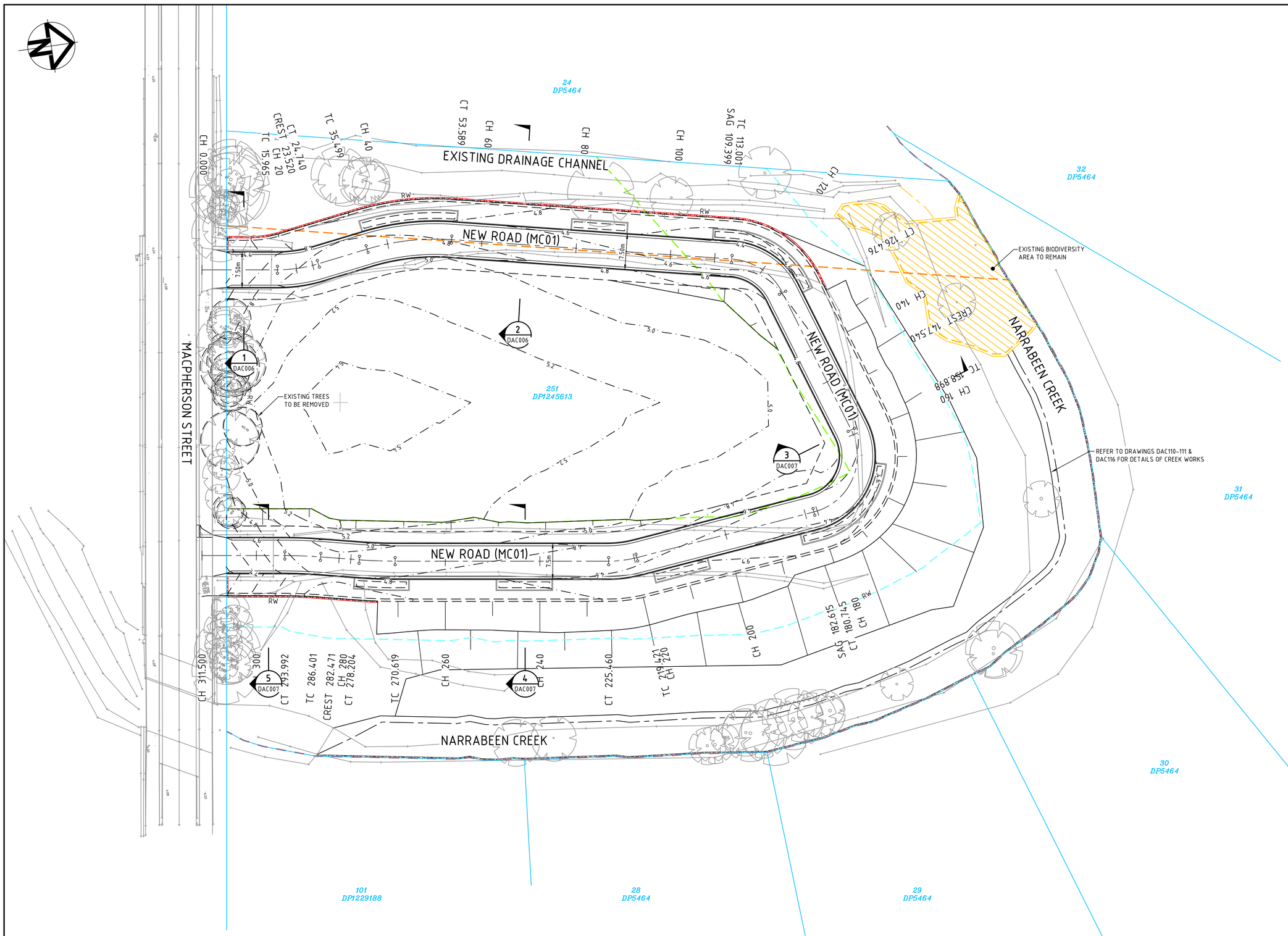
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1002	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1002.dwg



GENERAL ARRANGEMENT LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING CONTOUR (3.0)
- EXISTING 20m ASSET PROTECTION ZONE
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- PROPOSED EASEMENT
- PROPOSED CREEK CENTERLINE
- PROPOSED 25m RIPARIAN CORRIDOR
- PROPOSED 25m PRIVATE BUFFER
- K&G — KERB & GUTTER
- RK — ROLL TOP KERB AND GUTTER
- BATTER
- 5.0 — CONTOUR (0.2m INTERVAL)
- RRW — ROCK RETAINING WALL
- RW — RETAINING WALL
- 375ø — STORMWATER PIPE (SHOWING SIZE)
- STORMWATER KERB INLET PIT
- STORMWATER SURFACE INLET PIT
- A\1 — STORMWATER PIT NUMBER
- STORMWATER RAINGARDEN

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT
2. REFER DRAWING DAC1020 FOR CIVIL DETAILS.
3. REFER DRAWING DAC1021-1023 FOR STORMWATER DETAILS.

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED

Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales	1 : 400 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
GENERAL ARRANGEMENT PLAN

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

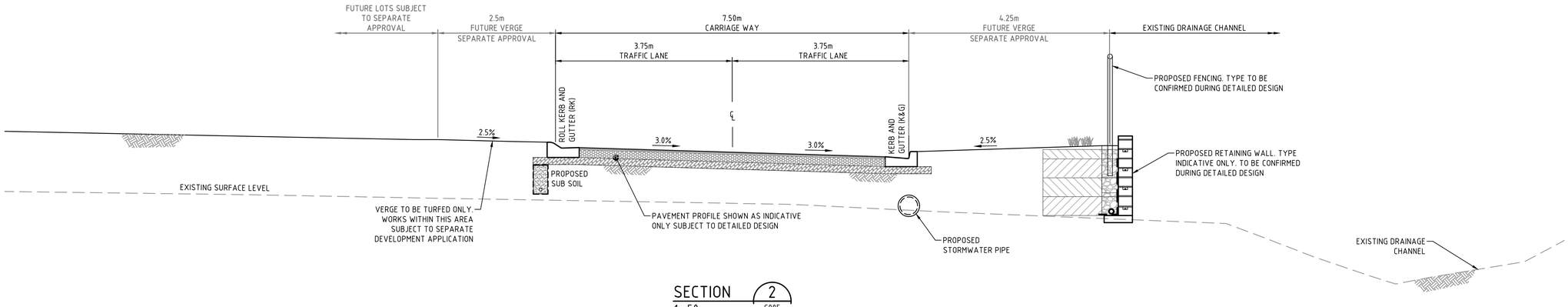
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

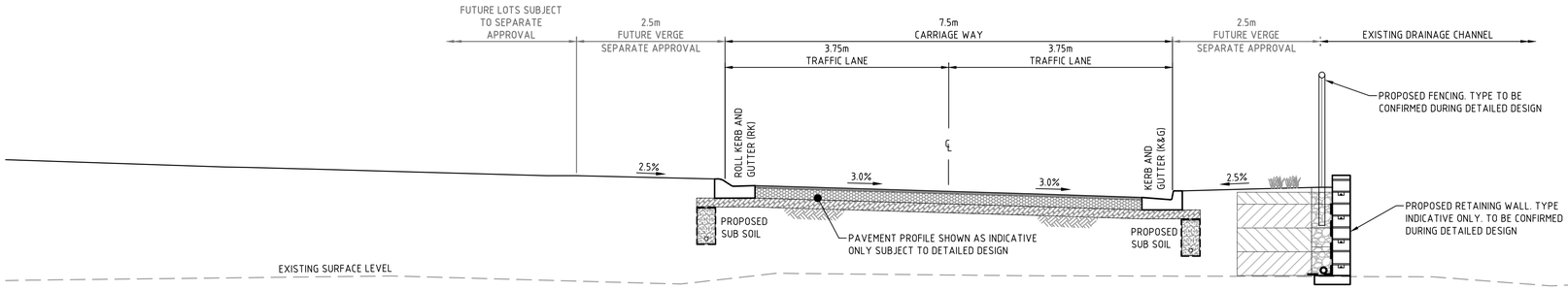
Drawing No.	Project No.	Issue
DAC1005	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1005.dwg



SECTION 2 (C005)
1 : 50



SECTION 1 (C005)
1 : 50

Issue	Description	Date
G	ISSUE FOR APPROVAL	28-03-19
F	ISSUE FOR APPROVAL	12-12-18
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 1 2 3 4 5m

1 : 50 @ A1 1 : 100 @ A3

Client

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PTY LIMITED

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Scales	1 : 50 @ A1	Drawn	GJ
		Designed	GJ
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
TYPICAL SECTIONS
SHEET 1 OF 2

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

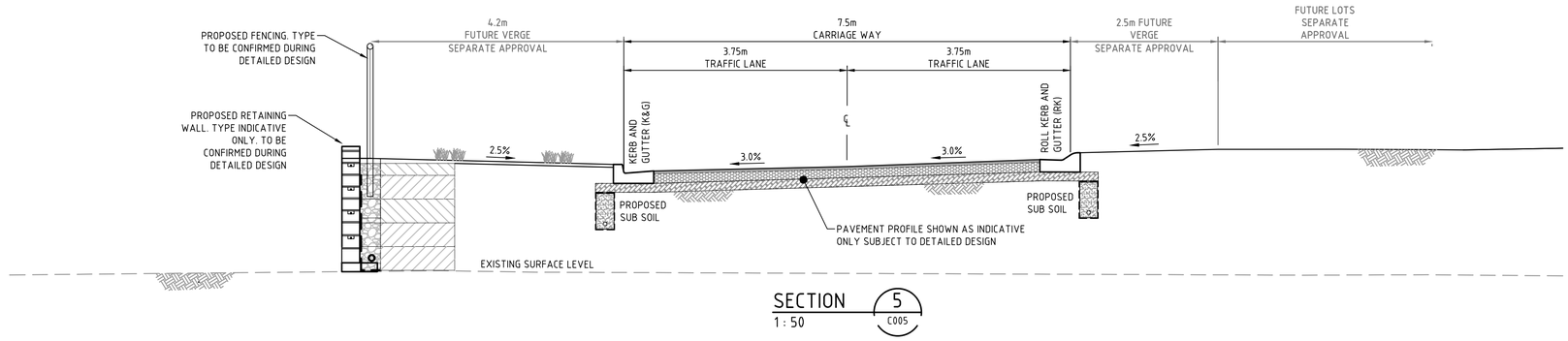
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

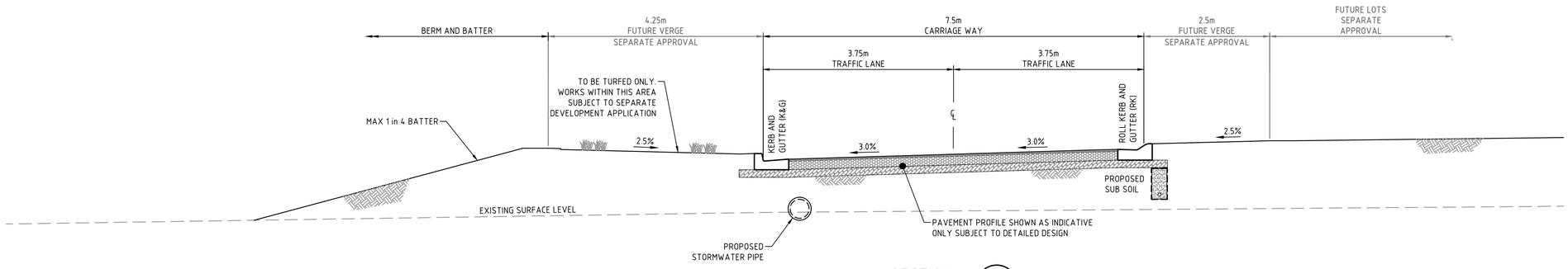
Drawing No.	Project No.	Issue
DAC1006	18-580	G

100mm on Original

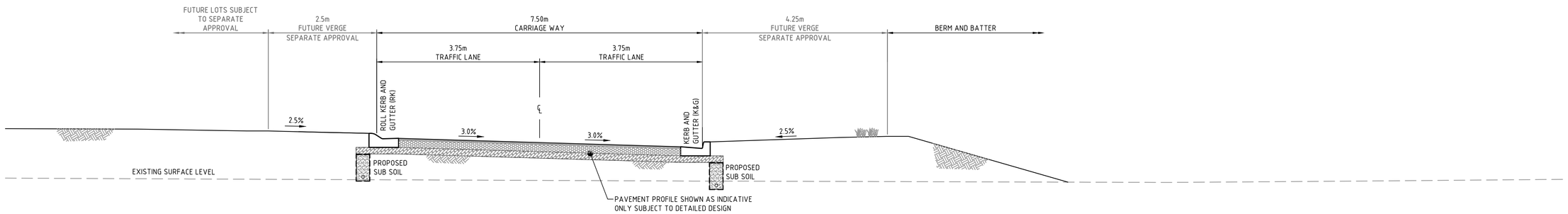
F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1006.dwg



SECTION 5 (C005)
1 : 50



SECTION 4 (C005)
1 : 50



SECTION 3 (C005)
1 : 50

Issue	Description	Date
G	ISSUE FOR APPROVAL	28-03-19
F	ISSUE FOR APPROVAL	12-12-18
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 1 2 3 4 5m

1 : 50 @ A1 1 : 100 @ A3

Client

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Scales	1 : 50 @ A1	Drawn	GJ
		Designed	GJ
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
TYPICAL SECTIONS
SHEET 2 OF 2

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1007	18-580	G

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1007.dwg

CONTINUATION ON SHEET 002

EXISTING DRAINAGE CHANNEL

NEW ROAD (MC01)

RAINGARDEN A

RAINGARDEN B

RAINGARDEN D

RAINGARDEN E

EXISTING TREES TO REMAIN

EXISTING TRESS TO BE REMOVED

TIE PROPOSED RETAINING WALL INTO EXISTING

TAPER PROPOSED KERB OVER 1m TO TIE INTO CROSSOVER

MODIFY CROSSOVER TO SUIT ROAD ALIGNMENT

EXISTING VEHICULAR CROSSING (TO REMAIN)

EXISTING CONCRETE PATH (TO REMAIN)

RAISED ACCESSWAY WITH VISIBLE CRUSHED CONSTRUCTION MATERIAL

THE SUPPLIED DBYD INFORMATION APPEARS TO BE OUT OF DATE AND INCORRECT - SEE THE SPECIFIC DBYD NOTE

EXTENTS OF PROPOSED ROAD BATTER

EXTENTS OF PROPOSED CREEK BATTER

MAX 1 In 4 BATTER

0.50 BERM

REFER TO DRAWINGS DAC1110-DAC1116 FOR DETAILS

NARRABEEN CREEK

EXISTING CREEK

MACPHERSON STREET

MACPHERSON

DIRT/SAND AREA

DENSE OVERGROWN VEGETATION

CONCRETE AREA

CONCRETE DRIVEWAY

BITUMEN SURFACE

CONCRETE SURFACE

SITEWORKS LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING CONTOUR
- EXISTING 20m ASSET PROTECTION ZONE
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- PROPOSED BOUNDARY
- PROPOSED EASEMENT
- PROPOSED CREEK CENTERLINE
- PROPOSED 25m RIPARIAN CORRIDOR
- PROPOSED 25m PRIVATE BUFFER
- K&G — KERB & GUTTER
- RK — ROLL TOP KERB AND GUTTER
- BATTER (SHOWN AS COLOUR ORANGE FOR CREEK BATTERS)
- 5.0 — CONTOUR (0.2m INTERVAL)
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- 375ø — STORMWATER PIPE (SHOWING SIZE)
- STORMWATER KERB INLET PIT
- STORMWATER SURFACE INLET PIT
- A\1 — STORMWATER PIT NUMBER
- STORMWATER RAINGARDEN
- SUBSOIL PIPE
- FP — SUBSOIL FLUSHING POINT
- IR — SUBSOIL INTERMEDIATE RISER

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT
2. REFER DRAWING DAC1020 FOR CIVIL DETAILS.
3. REFER DRAWING DAC1021-1023 FOR STORMWATER DETAILS.
4. DRIVEWAYS ARE SHOWN FOR COORDINATION PURPOSES ONLY AND ARE SUBJECT TO INDIVIDUAL LOT APPROVALS.
5. REFER TO DACC110-DAC116 FOR CREEK WORKS

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
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C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 5 10 15 20m

1 : 200 @ A1 1 : 400 @ A3

Client

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Scales	1 : 200 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project

2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title

SITEWORKS AND STORMWATER PLAN
SHEET 1

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

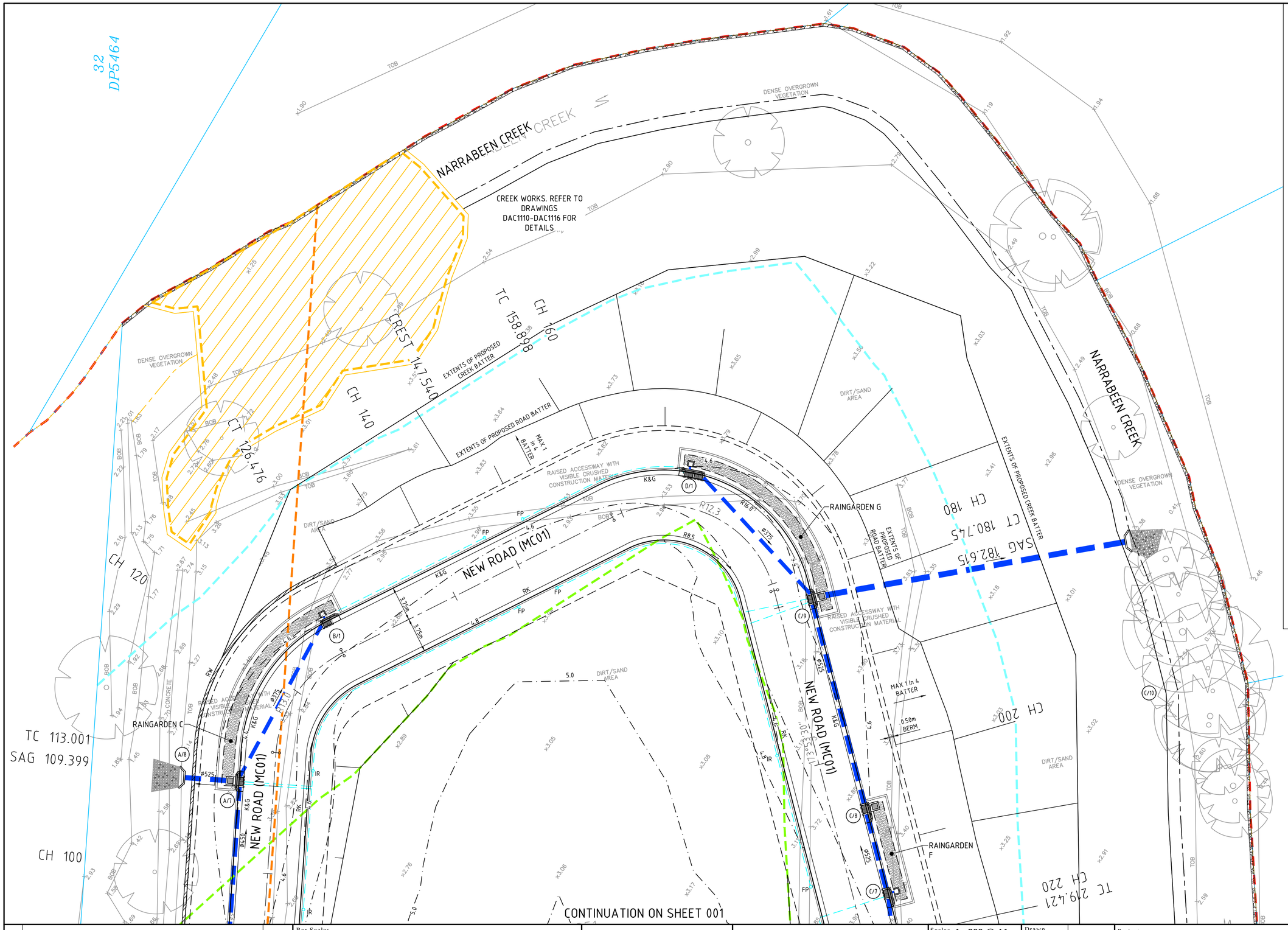
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1010	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1010.dwg



SITEWORKS LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING CONTOUR
- EXISTING 20m ASSET PROTECTION ZONE
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- PROPOSED BOUNDARY
- PROPOSED EASEMENT
- PROPOSED CREEK CENTERLINE
- PROPOSED 25m RIPARIAN CORRIDOR
- PROPOSED 25m PRIVATE BUFFER
- K&G — KERB & GUTTER
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- BATTER (SHOWN AS COLOUR ORANGE FOR CREEK BATTERS)
- CONTOUR (0.2m INTERVAL)
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NOTES

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2. REFER DRAWING DAC1020 FOR CIVIL DETAILS.
3. REFER DRAWING DAC1021-1023 FOR STORMWATER DETAILS.
4. DRIVEWAYS ARE SHOWN FOR COORDINATION PURPOSES ONLY AND ARE SUBJECT TO INDIVIDUAL LOT APPROVALS.
5. REFER TO DACC110-DAC116 FOR CREEK WORKS

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

100mm on Original

Bar Scales

0 5 10 15 20m

1 : 200 @ A1 1 : 400 @ A3

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Scales 1 : 200 @ A1
Grid MGA
Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
SITEWORKS AND
STORMWATER
PLAN
SHEET 2

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1011	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1011.dwg

BULK EARTHWORKS VOLUMES

	DEPTH (mm)	STRIP VOL (m^3)	CUT (m^3)	FILL (m^3)	VOLUME (m^3)
LANDSCAPE	150	-956	-6	15,127	+14,165
PAVEMENT	380	-243	0	2,448	+2,205
CREEK	150	-812	-6,027	131	-6,708
VALUE		-2,011	-6,033	17,706	
BALANCE					+9,662 (IMPORT)

BULK EARTHWORKS LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING CONTOUR (3.0)
- EXISTING 20m ASSET PROTECTION ZONE
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- PROPOSED EASEMENT
- CONTOUR (0.2m INTERVAL) (5.0)
- SPOT LEVEL (BE 44.45)

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT
2. REFER DRAWING C020 FOR CIVIL DETAILS.
3. REFER DRAWING C021-023 FOR STORMWATER DETAILS.
4. DRIVEWAYS ARE SHOWN FOR COORDINATION PURPOSES ONLY AND ARE SUBJECT TO INDIVIDUAL LOT APPROVALS.
5. PROPOSED FOOTPATH AND LANDSCAPE THICKNESS ASSUMED TO BE 150mm.
6. PROPOSED ROAD PAVEMENT THICKNESS ASSUMED TO BE 380mm.
7. EXISTING SURFACE ASSUMED TO BE STRIPPED 100mm.
8. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - PROPOSED RETAINING WALL EARTHWORKS AND BACKFILL MATERIAL
   - BLENDING OF STRIPPED TOPSOIL MATERIAL
   - STORMWATER PIPE AND UTILITY TRENCHING EXCAVATION
   - EARTHWORKS FILL ABOVE PROPOSED STRUCTURE

CUT\FILL DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-100	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	1.0	m	
1.0	to	2.0	m	
2.0	to	3.0	m	
3.0	to	4.0	m	
4.0	to	5.0	m	
5.0	to	6.0	m	
6.0	to	7.0	m	
7.0	to	8.0	m	
8.0	to	100	m	

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

100mm on Original

Client

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Scales	1 : 400 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
BULK
EARTHWORKS
PLAN

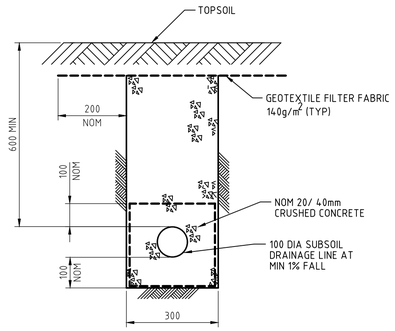
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

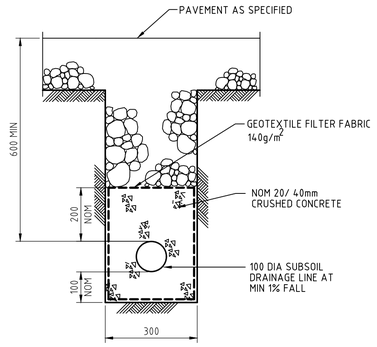
A1

Drawing No.	Project No.	Issue
DAC1015	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1015.dwg



SUBSOIL IN LANDSCAPED AREAS
SCALE 1:10



SUBSOIL IN PAVED AREAS
SCALE 1:10

NOTES:
1. BACKFILL IS TO BE CLEAN FILLING SAND AND COMPACTED

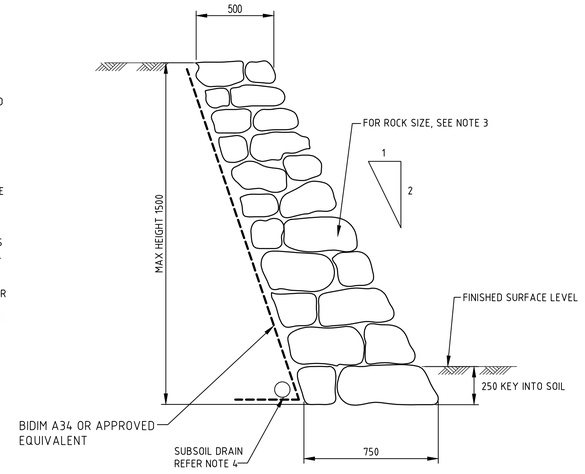
2. FOUNDATION TO BE APPROVED FOR A SAFE BEARING CAPACITY OF 200 KPa PRIOR TO CONSTRUCTION

3. ROCK IS TO BE SOUND DURABLE SANDSTONE OR OTHER APPROVED MATERIAL AND AT LEAST 0.5 SQUARE METRES PLAN AREA

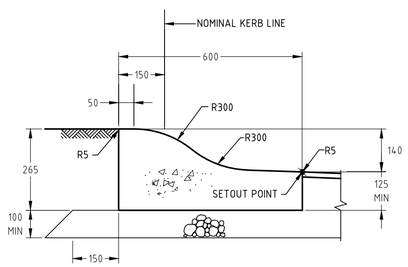
4. A CONTINUOUS 100mm DIA SUBSOIL DRAIN IS TO BE INSTALLED AT THE REAR OF THE WALL. DISCHARGE AT PRECAST HEADWALL

5. ROCKS SHALL BE PLACED IN SUCH A MANNER THAT THEY ARE STABLE AND INTERLOCKING AND LAID ROUGHLY COURSED AND BEDDED ON THEIR BROADEST BASE.

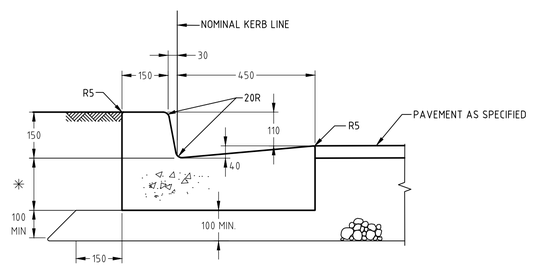
6. WALL TYPE AND DETAIL IS TO BE CONFIRMED BY STRUCTURAL ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION



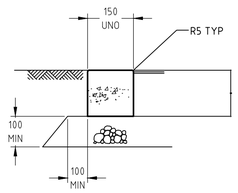
MASS ROCK WALL
SCALE 1:20



ROLL KERB AND TOE (RK&T)
SCALE 1:10



KERB AND GUTTER (K&G)
SCALE 1:10
✳ TO SUIT PAVEMENT DEPTH MIN. 150mm



CONCRETE EDGE STRIP (ES)
SCALE 1:10

Issue	Description	Date
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B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 100 200 400 600 800 1000mm
1 : 10 @ A1 1 : 20 @ A3

0 500 1000 1500 2000mm
1 : 20 @ A1 1 : 40 @ A3

Client
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Scales	AS SHOWN
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
SITEWORKS
DETAILS

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Status
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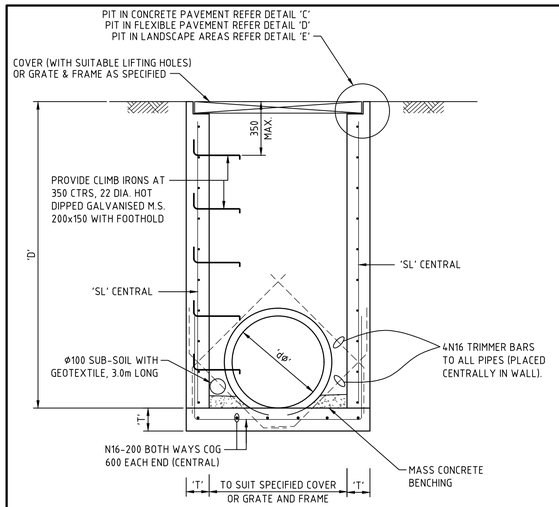
A1

Drawing No.	Project No.	Issue
DAC1020	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1020.dwg



PIT TYPE 'A' DETAIL
SURFACE INLET PIT
FOR PIPES UP TO 525ø

SCALE: 1:20

PIPE DIA. 'dØ'	WIDTH 'W'	DEPTH 'D'	WALL 'T'	FABRIC/COV 'SL'
375	650	800	150	SL72
	650	1200	150	SL72
	650	1600	150	SL72
	650	2000	150	SL72
	650	2400	150	SL72
450	650	800	150	SL72
	650	1200	150	SL72
	650	1600	150	SL72
	650	2000	150	SL72
	650	2400	150	SL72
525	650	800	150	SL72
	650	1200	150	SL72
	650	1600	150	SL72
	650	2000	150	SL72
	650	2400	150	SL72

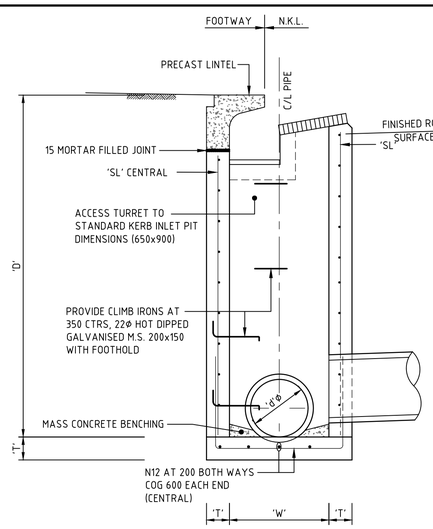
NOTE

1. FOR PIT SIZE REFER TO TABLE (900 MIN LONG).
2. REINFORCING MESH IS TO BE BENT TO LAP 300 AROUND ALL CORNERS. VERTICAL BARS ARE NOT TO BE CUT. ALTERNATELY PROVIDE N12 "L" BARS (500x500) AT 400 VERTICAL CTS.
3. COMPRESSIVE STRENGTH (F'c) FOR CAST IN SITU CONCRETE SHALL BE A MINIMUM 32 MPa AT 28 DAYS.
4. TOP OF BENCHING SHALL BE ½ OF OUTLET PIPE DIAMETER.
5. 100mm SUBSOIL DRAINAGE PIPE 3000 LONG WRAPPED IN FABRIC SOCK TO BE PROVIDE ADJACENT TO INLET PIPES.
6. ALL PITS SHALL BE PROVIDED WITH A LOCKING CLIP.
7. PIT GRATE TO BE 'WELDLOK' GULLY GRATE GG 78-50 OR APPROVED EQUIVALENT.
8. DURING INSTALLATION OF GRATE AND FRAME CONTRACTOR IS TO ENSURE CLEARANCE BETWEEN LINTEL AND OPENED GRATE (REFER TO INSTALLATION TOLERANCE).
9. PROVIDE STEP IRONS AS INDICATED FOR PITS DEEPER THAN 1200.
10. N12 AT 200 CENTRAL MAY BE USED IN LIEU OF MESH. LAP 500 AT CORNERS
11. CONCRETE STRENGTH - UNLESS NOTED OTHERWISE

ELEMENT	f'c MPa (28 DAYS)	SLUMP	MAX AGG SIZE	CEMENT TYPE
PITS	32	80mm	20mm	GP

12. COVER - UNLESS NOTED OTHERWISE

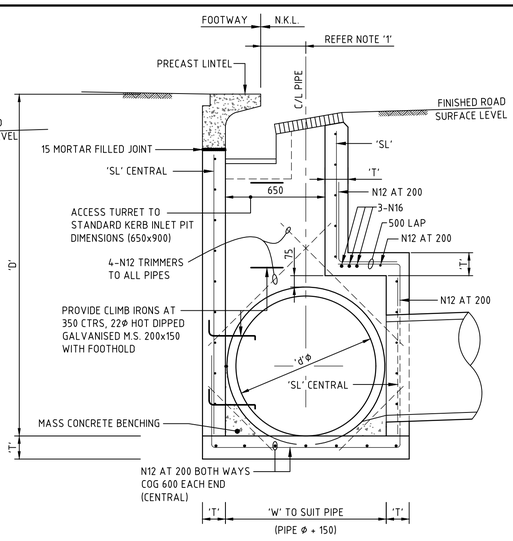
ELEMENT	INTERIOR	EXTERIOR
PITS		45mm
SLAB TOP	45mm	45mm
SLAB BOTTOM	45mm	45mm
BEAM TOP		
BEAM BOTTOM		
BEAM SIDE		
COLUMNS		



PIT TYPE 'B' DETAIL
STANDARD GRATED KERB INLET PIT
FOR PIPES UPTO 525ø

SCALE: 1:20

PIPE DIA. 'dØ'	WIDTH 'W'	DEPTH 'D'	WALL 'T'	FABRIC/COV 'SL'
375	650	800	150	SL72
	650	1200	150	SL72
	650	1600	150	SL72
	650	2000	150	SL72
	650	2400	150	SL72
450	650	800	150	SL72
	650	1200	150	SL72
	650	1600	150	SL72
	650	2000	150	SL72
	650	2400	150	SL72
525	650	800	150	SL72
	650	1200	150	SL72
	650	1600	150	SL72
	650	2000	150	SL72
	650	2400	150	SL72



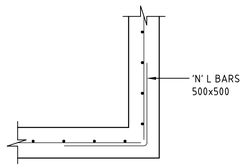
PIT TYPE 'C' DETAIL
STANDARD GRATED KERB INLET PIT
FOR PIPES FROM 600ø TO 1200ø

(ENLARGED CHAMBER)

SCALE: 1:20

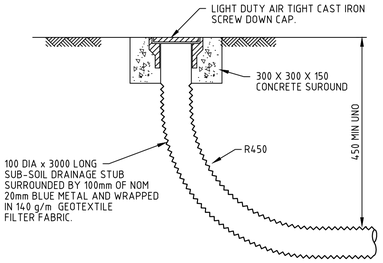
PIPE DIA. 'dØ'	WIDTH 'W'	DEPTH 'D'	WALL 'T'	FABRIC/COV 'SL'
600	850	1200	150	SL72
	850	1600	150	SL72
	850	2000	150	SL72
	850	2400	150	SL72
675	940	1200	150	SL72
	940	1600	150	SL72
	940	2000	150	SL72
	940	2400	150	SL72
750	1020	1200	150	SL72
	1020	1600	150	SL72
	1020	2000	150	SL72
	1020	2400	150	SL72
825	1100	1600	150	SL72
	1100	2000	150	SL72
	1100	2400	150	SL72
900	1180	1600	150	SL72
	1180	2000	150	SL72
	1180	2400	150	SL72
1050	1345	1600	150	SL92
	1345	2000	150	SL92
	1345	2400	150	SL92
1200	1510	2000	150	SL102
	1510	2400	150	SL102
	1510	2800	150	SL102

NOTE 1
150 FOR ø600 DIA.
180 FOR ø675 DIA.
220 FOR ø750 DIA.
255 FOR ø825 DIA.
295 FOR ø900 DIA.
370 FOR ø1050 DIA.
445 FOR ø1200 DIA.



TYPICAL CORNER DETAIL

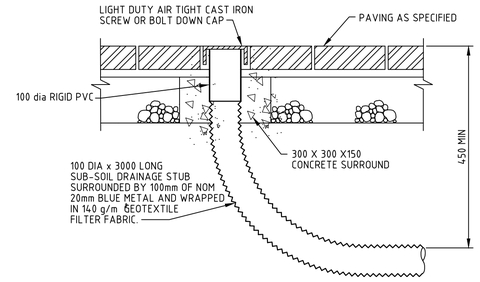
SCALE 1:20



FLUSHING POINT

SCALE 1:10

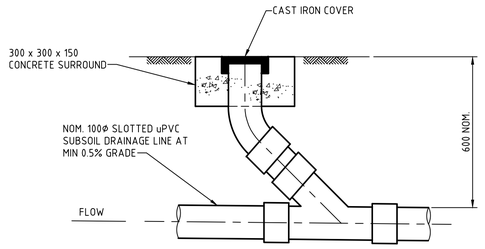
NOTE: SLOTTED RIGID PVC PIPE AND FITTINGS MAY BE USED



FLUSHING POINT IN PAVING

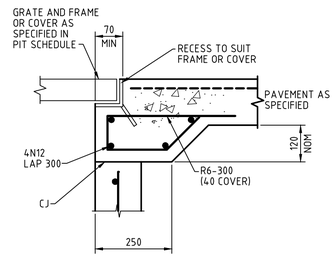
SCALE 1:10

NOTE: SLOTTED RIGID PVC PIPE AND FITTINGS MAY BE USED



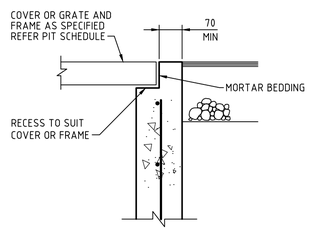
INTERMEDIATE RISER

SCALE 1:10



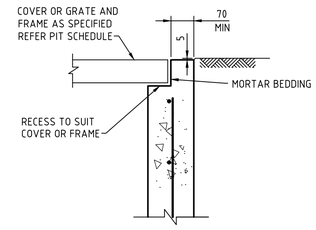
DETAIL "C"

SCALE 1:10



DETAIL "D"

SCALE 1:10



DETAIL "E"

SCALE 1:10

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 100 200 400 600 800 1000mm

1 : 10 @ A1 1 : 20 @ A3

0 500 1000 1500 2000mm

1 : 20 @ A1 1 : 40 @ A3

Client

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Scales	AS SHOWN
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS PACKAGE

Title
STORMWATER DETAILS SHEET 1

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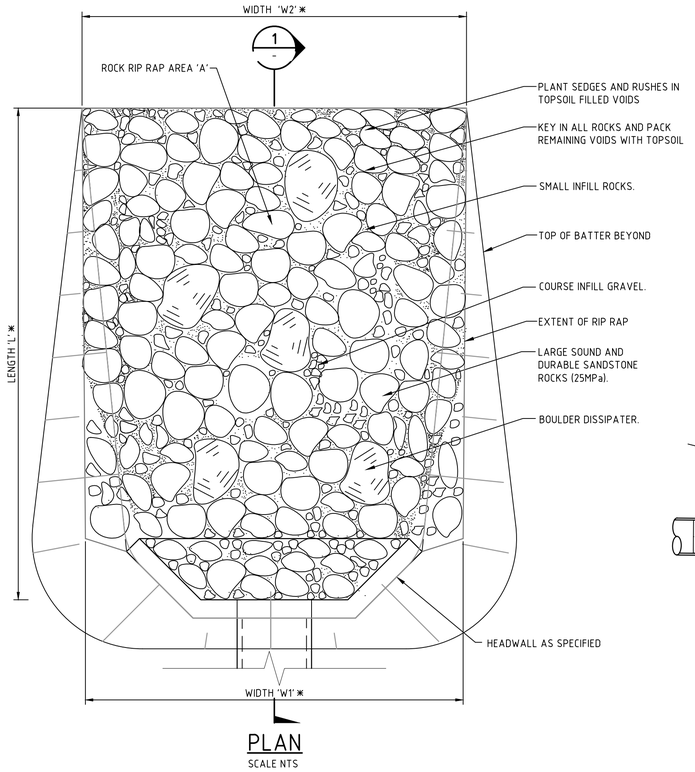
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

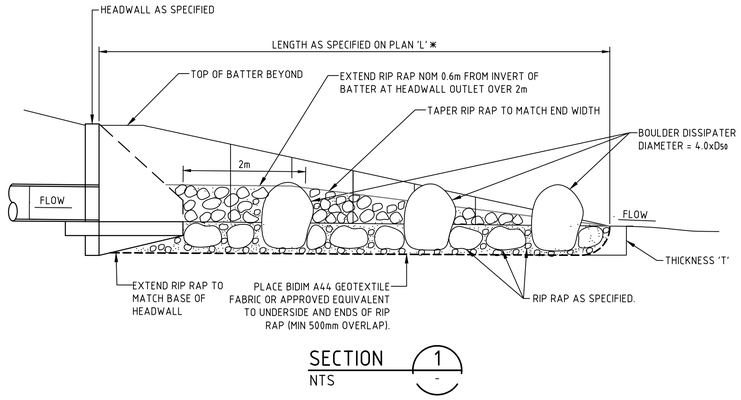
Drawing No.	Project No.	Issue
DAC1021	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1021.dwg



PLAN
SCALE NTS



SECTION 1
NTS

TYPICAL ROCK RIP RAP ENERGY DISSIPATER SCOUR PROTECTION DETAIL

SCALE NTS

*- REFER SCOUR PROTECTION SCHEDULE ON THIS DRAWING

ROCK RIP RAP GRADATION SIZE

SPHERICAL DIA	% OF RIP RAP SMALLER (ie RIP RAP PASSING THROUGH SIEVE)
1.5-2.0 Ds0	100%
Ds0	50%
0.3-0.4 Ds0	10-20%

Ds0 = MEDIAN ROCK SIZE AS SPECIFIED

ROCK GRADATION TABLE

	ds0					ROCK DISTRIBUTION BY %
	200mm	300mm	400mm	500mm	600mm	
ROCK SIZE (mm)	400	600	750	850	900	15-25%
	300	400	525	600	750	20%
	200	300	400	500	600	50%
	75	100	150	150	200	15-25%

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
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D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

100mm on Original

Client
KARIMBLA CONSTRUCTION SERVICES (NSW) PTY LIMITED
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Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales NTS
Grid MGA
Height Datum AHD
Drawn GJ
Designed GJ
Checked AT
Approved

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS PACKAGE

Title
STORMWATER DETAILS SHEET 2

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info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1022	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1022.dwg

BIO-RETENTION FILTER MEDIA SPECIFICATION

MATERIALS:

BIO-RETENTION FILTER MEDIA, TRANSITION LAYER AND DRAINAGE LAYERS TO BE IN ACCORDANCE WITH CURRENT VERSION OF FAWB DOCUMENT "STORMWATER BIO-FILTRATION SYSTEMS ADOPTION GUIDELINES" AND THE FOLLOWING,:

A) BIO-RETENTION FILTER MEDIA

1. BIO-RETENTION MEDIA IS TO BE FREE OF RUBBISH AND DELETERIOUS MATERIAL.
2. BIO-RETENTION FILTER MEDIA SATURATED HYDRAULIC CONDUCTIVITY TO BE 180mm/hr USING TEST METHOD ASTM F1815-06.

3. BIO-RETENTION FILTER MEDIA PARTICLE SIZE DISTRIBUTION IS TO BE AS FOLLOWS:

CLAY & SILT	<3%	(<0.05mm)
VERY FINE SAND	5-30%	(0.05-0.15mm)
FINE SAND	10-30%	(0.15-0.25mm)
MEDIUM TO COARSE SAND	40-60%	(0.25-1.0mm)
COARSE SAND	7-10%	(1.0-2.0mm)
FIN GRAVEL	<3%	(2.0-3.4mm)

THE COMBINED PERCENTAGE OF CLAY AND SILT MUST NOT EXCEED 3% (W/W) UNDER ANY CIRCUMSTANCES.

4. BIO-RETENTION FILTER MEDIA IS TO BE TESTED AND COMPLY WITH THE FOLLOWING REQUIREMENTS:
a) ORGANIC MATTER CONTENT IN ACCORDANCE WITH AS 4419 AT LEAST 3% (W/W)
b) TOTAL NITROGEN (TN) CONTENT <900mg/kg
c) ORTHOPHOSPHATE (PO_4^3) CONTENT - <30mg/kg WHERE PLANTS WITH MODERATE PHOSPHOROUS SENSITIVITY ARE TO BE USED, TOTAL PHOSPHOROUS CONCENTRATION SHOULD BE <20mg/kg.
d) AS SPECIFIED FOR "NATURAL SOILS AND SOIL BLENDS" AS4419 - pH 5.5-7.5 (pH 1.5 IN WATER)
e) ELECTRICAL CONDUCTIVITY (EC) AS SPECIFIED FOR "NATURAL SOILS AND SOILS BLENDS" AS4419 <1.2ds/m
f) DISPENSABILITY - AS SPECIFIED FOR 'NATURAL SOILS AND SOIL BLENDS' AS4419 CATEGORY 1 OR 2
g) TEXTURE - LOAMY SAND AS PER AS4419

5. PRIOR TO PLACEMENT OF THE FILTER MEDIA A STATEMENT IS TO BE SUBMITTED FROM A QUALIFIED HORTICULTURIST CONFIRMING THAT THE SOIL IS CAPABLE OF SUPPORTING A HEALTHY VEGETABLE COMMUNITY.

6. TESTS CONFIRMING THE REQUIREMENTS OF ITEMS 1 TO 4 ARE TO BE SUBMITTED FOR APPROVAL PRIOR TO PLACEMENT OF FILTER MEDIA.

B) DRAINAGE LAYER A

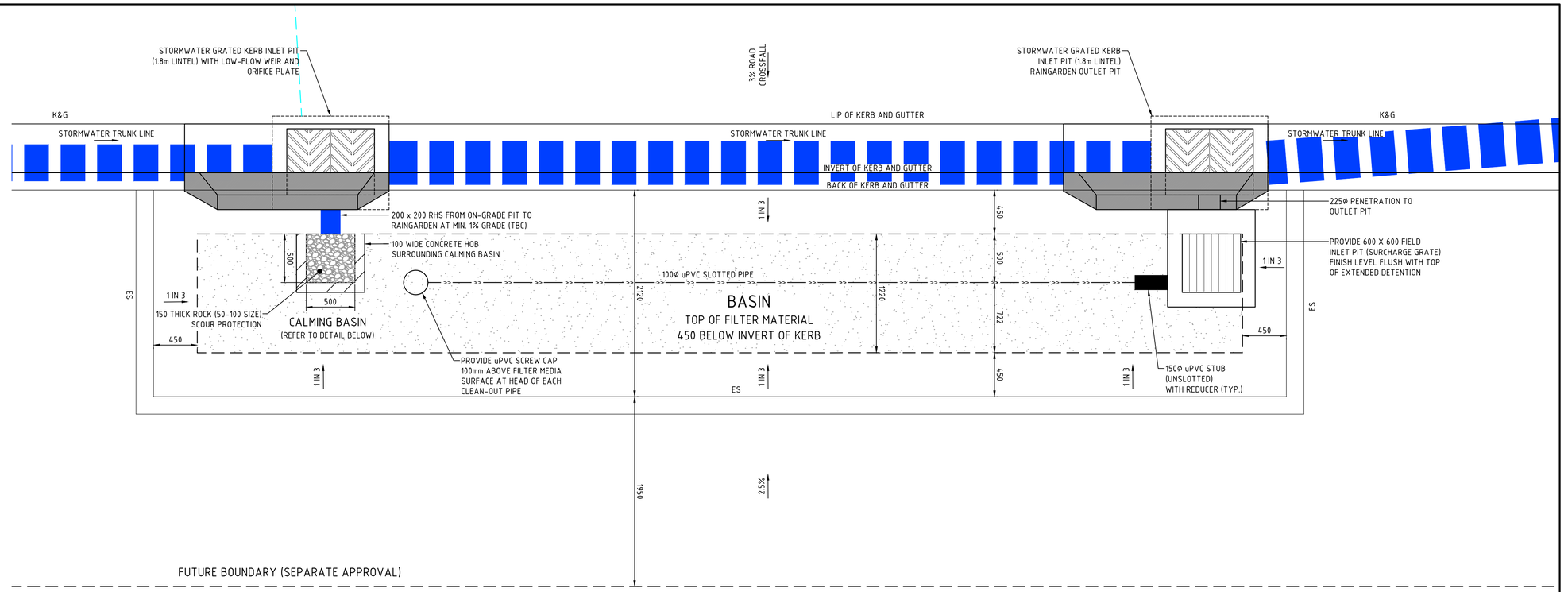
DRAINAGE LAYER MATERIAL IS TO BE CLEAN, FINE GRAVEL, SUCH AS A 2 - 5mm WASHED SCREENING. THE PARTICLE SIZE DISTRIBUTION TO BE:
D_{15} (DRAINAGE LAYER) > 5 x D_{85} (TRANSITION LAYER)
WHERE: D_{15} (DRAINAGE LAYER) IS THE 15TH PERCENTILE PARTICLE SIZE IN THE TRANSITION LAYER MATERIAL (i.e, 15% OF THE SAND IS SMALLER THAN D_{15} mm), AND D_{85} (TRANSITION LAYER) IS THE 85th PERCENTILE PARTICLE SIZE IN THE FILTER MEDIA.

C) DRAINAGE LAYER B

10-20mm CLEAN GRAVEL WITH 2% VOLUME FINE STRAW AND 4-6% VOLUME HARDWOOD CHIPS.

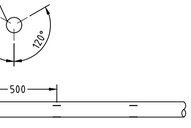
INSTALLATION:

FILTER MATERIAL IS TO BE LIGHTLY COMPACTED EG. A SINGLE PASS WITH A DRUM LAWN ROLLER. UNDER NO CIRCUMSTANCES SHOULD HEAVY EQUIPMENT OR MULTIPLE PASSES BE MADE. FILTER MEDIA SHOULD BE INSTALLED IN TWO LIFTS UNLESS THE DEPTH IS LESS THAN 500mm.



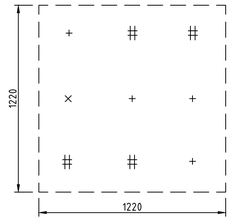
TYPICAL RAINGARDEN PLAN

SCALE 1:25



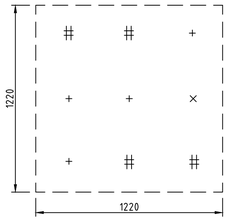
TYPICAL SLOTTED PIPE DETAILS

1:20



TYPICAL PLANTING LOCATION GRID A

SCALE 1:20



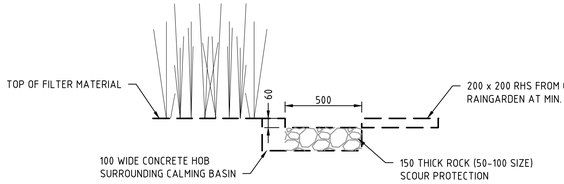
TYPICAL PLANTING LOCATION GRID B

SCALE 1:20

NOMINAL 10 PLANTS PER SQUARE METRE, SUBJECT TO COUNCIL APPROVAL PRIOR TO THE COMMENCEMENT OF CONSTRUCTION
JUNCUS USITATUS "COMMON RUSH" - (MAX 1m HEIGHT)

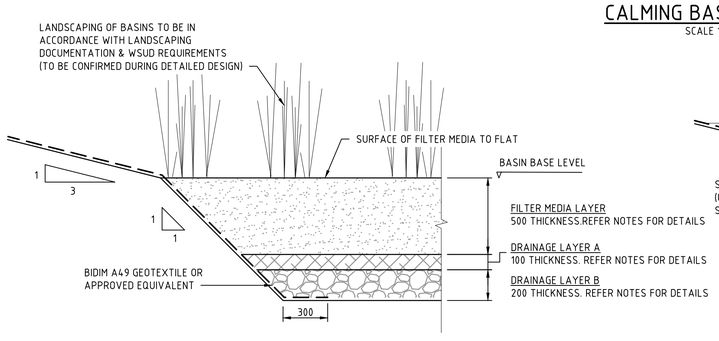
× CYPREUS POLYSTACHYOS - (MAX 0.6m HEIGHT)

+ THEMEDA TRIANDA THOMEDA AUSTRALIS "KANGAROO GRASS" - (MAX 0.6m HEIGHT)



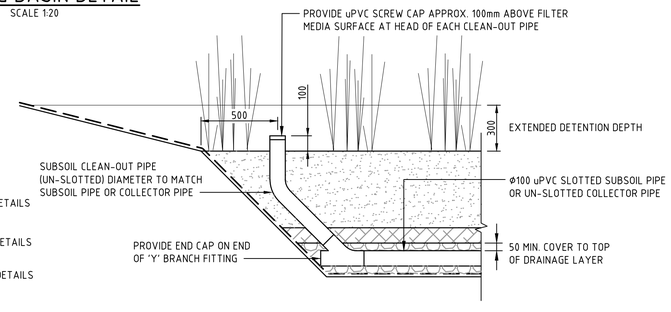
CALMING BASIN DETAIL

SCALE 1:20



TYPICAL BIO-RETENTION FILTER MEDIA AND EDGE TREATMENT DETAIL

SCALE 1:20



SUBSOIL PIPE FLUSH-OUT DETAIL

SCALE 1:20

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 500 1000 1500 2000mm
1 : 20 @ A1 1 : 40 @ A3

0 0.5 1 1.5 2 2.5m
1 : 25 @ A1 1 : 50 @ A3

Client
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Internet: http://www.meriton.com.au

Scales	AS SHOWN	Drawn	GJ
		Designed	GJ
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS PACKAGE

Title
STORMWATER DETAILS SHEET 3

Civil Engineers and Project Managers
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Level 7, 153 Walker Street
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info@atl.net.au

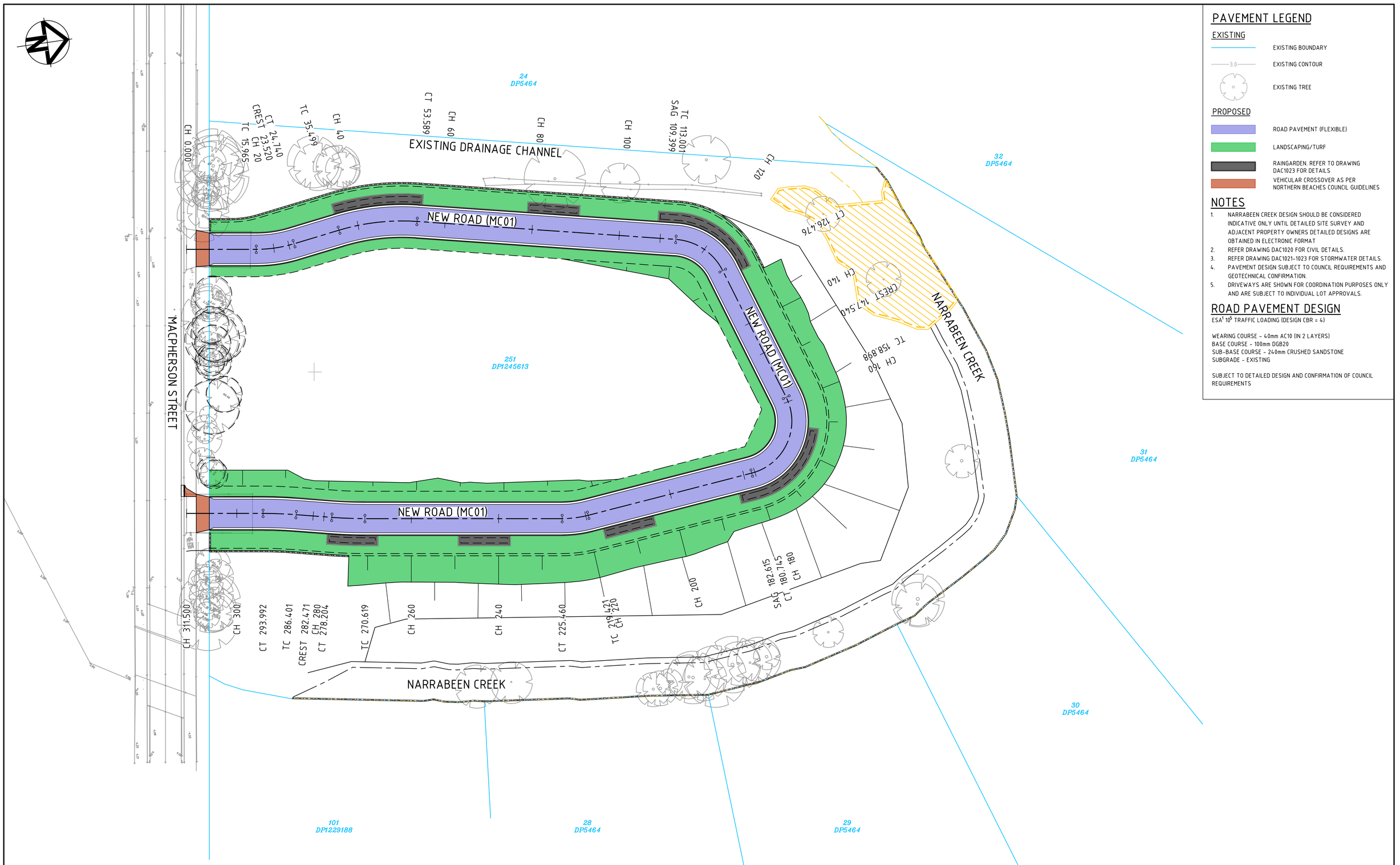
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1023	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1023.dwg



PAVEMENT LEGEND

EXISTING

- EXISTING BOUNDARY
- 3.0 EXISTING CONTOUR
- EXISTING TREE

PROPOSED

- ROAD PAVEMENT (FLEXIBLE)
- LANDSCAPING/TURF
- RAINGARDEN. REFER TO DRAWING DAC1023 FOR DETAILS
- VEHICULAR CROSSOVER AS PER NORTHERN BEACHES COUNCIL GUIDELINES

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT
2. REFER DRAWING DAC1020 FOR CIVIL DETAILS.
3. REFER DRAWING DAC1021-1023 FOR STORMWATER DETAILS.
4. PAVEMENT DESIGN SUBJECT TO COUNCIL REQUIREMENTS AND GEOTECHNICAL CONFIRMATION.
5. DRIVEWAYS ARE SHOWN FOR COORDINATION PURPOSES ONLY AND ARE SUBJECT TO INDIVIDUAL LOT APPROVALS.

ROAD PAVEMENT DESIGN

ESA[1] 10^5 TRAFFIC LOADING (DESIGN CBR = 4)

WEARING COURSE - 40mm AC10 (IN 2 LAYERS)
BASE COURSE - 100mm DGB20
SUB-BASE COURSE - 240mm CRUSHED SANDSTONE
SUBGRADE - EXISTING

SUBJECT TO DETAILED DESIGN AND CONFIRMATION OF COUNCIL REQUIREMENTS

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

Client

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Scales	1 : 400 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project

2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title

PAVEMENT
SIGNAGE AND
LINEMARKING
PLAN

Civil Engineers and Project Managers
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Level 7, 153 Walker Street
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Tel: 02 9439 1777
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info@atl.net.au

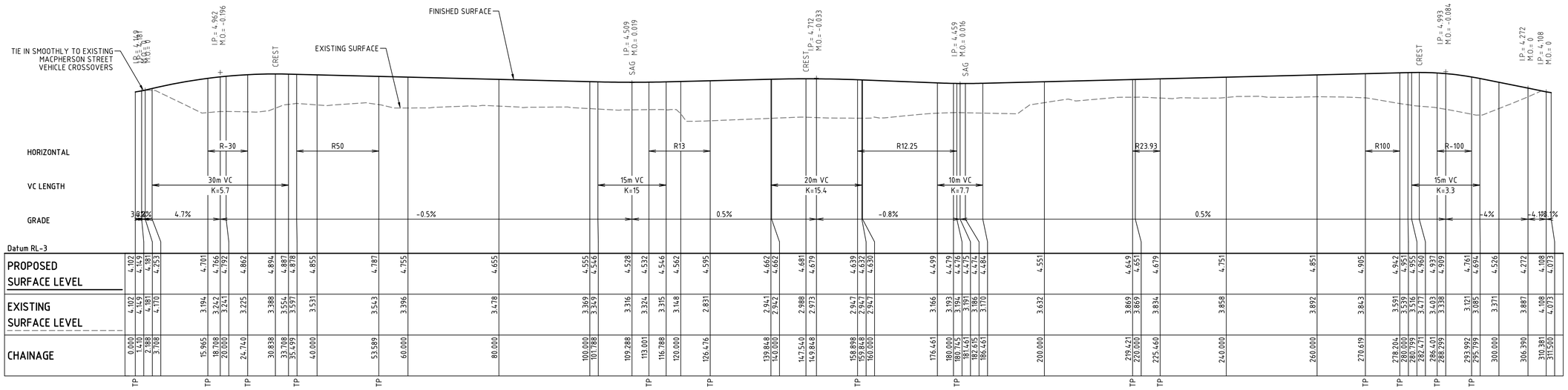
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1030	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1030.dwg



MC01 LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED
Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 500 (H) @ A1
1 : 100 (V) @ A1

Grid MGA
Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
LONGITUDINAL
SECTION

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

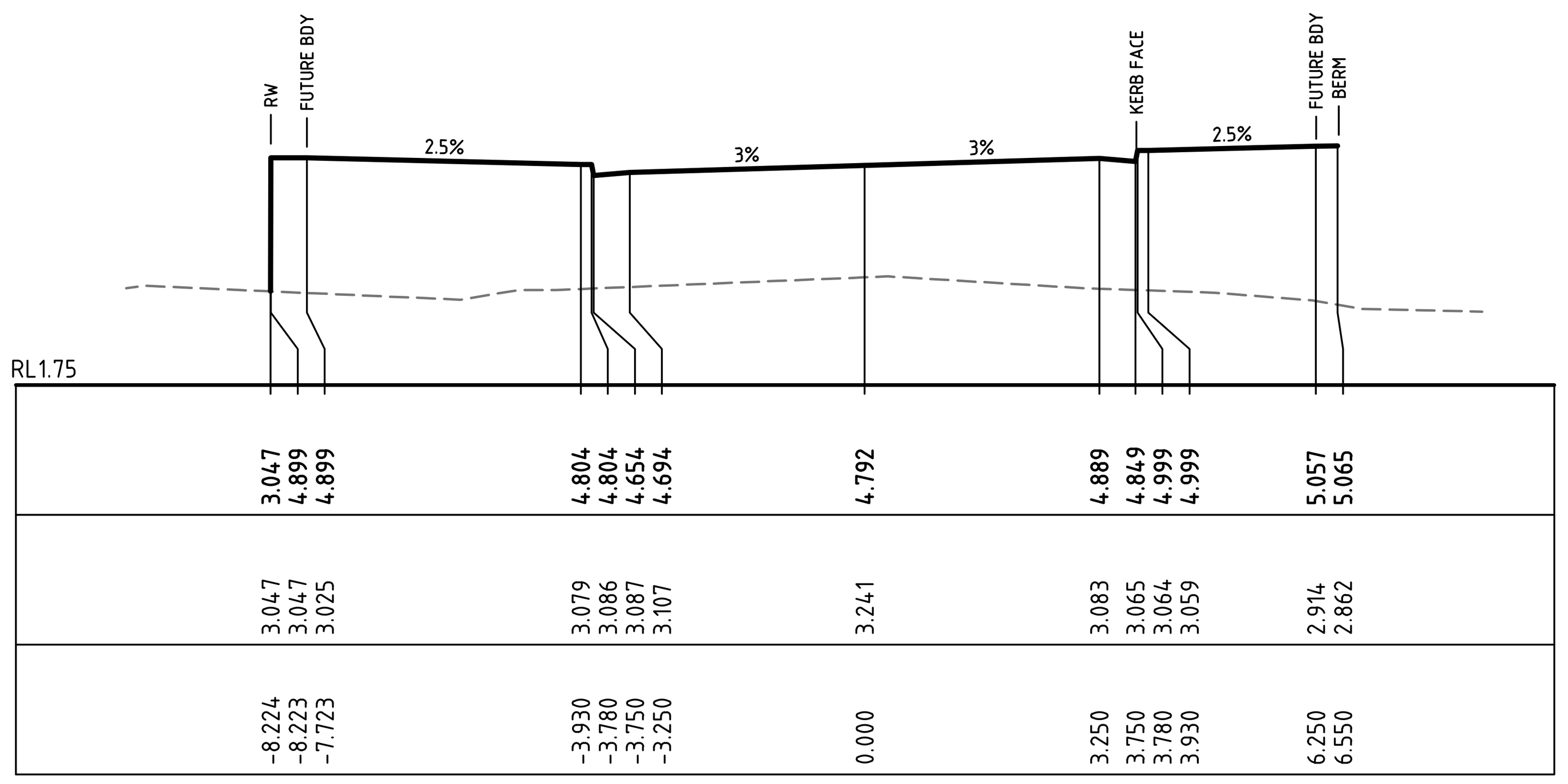
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

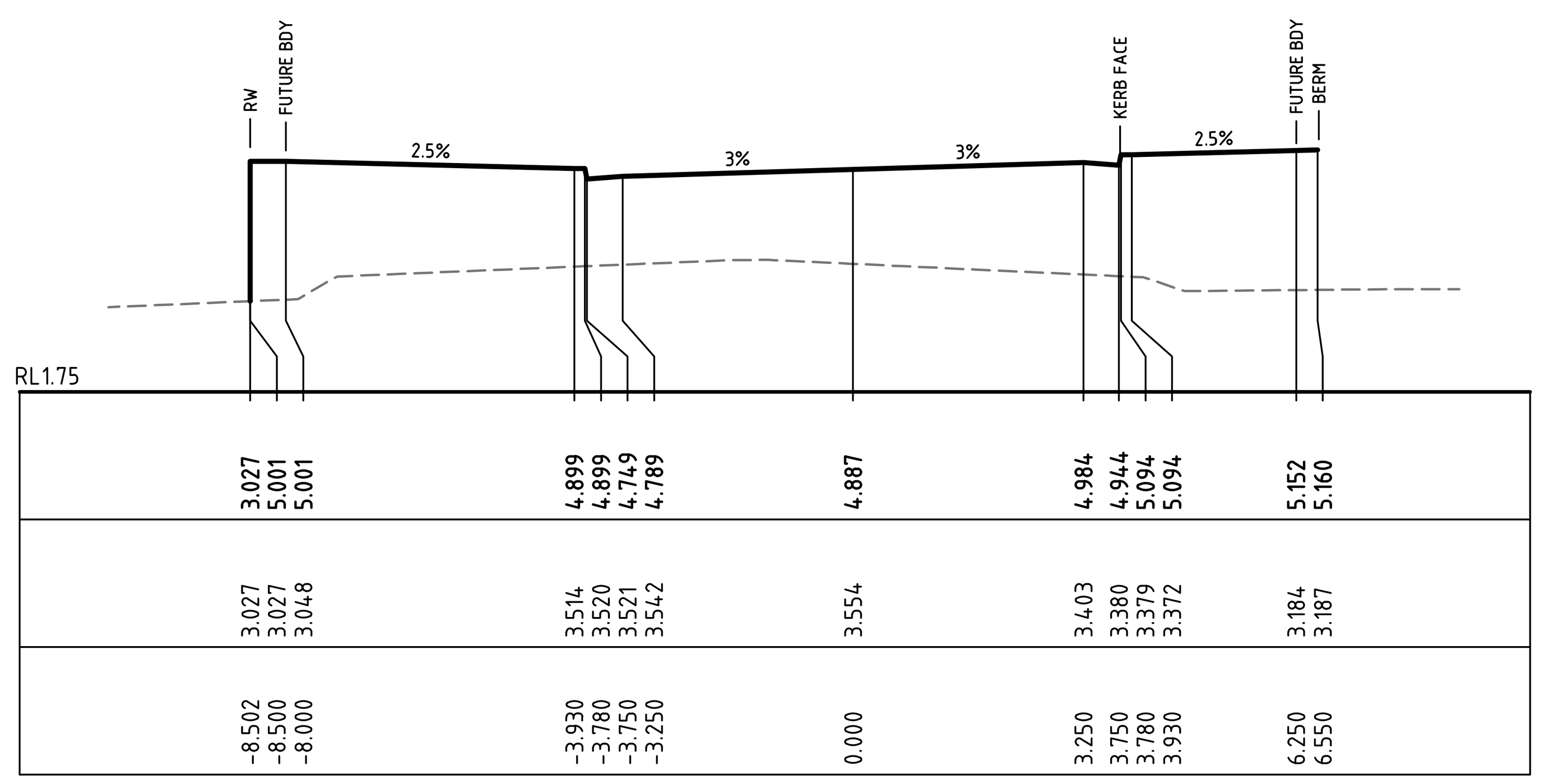
Drawing No.	Project No.	Issue
DAC1040	18-580	F

100mm on Original

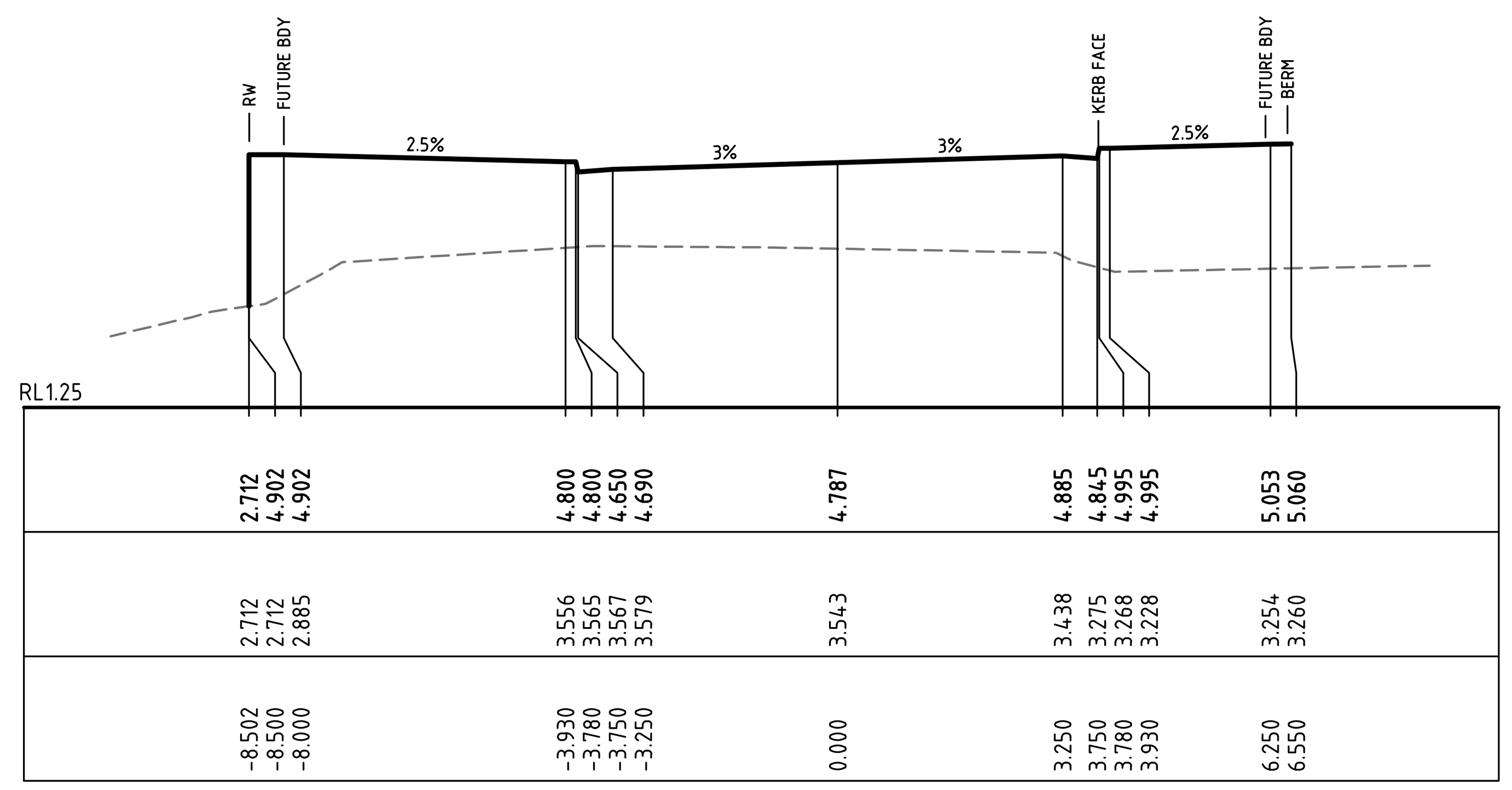
F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1040.dwg



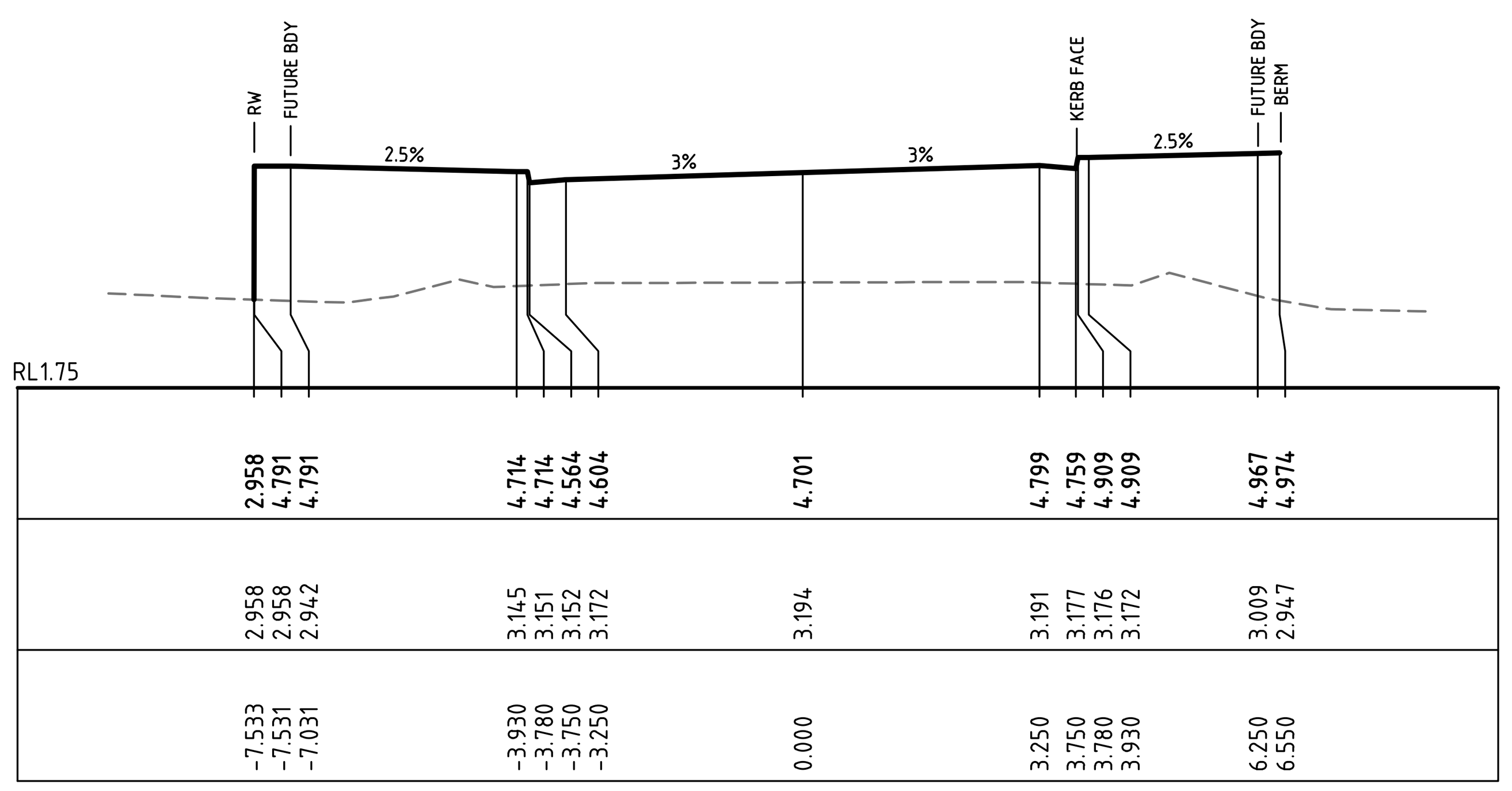
CH 20



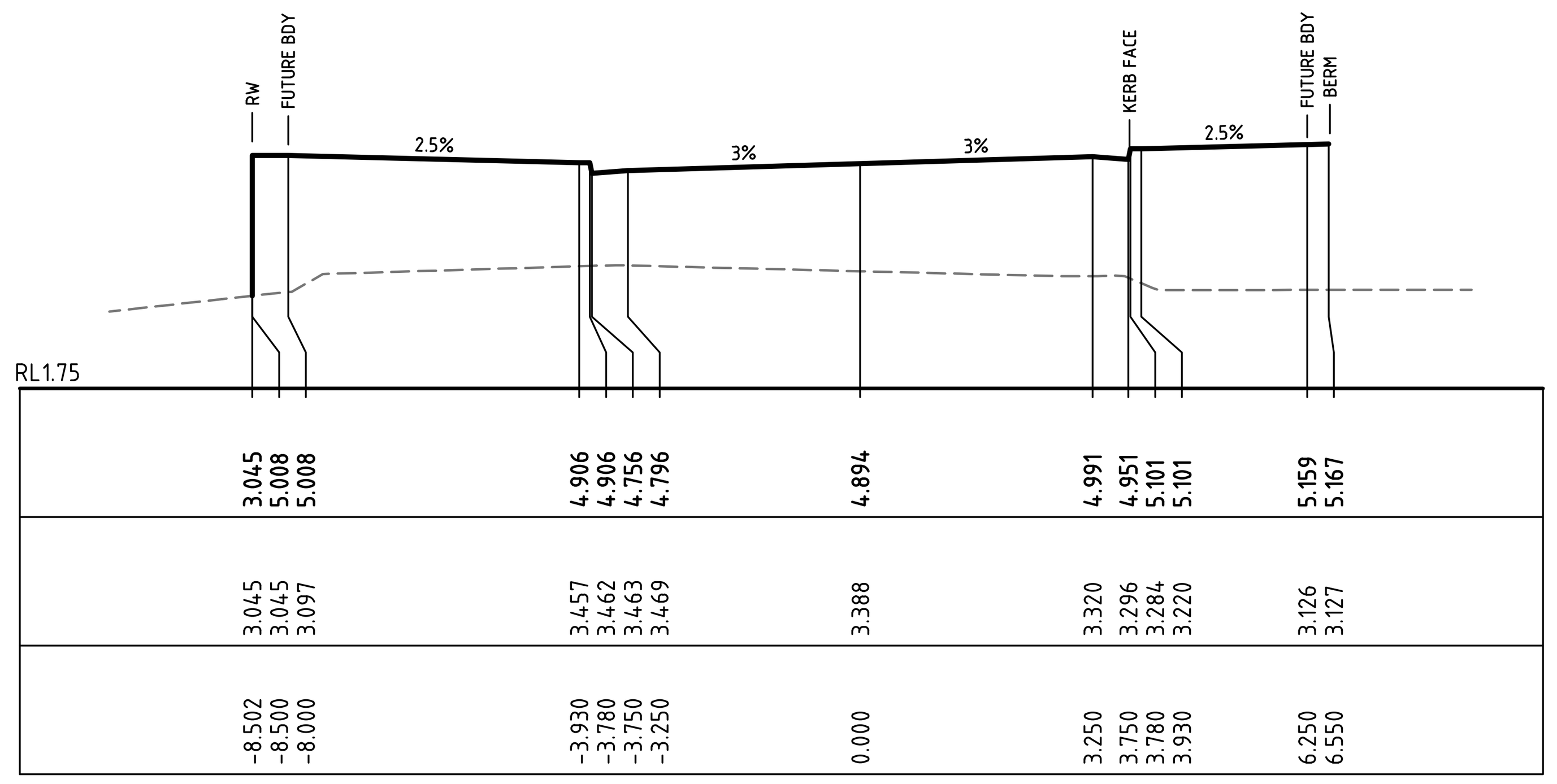
CH 33.708



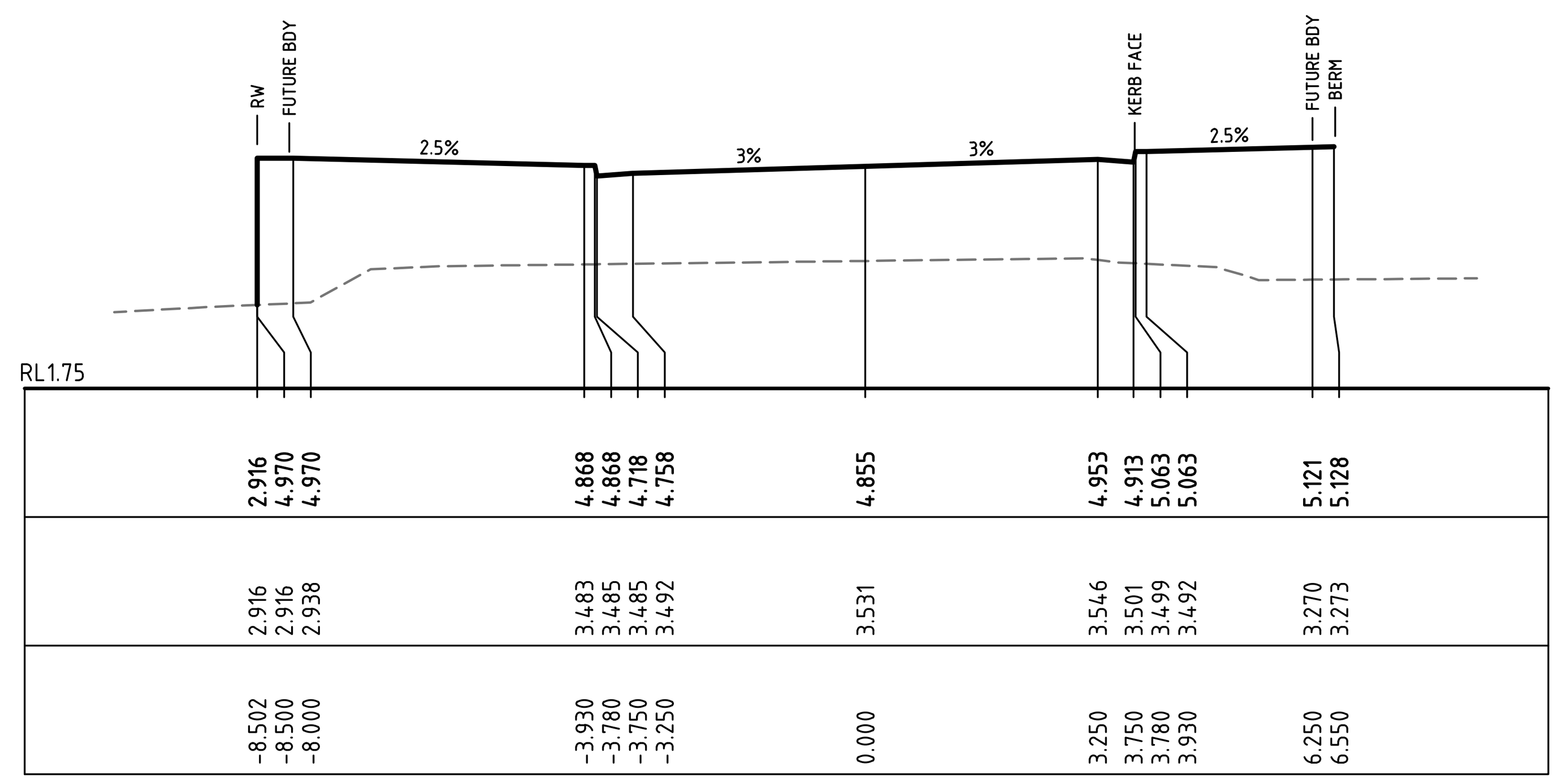
CH 53.589



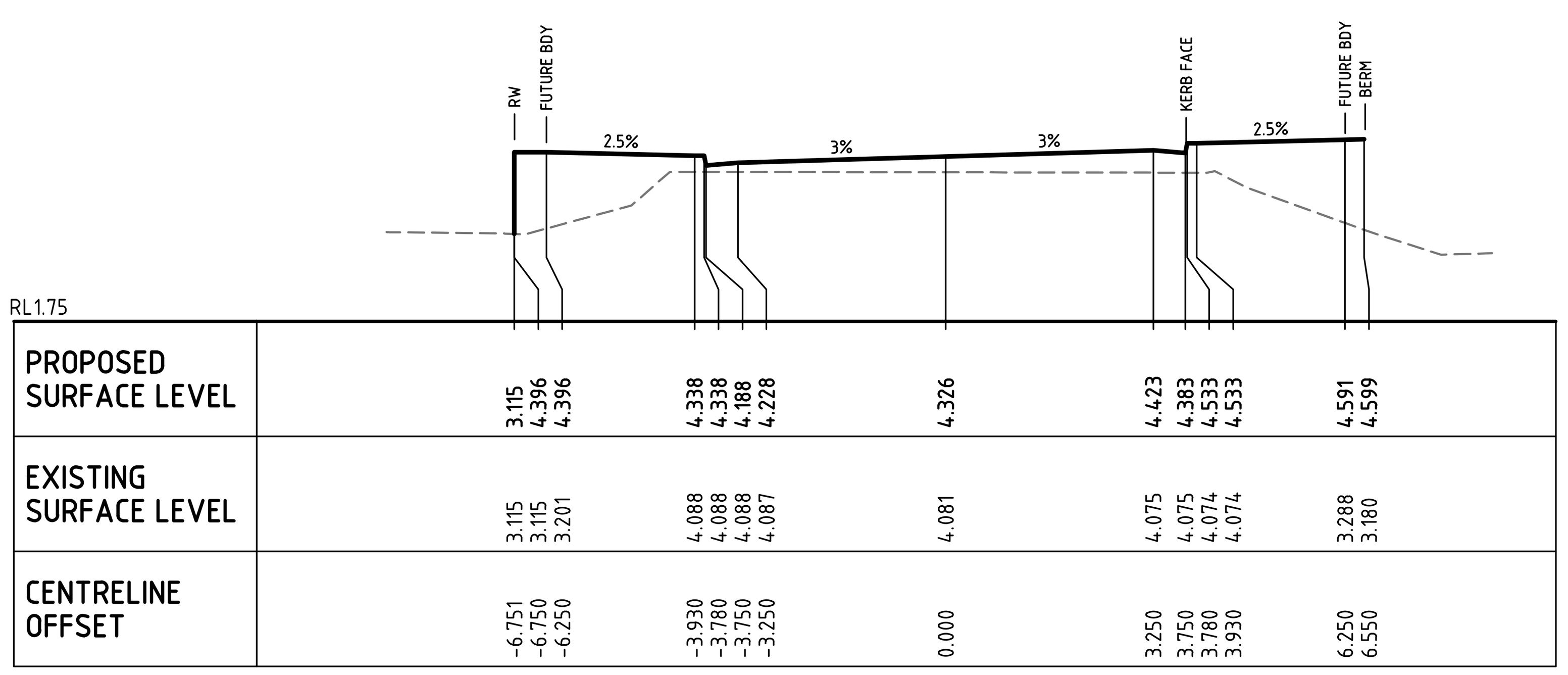
CH 15.965



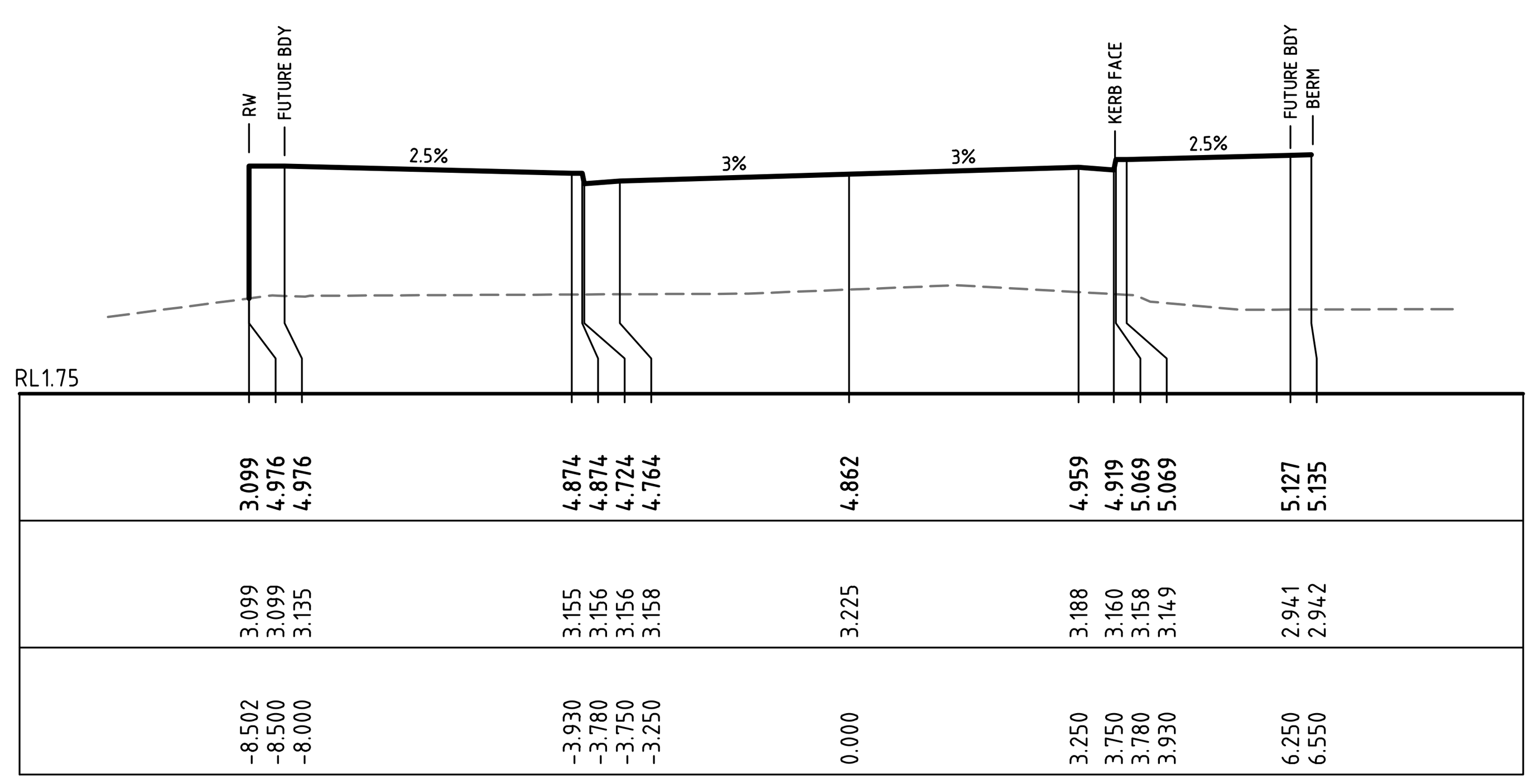
CH 30.838



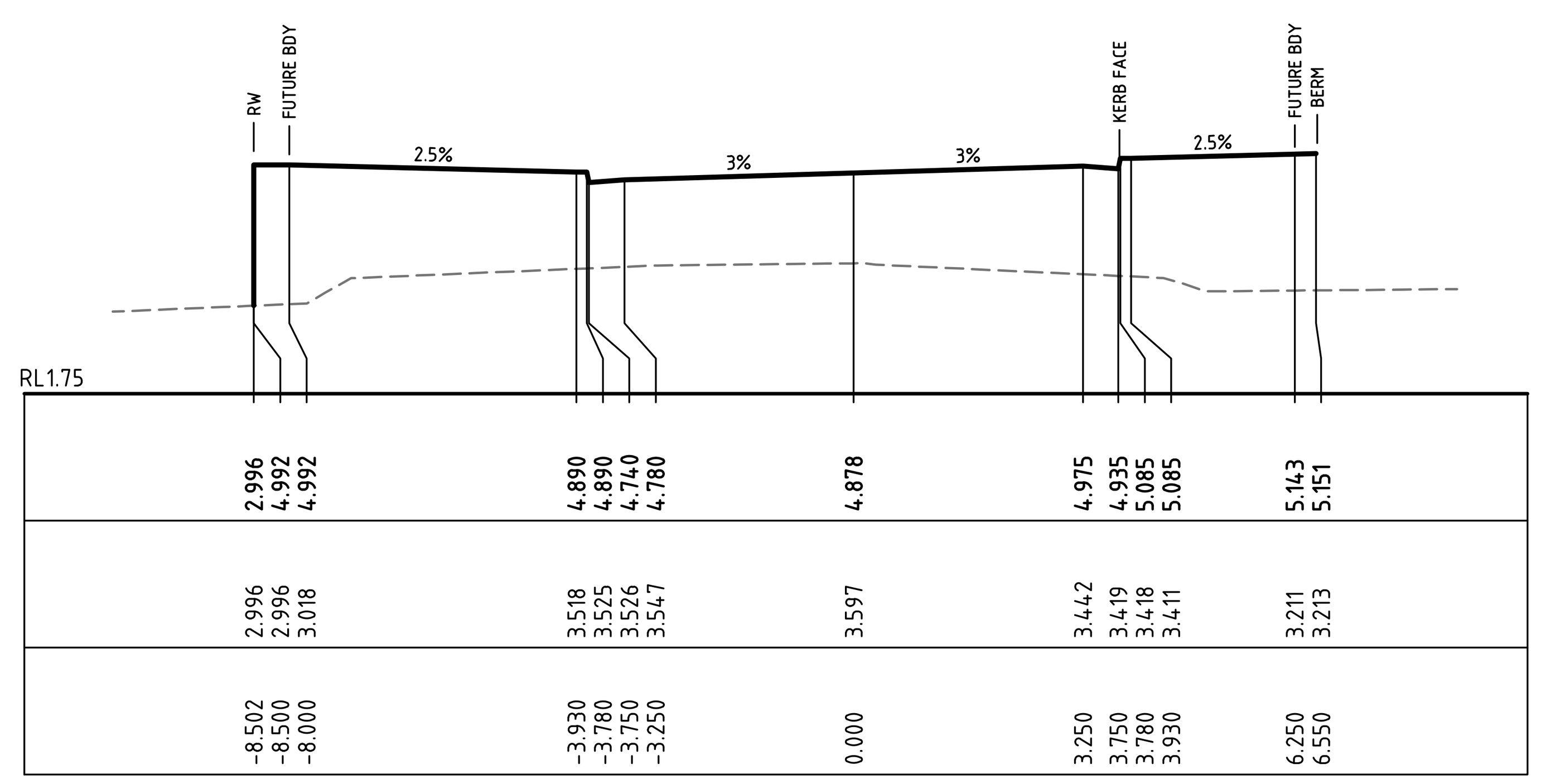
CH 40



CH 5.3



CH 24.74



CH 35.499

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Client

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Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 100 @ A1
Grid MGA
Height Datum AHD

Drawn GJ
Designed GJ
Checked AT
Approved

Project
2 MACPHERSON STREET WARRIEWOOD EARLY WORKS PACKAGE

Title
MC01 CROSS SECTIONS SHEET 1

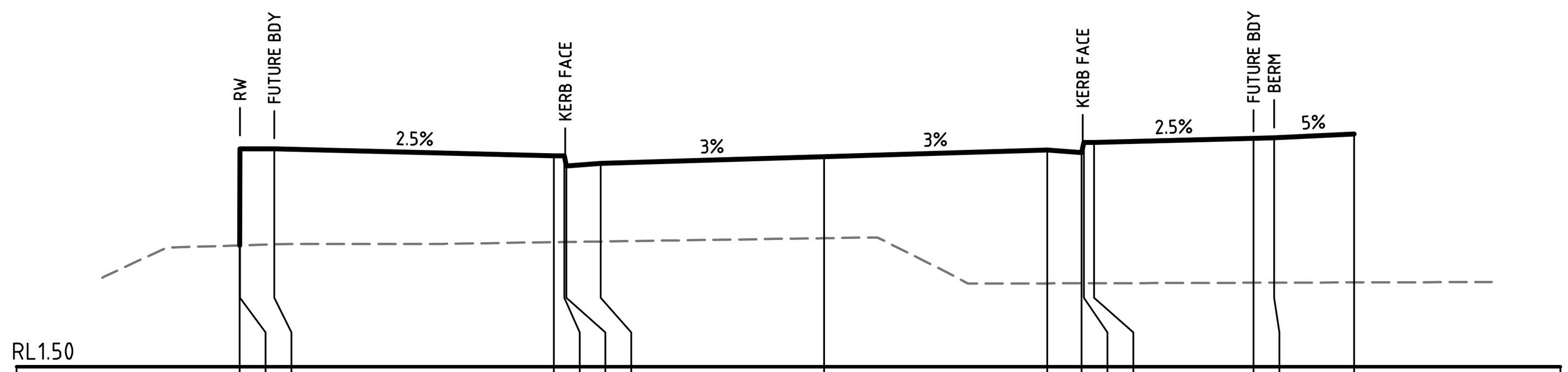
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION
A1

Drawing No. DAC1050
Project No. 18-580
Issue F

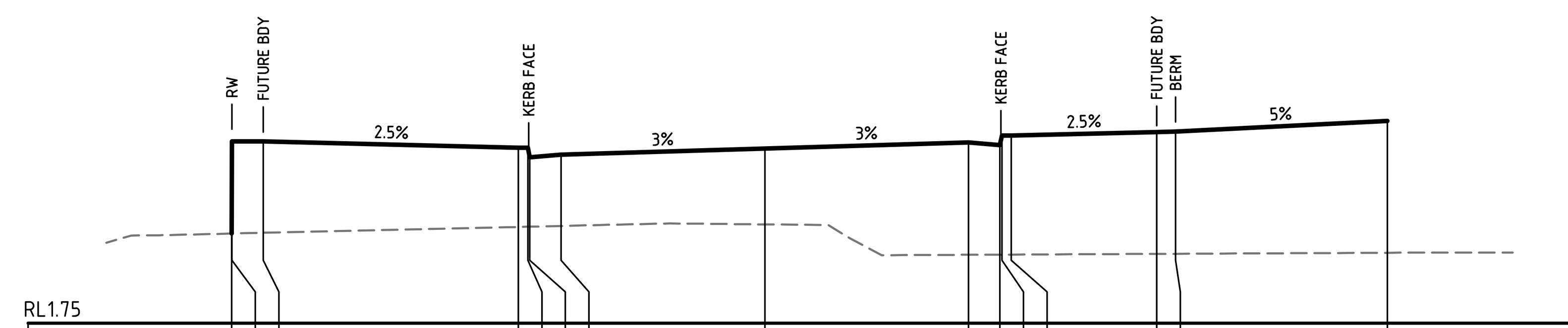
100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1050.dwg



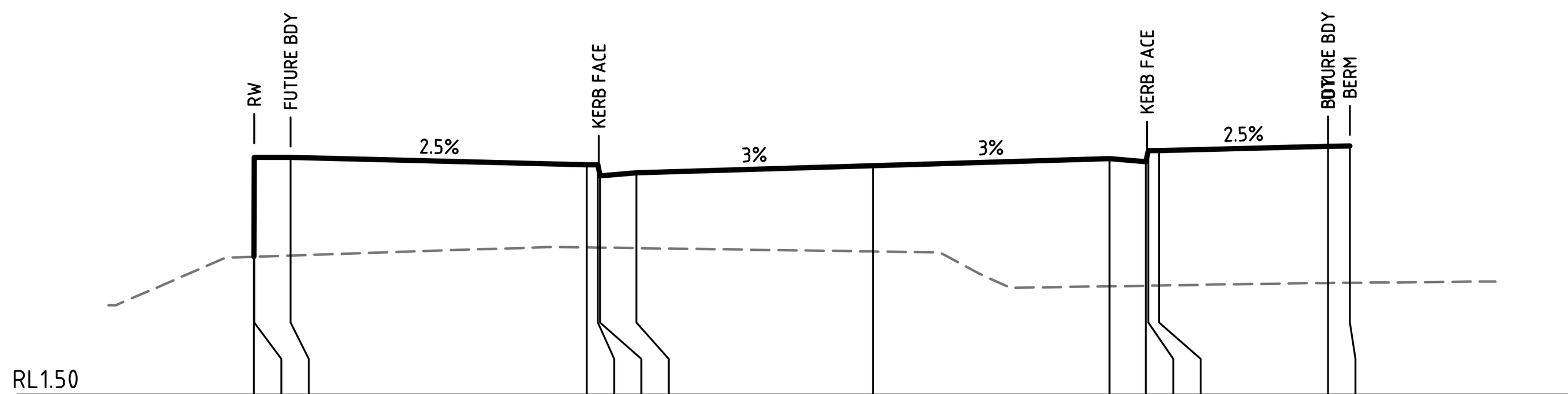
	3.263	4.670	4.670	4.568	4.568	4.418	4.458	4.555	4.653	4.613	4.763	4.763	4.821	4.828	4.887
	3.263	3.264	3.278	3.311	3.313	3.313	3.321	3.369	2.711	2.713	2.713	2.713	2.721	2.721	2.725
	-8.501	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	7.716

CH 100



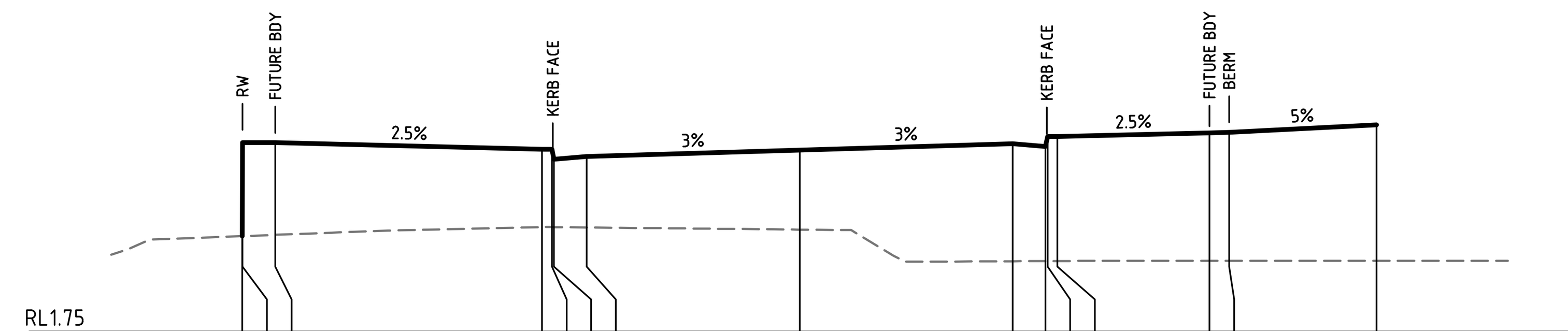
	3.178	4.646	4.646	4.545	4.545	4.395	4.435	4.532	4.630	4.590	4.740	4.740	4.798	4.805	4.974
	3.178	3.178	3.190	3.284	3.287	3.288	3.300	3.324	2.839	2.842	2.842	2.843	2.854	2.855	2.872
	-8.501	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	9.928

CH 113.001



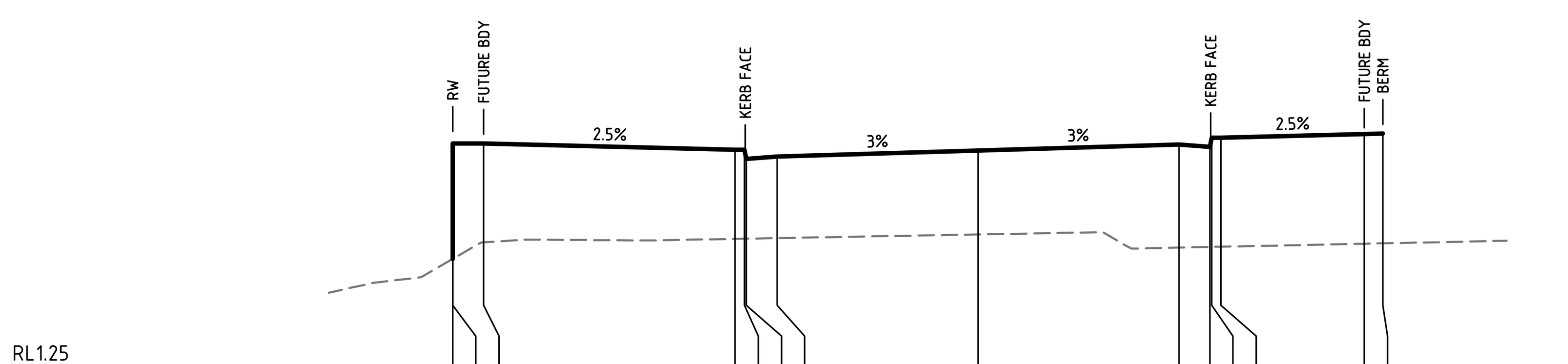
	3.405	4.770	4.770	4.668	4.668	4.518	4.558	4.655	4.753	4.713	4.863	4.863	4.921	4.928
	3.405	3.405	3.422	3.533	3.531	3.531	3.524	3.478	3.000	3.007	3.008	3.010	3.045	3.047
	-8.501	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550

CH 80



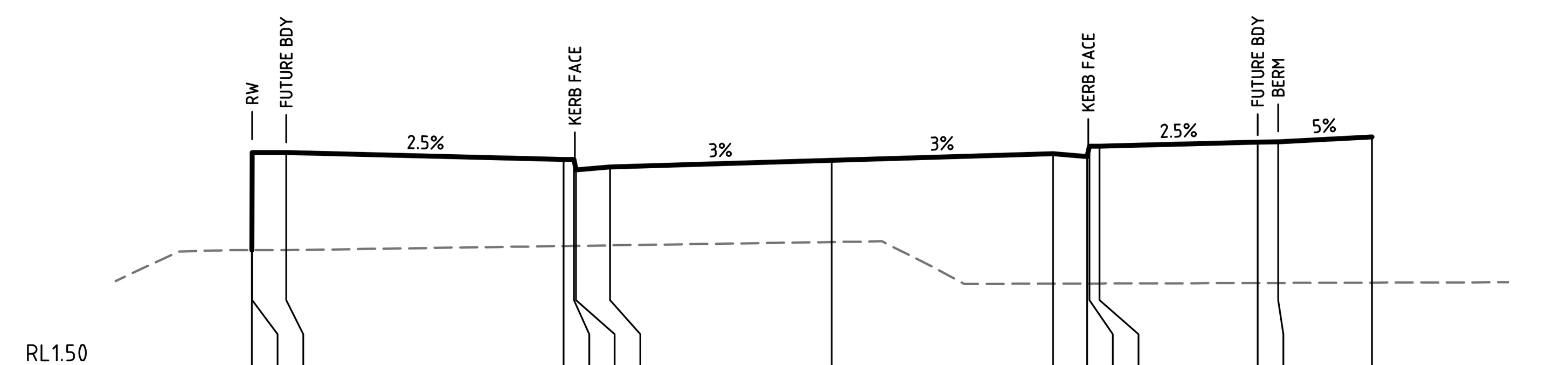
	3.217	4.642	4.642	4.540	4.540	4.390	4.430	4.528	4.625	4.585	4.735	4.735	4.793	4.801	4.913
	3.217	3.217	3.236	3.356	3.355	3.354	3.349	3.316	2.834	2.836	2.836	2.837	2.840	2.840	2.840
	-8.501	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.800

CH 109.288



PROPOSED SURFACE LEVEL	2.999	4.870	4.870	4.768	4.768	4.618	4.658	4.755	4.853	4.813	4.963	4.963	5.021	5.028
EXISTING SURFACE LEVEL	2.999	3.000	3.268	3.323	3.326	3.327	3.336	3.396	3.182	3.193	3.193	3.196	3.245	3.251
CENTRELINE OFFSET	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550

CH 60



	3.231	4.661	4.661	4.559	4.559	4.409	4.449	4.546	4.644	4.604	4.754	4.754	4.812	4.819	4.888
	3.231	3.231	3.231	3.291	3.293	3.294	3.301	3.349	2.739	2.741	2.741	2.742	2.749	2.750	2.754
	-8.501	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	7.925

CH 101.788

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

100mm on Original

Client
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Internet: http://www.meriton.com.au

Scales	1 : 100 @ A1	Drawn	GJ
		Designed	GJ
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 2

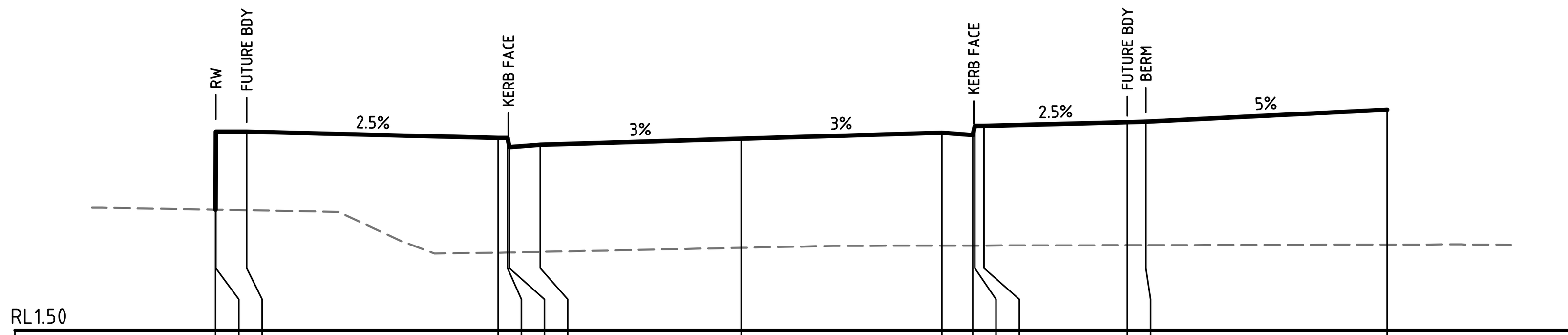
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

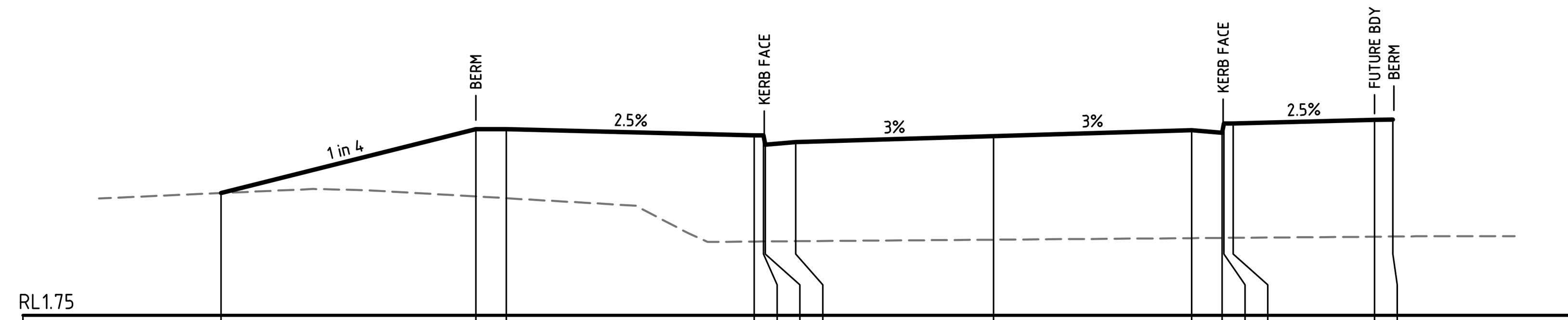
Drawing No.	Project No.	Issue
DAC1051	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1051.dwg



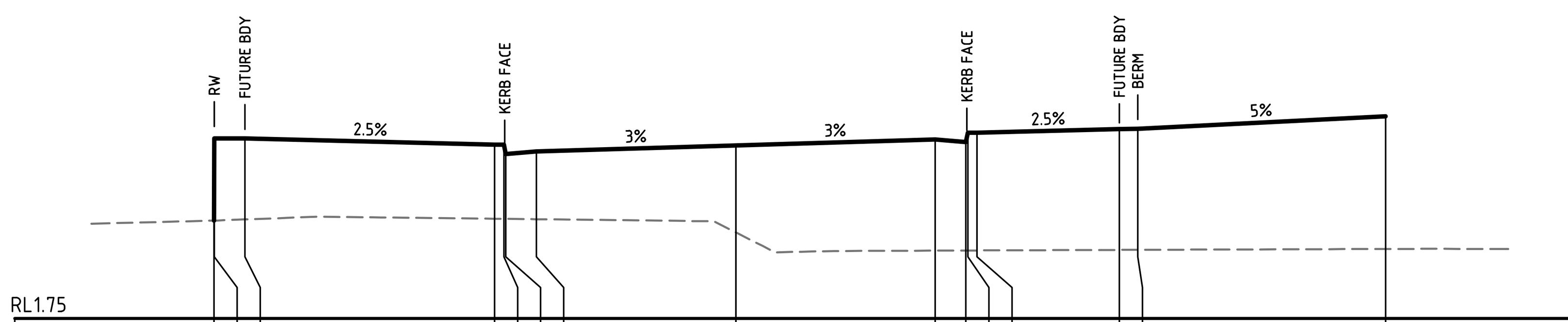
CENTRELINE OFFSET	PROPOSED SURFACE LEVEL	EXISTING SURFACE LEVEL
-8.501	3.447	3.447
-8.500	4.709	3.447
-8.000	4.709	3.438
-3.930	4.607	2.752
-3.780	4.607	2.754
-3.750	4.457	2.754
-3.250	4.497	2.765
0.000	4.595	2.831
3.250	4.692	2.866
3.750	4.652	2.867
3.780	4.802	2.867
3.930	4.802	2.868
6.250	4.860	2.873
6.550	4.868	2.874
10.455	5.063	2.883

CH 126.476



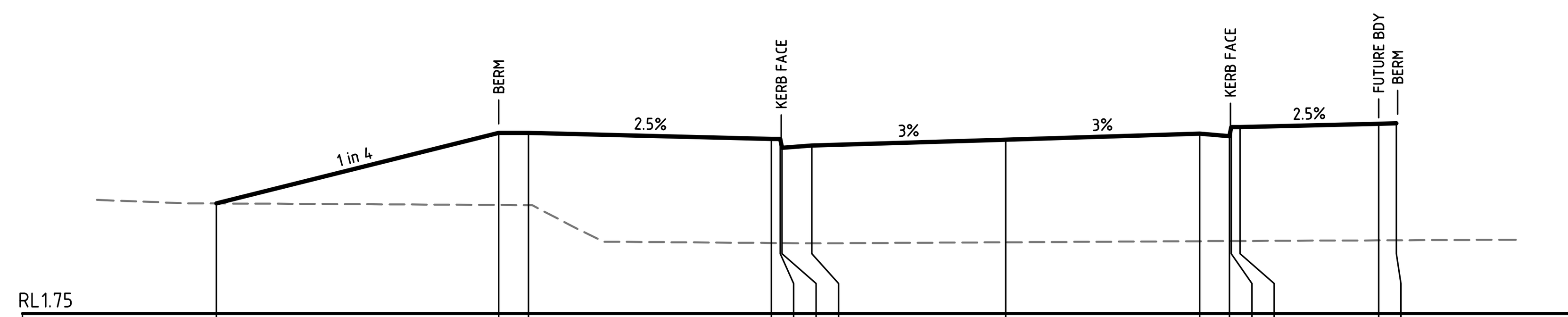
CENTRELINE OFFSET	PROPOSED SURFACE LEVEL	EXISTING SURFACE LEVEL
-12.682	3.750	3.750
-8.500	4.796	3.694
-8.000	4.796	3.666
-3.930	4.694	2.956
-3.780	4.694	2.957
-3.750	4.544	2.958
-3.250	4.584	2.961
0.000	4.681	2.987
3.250	4.779	3.012
3.750	4.739	3.016
3.780	4.889	3.016
3.930	4.889	3.017
6.250	4.947	3.035
6.550	4.954	3.039

CH 147.699



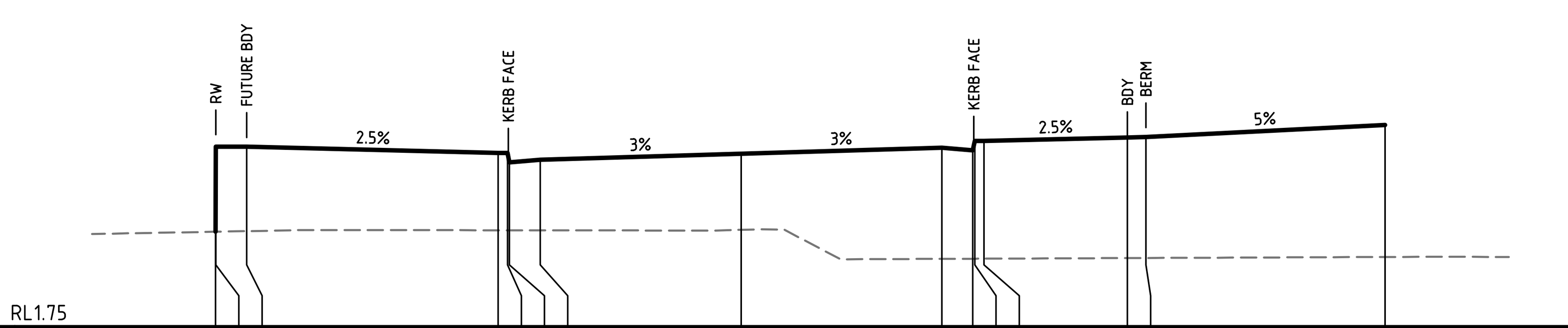
CENTRELINE OFFSET	PROPOSED SURFACE LEVEL	EXISTING SURFACE LEVEL
-8.501	3.340	3.340
-8.500	4.677	3.340
-8.000	4.677	3.359
-3.930	4.575	3.371
-3.780	4.575	3.369
-3.750	4.425	3.368
-3.250	4.465	3.363
0.000	4.562	3.148
3.250	4.660	2.852
3.750	4.620	2.854
3.780	4.770	2.854
3.930	4.770	2.855
6.250	4.828	2.864
6.550	4.835	2.865
10.589	5.037	2.879

CH 120



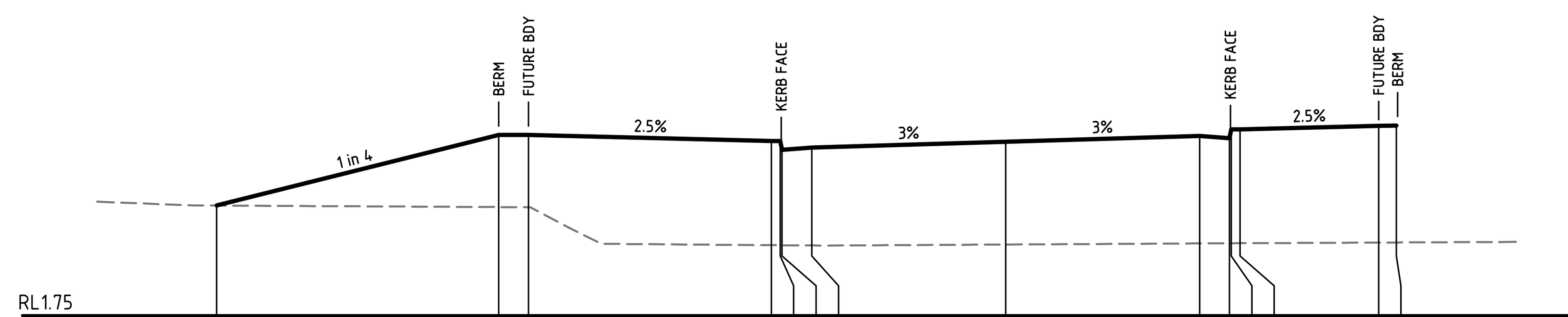
CENTRELINE OFFSET	PROPOSED SURFACE LEVEL	EXISTING SURFACE LEVEL
-13.235	3.593	3.593
-8.500	4.777	3.567
-8.000	4.777	3.565
-3.930	4.675	2.930
-3.780	4.675	2.929
-3.750	4.525	2.928
-3.250	4.565	2.924
0.000	4.662	2.942
3.250	4.760	2.960
3.750	4.720	2.963
3.780	4.870	2.963
3.930	4.870	2.963
6.250	4.928	2.974
6.550	4.935	2.976

CH 140



CENTRELINE OFFSET	PROPOSED SURFACE LEVEL	EXISTING SURFACE LEVEL
-8.501	3.285	3.285
-8.500	4.661	3.285
-8.000	4.661	3.294
-3.930	4.559	3.309
-3.780	4.559	3.308
-3.750	4.409	3.308
-3.250	4.449	3.308
0.000	4.546	3.315
3.250	4.644	2.845
3.750	4.604	2.848
3.780	4.754	2.848
3.930	4.754	2.848
6.250	4.812	2.858
6.550	4.819	2.859
10.420	5.013	2.876

CH 116.788



CENTRELINE OFFSET	PROPOSED SURFACE LEVEL	EXISTING SURFACE LEVEL
-13.231	3.593	3.593
-8.500	4.776	3.567
-8.000	4.776	3.565
-3.930	4.674	2.929
-3.780	4.674	2.928
-3.750	4.524	2.928
-3.250	4.564	2.924
0.000	4.662	2.941
3.250	4.759	2.959
3.750	4.719	2.961
3.780	4.869	2.961
3.930	4.869	2.962
6.250	4.927	2.973
6.550	4.935	2.975

CH 139.848

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Client

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Internet: http://www.meriton.com.au

Scales	1 : 100 @ A1	Drawn	GJ
		Designed	GJ
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 3

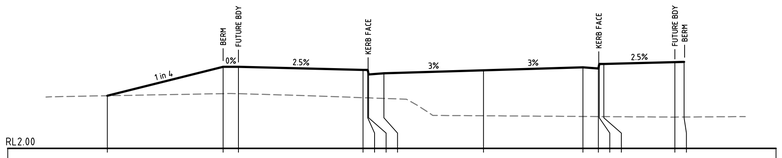
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1052	18-580	F

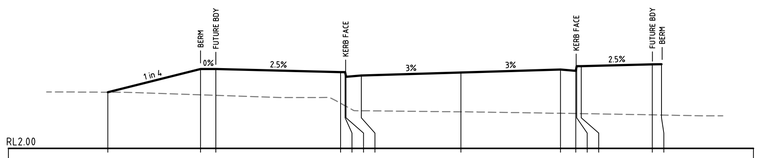
F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1052.dwg



RL2.00

	3.720		**4.665**	**4.665**		**4.563**	**4.563**	**4.413**	**4.453**	**4.550**		**4.648**	**4.608**	**4.758**	**4.758**		**4.816**	**4.823**
3.720		3.787	3.786		3.656	3.651	3.650	3.632		3.066	3.043	3.039	3.039	3.038		3.022	3.024	
-12.281		-8.500	-8.000		-3.930	-3.780	-3.750	-3.250		0.000	3.250	3.750	3.780	3.930		6.250	6.550	

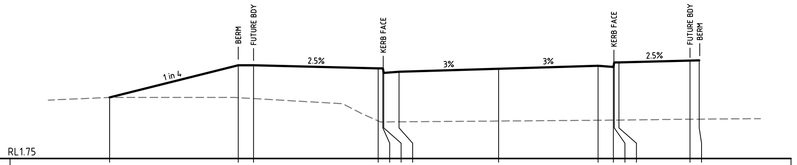
CH 170



RL2.00

	3.834		**4.591**	**4.591**		**4.489**	**4.489**	**4.339**	**4.379**	**4.476**		**4.574**	**4.534**	**4.684**	**4.684**		**4.742**	**4.749**
3.834		3.748	3.731		3.475	3.391	3.375	3.229		3.194	3.146	3.138	3.138	3.135		3.095	3.089	
-11.526		-8.500	-8.000		-3.930	-3.780	-3.750	-3.250		0.000	3.250	3.750	3.780	3.930		6.250	6.550	

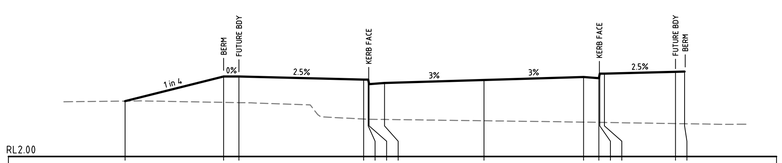
CH 180.745



RL1.75

	3.714		**4.745**	**4.745**		**4.643**	**4.643**	**4.493**	**4.533**	**4.630**		**4.728**	**4.688**	**4.838**	**4.838**		**4.896**	**4.903**
3.714		3.789	3.798		3.664	3.656	3.654	3.627		2.947	2.985	2.989	2.990	2.991		3.011	3.014	
-12.622		-8.500	-8.000		-3.930	-3.780	-3.750	-3.250		0.000	3.250	3.750	3.780	3.930		6.250	6.550	

CH 160



RL2.00

	3.851		**4.593**	**4.593**		**4.491**	**4.491**	**4.341**	**4.381**	**4.479**		**4.576**	**4.536**	**4.686**	**4.686**		**4.744**	**4.752**
3.851		3.765	3.748		3.323	3.241	3.238	3.233		3.193	3.143	3.136	3.135	3.133		3.092	3.087	
-11.469		-8.500	-8.000		-3.930	-3.780	-3.750	-3.250		0.000	3.250	3.750	3.780	3.930		6.250	6.550	

CH 180

RL1.75

PROPOSED SURFACE LEVEL	**3.743**		**4.793**	**4.793**		**4.691**	**4.691**	**4.541**	**4.581**	**4.679**		**4.776**	**4.736**	**4.886**	**4.886**		**4.944**	**4.952**
EXISTING SURFACE LEVEL	3.743		3.734	3.705		2.975	2.943	2.943	2.947	2.972		2.997	3.002	3.002	3.004		3.031	3.034
CENTRELINE OFFSET	-12.700		-8.500	-8.000		-3.930	-3.780	-3.750	-3.250	0.000		3.250	3.750	3.780	3.930		6.250	6.550

CH 150

RL2.00

	3.809		**4.613**	**4.613**		**4.511**	**4.511**	**4.361**	**4.401**	**4.499**		**4.596**	**4.556**	**4.706**	**4.706**		**4.764**	**4.772**
3.809		3.767	3.758		3.222	3.215	3.215	3.208		3.166	3.121	3.114	3.113	3.111		3.074	3.069	
-11.718		-8.500	-8.000		-3.930	-3.780	-3.750	-3.250		0.000	3.250	3.750	3.780	3.930		6.250	6.550	

CH 176.461

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED

Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 100 @ A1

Grid MGA

Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 4

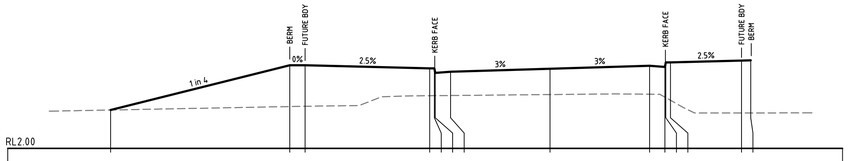
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

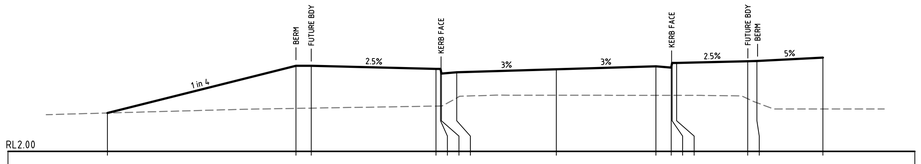
Drawing No.	Project No.	Issue
DAC1053	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1053.dwg



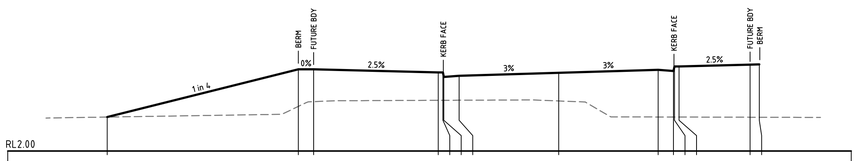
PROPOSED SURFACE LEVEL	3.253	4.716	4.716	4.614	4.614	4.664	4.504	4.601	4.699	4.659	4.809	4.867	4.874
EXISTING SURFACE LEVEL	3.253	3.366	3.375	3.720	3.722	3.722	3.727	3.758	3.769	3.674	3.572	3.158	3.158
CENTRELINE OFFSET	-14.349	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.930	6.250	6.550

CH 210



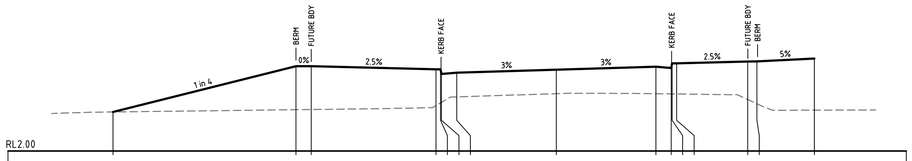
PROPOSED SURFACE LEVEL	3.254	4.793	4.793	4.691	4.691	4.541	4.581	4.679	4.776	4.736	4.886	4.944	4.952	5.059
EXISTING SURFACE LEVEL	3.254	3.404	3.412	3.480	3.482	3.483	3.745	3.834	3.830	3.829	3.829	3.829	3.719	3.589	3.385
CENTRELINE OFFSET	-14.655	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.704

CH 225.46



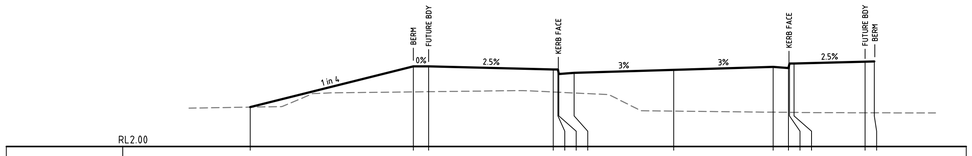
PROPOSED SURFACE LEVEL	3.106	4.666	4.666	4.564	4.564	4.414	4.454	4.551	4.649	4.609	4.759	4.817	4.824
EXISTING SURFACE LEVEL	3.106	3.454	3.608	3.653	3.653	3.653	3.656	3.632	3.109	3.107	3.107	3.101	3.100
CENTRELINE OFFSET	-14.737	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550

CH 200



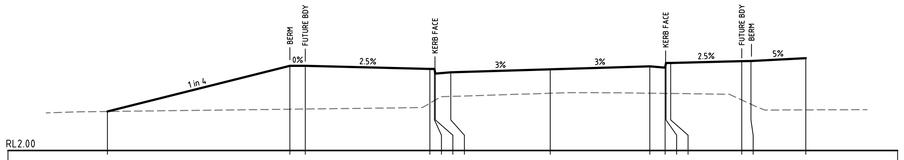
PROPOSED SURFACE LEVEL	3.273	4.766	4.766	4.664	4.664	4.514	4.554	4.651	4.749	4.709	4.859	4.917	4.924	5.018
EXISTING SURFACE LEVEL	3.273	3.346	3.353	3.479	3.567	3.585	3.765	3.869	3.868	3.862	3.861	3.859	3.678	3.539	3.331
CENTRELINE OFFSET	-14.472	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.425

CH 220



PROPOSED SURFACE LEVEL	3.284	4.616	4.616	4.514	4.514	4.364	4.404	4.501	4.599	4.559	4.709	4.767	4.774
EXISTING SURFACE LEVEL	3.284	3.782	3.788	3.779	3.772	3.770	3.746	3.155	3.120	3.114	3.114	3.112	3.100	3.099
CENTRELINE OFFSET	-13.825	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550

CH 190



PROPOSED SURFACE LEVEL	3.274	4.763	4.763	4.661	4.661	4.511	4.551	4.649	4.746	4.706	4.856	4.914	4.922	5.011
EXISTING SURFACE LEVEL	3.274	3.347	3.353	3.544	3.632	3.650	3.764	3.869	3.870	3.863	3.863	3.861	3.648	3.511	3.325
CENTRELINE OFFSET	-14.457	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.342

CH 219.421

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Client

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Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 100 @ A1

Grid MGA

Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 5

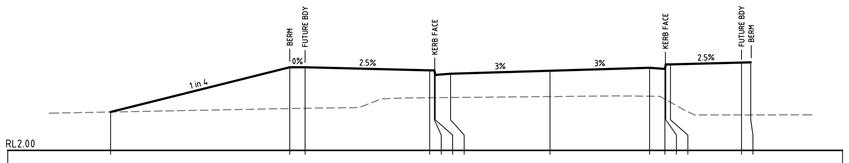
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

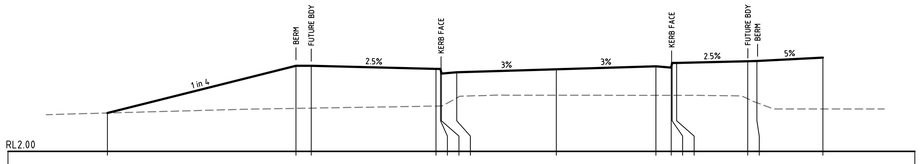
Drawing No.	Project No.	Issue
DAC1054	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1054.dwg



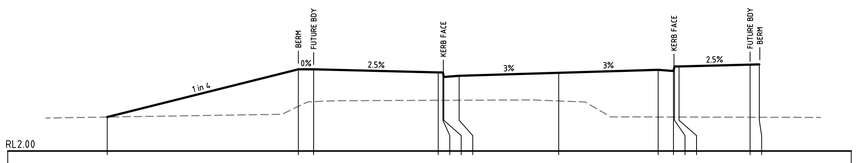
	3.253	4.716	4.614	4.601	4.699	4.659	4.867	
	3.253	3.366	3.720	3.758	3.769	3.674	3.158	
-14.349		-8.500	-3.930	0.000	3.250	3.750	6.250	
		-8.000	-3.780		3.780	3.657	6.550	
			-3.750		3.930	3.809		
			-3.250			3.572		
		4.716	4.614		4.699	4.659	4.867	
		4.716	4.664			4.809	4.874	
			4.504					

CH 210



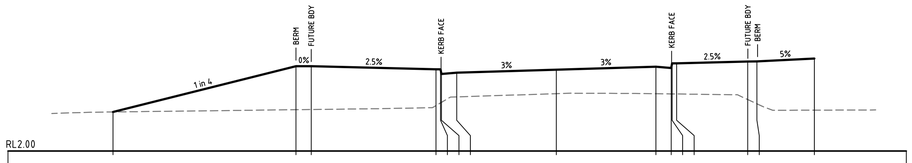
	3.254	4.793	4.691	4.679	4.776	4.736	4.944	5.059
	3.254	3.404	3.480	3.834	3.830	3.829	3.719	3.385
-14.655		-8.500	-3.930	0.000	3.250	3.750	6.250	8.704
		-8.000	-3.780		3.780	3.829	6.550	
			-3.750		3.930			
			-3.250					
		4.793	4.691		4.776	4.886	4.952	
		4.793	4.691			4.886	5.059	
			4.581					

CH 225.46



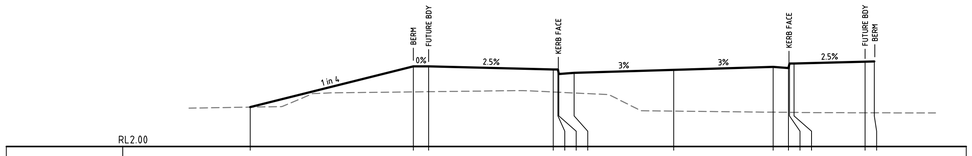
	3.106	4.666	4.564	4.551	4.649	4.609	4.817	
	3.106	3.454	3.653	3.632	3.109	3.107	3.101	
-14.737		-8.500	-3.930	0.000	3.250	3.750	6.250	
		-8.000	-3.780		3.780	3.107	6.550	
			-3.750		3.930			
			-3.250					
		4.666	4.564		4.649	4.759	4.824	
		4.666	4.564			4.759	4.759	
			4.454					

CH 200



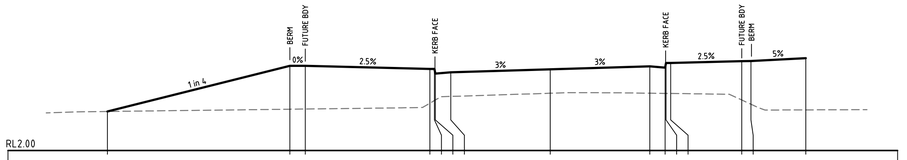
	3.273	4.766	4.664	4.651	4.749	4.709	4.917	5.018
	3.273	3.346	3.479	3.869	3.868	3.862	3.678	3.331
-14.472		-8.500	-3.930	0.000	3.250	3.750	6.250	8.425
		-8.000	-3.780		3.780	3.861	6.550	
			-3.750		3.930	3.859		
			-3.250					
		4.766	4.664		4.749	4.859	4.924	
		4.766	4.514			4.859	5.018	
			4.554					

CH 220



PROPOSED SURFACE LEVEL	3.284	4.616	4.514	4.501	4.599	4.559	4.767	
EXISTING SURFACE LEVEL	3.284	3.782	3.779	3.155	3.120	3.114	3.100	
CENTRELINE OFFSET	-13.825	-8.500	-3.930	0.000	3.250	3.750	6.250	
		-8.000	-3.780		3.780	3.930	6.550	
			-3.750		3.930			
			-3.250					
		4.616	4.514		4.599	4.709	4.774	
		4.616	4.364			4.709	4.774	
			4.404					
		3.788	3.772		3.114	3.112	3.099	
			3.770					
			3.746					

CH 190



	3.274	4.763	4.661	4.649	4.746	4.706	4.914	5.011
	3.274	3.347	3.544	3.869	3.870	3.863	3.648	3.325
-14.457		-8.500	-3.930	0.000	3.250	3.750	6.250	8.342
		-8.000	-3.780		3.780	3.861	6.550	
			-3.750		3.930			
			-3.250					
		4.763	4.661		4.746	4.856	4.922	
		4.763	4.551			4.856	5.011	
			4.551					

CH 219.421

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Client

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PTY LIMITED
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Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 100 @ A1

Grid MGA

Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 6

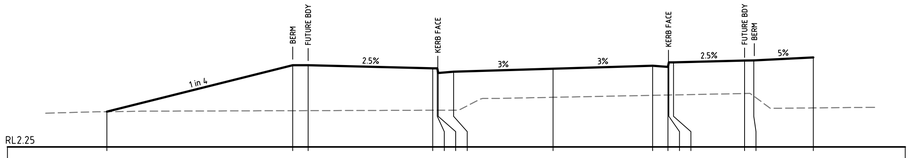
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

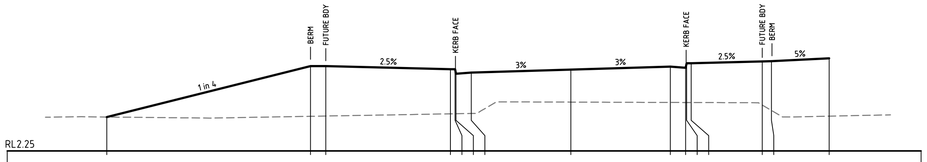
Drawing No.	Project No.	Issue
DAC1055	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1055.dwg



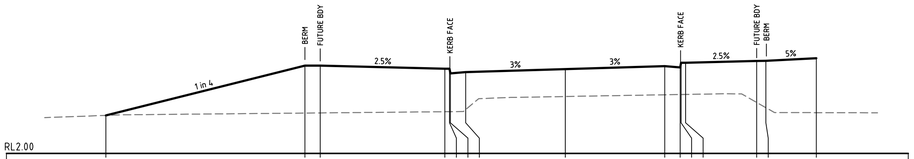
	3.399	4.916	4.916	4.814	4.814	4.664	4.704	4.801	4.899	4.859	5.009	5.009	5.067	5.074	5.172
	3.399	3.432	3.433	3.446	3.447	3.447	3.449	3.869	3.933	3.943	3.944	3.946	3.992	3.909	3.522
	-14.567	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.496

CH 250



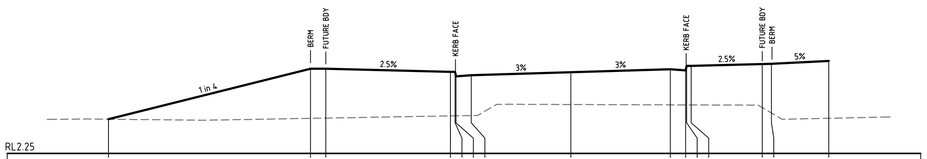
	3.356	5.019	5.019	4.917	4.917	4.767	4.807	4.905	5.002	4.962	5.112	5.112	5.170	5.178	5.272
	3.356	3.379	3.388	3.460	3.462	3.463	3.472	3.843	3.831	3.830	3.830	3.829	3.746	3.570	3.383
	-15.151	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.435

CH 270.619



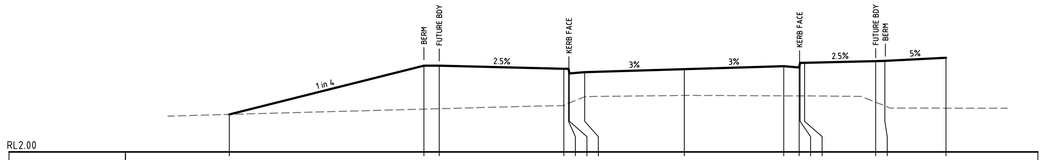
	3.242	4.866	4.866	4.764	4.764	4.614	4.654	4.751	4.849	4.809	4.959	4.959	5.017	5.024	5.107
	3.242	3.318	3.322	3.361	3.363	3.363	3.432	3.858	3.914	3.923	3.923	3.926	3.664	3.494	3.332
	-14.996	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.196

CH 240



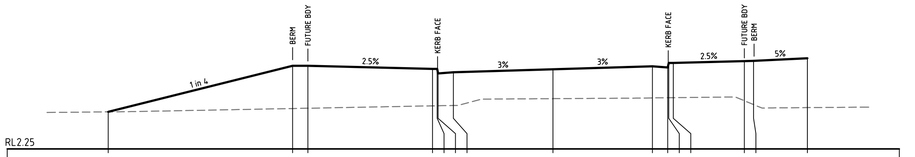
	3.367	5.016	5.016	4.914	4.914	4.764	4.804	4.901	4.999	4.959	5.109	5.109	5.167	5.174	5.268
	3.367	3.395	3.404	3.476	3.478	3.479	3.485	3.847	3.836	3.834	3.834	3.834	3.748	3.571	3.398
	-15.094	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.422

CH 270



PROPOSED SURFACE LEVEL	3.227	4.816	4.816	4.714	4.714	4.564	4.604	4.701	4.799	4.759	4.909	4.909	4.967	4.974	5.074
EXISTING SURFACE LEVEL	3.227	3.399	3.413	3.516	3.591	3.603	3.802	3.846	3.833	3.830	3.830	3.830	3.625	3.508	3.430
CENTRELINE OFFSET	-14.856	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.546

CH 230



	3.461	4.966	4.966	4.864	4.864	4.714	4.754	4.851	4.949	4.909	5.059	5.059	5.117	5.124	5.212
	3.461	3.570	3.580	3.658	3.661	3.661	3.668	3.892	3.916	3.922	3.923	3.924	3.824	3.700	3.600
	-14.517	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250	3.750	3.780	3.930	6.250	6.550	8.309

CH 260

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED
Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 100 @ A1
Grid MGA
Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 7

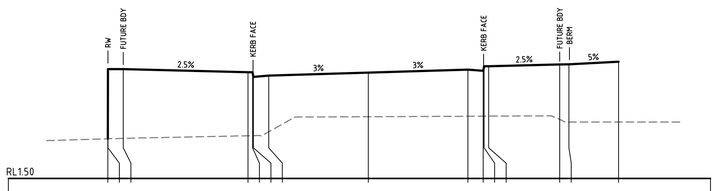
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1056	18-580	F

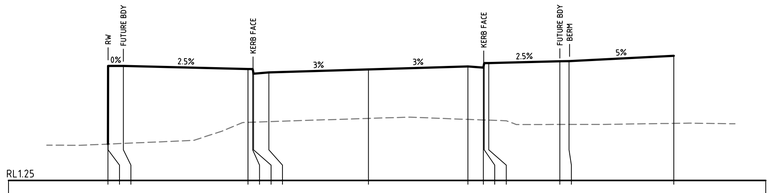
F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1056.dwg



	2.795	5.070	5.070	4.968	4.968	4.818	4.858	4.955	5.053
	2.795	5.070	5.070	4.968	4.968	4.818	4.858	4.955	5.013
	2.795	2.795	2.810	2.894	2.897	2.898	3.026	3.516	3.532
	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	5.053	5.013	5.163	5.163	5.221	5.228	5.309		
	5.013	5.163	5.163	5.163	5.221	5.228	5.309		
	3.532	3.534	3.535	3.535	3.427	3.343	3.342		
	3.250	3.750	3.780	3.930	6.250	6.550	8.170		

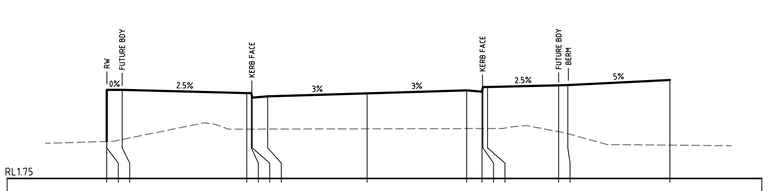
CH 280.799



	2.438	4.989	4.989	4.887	4.887	4.737	4.777	4.875	4.972
	2.438	4.989	4.989	4.887	4.887	4.737	4.777	4.875	4.932
	2.438	2.438	2.460	3.146	3.151	3.152	3.169	3.276	3.244
	-8.503	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	4.972	4.932	5.082	5.082	5.140	5.148	5.319		
	4.932	5.082	5.082	5.082	5.140	5.148	5.319		
	3.244	3.226	3.225	3.220	3.079	3.079	3.114		
	3.250	3.750	3.780	3.930	6.250	6.550	9.971		

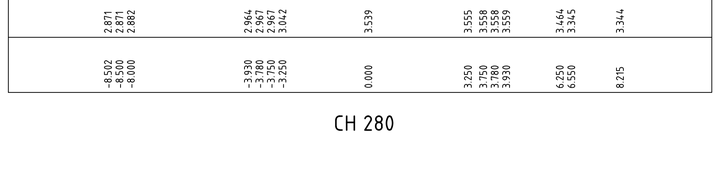
CH 290



	2.959	4.641	4.641	4.539	4.538	4.389	4.429	4.526	4.624
	2.959	4.641	4.641	4.539	4.538	4.389	4.429	4.526	4.586
	2.959	2.955	3.023	3.361	3.362	3.362	3.363	3.371	3.379
	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	4.624	4.586	4.734	4.734	4.792	4.799	4.966		
	4.586	4.734	4.734	4.734	4.792	4.799	4.966		
	3.379	3.381	3.381	3.381	3.279	3.211	2.839		
	3.250	3.750	3.780	3.930	6.250	6.550	9.883		

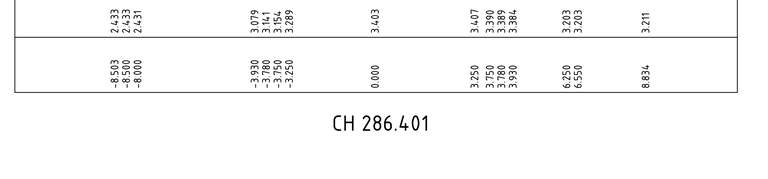
CH 300



	2.871	5.066	5.066	4.964	4.964	4.814	4.854	4.951	5.049
	2.871	5.066	5.066	4.964	4.964	4.814	4.854	4.951	5.009
	2.871	2.871	2.882	2.964	2.967	2.967	3.042	3.539	3.555
	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	5.049	5.009	5.159	5.159	5.217	5.224	5.308		
	5.009	5.159	5.159	5.159	5.217	5.224	5.308		
	3.555	3.558	3.558	3.559	3.464	3.345	3.344		
	3.250	3.750	3.780	3.930	6.250	6.550	8.215		

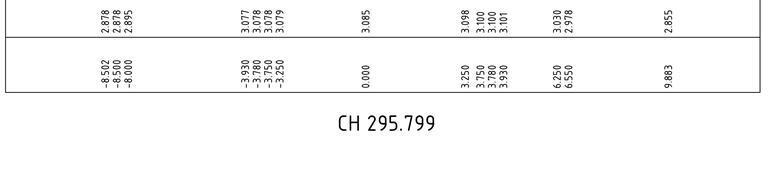
CH 280



	2.433	5.051	5.051	4.949	4.949	4.799	4.839	4.937	5.034
	2.433	5.051	5.051	4.949	4.949	4.799	4.839	4.937	4.994
	2.433	2.433	2.431	3.079	3.141	3.154	3.289	3.403	3.407
	-8.503	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	5.034	4.994	5.144	5.144	5.202	5.210	5.324		
	4.994	5.144	5.144	5.144	5.202	5.210	5.324		
	3.390	3.389	3.384	3.384	3.203	3.203	3.211		
	3.750	3.780	3.930	3.930	6.250	6.550	8.834		

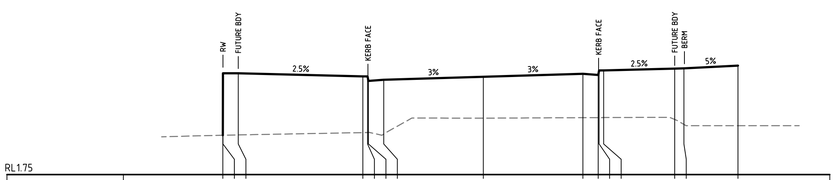
CH 286.401



	2.878	4.808	4.808	4.706	4.706	4.556	4.596	4.694	4.791
	2.878	4.808	4.808	4.706	4.706	4.556	4.596	4.694	4.751
	2.878	2.878	2.895	3.077	3.078	3.078	3.079	3.085	3.098
	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	4.791	4.751	4.901	4.901	4.959	4.967	5.134		
	4.751	4.901	4.901	4.901	4.959	4.967	5.134		
	3.098	3.100	3.100	3.101	3.030	2.978	2.855		
	3.750	3.780	3.930	3.930	6.250	6.550	9.883		

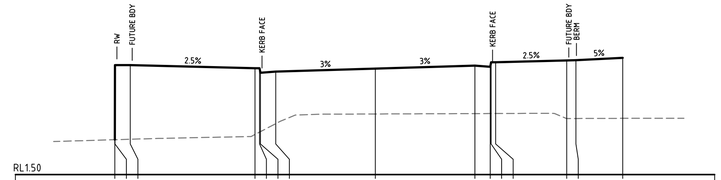
CH 295.799



PROPOSED SURFACE LEVEL	3.033	5.057	5.057	4.955	4.955	4.805	4.845	4.942	5.040
EXISTING SURFACE LEVEL	3.033	3.033	3.043	3.120	3.123	3.124	3.073	3.591	3.607
CENTRELINE OFFSET	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

PROPOSED SURFACE LEVEL	5.040	5.000	5.150	5.150	5.208	5.215	5.304		
EXISTING SURFACE LEVEL	3.607	3.610	3.610	3.611	3.548	3.387	3.347		
CENTRELINE OFFSET	3.750	3.780	3.930	3.930	6.250	6.550	8.314		

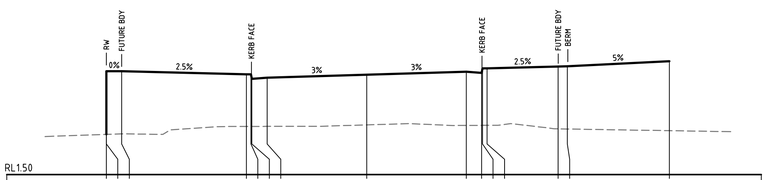
CH 278.204



	2.638	5.074	5.074	4.972	4.972	4.822	4.862	4.960	5.057
	2.638	5.074	5.074	4.972	4.972	4.822	4.862	4.960	5.017
	2.638	2.638	2.653	2.808	2.886	2.902	3.165	3.477	3.490
	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	5.057	5.017	5.167	5.167	5.225	5.233	5.309		
	5.017	5.167	5.167	5.167	5.225	5.233	5.309		
	3.490	3.492	3.492	3.493	3.330	3.331	3.335		
	3.750	3.780	3.930	3.930	6.250	6.550	8.078		

CH 282.471



	2.811	4.815	4.815	4.774	4.774	4.624	4.664	4.761	4.859
	2.811	4.815	4.815	4.774	4.774	4.624	4.664	4.761	4.819
	2.811	2.811	2.828	3.071	3.072	3.072	3.073	3.121	3.104
	-8.502	-8.500	-8.000	-3.930	-3.780	-3.750	-3.250	0.000	3.250

	4.859	4.819	4.969	4.969	5.027	5.034	5.201		
	4.819	4.969	4.969	4.969	5.027	5.034	5.201		
	3.104	3.106	3.107	3.107	2.992	2.987	2.933		
	3.750	3.780	3.930	3.930	6.250	6.550	9.883		

CH 293.992

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

100mm on Original

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED

Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 100 @ A1

Grid MGA

Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
MC01
CROSS SECTIONS
SHEET 8

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1057	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1057.dwg

EXISTING DRAINAGE CHANNEL

NEW ROAD (MC01)

NEW ROAD (MC01)

NEW ROAD (MC01)

MACPHERSON STREET

MACPHERSON STREET

NARRABEEN CREEK

NARRABEEN CREEK

24
DP5464

32
DP5464

31
DP5464

30
DP5464

251
DP1245613

251
D.P. 1245613
(NOT REGISTERED)

101
DP1229188

28
DP5464

29
DP5464

EXISTING SERVICES WITHIN MACPHERSON STREET ARE TO BE PROTECTED DURING CONSTRUCTION TO THE SATISFACTION OF THE UTILITY AUTHORITY AND THE SUPERINTENDENT

CONNECTION POINTS PROVIDED BY NORTHERN BEACHES COUNCIL DURING MACPHERSON STREET UPGRADE TO BE PROTECTED DURING CONSTRUCTION

EXISTING TELSTRA TO BE REMOVED.

EXISTING SERVICES WITHIN MACPHERSON STREET ARE TO BE PROTECTED DURING CONSTRUCTION TO THE SATISFACTION OF THE UTILITY AUTHORITY AND THE SUPERINTENDENT

SERVICES LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING 20m ASSET PROTECTION ZONE
- BIODIVERSITY EXTENTS
- EXISTING TREE
- e — ELECTRICITY
- ELECTRICITY OVERHEAD
- t — TELSTRA CONDUITS
- nbn — NBN SERVICE
- s — SEWER SERVICE
- w — WATER SERVICE
- g — GAS SERVICE
- sw — STORMWATER
- WATER HYDRANT
- WATER STOP VALVE
- SEWER MANHOLE
- PP — POWER POLE
- T — TELSTRA PIT
- EXISTING POWER POLE

PROPOSED

- SERVICE TO BE REMOVED
- KERB & GUTTER
- ROLL TOP KERB AND GUTTER
- BATTER
- 5.0 — CONTOUR (0.2m INTERVAL)
- RETAINING WALL
- STORMWATER PIPE (SHOWING SIZE)
- STORMWATER KERB INLET PIT
- STORMWATER SURFACE INLET PIT
- STORMWATER RAINGARDEN

NOTES

1. SERVICE ALIGNMENTS AND CONNECTION DETAILS ARE SUBJECT TO INDIVIDUAL UTILITIES AND LOT APPROVAL SHOULD BE CONSIDERED INDICATIVE ONLY.

DIAL 1100 BEFORE YOU DIG

CONTRACTOR SHALL CALL;
DIAL BEFORE YOU DIG 1100
PRIOR TO COMMENCEMENT OF WORK TO OBTAIN ALL CURRENT SERVICE AUTHORITY PLANS

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

Client
HOMEBUSH BAY PROPERTIES PTY LTD

Scales 1 : 400 @ A1
Grid MGA
Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
SERVICES
AND UTILITIES
COORDINATION
PLAN

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

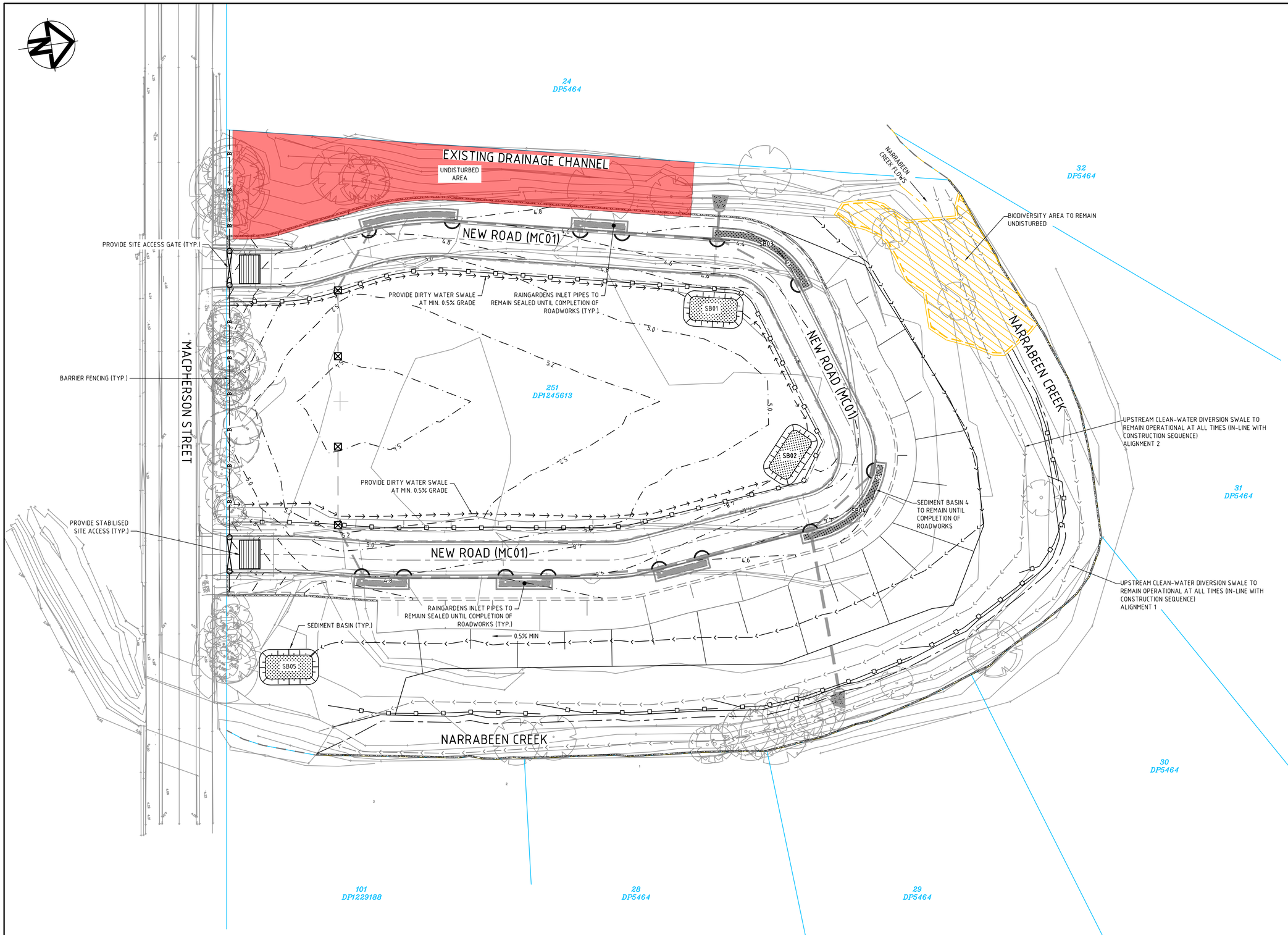
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1070	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1070.dwg



ESC LEGEND

EXISTING

- EXISTING BOUNDARY
- 3.0 EXISTING CONTOUR
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- B BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- SITE ACCESS GATE
- UNDISTURBED AREA
- SEDIMENT BASIN
- 375ϕ STORMWATER PIPE WITH SIZE

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT.
2. REFER DRAWING DAC1081 FOR ESC DETAILS
3. EROSION AND SEDIMENT CONTROLS TO SUIT CONSTRUCTION STAGING.
4. NARRABEEN CREEK WORKS ESC MEASURES ARE TO BE COORDINATED WITH COUNCIL AND STAGING OF WORKS.

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

Client

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Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales	1 : 400 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project

2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title

SEDIMENTATION AND EROSION CONTROL PLAN

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

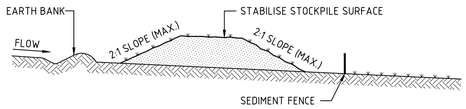
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1080	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1080.dwg

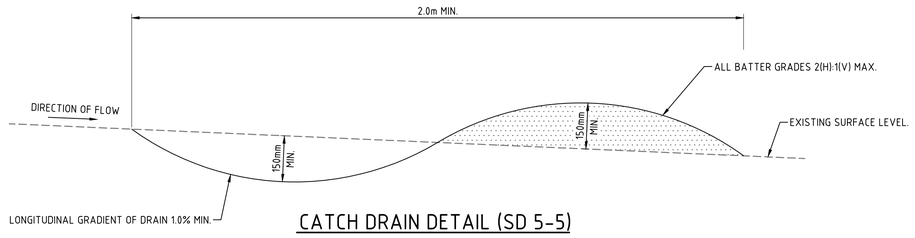


STOCKPILE CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE PLACED FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED E.S.C.P. OR S.W.M.P. TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

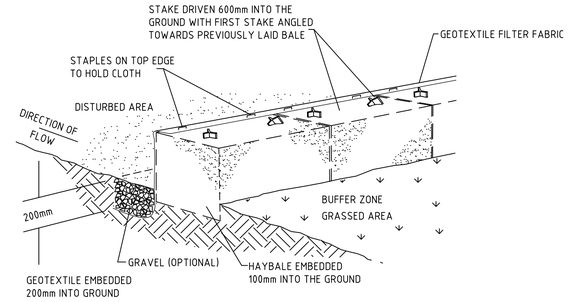
STOCKPILE SECTION (SD 4-1)

SCALE N.T.S.



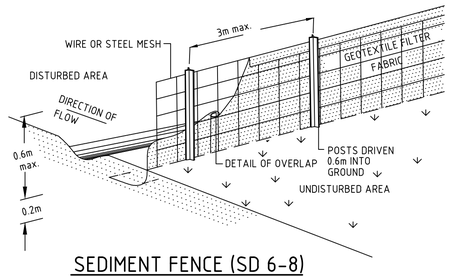
CATCH DRAIN DETAIL (SD 5-5)

SCALE 1:10



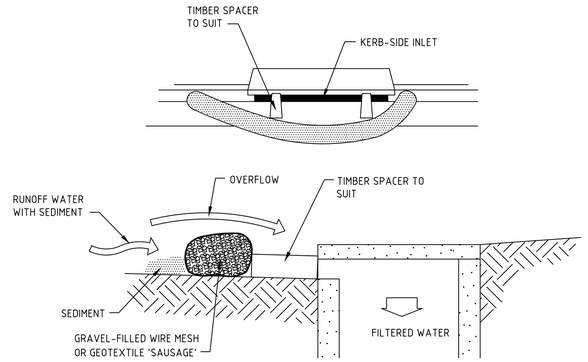
HAYBALE AND GEOTEXTILE SEDIMENT FILTER (SD 6-7)

NTS



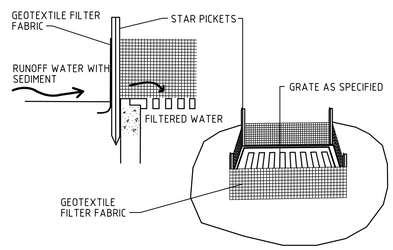
SEDIMENT FENCE (SD 6-8)

NTS



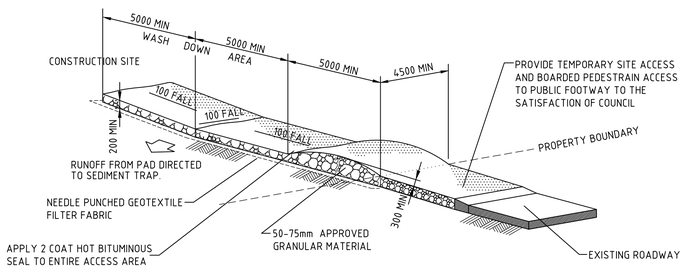
MESH AND GRAVEL INLET FILTER (SD 6-11)

NTS



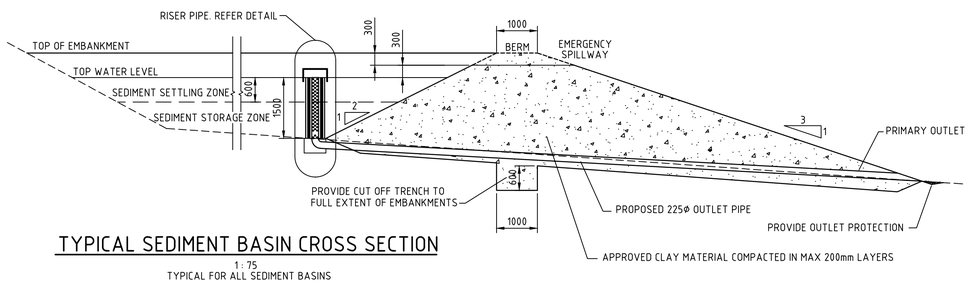
GEOTEXTILE FILTER PIT SURROUND (SD 6-12)

NTS



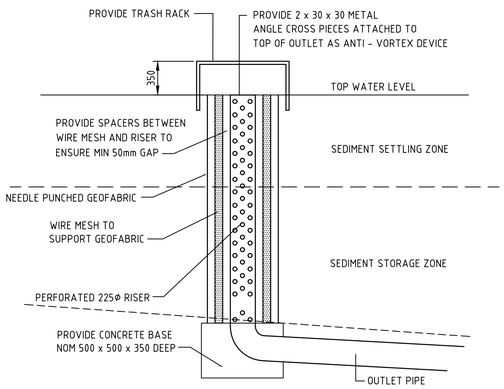
STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)

NTS



TYPICAL SEDIMENT BASIN CROSS SECTION

1 : 75
TYPICAL FOR ALL SEDIMENT BASINS



RISER PIPE DETAIL

1 : 50

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 1 2 3 4 5m
1 : 50 @ A1 1 : 100 @ A3
0 1.5 3 4.5 6 7.5m
1 : 75 @ A1 1 : 150 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED
Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales	AS SHOWN	Drawn	GJ
		Designed	GJ
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
SEDIMENTATION AND EROSION CONTROL DETAILS

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
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Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1081	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1081.dwg

SITE DATA

Site area	Site 1	2	3	4	5		Remarks
Total catchment area (ha)	0.29	0.32	0.18	0.22	0.91		
Disturbed catchment area (ha)	0.29	0.32	0.18	0.22	0.91		
Soil analysis							
% sand (fraction 0.02 to 2.00 mm							Soil texture should be assessed through
% silt (fraction 0.002 to 0.02 mm)							mechanical dispersion only. Dispersing
% clay (fraction finer than 0.002 mm)							agents (e.g. Calgon) should not be used
Dispersion percentage							E.g. enter 10 for dispersion of 10%
% of whole soil dispersible							See Section 6.3.3(e)
Soil Texture Group							See Section 6.3.3(c), (d) and (e)
Rainfall data							
Design rainfall depth (days)	5	5	5	5	5		See Sections 6.3.4 (d) and (e)
Design rainfall depth (percentile)	85	85	85	85	85		See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	44	44	44	44	44		See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	13.5	13.5	13.5	13.5	13.5		See IFD chart for the site
RUSLE Factors							
Rainfall erosivity (*R*-factor)	3960	3960	3960	3960	3960		Automatic calculation from above data
Soil erodibility (*K*-factor)	0.007	0.007	0.007	0.007	0.007		
Slope length (m)	80	80	80	80	80		
Slope gradient (%)	5	5	5	5	5		RUSLE data can be obtained from
Length/gradient (*LS*-factor)	1.19	1.19	1.19	1.19	1.19		Appendixes A, B and C
Erosion control practice (*P*-factor)	1.2	1.2	1.2	1.2	1.2	1.3	
Ground cover (*C*-factor)	1	1	1	1	1	1	
Calculations							
Soil loss (t/ha/yr)	40	40	40	40	40		
Soil Loss Class	1	1	1	1	1		See Section 4.4.2(b)
Soil loss (m^3/ha/yr)	30	30	30	30	30		
Sediment basin storage volume, m^3	2	2	1	1	5		See Sections 6.3.4(i) and 6.3.5 (e)

PEAK FLOW CALCULATIONS

Peak flow calculations, 1

Site	A (ha)	tc (mins)	Rainfall intensity, I, mm/hr $1_{yr,tc}$	$5_{yr,tc}$	$10_{yr,tc}$	$20_{yr,tc}$	$50_{yr,tc}$	$100_{yr,tc}$	C_{10}
1	0.29	5	98.1	159	178	204	237	262	0.5
2	0.32	5	98.1	159	178	204	237	262	0.5
3	0.18	4	98.1	159	178	204	237	262	0.5
4	0.22	5	75.3	159	178	204	237	262	0.5
5	0.91	8	75.3	123	139	159	185	205	0.5

Peak flow calculations, 2

ARI (yrs)	Frequency factor (F_y)	Peak flows 1 (m^3/s)	2 (m^3/s)	3 (m^3/s)	4 (m^3/s)	5 (m^3/s)	(m3/s)	Comment
1 yr,tc	0.9	0.036	0.039	0.022	0.021	0.086		
5 yr,tc	0.95	0.061	0.067	0.038	0.046	0.148		
10 yr,tc	1	0.072	0.079	0.045	0.054	0.176		
20 yr,tc	1.05	0.086	0.095	0.054	0.066	0.211		
50 yr,tc	1.15	0.110	0.121	0.068	0.083	0.269		
100 yr,tc	1.2	0.127	0.140	0.079	0.096	0.311		

TOTAL BASIN VOLUME

Site	$Q_{tc,0.25}$ (m^3/s)	Area factor	Basin surface area (m^3)	Depth of settling zone (m)	Settling zone volume (m^3)	Sediment storage volume (m^3)	Total basin volume (m^3)	Basin shape L:W Ratio	Length (m)	Width (m)
1	0.018	4100	73	0.6	44	2	46	3	14.8	4.9
2	0.020	4100	81	0.6	48	2	50	3	15.5	5.2
3	0.011	4100	45	0.6	27	1	28	3	11.7	3.9
4	0.010	4100	42	0.6	25	1	26	3	11.3	3.8
5	0.043	4100	176	0.6	105	5	110	3	23.0	7.7

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

Client

KARIMBLA CONSTRUCTION SERVICES (NSW) PTY LIMITED

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Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales NTS | Drawn GJ | Designed GJ | Checked AT | Approved

Grid MGA

Height Datum AHD

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
SEDIMENTATION AND EROSION CONTROL CALCULATIONS

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
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Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

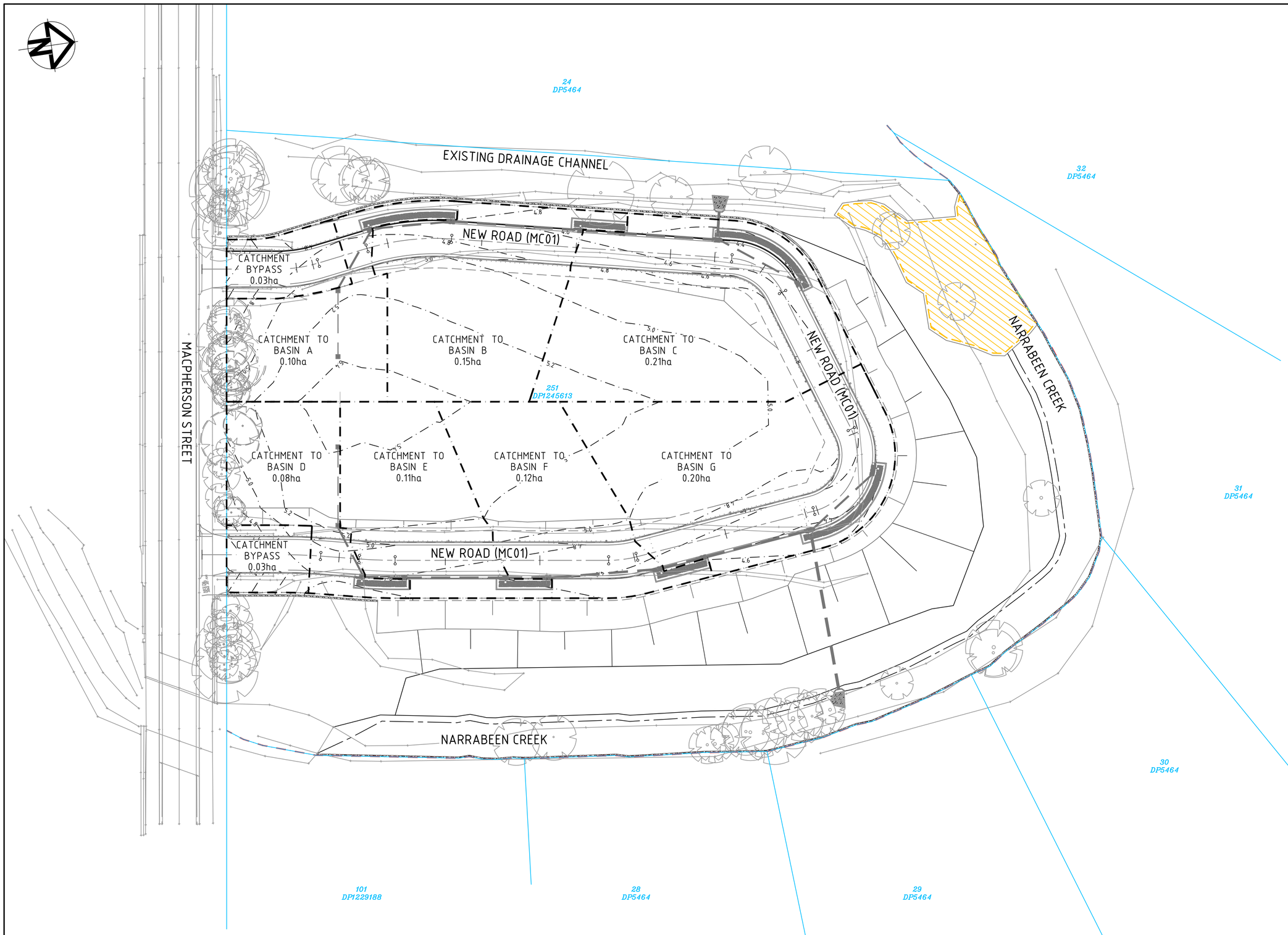
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No. DAC1082 | Project No. 18-580 | Issue F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1082.dwg



SW CATCHMENT LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING CONTOUR (3.0)
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- PROPOSED EASEMENT
- PROPOSED CREEK CENTERLINE
- PROPOSED 25m RIPARIAN CORRIDOR
- PROPOSED 25m PRIVATE BUFFER
- STORMWATER CATCHMENT BOUNDARY
- STORMWATER CATCHMENT IDENTIFICATION (CATCHMENT TO BASIN E 0.12ha)
- KERB & GUTTER
- ROLL TOP KERB AND GUTTER
- BATTER
- CONTOUR (0.2m INTERVAL) (5.0)
- RETAINING WALL
- STORMWATER PIPE (SHOWING SIZE)
- STORMWATER KERB INLET PIT
- STORMWATER SURFACE INLET PIT
- STORMWATER RAINGARDEN

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT
2. REFER DRAWING DAC020 FOR CIVIL DETAILS.
3. REFER DRAWING DAC021-023 FOR STORMWATER DETAILS.
4. DRIVEWAYS ARE SHOWN FOR COORDINATION PURPOSES ONLY AND ARE SUBJECT TO INDIVIDUAL LOT APPROVALS.

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

100mm on Original

Client

KARIMBLA CONSTRUCTION SERVICES (NSW) PTY LIMITED

Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 400 @ A1

Grid MGA

Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project

2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title

INTERNAL STORMWATER CATCHMENT PLAN

Civil Engineers and Project Managers

at&l

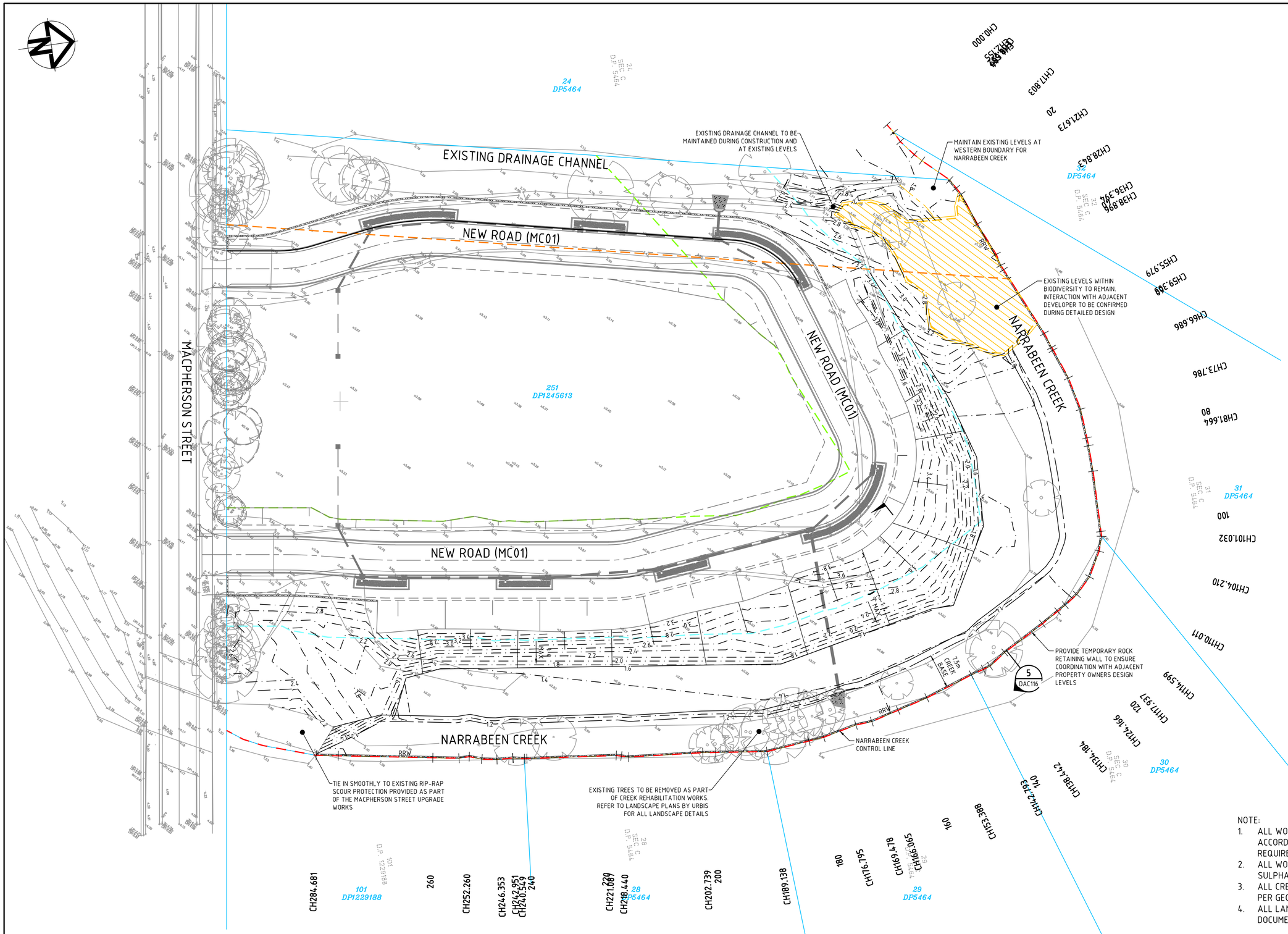
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

Status FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1090	18-580	F

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1090.dwg



CREEK PLAN LEGEND

EXISTING

- EXISTING BOUNDARY
- EXISTING CONTOUR
- EXISTING 20m ASSET PROTECTION ZONE
- EXISTING TREE
- BIODIVERSITY EXTENTS

PROPOSED

- PROPOSED EASEMENT
- PROPOSED CREEK CENTERLINE
- PROPOSED 25m RIPARIAN CORRIDOR
- PROPOSED 25m PRIVATE BUFFER
- PROPOSED CREEK BASE
- CONTOUR (0.2m INTERVAL)
- FINISHED LEVEL
- KERB & GUTTER
- ROLL TOP KERB AND GUTTER
- BARRIER KERB
- DISH DRAIN
- VEHICULAR CROSSING
- BATTER
- RETAINING WALL
- STORMWATER PIPE (SHOWING SIZE)
- STORMWATER KERB INLET PIT
- STORMWATER SURFACE INLET PIT
- STORMWATER RAINGARDEN

NOTES

1. NARRABEEN CREEK DESIGN SHOULD BE CONSIDERED INDICATIVE ONLY UNTIL DETAILED SITE SURVEY AND ADJACENT PROPERTY OWNERS DETAILED DESIGNS ARE OBTAINED IN ELECTRONIC FORMAT
2. REFER DRAWING DAC1020 FOR CIVIL DETAILS.
3. REFER DRAWING DAC1021-1023 FOR STORMWATER DETAILS.

NOTE:

1. ALL WORKS WITHIN NARRABEEN CREEK ARE TO BE IN ACCORDANCE WITH NORTHERN BEACHES COUNCIL REQUIREMENTS AND ASSOCIATED APPROVAL
2. ALL WORKS TO BE IN ACCORDANCE WITH APPROVED ACID SULPHATE SOILS MANAGEMENT PLAN
3. ALL CREEK STABILISAITON WORKS TO BE COMPLETED AS PER GEOTECHNIAL ENGINEERS DIRECITON
4. ALL LANDSCAPE WORKS ARE AS PER URBIS DOCUMENTATION

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 10 20 30 40m

1 : 400 @ A1 1 : 800 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED
Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales	1 : 400 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project

2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title

NARRABEEN CREEK
PLAN

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9460 8413
www.atl.net.au
info@atl.net.au

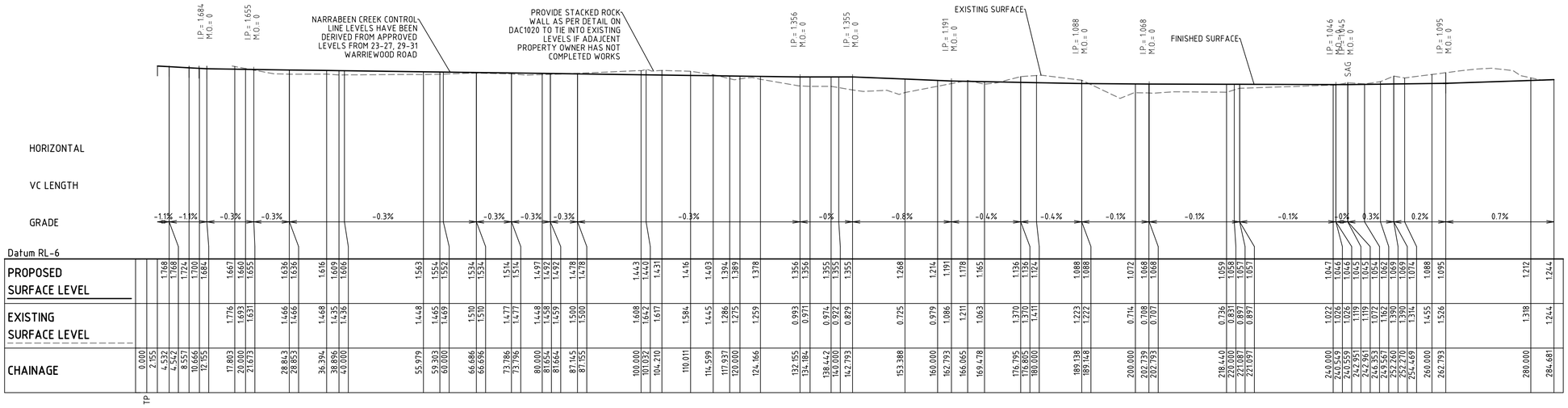
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1110	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1110.dwg



NARRABEEN CREEK LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

Client
KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED
Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
Email: info@design.meriton.com.au
Internet: http://www.meriton.com.au

Scales 1 : 500 (H) @ A1
1 : 100 (V) @ A1
Grid MGA
Height Datum AHD

Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
NARRABEEN CREEK
LONGITUDINAL
SECTION

Civil Engineers and Project Managers
at&l
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North Sydney NSW 2060
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www.atl.net.au
info@atl.net.au

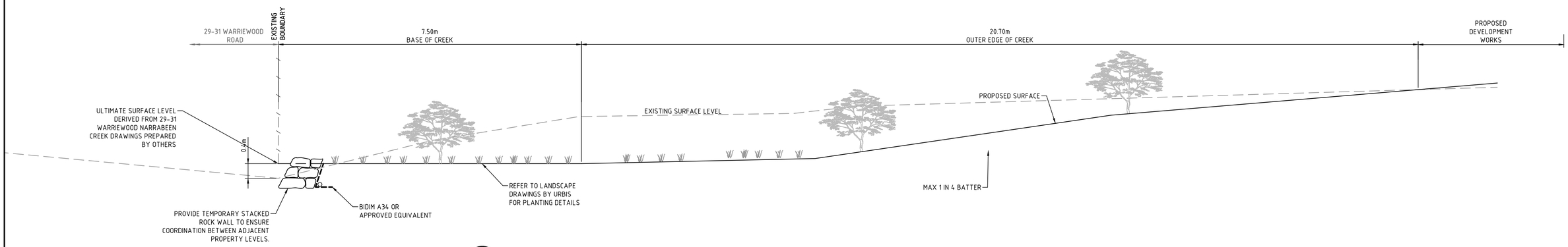
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1115	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1115.dwg



SECTION 6
1 : 50 DAC1110

NOTE:
1. ALL WORKS WITHIN NARRABEEN CREEK ARE TO BE IN ACCORDANCE WITH NORTHERN BEACHES COUNCIL REQUIREMENTS AND ASSOCIATED APPROVAL
2. ALL WORKS TO BE IN ACCORDANCE WITH APPROVED ACID SULPHATE SOILS MANAGEMENT PLAN
3. ALL CREEK STABILISAITON WORKS TO BE COMPLETED AS PER GEOTECHNIAL ENGINEERS DIRECITON
4. ALL LANDSCAPE WORKS ARE AS PER URBIS DOCUMENTATION

Issue	Description	Date
F	ISSUE FOR APPROVAL	28-03-19
E	ISSUE FOR APPROVAL	10-12-18
D	ISSUE FOR APPROVAL	07-12-18
C	ISSUE FOR APPROVAL	30-10-18
B	ISSUE FOR COMMENT	25-10-18
A	ISSUE FOR COMMENT	24-10-18

Bar Scales

0 1 2 3 4 5m

1 : 50 @ A1 1 : 100 @ A3

Client

KARIMBLA
CONSTRUCTION SERVICES (NSW)
PTY LIMITED

Level 11, 528 Kent Street, Sydney NSW 2000
Tel: (02) 9287 2888 Fax: (02) 9287 2777
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Scales	1 : 50 @ A1
Grid	MGA
Height Datum	AHD
Drawn	GJ
Designed	GJ
Checked	AT
Approved	

Project
2 MACPHERSON STREET
WARRIEWOOD
EARLY WORKS
PACKAGE

Title
NARRABEEN CREEK
TYPICAL
SECTIONS

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
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www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.	Project No.	Issue
DAC1116	18-580	F

100mm on Original

F:\18-580 Warriewood Meriton\6.0 Drgs\Civil\Final\1000 Series - Early Works\DAC1116.dwg

MACPHERSON STREET (20.115 WIDE)

LOT 24
SEC. C
DP5464

NEW ACCESSWAY

2
294m²
(Excluding Emt 240m²)

3
240m²
(Excluding Emt 200m²)

23
240m²
(Excluding Emt 200m²)

22
389m²
(Excluding Emt 323m²)

4.0 WIDE ACCESS & SERVICES EASEMENTS

4 257m² | 5 279m² | 6 281m² | 7 274m² | 8 267m² | 9 260m² | 10 253m² | 11 246m²

21 270m² | 20 273m² | 19 273m² | 18 273m² | 17 273m² | 16 273m² | 15 257m² | 14 232m²

12
388m²

1
COMMON PROPERTY
4324m²

13
296m²

25 PRIVATE BUFFER

CENTRE OF CREEK

LOT 31
SEC. C
DP5464

NEW ACCESSWAY

24
(PUBLIC RESERVE)
1.286 ha
(BY DEDUCTION DP5464)
(Note area will vary by up to 15% depending future investigation of creek boundary and registration of survey plan)

25 RIPARIAN ZONE OFFSET

LOT 30
SEC. C
DP5464

CENTRE OF

LOT 29
SEC. C
DP5464

LOT 101
DP1229186

LOT 28
SEC. C
DP5464

DEVELOPMENT SUMMARY

SUBDIVIDE LOT 25 TO CREATE:

- LOT 1 COMMON PROPERTY & NEW ACCESSWAY
- LOTS 2 TO 23 VACANT LAND COMMUNITY TITLE LOTS
- LOT 24 OPEN SPACE TO BE DEDICATED TO COUNCIL (PUBLIC RESERVE)

Revision	Chk'd
Rev G 12/04/19, Revise Layout	
Rev F 18/12/18, Add emt	
Rev E 5/12/18, Revise layout	
Rev D 20/2/18, Revise layout	
Rev C 6/11/17, Revise layout	
Rev B 12/10/17, Reduce Lot number	

Client: MERITON GROUP

Important Notes:

THE PROPOSED BOUNDARIES AS SHOWN HEREON ARE PRELIMINARY ONLY AND ARE SUBJECT TO FINAL DESIGN, LOCAL AUTHORITY APPROVAL AND REGISTRATION WITH LAND & PROPERTY INFORMATION

SITE DETAIL SURVEY TAKEN FROM JOHN B WHITE PTY LTD DRAWING 123899/D2 DATED 25/7/2006

CIVIL WORKS & BUFFER LINES TAKEN FROM AT&L DRAWINGS SKC001 ISSUE B DATED 15/03/2019 – SUPPLIED BY MERITON GROUP 11-04-2019.

0 15 mm 50 m 30 m 100 mm 45 m 150 mm

PROPOSED SUBDIVISION PLAN

OF LOT 25 SECTION C IN DP5464
2 MACPHERSON STREET

Locality : WARRIEWOOD
Local Government : NORTHERN BEACHES

J:\42300-\42387\DWGS\22053Bg.pro

Scale	Level Datum	F.Bk	L.Bk	Drawn / Chk'd
1 : 300 @ A1 SIZE	AHD Origin	–	–	GVG

Ref. No.	Date	Drawing No./Size	Sheet	Of	Rev.
42387	20/6/17	22053 B	-	-	G

B & P SURVEYS
CONSULTING SURVEYORS
ABN: 55010117256
10 Nerang Street
Nerang,QLD,4211,Australia
Telephone: 07 5596 0370
Fax: 07 5502 0374
Email: nerang@bpsurveys.com.au
Webpage: www.bpsurveys.com.au
Offices Also At : Tweed Heads Ph.07 5536 3611 Murwillumbah Ph.02 6672 1924
A QUALITY ASSURED COMPANY

Appendix B – Site Photographs

APPENDIX B - SITE PHOTOGRAPHS

Photograph 1: Excavation area following removal of fill material to a depth of 0.2m bgs at test-pit location TP04

Photograph 2: Excavation area following removal of fill material to a depth of 0.2m bgs at test-pit location TP21

Photograph 3: Excavation area following removal of fill material to a depth of 0.2m bgs at test-pit location TP13

Appendix C – Borehole Logs (from Coffey 2017a DSI and 2017c Addendum DSI)

coffey
A TETRA TECH COMPANY

Engineering Log - Borehole

Borehole No.	**HA01**
Sheet	1 of 1
Office Job No.:	**SYDEN205656**
Client:	**Meriton Group**
Date started:	**17.5.2017**
Principal:	
Date completed:	**17.5.2017**
Project:	**DSI, 2 Macpherson Street, Warriewood, NSW**
Logged by:	**JS**
Borehole Location:	**Refer Fig 2**
Checked by:	**PA**

drill model and mounting: HA | Easting: | slope: -90° | R.L. Surface:

hole diameter: mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA									**Concrete** (100mm thick)	m			No ACM, staining or odours observe
									Bitumen				
				E+4.5ppm					**FILL (Silty SAND):** medium grained, brown, trace low plasticity clay, plastics, crushed terracotta and concrete refusal on concrete				
						0.5			Borehole HA01 terminated at 0.3m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No.	**HA02**
Sheet	1 of 1
Office Job No.:	**SYDEN205656**
Client:	**Meriton Group**
Date started:	**17.5.2017**
Principal:	
Date completed:	**17.5.2017**
Project:	**DSI, 2 Macpherson Street, Warriewood, NSW**
Logged by:	**JS**
Borehole Location:	**Refer Fig 2**
Checked by:	**PA**

drill model and mounting: HA | Easting: | slope: -90° | R.L. Surface:

hole diameter: mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA									**Concrete** (50mm thick)	M			No ACM, staining or odours observed
				E+2.3ppm					**FILL (Gravelly SAND):** medium to coarse grained, brown to grey, fine to medium aub-angular gravels, with some clay, ash and crushed sandstone				
				E+3.6ppm		0.5			**FILL (Sandy CLAY):**medium to high plasticity, brown to orange to grey, fine grained sand, with some ash and fine gravels refusal				
						1.0			Borehole HA02 terminated at 0.6m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No.	***HA03***
Sheet	1 of 1
Office Job No.:	***SYDEN205656***
Client:	***Meriton Group***
Date started:	***17.5.2017***
Principal:	
Date completed:	***17.5.2017***
Project:	***DSI, 2 Macpherson Street, Warriewood, NSW***
Logged by:	***PA***
Borehole Location:	***Refer Fig 2***
Checked by:	***JS***

drill model and mounting: HA | Easting: | slope: -90° | R.L. Surface:

hole diameter: mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA									**Concrete** (80mm thick)	M			No ACM, staining or odours observed
						–			**FILL (Sandy CLAY):** medium plasticity, white to grey, fine to medium sand				
				E+1.6ppm		–							
						–			**FILL (Gravelly SAND):** fine to medium grained, brown to black, fine to medium sub-angular gravels, with some medium plasticity clay and trace ash				
				E+0.2ppm		–			refusal				
						0.5			Borehole HA03 terminated at 0.4m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No.	***HA04***
Sheet	1 of 1
Office Job No.:	***SYDEN205656***
Client:	***Meriton Group***
Date started:	***17.5.2017***
Principal:	
Date completed:	***17.5.2017***
Project:	***DSI, 2 Macpherson Street, Warriewood, NSW***
Logged by:	***PA***
Borehole Location:	***Refer Fig 2***
Checked by:	***JS***

drill model and mounting: HA | Easting: | slope: -90° | R.L. Surface:

hole diameter: mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA				E+2.9ppm		–			**FILL (Gravelly SAND):** fine to medium grained, orange to brown to white, medium gravels, trace low plasticity clay and crushed terracotta	M			No ACM, staining or odours observed
						–			**FILL (Gravelly SAND):** fine to medium grained, black to brown, medium gravels with some clay refusal				
						0.5			Borehole HA04 terminated at 0.3m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No.	**HA05**
Sheet	1 of 1
Office Job No.:	**SYDEN205656**
Client:	**Meriton Group**
Date started:	**17.5.2017**
Principal:	
Date completed:	**17.5.2017**
Project:	**DSI, 2 Macpherson Street, Warriewood, NSW**
Logged by:	**PA**
Borehole Location:	**Refer Fig 2**
Checked by:	**JS**

drill model and mounting: HA | Easting: | slope: -90° | R.L. Surface:

hole diameter: mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA									**Concrete** (100mm thick)	M			No ACM, staining or odours observed
				E+4.1ppm					**FILL (Gravelly SAND):** medium to coarse grained, brown to black, fine to coarse gravel, trace low plasticity clay, ash and crushed terracotta refusal				
						0.5			Borehole HA05 terminated at 0.3m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description
based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP01**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**FILL (Gravel):** Crushed terracotta	D			No ACM
				E+1.8ppm				**FILL (Clayey SAND):** fine to medium grained, brown to orange, low plasticity, with some tiles				
				E+2.1ppm	0.5		SC	**Clayey SAND:** fine grained, brown to grey to black, low plasticity, potential acid sulfate soils	M			Sulfur odour
				E+1.0ppm	1.0			Test pit TP01 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP02**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									**FILL (Gravelly SAND):** fine grained, black to white, with some ash	M			No ACM or staining observed
				E+2.2pm					**FILL (Sandy CLAY):** low plasticity, brown to grey, fine grained				
		▶		E+5.4ppm		0.5			**FILL (Sandy SILT):** grey, fine to medium grained, with some low plasticity clay and plastic, trace sandstone cobbles (reworked natural material)	W			
				E+3.6ppm		1.0			Test pit TP02 terminated at 1m				
						1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP03**
Sheet 1 of 1
Office Job No.: **SYDEN205656**

Client: **Meriton Group**
Date started: **16.5.2017**
Principal:
Date completed: **16.5.2017**
Project: **Meriton Warriewood DSI**
Logged by: **LS**
Test pit location: **2 Macpherson Street, Warriewood, NSW**
Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:
excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									**FILL (Gravelly SAND):** fine grained, brown to grey, sub-angular gravel, trace low plasticity clay	M			No ACM or staining observed
				E+4.4ppm									
			E+2.5ppm	+QD01/QT01		0.5			**Ash Layer:** Asphalt with some fine to medium clayey sand (brown to grey) and some fine to medium sub-angular gravels				
		►							**FILL (Clayey SAND):** fine to medium grained, brown, low plasticity, with some small to medium sub-angular gravel and crushed terracotta	W			
				E+5.2ppm									
						1.0			Test pit TP03 terminated at 0.8m				

method
DT diatube
PT push tube
SS soild stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

TEST PIT + PID GINT LOGS.GPJ COFFEY.GDT 5.6.17
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Engineering Log - Excavation

Excavation No. **TP04**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									Concrete	D			
				E+6.3ppm					**FILL (CLAY):** high plasticity, with some fine to medium grained sand, crushed sandstone, dark brown terracotta, gravel				
						0.5			becoming stiff clay @ 0.4m	M			
				E+6.5ppm									
									Test pit TP04 terminated at 0.6m				
						1.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP05**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**FILL (Gravelly SAND):** fine to medium grained, brown to grey, fine to coarse crushed terracotta pot sub-angular gravel, with some low plasticity clay	M			No ACM, staining or odour observed
				E+3.2ppm								
								fragments of steel + plastic				
					0.5							
				E+2.6ppm				**FILL (Clayey SAND):** fine to medium grained, grey, low plasticity, with some sub-angular gravel and crushed terracotta				
		►							W			
				E+2.3ppm								
					1.0			Test pit TP05 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP06**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+3.1ppm	0.0			**FILL (Clayey SAND):** fine to medium grained, brown to orange, low plasticity, with some tiles	M			No ACM, staining or odour observed
				E+2.3ppm	0.5			**FILL (Clayey SAND):** fine grained, brown to grey to black, low plasticity, potential acid sulfate soils, with some asphalt, glass fragments, trace ash, sub-angular gravel, crushed terracotta pots				
					1.0			Test pit TP06 terminated at 0.8m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP07**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+5.1ppm				**FILL (Clayey SAND):** fine to medium grained, brown to orange, low plasticity, with some tiles	M			No ACM or odour observed
				E+4.6ppm	0.5			**FILL (Clayey SAND):** fine grained, brown to grey to black, low plasticity, potential acid sulfate soils, with some asphalt, glass fragments, trace ash inclusions, sub-angular gravel, crushed terracotta pots				
					1.0			Test pit TP07 terminated at 0.8m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP08**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E								**Crushed terracotta**	M			
				E+7.4ppm				**FILL (SAND):** fine grained, brown to grey, trace fine to medium aub-angular gravel and low plasticity clay				
					0.5		CL	**Silty CLAY:** medium to high plasticity, grey to yellow to orange				Iron staining
				E+4.9ppm								
								Test pit TP08 terminated at 0.6m				
					1.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP09**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
EI					0			**FILL (Gravelly SAND):** fine to medium grained, brown to grey, sub-angular fine to coarce gravels with some crushed terracotta, trace ash	M			No ACM or odours observed
				E+6.5ppm								
							CH	**Silty CLAY** high plasticity, grey to red				Iron Staining
					0.5							
				E+8.7ppm								
								Test pit TP09 terminated at 0.8m				
					1.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP10**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**FILL (Crushed terracotta)**	M			No ACM, Staining or odours observed
				E+6.5ppm				**FILL (Sandy CLAY):** medium to high plasticity, borwn to grey, fine to medium sand, with some crushed sandstone and medium to coarse sub-angular gravel, trace ash				
					0.5							
				E+6.8ppm								
					0.8			Test pit TP10 terminated at 0.8m				
					1.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP11**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+8.2ppm				**FILL (Gravelly SAND):** fine to medium grained, brown to grey, sub-angular fine to meidum gravels	M			No ACM, staining or odours observed
				E+8.1ppm	0.5			**FILL (Sandy CLAY):** low to medium plasticity, brown to grey, fine grained, with some crushed sandstone boulers				
					1.0			Test pit TP11 terminated at 0.7m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP12**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**FILL (Gravelly SAND):** fine to medium grained, brown to grey, crushed terracotta gravels, with some low plasticity clay	M			No ACM, staining or odours observed
				E+5.5ppm								
					0.5			**FILL (Gravelly SAND):** fine to medium grained, grey to pale brown, fine to medium sub-angular gravel, with some steel fragments				
				E+8.9ppm								
					1.0			Test pit TP12 terminated at 0.8m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP13**
Sheet 1 of 1
Office Job No.: **SYDEN205656**

Client: **Meriton Group**
Date started: **16.5.2017**
Principal:
Date completed: **16.5.2017**
Project: **Meriton Warriewood DSI**
Logged by: **LS**
Test pit location: **2 Macpherson Street, Warriewood, NSW**
Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:
excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**FILL (Gravelly SAND):** fine to medium grained, brown to grey, sub-angular medium to coarse crushed terracotta gravels	M			No ACM, staining or odours observed
				E+5.4ppm								
							SP	**SAND:** fine to medium grained, brown to grey, with some sub-angular fine to medium gravel, trace low plasticity clay				
					0.5							
				E+3.7ppm								
					1.0			Test pit TP13 terminated at 1m				
					1.5							

method
DT diatube
PT push tube
SS soild stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Excavation

Excavation No. **TP14**
Sheet 1 of 1
Office Job No.: **SYDEN205656**

Client: ***Meriton Group***
Date started: ***16.5.2017***
Principal:
Date completed: ***16.5.2017***
Project: ***Meriton Warriewood DSI***
Logged by: ***LS***
Test pit location: ***2 Macpherson Street, Warriewood, NSW***
Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:
excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+3.9ppm		0.5			**FILL (Gravelly SAND):** fine to medium grained, brown to grey, sub-angular medium to coarse crushed terracotta gravels	M			No ACM, staining or odour observed
									Asphalt trace ash				
				E+4.0ppm				SP	**SAND:** fine to medium grained, brown to grey, with some sub-angular fine to medium gravel, trace low plasticity clay				
						1.0			Test pit TP14 terminated at 1m				
						1.5							

method
DT diatube
PT push tube
SS soild stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Excavation

Excavation No. **TP15**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+3.9ppm	0.0			**FILL (Gravelly SAND):** fine to medium grained, brown to grey, sub-angular medium to coarse crushed terracotta gravels	M			No ACM, staining or odours observed
				E+3.6ppm	0.5		SP	**SAND:** fine to medium grained, brown to grey, with some sub-angular fine to medium gravel, trace low plasticity clay				
					1.0			Test pit TP15 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP16**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									**FILL (Crushed terracotta)**	M			No ACM, Staining or odours observed
									FILL (Gravelly SAND): fine to medium grained, brown to grey, sub-angular medium to coarsegrained gravels				
				E+7.8ppm				SP	**SAND:** fine to medium grained, brown to grey, with some sub-angular fine to medium gravel, trace low plasticity clay, organic material (wood)				
						0.5							
				E+3.2ppm									
						1.0			Test pit TP16 terminated at 1m				
						1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP17**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**FILL (Crushed terracotta)**	M			No ACM, staining or odours observed
				E+4.4ppm				**FILL (Gravelly SAND):** fine to medium grained, brown to grey, sub-angular medium to coarse grained gravels, tracel low plasticity clay				
					0.5		SP	**SAND:** fine to medium grained, brown to grey, with some sub-angular fine to medium gravel, trace low plasticity clay, organic material (wood)				
				E+9.4ppm	1.0			Test pit TP17 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP18**
Sheet 1 of 1
Office Job No.: **SYDEN205656**

Client: ***Meriton Group***
Date started: ***16.5.2017***
Principal:
Date completed: ***16.5.2017***
Project: ***Meriton Warriewood DSI***
Logged by: ***LS***
Test pit location: ***2 Macpherson Street, Warriewood, NSW***
Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:
excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									**FILL (Crushed terracotta)**	M			No ACM, staining or odours observed
									FILL (Ashy Gravelly SAND): fine to medium grained, sub-angular fine to coarse grained gravels				
				E+5.4ppm									
								SP	**SAND:**fine to medium grained, brown to grey, with some sub-angular fine to medium gravel, trace low plasticity clay, organic material (wood)				
				E+4.2ppm+QD2/QT2		0.5							
				E+4.8ppm		1.0			Test pit TP18 terminated at 1m				
						1.5							

method
DT diatube
PT push tube
SS soild stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Excavation

Excavation No. **TP19**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									**FILL (Gravely SAND):** fine to medium grained, brown, sub-angular fine to coarse crushed terracotta and ballast gravel	M			No ACM, staining or odours observed
				E+4.8ppm									
				E+3.7ppm		0.5			**FILL (Gravelly CLAY):** low pasticity, brown to green to grey, fine to coarse sub-angular gravel, with some crushed terracotta pot gravels				
				E+4.7ppm		1.0			Test pit TP19 terminated at 1.2m				
						1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP20**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+4.2ppm	0.5		SP	**FILL (Gravelly SAND):** fine to medium grained, crushed terracotta gravels	M			No ACM, staining or odours observed
				E+4.8ppm	1.0			**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
					1.5			Test pit TP20 terminated at 1m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP21**
Sheet 1 of 1
Office Job No.: **SYDEN205656**

Client: **Meriton Group**
Date started: **16.5.2017**
Principal:
Date completed: **16.5.2017**
Project: **Meriton Warriewood DSI**
Logged by: **LS**
Test pit location: **2 Macpherson Street, Warriewood, NSW**
Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:
excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+4.6ppm				**FILL (Gravelly SAND):** fine to medium grained, crushed terracotta gravels	D			No ACM, staining or odours observed
				E+3.3ppm	0.5		SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
					1.0			Test pit TP21 terminated at 1m				
					1.5							

method
DT diatube
PT push tube
SS soild stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Excavation

Excavation No. **TP22**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E+6.6ppm				**FILL (Sandy GRAVEL):** crushed terracotta, with some ash	M			No ACM, staining or odours observed
				E+6.7ppm	0.5		SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
					1.0			Test pit TP22 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP23**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
EI					0			**FILL (Sandy GRAVEL):** crushed terracotta, with some ash	M			No ACM, staining or odours observed
				E+7.2ppm								
							SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
				E+6.1ppm	0.5							
					1.0			Test pit TP23 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP24**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
EI								**Crushed Terracotta**	M			No ACM, staining or odours observed
				E+9.7ppm				**FILL (Gravelly SAND):** fine to medium grained, brown to black, fine to coarse sub-angular gravels, trace ash				
							SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
				E+8.8ppm	0.5							
					1.0			Test pit TP24 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP25**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***16.5.2017***

Principal:

Date completed: ***16.5.2017***

Project: ***Meriton Warriewood DSI***

Logged by: ***LS***

Test pit location: ***2 Macpherson Street, Warriewood, NSW***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**Crushed terracotta**	M			No ACM, staining or odours observed
				E+7.4ppm				**FILL (Gravelly SAND):** fine to medium grained, brown to black, fine to coarse sub-angular gravels, trace ash				
					0.5		SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
				E+6.7ppm								
					1.0			Test pit TP25 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP26**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									**Crushed terracotta**	M			No ACM, staining or odours observed
				E+7.4ppm					**Crushed terracotta** with some brown fine to medium grained sand				
						0.5		SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
				E+6.7ppm									
						1.0			Test pit TP26 terminated at 1m				
						1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP27**
Sheet 1 of 1
Office Job No.: **SYDEN205656**

Client: **Meriton Group**
Date started: **16.5.2017**
Principal:
Date completed: **16.5.2017**
Project: **Meriton Warriewood DSI**
Logged by: **LS**
Test pit location: **2 Macpherson Street, Warriewood, NSW**
Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:
excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0			**Crushed terracotta** with some brown fine to medium grained sand	M			No ACM, staining or odours observed
				E+8.6ppm								
							SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
			E+7.5ppm	+QD03/QT03	0.5							
					1.0			Test pit TP27 terminated at 1m				
					1.5							

method
DT diatube
PT push tube
SS soild stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Excavation

Excavation No. **TP28**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: **Meriton Group**

Date started: **16.5.2017**

Principal:

Date completed: **16.5.2017**

Project: **Meriton Warriewood DSI**

Logged by: **LS**

Test pit location: **2 Macpherson Street, Warriewood, NSW**

Checked by: **JS**

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			**Crushed terracotta** with some brown fine to medium grained sand	M			No ACM, staining or odours observed
				E+3.4ppm								
							SP	**SAND:** fine to medium grained, brown to grey, trace low plasticity clay				
				E+4.1ppm	0.5							
					1.0			Test pit TP28 terminated at 1m				
					1.5							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey
A TETRA TECH COMPANY

Engineering Log - Excavation

Excavation No. **TP29**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E									CONCRETE 100mm thick				Slight hydrocarbon odour, no ACM or staining
				E (PID=1.3ppm)					FILL: Clayey SAND, grey/brown, fine to medium grained, medium plasticity, with some sub-angular, small to medium gravels, crushed concrete, ash/asphalt.				No odour, staining or ACM observed
				E (PID=2.4ppm)		0.5							
				E (PID=2.9ppm)		1.0			Clayey SAND, brown/grey, fine to meidum grained, low plasticity, trace wood.				No odour, staining observed
						1.5			Test pit TP29 terminated at 1m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TEST PIT + PID GINT LOGS.GPJ COFFEY.GDT 19.12.17

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Engineering Log - Excavation

Excavation No. **TP30**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter 100 200 300 400 kPa	structure and additional observations
E				E + QD101 and QT101 (PID=3.7ppm)					FILL: Clayey SAND, yellow/brown, fine to medium grained, crushed sandstone blocks,				No odour, staining or ACM observed
						0.5			Sandy CLAY, grey to black, medium plasticity, fine to medium grained sand, some plastic, wood and sub-angular medium to large gravels.				
				E (PID=4.8ppm)									
						1.0			Clayey SAND, brown/grey, fine to medium grained, low plasticity.				Slight sulfur odour
				E (PID=3.7ppm)									
						1.5			Test pit TP30 terminated at 1.5m				
						2.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP31**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E					0.0			CONCRETE 100mm thick				No odour, staining or ACM observed
				E (PID=3.5ppm)				FILL: Sandy CLAY, brown/grey, medium to low plasiticty, fine to medium grained sand, with some sub-angular small to medium gravels, trace ash.				
					0.5			Clayey Sand, fbrown/dark brown, fine to medium grained, low plasticity.				
				E (PID=3.9ppm)								
				E (PID=1.2ppm)	1.0							
					1.5			Test pit TP31 terminated at 1.2m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP32**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E (PID=2.7ppm)		0.5			FILL: Sandy GRAVEL, brown, fine to medium grained, gravels are small to large, sub-angular, with some concrete boulders and crushed terracotta.				No odour, staining or ACM observed
				E (PID=2.7ppm)					SAND, brown, fine to medium grained, trace low plasticity clay, some peat				
				E (PID=2.0ppm)		1.0							
						1.5			Test pit TP32 terminated at 1.2m				
						2.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TEST PIT + PID GINT LOGS.GPJ COFFEY.GDT 19.12.17

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Engineering Log - Excavation

Excavation No. **TP33**

Sheet 1 of 2

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E (PID=3.1ppm)					FILL: Gravelly SAND, fine to medium grained, brown/grey/black, with some ash and medium to large sub-angular concrete gravels.				No odour, staining or ACM observed
						0.5			FILL: Gravelly SAND, brown.grey/black fine to medium grained with some medium to low plasticity clays				
				E (PID=2.1ppm)									
									FILL: Silty CLAY, brown/yellow, medium to high plasticty, mottled red with some large concrete footings, wood and trace ash.				
				E (PID=2.6ppm)		1.0							
						1.5							
						2.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Excavation

Excavation No. **TP33**

Sheet 2 of 2

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E (PID=4.9ppm)	2.5			FILL: Silty CLAY, brown/yellow, medium to high plasticty, mottled red with some large concrete footings, wood and trace ash. *(continued)*				No odour, staining or ACM observed
								Test pit TP33 terminated at 1.2m				
					3.0							
					3.5							
					4.0							

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey
A TETRA TECH COMPANY

Engineering Log - Excavation

Excavation No. **TP34**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
E				E (PID=5.8ppm)		0.5			FILL: Gravelly SAND, brown/red, fine to medium grained, gravel is crushed terracotta, small to large in size and sub-angular.				No odour, staining or ACM observed
				E (PID=3.0ppm)		1.0			FILL: Gravelly SAND, brown/dark brown, fine to medium grained, with bricks, plastic, wood and some crushed terracotta				
				E (PID=2.4ppm)		1.5			Clayey SAND, brown/grey, fine to medium grained, low plasticity				
						2.0			Test pit TP34 terminated at 1.5m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4 — no resistance ranging to refusal

water

- 10/1/98 water level on date shown
- water inflow
- water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey
A TETRA TECH COMPANY

Engineering Log - Excavation

Excavation No. **TP35**

Sheet 1 of 1

Office Job No.: **SYDEN205656**

Client: ***Meriton Group***

Date started: ***29.11.2017***

Principal:

Date completed: ***29.11.2017***

Project: ***DSI, 2 Macpherson Street, Warriewood, NSW***

Logged by: ***JS***

Test pit location: ***Refer Fig 2***

Checked by: ***JS***

equipment type and model: | Pit Orientation: | Easting: m | R.L. Surface:

excavation dimensions: m long m wide | Northing: m | datum: AHD

excavation information						material substance						
method	penetration 1 2 3	water	PID	notes samples, tests, etc	RL / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa (100 200 300 400)	structure and additional observations
E					0.5			FILL: Sandy GRAVEL, brown/red - crushed terracotta, with fine to medium grained grey/brown sand				No odour, staining or ACM observed, VISUAL LOG
					1.0			SAND, brown/grey, fine to medium grained, trace low plasticity clay.				
					1.5			Test pit TP35 terminated at 1m				

method

DT	diatube
PT	push tube
SS	soild stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

penetration

1 2 3 4

no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
V	vane shear (kPa)
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Appendix D - Clearance Certificate

P. CLIFTON
& ASSOCIATES

PO Box 457
Turramurra NSW 2074

ABN: 69 041 751 671

PH: 0437 251 358
Email: philclifton@bigpond.com

19 January 2018

Ms Nicole Maroun
Earthworx
PO Box 7815
Baulkham Hills NSW 2153

RE: VISUAL ASBESTOS REMOVAL CLEARANCE CERTIFICATION
THREE EXCAVATION AREAS AT 2 MACPHERSON STREET, WARRIEWOOD NSW

Dear Sir,

We refer to the visual inspection undertaken on Friday 19 January 2018 following the excavation and removal of soil containing asbestos contamination from three nominated locations within the Meriton development site at 2 Macpherson Street, Warriewood NSW.

The three locations from with the soil was excavated and removed from the site were those locations identified in the contamination assessment of the site completed by Coffey in October 2017 ref: 754-SYDEN205656_R02. These areas are located in the north-west area, centre south area and south-east area. A site plan showing these locations is attached.

This inspection, which was of a visual nature only, was carried out in accordance with the Section 3.10 of the How to Safely Remove Asbestos Code of Practice issued by Safe Work Australia and Clause 473 of the NSW Work Health and Safety Regulation 2017. This clearance certificate has been compiled in accordance with the requirements of Clause 474 of the NSW Work Health and Safety Regulation 2017.

This visual inspection undertaken on 19 January 2018 was carried out by completing a systematic walkover of the exposed ground surface and surrounding ground surface at each of the three nominated locations.

This visual inspection found the exposed surface soil in each of the three nominated areas from which the asbestos contaminated soil had been excavated to be free of visible asbestos containing materials such as fragments of asbestos cement. See attached photographs.

Monitoring for airborne asbestos fibres was undertaken in conjunction with the asbestos contaminated soil removal work on 30 November 2017. This monitoring returned a result of less than 0.01 fibres per millilitre of air (<0.01 fibres/ml) which is below the lowest detectable level using the membrane filter method [NOHSC:3003(2005)].

The National Occupational Health and Safety Commission recommended maximum exposure level for airborne asbestos fibres is 0.1 fibres per millilitre of air (as an 8-hour time weighted average).

A copy of the airborne asbestos fibre monitoring report is attached.

Based on the findings of the visual inspection which found the remaining exposed soil in each of three excavation areas to be free of visible asbestos contamination and the results of the airborne asbestos fibre monitoring which returned results below the lowest detectable level for the estimation of airborne asbestos fibres, we confirm that the removal of asbestos contaminated soil from the three nominated locations within the Meriton development site at 2 Macpherson Street, Warriewood NSW has been satisfactorily completed and these areas of the site may be accessed for construction work without the use of asbestos personal protective equipment (PPE).

In the event that during future excavation work at the site (or other soil disturbance such as strong wind or heavy rain) some asbestos containing materials such as fragments of asbestos cement become exposed, these pieces should be collected and disposed of as asbestos waste in accordance with the requirements of SafeWork NSW and the NSW Environment Protection Authority (NSW EPA).

If you require any further information, please contact me on 0437 251 358.

Yours faithfully
P. CLIFTON & ASSOCIATES PTY LTD

Philip Clifton
Principal
BOHS IP402 Certified
SafeWork NSW Licenced Asbestos Assessor: LAA000119

Attachments: Site Plan, Photographs, Airborne Asbestos Fibre Monitoring Report

SITE PLAN


N
WARRIEWOOD ROAD
MACPHERSON STREET
DRAFT
LEGEND
HAND AUGER LOCATION
TEST PIT LOCATION
APPROXIMATE SITE BOUNDARY
Scale (metres) 1:1000
MERITON GROUP
CONTAMINATION MANAGEMENT PLAN
2 MACPHERSON STREET, WARRIEWOOD NSW
SAMPLING EXCEEDANCES
754-SYDEN205656-R02
FIGURE 3

PHOTOGRAPHS

19 January 2018

Photograph No. 1: North- west excavation area at 2 Macpherson Street, Warriewood NSW on 19 January 2018

Photograph No. 2: Centre south excavtion area at 2 Macpherson Street, Warriewood NSW on 19 January 2018

19 January 2018

Photograph No. 3: South-east excavation area at 2 Macpherson Street, Warriewood NSW on 19 January 2018

AIRBORNE ASBESTOS FIBRE MONITORING REPORT

P. CLIFTON
& ASSOCIATES

PO Box 457
Turramurra NSW 2074

ABN: 69 041 751 671

PH: 0437 251 358
Email: philclifton@bigpond.com

4 December 2017

Ms Nicole Maroun
Earthworx
PO Box 7815
Baulkham Hills NSW 2153

RE: RESULTS OF AIRBORNE ASBESTOS FIBRE MONITORING
2 MACPHERSON STREET, WARRIEWOOD NSW

Dear Sir,

We refer to your request to undertake monitoring for airborne asbestos fibres on Thursday 30 November 2017 during the removal of soil containing asbestos contamination from the Meriton development site at 2 Macpherson Street, Warriewood NSW.

This monitoring was carried out in accordance the requirements of the Safe Work Australia How to Safely Remove Asbestos Code of Practice, Section 3.11 and the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres' 2nd edition [NOHSC 3003:2005].

The results of the monitoring are as follows:

Sample No.	Location	Time On	Time Off	Fibre Count fibres/fields	Airborne Fibre Concentration (fibres/ml)
PCA 5644 - 2017/A10/1	North west excavation area	07:00	15:00	0.0/100	<0.01
PCA 5644 - 2017/B50/2	Centre south excavation area	07:02	15:02	2.0/100	<0.01
PCA 5644 - 2017/B77/3	South east excavation area	07:04	15:04	3.0/100	<0.01

The above result is below the lowest detectable level for the estimation of airborne asbestos fibres using the membrane filter method and below the NOHSC recommended exposure level for airborne asbestos fibres (8 hour TWA) of 0.1 fibres/ml.

This result indicates that there was no measurable human health risk from airborne asbestos fibres in these areas during the monitoring period.

The NATA endorsed laboratory report is attached.

If you require any further information, please contact me on 0437 251 358.

Yours faithfully
P. CLIFTON & ASSOCIATES PTY LTD

Philip Clifton
Principal

Attachment: Laboratory Report

P. CLIFTON
& ASSOCIATES

LABORATORY REPORT

A division of Enviro-Net Australia Pty. Ltd.
ABN 39 067 499 389 ACN 067 499 389 NATA Reg. 3110
www.environet.com.au
Email: esp@esplabs.com.au

Melbourne Laboratory (Head Office)
Unit 2/2B Parker Street
Footscray, Victoria 3011
Ph: (03) 9688 8000

CERTIFICATE OF AIR MONITORING

Date: 4 December 2017

ESP Job Number: J37628

Customer: P. Clifton & Associates Pty Ltd

Address: PO Box 457, Turramurra NSW, 2074

Attention: Phil Clifton

Sampled From: As received (Your ref: PCA 5644-2017)

Sampled By: As received

Date Received: 4 December 2017

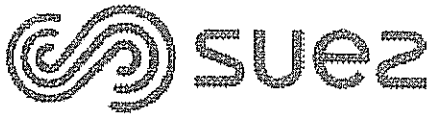
Test Method: Filters examined in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)] using ESP in-house Method No. 1.

ESP Lab No.	Customer Sample Reference	Result (fibres/field)
53935	A10/1	Nil/ 100
53936	B50/2	2/ 100
53937	B77/3	3/ 100

The results contained in this report relate only to the sample(s) submitted for testing. ESP Environmental & Safety Professionals accepts no responsibility for the representivity of the sample(s) submitted

Mathew Cupic
Approved Counter / Approved Signatory

Appendix E - Waste Disposal Weighbridge Dockets



SUEZ Recycling & Recovery Pty Ltd

Elizabeth Drive Waste Management
Centre
1725 Elizabeth Drive
Kemps Creek NSW 2178

Phone: 1300 651 116
ABN: 70 002 902 650

Delivery Docket

Ticket No: ED310435201.0
Time In: 29/11/2017 1:56:39 PM
Time Out: 29/11/2017 2:16:00 PM
Vehicle Rego: EWX030

701122 - EARTHWORX AUSTRALIA PTY LTD

Cust ref: H282 WARRIEWOOD

Contaminated Asbestos Soil - 8032

32.80t@
Source: External
Dest: Elizabeth Drive General Waste
GROSS 49.46t
TARE 16.66t
NET Weight: 32.80t

Chargeable Weight: 32.80t
Each Item Weight: 0.00t

Total (ex GST):
GST :

Total Price:

------ Payment Details----------

Temporary Acc:
==========
Total Price:
==========

Total Amount Tendered:
Change Given:

Operator: WOJJW

....

Appendix F - Laboratory Analysis Test Certificates & Chain of Custody Documentation

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

 8067

coffey

Consigning Office: Chatswood
Report Results to: Jessie.Sixsmith@coffey.com Mobile: Email: @coffey.com
Invoices to: Phone: Email: @coffey.com

Project No: SYDEN203656 Task No: Validation
Project Name: Meriton Warriewood Laboratory: Eurofins
Sampler's Name: J.Sixsmith Project Manager:
Special Instructions:
Relevant agreements: Eurofins COF_ENAUABTF00952AA_MSA1 ; ALS COF_ENAUABTF00952AA_MSA2 and SGS COF_ENAUABTF00952AA_MSA3

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	ASBESTOS (QUANTITY)	BIO	Herbicides	PCBs										NOTES
	TP13-V1	29/9	Am/pm	Soil	ZLB	STD	✓													
	TP13-V2	↓	↓	↓	↓	↓	✓													
	TP13-V3						✓													BIO = TRH/BTEXN/PAH/OCP/OPP/Metals.
	TP13-V4						✓													
	TP13-V5						✓													
	TP21-V1						✓													
	TP21-V2						✓													
	TP21-V3						✓													
	TP21-V4						✓													*Date on Samples = 29/9/17 may say 28 on Samples, but were collected on 29th.
	TP21-V5						✓													
	TP04-V1						✓													
	TP04-V2						✓													
	TP04-V3						✓													
	TP04-V4						✓													
	TP04-V5	↓	↓		↓		✓													
	TP29-0.1-0.2				J, ZLB		✓	✓	✓	✓										
	TP29-0.5-0.6				J, ZLB															
	TP29-0.8-1.0	↓	↓	↓	Jar	↓		✓												

RELINQUISHED BY			RECEIVED BY			Sample Receipt Advice: (Lab Use Only)	
Name: J Sixsmith	Date: 29/11	→	Name: Catherine	Date: 30/11		All Samples Recieved in Good Condition	☐
Coffey Environments	Time: ?		Company: EF/mgd	Time: 5.20 pm		All Documentation is in Proper Order	☐
Name:	Date:	→	Name:	Date:		Samples Received Properly Chilled	☐
Company:	Time:		Company:	Time:		Lab. Ref/Batch No. 575489	

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock Bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative, OP - Other Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

 8068

coffey

Consigning Office:			
Report Results to: AS Page1	Mobile:	Email:	@coffey.com
Invoices to:	Phone:	Email:	@coffey.com

Project No:	Task No:
Project Name:	Laboratory: AS Page1
Sampler's Name:	Project Manager:
Special Instructions:	

Relevant agreements: Eurofins COF_ENAUABTF00952AA_MSA1 ; ALS COF_ENAUABTF00952AA_MSA2 and SGS COF_ENAUABTF00952AA_MSA3

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Asbestos (Quantitative)	Bio	Herbicides	PCBs	Hold	BTEX/TRH		NOTES
	TP30-0.0-0.2	29/11	PM	Soil	J,2LB	STD	/	/	/	/				
	TP30-0.5-0.6	↓	↓	↓	" "	↓	/	/	/	/				
	TP30-1.1-1.3				Jar						/			BIO = TRH/BTEXN
	QD-101				↓			/						PAH/OCP/OPP/
	QT-101 *							/						metals.
	QR-101				P,2xVC, G			/						
	Trip Spike 101				2xVC							/		*forward
	Trip Blank 101				2xVC							/		QT 101
	TP32-0.1-0.2				J,2LB		/	/	/	/				to ALS
	TP32-0.5-0.6				J,2LB		/	/	/	/				
	TP32-0.9-1.1				Jar						/			
	TP31-0.1-0.2				J,2LB		/	/	/	/				
	TP31-0.5-0.6				J,2LB						/			
	TP31-1.0-1.1				Jar			/						
	TP33-0.1-0.2				J,2LB		/	/	/	/				
	TP33-0.5-0.6						/	/	/	/				xcould not sieve
	TP33-1.0-1.2										/			
	TP33-2.3-2.4	↓	↓	↓	↓	↓		/	/	/				*could not sieve.

RELINQUISHED BY		RECEIVED BY	
Name: J.Sixsmith	Date: 30/11/17 →	Name: Coraerie	Date: 30/11
Coffey Environments	Time:	Company: EF lap	Time: 5.20pm
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐

Lab. Ref/Batch No. 575489

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock Bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative, **OP** - Other Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

 8069

coffey

Consigning Office:

Report Results to: as page 1 Mobile: Email: @coffey.com

Invoices to: Phone: Email: @coffey.com

Project No: Task No:

Project Name: Laboratory:

Sampler's Name: Project Manager: as page 1

Special Instructions:

Relevant agreements: Eurofins COF_ENAUABTF00952AA_MSA1 ; ALS COF_ENAUABTF00952AA_MSA2 and SGS COF_ENAUABTF00952AA_MSA3

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)
	TP34- 0.2-0.3	28/11	PM	SOIL	J, ZLB	STD
	TP34- 0.5-0.7	↓	↓	↓	↓	↓
	TP34- 1.0-1.3	↓	↓	↓	Jars	↓

Analysis columns: BTEX, Asbestos (Quantification), Herbicides, PCBs, Hold

NOTES

RELINQUISHED BY

Name: J.Sixsmith Date: 30/11/17 →

Coffey Environments Time:

Name: Date: →

Company: Time:

RECEIVED BY

Name: Catherine Date: 30/11

Company: EFL Time: 5.20 p-

Name: Date:

Company: Time:

Sample Receipt Advice: (Lab Use Only)

All Samples Recieved in Good Condition ☐

All Documentation is in Proper Order ☐

Samples Received Properly Chilled ☐

Lab. Ref/Batch No. 575489

*Container Type & Preservation Codes: **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock Bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative, **OP** - Other Preservative

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NATA # 1261 Site # 18217

Brisbane
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NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**Coffey Geotechnics Pty Ltd Chatswood**
Contact name:	Jessie Sixsmith
Project name:	MERITON WARRIEWOOD
Project ID:	SYDEN205656
COC number:	8067,8068,8069
Turn around time:	5 Day
Date/Time received:	Nov 30, 2017 5:20 PM
Eurofins | mgt reference:	**575489**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 12 degrees Celsius.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☑ Sample containers for volatile analysis received with zero headspace.

☑ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Jessie Sixsmith - Jess.Sixsmith@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Geotechnics Pty Ltd Chatswood email address.

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NATA # 1261
Site # 23736

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MERITON WARRIEWOOD
Project ID: SYDEN205656

Order No.:
Report #: 575489
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Nov 30, 2017 5:20 PM
Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X						
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP13_V1	Nov 29, 2017		Soil	M17-De02406	X						
2	TP13_V2	Nov 29, 2017		Soil	M17-De02407	X						
3	TP13_V3	Nov 29, 2017		Soil	M17-De02408	X						
4	TP13_V4	Nov 29, 2017		Soil	M17-De02409	X						
5	TP13_V5	Nov 29, 2017		Soil	M17-De02410	X						
6	TP21_V1	Nov 29, 2017		Soil	M17-De02411	X						
7	TP21_V2	Nov 29, 2017		Soil	M17-De02412	X						
8	TP21_V3	Nov 29, 2017		Soil	M17-De02413	X						
9	TP21_V4	Nov 29, 2017		Soil	M17-De02414	X						

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Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X						
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
10	TP21_V5	Nov 29, 2017		Soil	M17-De02415	X						
11	TP04_V1	Nov 29, 2017		Soil	M17-De02416	X						
12	TP04_V2	Nov 29, 2017		Soil	M17-De02417	X						
13	TP04_V3	Nov 29, 2017		Soil	M17-De02418	X						
14	TP04_V4	Nov 29, 2017		Soil	M17-De02419	X						
15	TP04_V5	Nov 29, 2017		Soil	M17-De02420	X						
16	TP29_0.1-0.2	Nov 29, 2017		Soil	M17-De02421	X		X	X	X	X	
17	TP29_0.8-1.0	Nov 29, 2017		Soil	M17-De02422					X	X	
18	TP30_0.0-0.2	Nov 29, 2017		Soil	M17-De02423	X		X	X	X	X	
19	TP30_0.5-0.6	Nov 29, 2017		Soil	M17-De02424	X		X	X	X	X	
20	QB101	Nov 29, 2017		Soil	M17-De02425					X	X	
21	QR101	Nov 29, 2017		Water	M17-De02426						X	

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Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MERITON WARRIEWOOD
Project ID: SYDEN205656

Order No.:
Report #: 575489
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Nov 30, 2017 5:20 PM
Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X						
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
22	TP32_0.1-0.2	Nov 29, 2017		Soil	M17-De02427	X		X	X	X	X	
23	TP32_0.5-0.6	Nov 29, 2017		Soil	M17-De02428	X		X	X	X	X	
24	TP31_0.1-0.2	Nov 29, 2017		Soil	M17-De02429	X		X	X	X	X	
25	TP31_1.0-1.1	Nov 29, 2017		Soil	M17-De02430					X	X	
26	TP33_0.1-0.2	Nov 29, 2017		Soil	M17-De02431	X		X	X	X	X	
27	TP33_0.5-0.6	Nov 29, 2017		Soil	M17-De02432	X		X	X	X	X	
28	TP33_2.3-2.4	Nov 29, 2017		Soil	M17-De02433	X		X	X	X	X	
29	TP34_0.2-0.3	Nov 29, 2017		Soil	M17-De02434	X		X	X	X	X	
30	TP34_0.5-0.7	Nov 29, 2017		Soil	M17-De02435	X		X	X	X	X	
31	TP29_0.5-0.6	Nov 29, 2017		Soil	M17-De02436		X					
32	TP30_1.1-1.3	Nov 29, 2017		Soil	M17-De02437		X					
33	TP32_0.9-1.1	Nov 29, 2017		Soil	M17-De02438		X					

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NATA # 1261
Site # 23736

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MERITON WARRIEWOOD
Project ID: SYDEN205656

Order No.:
Report #: 575489
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Nov 30, 2017 5:20 PM
Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X						
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
34	TP31_0.5-0.6	Nov 29, 2017		Soil	M17-De02439		X					
35	TP33_1.0-1.2	Nov 29, 2017		Soil	M17-De02440		X					
36	TP34_1.0-1.3	Nov 29, 2017		Soil	M17-De02441		X					
37	TRIP SPIKE 101	Nov 29, 2017		Soil	M17-De02442							X
38	TRIP BLANK 101	Nov 29, 2017		Soil	M17-De02443							X
Test Counts						26	6	11	11	14	15	2

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30 years Testing For Life 1987–2017
Celebrating 30 years Testing and Protecting Human Health

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention:	Jessie Sixsmith
Report	575489-AID
Project Name	MERITON WARRIEWOOD
Project ID	SYDEN205656
Received Date	Nov 30, 2017
Date Reported	Dec 07, 2017

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS4964 method for inhomogeneous samples is around 0.1 g/kg (0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis where required, this is considered to be at the nominal reporting limit of 0.01 % (w / w).The examination of large sample sizes(500 mL is recommended) may improve the likelihood of identifying ACM in the > 2mm fraction.The NEPM screening level of 0.001 % (w / w) asbestos in soil for FA(friable asbestos) and AF(asbestos fines) then applies where they are able to be quantified by gravimetric procedures.This quantitative screening is not generally applicable to FF(free fibres) and results of Trace Analysis are referred. *NOTE: NATA News March 2014, p.7, states in relation to AS4964: "This is a qualitative method with a nominal reporting limit of 0.01%" and that currently in Australia "there is no validated method available for the quantification of asbestos". Accordingly, NATA Accreditation does not cover the performance of this service (indicated with an asterisk).* *This report is consistent with the analytical procedures and reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended) and the Western Australia Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, 2009, including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil, June 2011.*

Project Name MERITON WARRIEWOOD
Project ID SYDEN205656
Date Sampled Nov 29, 2017
Report 575489-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TP13_V1	17-De02406	Nov 29, 2017	Approximate Sample 127g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP13_V2	17-De02407	Nov 29, 2017	Approximate Sample 202g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP13_V3	17-De02408	Nov 29, 2017	Approximate Sample 217g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP13_V4	17-De02409	Nov 29, 2017	Approximate Sample 194g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP13_V5	17-De02410	Nov 29, 2017	Approximate Sample 280g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP21_V1	17-De02411	Nov 29, 2017	Approximate Sample 369g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP21_V2	17-De02412	Nov 29, 2017	Approximate Sample 243g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP21_V3	17-De02413	Nov 29, 2017	Approximate Sample 242g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP21_V4	17-De02414	Nov 29, 2017	Approximate Sample 256g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP21_V5	17-De02415	Nov 29, 2017	Approximate Sample 206g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TP04_V1	17-De02416	Nov 29, 2017	Approximate Sample 369g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP04_V2	17-De02417	Nov 29, 2017	Approximate Sample 348g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP04_V3	17-De02418	Nov 29, 2017	Approximate Sample 377g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP04_V4	17-De02419	Nov 29, 2017	Approximate Sample 308g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP04_V5	17-De02420	Nov 29, 2017	Approximate Sample 237g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP29_0.1-0.2	17-De02421	Nov 29, 2017	Approximate Sample 660g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP30_0.0-0.2	17-De02423	Nov 29, 2017	Approximate Sample 508g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP30_0.5-0.6	17-De02424	Nov 29, 2017	Approximate Sample 484g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP32_0.1-0.2	17-De02427	Nov 29, 2017	Approximate Sample 311g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP32_0.5-0.6	17-De02428	Nov 29, 2017	Approximate Sample 301g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP31_0.1-0.2	17-De02429	Nov 29, 2017	Approximate Sample 574g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP33_0.1-0.2	17-De02431	Nov 29, 2017	Approximate Sample 312g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP33_0.5-0.6	17-De02432	Nov 29, 2017	Approximate Sample 370g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TP33_2.3-2.4	17-De02433	Nov 29, 2017	Approximate Sample 474g Sample consisted of: Brown coarse grain soil and rocks	Chrysotile asbestos detected in the form of loose fibre bundles. Approximate raw weight of asbestos containing material = 0.0031g* Total estimated asbestos content in the sample = 0.0028g* Total estimated asbestos concentration = 0.00059% w/w* Organic fibre detected. No respirable fibres detected.
TP34_0.2-0.3	17-De02434	Nov 29, 2017	Approximate Sample 445g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TP34_0.5-0.7	17-De02435	Nov 29, 2017	Approximate Sample 325g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Perth	Dec 07, 2017	Indefinite

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NATA # 1261
Site # 23736

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MERITON WARRIEWOOD
Project ID: SYDEN205656

Order No.:
Report #: 575489
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Nov 30, 2017 5:20 PM
Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP13_V1	Nov 29, 2017		Soil	M17-De02406	X						
2	TP13_V2	Nov 29, 2017		Soil	M17-De02407	X						
3	TP13_V3	Nov 29, 2017		Soil	M17-De02408	X						
4	TP13_V4	Nov 29, 2017		Soil	M17-De02409	X						
5	TP13_V5	Nov 29, 2017		Soil	M17-De02410	X						
6	TP21_V1	Nov 29, 2017		Soil	M17-De02411	X						
7	TP21_V2	Nov 29, 2017		Soil	M17-De02412	X						
8	TP21_V3	Nov 29, 2017		Soil	M17-De02413	X						
9	TP21_V4	Nov 29, 2017		Soil	M17-De02414	X						

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
10	TP21_V5	Nov 29, 2017		Soil	M17-De02415	X						
11	TP04_V1	Nov 29, 2017		Soil	M17-De02416	X						
12	TP04_V2	Nov 29, 2017		Soil	M17-De02417	X						
13	TP04_V3	Nov 29, 2017		Soil	M17-De02418	X						
14	TP04_V4	Nov 29, 2017		Soil	M17-De02419	X						
15	TP04_V5	Nov 29, 2017		Soil	M17-De02420	X						
16	TP29_0.1-0.2	Nov 29, 2017		Soil	M17-De02421	X		X	X	X	X	
17	TP29_0.8-1.0	Nov 29, 2017		Soil	M17-De02422					X	X	
18	TP30_0.0-0.2	Nov 29, 2017		Soil	M17-De02423	X		X	X	X	X	
19	TP30_0.5-0.6	Nov 29, 2017		Soil	M17-De02424	X		X	X	X	X	
20	QB101	Nov 29, 2017		Soil	M17-De02425					X	X	
21	QR101	Nov 29, 2017		Water	M17-De02426						X	

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Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
22	TP32_0.1-0.2	Nov 29, 2017		Soil	M17-De02427	X		X	X	X	X	
23	TP32_0.5-0.6	Nov 29, 2017		Soil	M17-De02428	X		X	X	X	X	
24	TP31_0.1-0.2	Nov 29, 2017		Soil	M17-De02429	X		X	X	X	X	
25	TP31_1.0-1.1	Nov 29, 2017		Soil	M17-De02430					X	X	
26	TP33_0.1-0.2	Nov 29, 2017		Soil	M17-De02431	X		X	X	X	X	
27	TP33_0.5-0.6	Nov 29, 2017		Soil	M17-De02432	X		X	X	X	X	
28	TP33_2.3-2.4	Nov 29, 2017		Soil	M17-De02433	X		X	X	X	X	
29	TP34_0.2-0.3	Nov 29, 2017		Soil	M17-De02434	X		X	X	X	X	
30	TP34_0.5-0.7	Nov 29, 2017		Soil	M17-De02435	X		X	X	X	X	
31	TP29_0.5-0.6	Nov 29, 2017		Soil	M17-De02436		X					
32	TP30_1.1-1.3	Nov 29, 2017		Soil	M17-De02437		X					
33	TP32_0.9-1.1	Nov 29, 2017		Soil	M17-De02438		X					

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Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
34	TP31_0.5-0.6	Nov 29, 2017		Soil	M17-De02439		X					
35	TP33_1.0-1.2	Nov 29, 2017		Soil	M17-De02440		X					
36	TP34_1.0-1.3	Nov 29, 2017		Soil	M17-De02441		X					
37	TRIP SPIKE 101	Nov 29, 2017		Soil	M17-De02442							X
38	TRIP BLANK 101	Nov 29, 2017		Soil	M17-De02443							X
Test Counts						26	6	11	11	14	15	2

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Western Australia Department of Health
NOHSC	National Occupational Health and Safety Commission
ACM	Bonded asbestos-containing material means any material containing more than 1% asbestos and comprises asbestos-containing-material which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. Common examples of ACM include but are not limited to: pipe and boiler insulation, sprayed-on fireproofing, troweled-on acoustical plaster, floor tile and mastic, floor linoleum, transite shingles, roofing materials, wall and ceiling plaster, ceiling tiles, and gasket materials. This term is restricted to material that cannot pass a 7 mm x 7 mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.
FA	FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).
PACM	Presumed Asbestos-Containing Material means thermal system insulation and surfacing material found in buildings, vessels, and vessel sections constructed no later than 1980 that are assumed to contain greater than one percent asbestos but have not been sampled or analyzed to verify or negate the presence of asbestos.
AF	Asbestos fines (AF) are defined as free fibres, or fibre bundles, smaller than 7mm. It is the free fibres which present the greatest risk to human health, although very small fibres (< 5 microns in length) are not considered to be such a risk. AF also includes small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve. (Note that for bonded ACM fragments to pass through a 7 mm x 7 mm sieve implies a substatntial degree of damage which increases the potential for fibre release.)
AC	Asbestos cement means a mixture of cement and asbestos fibres (typically 90:10 ratios).

Comments

The samples received were subsampled in accordance with AS4964. Valid sub-sampling procedures were applied.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Comments

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Asbestos Counter/Identifier:

Edward Rowley	Asbestos Analyst (WA)

Authorised by:

Rhys Thomas	Senior Analyst-Asbestos (WA)

Glenn Jackson
National Operations Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
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NSW 2067

Attention: **Jessie Sixsmith**

Report **575489-S**
Project name MERITON WARRIEWOOD
Project ID SYDEN205656
Received Date Nov 30, 2017

Client Sample ID			**TP29_0.1-0.2**	**TP29_0.8-1.0**	**TP30_0.0-0.2**	**TP30_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02421**	**M17-De02422**	**M17-De02423**	**M17-De02424**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	220	< 100	110	140
TRH >C34-C40	100	mg/kg	170	< 100	130	170
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	79	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	190	< 50	100	140
TRH C10-36 (Total)	50	mg/kg	269	< 50	100	140
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	89	93	90	95
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.0	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.3	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			TP29_0.1-0.2	TP29_0.8-1.0	TP30_0.0-0.2	TP30_0.5-0.6
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02421**	**M17-De02422**	**M17-De02423**	**M17-De02424**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluoranthene	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.8	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	2	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	88	99	93	89
p-Terphenyl-d14 (surr.)	1	%	84	103	96	84
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	103	110	[Q09]int	[Q09]int
Tetrachloro-m-xylene (surr.)	1	%	97	97	60	51
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID			TP29_0.1-0.2	TP29_0.8-1.0	TP30_0.0-0.2	TP30_0.5-0.6
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02421**	**M17-De02422**	**M17-De02423**	**M17-De02424**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	89	89	88	84
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	103	-	[Q09]int	[Q09]int
Tetrachloro-m-xylene (surr.)	1	%	97	-	60	51
Acid Herbicides						
2.4-D	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
2.4-DB	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
2.4.5-T	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
2.4.5-TP	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Actril (loxynil)	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Dicamba	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Dichlorprop	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Dinitro-o-cresol	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Dinoseb	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
MCPA	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
MCPB	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Mecoprop	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Warfarin (surr.)	1	%	91	-	107	93

Client Sample ID			TP29_0.1-0.2	TP29_0.8-1.0	TP30_0.0-0.2	TP30_0.5-0.6
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02421**	**M17-De02422**	**M17-De02423**	**M17-De02424**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	3.7	5.8	< 2	2.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	28	21	14	18
Copper	5	mg/kg	9.0	< 5	6.0	29
Lead	5	mg/kg	22	19	26	50
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	11	< 5	< 5	9.1
Zinc	5	mg/kg	46	5.3	69	43
% Moisture	1	%	16	24	11	19

Client Sample ID			QB101	TP32_0.1-0.2	TP32_0.5-0.6	TP31_0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02425**	**M17-De02427**	**M17-De02428**	**M17-De02429**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	200
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	120
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	86
TRH C29-C36	50	mg/kg	70	< 50	52	170
TRH C10-36 (Total)	50	mg/kg	70	< 50	52	256
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	93	97	123	120
Polycyclic Aromatic Hydrocarbons						
Comments					G01	
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.9
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	2.4	1.2
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	4.8	1.5
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 2	0.8

Client Sample ID			QB101	TP32_0.1-0.2	TP32_0.5-0.6	TP31_0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02425**	**M17-De02427**	**M17-De02428**	**M17-De02429**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 2	0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 2	0.6
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 2	1.1
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 2	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 2	0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 2	1.0
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 2	4.5
2-Fluorobiphenyl (surr.)	1	%	105	92	81	76
p-Terphenyl-d14 (surr.)	1	%	104	90	78	81
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	[Q09]int	101	[Q09]int	99
Tetrachloro-m-xylene (surr.)	1	%	50	90	58	92
Organophosphorus Pesticides						
Comments					G01	
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2

Client Sample ID			QB101	TP32_0.1-0.2	TP32_0.5-0.6	TP31_0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02425**	**M17-De02427**	**M17-De02428**	**M17-De02429**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 2	< 0.2
Triphenylphosphate (surr.)	1	%	89	92	88	91
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	-	101	[Q09]int	99
Tetrachloro-m-xylene (surr.)	1	%	-	90	58	92
Acid Herbicides						
2.4-D	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2.4-DB	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2.4.5-T	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2.4.5-TP	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Actril (loxynil)	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dicamba	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dichlorprop	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5

Client Sample ID			QB101	TP32_0.1-0.2	TP32_0.5-0.6	TP31_0.1-0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02425**	**M17-De02427**	**M17-De02428**	**M17-De02429**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Acid Herbicides						
Dinitro-o-cresol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dinoseb	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
MCPA	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
MCPB	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Mecoprop	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Warfarin (surr.)	1	%	-	96	96	94
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	2.0	2.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	14	7.8	34	23
Copper	5	mg/kg	6.9	< 5	40	13
Lead	5	mg/kg	35	19	28	28
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	63	14
Zinc	5	mg/kg	27	17	68	17
% Moisture	1	%	12	7.7	5.6	16

Client Sample ID			TP31_1.0-1.1	TP33_0.1-0.2	TP33_0.5-0.6	TP33_2.3-2.4
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02430**	**M17-De02431**	**M17-De02432**	**M17-De02433**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	116	82	109	97

Client Sample ID			TP31_1.0-1.1	TP33_0.1-0.2	TP33_0.5-0.6	TP33_2.3-2.4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			M17-De02430	M17-De02431	M17-De02432	M17-De02433
Date Sampled			Nov 29, 2017	Nov 29, 2017	Nov 29, 2017	Nov 29, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	91	100	86	79
p-Terphenyl-d14 (surr.)	1	%	94	102	91	84
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	97	54	56	55
Tetrachloro-m-xylene (surr.)	1	%	91	53	56	59

Client Sample ID			TP31_1.0-1.1	TP33_0.1-0.2	TP33_0.5-0.6	TP33_2.3-2.4
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02430**	**M17-De02431**	**M17-De02432**	**M17-De02433**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	87	90	88	91
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	-	54	56	55
Tetrachloro-m-xylene (surr.)	1	%	-	53	56	59

Client Sample ID			TP31_1.0-1.1	TP33_0.1-0.2	TP33_0.5-0.6	TP33_2.3-2.4
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02430**	**M17-De02431**	**M17-De02432**	**M17-De02433**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Acid Herbicides						
2.4-D	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2.4-DB	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2.4.5-T	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2.4.5-TP	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Actril (loxynil)	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dicamba	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dichlorprop	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dinitro-o-cresol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dinoseb	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
MCPA	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
MCPB	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Mecoprop	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Warfarin (surr.)	1	%	-	99	93	93
Heavy Metals						
Arsenic	2	mg/kg	7.8	< 2	5.5	7.0
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	5.2	32	38
Copper	5	mg/kg	< 5	< 5	5.6	< 5
Lead	5	mg/kg	< 5	9.1	16	18
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	< 5	5.3	12	15
% Moisture	1	%	13	10	23	23

Client Sample ID			TP34_0.2-0.3	TP34_0.5-0.7	[R20]TRIP SPIKE 101	TRIP BLANK 101
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02434**	**M17-De02435**	**M17-De02442**	**M17-De02443**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	94	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	100	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	-
TRH >C16-C34	100	mg/kg	< 100	260	-	-
TRH >C34-C40	100	mg/kg	< 100	< 100	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	100	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	-
TRH C15-C28	50	mg/kg	< 50	97	-	-
TRH C29-C36	50	mg/kg	62	210	-	-
TRH C10-36 (Total)	50	mg/kg	62	307	-	-

Client Sample ID			TP34_0.2-0.3	TP34_0.5-0.7	[R20]TRIP SPIKE 101	TRIP BLANK 101
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02434**	**M17-De02435**	**M17-De02442**	**M17-De02443**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	94	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	94	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	92	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	93	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	92	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	93	< 0.3
4-Bromofluorobenzene (surr.)	1	%	83	104	98	55
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	87	67	-	-
p-Terphenyl-d14 (surr.)	1	%	89	76	-	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	0.1	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	-	-
a-BHC	0.05	mg/kg	< 0.05	< 0.05	-	-
Aldrin	0.05	mg/kg	< 0.05	< 0.05	-	-
b-BHC	0.05	mg/kg	< 0.05	< 0.05	-	-
d-BHC	0.05	mg/kg	< 0.05	< 0.05	-	-
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	-	-
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	-	-
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	-	-
Endrin	0.05	mg/kg	< 0.05	< 0.05	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	-	-
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	-	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	-	-
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	-	-

Client Sample ID			TP34_0.2-0.3	TP34_0.5-0.7	R20TRIP SPIKE 101	TRIP BLANK 101
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02434**	**M17-De02435**	**M17-De02442**	**M17-De02443**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	-	-
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	-	-
Toxaphene	1	mg/kg	< 1	< 1	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	0.1	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	0.1	-	-
Dibutylchlorendate (surr.)	1	%	117	111	-	-
Tetrachloro-m-xylene (surr.)	1	%	94	82	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Bolstar	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Coumaphos	2	mg/kg	< 2	< 2	-	-
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	-	-
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	-	-
Diazinon	0.2	mg/kg	< 0.2	< 0.2	-	-
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	-	-
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	-	-
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	-	-
EPN	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethion	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fenthion	0.2	mg/kg	< 0.2	< 0.2	-	-
Malathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Merphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Monocrotophos	2	mg/kg	< 2	< 2	-	-
Naled	0.2	mg/kg	< 0.2	< 0.2	-	-
Omethoate	2	mg/kg	< 2	< 2	-	-
Phorate	0.2	mg/kg	< 0.2	< 0.2	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	-	-
Ronnel	0.2	mg/kg	< 0.2	< 0.2	-	-
Terbufos	0.2	mg/kg	< 0.2	< 0.2	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	-	-
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	-	-
Triphenylphosphate (surr.)	1	%	87	89	-	-

Client Sample ID			TP34_0.2-0.3	TP34_0.5-0.7	R20TRIP SPIKE 101	TRIP BLANK 101
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**M17-De02434**	**M17-De02435**	**M17-De02442**	**M17-De02443**
Date Sampled			**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**	**Nov 29, 2017**
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	-	-
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	-	-
Dibutylchlorendate (surr.)	1	%	117	111	-	-
Tetrachloro-m-xylene (surr.)	1	%	94	82	-	-
Acid Herbicides						
2.4-D	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4-DB	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4.5-T	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4.5-TP	0.5	mg/kg	< 0.5	< 0.5	-	-
Actril (loxynil)	0.5	mg/kg	< 0.5	< 0.5	-	-
Dicamba	0.5	mg/kg	< 0.5	< 0.5	-	-
Dichlorprop	0.5	mg/kg	< 0.5	< 0.5	-	-
Dinitro-o-cresol	0.5	mg/kg	< 0.5	< 0.5	-	-
Dinoseb	0.5	mg/kg	< 0.5	< 0.5	-	-
MCPA	0.5	mg/kg	< 0.5	< 0.5	-	-
MCPB	0.5	mg/kg	< 0.5	< 0.5	-	-
Mecoprop	0.5	mg/kg	< 0.5	< 0.5	-	-
Warfarin (surr.)	1	%	92	94	-	-
Heavy Metals						
Arsenic	2	mg/kg	2.8	6.5	-	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	-	-
Chromium	5	mg/kg	34	11	-	-
Copper	5	mg/kg	22	28	-	-
Lead	5	mg/kg	17	29	-	-
Mercury	0.1	mg/kg	< 0.1	< 0.1	-	-
Nickel	5	mg/kg	29	< 5	-	-
Zinc	5	mg/kg	62	120	-	-
% Moisture	1	%	12	19	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 05, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons	Melbourne	Dec 02, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 05, 2017	14 Day
- Method: LTM-ORG-2010 TRH C6-C36			
BTEX	Melbourne	Dec 05, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B10			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 05, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 05, 2017	14 Day
- Method: LTM-ORG-2130 PAH and Phenols in Soils by GCMS			
Organochlorine Pesticides	Melbourne	Dec 05, 2017	14 Day
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Melbourne	Dec 05, 2017	14 Day
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Metals M8	Melbourne	Dec 05, 2017	28 Days
- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)			
Polychlorinated Biphenyls	Melbourne	Dec 05, 2017	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Acid Herbicides	Melbourne	Dec 05, 2017	14 Day
- Method: LTM-ORG-2180 Phenoxy Acid Herbicides			
% Moisture	Melbourne	Dec 02, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

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Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
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NSW 2067

Project Name: MERITON WARRIEWOOD
Project ID: SYDEN205656

Order No.:
Report #: 575489
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Nov 30, 2017 5:20 PM
Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP13_V1	Nov 29, 2017		Soil	M17-De02406	X						
2	TP13_V2	Nov 29, 2017		Soil	M17-De02407	X						
3	TP13_V3	Nov 29, 2017		Soil	M17-De02408	X						
4	TP13_V4	Nov 29, 2017		Soil	M17-De02409	X						
5	TP13_V5	Nov 29, 2017		Soil	M17-De02410	X						
6	TP21_V1	Nov 29, 2017		Soil	M17-De02411	X						
7	TP21_V2	Nov 29, 2017		Soil	M17-De02412	X						
8	TP21_V3	Nov 29, 2017		Soil	M17-De02413	X						
9	TP21_V4	Nov 29, 2017		Soil	M17-De02414	X						

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
10	TP21_V5	Nov 29, 2017		Soil	M17-De02415	X						
11	TP04_V1	Nov 29, 2017		Soil	M17-De02416	X						
12	TP04_V2	Nov 29, 2017		Soil	M17-De02417	X						
13	TP04_V3	Nov 29, 2017		Soil	M17-De02418	X						
14	TP04_V4	Nov 29, 2017		Soil	M17-De02419	X						
15	TP04_V5	Nov 29, 2017		Soil	M17-De02420	X						
16	TP29_0.1-0.2	Nov 29, 2017		Soil	M17-De02421	X		X	X	X	X	
17	TP29_0.8-1.0	Nov 29, 2017		Soil	M17-De02422					X	X	
18	TP30_0.0-0.2	Nov 29, 2017		Soil	M17-De02423	X		X	X	X	X	
19	TP30_0.5-0.6	Nov 29, 2017		Soil	M17-De02424	X		X	X	X	X	
20	QB101	Nov 29, 2017		Soil	M17-De02425					X	X	
21	QR101	Nov 29, 2017		Water	M17-De02426						X	

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
22	TP32_0.1-0.2	Nov 29, 2017		Soil	M17-De02427	X		X	X	X	X	
23	TP32_0.5-0.6	Nov 29, 2017		Soil	M17-De02428	X		X	X	X	X	
24	TP31_0.1-0.2	Nov 29, 2017		Soil	M17-De02429	X		X	X	X	X	
25	TP31_1.0-1.1	Nov 29, 2017		Soil	M17-De02430					X	X	
26	TP33_0.1-0.2	Nov 29, 2017		Soil	M17-De02431	X		X	X	X	X	
27	TP33_0.5-0.6	Nov 29, 2017		Soil	M17-De02432	X		X	X	X	X	
28	TP33_2.3-2.4	Nov 29, 2017		Soil	M17-De02433	X		X	X	X	X	
29	TP34_0.2-0.3	Nov 29, 2017		Soil	M17-De02434	X		X	X	X	X	
30	TP34_0.5-0.7	Nov 29, 2017		Soil	M17-De02435	X		X	X	X	X	
31	TP29_0.5-0.6	Nov 29, 2017		Soil	M17-De02436		X					
32	TP30_1.1-1.3	Nov 29, 2017		Soil	M17-De02437		X					
33	TP32_0.9-1.1	Nov 29, 2017		Soil	M17-De02438		X					

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Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
34	TP31_0.5-0.6	Nov 29, 2017		Soil	M17-De02439		X					
35	TP33_1.0-1.2	Nov 29, 2017		Soil	M17-De02440		X					
36	TP34_1.0-1.3	Nov 29, 2017		Soil	M17-De02441		X					
37	TRIP SPIKE 101	Nov 29, 2017		Soil	M17-De02442							X
38	TRIP BLANK 101	Nov 29, 2017		Soil	M17-De02443							X
Test Counts						26	6	11	11	14	15	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Acid Herbicides							
2.4-D	mg/kg	< 0.5			0.5	Pass	
2.4-DB	mg/kg	< 0.5			0.5	Pass	
2.4.5-T	mg/kg	< 0.5			0.5	Pass	
2.4.5-TP	mg/kg	< 0.5			0.5	Pass	
Actril (loxynil)	mg/kg	< 0.5			0.5	Pass	
Dicamba	mg/kg	< 0.5			0.5	Pass	
Dichlorprop	mg/kg	< 0.5			0.5	Pass	
Dinitro-o-cresol	mg/kg	< 0.5			0.5	Pass	
Dinoseb	mg/kg	< 0.5			0.5	Pass	
MCPA	mg/kg	< 0.5			0.5	Pass	
MCPB	mg/kg	< 0.5			0.5	Pass	
Mecoprop	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	107			70-130	Pass	
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	89			70-130	Pass	
TRH C6-C10	%	121			70-130	Pass	
TRH >C10-C16	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	96			70-130	Pass	
TRH C10-C14	%	90			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	97			70-130	Pass	
Toluene	%	107			70-130	Pass	
Ethylbenzene	%	114			70-130	Pass	
m&p-Xylenes	%	115			70-130	Pass	
Xylenes - Total	%	114			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	83			70-130	Pass	
Acenaphthylene	%	87			70-130	Pass	
Anthracene	%	75			70-130	Pass	
Benz(a)anthracene	%	94			70-130	Pass	
Benzo(a)pyrene	%	85			70-130	Pass	
Benzo(b&j)fluoranthene	%	84			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g.h.i)perylene	%	90			70-130	Pass	
Benzo(k)fluoranthene	%	85			70-130	Pass	
Chrysene	%	79			70-130	Pass	
Dibenz(a.h)anthracene	%	70			70-130	Pass	
Fluoranthene	%	85			70-130	Pass	
Fluorene	%	89			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	75			70-130	Pass	
Naphthalene	%	91			70-130	Pass	
Phenanthrene	%	98			70-130	Pass	
Pyrene	%	86			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4.4'-DDD	%	123			70-130	Pass	
4.4'-DDE	%	112			70-130	Pass	
4.4'-DDT	%	85			70-130	Pass	
a-BHC	%	101			70-130	Pass	
Aldrin	%	108			70-130	Pass	
b-BHC	%	96			70-130	Pass	
d-BHC	%	99			70-130	Pass	
Dieldrin	%	109			70-130	Pass	
Endosulfan I	%	108			70-130	Pass	
Endosulfan II	%	106			70-130	Pass	
Endosulfan sulphate	%	106			70-130	Pass	
Endrin	%	119			70-130	Pass	
Endrin aldehyde	%	104			70-130	Pass	
Endrin ketone	%	103			70-130	Pass	
g-BHC (Lindane)	%	100			70-130	Pass	
Heptachlor	%	104			70-130	Pass	
Heptachlor epoxide	%	107			70-130	Pass	
Hexachlorobenzene	%	97			70-130	Pass	
Methoxychlor	%	72			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	115			70-130	Pass	
Dimethoate	%	85			70-130	Pass	
Ethion	%	110			70-130	Pass	
Fenitrothion	%	79			70-130	Pass	
Methyl parathion	%	71			70-130	Pass	
Mevinphos	%	120			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	121			70-130	Pass	
LCS - % Recovery							
Acid Herbicides							
2.4-D	%	103			70-130	Pass	
2.4-DB	%	111			70-130	Pass	
2.4.5-T	%	104			70-130	Pass	
2.4.5-TP	%	89			70-130	Pass	
Actril (loxynil)	%	93			70-130	Pass	
Dicamba	%	104			70-130	Pass	
Dichlorprop	%	93			70-130	Pass	
Dinitro-o-cresol	%	91			70-130	Pass	
Dinoseb	%	96			70-130	Pass	
MCPA	%	107			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
MCPB			%	111			70-130	Pass	
Mecoprop			%	93			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	87			80-120	Pass	
Cadmium			%	97			80-120	Pass	
Chromium			%	86			80-120	Pass	
Copper			%	90			80-120	Pass	
Lead			%	106			80-120	Pass	
Mercury			%	92			75-125	Pass	
Nickel			%	85			80-120	Pass	
Zinc			%	104			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	P17-No36606	NCP	%	93			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	P17-No36606	NCP	%	99			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDD	M17-De00806	NCP	%	106			70-130	Pass	
4.4'-DDE	M17-De00806	NCP	%	99			70-130	Pass	
4.4'-DDT	M17-De00806	NCP	%	92			70-130	Pass	
a-BHC	M17-De00806	NCP	%	92			70-130	Pass	
Aldrin	M17-De00806	NCP	%	97			70-130	Pass	
b-BHC	M17-De00806	NCP	%	87			70-130	Pass	
d-BHC	M17-De00806	NCP	%	91			70-130	Pass	
Dieldrin	M17-De00806	NCP	%	98			70-130	Pass	
Endosulfan I	M17-De00806	NCP	%	94			70-130	Pass	
Endosulfan II	M17-De00806	NCP	%	96			70-130	Pass	
Endosulfan sulphate	M17-De00806	NCP	%	96			70-130	Pass	
Endrin	M17-De00806	NCP	%	116			70-130	Pass	
Endrin aldehyde	M17-De00806	NCP	%	87			70-130	Pass	
Endrin ketone	M17-De00806	NCP	%	91			70-130	Pass	
g-BHC (Lindane)	M17-De00806	NCP	%	92			70-130	Pass	
Heptachlor	M17-De00806	NCP	%	101			70-130	Pass	
Heptachlor epoxide	M17-De00806	NCP	%	102			70-130	Pass	
Hexachlorobenzene	M17-De00806	NCP	%	91			70-130	Pass	
Methoxychlor	M17-De00806	NCP	%	100			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Methyl parathion	M17-De02030	NCP	%	72			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M17-De02422	CP	%	92			75-125	Pass	
Cadmium	M17-De02422	CP	%	92			75-125	Pass	
Chromium	M17-De02422	CP	%	96			75-125	Pass	
Copper	M17-De02422	CP	%	95			75-125	Pass	
Lead	M17-De02422	CP	%	99			75-125	Pass	
Mercury	M17-De02422	CP	%	91			70-130	Pass	
Nickel	M17-De02422	CP	%	93			75-125	Pass	
Zinc	M17-De02422	CP	%	93			75-125	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polychlorinated Biphenyls				Result 1					
Aroclor-1260	M17-De02041	NCP	%	93			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M17-De02424	CP	%	90			70-130	Pass	
TRH C6-C10	M17-De02424	CP	%	89			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M17-De02424	CP	%	90			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M17-De02424	CP	%	86			70-130	Pass	
Toluene	M17-De02424	CP	%	93			70-130	Pass	
Ethylbenzene	M17-De02424	CP	%	100			70-130	Pass	
m&p-Xylenes	M17-De02424	CP	%	101			70-130	Pass	
o-Xylene	M17-De02424	CP	%	101			70-130	Pass	
Xylenes - Total	M17-De02424	CP	%	101			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M17-De02424	CP	%	97			70-130	Pass	
Acenaphthylene	M17-De02424	CP	%	102			70-130	Pass	
Anthracene	M17-De02424	CP	%	86			70-130	Pass	
Benz(a)anthracene	M17-De02424	CP	%	113			70-130	Pass	
Benzo(a)pyrene	M17-De02424	CP	%	97			70-130	Pass	
Benzo(b&j)fluoranthene	M17-De02424	CP	%	104			70-130	Pass	
Benzo(g.h.i)perylene	M17-De02424	CP	%	102			70-130	Pass	
Benzo(k)fluoranthene	M17-De02424	CP	%	105			70-130	Pass	
Chrysene	M17-De02424	CP	%	98			70-130	Pass	
Dibenz(a.h)anthracene	M17-De02424	CP	%	84			70-130	Pass	
Fluoranthene	M17-De02424	CP	%	111			70-130	Pass	
Fluorene	M17-De02424	CP	%	103			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M17-De02424	CP	%	88			70-130	Pass	
Naphthalene	M17-De02424	CP	%	100			70-130	Pass	
Phenanthrene	M17-De02424	CP	%	116			70-130	Pass	
Pyrene	M17-De02424	CP	%	112			70-130	Pass	
Spike - % Recovery									
Acid Herbicides				Result 1					
2.4-D	M17-De02424	CP	%	96			70-130	Pass	
Actril (loxynil)	M17-De02424	CP	%	90			70-130	Pass	
Dichlorprop	M17-De02424	CP	%	83			70-130	Pass	
MCPA	M17-De02424	CP	%	102			70-130	Pass	
MCPB	M17-De02424	CP	%	92			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C16-C34	M17-No37037	NCP	%	370			70-130	Fail	Q08
TRH >C34-C40	M17-No37037	NCP	%	65			70-130	Fail	Q08
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M17-De02430	CP	%	83			70-130	Pass	
TRH C6-C10	M17-De02430	CP	%	111			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M17-De02430	CP	%	126			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
BTEX				Result 1					
Benzene	M17-De02430	CP	%	90			70-130	Pass	
Toluene	M17-De02430	CP	%	96			70-130	Pass	
Ethylbenzene	M17-De02430	CP	%	99			70-130	Pass	
m&p-Xylenes	M17-De02430	CP	%	101			70-130	Pass	
o-Xylene	M17-De02430	CP	%	99			70-130	Pass	
Xylenes - Total	M17-De02430	CP	%	100			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	M17-De02430	CP	%	96			70-130	Pass	
Dimethoate	M17-De02430	CP	%	70			70-130	Pass	
Ethion	M17-De02430	CP	%	87			70-130	Pass	
Fenitrothion	M17-De02430	CP	%	71			70-130	Pass	
Mevinphos	M17-De02430	CP	%	116			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M17-De02421	CP	mg/kg	3.7	3.7	1.0	30%	Pass	
Cadmium	M17-De02421	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M17-De02421	CP	mg/kg	28	33	16	30%	Pass	
Copper	M17-De02421	CP	mg/kg	9.0	9.3	3.0	30%	Pass	
Lead	M17-De02421	CP	mg/kg	22	22	<1	30%	Pass	
Mercury	M17-De02421	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M17-De02421	CP	mg/kg	11	12	7.0	30%	Pass	
Zinc	M17-De02421	CP	mg/kg	46	45	2.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M17-De02422	CP	mg/kg	5.8	6.0	2.0	30%	Pass	
Cadmium	M17-De02422	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M17-De02422	CP	mg/kg	21	22	3.0	30%	Pass	
Copper	M17-De02422	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	M17-De02422	CP	mg/kg	19	19	2.0	30%	Pass	
Mercury	M17-De02422	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M17-De02422	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	M17-De02422	CP	mg/kg	5.3	5.5	3.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M17-De02423	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M17-De02423	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M17-De02423	CP	mg/kg	110	< 100	64	30%	Fail	Q15
TRH >C34-C40	M17-De02423	CP	mg/kg	130	< 100	43	30%	Fail	Q15
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M17-De02423	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M17-De02423	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M17-De02423	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M17-De02423	CP	mg/kg	100	61	50	30%	Fail	Q15
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M17-De02423	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M17-De02423	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M17-De02423	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
o-Xylene	M17-De02423	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	M17-De02423	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M17-De02423	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M17-De02423	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M17-De02423	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tokuthion	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M17-De02423	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Acid Herbicides				Result 1	Result 2	RPD			
2.4-D	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-DB	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-T	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-TP	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Actril (loxynil)	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dicamba	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorprop	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dinitro-o-cresol	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dinoseb	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
MCPA	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
MCPB	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mecoprop	M17-De02423	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M17-De02428	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M17-De02428	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	M17-De02428	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M17-De02429	CP	mg/kg	< 20	< 20	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M17-De02429	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M17-De02429	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M17-De02429	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M17-De02429	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M17-De02429	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	M17-De02429	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M17-De02429	CP	mg/kg	0.8	0.6	21	30%	Pass	
Benzo(b&j)fluoranthene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M17-De02429	CP	mg/kg	0.5	< 0.5	9.0	30%	Pass	
Benzo(k)fluoranthene	M17-De02429	CP	mg/kg	0.6	< 0.5	51	30%	Fail	Q15
Chrysene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M17-De02429	CP	mg/kg	1.1	1.0	11	30%	Pass	
Fluorene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M17-De02429	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M17-De02429	CP	mg/kg	0.5	0.6	17	30%	Pass	
Pyrene	M17-De02429	CP	mg/kg	1.0	1.0	3.0	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M17-De02429	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M17-De02429	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Omethoate	M17-De02429	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M17-De02429	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M17-De02430	CP	%	13	12	4.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Comments

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.
R20	This sample is a Trip Spike and therefore all results are reported as a percentage

Authorised By

Nibha Vaidya	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Matthew Deaves	Senior Analyst-Asbestos (WA)
Rhys Thomas	Senior Analyst-Asbestos (WA)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Jessie Sixsmith**

Report **575489-W**
Project name MERITON WARRIEWOOD
Project ID SYDEN205656
Received Date Nov 30, 2017

Client Sample ID			**QR101**
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**M17-De02426**
Date Sampled			**Nov 29, 2017**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	78
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			QR101
Sample Matrix			Water
Eurofins | mgt Sample No.			M17-De02426
Date Sampled			Nov 29, 2017
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	58
p-Terphenyl-d14 (surr.)	1	%	86
Organochlorine Pesticides			
Chlordanes - Total	0.001	mg/L	< 0.001
4.4'-DDD	0.0001	mg/L	< 0.0001
4.4'-DDE	0.0001	mg/L	< 0.0001
4.4'-DDT	0.0001	mg/L	< 0.0001
a-BHC	0.0001	mg/L	< 0.0001
Aldrin	0.0001	mg/L	< 0.0001
b-BHC	0.0001	mg/L	< 0.0001
d-BHC	0.0001	mg/L	< 0.0001
Dieldrin	0.0001	mg/L	< 0.0001
Endosulfan I	0.0001	mg/L	< 0.0001
Endosulfan II	0.0001	mg/L	< 0.0001
Endosulfan sulphate	0.0001	mg/L	< 0.0001
Endrin	0.0001	mg/L	< 0.0001
Endrin aldehyde	0.0001	mg/L	< 0.0001
Endrin ketone	0.0001	mg/L	< 0.0001
g-BHC (Lindane)	0.0001	mg/L	< 0.0001
Heptachlor	0.0001	mg/L	< 0.0001
Heptachlor epoxide	0.0001	mg/L	< 0.0001
Hexachlorobenzene	0.0001	mg/L	< 0.0001
Methoxychlor	0.0001	mg/L	< 0.0001
Toxaphene	0.01	mg/L	< 0.01
Aldrin and Dieldrin (Total)*	0.0001	mg/L	< 0.0001
DDT + DDE + DDD (Total)*	0.0001	mg/L	< 0.0001
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	< 0.001
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	< 0.001
Dibutylchlorendate (surr.)	1	%	78
Tetrachloro-m-xylene (surr.)	1	%	112
Organophosphorus Pesticides			
Azinphos-methyl	0.002	mg/L	< 0.002
Bolstar	0.002	mg/L	< 0.002
Chlorfenvinphos	0.002	mg/L	< 0.002
Chlorpyrifos	0.02	mg/L	< 0.02
Chlorpyrifos-methyl	0.002	mg/L	< 0.002
Coumaphos	0.02	mg/L	< 0.02
Demeton-S	0.02	mg/L	< 0.02
Demeton-O	0.002	mg/L	< 0.002
Diazinon	0.002	mg/L	< 0.002
Dichlorvos	0.002	mg/L	< 0.002
Dimethoate	0.002	mg/L	< 0.002
Disulfoton	0.002	mg/L	< 0.002
EPN	0.002	mg/L	< 0.002
Ethion	0.002	mg/L	< 0.002

Client Sample ID			QR101
Sample Matrix			Water
Eurofins | mgt Sample No.			M17-De02426
Date Sampled			Nov 29, 2017
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Ethoprop	0.002	mg/L	< 0.002
Ethyl parathion	0.002	mg/L	< 0.002
Fenitrothion	0.002	mg/L	< 0.002
Fensulfothion	0.002	mg/L	< 0.002
Fenthion	0.002	mg/L	< 0.002
Malathion	0.002	mg/L	< 0.002
Merphos	0.002	mg/L	< 0.002
Methyl parathion	0.002	mg/L	< 0.002
Mevinphos	0.002	mg/L	< 0.002
Monocrotophos	0.002	mg/L	< 0.002
Naled	0.002	mg/L	< 0.002
Omethoate	0.002	mg/L	< 0.002
Phorate	0.002	mg/L	< 0.002
Pirimiphos-methyl	0.02	mg/L	< 0.02
Pyrazophos	0.002	mg/L	< 0.002
Ronnel	0.002	mg/L	< 0.002
Terbufos	0.002	mg/L	< 0.002
Tetrachlorvinphos	0.002	mg/L	< 0.002
Tokuthion	0.002	mg/L	< 0.002
Trichloronate	0.002	mg/L	< 0.002
Triphenylphosphate (surr.)	1	%	67
Heavy Metals			
Arsenic	0.001	mg/L	< 0.001
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Copper	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	< 0.001
Zinc	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 05, 2017	7 Day
- Method: LTM-ORG-2010 TRH C6-C36			
BTEX	Melbourne	Dec 04, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 04, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B10			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 05, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 05, 2017	7 Day
- Method: LTM-ORG-2130 PAH and Phenols in Water by GCMS			
Organochlorine Pesticides	Melbourne	Dec 05, 2017	7 Day
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Melbourne	Dec 05, 2017	7 Day
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Metals M8	Melbourne	Dec 02, 2017	28 Days
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

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Site # 23736

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: MERITON WARRIEWOOD
Project ID: SYDEN205656

Order No.:
Report #: 575489
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Nov 30, 2017 5:20 PM
Due: Dec 7, 2017
Priority: 5 Day
Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP13_V1	Nov 29, 2017		Soil	M17-De02406	X						
2	TP13_V2	Nov 29, 2017		Soil	M17-De02407	X						
3	TP13_V3	Nov 29, 2017		Soil	M17-De02408	X						
4	TP13_V4	Nov 29, 2017		Soil	M17-De02409	X						
5	TP13_V5	Nov 29, 2017		Soil	M17-De02410	X						
6	TP21_V1	Nov 29, 2017		Soil	M17-De02411	X						
7	TP21_V2	Nov 29, 2017		Soil	M17-De02412	X						
8	TP21_V3	Nov 29, 2017		Soil	M17-De02413	X						
9	TP21_V4	Nov 29, 2017		Soil	M17-De02414	X						

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
10	TP21_V5	Nov 29, 2017		Soil	M17-De02415	X						
11	TP04_V1	Nov 29, 2017		Soil	M17-De02416	X						
12	TP04_V2	Nov 29, 2017		Soil	M17-De02417	X						
13	TP04_V3	Nov 29, 2017		Soil	M17-De02418	X						
14	TP04_V4	Nov 29, 2017		Soil	M17-De02419	X						
15	TP04_V5	Nov 29, 2017		Soil	M17-De02420	X						
16	TP29_0.1-0.2	Nov 29, 2017		Soil	M17-De02421	X		X	X	X	X	
17	TP29_0.8-1.0	Nov 29, 2017		Soil	M17-De02422					X	X	
18	TP30_0.0-0.2	Nov 29, 2017		Soil	M17-De02423	X		X	X	X	X	
19	TP30_0.5-0.6	Nov 29, 2017		Soil	M17-De02424	X		X	X	X	X	
20	QB101	Nov 29, 2017		Soil	M17-De02425					X	X	
21	QR101	Nov 29, 2017		Water	M17-De02426						X	

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
22	TP32_0.1-0.2	Nov 29, 2017		Soil	M17-De02427	X		X	X	X	X	
23	TP32_0.5-0.6	Nov 29, 2017		Soil	M17-De02428	X		X	X	X	X	
24	TP31_0.1-0.2	Nov 29, 2017		Soil	M17-De02429	X		X	X	X	X	
25	TP31_1.0-1.1	Nov 29, 2017		Soil	M17-De02430					X	X	
26	TP33_0.1-0.2	Nov 29, 2017		Soil	M17-De02431	X		X	X	X	X	
27	TP33_0.5-0.6	Nov 29, 2017		Soil	M17-De02432	X		X	X	X	X	
28	TP33_2.3-2.4	Nov 29, 2017		Soil	M17-De02433	X		X	X	X	X	
29	TP34_0.2-0.3	Nov 29, 2017		Soil	M17-De02434	X		X	X	X	X	
30	TP34_0.5-0.7	Nov 29, 2017		Soil	M17-De02435	X		X	X	X	X	
31	TP29_0.5-0.6	Nov 29, 2017		Soil	M17-De02436		X					
32	TP30_1.1-1.3	Nov 29, 2017		Soil	M17-De02437		X					
33	TP32_0.9-1.1	Nov 29, 2017		Soil	M17-De02438		X					

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Contact Name: Jessie Sixsmith

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Acid Herbicides	Moisture Set	Eurofins | mgt Suite B10	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736						X						
34	TP31_0.5-0.6	Nov 29, 2017		Soil	M17-De02439		X					
35	TP33_1.0-1.2	Nov 29, 2017		Soil	M17-De02440		X					
36	TP34_1.0-1.3	Nov 29, 2017		Soil	M17-De02441		X					
37	TRIP SPIKE 101	Nov 29, 2017		Soil	M17-De02442							X
38	TRIP BLANK 101	Nov 29, 2017		Soil	M17-De02443							X
Test Counts						26	6	11	11	14	15	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/L	< 0.002			0.002	Pass	
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	
Demeton-S	mg/L	< 0.02			0.02	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.002			0.002	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	
Pyrazophos	mg/L	< 0.002			0.002	Pass	
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	91			70-130	Pass	
TRH C10-C14	%	115			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	92			70-130	Pass	
Toluene	%	96			70-130	Pass	
Ethylbenzene	%	95			70-130	Pass	
m&p-Xylenes	%	105			70-130	Pass	
Xylenes - Total	%	105			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	119			70-130	Pass	
TRH C6-C10	%	92			70-130	Pass	
TRH >C10-C16	%	106			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	116			70-130	Pass	
Acenaphthylene	%	113			70-130	Pass	
Anthracene	%	102			70-130	Pass	
Benz(a)anthracene	%	116			70-130	Pass	
Benzo(a)pyrene	%	112			70-130	Pass	
Benzo(b&j)fluoranthene	%	113			70-130	Pass	
Benzo(g.h.i)perylene	%	119			70-130	Pass	
Benzo(k)fluoranthene	%	111			70-130	Pass	
Chrysene	%	94			70-130	Pass	
Dibenz(a.h)anthracene	%	110			70-130	Pass	
Fluoranthene	%	114			70-130	Pass	
Fluorene	%	112			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	104			70-130	Pass	
Naphthalene	%	112			70-130	Pass	
Phenanthrene	%	114			70-130	Pass	
Pyrene	%	116			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4.4'-DDD	%	77			70-130	Pass	
4.4'-DDE	%	99			70-130	Pass	
4.4'-DDT	%	90			70-130	Pass	
a-BHC	%	95			70-130	Pass	
Aldrin	%	100			70-130	Pass	
b-BHC	%	92			70-130	Pass	
d-BHC	%	102			70-130	Pass	
Dieldrin	%	107			70-130	Pass	
Endosulfan I	%	95			70-130	Pass	
Endosulfan II	%	98			70-130	Pass	
Endosulfan sulphate	%	84			70-130	Pass	
Endrin	%	109			70-130	Pass	
Endrin aldehyde	%	86			70-130	Pass	
Endrin ketone	%	91			70-130	Pass	
g-BHC (Lindane)	%	88			70-130	Pass	
Heptachlor	%	106			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heptachlor epoxide			%	98			70-130	Pass	
Hexachlorobenzene			%	107			70-130	Pass	
Methoxychlor			%	109			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	100			80-120	Pass	
Cadmium			%	93			80-120	Pass	
Chromium			%	97			80-120	Pass	
Copper			%	97			80-120	Pass	
Lead			%	89			80-120	Pass	
Mercury			%	82			75-125	Pass	
Nickel			%	98			80-120	Pass	
Zinc			%	107			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M17-No32379	NCP	%	90			70-130	Pass	
TRH C10-C14	M17-No32718	NCP	%	107			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M17-No32379	NCP	%	92			70-130	Pass	
Toluene	M17-No32379	NCP	%	97			70-130	Pass	
Ethylbenzene	M17-No32379	NCP	%	96			70-130	Pass	
m&p-Xylenes	M17-No32379	NCP	%	107			70-130	Pass	
o-Xylene	M17-No32379	NCP	%	106			70-130	Pass	
Xylenes - Total	M17-No32379	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M17-No32379	NCP	%	123			70-130	Pass	
TRH C6-C10	M17-No32379	NCP	%	90			70-130	Pass	
TRH >C10-C16	M17-No32718	NCP	%	98			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M17-De00326	NCP	%	75			70-130	Pass	
Acenaphthylene	M17-De00326	NCP	%	88			70-130	Pass	
Anthracene	M17-De00326	NCP	%	71			70-130	Pass	
Benz(a)anthracene	M17-De00326	NCP	%	93			70-130	Pass	
Benzo(a)pyrene	M17-De00326	NCP	%	88			70-130	Pass	
Benzo(b&j)fluoranthene	M17-De00326	NCP	%	87			70-130	Pass	
Benzo(g.h.i)perylene	M17-De00326	NCP	%	91			70-130	Pass	
Benzo(k)fluoranthene	M17-De00326	NCP	%	88			70-130	Pass	
Chrysene	M17-De00326	NCP	%	80			70-130	Pass	
Dibenz(a.h)anthracene	M17-De00326	NCP	%	105			70-130	Pass	
Fluoranthene	M17-De00326	NCP	%	87			70-130	Pass	
Fluorene	M17-De00326	NCP	%	74			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M17-De00326	NCP	%	128			70-130	Pass	
Naphthalene	M17-De00326	NCP	%	75			70-130	Pass	
Phenanthrene	M17-De00326	NCP	%	71			70-130	Pass	
Pyrene	M17-De00326	NCP	%	86			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDD	M17-De02328	NCP	%	72			70-130	Pass	
4.4'-DDE	M17-De02328	NCP	%	83			70-130	Pass	
4.4'-DDT	M17-De02328	NCP	%	83			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
a-BHC	M17-De02328	NCP	%	87			70-130	Pass	
Aldrin	M17-De02328	NCP	%	80			70-130	Pass	
b-BHC	M17-De02328	NCP	%	85			70-130	Pass	
d-BHC	M17-De02328	NCP	%	83			70-130	Pass	
Dieldrin	M17-De02328	NCP	%	78			70-130	Pass	
Endosulfan I	M17-De02328	NCP	%	71			70-130	Pass	
Endosulfan II	M17-De02328	NCP	%	79			70-130	Pass	
Endosulfan sulphate	M17-De02328	NCP	%	77			70-130	Pass	
Endrin	M17-De02328	NCP	%	88			70-130	Pass	
Endrin aldehyde	M17-De02328	NCP	%	72			70-130	Pass	
Endrin ketone	M17-De02328	NCP	%	73			70-130	Pass	
g-BHC (Lindane)	M17-De02328	NCP	%	76			70-130	Pass	
Heptachlor	M17-De02328	NCP	%	80			70-130	Pass	
Heptachlor epoxide	M17-De02328	NCP	%	74			70-130	Pass	
Hexachlorobenzene	M17-De02328	NCP	%	117			70-130	Pass	
Methoxychlor	M17-De02328	NCP	%	104			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	M17-De00326	NCP	%	94			70-130	Pass	
Dimethoate	M17-De00326	NCP	%	79			70-130	Pass	
Ethion	M17-De00326	NCP	%	79			70-130	Pass	
Mevinphos	M17-De00326	NCP	%	72			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M17-De02230	NCP	%	99			75-125	Pass	
Cadmium	M17-De00247	NCP	%	105			75-125	Pass	
Chromium	M17-De02230	NCP	%	96			75-125	Pass	
Copper	M17-De02230	NCP	%	96			75-125	Pass	
Lead	M17-De02230	NCP	%	89			75-125	Pass	
Mercury	M17-De02230	NCP	%	90			70-130	Pass	
Nickel	M17-De02230	NCP	%	96			75-125	Pass	
Zinc	M17-De02230	NCP	%	84			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M17-No32378	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	M17-De02327	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M17-De02327	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M17-De02327	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M17-No32378	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M17-No32378	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M17-No32378	NCP	mg/L	0.002	0.002	1.0	30%	Pass	
m&p-Xylenes	M17-No32378	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M17-No32378	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	M17-No32378	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M17-No32378	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	M17-No32378	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	M17-De02327	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M17-De02327	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M17-De02327	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M17-De02981	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
4.4'-DDD	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
4.4'-DDE	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
4.4'-DDT	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
a-BHC	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Aldrin	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
b-BHC	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
d-BHC	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Dieldrin	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan I	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan II	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan sulphate	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin aldehyde	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin ketone	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
g-BHC (Lindane)	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Heptachlor	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Heptachlor epoxide	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Hexachlorobenzene	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Methoxychlor	M17-De02981	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Toxaphene	M17-De02981	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Bolstar	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorfenvinphos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorpyrifos	M17-De02981	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Chlorpyrifos-methyl	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Coumaphos	M17-De02981	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-S	M17-De02981	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-O	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Diazinon	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dichlorvos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dimethoate	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Disulfoton	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
EPN	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Ethion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethoprop	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethyl parathion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenitrothion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fensulfothion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenthion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Malathion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Merphos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Methyl parathion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Mevinphos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Monocrotophos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Naled	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Omethoate	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Phorate	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Pirimiphos-methyl	M17-De02981	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Pyrazophos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ronnel	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Terbufos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Tetrachlorvinphos	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Tokuthion	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Trichloronate	M17-De02981	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M17-De02230	NCP	mg/L	0.002	0.002	2.0	30%	Pass	
Cadmium	M17-De00247	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M17-De02230	NCP	mg/L	0.001	< 0.001	35	30%	Fail	Q15
Copper	M17-De02230	NCP	mg/L	0.001	< 0.001	17	30%	Pass	
Lead	M17-De02230	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	M17-De02230	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	M17-De02230	NCP	mg/L	0.002	0.002	25	30%	Pass	
Zinc	M17-De02230	NCP	mg/L	0.16	0.16	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Comments

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Nibha Vaidya	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Appendix G – Unexpected Finds Procedure

9. UNEXPECTED FINDS PROTOCOL

9.1. Awareness of Personnel

Personnel involved in earthworks on site are to be inducted on the recognition of unexpected finds and asbestos (in soil) awareness. The induction can be undertaken at the time of general site induction and refreshed periodically at toolbox meetings.

Awareness of all types of possible unexpected finds is not practicable, but conditions that indicate a potential risk would be discussed, such as presence of foreign materials and demolition rubble. In general, a precautionary approach will be employed, in that when a suspected hazard is discovered activity in the immediate area will be suspended and the affected area isolated until a competent person is available to assess the risk and make recommendations for mitigation and/or management of that risk, as appropriate. This unexpected finds procedure outlined in the following section will be implemented.

Some forms of potential contamination may not have any visual or olfactory indicators in the field. The unexpected finds procedure will not provide protection against such hazards. Coffey expects that such contaminants would be apparent through results of chemical analysis for validation sampling, either directly or indirectly.

9.2. Potential Unexpected Finds

Based on findings of previous investigations and site history, unexpected finds which could reasonably occur within the site are summarised in Table 9.1.

Table 9.1: Summary of Non-specific Unexpected Finds

Potential Unexpected Find	Observed Characteristic
Buried dry waste materials	May include a variety of waste materials including wood, plastic, metal fragments, building rubble (e.g. concrete, brick, asphalt, forms of asbestos etc.).
Buried putrescible wastes	Putrescible waste materials typically comprise decomposed organic waste materials intermixed within the fill materials on site, with an associated characteristic rotten egg type odour. Such materials should not be confused with decomposed plant matter found within the natural sandy soils.
Structures or conduits containing deleterious materials	Could be identified as follows: • A buried tank, or cess pit, or former process pipelines; • Deeper sand fill sometimes with visual/olfactory indications of contamination • Presence of small concrete footings surrounding by odorous of visually impacted soils and/or groundwater.
Ash or slag deposits	Ash materials typically light weight, grey and white sand and gravel sized (1mm to 10mm) particles. Slag materials can be varied in consistency and colour and may comprise pale grey to blue/green/grey, and be loose or cemented. Slag gravels can be very angular and appear to have a vesicular (i.e. 'honeycomb') texture.

Hydrocarbon Compounds	May be identified by a hydrocarbon odour which may vary in strength from weak (just detectable) to very strong (easily detectable at a distance from the source). The odour may or may not be accompanied by specific areas of dark staining (black-grey) or larger scale discolouration of strata from a previously identified 'natural colour' e.g. staining of orange and brown clay to dark grey and green. May also be visible as a distinct coloured sheen on water within an excavation.	
Other unusual odours	• Solvent odour • Acetone odour • Alcohol odour • Caustic odour	• Acidic (Acetic/Formic/Citric) odour. • Ammonia odour • Sulfur (rotten egg) odour (possibly associated with acid sulfate soil)

9.3. Unexpected Finds Procedure

Should actual or suspected contamination be discovered during asbestos removal or basement construction works, the following procedure will be applied:

- Stop work in the suspected hazardous area as soon as it is safe to do so and move to the upwind side of the area, or away from the area.
- Assess the potential immediate risk to human health posed by the unexpected find and assess if evacuation should commence and/or emergency services need to be contacted.
- Establish an exclusion zone around the affected area using fencing and/or appropriate barriers and signage. Additional control measures may be required for odours and/or volatile compounds: odour suppression and no flames/hot work signage.
- Contact the Environmental Consultant for advice and request a site visit for assessment of the unexpected find. The Site Auditor and Karimbla should be informed of the find.

The Environmental Consultant will assess the unexpected find and provide advice regarding:

- Preliminary assessment of the contamination and need for immediate risk reduction;
- What further assessment and/or risk reduction works are required and how such works are to be undertaken in accordance with contaminated site regulations and guidelines;
- Risk reduction works required (where applicable); and
- Validation works required following risk reduction works (if applicable).

Works are not to recommence in the affected area until appropriate advice has been obtained from the Environmental Consultant and relevant information has been provided to the Site Superintendent / Principal Contractor to issue notification to recommence.

If it is deemed safe to do so by the Site Superintendent / Principal Contractor, works may resume in the affected area.

10. RESPONSIBILITIES

A summary of responsibilities in relation to implementation of the CMP is tabulated in Table 10.1.

Table 10.1: Summary of Responsibilities

Role	Responsibilities
Site Superintendent / Principal Contractor	• Ensure that this CMP is implemented and adhered to. • Provide relevant information regarding site environmental management to contractors and subcontractors working at the site. • Inform contractors and subcontractors working on-site of this CMP. • Ensure that contractors and subcontractors undertaking works at the site are fulfilling the environmental protection/management responsibilities for the work. • Maintain records and documents produced as a result of this CMP. • Implement an inspection and maintenance program as recommended in Section 7 of this CMP. • Arrange for themselves (including contractors/subcontractors) and relevant representatives to be inducted into this CMP, both now and in the future as required, by a competent environmental professional or appropriately trained alternative representative.
Contractors / subcontractors	• Liaise with the Site Superintendent / Principal Contractor, other contractors and parties, and relevant authorities. • Ensure overall compliance with the CMP, applicable legislation and regulations during the works. • Regular reporting of the CMP performance to the Site Superintendent / Principal Contractor.
Environmental Consultant	• Induct the Civil Contractor into the requirements of the CMP, as required. • Provide advice to the Site Superintendent / Principal Contractor and relevant parties regarding management of environmental issues as detailed in Section 8 of this CMP. • Respond to unexpected finds, as required. • Undertake annual review of the effectiveness of the CMP, and revise the CMP as required at the request of the Site Superintendent / Principal Contractor.

Appendix H – SafeWork NSW Notice of Intent to Remove Friable Asbestos

A copy had not been provided at the time of writing

Appendix I – Asbestos Air Monitoring Results

P. CLIFTON
& ASSOCIATES

PO Box 457
Turramurra NSW 2074

ABN: 69 041 751 671

PH: 0437 251 358
Email: philclifton@bigpond.com

4 December 2017

Ms Nicole Maroun
Earthworx
PO Box 7815
Baulkham Hills NSW 2153

RE: RESULTS OF AIRBORNE ASBESTOS FIBRE MONITORING
2 WARRIEWOOD ROAD, WARRIEWOOD NSW

Dear Sir,

We refer to your request to undertake monitoring for airborne asbestos fibres on Thursday 30 November 2017 during the removal of soil containing asbestos cement sheet debris from the Meriton development site at 2 Warriewood Road, Warriewood NSW.

This monitoring was carried out in accordance the requirements of the Safe Work Australia How to Safely Remove Asbestos Code of Practice, Section 3.11 and the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres' 2nd edition [NOHSC 3003:2005].

The results of the monitoring are as follows:

Sample No.	Location	Time On	Time Off	Fibre Count fibres/fields	Airborne Fibre Concentration (fibres/ml)
PCA 5644 - 2017/A10/1	East side of excavation area	07:00	15:00	0.0/100	<0.01
PCA 5644 - 2017/B50/2	West side of excavation area	07:02	15:02	2.0/100	<0.01
PCA 5644 - 2017/B77/3	South side of excavation area	07:04	15:04	3.0/100	<0.01

The above result is below the lowest detectable level for the estimation of airborne asbestos fibres using the membrane filter method and below the NOHSC recommended exposure level for airborne asbestos fibres (8 hour TWA) of 0.1 fibres/ml.

This result indicates that there was no measurable human health risk from airborne asbestos fibres in these areas during the monitoring period.

The NATA endorsed laboratory report is attached.

If you require any further information, please contact me on 0437 251 358.

Yours faithfully
P. CLIFTON & ASSOCIATES PTY LTD

Philip Clifton
Principal

Attachment: Laboratory Report

P. CLIFTON
& ASSOCIATES

LABORATORY REPORT

A division of Enviro-Net Australia Pty. Ltd.
ABN 39 067 499 389 ACN 067 499 389 NATA Reg. 3110
www.environet.com.au
Email: esp@esplabs.com.au

Melbourne Laboratory (Head Office)
Unit 2/2B Parker Street
Footscray, Victoria 3011
Ph: (03) 9688 8000

CERTIFICATE OF AIR MONITORING

Date: 4 December 2017

ESP Job Number: J37628

Customer: P. Clifton & Associates Pty Ltd

Address: PO Box 457, Turramurra NSW, 2074

Attention: Phil Clifton

Sampled From: As received (Your ref: PCA 5644-2017)

Sampled By: As received

Date Received: 4 December 2017

Test Method: Filters examined in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)] using ESP in-house Method No. 1.

ESP Lab No.	Customer Sample Reference	Result (fibres/field)
53935	A10/1	Nil/ 100
53936	B50/2	2/ 100
53937	B77/3	3/ 100

The results contained in this report relate only to the sample(s) submitted for testing. ESP Environmental & Safety Professionals accepts no responsibility for the representivity of the sample(s) submitted

Mathew Cupic
Approved Counter / Approved Signatory

Appendix J – Visual Validation: Relocation of Terracotta to beneath roadway

APPENDIX J – VISUAL VALIDATION OF SITE

Photograph 1: Visual validation of the western portion of the site (looking north west)

Photograph 2: Visual validation of eastern portion of the site (looking north east)

Photograph 3: Area of terracotta remaining which was requested to be excavated

Photograph 4: Area following removal of terracotta (photo provided by Meriton 23 February 2018)

Photograph 5: Area of terracotta remaining which was requested to be excavated – looking east/north east

Photograph 6: Area following removal of terracotta (photo provided by Meriton 23 February 2018) – It is noted that the exposed material is consistent with natural sands encountered during the site investigation.

Photograph 7: Eastern boundary of the site – view of future riparian reserve and road (beneath). It is noted that the exposed material is consistent with natural sands encountered during the site investigation (photo provided by Meriton 23 February 2018).

Photograph 8: Crushed terracotta placed within future road area. Photograph looking south along the western boundary.

Photograph 9: Exposed surface within the future residential area, some gravelly sand remains. Photograph looking north east with the future road in the distance.

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