Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation (PSI) for Contamination

Proposed Harrington Waters Lifestyle Village
26, 48 and 56 Manor Road, Harrington

Prepared for
Bayline Homes and Developments

Project 31872.02
July 2019

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

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Report on Preliminary Site Investigation (PSI) for Contamination
Proposed Harrington Waters Lifestyle Village
26, 48 and 56 Manor Road, Harrington

1. Introduction

This report presents the results of a preliminary site investigation (PSI) for contamination undertaken for the proposed Harrington Waters Lifestyle Village at 26, 48 and 56 Manor Road, Harrington. The investigation was commissioned in an email dated 3 June 2019 by Danny Bayly of Bayline Homes and Developments and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal PMQ190028 dated 31 May 2019.

It is understood that an eleven (11) stage subdivision is proposed for the site which covers an area of approximately 23 hectares and will include the following:

- 292 residential allotments;
- Upgrade of Manor Road to include kerb and guttering, approximately 380 m in length;
- Approximately 4 km of internal roadways;
- Car parking and caravan storage;
- Wetland areas adjacent to Manor Road;
- Proposed detention basins;
- Sewer pump station;
- Village green including retail shops, short term accommodation and rec centre; and
- Tennis courts, club house, gym, bowling green and a Mens shed.

The aim of the PSI was to undertake and provide comment on the following:

- Desktop review including review of geological, topographic and acid sulfate soil risk maps;
- Brief site history review to assess the potential for contamination at the site;
- Site inspection by a geo-environmental engineer to identify areas of potential contamination and assess current site conditions;
- Collection of near surface soil samples;
- Laboratory testing of selected soil samples for a range of potential organic and inorganic contaminants and for assessment of acid sulfate soil (ASS) conditions;
- Preparation of this report presenting the results of the assessment.

The PSI was undertaken with reference to NSW EPA 'Guidelines for Consultants Reporting on Contaminated Sites' (EPA, 2011) and NEPC (2013). The acid sulfate soil investigation was undertaken with reference to ASSMAC (1998) and QASSIT (2014).

2. Site Description

The site extends across three lots being Lot 2 DP1219123 (26 Manor Road), Lot 4 DP1219124 (48 Manor Road) and Lot 6 DP1217806 (56 Manor Road), Harrington, NSW, as shown on Drawing 1 in Appendix E. The site covers an area of approximately 23 hectares and has a northern frontage of 520 m to Manor Road and Harrington Road.

The site is bounded to the north by Manor Road and Harrington Road, to the east by existing residential development, to the south and west by rural residential properties and the Manning River beyond to the south.

The site is currently zoned R5 'Large Lot Residential' and E2 'Environmental Conservation' under the current Mid-Coast LEP 2010

At the time of the inspection the site comprised a grassed covered area with a number of mature to semi mature trees along the northern frontage and sporadically across the site but mainly constrained to the northern parts of the site. An existing weatherboard house was present in the north western portion of the site which included numerous stockpiles of demolition waste (including metal sheeting, concrete, bricks, metal scaffolding, timber, concrete and tiles). Near to the house was an above ground metal fuel storage tank on a metal stand. A large stockpile of soil with a smaller stockpile of soil, bricks and concrete was also located within the north western portion of the site.

3. Regional Geology, Soil Landscape and Acid Sulfate Soil Mapping

3.1 Geology

Reference to the 1:25,000 scale NSW NCCA Quaternary Geology data set (Figure 1) indicates the site is underlain by Pleistocene aged coastal barrier (yellow shading), which typically comprises marine sand, indurated sand, silt, clay, gravel, organic mud and peat. The coastal barrier materials are generally characterised as low pyrite, low carbonate and low organic content soils. The southern tip of the site is mapped as comprising Holocene aged estuarine plain (green shading), which typically comprises marine sand, silt, clay, shell and gravel. The estuarine plain materials are generally characterised as moderate pyrite, high carbonate and low organic content.

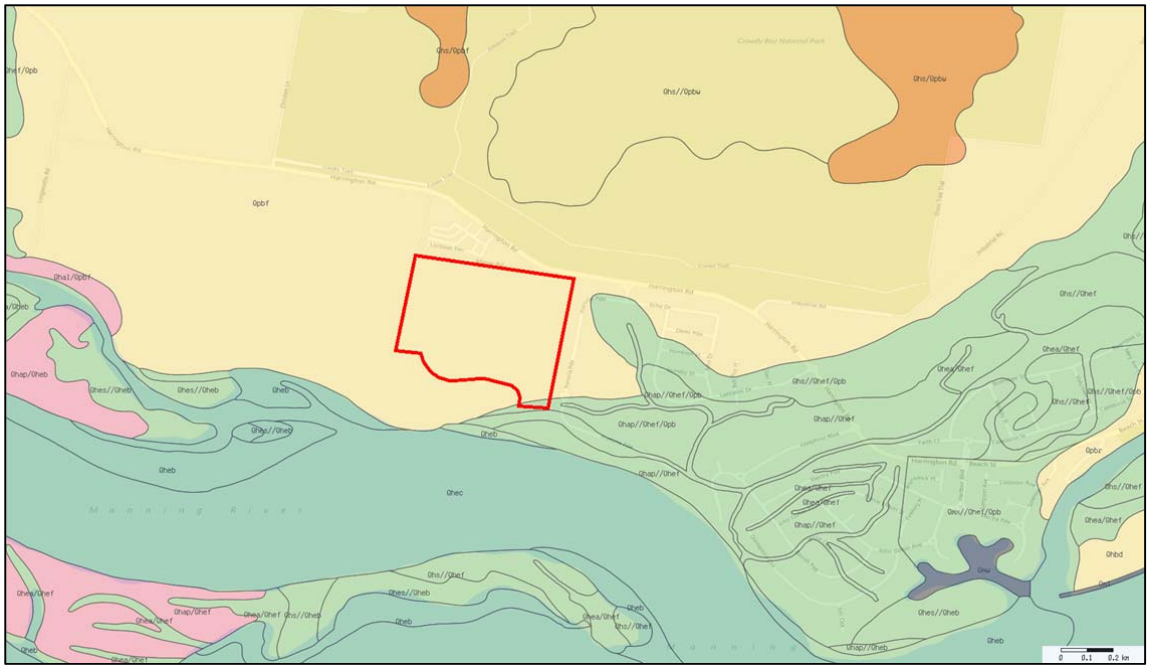

Figure 1: NCCA Quaternary and bedrock geology map with approximate site location (red square)

3.2 Soil Landscape

Reference to the Soil and Land Resources of the Hunter Region (Figure 2) indicates the site is mapped as comprising aeolian soils of the Harrington landscape (green shading). Also within close proximity to the east is mapped as comprising disturbed terrain (purple shading) associated with the previous residential development.

The Harrington landscape is characterised by “level plain to gently undulating plain on Pleistocene backbarrier quartz sands”. The soils within this landscape are characterised as “non-cohesive, wind erosion hazard, poor drainage, seasonal waterlogging”.

Figure 2: Soil landscape map with approximate site location (red square)

3.3 Acid Sulfate Soils

Reference to the Cundletown 1:25,000 Acid Sulfate Soil Risk Map (Figure 3) indicates the majority of the site is located within an area of "*low probability of occurrence at depths between 1 m and 3 m below the ground surface*" (yellow shading). The south eastern corner of the site is located within an area of "*high probability of occurrence between 1 m and 3 m below the ground surface*" (red shading).

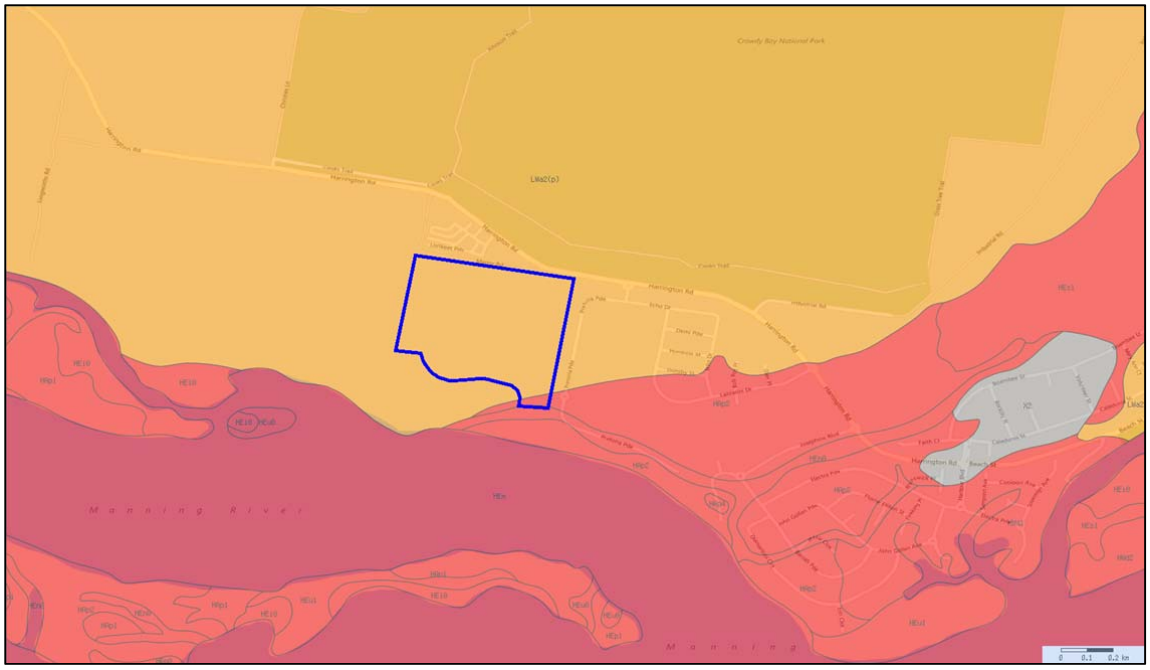

Figure 3: Acid Sulfate Soils Map with approximate site location (red square)

4. Hydrogeology

An online groundwater bore search undertaken with Water NSW indicated that one registered groundwater well is located within 500 m of the site. The nearest registered groundwater well (GW033008.1.1) is located approximately 400 m to the east of the site. The well was drilled to a depth of 3.7 m in 1971, with no further details available. The quality of groundwater in the area is unknown.

Groundwater at the site is expected to flow in a southerly direction towards the Manning River which is located approximately100 m to 250 m to the south of the site. This water body is considered to be the nearest environmentally sensitive receptor.

5. Site History

5.1 Extent of Site History Review

The brief review of site history comprised the following:

- Review of previous DP geotechnical and environmental assessments within the nearby area;
- Historical title deed search;
- Review of historical aerial photos;
- Searches with NSW EPA; and
- Searches of available Council and Government records.

Details are presented in the following sections.

5.2 Previous Douglas Partners Reports

DP has undertaken two previous geotechnical investigations at the site and a number of investigations in the nearby area particularly with the adjacent Harrington Waters development to the east.

The previous investigations undertaken on the site included excavation of 20 test pits, drilling of seven (7) test bores, installation of groundwater monitoring wells at each test bore location to assess water level, assessment of acid sulfate soil conditions, infiltration testing at ten (10) locations, in-situ permeability testing, geotechnical laboratory testing and engineering analysis.

A generalised geotechnical model of the site has been developed based on the previous geotechnical investigations undertaken at the site. The following summarises the generalised geotechnical model for the site:

- Topsoil / Silty Sand to depths ranging from 0.0 m to 0.5m;
- Very loose to loose sand to depths ranging from 0.5 m to 1.5 m;
- Medium dense sand to depths ranging from 1.5 m to 2 m;
- Indurated Sand to depths ranging from 2 m to 3 m;
- Medium dense sand to depths ranging from 3 m to 5 m; and
- Very loose to loose sand and clayey sand from 5 m to 10 m.

Although the previous Test Pits/Bores were not specifically conducted for the assessment of possible site contamination, there were no obvious indications of gross contamination (i.e. odours, staining etc.) within the logs.

Groundwater levels were recorded at depths ranging from 1.2 m to 2.0 m within the pits and bores. It should be noted that groundwater levels are affected by factors such as climatic conditions and soil permeability and will therefore vary with time

The approximate location of the test locations undertaken at the site are shown on Drawing 1 in Appendix E. Copies for previous test pits and test bores are included in Appendix A

A total of 49 ASS screening tests and five (5) detailed ASS tests were carried out on soil samples from the investigation, which indicated that 'actual' acid sulfate conditions were not present at the site in the samples tested. However the results indicated that 'potential' acid sulfate soils were present at the site up to the investigation depths (i.e. 10.5 m) and an acid sulfate soil management plan (ASSMP) is required for any excavation activities.

DP have also undertaken numerous geotechnical and environmental investigations for the adjacent residential development which indicated similar subsurface soil profile and acid sulfate potential.

5.3 Historical Title Search

A historic title deeds search was carried out by InfoTrack, the results of which are provided in Appendix C.

Reference should be made to Figure 4 for the location of the historical lots.

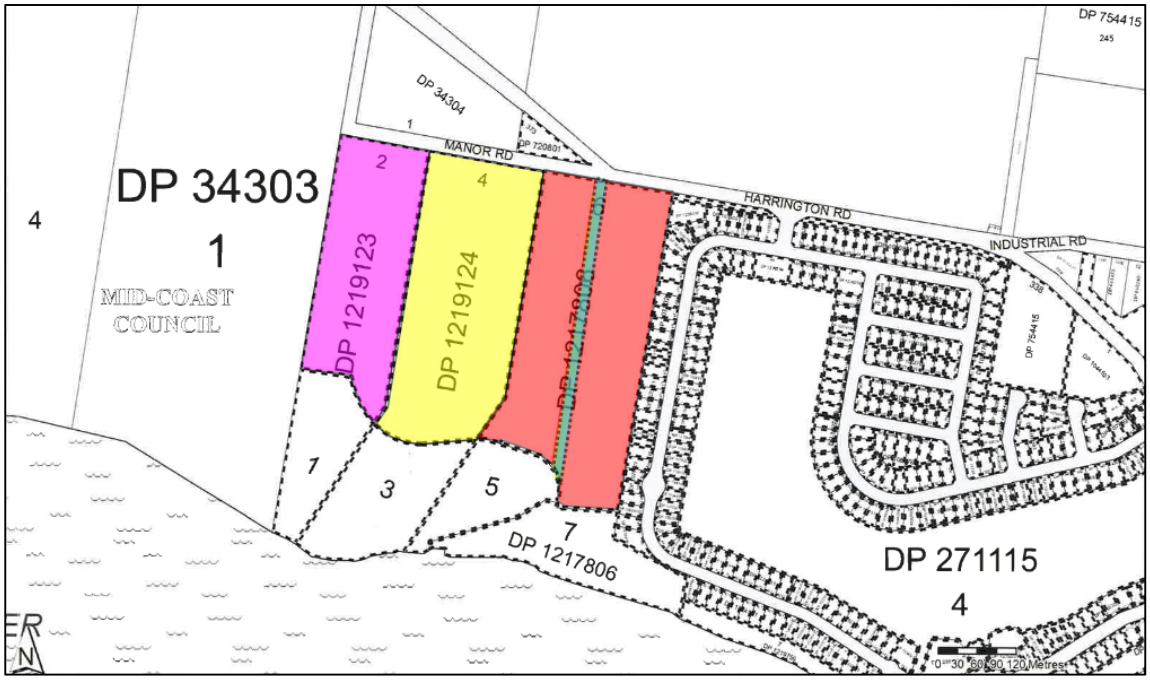

Figure 4: Historical allotment layout

The titles history of the site, shown above, is presented in Table 1 below for the western allotment (yellow shading), Table 2 for the central allotment (green shading) and Table 3 for the eastern allotment (red shading).

Table 1: Historical Title Search – Lot 2, DP1219123 – 26 Manor Road (pink shading)

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available
17.09.1902 (1902 to 1963)	Alexander Newton (Engineering Student)
28.06.1963 (1963 to 1982)	William Herbert Sheather (Dairy Farmer)
09.07.1982 (1982 to 2016)	Terence Charles Clifton Janeen Rhonda Clifton
17.12.2016 (2016 to date)	# Riverside Manors (Harrington) Pty Ltd

Notes to Table 1:
# Denotes Current Registered Proprietor

No leases were identified during the search

The following easements were found on the allotment

- Right of access (4 metres wide);
- Easement for services; and
- Easement for overhead power lines (20 metres wide).

Table 2: Historical Title Search – Lot 4, DP1219124 – 48 Manor Road (yellow shading)

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available
17.09.1902 (1902 to 1963)	Alexander Newton (Engineering Student)
28.06.1963 (1963 to 1982)	William Herbert Sheather (Dairy Farmer)
13.09.1982 (1982 to 1993)	John Andrew Clark Paul Michael Simon Peter James Callaghan
22.02.1993 (1993 to 1995)	John Andrew Clark (& his bankrupt estate)
19.12.1995 (1995 to 2016)	J & M MacDonald Pty Limited
08.12.2016 (2016 to date)	# Riverside Manors (Harrington) Pty Ltd

Notes to Table 2:
# Denotes Current Registered Proprietor

No leases were identified during the search

The following easements were found on the allotment

- Right of access (4 metres wide);
- Easement for services (variable width); and
- Easement for overhead power lines (20 metres wide).

Table 3: Historical Title Search – Lot 6, DP1217806 – 56 Manor Road (red shading)

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available
17.09.1902 (1902 to 1963)	Alexander Newton (Engineering Student)
28.06.1963 (1963 to 1984)	William Herbert Sheather (Dairy Farmer)
27.04.1984 (1984 to 2016)	Kenneth Edgar Billings Shirley Margaret Billings
29.11.2016 (2016 to 2019)	Riverside Manors (Harrington) Pty Ltd
01.04.2019 (2019 to date)	# Blue Water (Aust) Pty Ltd

Notes to Table 3:
# Denotes Current Registered Proprietor

No leases were identified during the search

The following easements were found on the allotment

- Right of access (4 metres wide);
- Easement for services (variable width);
- Right of access (5 metres wide); and
- Easement for overhead power lines (20 metres wide).

A former proposed road within Lot 6 as indicated by the green shading was purchased by William Herbert Sheather in 1969.

The title deed search indicated that the majority of the site has been used for agricultural purposes since 1963 with prior uses unknown.

There were generally no obvious indications of gross potentially contaminating activities based on the results of the title deed search.

5.3.1 Review of Historical Aerial Photos

The following historical aerial photos were reviewed for this assessment:

Table 4: Aerial Photo Review

Year	Approximate Scale	Black and White/Colour
1965	1:40,000	Black and White
1979	1:25,000	Black and White
1981	1:60,000	Black and White
1991	1:25,000	Colour
2002	1:25,000	Colour
2009	NTS	Colour
2011	NTS	Colour
2012	NTS	Colour
2015	NTS	Colour
2018	NTS	Colour

1965 Aerial Photograph

- The site appears to be undeveloped with good coverage of trees across the site;
- Harrington Road and Manor Road are present to the north of the site;
- Surrounding areas appear undeveloped;
- A track is present running from Manor Road along the approximate boundary of Lot 2 to the south to approximately half way along the lot before heading east to the approximate boundary of Lot 6 before heading south towards the Manning River.

1979 Aerial Photograph

- The site appears to be cleared of trees except along Manor Road;
- Pre existing track still present in the north of the site.

1981 Aerial Photograph

- Similar to 1979 aerial photo

1991 Aerial Photograph

- House within north western corner of Lot 2 present
- Houses along the river bank present with associated driveways from Manor Road
- Caravan park immediately to the north of Manor Road present
- Harrington Road is sealed with Manor Road unsealed.

2002 Aerial Photograph

- Similar to 1991 aerial photo;
- Further development within caravan park to the north of Manor Road is evident;
- Adjacent residential development commenced.

July 2009 Aerial Photograph

- Similar to 2002 aerial photo
- Grass appears to be brown in colour across the majority of the site with the exception of the northern part of Lot 4 and the western portion of Lot 6;
- Additional trees present across the northern part of the site;
- Above ground storage tank visible adjacent to overhead power pole within north western part of Lot 2;
- Possible stockpiles material adjacent to overhead power pole in Lot 2.

September 2011 Aerial Photograph

- Similar to 2009 aerial photo;
- Dead tree on ground adjacent to house within north western part of Lot 2
- Additional stockpiled material within north western corner of Lot 6.

March 2012 Aerial Photograph

- Similar to 2011 aerial photo;

August 2015 Aerial Photograph

- Similar to 2012 aerial photo;
- Dead tree near eastern boundary of Lot 4;

July 2018 Aerial Photograph

- Similar to 2015 aerial photo;
- A number of additional stockpiles of material to the north west and west of the house in the north western part of Lot 2;
- Large stockpile of material to the north east of the house in north western part of Lot 2;
- Other stockpiles of building and construction material present immediately adjacent to the house.

It is noted that data obtained from aerial photos was limited due to the relatively small scale and poor resolution.

5.4 NSW EPA Search

A review of the NSW EPA contaminated land management register indicated the site and immediate surrounds have no notices issued under the Contaminated Land Management Register.

A review of the list of contaminated sites notified to the NSW EPA indicated the site was not listed and immediately surrounding properties were not listed.

A search of the NSW EPA POEO Public Register indicated that there are no POEO Licences for the site, however the register did indicate a number of licences for the adjacent Harrington Waters Estate or immediately nearby properties.

Table 5: NSW EPA POEO Licences for surrounding area

Licence Number	Holder	Purpose	Status
5911	Birdon Sands Pty Ltd	Dredging	Surrendered (2001)
11373	Roche Group Pty Ltd	Dredging	Surrendered (2006)

5.5 SafeWork NSW Search

A search of the stored Chemical Information Database (SCID) and microfiche records at SafeWork NSW regarding licenses to keep dangerous goods did not reveal any records pertaining to the storage of dangerous goods on the site. A copy of the correspondence from SafeWork NSW is provided in Appendix C.

5.6 Council and Government Records Search

A search of the Mid-Coast Council website indicates that no development applications have been submitted on the allotment.

A review of the property reports from the NSW Planning and environment portal was undertaken and indicated the following:

- Lots 2 and 4 are within
  - Zone R5 – Large Lot Residential;
  - Class 3 acid sulfate soils;
- Lot 6 is within:
  - Zone R5 – Large Lot Residential and E2 – Environmental Conservation;
  - Class 2a and 3 acid sulfate soils.

Section 10.7(2) and 10.7(5) certificates were not available whilst preparing this report.

6. Site Condition

A site inspection was conducted on 7, 10 and 12 June 2019 by a senior engineer from DP. Observations made during the inspection are summarised below.

- The site generally had a good covering of grass across the majority of the site (Figure 7);
- Mature to semi mature trees along the northern boundary of the lots, sporadic coverage of trees across the rest of the site;
- Large stockpile of soil, concrete and bricks within the northern part of Lot 2 near the boundary with Lot 4 (Figure 11);
- Weatherboard house within northern part of Lot 2 (Figure 5)
- Above ground metal tank near weatherboard house (Figure 8)
- Stockpiled building and construction materials around weatherboard house, including metal scaffolding poles, bricks, tiles, weatherboard sheets (Figure 5, Figure 6 and Figure 8);
- Below ground concrete septic tank near weatherboard house (Figure 13);
- Small shed with corrugated iron sheeted roof and corrugated asbestos clad walls (Figure 9);
- Evidence of filling or previous fill stockpiles to the west of the weatherboard house with some fibro fragments (i.e. possible asbestos containing materials (ACM)) (Figure 14);
- Grass covered stockpile within Lot 6 near northern boundary;

Refer to Drawing 2 – Site Features in Appendix E for site features and location of the following photographs.

The following photos show parts of the site during the investigation.

Figure 5: View of weatherboard house and surrounding stockpiled material

Figure 6: View of stockpiled concrete fragments, bricks and tiles

Figure 7: View north east from Lot 2 eastern boundary

Figure 8: View of above ground tank and bricks

Figure 9: View of small shed with fibro sheeting (possible ACM) on walls

Figure 10: Fibro fragments around weatherboard house

Figure 11: Large stockpile of soil

Figure 12: Stockpile of soil, bricks and concrete adjacent to large stockpile

Figure 13: View of inside of concrete septic tank

Figure 14: Evidence of Fill and possible ACM fragment

Approximate locations and orientation of photos are shown on Drawing 2 in Appendix E.

7. Potential Contaminants

Based on the available site history information and observations made during the site inspection, the principal on-site sources of potential contamination are considered to be:

- Imported filling within the northern part of Lot 2 and Lot 6, which may contain a range of contaminants depending on the source;
- Presence of stored building materials and other imported materials over unsealed areas of the site;
- Existing structures containing possible hazardous building materials including ACM (i.e. possible damage to cladding/materials);
- Possible hydrocarbon impact from leaking aboveground service tanks (AGST) within northern part of Lot 2;
- Possible pesticide, heavy metal, hydrocarbon impacts from pesticide / herbicide application;
- Possible leaks/migration from onsite septic system.

The risk of gross contamination from off-site land uses is generally considered to be low due to the local topography, the neighbouring residential properties and previous surrounding land uses.

8. Conceptual Site Model

A conceptual site model (CSM) has been prepared for the investigation area with reference to the National Environment Protection (Assessment of Site Contamination) Measure 1999 amended 2013 Schedule B2 (NEPC, 2013). The CSM identifies potential contaminant sources and contaminants of concern, contaminant release mechanisms, exposure pathways and potential receptors.

Table 6: Conceptual Site Model

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Possible imported filling and stored building materials within the site (source unknown)	Placement of filling on-site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, Pesticides, PCB, OCP/OPP, asbestos	Dermal contact, inhalation (dust/vapours), ingestion	Site users, site workers, Consultants, trespassers, surface water bodies, groundwater, neighbouring properties	Potential site users, site workers, maintenance workers, construction workers, consultants, trespassers, surface water bodies, neighbouring properties, groundwater
Hazardous building materials (HBM), including ACM	Possible demolition or damage to existing structures containing HBM including ACM	Exposure/disturbance during proposed development	Soil, groundwater, surface water	Asbestos, PCB, metals	Dermal contact, inhalation (dust/vapours), ingestion		
Possible pesticide use	Spraying of weeds/pests and/or spills/leaks from stored pesticides	Long-term leaching of contaminants via runoff, rain water infiltration / percolation through soil, exposure/disturbance during proposed development	Soil, groundwater, surface water	OCP, OPP, TRH, PAH, Metals	Dermal contact, inhalation (dust/vapours), ingestion		
Possible Hydrocarbon Contamination from above ground storage tank	Leakage from tank, spills during refuelling	Long term deterioration of metal tank. Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure/disturbance during proposed development	Soil, groundwater, surface water	PAH, TRH, BTEX, metals	Dermal contact, inhalation (dust/vapours), ingestion		
On-site septic system	Leakage from system	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure/disturbance during proposed development	Soil, groundwater, surface water	Nutrients, microbiological impacts, hydrocarbons, Metals,	Dermal contact, inhalation (dust/vapours), ingestion		

Notes to Table 6
Heavy Metals = arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc
TRH = total recoverable hydrocarbons, BTEX – benzene, Toluene, ethyl benzene and xylene
PAH = polycyclic aromatic hydrocarbons, PCB = polychlorinated biphenyls
OCP = organochlorine pesticides OPP = organophosphorus pesticides

9. Field Work

9.1 Methods

Limited field work was undertaken on the 10 June 2019 and comprised the following:

- Collection of three near surface soil samples at targeted locations;
- Collection of two possible asbestos samples and surrounding soil samples

The approximate sample locations are shown on Drawing 1 in Appendix E along with the previous test locations.

The field work and sampling was undertaken by a senior engineer from DP.

It is noted that an accurate survey was not conducted for this investigation. The locations of the samples were recorded using a hand held GPS which are typically accurate to ±5 m depending on satellite coverage. Sample locations are therefore approximate only. Test locations from the previous investigation where however surveyed by the project surveyors to Map Grid of Australia (MGA). The location and surface levels of the pits and bores from the previous investigation are presented on the logs in Appendix A.

9.2 Sampling Rationale

Potential sources of site contamination identified in the CSM included imported filling (source unknown), hazardous building materials, possible hydrocarbon and possible pesticides application.

A judgemental sampling procedure was conducted for the preliminary investigation to target the following potential contamination sources:

- Possible area of filling – Location 301;
- Possible hydrocarbon contamination – Location 303; and
- Possible pesticide use – Location 302.

Samples were selected for analysis on the basis of the likely presence of contamination, based on visual evidence of possible contamination (i.e. asbestos or evidence of filling), and proximity to a known source of contamination.

It is noted that the site comprises an area of approximately 23 ha. The three targeted locations undertaken within the investigation area provided preliminary assessment of conditions at the locations tested only.

It is noted that the preliminary contamination assessment has not included an assessment of groundwater.

9.3 Sampling Methods

Near surface soil samples for contamination testing were collected with reference to environmental sampling protocols. Soil samples were collected directly by hand, using disposable new gloves or stainless steel sampling equipment. Care was taken to remove any extraneous material deposited on the sample.

The general sampling procedure comprised:

- Decontamination of all sampling equipment (where used) using a 3% solution of phosphate free detergent (Decon 90) and tap water prior to collecting each sample;
- The use of new disposable gloves for each sampling event;
- Transfer of samples into laboratory-prepared jars and capping immediately;
- Collection of replicate samples for Quality Assurance / Quality Control (QA / QC) purposes;
- Collection of replicate soil samples in zip-lock plastic bags at each depth for Photo-ionisation Detector (PID) screening;
- Collection of ASS samples in plastic wrap and plastic bags to exclude air;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the sample jars, ASS samples and replicate sample bags into a cooled, insulated and sealed container with ice for transport to the laboratory; and
- Use of chain of custody (C-O-C) documentation ensuring that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory. Copies of the completed forms are provided in Appendix B.

Following each test bore, the augers were decontaminated using tap water and phosphate free detergent (Decon 90) to minimise the potential for cross contamination.

Replicate samples collected in zip-lock bags were screened for the presence of volatile organic compounds (VOCs) using a calibrated MiniRAE Lite PID, with a 10.6 eV lamp, calibrated to 100 ppm Isobutylene.

9.4 Data Quality Objectives (DQOs)

The scope of the PSI was devised generally in accordance with the seven step data quality objective (DQO) process, as documented in Appendix C, Schedule B2, National Environmental Protection Council (NEPC) National Environmental Protection (Assessment of Site Contamination) Measure 2013 (NEPC 2013). The DQO process is outlined in Table 7.

Table 7: Data Quality Objectives

DQO	Achievement Evaluation Procedure
Step 1 – State the problem	Possible presence of contamination
Step 2 – Identify the decision	Assess whether the site is suitable for the intended land use from a contamination perspective Refer Section 11 for adopted site assessment criteria
Step 3 - Identify the inputs to the decision	Site history review from previous investigation/s Selection of appropriate contaminants of concern Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment
Step 4 – Define the Boundary of the Assessment	As defined in Section 2 and shown on Drawing 1 in Appendix E.
Step 5 – Develop of decision rule	Selected soil samples were analysed for the contaminants of concern as outlined in Section 8. The field and laboratory data was assessed as reliable by reference to the Data Quality Indicators (DQI) as outlined in Step 7.
Step 6 – Specify the acceptance criteria	The site assessment criteria was developed through reference to NEPC 1999 (amended 2013). The acceptance limits for laboratory QA/QC parameters were based on the laboratory reported acceptance limits and those stated in NEPC 2013.
Step 7 – Optimise the design for obtaining data	Design was optimised by the development of a plan for sample collection, handling and analysis, including undertaking quality assurance and quality control measures to allow assessment of the suitability of the data collected. Measurement to assess the project DQOs using data quality indicators (DQIs) as follows: Completeness – completion of field and laboratory chain of custody documentation, use of experienced field staff, compliance with holding times and documentation correct Comparability – consistent sampling procedures, use of NATA certified laboratory and experienced field staff Representativeness – appropriate media sampled Precision - Analysis of field and laboratory replicates and achievement of acceptable RPDs, acceptable levels for laboratory QC criteria Accuracy – Analysis of field duplicates, matrix spikes and surrogate spikes

9.5 Field QA / QC

Quality assurance (QA) and quality control (QC) procedures were adopted throughout the field sampling programme and comprised the following:

- Following standard operating procedures;
- Storage of samples under secure, temperature controlled conditions; and
- Use of chain of custody documentation for the handling, transport and delivery of samples to the selected laboratory.

9.6 Laboratory QA/QC

The NATA accredited chemical laboratories undertook in-house QA/QC procedures involving the routine testing of:

- Reagent blanks;
- Spike recovery analysis;
- Laboratory duplicate analysis;
- Analysis of control standards;
- Calibration standards and blanks; and
- Statistical analysis of QC data.

9.7 Contamination Observations

Observations of potential contamination across the site is summarised below in Table 8.

Table 8: Potential Contaminant Observations within Test locations

Potential Contaminant Observation	Observations
Filling	Stockpiled materials
Anthropogenic inclusions (Glass, Steel, Plastic)	Stockpiled materials
Possible Asbestos Containing Material – Fibro fragments	Fibro sheeting on small shed and fragments observed near surface around potential filled areas

PID screening generally indicated the absence of gross volatile hydrocarbon impact (PID <1 ppm) in the samples screened.

There was no visual or olfactory evidence (i.e. staining or odours) to suggest the presence of gross contamination within the soils investigated to the depths investigated (i.e. <0.1 m depth).

10. Proposed Development

It is understood that an eleven (11) stage subdivision is proposed for the site which covers an area of approximately 23 hectares and will include the following:

- 292 residential allotments;
- Upgrade of Manor Road to include kerb and guttering, approximately 380 m in length;
- Approximately 4 km of internal roadways;
- Car parking and caravan storage;
- Wetland areas adjacent to Manor Road;
- Proposed detention basins;
- Sewer pump station;
- Village green including retail shops, short term accommodation and rec centre; and
- Tennis courts, club house, gym, bowling green and a Mens shed.

It is further understood that approximately 150,000 m^3 of fill is proposed to be brought to the site to raise the surface level above the flood zone. The filling is proposed to raise the surface by up to 1.5 m.

11. Site Assessment Criteria

11.1 Introduction

The proposed development includes residential land use.

The assessment and characterisation of the material on the site and the results of laboratory testing have been compared to the following guidelines:

- National Environmental Protection Council (NEPC), 'National Environmental Protection (Assessment of Site Contamination) Measures' (NEPM), 1999 (amended 2013) (NEPC, 2013); and
- NSW EPA, 'Waste Classification Guidelines, Part 1: Classifying Waste', November 2014 (EPA, 2014a).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential with garden / accessible soil use scenario (HIL-A).

11.2 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of contamination at the site. The adopted soil HIL and HSL for the potential contaminants of concern are presented in Table 9.

Table 9: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL-A	HSL-A[4] Vapour Intrusion	HSL-A[5] Direct Contact
Metals	Arsenic	100	NC	NC
	Cadmium	20	NC	NC
	Chromium (VI)	100	NC	NC
	Copper	6,000	NC	NC
	Lead	300	NC	NC
	Mercury (inorganic)	40	NC	NC
	Nickel	400	NC	NC
	Zinc	7,400	NC	NC
PAH	Benzo(a)pyrene TEQ[1]	3	NC	NC
	Naphthalene	3	NL	1,400
	Total PAH	300	NC	NC
TRH	C6 – C10 (less BTEX) [F1]	NC	200	4,400
	>C10-C16 (less Naphthalene) [F2]	NC	NL	3,300
	>C16-C34 [F3]	NC	NC	4,500
	>C34-C40 [F4]	NC	NC	6,300
BTEX	Benzene	0.5	0.5	100
	Toluene	160	540	14,000
	Ethylbenzene	55	NL	4,500
	Xylenes	40	170	12,000
OCP	Aldrin + Dieldrin	6	NC	NC
	Chlordane	50	NC	NC
	DDT+DDE+DDD	240	NC	NC
	Endosulfan	2,700	NC	NC
	Endrin	10	NC	NC
	Heptachlor	6	NC	NC
	HCB	10	NC	NC
	Methoxychlor	300	NC	NC
OPP	Chlorpyrifos	160	NC	NC
PCB[2]		1	NC	NC

Notes to Table 9:

1 Sum of carcinogenic PAHs

2 Non dioxin-like PCBs only.

3 The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

4 The HSL have been calculated for a potential vapour intrusion pathway, a conservative sand soil (based on nature of filling) and an assumed depth to contamination of 0 m to <1 .

5 The HSL have been calculated for the direct contact pathway

NC – No Criteria.

As shown in Table 9 the HSLs for potential vapour intrusion pathways are non-limiting, due to the land use type (i.e. open space). For this reason, the adopted HSLs are predicated on a potential direct contact pathway identified in the CSM and are therefore the drivers for further assessment and / or remediation (if required).

11.3 Ecological Investigation Levels

EIL and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EIL, derived using the *Interactive (Excel) Calculation Spreadsheet* (Standing Council on Environment and Water (SCEW) website (http://www.scew.gov.au/node/941)) are shown in the following Table 10.

Table 10: EIL in mg/kg

Analyte		EIL	Comments
		Residential	
Metals	Arsenic	100	**Adopted parameters** pH = 5 (based on laboratory testing) CEC = 5 $cmol_c$/kg]; assumed clay content [5%] Organic content 1% 'Aged' (>2 years) source of contamination Low traffic volumes in NSW
	Cadmium	NC	
	Chromium III	320	
	Copper	100	
	Nickel	35	
	Lead	1,100	
	Mercury	NC	
	Zinc	210	
PAH	Naphthalene	170	
OCP	DDT	320	

11.4 Ecological Screening Levels

ESL are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in the following Table 11.

Table 11: ESL in mg/kg

Analyte		ESL (Residential)[1]
TRH	C6 – C10 (less BTEX) [F1]	180
	>C10-C16 (less Naphthalene) [F2]	120
	>C16-C34 [F3]	300
	>C34-C40 [F4]	2,800
BTEX	Benzene	50
	Toluene	85
	Ethylbenzene	70
	Xylenes	105
PAH	Benzo(a)pyrene	0.7

Notes to Table 11:

1. The ESL have been calculated for a coarse soil based on a conservative sand soil and recreational landuse.

11.5 Management Limits

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

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

The adopted management limits from Schedule B1 of NEPC (2013) are shown in the following Table 12.

Table 12: Management Limits in mg/kg

Analyte		Management Limit	Comments
TRH	$C_6 - C_{10}$ (F1)#	700	The management limits have been calculated for a conservative coarse sand and residential landuse
	$>C_{10}$-C_{16} (F2)#	1,000	
	$>C_{16}$-C_{34} (F3)	2,500	
	$>C_{34}$-C_{40} (F4)	10,000	

Notes to Table 12:

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

11.6 Asbestos in Soil

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

A detailed asbestos assessment was not undertaken as part of these works. Therefore the presence or absence of asbestos at a limit of reporting of 0.1 g/kg has been adopted for this assessment as an initial screen.

11.7 Waste Classification

The results of chemical testing were also compared against NSW EPA Waste Classification Guidelines (EPA, 2014a) for a preliminary assessment of possible off-site disposal options to a licenced facility. For comparison purposes the results were also compared to NSW EPA Excavated Natural Material (ENM) criteria (EPA, 2014b).

12. Laboratory Testing

Laboratory testing for the preliminary investigation was undertaken by Envirolab Services, a National Association of Testing Authorities, Australia (NATA) registered laboratory. Analytical Methods used are shown on the laboratory sheets in Appendix B.

12.1 Contamination Testing

A total of three soil samples were selected for analysis for the following potential contaminants:

- Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Polychlorinated Biphenyls (PCBs);
- Organochlorine (OCP) and Organophosphate (OPP) Pesticides; and
- Asbestos Identification.

An additional three samples were submitted for asbestos ID testing with two samples of possible asbestos sheeting fragments and a soil sample collected immediately beneath a fragment.

The detailed results of chemical analysis on the tested samples are presented in the laboratory report sheets in Appendix B, and are summarised in Table 13 to Table 16, below.

Based on a review of the report QC results, it is considered that the laboratory test data obtained are reliable and useable for this assessment. The results of QA/QC testing are presented in Appendix B.

Table 13: Laboratory Results for Metals in Soil

Location	Depth (m)	Fill (F) / Natural (N)	PID (ppm)	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
301	0.05	F	<1	4	<0.4	18	8	4	<0.1	14	31
302	0.05	F	<1	<4	<0.4	1	<1	4	<0.1	<1	2
303	0.05	N	<1	<4	<0.4	7	8	6	<0.1	6	32
Laboratory PQL				4	0.4	1	1	1	0.1	1	1
NEPM HIL A[1]				100	20	100	6000	300	40	400	7400
Ecological Investigation Levels (EILs) - Urban residential/Public open space				100	NC	320	100	1100	NC	35	210
NSW EPA - General Solid Waste Guidelines - CT1				100	20	100	NC	100	4	40	NC
NSW EPA - Restricted Solid Waste Guidelines - CT2				400	80	400	NC	400	16	160	NC
ENM Order (2014) - Absolute Maximum Concentration				40	1	150	200	100	NC	60	300
ENM Order (2014) - Maximum Average Concentration				20	0.5	75	100	50	NC	30	150
Average Concentration			**Fill**	4	<0.4	10	8	4	<0.1	14	17
			Natural	<4	<0.4	7	8	6	<0.1	6	32
Maximum Concentration				4	<0.4	18	8	6	0	14	32

Notes to Table:
Total concentration results in mg/kg on a dry weight basis
CT - Concentration Threshold
NC - No Criteria
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
1 - Health Based Criteria for Recreational Landuse
2 - Chromium (VI) (Conservative)
exceeds NEPM Health Investigation Levels for Recreational Landuse
exceeds NSW EPA Excavated Natural Material Order
Bold results exceed NSW EPA Waste Classification Guidelines for General Solid Waste without leachability testing
UNDERLINE results exceed NEPM Ecological Investigation Levels (Urban residential / public open space)

Table 14: Laboratory Results for TRH, BTEXN in Soil

Bore	Depth (m)	PID (ppm)	TRH				TRH (NEPM)						BTEXN				
			C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}	F1 (C_6-C_{10}-BTEX)	F2 (>C_{10}-C_{16} - Naphthalene)	F1 (C_6-C_{10})	F2 (>C_{10}-C_{16})	F3 (>C_{16}-C_{34})	F4 (>C_{34}-C_{40})	Benzene	Toluene	Ethyl Benzene	Xylenes	Naphthalene
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
301	0.05	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
302	0.05	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
303	0.05	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
Laboratory PQL			25	50	100	100	25	50	25	50	100	100	0.2	0.5	1	3	1
NEPM HSL A SAND			NC	NC			200	NL	NC	NC	NC	NC	0.5	540	NL	170	NL
NEPM ESL / EIL Residential Coarse Soils			NC	NC			180	120	NC	120	300	2800	50	85	70	105	170
Management limits for TPH fractions in coarse soils - Open Space			NC	NC			NC	NC	700	1000	2500	10000	NC	NC	NC	NC	NC
NSW EPA - General Solid Waste Guidelines - CT1			650	10000 total			NC	NC	NC	NC	NC	NC	10	288	600	1000	NC
NSW EPA - Restricted Solid Waste Guidelines - CT2			2600	40000 total			NC	NC	NC	NC	NC	NC	40	1152	2400	4000	NC
ENM Order (2014) - Absolute Maximum Concentration			NC	500			NC	NC	NC	NC	NC	NC	0.5	65	25	NC	NC
ENM Order (2014) - Maximum Average Concentration			NC	250			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Average Concentration			<25	<50	<100	<100	NC	NC	NC	NC	NC	NC	<0.2	<0.5	<1	<3	<1
Maximum Concentration			<25	<50	<100	<100	NC	NC	NC	NC	NC	NC	<0.2	<0.5	<1	<3	<1

Notes to Table:
All results in mg/kg on a dry weight basis
CT - Concentration Threshold
NC - No Criteria
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
exceeds NEPM HSL Health-Based Criteria for Residential Landuse
exceeds NEPM management limits for TPH fractions in coarse soils - Residential Landuse (Landuse)
Underlined results exceed the NEPM ESL guideline values for Residential Landuse
Bold results exceed NSW EPA Waste Classification Guidelines for General Solid Waste without leachability testing

Table 15: Laboratory Results for PAH, OCP, OPP and PCB

Bore	Depth (m)	PID (ppm)	Total PAH*	Benzo(a) Pyrene	Benzo(a) Pyrene TEQ	PCB *	Total *OPP	Chlorpyrifos	Total* OCP	Endosulphan*	Aldrin + Dieldrin*	Chlordane	DDT+DDE +DDD*	Endrin	Heptachlor	HCB	Methoxychlor
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
301	0.05	<1	<0.05	<0.05	<0.5	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
302	0.05	<1	<0.05	<0.05	<0.5	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
303	0.05	<1	<0.05	<0.05	<0.5	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Laboratory PQL			0.05	0.05	0.5	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM HIL A[1]			300	NC	4	1	NC	160	NC	270	6	50	240	10	6	10	300
NEPM ESL/EIL Residential A,B,C - Coarse Soils			NC	0.7	NC	NC	NC	NC	NC	NC	NC	NC	320	NC	NC	NC	NC
NSW EPA - General Solid Waste Guidelines - CT1			200	0.8	NC	50	NC	4	NC	60	NC	NC	NC	NC	NC	NC	NC
NSW EPA - Restricted Solid Waste Guidelines - CT2			800	3.2	NC	50	NC	16	NC	240	NC	NC	NC	NC	NC	NC	NC
ENM Order (2014) - Absolute Maximum Concentration			40	1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
ENM Order (2014) - Maximum Average Concentration			20	0.5	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Average Concentration			<0.05	<0.05	<0.5	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Maximum Concentraion			0	0	<0.5	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes to Table:
Total concentrations in mg/kg on a dry weight basis
TCLP and ASLP concentrations in mg/L
CT - Concentration Threshold
NC - No Criteria
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
TEQ - Toxicity Equivalent Quotient
1 - Health Based Criteria for Residential Landuse
* Sum of positive values
exceeds NEPM Health Investigation Levels for Residential Landuse
Bold results exceed NSW EPA Waste Classification Guidelines for General Solid Waste considering leachability testing
UNDERLINE results exceed NEPM Ecological Screening Levels

Table 16: Laboratory Result of Asbestos Identification Testing (soil)

Sample ID / Depth (m)	Sample Type	Approx. Sample Mass (g)	Description	Result	
				Asbestos ID in Soil	Trace Analysis
301	Soil	25	Brown sandy soil	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected
302	Soil	20	Brown sandy soil	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected
303	Soil	15	Brown sandy soil	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected
305a	Soil	20	Brown sandy soil	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected

Table 17: Laboratory Result of Asbestos Identification Testing (Materials)

Sample ID / Depth (m)	Sample size (mm)	Description	Result
			Asbestos ID in Materials
304	117 x 18 x 7	Beige compressed fibre cement material	Chrysotile asbestos detected Amosite asbestos detected
305	65 x 48 x 6	Beige layered fibre cement material	No asbestos detected

12.2 Acid Sulfate Screening Tests

Acid sulfate soil screening tests were undertaken during a previous investigation by DP at the site. Testing for the preliminary ASS investigation comprised 49 acid sulfate screening tests on samples retrieved from the bores. The results of the previous screening tests are summarised in Table 18.

Table 18: Acid Sulfate Soil Screening Tests

Location	Sample Depth [a] (m)	Sample Description	Soil Textural Classification	Screening Test Results		
				pH		
				pH_F	pH_{FOX}	$pH_F - pH_{FOX}$
Bore 1	0.20	TOPSOIL - SILTY SAND	M	5.0	***3.1***	***1.9***
	1-1.45	SAND	C	5.0	4.5	0.5
	2.5-2.95	SAND	C	5.8	5.0	0.8
	4-4.45	SAND	C	6.0	5.5	0.5
	5.5-5.95	SAND	C	6.5	6.0	0.5
	7-7.45	CLAYEY SAND	M	6.1	***2.1***	***4.0***
	8.5-8.95	CLAYEY SAND	M	6.1	***2.1***	***4.0***
Bore 2	0.20	TOPSOIL - SILTY SAND	M	5.3	3.5	***1.8***
	0.40	SILTY SAND	M	5.6	4.3	***1.3***
	1-1.45	SAND	C	5.5	4.4	***1.1***
	2.5-2.95	SILTY SAND	M	5.5	4.4	***1.1***
	4-4.5	SAND	C	6.7	4.7	***2.0***
	5.5-5.95	SAND	C	6.5	***3.0***	***3.5***
	7-7.45	CLAYEY SAND	M	5.7	***2.1***	***3.6***
	8.5-8.95	SAND	C	6.1	***2.0***	***4.1***
Bore 3	0.20	TOPSOIL - SILTY SAND	M	5.1	***2.4***	***2.7***
	0.40	SILTY SAND	M	5.1	3.7	***1.4***
	0.70	SAND	C	5.3	3.5	***1.8***
	1-1.45	INDURATED SAND	C	5.3	4.2	***1.1***
	2.5-2.95	SAND	C	5.9	3.9	***2.0***
	4-4.45	SAND (some silt and clay)	C	5.9	***1.9***	***4.0***
	5.5-5.95	SAND	C	6.0	***2.8***	***3.2***
	7-7.45	SAND	C	6.0	***2.0***	***4.0***
	8.5-8.95	CLAYEY SAND / SAND CLAY	M	5.9	***3.2***	***2.7***
	10-10.45	SAND	C	5.8	3.5	***2.3***
Bore 4	0.20	TOPSOIL - CLAYEY SAND	M	5.0	***2.9***	***2.1***
	0.40	SILTY SAND	M	5.4	3.9	***1.5***
	0.80	SAND	C	5.5	3.8	***1.7***
	1-1.45	SAND (some clay)	C	5.5	4.4	***1.1***
	2.5-2.95	SAND	C	5.5	3.9	***1.6***
	4-4.45	SAND (some silt and clay)	C	5.4	***2.4***	***3.0***
	5.5-5.95	SAND (some silt and clay)	C	5.7	***2.1***	***3.6***
Bore 5	0.20	TOPSOIL - SILTY SAND	M	5.0	***3.2***	***1.8***
	0.40	SAND	C	5.0	3.7	***1.3***
	1-1.45	SAND	C	5.2	4.0	***1.2***
	2.5-2.95	SAND	C	5.6	4.0	***1.6***
	4-4.45	SAND	C	5.9	***2.8***	***3.1***
	5.5-5.95	SAND	C	5.9	***2.4***	***3.5***

Table 18: Acid Sulfate Soil Screening Tests (continued)

Location	Sample Depth [a] (m)	Sample Description	Soil Textural Classification	Screening Test Results		
				pH		
				pH_F	pH_{FOX}	$pH_F - pH_{FOX}$
Bore 6	0.20	TOPSOIL - SILTY SAND	M	4.7	***3.0***	***1.7***
	0.40	SAND	C	5.0	3.5	***1.5***
	1-1.45	SAND	C	5.0	4.1	0.9
	2.5-2.95	SAND	C	5.6	***3.2***	***2.4***
Bore 7	0.10	TOPSOIL - CLAYEY SAND	M	5.0	***3.0***	***2.0***
	0.40	SILTY CLAYEY SAND	M	5.0	3.5	***1.5***
	0.60	SAND	C	5.3	3.5	***1.8***
	1-1.45	SAND	C	5.3	4.1	***1.2***
	2.5-2.7	INDURATED SAND	C	5.4	***2.7***	***2.7***
	4-4.45	SAND	C	5.2	***1.9***	***3.3***
	5.5-5.95	SAND	C	5.4	***2.1***	***3.3***
ASSMAC Indicators		Coarse sands, poorly buffered		<4[c]	<3.5[d]	≥1[d]
		Coarse sands to loamy sands and peats				
		Medium sandy loams to light clays				
		Fine medium to heavy clays & silty clays				

Legend:

a Depth below ground surface

b Strength of Reaction

1 denotes no or slight reaction

2 denotes moderate reaction

3 denotes high reaction

4 denotes very vigorous reaction

F denotes bubbling/frothy reaction indicative of organics

H denotes heat generated

C denotes colour change

Bold notates exceedance of net acidity action criteria or ASSMAC indicator

c For actual acid sulphate soils (ASS)

d Indicative value only for Potential Acid Sulphate Soils (PASS)

Based on the results of the screening tests, six samples were selected and forwarded to ALS Environmental Pty Ltd to undergo Total Actual Acidity (TAA), Total Potential Acidity (TPA) and Chromium Reducible Sulphur (Scr) testing. The results of these tests are summarised in Table 19, with the laboratory testing certificate provided in Appendix B

Table 19: Results of Detailed Acid Sulfate Soil Testing

Bore	Depth[(1)] (m)	RL (m, AHD)	Description	pH_{KCL}	TPA (mol H^+/t)	TAA (mol H^+/t)	Scr (%)
1	7.0 – 7.45	-4.5 to -4.9	Clayey Sand	4.4	180	6	0.27
2	7.00 – 7.45	-4.5 to -4.9	Clayey Sand	4.4	123	6	0.23
3	0.2	2.3	Topsoil – Silty Sand	4.4	26	8	<0.02
3	7.00 – 7.45	-4.5 to -4.9	Sand	4.2	169	8	0.35
7	4.00 – 4.45	-1.9 to -2.2	Sand	4.5	156	15	0.22
Action criteria for sand (course texture)					18	18	0.03
Action criteria for sandy loams to light clays (medium texture)[(2)]					36	36	0.06

Notes to Table 19:
Shaded samples exceed ASSMAC action criteria (ASSMAC, 1998)
(1) Depth below existing ground level
(2) Action criteria level assuming that less than 1000 m3 to be excavated at one time

13. Comments

13.1 Acid Sulfate Soil

The QASSIT guidelines suggest that a soil pH<4 in water (i.e. pH_F) is an indicator of actual acid sulfate soils. The results of screening tests therefore suggest the absence of actual acid sulfate soils at the locations and depths tested.

The QASSIT guidelines also suggest that indicators of potential acid sulfate soils (PASS) include the following:

- Soil pH <3.5 in H_2O_2 (i.e. pH_{FOX}); and
- Drop of 1 pH unit or more between pH_F and pH_{FOX}.

The majority of the samples tested (39) exhibited a pH drop of greater than one unit, however 22 soil samples exhibited a pH below 3.5 following oxidation.

It is noted that the above test method is a qualitative method only and gives an indication of the intensity of total acidification (pH). The ASSMAC guidelines indicate that peroxide may also oxidise organic matter (in addition to pyrite) to produce acids which are unlikely to form under natural conditions, thus giving falsely high indication of acid sulfate potential.

Quantitative results are obtained from laboratory testing by either Suspension Peroxide Oxidation Combined Acidity and Sulfate (SPOCAS) or Chromium reducible sulfur (S_{Cr}) methods. Detailed laboratory testing was carried out on five samples that exceeded the above indicators of acid sulfate soils. The results of these tests are presented in Table 19, Section 12.2.

As outlined in *The Soil Management Guidelines* (Dear, et al., 2014) the action criteria which define the requirement for management of acid sulfate soils vary depending on the amount of soil disturbed and textural classification of the soil.

The results of detailed laboratory analysis confirm that actual acid sulfate soils are not present within the samples tested within the site. However, the results of TPA or %SCr exceed the ASSMAC action criteria (ASSMAC, 1998) for most samples, and is marginal for the topsoil material, and therefore indicate the presence of potential acid sulfate soils (PASS) across the majority of the site.

The results of the acid sulfate soil testing indicates that potential acid sulfate soils (PASS) are generally present in the underlying soils below depths of about 1 m (i.e. below groundwater). The topsoil material does not constitute a significant risk of generating acid upon oxidation.

It is understood that the only excavations at the site are expected to be associated with installation of services and stripping of topsoil prior to placement of filling. An Acid Sulfate Soil Management Plan (ASSMP) is being prepared for the proposed development and will be presented in a separate report. The ASSMP will include details on construction activities involving excavation or possible dewatering and the treatment of acid sulfate soils.

13.2 Contamination Assessment

13.2.1 Contamination Status

The results of the site history review suggested the general absence of gross contaminating landuses or activities for the site, other than historically recent storage of construction materials/waste, former agricultural landuse and the presence of imported filling (source unknown).

The current preliminary assessment comprised collection of near surface samples at limited targeted locations.

The current preliminary assessment comprised the collection of near surface soil samples and fibro fragments at targeted locations across the site.
Three soil samples were analysed for the suite of testing outlined in Section 12 for the current preliminary investigation. The results of testing were compared against NEPM for health based investigation / screening levels, ecological investigation / screening levels, total petroleum hydrocarbon management limits for low density residential landuse applicable for urban residential as discussed in Section 11.

All samples tested were below the relevant criteria for the health investigation and screening levels, and environmental investigation and screening levels for the adopted low density residential landuse.

All samples tested returned contaminant concentrations below the total petroleum hydrocarbon management limits.

The laboratory results were generally consistent with the visual and olfactory ‘screening’ that suggested the absence of gross contamination within the test locations.

Hazardous building materials (HBM) including asbestos, were observed at the surface on the site or on existing structures at the site. Laboratory testing undertaken on collected samples indicated the presence of asbestos to the laboratory reporting limits within one of the samples analysed. Owing to the presence of fill/anthropogenic inclusions and historical demolition activities at the site, there is a risk of HBM (including ACM) in unobserved or untested parts of the site.

No assessment of groundwater was undertaken for the preliminary investigation.

13.2.2 Conclusions

The results of limited testing generally indicated the absence of gross chemical contamination at the near surface locations tested. All samples tested returned contaminant concentrations below the adopted health based investigation / screening levels, ecological investigation / screening levels, total petroleum hydrocarbon management limits for the adopted low density residential land use (refer to Section 11).

Based on the results of the preliminary investigation the site is considered to be suitable for the proposed development from a contamination perspective subject to the following, which should be undertaken prior to the commencement of earthworks construction:

- Additional targeted testing and sampling of fill materials across the site where present to confirm the presence/absence of impacts including HBM. Requirements for remediation/management (if any) would be confirmed following the additional investigation;
- Additional testing over the site to confirm the presence/absence of herbicides and pesticides from previous farm/agricultural site use;
- Appropriate decommissioning of site septic system;
- Incorporation of an unexpected finds protocols into the Construction Environmental Management Plan (CEMP) for the development given the presence of filling of unknown origin and possible previous demolition activities.

If additional investigation identifies the presence of contamination requiring remediation/management, remediation and validation of the site should be conducted in accordance with a site specific remediation action plan (RAP).

It is noted that fill materials have been identified within the site (source unknown) together with the presence of anthropogenic inclusions which are considered to be typical of the presence of demolition waste and hazardous building materials (including asbestos containing materials). Additional assessment is therefore recommended to better characterise site conditions. An unexpected finds protocol is also recommended during development to manage this risk.

13.2.3 Preliminary Waste Classification

Based on the site historical information, site investigations and limited laboratory testing the following waste classifications comments are provided:

Existing Filling/Topsoil where tested

- Generally classified as General Solid Waste (GSW) with reference to NSW EPA Waste Classification guidelines (EPA, 2014a).
- Fill materials tested are generally not classified as Excavated Natural Materials (ENM) due to total contaminant concentrations and presence of anthropogenic inclusions. It is noted that the preliminary sampling and testing conducted to date does not meet the requirements of the NSW EPA ENM RRO.
- Although the risk of ASS in filling is considered to be low, ASS conditions should be confirmed prior to disposal or reuse of the soils. Treatment of ASS will be required prior to disposal if ASS are identified.

Materials proposed to be disposed from the site during development should be appropriately classified with reference to NSW EPA Waste Classification guidelines (EPA, 2014a).

During development, it is recommended that appropriate inspections are conducted and if any materials are encountered that are different to the materials sampled and tested or exhibit signs of contamination (e.g. anthropogenic inclusions, fibro fragments, staining or odours etc.), these should be appropriately segregated for further assessment. The handling, transport and disposal / re-use of the materials should be conducted in accordance with regulatory and statutory requirements.

Underlying Natural Soils

Owing to the preliminary nature of the investigation no sampling and testing has been undertaken on underlying natural soils. Underlying natural material won from site excavations (i.e. sandy materials) would likely satisfy the criteria for Virgin Excavated Natural Material (VENM) subject to appropriate segregation and validation from upper fill materials and further assessment to confirm the absence of ASS conditions. Natural soils classified as ASS cannot be classified as VENM.

It is noted that the scope of testing was intended to provide a preliminary indication of contaminant concentrations and waste classification at nominated test locations. The scope of work does not meet the sampling density and testing requirements for classification of fill materials with reference to the NSW EPA ENM RRO (EPA, 2014b), nor the sampling density requirements of the NSW EPA Sampling design guidelines for site characterisation (EPA, 1995).

14. References

ASSMAC. (1998). *Acid Sulfate Soil Manual.* NSW Acid Sulfate Soil Management Advisory Committee.

Dear, S. W., Ahern, C. R., O'Brien, l. E., Dobos, S. K., McElnea, A. E., Moore, N. G., et al. (2014). *Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidlines, Department of Science, Information, Technology, Innovation and the Arts, Queensland Government, Version 4.0.*

EPA. (1995). *Contaminated Site, Sampling Design Guidelines.* NSW Environmental Protection Agency.

EPA. (2011). *Contaminated Sites, Guidelines for Consultants Reporting on Contaminated Sites.* NSW EPA.

EPA. (2014a). *Waste Classification Guidelines, Part 1: Classifying Waste, November 2014.* NSW Environmental Protection Agency.

EPA. (2014b). *Resource Recovery Order under Part 9 of the Protection of the Environment Operations (Waste) Regulation 2014 - The Excavated Natural Material Order, November 2014.* NSW Environmental Protection Agency.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013.* National Environment Protection Council.

QASSIT. (2014). *Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines.* Dear SW, Ahern CR, O'Brien LE, Dobos SK, McElnea AE, Moore NG and Watling KM, Department of Science, Information, Technology, Innovation and the Arts, Queensland Government.

15. Limitations

Douglas Partners (DP) has prepared this report for this project at 26, 48 and 56 Manor Road, Harrington with reference to DP's proposal PMQ190028 dated 31 May 2019 and acceptance received from Danny Bayly dated 3 June 2019. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Bayline Homes and Developments Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed. It is noted that limited sampling and testing was conducted on selected near surface soils. Additional testing will be required to confirm site conditions, as recommended.

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

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

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

Asbestos has been detected by observation and by laboratory analysis, either on the surface of the site, or in fill materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile, fibro sheeting, were, however, located in previous and current above-ground stockpiles, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

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

Douglas Partners Pty Ltd

Appendix A

About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Test Bore Logs (Bores 1 to 7)
Test Pit Logs (Pits 101 to 120)

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

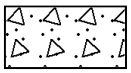
Symbols & Abbreviations

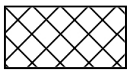
Graphic Symbols for Soil and Rock

General

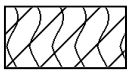

Asphalt

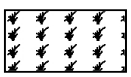

Road base

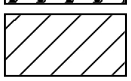

Concrete


Filling

Soils


Topsoil

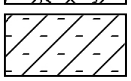

Peat


Clay


Silty clay

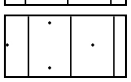

Sandy clay

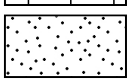

Gravelly clay

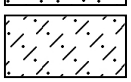

Shaly clay

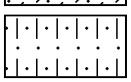

Silt


Clayey silt


Sandy silt

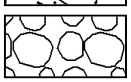

Sand


Clayey sand


Silty sand


Gravel

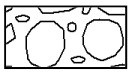

Sandy gravel


Cobbles, boulders

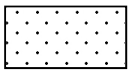

Talus

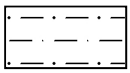
Sedimentary Rocks

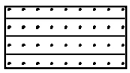

Boulder conglomerate

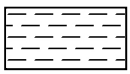

Conglomerate


Conglomeratic sandstone

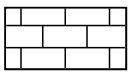

Sandstone


Siltstone

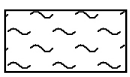

Laminite

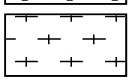

Mudstone, claystone, shale

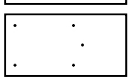

Coal


Limestone

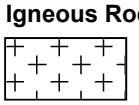
Metamorphic Rocks

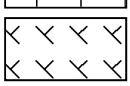

Slate, phyllite, schist

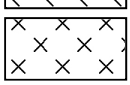

Gneiss

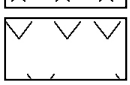

Quartzite

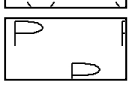
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

TEST BORE REPORT

BORE No: 1

CLIENT: Terra Consulting (Aust) Pty Ltd | **PROJECT No:** 31872 | **DATE:** 15 Dec 03

PROJECT: Proposed Rural Residential Subdivision | **SURFACE LEVEL:** 2.52 AHD | **SHEET** 1 OF 1

LOCATION: Manor Road, Harrington | **DIP OF HOLE:** 90° | **AZIMUTH:** –

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.2	TOPSOIL - Dark grey silty sand with trace clay abundant rootlets, damp to moist						A			
0.8	SILTY SAND - Loose, light grey-brown fine to medium grained silty sand, moist to very moist									
1	SAND - Loose, light grey-yellow fine to medium grained sand, trace silt, moist						S			3,4,9 N = 13
1.35	from 1.05m, brown-dark brown									
1.8	INDURATED SAND - Medium dense, dark brown fine to medium grained indurated sand with some silt, very moist									
2	SAND - Loose to medium dense, light brown-grey fine to medium grained sand, trace silt, wet to saturated						S			4,6,7 N = 13
4	from about 3.9m, some fine black/red subrounded gravel and trace shell fragments						S			2,4,6 N = 10
6	from about 5.8m, brown, silty						S			2,4,10 N = 14
7.1	CLAYEY SAND - Very loose, dark grey-grey clayey fine to medium grained sand, saturated						S			1,0,0 N = 0
8	from 7.7m, clay content decreasing with depth						S			3,2,2 N = 4
8.95	TEST BORE DISCONTINUED AT 8.95m									

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 2m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U,	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: SBD
Date: 7-7-04

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TEST BORE REPORT

BORE No: 2

CLIENT: Terra Consulting (Aust) Pty Ltd **PROJECT No:** 31872 **DATE:** 15 Dec 03

PROJECT: Proposed Rural Residential Subdivision **SURFACE LEVEL:** 2.55 AHD **SHEET** 1 OF 1

LOCATION: Manor Road, Harrington **DIP OF HOLE:** 90° **AZIMUTH:** --

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.25	TOPSOIL - Dark grey silty sand with trace clay abundant rootlets, damp to moist						A			
	SILTY SAND,- Very loose, grey-brown fine to medium grained silty sand, trace clay, moist						A			
0.9	from about 0.6m, orange									
1	SAND - Very loose, light grey fine to medium grained sand, trace silt, wet to saturated						S			1,1,1 N = 2
	from about 1.3m, saturated									
2	from 1.6m, silty									
2.9	SAND - Loose, light grey fine to medium grained sand, saturated						S			1,2,4 N = 6
3	from about 3.5m, medium dense									
4							S			3,6,11 N = 17
	from 4.4m, light grey									
5										
							S			4,5,9 N = 14
6	from 5.9m, with some thin lenses of clayey silty sand (peat)									
7										
7.1	CLAYEY SAND - Very loose, dark grey clayey fine to medium grained sand with some silt, saturated						S			4,0,1 N = 1
8										
8.6	from 8.5m, with some timber						S			5,4,2 N = 6
8.95	SAND - Loose, grey fine to medium grained sand with trace silt, saturated									
9	TEST BORE DISCONTINUED AT 8.95m									

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.3m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U,	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: SB
Date: 7.1.04

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TEST BORE REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.52 AHD
DIP OF HOLE: 90°

BORE No: 3
DATE: 15 Dec 03
SHEET 1 **OF** 1
AZIMUTH: –

Depth (m)	Description of Strata	Sample Type	Test Results & Comments
0.25	TOPSOIL - Dark grey silty sand with some clay and rootlets, moist	A	
0.6	SILTY SAND - Grey fine to medium grained silty sand, trace clay, moist	A	
0.85	SAND - Light grey-yellow fine to medium grained sand, moist	A	
2.2	SAND - Loose to medium dense, brown fine to medium grained sand with some silt, very moist; from 1.3m to 2.2m, medium dense, indurated dark brown, lense saturated	S	5,3,8 N = 11
3.7	SAND - Loose to medium dense, light grey-brown fine to medium grained sand, trace silt, saturated	S	4,5,5 N = 10
8.0	SAND - Very loose, dark grey fine to medium grained sand with some silt and clay lenses, saturated	S	1,0,0 N = 0
	from 5m, medium dense, silt and clay content decreasing	S	3,8,14 N = 22
	from 6.8m, very loose, silt and clay content increasing	S	0,0,1 N = 1
9.5	CLAYEY SAND / SANDY CLAY - Very loose/soft, grey clayey fine to medium grained sand/sandy clay, saturated	S,pp	0,0,1 N = 1 20-40 kPa
10.45	SAND - Loose, grey mottled yellow fine to medium grained sand, trace clay, saturated	S	3,4,5 N = 9
	TEST BORE DISCONTINUED AT 10.45m		

Column headings also printed: Degree of Weathering (EW, HW, MW, SW, FS, FR); Graphic Log; Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High); Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break); Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00); Core Rec. %; RQD %.

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased
TYPE OF BORING: Hollow flight augers
WATER OBSERVATIONS: Free groundwater observed at about 1.3m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U,	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: SB
Date: 7.7.04

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TEST BORE REPORT

BORE No: 3A
DATE: 15 Dec 03
SHEET 1 OF 1
AZIMUTH: –

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington
PROJECT No: 31872
SURFACE LEVEL: 2.52 AHD
DIP OF HOLE: 90°

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.25	TOPSOIL - Dark grey silty sand with some clay and rootlets, moist						A			
0.6	SILTY SAND - Grey fine to medium grained silty sand, trace clay, moist						A			
0.85	SAND - Light grey-yellow fine to medium grained sand, moist						A			
1.15	SAND - Loose to medium dense, brown fine to medium grained sand with some silt, very moist									
	TEST BORE DISCONTINUED AT 1.15m									

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.3m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials:
Date: 7.7.04

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TEST BORE REPORT

BORE No: 4

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT No: 31872
DATE: 16 Dec 03

PROJECT: Proposed Rural Residential Subdivision
SURFACE LEVEL: 2.47 AHD
SHEET 1 OF 1

LOCATION: Manor Road, Harrington
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.25	TOPSOIL - Dark grey clayey fine to medium grained sand some rootlets, moist						A			
							A			
0.7	SILTY SAND - Grey, fine to medium grained silty sand, trace clay, moist						A			
1	SAND - Loose to medium dense, light grey-brown fine to medium grained sand, trace silt, moist						S			2,4,6 N = 10
	from 1m, light grey									
	from 1.4m, trace yellow lenses with some clay, wet to saturated									
2										
	from 2.5m, clay content decreasing						S			3,6,6 N = 12
3										
3.5	SAND - Very loose to loose, grey-dark grey fine to medium grained sand with some silty clay lenses/nodules									
4							S			3,2,0 N = 2
5	from about 5m, loose to medium dense									
							S			1,4,7 N = 11
5.95	TEST BORE DISCONTINUED AT 5.95m									
6										
7										
8										
9										

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: BB
Date: 7.1.04

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TEST BORE REPORT

BORE No: 5

CLIENT: Terra Consulting (Aust) Pty Ltd | **PROJECT No:** 31872 | **DATE:** 16 Dec 03

PROJECT: Proposed Rural Residential Subdivision | **SURFACE LEVEL:** 2.64 AHD | **SHEET** 1 OF 1

LOCATION: Manor Road, Harrington | **DIP OF HOLE:** 90° | **AZIMUTH:** --

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.2	TOPSOIL - Dark grey silty sand with some clay and trace rootlets, moist						A			
0.6	SAND - Grey mottled orange slightly clayey sand with some silt, moist						A			
1	SAND - Very loose to loose, light grey-brown fine to medium grained sand trace silt, moist to very moist						S			2,2,4 N = 6
	from 0.9m to 1.25m, with some dark brown indurated layering / nodules, brown									
2	from 1.25m, grey, wet to saturated									
	from 1.6m, medium dense, light grey, saturated						S			3,6,8 N = 14
3										
	from 3.5m, grey									
4							S			4,6,9 N = 15
5										
							S			4,6,8 N = 14
5.95	TEST BORE DISCONTINUED AT 5.95m									
6										
7										
8										
9										

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: SB
Date: 7.1.04

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TEST BORE REPORT

BORE No: 5A
DATE: 16 Dec 03
SHEET 1 OF 1

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington
PROJECT No: 31872
SURFACE LEVEL: 2.64 AHD
DIP OF HOLE: 90°
AZIMUTH: –

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.2	TOPSOIL - Dark grey silty sand with some clay and trace rootlets, moist						A			
0.6	SAND - Grey mottled orange slightly clayey sand with some silt, moist						A			
1	SAND - Very loose to loose, light grey-brown fine to medium grained sand trace silt, moist to very moist						S			2,2,4 N = 6
	from 0.9m to 1.25m, with some dark brown indurated layering / nodules, brown									
2 2.0	from 1.25m, grey, wet to saturated									
	from 1.6m, medium dense, light grey, saturated									
	TEST BORE DISCONTINUED AT 2.0m									
3										
4										
5										
6										
7										
8										
9										

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U,	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: SRB
Date: 7.7.04

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TEST BORE REPORT

BORE No: 6

CLIENT: Terra Consulting (Aust) Pty Ltd | **PROJECT No:** 31872 | **DATE:** 16 Dec 03

PROJECT: Proposed Rural Residential Subdivision | **SURFACE LEVEL:** 2.50 AHD | **SHEET** 1 OF 1

LOCATION: Manor Road, Harrington | **DIP OF HOLE:** 90° | **AZIMUTH:** --

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.2	TOPSOIL - Dark grey silty sand, trace clay and rootlets, moist						A			
	SAND - Loose, brown fine to medium grained sand, trace silt, moist						A			
	from 0.6m, light grey									
1	from 0.9m, with some dark brown indurated sand lenses						S			3,3,4 N = 7
	from 1.3m to 2m, light grey with trace brown indurated lenses, wet to saturated									
2	from about 2m, medium dense, clayey									
	from 2.55m, clay content decreasing, light grey						S			3,5,8 N = 13
3										
4							S			6,10,10 for 100mm, N=20, no recovery
5										
							S			5,9,13 N = 22 no recovery
5.95	TEST BORE DISCONTINUED AT 5.95m									
6										
7										
8										
9										

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials:
Date: 7.1.04

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TEST BORE REPORT

BORE No: 7

CLIENT: Terra Consulting (Aust) Pty Ltd | **PROJECT No:** 31872 | **DATE:** 16 Dec 03

PROJECT: Proposed Rural Residential Subdivision | **SURFACE LEVEL:** 2.27 AHD | **SHEET** 1 OF 1

LOCATION: Manor Road, Harrington | **DIP OF HOLE:** 90° | **AZIMUTH:** --

Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.2	TOPSOIL - Dark grey silty clayey sand with trace rootlets, moist						A			
0.5	SILTY CLAYEY SAND - Dark grey-brown silty clayey sand, moist						A			
0.9	SAND - Medium dense, light grey-orange fine to medium grained sand, trace silt, moist						A			
1.4	SAND - Brown-dark brown fine to medium grained sand with some silt and clay and some indurated lenses, very moist						S			6,6,7 N = 13
2	INDURATED SAND - Medium dense to dense, dark brown-black indurated silty sand, wet to saturated						S			16, 6 for 50mm, N>30
4.05	SAND - Medium dense, dark brown fine to medium grained sand with some silt to slightly silty sand, saturated						S			4,7,14 N = 21
							S			4,8,13 N = 21
5.95	TEST BORE DISCONTINUED AT 5.95m									

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.3m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U,	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials:
Date: 7.7.04

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TEST BORE REPORT

BORE No: 7A
DATE: 16 Dec 03
SHEET 1 OF 1
AZIMUTH: --

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington
PROJECT No: 31872
SURFACE LEVEL: 2.27 AHD
DIP OF HOLE: 90°

Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Sampling & In Situ Testing: Sample Type	Core Rec. %	RQD %	Test Results & Comments
0.2	TOPSOIL - Dark grey silty clayey sand with trace rootlets, moist						A			
0.5	SILTY CLAYEY SAND - Dark grey-brown silty clayey sand, moist						A			
0.9	SAND - Medium dense, light grey-orange fine to medium grained sand, trace silt, moist						A			
1.15	SAND - Brown-dark brown fine to medium grained sand with some silt and clay and some indurated lenses, very moist									
	TEST BORE DISCONTINUED AT 1.15m									
2										
3										
4										
5										
6										
7										
8										
9										

RIG: 4WD Mounted Drill Rig **DRILLER:** Atkins **LOGGED:** Blackert **CASING:** Uncased

TYPE OF BORING: Hollow flight augers

WATER OBSERVATIONS: Free groundwater observed at about 1.3m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
B	Bulk sample	S	Standard penetration test
C	Core drilling	U,	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	V	Shear vane (kPa)

CHECKED
Initials: BB
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.58 AHD

PIT No: 101
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.18	TOPSOIL: Dark grey silty sand topsoil with abundant rootlets to 0.15m			
0.4	SAND: Grey, fine to medium sand with trace to some silt, moist			
	SAND: Light yellow brown and light grey sand, moist	D	0.5	
1	From 0.8 to 1m, slightly indurated orange brown and brown sand From 1m, trace clay			
1.5	INDURATED SAND: Light grey and grey, moderately indurated sand			
1.8	SAND: Light grey, fine to medium grained sand, saturated			
2		D	2.0	
2.5	TEST PIT DISCONTINUED AT 2.5m, due to pit walls caving			
3				
4				

RIG: Ford 555C Extendahoe Backhoe

LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.4m depth, high flow from 2m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U_x	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials:
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.48 AHD

PIT No: 102
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.16	TOPSOIL: Dark grey silty sandy topsoil with some rootlets, moist			
	SILTY SAND: Loose, brown silty sand, trace rootlets, moist			
0.4	SAND: Loose, light brown sand with trace to some silt, trace rootlets, moist	B	0.4	
0.75	INDURATED SAND: Dense to very dense, grey, light grey and brown, moderately cemented indurated sand, moist		0.75	
1	From 0.75m, to 1.0m, dark grey			
1.7	SAND: Light grey, fine to medium grained sand, saturated	D	1.8	
2				
2.3	TEST PIT DISCONTINUED AT 2.3m , due to pit walls caving			
3				
4				

RIG: Ford 555C Extendahoe Backhoe

LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6m depth

REMARKS: Pit walls caving from 1.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo tonisation Detector
D	Disturbed sample	U_x	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SB
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.59 AHD

PIT No: 103
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
0.22	SAND: Loose, light grey sand with trace clay and silt and rootlets, moist	D	0.3	
0.45	SAND: Loose to medium dense, light orange brown, fine to medium grained sand, trace silt, moist			
1	From 1.0m, orange brown mottled light grey, moist			
2	From 2.1m, saturated	D	2.2	
2.4	TEST PIT DISCONTINUED AT 2.4m, due to pit walls caving			
3				
4				

RIG: Ford 555C Extendahoe Backhoe

LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.2m depth, at completion rose to 1.55m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo tonisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials:
Date: 7-1-04

TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.56 AHD

PIT No: 104
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil, trace clay, some rootlets			
0.5	SILTY SAND: Loose, dark brown silty sand, trace clay and rootlets, moist			
1.0	SAND: Loose to medium dense, orange brown sand with trace dark brown indurated sand layers (discontinuous)	D	0.65	
1.6	INDURATED SAND: Loose to medium dense, dark grey and dark brown slightly to moderately cemented indurated sand			
2.1	SAND - Light grey fine to medium grained sand, saturated			
	TEST PIT DISCONTINUED AT 2.1m, due to pit walls caving			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SR
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.46 AHD

PIT No: 105
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets to 0.1m, moist			
0.5	SILTY SAND: Loose, dark grey brown silty sand with trace clay, moist			
0.8	SAND: Loose, light grey and brown, fine to medium grained sand, trace clay with some dark grey slightly indurated lenses	D	0.7	
1	INDURATED SAND: Medium dense, dark grey/brown slightly to moderately indurated sand, moist			
1.35	SAND: Light grey, fine to medium grained sand, saturated			
2				
2.7	TEST PIT DISCONTINUED AT 2.7m, due to pit walls caving			
3				
4				

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.45m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U_x	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SB
Date: 7-1-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.48 AHD

PIT No: 106
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing: Type	Depth (m)	Results
0.25	TOPSOIL: Dark grey silty sand topsoil, with some rootlets, moist			
	SILTY SAND: Loose to medium dense, dark brown silty sand, moist	B	0.3 0.5	
0.65	INDURATED SAND: Medium dense to very dense, dark brown and orange brown and light grey, moderately indurated sand			
1.2	SAND: Light brown sand with some clay, moist to wet	D	1.3	
1.7	SAND: Light grey sand with trace clay, saturated			
2.1	SAND - Light grey fine to medium grained sand, saturated	D	2.3	
2.5	TEST PIT DISCONTINUED AT 2.5m, due to pit walls caving			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.7m, high inflow into pit at 2.1m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U_x	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials:
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.49 AHD

PIT No: 107
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil, with some rootlets, moist			
0.55	SILTY SAND: Loose, brown silty sand, moist			
1	SAND: Medium dense, light grey brown, fine to medium grained sand, moist	D	0.7	
1.2	SAND: Dark grey and brown, slightly clayey sand with some indurated zones			
1.7	INDURATED SAND: Dark brown and dark grey moderately to heavily cemented, indurated sand			
2				
2.7	SAND: Brown, fine to medium grained sand, saturated			
3		D	3.0	
3.1	TEST PIT DISCONTINUED AT 3.1m, due to pit walls caving			
4				

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.5m to 1.8m, then from 1.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: BR
Date: 7-7-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.49 AHD

PIT No: 108
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing: Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets			
0.5	SILTY SAND: Loose to medium dense, dark brown silty sand with trace clay/rootlets			
0.85	SAND: Loose to medium dense, light grey and light brown sand with trace to some silt			
1.5	INDURATED SAND: Medium dense, dark grey brown slightly to moderately indurated sand			
2.5	SAND: Brown, fine to medium grained sand from 2m, light grey			
	TEST PIT DISCONTINUED AT 2.5m			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SBB
Date: 7-7-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.46 AHD

PIT No: 109
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
	SAND: Medium dense, yellow brown, fine to medium grained sand with trace silt and clay	D	0.6	
0.68	INDURATED SAND: Medium dense to dense, grey and dark grey slightly indurated sand			
1.1	SAND: Medium dense to dense, light grey and orange brown sand, trace to some clay	D	1.3	
	From 1.8m, with trace clay			
2.5	TEST PIT DISCONTINUED AT 2.5m, due to pit walls collapsing			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Slight seepage from 1.6m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo tonisation Detector
D	Disturbed sample	U_x	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SAB
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.40 AHD

PIT No: 110
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
0.35	SILTY SAND: Loose, brown, fine to medium grained silty sand	D	0.3	
	SAND: Medium dense to dense, light grey, fine to medium grained sand, trace silt			
0.85	INDURATED SAND: Medium dense to dense, dark grey brown slightly to moderately indurated sand, moist			
	From 1.3m, with some light grey sand	D	1.6	
2.1	SAND: Brown, fine to medium grained sllightly clayey sand, moist to saturated			
2.8	SAND: Light grey, fine to medium grained sand			
3.1	TEST PIT DISCONTINUED AT 3.1m, due to pit walls collapsing			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Slight seepage from 1.5 to 2.1m, strong seepage from 2.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: ERB
Date: 7-1-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.32 AHD

PIT No: 111
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.15	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
	SILTY SAND: Medium dense, grey silty sand with trace rootlets, moist	D	0.3	
0.4	SAND: Medium dense, light yellow brown and light grey, fine to medium grained sand			
0.75	SAND: Medium dense, grey, slightly clayey sand, moist			
1.4	INDURATED SAND: Dark grey brown slightly to moderately indurated sand with some lenses of light grey (saturated) sand From 1.8m, moderately to heavily indurated			
2.7	SAND: Brown, fine to medium grained sand, saturated			
3.0	TEST PIT DISCONTINUED AT 3.0m			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Slight seepage from 1.5m, strong seepage from 2.35m

REMARKS: Slow progress from 1.4 to 2.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: BW
Date: 7.7.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.47 AHD

PIT No: 112
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing: Type	Depth (m)	Results
0.15	TOPSOIL: Dark grey silty sand with some rootlets, moist			
	SILTY SAND: Loose, dark grey silty sand with trace rootlets, moist	B	0.3	
	From 0.45m, orange brown		0.6	
0.75	SAND: Medium dense, light grey mottled orange brown, fine to medium grained sand, moist			
1	from 0.9m, dense	D	1.4	
1.7	INDURATED SAND: Dark grey moderately indurated sand			
2				
2.9	SAND: Brown, fine to medium grained sand, saturated			
3		D	3.1	
3.5	TEST PIT DISCONTINUED AT 3.5m			
4				

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6 to 1.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials:
Date: 7-1-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.33 AHD

PIT No: 113
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing Type	Depth (m)	Results
0.15	TOPSOIL: Dark grey silty sand with some rootlets, moist			
0.4	SILTY SAND: Medium dense, dark grey silty sand, moist	D	0.25	
0.75	SAND: Medium dense, light grey, fine to medium grained sand, moist from 0.6m, very dense	D	0.6	
1.35	SAND: Light grey slightly clayey sand, moist			
2.7	INDURATED SAND: Dark grey, moderately to heavily indurated sand with some light grey saturated sand lenses			
	TEST PIT DISCONTINUED AT 2.7m, slow progress within indurated sand			

RIG: Ford 555C Extendahoe Backhoe

LOGGED: McFarlane

WATER OBSERVATIONS: Slight seepage from 1.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SB
Date: 7-7-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.46 AHD

PIT No: 114
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.15	TOPSOIL: Dark grey silty sand with some rootlets, moist			
0.3	SILTY SAND: Loose, dark grey silty sand, trace rootlets, moist			
	SAND: Loose to medium dense, grey, fine to medium grained sand, trace silt, moist	D	0.5	
0.8	INDURATED SAND: Medium dense, dark brown and dark grey slightly indurated sand From 1.1m, brown			
1.6	SAND: Brown, fine to medium grained sand, saturated	D	1.7	
2.0	INDURATED SAND: Brown, slightly indurated sand			
2.3	SAND - Light grey fine to medium grained sand			
2.6	TEST PIT DISCONTINUED AT 2.6m			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6m to 2m depth and from 2.3m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: SB
Date: 7.2.04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.25 AHD

PIT No: 115
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.1	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
	SILTY SAND - Loose, dark grey silty sand, trace rootlets From 0.3m depth, dark brown			
0.5	SAND: Medium dense, dark grey and dark brown sand with some silt (trace cementation), moist			
0.8	SAND: Medium dense to dense, light grey, fine to medium grained sand, moist			
1.05	INDURATED SAND: Dark grey/brown slightly indurated sand, moist			
1.6	SAND: Light grey, fine to medium grained sand, saturated	D	2.0	
2.4	TEST PIT DISCONTINUED AT 2.4m			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U_x	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: BJS
Date: 7-7-04

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TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.33 AHD

PIT No: 116
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets			
0.4	SILTY SAND: Loose, dark grey, fine to medium grained silty sand with trace rootlets			
	SAND: Medium dense, light grey, fine to medium grained sand, trace orange brown mottling, moist	D	0.6	
1	From 1.2m, grey and brown sand, trace silt			
	From 1.8m, dark grey			
2 2.0	INDURATED SAND: Dark grey, slightly to moderately indurated sand with some light grey saturated sand lenses			
2.7	SAND: Brown, fine to medium grained sand, saturated			
3 3.0	TEST PIT DISCONTINUED AT 3.0m			
4				

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.5m to 1.8m and from 2.1m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: ERB
Date: 7.7.04

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.68 AHD

PIT No: 117
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.1	TOPSOIL: Dark grey silty sand topsoil with some rootlets			
0.35	SILTY SAND: Very loose to loose, dark grey silty sand, trace rootlets, moist			
	SAND: Loose to medium dense, light grey mottled orange brown sand, trace clay, moist	D	0.6	
1	From 1.05m depth, light orange brown mottled grey and brown with some indurated zones			
1.4	SAND: Light brown, fine to medium grained sand, saturated	D	1.7	
2				
2.5	TEST PIT DISCONTINUED AT 2.5m, due to pit walls collapsing			
3				
4				

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.4m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: BB
Date: 7.1.04

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.49 AHD

PIT No: 118
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark brown silty sand topsoil, with some rootlets, moist			
	SAND: Medium dense, orange brown and light grey, fine to medium grained sand			
1	from 1m, light grey mottled dark brown, trace indurated sand lenses			
1.4	SAND: Light grey, fine to medium grained sand, saturated			
2				
2.1	TEST PIT DISCONTINUED AT 2.1m, due to pit walls caving			
3				
4				

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.45m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials: BB
Date: 7.1.04

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.61 AHD

PIT No: 119
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing: Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
	SAND: Loose to medium dense, brown and dark brown, fine to medium grained sand, trace silt, moist			
0.75	INDURATED SAND: Medium dense to dense, brown and dark brown slightly indurated sand			
1.75	SAND: Light brown, fine to medium grained sand From 1.8m depth, light grey			
2.2	TEST PIT DISCONTINUED AT 2.2m, due to pit walls caving			

RIG: Ford 555C Extendahoe Backhoe

LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials:
Date: 7.1.04

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Terra Consulting (Aust) Pty Ltd
PROJECT: Proposed Rural Residential Subdivision
LOCATION: Manor Road, Harrington

PROJECT No: 31872
SURFACE LEVEL: 2.56 AHD

PIT No: 120
DATE: 15 Dec 03
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & Testing		
		Type	Depth (m)	Results
0.2	TOPSOIL: Dark grey silty sand topsoil with some rootlets, moist			
	SAND: Loose to medium dense, light grey, fine to medium grained sand, moist From 0.3m depth, orange brown mottled yellow brown sand, moist Trace indurated nodules	D	0.5	
1.3	SAND: Light grey brown, fine to medium grained sand, wet to saturated			
	Some cemented zones	D	2.0	
2.4	TEST PIT DISCONTINUED AT 2.4m, due to pit walls caving			

RIG: Ford 555C Extendahoe Backhoe
LOGGED: McFarlane

WATER OBSERVATIONS: Seepage from 1.6m depth

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	PID	Photo Ionisation Detector
D	Disturbed sample	U,	Tube sample (x mm dia.)
M	Moisture content (%)	Wp	Plastic limit

CHECKED
Initials:
Date: 7.1.04

Douglas Partners
Geotechnics · Environment · Groundwater

Appendix B

Laboratory Test Results
Quality Assurance / Quality Control Assessment
Chain of Custody (Field and Despatch)
Sample Receipts

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 219713

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Joel Cowan
Address	PO Box 5463, Port Macquarie, NSW, 2444

Sample Details

Your Reference	**31872.02, Harrington**
Number of Samples	4 Soil, 2 Material
Date samples received	17/06/2019
Date completed instructions received	17/06/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	24/06/2019
Date of Issue	24/06/2019

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Aida Marner
Authorised by Asbestos Approved Signatory: Matt Tang

Results Approved By
Giovanni Agosti, Group Technical Manager
Lucy Zhu, Senior Asbestos Analyst
Matthew Tang, Asbsestos Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	19/06/2019	19/06/2019	19/06/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	103	103	102

svTRH (C10-C40) in Soil				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	19/06/2019	19/06/2019	19/06/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	78	79	82

PAHs in Soil				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	21/06/2019	21/06/2019	21/06/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	133	97	92

Organochlorine Pesticides in soil				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	21/06/2019	21/06/2019	21/06/2019
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	99	98

Organophosphorus Pesticides				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	21/06/2019	21/06/2019	21/06/2019
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	99	98

PCBs in Soil				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date extracted	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	21/06/2019	21/06/2019	21/06/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	99	98

Acid Extractable metals in soil				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date prepared	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	18/06/2019	18/06/2019	18/06/2019
Arsenic	mg/kg	4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	18	1	7
Copper	mg/kg	8	<1	8
Lead	mg/kg	4	4	6
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	14	<1	6
Zinc	mg/kg	31	2	32

Moisture				
Our Reference		219713-1	219713-2	219713-3
Your Reference	UNITS	301	302	303
Date Sampled		10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil
Date prepared	-	18/06/2019	18/06/2019	18/06/2019
Date analysed	-	19/06/2019	19/06/2019	19/06/2019
Moisture	%	16	18	18

Asbestos ID - soils					
Our Reference		219713-1	219713-2	219713-3	219713-6
Your Reference	UNITS	301	302	303	305a
Date Sampled		10/06/2019	10/06/2019	10/06/2019	10/06/2019
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	18/06/2019	18/06/2019	18/06/2019	18/06/2019
Sample mass tested	g	Approx. 25g	Approx. 20g	Approx. 15g	Approx. 20g
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - materials			
Our Reference		219713-4	219713-5
Your Reference	UNITS	304	305
Date Sampled		10/06/2019	10/06/2019
Type of sample		Material	Material
Date analysed	-	18/06/2019	18/06/2019
Mass / Dimension of Sample	-	117x18x7mm	65x48x6mm
Sample Description	-	Beige compressed fibre cement material	Beige layered fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected Organic fibres detected	No asbestos detected Organic fibres detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			19/06/2019	[NT]	[NT]	[NT]	[NT]	19/06/2019	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	104	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	91	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	109	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			19/06/2019	[NT]	[NT]	[NT]	[NT]	19/06/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-003	89	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			21/06/2019	[NT]	[NT]	[NT]	[NT]	21/06/2019	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	99	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	99	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			21/06/2019	[NT]	[NT]	[NT]	[NT]	21/06/2019	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	99	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			21/06/2019	[NT]	[NT]	[NT]	[NT]	21/06/2019	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	[NT]	[NT]	[NT]	[NT]	106	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	[NT]	[NT]	[NT]	[NT]	108	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate TCMX	%		Org-008	99	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			21/06/2019	[NT]	[NT]	[NT]	[NT]	21/06/2019	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCLMX	%		Org-006	99	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date prepared	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Date analysed	-			18/06/2019	[NT]	[NT]	[NT]	[NT]	18/06/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	113	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	107	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples requested for asbestos testing were sub-sampled from bags provided by the client.

Quality Assurance / Quality Control Report
Proposed Harrington Waters Lifestyle Village
26, 48 and 56 Manor Street, Harrington

Quality Assurance (QA) was maintained by:

- Compliance with a Project Quality Plan written for the objectives of the study;
- Using qualified and experienced personnel to undertake the field supervision and sampling;
- Following the Douglas Partners Pty Ltd (DP) operating procedures for sampling, field testing and decontamination as presented in Table D1; and
- Using National Association of Testing Authorities, Australia (NATA) registered laboratories for sample testing that generally utilise standard laboratory methods of the US EPA, the APHA and NSW EPA.

Table D1: Field Procedures

Abbreviation	Procedure Name
FPM LOG	Logging
FPM DECONT	Decontamination of Personnel and Equipment
FPM ENVID	Sample Identification, Handling, Transport and Storage of Contamination Samples
FPM PIDETC	Operation of Field Analysers
FPM ENVSAMP	Sampling of Contaminated Soils

Notes to Table D1:
From DP Field Procedures Manual

Quality Control (QC) of the laboratory programme was achieved by the following means:

- Method blanks - the laboratory ran reagent blanks to confirm the equipment and standards used were uncontaminated;
- Laboratory replicates – the laboratory split samples internally and conducted tests on separate extracts; and
- Laboratory spikes - samples were spiked by the laboratory with a known concentration of contaminants and subsequently tested for percent recovery.

Discussion

B. Method Blanks

All method blanks returned results lower than the laboratory detection limit, therefore are acceptable.

B. Laboratory Replicates

Duplicate sample analysis was not conducted by the laboratory on the samples analysed for this project. The laboratory does, however, analyse replicate samples in batches of 20 samples at a frequency to meet or exceed NEPM requirements. The duplicate sample relative percentage differences (RPDs) for the batch were within laboratory acceptance criteria.

C. Laboratory Spikes

Recoveries in the order of 70% to 130% are generally considered to be acceptable for inorganic material and 60% to 140% for organic material. The average percent recovery for individual contaminants ranged from 86% to 124%, which is within the quality control objectives. The results should however be qualified and may slightly under-estimate or over-estimate contaminant concentrations in certain samples (i.e. biased low or high respectively).

Conclusions

It is noted that the samples were sent on 13 June 2019 and where received by the laboratory on 17 June 2019 with the temperature of the samples recorded at 14° on arrival. PID results on the soils during sampling indicated the absence gross volatile hydrocarbon impacts (ie PID <1 ppm), which was consistent with the results of laboratory testing received.

In summary, the accuracy and precision of the soil testing procedures, as inferred by the laboratory QA / QC data is considered to be of sufficient standard to allow the data reported to be used in interpret site contamination conditions.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY FIELD SHEET

Project No:	**31872.02**	**Client Project Name:**	**Proposed Harrington Waters Lifestyle Village**
Client:	**Bayline Developments (NSW) Pty Ltd**	**Location:**	**Manor Road, Harrington**
Project Manager:	**Joel Cowan**	**DP Lab Received**	By: 11/6/19 Date: JRE

Do samples contain 'potential' HBM? Yes ☑ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
301	0.05		S	G/P		JRE	10/6/19	1600	DP AM2	13/6/19			
302	0.05		↓	↓		↓	↓	↓	↓	↓			
303	0.05		↓	↓		↓	↓	↓	↓	↓			
304	-			P		↓	↓	↓	↓	↓			
305	-			↓		↓	↓	↓	↓	↓			
305a	0.05		S	↓		↓	↓	1630	↓	↓			

* **Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge**

A Provide name of Lab 1 Envirolab B Provide name of Lab 2 C Provide name of Lab 3

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	31872.02	**Suburb:**	Harrington	**To:**	Envirolab Services Pty Ltd
Project Name:	Proposed Harrington Waters Lifestyle Village	**Order Number**	141169		12 Ashley Street, CHATSWOOD NSW 2067
Project Manager:	Joel Cowan	**Sampler:**	Joel Cowan	**Attn:**	Jacinta Hurst
Emails:	joel.cowan@douglaspartners.com.au			**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 6A	Asbestos ID								Notes/preservation
301	1	10/06/19	S	G/P	●									includes sample 301a
302	2	10/06/19	S	G/P	●									includes sample 302a
303	3	10/06/19	S	G/P	●									includes sample 303a
304	4	10/06/19	S	P		●								
305	5	10/06/19	S	P		●								
305a	6	10/06/19	S	P		●								
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 219713
Date Received: 17/6/19
Time Received: 10:24
Received by: TN
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: 9 **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** T. Nguyen **Date & Time:** 17/6/19 10:24.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Joel Cowan

Sample Login Details

Your reference	31872.02, Harrington
Envirolab Reference	219713
Date Sample Received	17/06/2019
Date Instructions Received	17/06/2019
Date Results Expected to be Reported	24/06/2019

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	4 Soil, 2 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	Asbestos ID - materials
301	✓	✓	✓	✓	✓	✓	✓	✓	
302	✓	✓	✓	✓	✓	✓	✓	✓	
303	✓	✓	✓	✓	✓	✓	✓	✓	
304									✓
305									✓
305a								✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Appendix C

Titles Deeds Search Information
SafeWork Dangerous Goods Licence Search

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Summary of Owners Report

LRS NSW **Sydney**

Address: - Harrington, 26, 48 and 56 Manor Road

Description: - Lot 2 in D.P. 1219123, Lot 4 in D.P. 1219124 and Lot 6 in D.P. 1217806

As regards Lot 2 in D.P. 1219123

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
17.09.1902 (1902 to 1963)	Alexander Newton (Engineering Student)	Book 730 No 726
28.06.1963 (1963 to 1982)	William Herbert Sheather (Dairy Farmer)	Book 2672 No 453 Now Vol 14737 Fol 183
09.07.1982 (1982 to 2016)	Terence Charles Clifton Janeen Rhonda Clifton	Vol 14737 Fol 183 Now 2/1219123
17.12.2016 (2016 to date)	# Riverside Manors (Harrington) Pty Ltd	2/1219123

# Denotes current registered proprietor

Leases: - Nil

Easements: -

- 26.07.2016 (DP1219123) Right of Access 4 metres wide
- 26.07.2016 (DP1219123) Easement for Services
- 26.07.2016 (DP1219123) Easement for Overhead Power Lines 20 metres wide

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

As regards Lot 2 in D.P. 1219123

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
17.09.1902 (1902 to 1963)	Alexander Newton (Engineering Student)	Book 730 No 726
28.06.1963 (1963 to 1982)	William Herbert Sheather (Dairy Farmer)	Book 2672 No 453 Now Vol 14737 Fol 184
13.09.1982 (1982 to 1993)	John Andrew Clark Paul Michael Simon Peter James Callaghan	Vol 14737 Fol 184 Now 2/621005
22.02.1993 (1993 to 1995)	John Andrew Clark (& his bankrupt estate)	2/621005
19.12.1995 (1995 to 2016)	J & M MacDonald Pty Limited	2/621005 Now 4/1219124
08.12.2016 (2016 to date)	# Riverside Manors (Harrington) Pty Ltd	4/1219124

# Denotes current registered proprietor

Leases: - Nil

Easements: -

- 04.07.2016 (DP1219124) Right of Access 4 metres wide
- 04.07.2016 (DP1219124) Easement for Services variable width
- 04.07.2016 (DP1219124) Easement for Overhead Power Lines 20 metres wide

---

As regards the former road tinted yellow on the attached cadastre

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
01.10.1969	William Herbert Sheather (Dairy Farmer)	Vol 11153 Fol 97 Now Vol 14737 Fol 185

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

As regards Lot 6 in D.P. 1217806

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
17.09.1902 (1902 to 1963)	Alexander Newton (Engineering Student)	Book 730 No 726
28.06.1963 (1963 to 1984)	William Herbert Sheather (Dairy Farmer)	Book 2672 No 453 Now Vol 14737 Fol 185
27.04.1984 (1984 to 2016)	Kenneth Edgar Billings Shirley Margaret Billings	Vol 14737 Fol 185 Now 6/1217806
29.11.2016 (2016 to 2019)	Riverside Manors (Harrington) Pty Ltd	6/1217806
01.04.2019 (2019 to date)	# Blue Water (Aust) Pty Ltd	6/1217806

# Denotes current registered proprietor

Leases: - Nil

Easements: -

- 08.04.2016 (DP1217806) Right of Access 4 metres wide
- 08.04.2016 (DP1217806) Easement for Services variable width
- 08.04.2016 (DP1217806) Right of Access 5 metres wide
- 08.04.2016 (DP1217806) Easement for Overhead Power Lines 20 metres wide

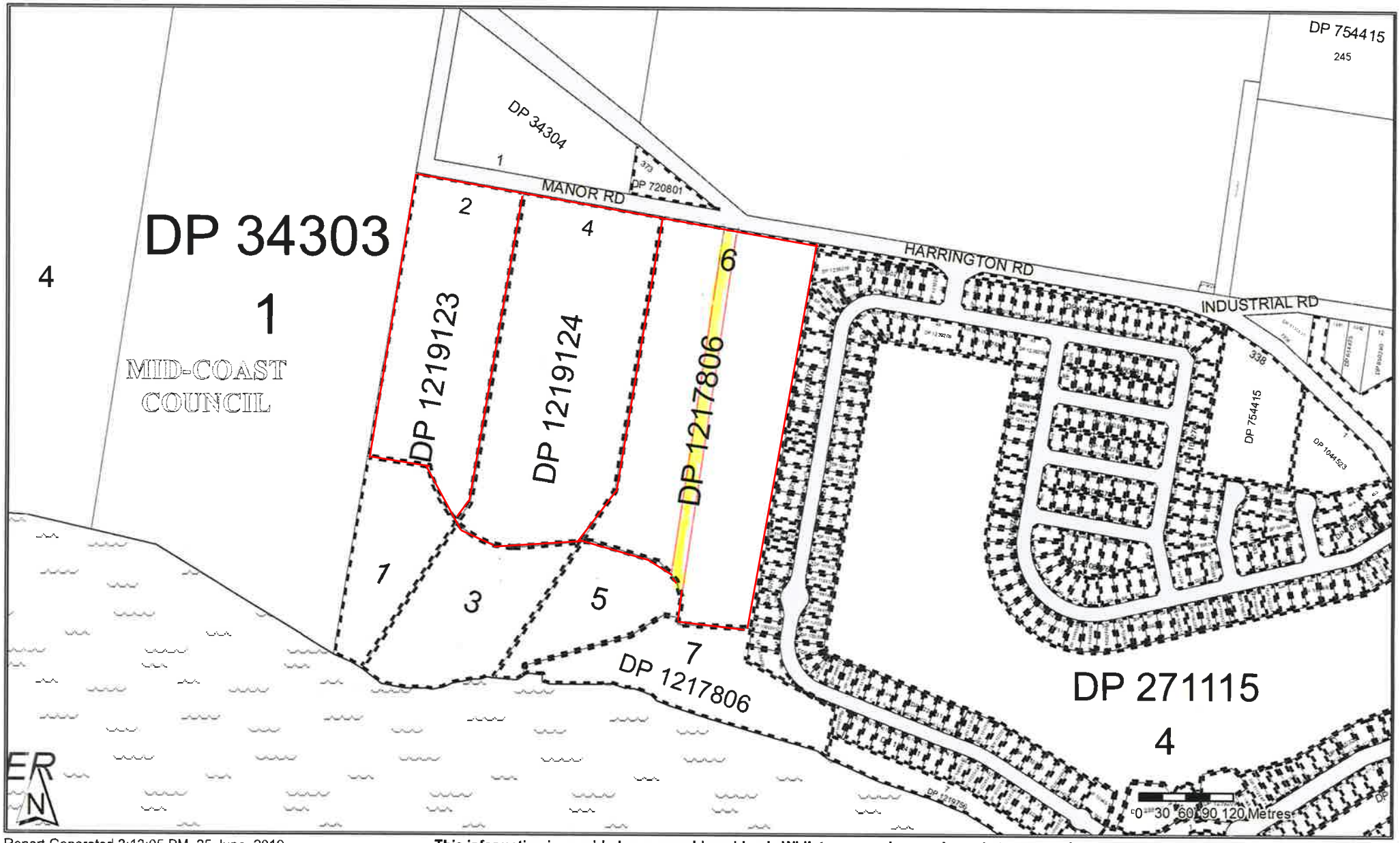
Yours Sincerely,
Matthew Hillerman
(checked by Mark Groll)
26 June 2019

LAND REGISTRY SERVICES

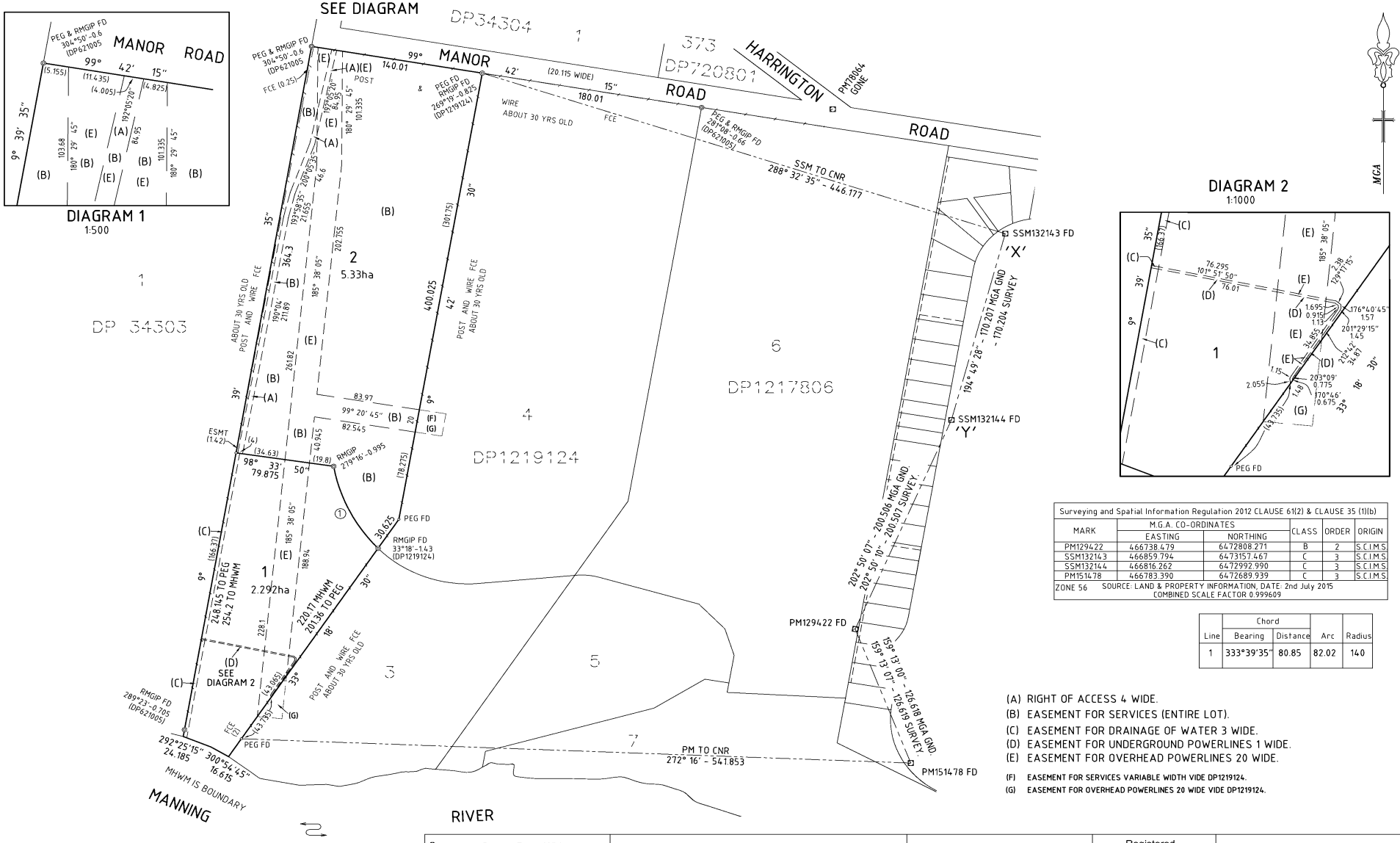
Cadastral Records Enquiry Report : Lot 6 DP 1217806

Locality : HARRINGTON
LGA : MID-COAST
Parish : HARRINGTON
County : MACQUARIE

Ref : Harrington



Report Generated 3:13:05 PM, 25 June, 2019



Surveying and Spatial Information Regulation 2012 CLAUSE 61(2) & CLAUSE 35 (1)(b)					
MARK	M.G.A. CO-ORDINATES		CLASS	ORDER	ORIGIN
	EASTING	NORTHING			
PM129422	466738.479	6472808.271	B	2	S.C.I.M.S.
SSM132143	466859.794	6473157.467	C	3	S.C.I.M.S.
SSM132144	466816.262	6472992.990	C	3	S.C.I.M.S.
PM151478	466783.390	6472689.939	C	3	S.C.I.M.S.
ZONE 56	SOURCE: LAND & PROPERTY INFORMATION, DATE: 2nd July 2015 COMBINED SCALE FACTOR 0.999609				

Line	Chord		Arc	Radius
	Bearing	Distance		
1	333°39'35"	80.85	82.02	140

(A) RIGHT OF ACCESS 4 WIDE.
(B) EASEMENT FOR SERVICES (ENTIRE LOT).
(C) EASEMENT FOR DRAINAGE OF WATER 3 WIDE.
(D) EASEMENT FOR UNDERGROUND POWERLINES 1 WIDE.
(E) EASEMENT FOR OVERHEAD POWERLINES 20 WIDE.
(F) EASEMENT FOR SERVICES VARIABLE WIDTH VIDE DP1219124.
(G) EASEMENT FOR OVERHEAD POWERLINES 20 WIDE VIDE DP1219124.

NOTE: THE LOCATION OF THE MHWM SHOWN HEREON IS SUBSTANTIALLY THE SAME AS THAT SHOWN IN DP621005

Surveyor : Steven Peter Whiteman Date of Survey : 31st October 2006 2nd July 2015 Surveyor's Ref : 7494/1 REPORT (CAD F:\7494\7494DP1.DWG - V9 - 20/07/16)	PLAN OF SUBDIVISION OF LOT 1 DP621005	LGA: MID-COAST Locality : HARRINGTON Subdivision No: 33/2016/SC Lengths are in metres. Reduction Ratio 1: 2000	Registered 26.7.2016	DP1219123

10 20 30 40 50 Table of mm 90 100 110 120 130 140

PLAN FORM 6 (2013) WARNING: Creasing or folding will lead to rejection

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 2 sheet(s)

Office Use Only

Registered: 26.7.2016

Title System: TORRENS

Purpose: SUBDIVISION

Office Use Only

DP1219123

PLAN OF SUBDIVISION
OF LOT 1 DP621005

LGA: ~~GREATER TAREE~~ MID-COAST

Locality: HARRINGTON

Parish: HARRINGTON

County: MACQUARIE

Crown Lands NSW/Western Lands Office Approval

I ..... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.

Signature: .....

Date: .....

File Number: .....

Office: .....

Survey Certificate

I, Steven Peter Whiteman

of 3 Wharf Street Forster, Po Box 510

a surveyor registered under the Surveying and Spatial Information Act 2002,certify that:

*(a) The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on: 31st October 2006 2nd July 2015

*(b) ~~The part of the land shown in the plan (*being/*excluding ^ .....)~~ was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on..... ~~the~~ part not surveyed was compiled in accordance with ~~that~~ Regulation.

*(c) The land shown in this plan was compiled in accordance with the ~~Surveying and Spatial Information Regulation 2012.~~

Signature: ..... Dated: 3-7-16

Surveyor ID: 2309

Datum Line: 'X'-'Y'

Type: *Urban/*~~Rural~~

The terrain is *Level-Undulating / *~~Steep-Mountainous.~~

*Strike through if inapplicable.

^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.

Subdivision Certificate

I, Petula Bowden

Authorised Person/~~General Manager~~/*~~Accredited Certifier~~, certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.

Signature: .....

Accreditation number: .....

Consent Authority: Mid-Coast Council

Date of Endorsement: 6 June 2016

Subdivision Certificate number: 33/2016/SC

File number: 75/2007/OA

*Strike through inapplicable parts

Statements of intention to dedicate public roads, create public reserves and drainage reserves, acquire/resume land.

Plans used in preparation of survey/compilation.

DP621005, DP847223, DP1219124

If space is insufficient continue on PLAN FORM 6A

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

(CAD F:\7494\7494DP1.DWG - V2 - 15/07/15)

Surveyor's Reference: 7494/1

ePlan

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 2 of 2 sheet(s)

Office Use Only

Registered: 26.7.2016

PLAN OF SUBDIVISION
OF LOT 1 DP621005

Office Use Only

DP1219123

Subdivision Certificate Number: 33/2016/SC

Date of Endorsement: 6 June 2016

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - Sec 60(c) SSI Regulation 2012
- Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919.
- Signatures and seals - see 195D Conveyancing Act 1919.
- Any Information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

PURSUANT TO Sec.88B OF THE CONVEYANCING ACT 1919
IT IS INTENDED TO CREATE:-

1. RIGHT OF ACCESS 4 WIDE. (A)
2. EASEMENT FOR SERVICES ~~VARIABLE WIDTH~~. (B) (ENTIRE LOT)
3. POSITIVE COVENANT.
4. EASEMENT FOR OVERHEAD POWERLINES 20 WIDE. (E)
5. EASEMENT FOR DRAINAGE OF WATER 3 WIDE. (C)
6. EASEMENT FOR UNDERGROUND POWERLINES 1 WIDE. (D)

Terrance Charles CLIFTON
22/03/2016

Janeen Rhonda CLIFTON
22/03/2016

Mortgagee under Mortgage No. 4492364
Signed at Taree this 21st day of June 2016 for National Australia Bank Limited ABN 12 004 044 937 by MARK KIRCHER its duly appointed Attorney under Power of Attorney No. 391 Book 4517

Level 3 Attorney

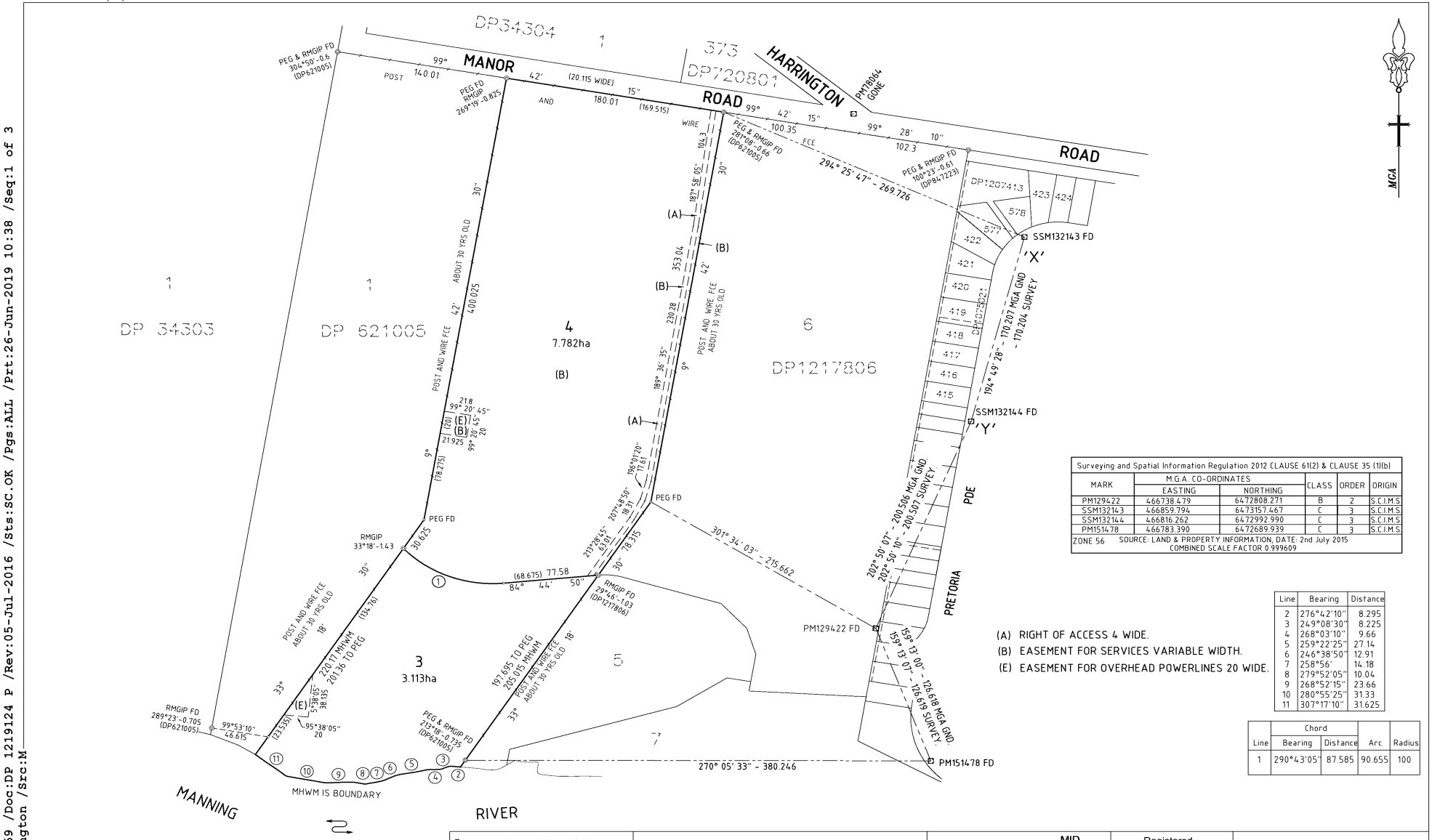
Witness : Guy Martin
Business Banking Manager
Taree Business Banking Centre
Level 2, 1 Pulteney St.
Taree NSW 2430

Witness/Bank Officer

Lot	Street Number	Street Name	Street Type	Locality
1	24	MANOR	ROAD	HARRINGTON
2	26	MANOR	ROAD	HARRINGTON

If space is insufficient use additional annexure sheet

Surveyor's Reference: 7494/1 (CAD F:\7494\7494DP1.DWG - V4 - 09/03/16)



Surveying and Spatial Information Regulation 2012 CLAUSE 61(2) & CLAUSE 35 (1)(b)					
MARK	M.G.A. CO-ORDINATES		CLASS	ORDER	ORIGIN
	EASTING	NORTHING			
PM129422	466738.479	6472808.271	B	2	S.C.I.M.S
SSM132143	466859.794	6473157.467	C	3	S.C.I.M.S
SSM132144	466816.262	6472992.990	C	3	S.C.I.M.S
PM151478	466783.390	6472689.939	C	3	S.C.I.M.S
ZONE 56	SOURCE: LAND & PROPERTY INFORMATION, DATE: 2nd July 2015 COMBINED SCALE FACTOR 0.999609				

(A) RIGHT OF ACCESS 4 WIDE.
(B) EASEMENT FOR SERVICES VARIABLE WIDTH.
(E) EASEMENT FOR OVERHEAD POWERLINES 20 WIDE.

Line	Bearing	Distance
2	276°42'10"	8.295
3	249°08'30"	8.225
4	268°03'10"	9.66
5	259°22'25"	27.14
6	246°38'50"	12.91
7	258°56'	14.18
8	279°52'05"	10.04
9	268°52'15"	23.66
10	280°55'25"	31.33
11	307°17'10"	31.625

Line	Chord		Arc	Radius
	Bearing	Distance		
1	290°43'05"	87.585	90.655	100

NOTE: THE LOCATION OF THE MHWM SHOWN HEREON IS SUBSTANTIALLY THE SAME AS THAT SHOWN IN DP621005

Table of mm 10 20 30 40 50 90 100 110 120 130 140

Surveyor : Steven Peter Whiteman Date of Survey : 31st October 2006 2nd July 2015 Surveyor's Ref : 7494/2 (CAD F:\7494\7494DP2.DWG - V5 - 07/06/16)	PLAN OF SUBDIVISION OF LOT 2 DP621005	LGA: ~~GREATER TAREE~~ MID-COAST Locality : HARRINGTON ~~Subdivision No:~~ Lengths are in metres. Reduction Ratio 1: 2000	Registered 4.7.2016	DP1219124

LGA AMENDED IN LPI DUE TO COUNCIL AMALGAMATIONS

PLAN FORM 6 (2013) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 2 sheet(s)

Office Use Only

Registered: 4.7.2016

Title System: TORRENS

Purpose: SUBDIVISION

Office Use Only

DP1219124

PLAN OF SUBDIVISION
OF LOT 2 DP621005

LGA: ~~GREATER TAREE~~ MID-COAST

Locality: HARRINGTON

Parish: HARRINGTON

County: MACQUARIE

LGA AMENDED IN LPI DUE TO COUNCIL AMALGAMATIONS

Crown Lands NSW/Western Lands Office Approval

I ..... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.

Signature: .....

Date: .....

File Number: .....

Office: .....

Survey Certificate

I, Steven Peter Whiteman

of 3 Wharf Street Forster, Po Box 510

a surveyor registered under the Surveying and Spatial Information Act 2002, certify that:

*(a) The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on: 31st October 2006 2nd July 2015

*(b) ~~The part of the land shown in the plan (*being/*excluding ^ .....)~~ was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on ~~the part not surveyed was compiled~~ in accordance with ~~that~~ Regulation.

*(c) The land shown in this plan was compiled in accordance with the ~~Surveying and Spatial Information Regulation 2012.~~

Signature: ..... Dated: 3-7-15

Surveyor ID: 2309

Datum Line: 'X'-'Y'

Type: *Urban/*~~Rural~~

The terrain is *Level-Undulating / *~~Steep-Mountainous.~~

*Strike through if inapplicable.

^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.

Subdivision Certificate

I, Petula Bowden

Authorised Person/~~General Manager~~/*~~Accredited Certifier~~, certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.

Signature: .....

Accreditation number: .....

Consent Authority: Mid-Coast Council

Date of Endorsement: 6 June 2016

Subdivision Certificate number: 34/2016/SC

File number: 74/2007/04

*Strike through inapplicable parts

Statements of intention to dedicate public roads, create public reserves and drainage reserves, acquire/resume land.

Plans used in preparation of survey/compilation.

DP621005, DP847223, DP1217606

If space is insufficient continue on PLAN FORM 6A

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

(CAD F:\7494\7494DP2.DWG - V2 - 15/07/15)

Surveyor's Reference: 7494/2

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 2 of 2 sheet(s)

Office Use Only

Registered: 4.7.2016

Office Use Only

DP1219124

PLAN OF SUBDIVISION
OF LOT 2 DP621005

This sheet is for the provision of the following information as required:
- A schedule of lots and addresses - Sec 60(c) SSI Regulation 2012
- Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919.
- Signatures and seals - see 195D Conveyancing Act 1919.
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Subdivision Certificate Number: 34/2016/SC

Date of Endorsement: 6 June 2016

PURSUANT TO Sec.88B OF THE CONVEYANCING ACT 1919
IT IS INTENDED TO CREATE:-
1. RIGHT OF ACCESS 4 WIDE
2. EASEMENT FOR SERVICES VARIABLE WIDTH.
3. POSITIVE COVENANT.
4. EASEMENT FOR OVERHEAD POWERLINES 20 WIDE (E)

J & M. Macdonald Pty Ltd
ACN 000269812

J Macdonald

John Macdonald

Sole Director and Secretary

Lot	Street Number	Street Name	Street Type	Locality
3	50	MANOR	ROAD	HARRINGTON
4	48	MANOR	ROAD	HARRINGTON

If space is insufficient use additional annexure sheet

Surveyor's Reference: 7494/2 (CAD F:\7494\7494DP2.DWG - V3 - 23/02/16)

MGA

Line	Bearing	Distance
1	307°07'	15.41
2	286°49'25"	46.03
3	286°31'05"	99.085
4	287°59'40"	53.565
5	292°09'50"	15.51
6	313°46'35"	11.465
7	288°56'10"	20.955
8	274°56'40"	13.47
9	287°16'40"	18.555
10	264°47'10"	16.32
11	270°22'25"	62.5
12	287°57'25"	8.855
13	0°57'45"	9.195
14	273°56'55"	19.525
15	239°05'	6.865
16	239°05'	9.095
17	275°12'05"	30.19

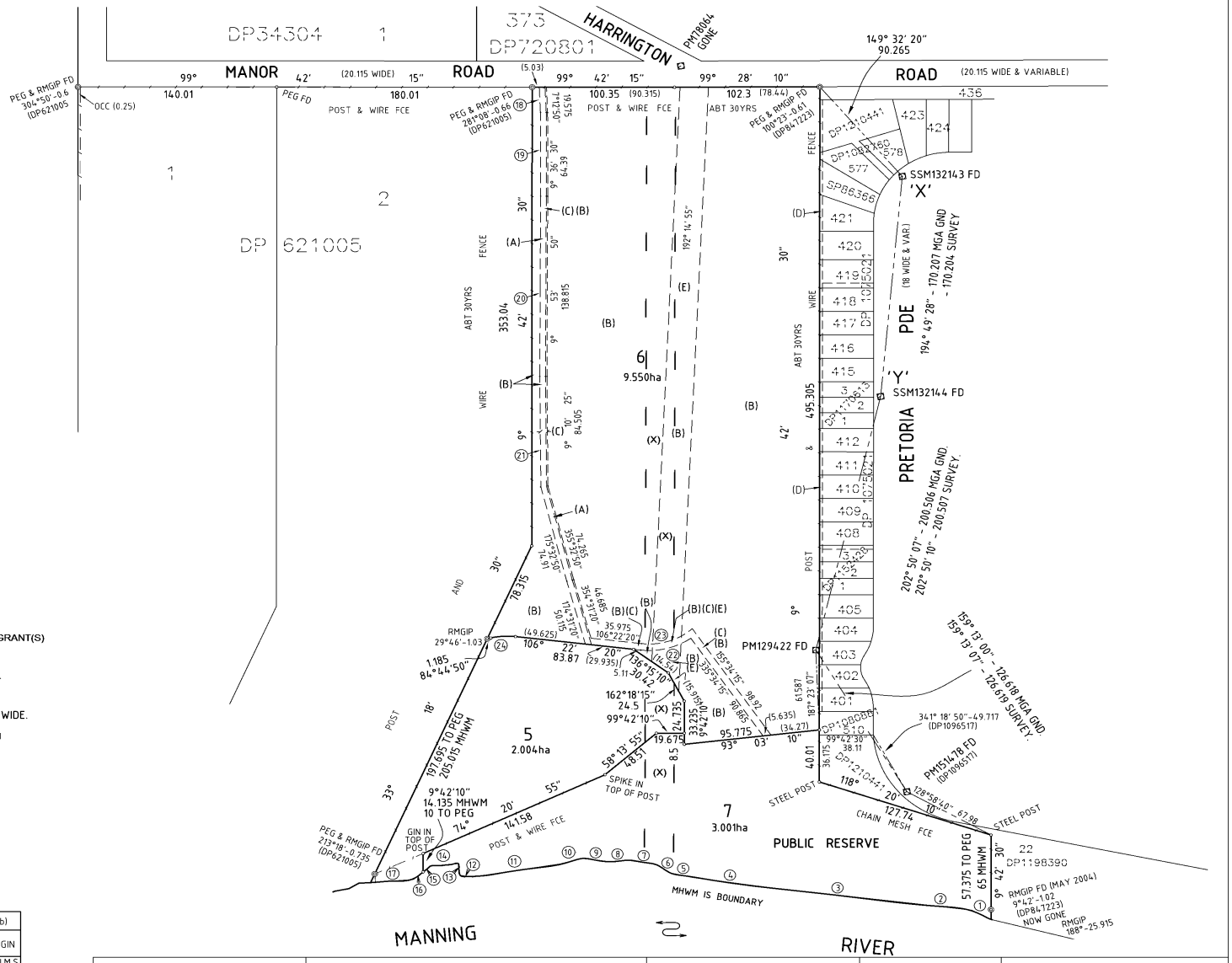
EASEMENT SCHEDULE

Line	Chord Bearing	Chord Distance	Arc	Radius
18	187°12'50"	19.69		
19	189°36'30"	64.275		
20	189°53'50"	138.83		
21	189°10'25"	85.13		
22	265°04'30"	36.32	37.17	50
23	261°46'40"	37.455	38.635	45

Line	Chord Bearing	Chord Distance	Arc	Radius
24	95°33'35"	18.76	18.87	50

(X) LAND EXCLUDES MINERALS - SEE CROWN GRANT(S)
(A) RIGHT OF ACCESS 4 WIDE.
(B) EASEMENT FOR SERVICES VARIABLE WIDTH.
(C) RIGHT OF ACCESS 5 WIDE.
(E) EASEMENT FOR OVERHEAD POWERLINES 20 WIDE.
(D) EASEMENT TO DRAIN WATER 2 WIDE VIDE DP1075021

NOTE: THE LOCATION OF THE MHWM SHOWN HEREON IS SUBSTANTIALLY THE SAME AS THAT SHOWN IN DP847223



Surveying and Spatial Information Regulation 2012 CLAUSE 61(2) & CLAUSE 35 (1)(b)					
MARK	M.G.A. CO-ORDINATES		CLASS	ORDER	ORIGIN
	EASTING	NORTHING			
PM129422	466738.479	6472808.271	B	2	S.C.I.M.S.
SSM132143	466859.794	6473157.467	C	3	S.C.I.M.S.
SSM132144	466816.262	6472992.990	C	3	S.C.I.M.S.
PM151478	466783.390	6472689.939	C	3	S.C.I.M.S.
ZONE 56	SOURCE: LAND & PROPERTY INFORMATION, DATE: 2nd July 2015 COMBINED SCALE FACTOR 0.999609				

10 20 30 40 50 Table of mm 90 100 110 120 130 140

Surveyor : Steven Peter Whiteman
Date of Survey : 31st October 2006 2nd July 2015
Surveyor's Ref : 7494/31
(CAD F:\7494\7494DP31.DWG - V3 - 26/02/16)

PLAN OF SUBDIVISION OF LOT 31 DP847223

LGA: GREATER TAREE
Locality : HARRINGTON
Subdivision No: 12/2016/SC
Lengths are in metres. Reduction Ratio 1: 2000

Registered 8.4.2016

DP1217806

PLAN FORM 6 (2013) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 2 sheet(s)

Office Use Only

Registered: 8.4.2016

Title System: TORRENS

Purpose: SUBDIVISION

Office Use Only

DP1217806

PLAN OF SUBDIVISION
OF LOT 31 DP847223

LGA: GREATER TAREE
Locality: HARRINGTON
Parish: HARRINGTON
County: MACQUARIE

Crown Lands NSW/Western Lands Office Approval

I ..... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.

Signature: .....

Date: .....

File Number: .....

Office: .....

Subdivision Certificate

I, PETULA BOWDEN

Authorised Person/~~General Manager~~/*Accredited Certifier, certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.

Signature: .....

Accreditation number: .....

Consent Authority: GTCC

Date of Endorsement: 30 NOVEMBER 2015

Subdivision Certificate number: 12/2016/SC

File number: 73/2007/DA

*Strike through inapplicable parts

Survey Certificate

I, Steven Peter Whiteman

of 3 Wharf Street Forster, Po Box 510

a surveyor registered under the Surveying and Spatial Information Act 2002,certify that:

*(a) The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on: 31st October 2006
2nd July 2015

*(b) ~~The part of the land shown in the plan (*being/*excluding ^.....~~
.....)
was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on..... the part not surveyed was compiled in accordance with that Regulation.

*(c) The land shown in this plan was compiled in accordance with the ~~Surveying and Spatial Information Regulation 2012.~~

Signature: ..... Dated: 3-7-15

Surveyor ID: 2309

Datum Line: 'X'-'Y'

Type: *Urban/*~~Rural~~

The terrain is *Level-Undulating / *~~Steep-Mountainous.~~

*Strike through if inapplicable.
^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.

Statements of intention to dedicate public roads, create public reserves and drainage reserves, acquire/resume land.

IT IS INTENDED TO DEDICATE
LOT 7 AS PUBLIC RESERVE.

Plans used in preparation of survey/compilation.

DP621005, DP847223, DP1075021, DP1082760, DP1096517.

If space is insufficient continue on PLAN FORM 6A

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

(CAD F:\7494\7494DP31.DWG - V2 - 14/07/15)

Surveyor's Reference: 7494/31

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 8.4.2016

PLAN OF SUBDIVISION
OF LOT 31 DP847223

Office Use Only

DP1217806

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - Sec 60(c) SSI Regulation 2012
- Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919.
- Signatures and seals - see 195D Conveyancing Act 1919.
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Subdivision Certificate Number: 12/2016/SC

Date of Endorsement: 30 November 2015

PURSUANT TO Sec.88B OF THE CONVEYANCING ACT 1919
IT IS INTENDED TO CREATE:-

1. RIGHT OF ACCESS 4 WIDE (A)
2. EASEMENT FOR SERVICES VARIABLE WIDTH (B)
3. RIGHT OF ACCESS 5 WIDE (C)
4. POSITIVE COVENANT.
5. EASEMENT FOR OVERHEAD POWERLINES 20 WIDE. (E)

K. Billings

Shirley M. Billings

Lot	Street Number	Street Name	Street Type	Locality
5		MANOR	ROAD	HARRINGTON
6		MANOR	ROAD	HARRINGTON
7	N/A			HARRINGTON

If space is insufficient use additional annexure sheet

Surveyor's Reference: 7494/31 (CAD F:\7494\7494DP31.DWG - V2 - 14/07/15)

NEW SOUTH WALES

[redacted]ICATE OF TITLE

[redacted]AL PROPERTY ACT, 1900

14737183

IVA No. 37093

Vol. 14737 Fol. 183

EDITION ISSUED

11 5 1982

(Page 1) Vol. 14737 Fol. 183

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

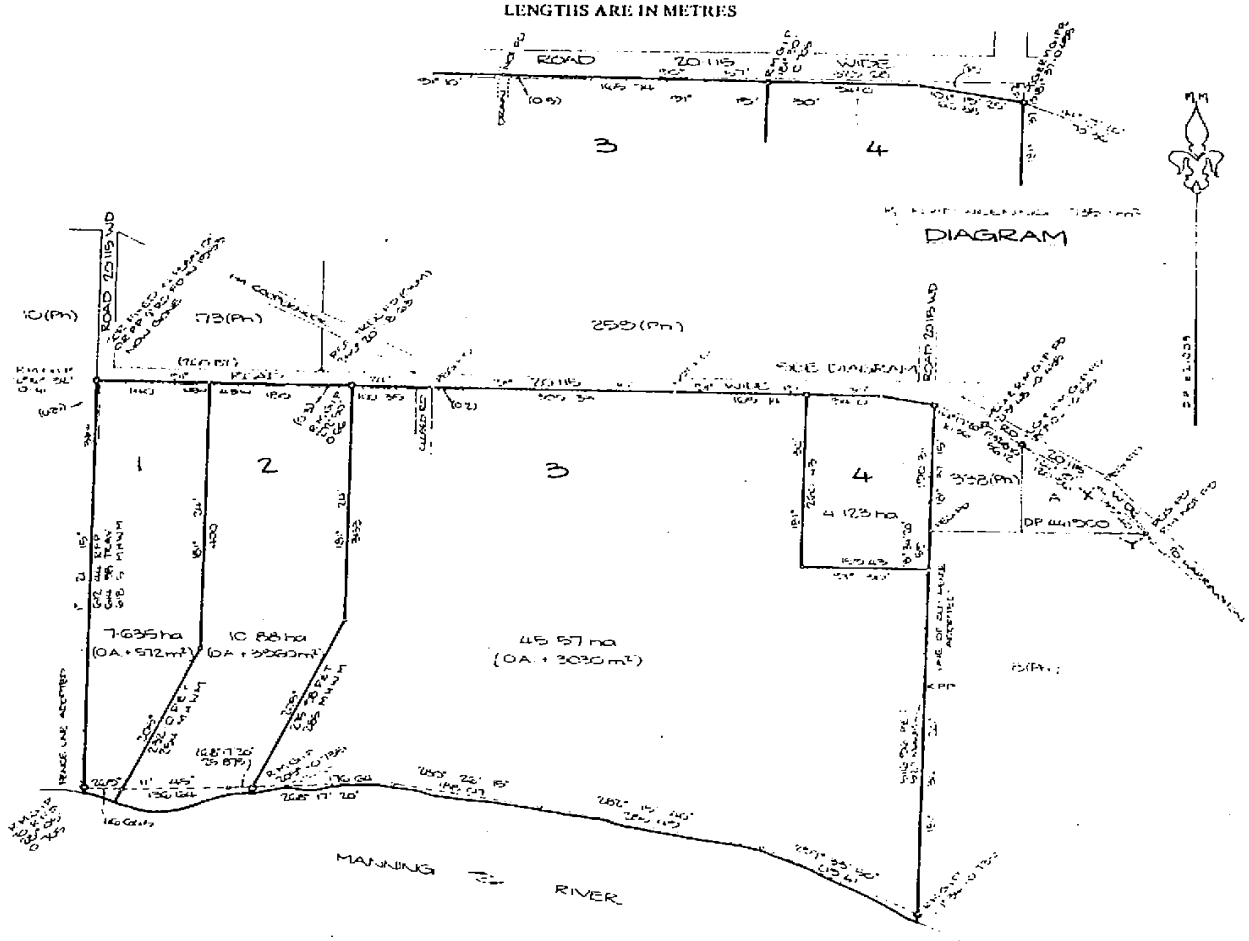
CANCELLED

Registrar General

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 1 in Deposited Plan 621005 at Harrington in the City of Greater Taree Parish of Harrington County of Macquarie being part of Portion 3 granted to Alexander Newton and William Malcolm on 15-11-1852.

FIRST SCHEDULE

~~WILLIAM GILBERT SHEATHER.~~

SECOND SCHEDULE

GRY

QG

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. CAUTION. The land within described is held subject to any subsisting interest (as defined in Section 28A Real Property Act, 1900). 11.5.1982

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

Vol. 14737 Fol. 183

94137C 4.81 D. West, Government Printer

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	Registrar General
Terence Charles Clifton and Janeen Rhonda Clifton as joint tenants by Transfer T136079. Registered 9.7.1982.	

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS	Registrar General	CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

T136079T		

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:41PM

FOLIO: 1/621005

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14737 FOL 183

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
14/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
2/8/1994	U492364	MORTGAGE	EDITION 1
24/11/2003	AA189088	CAVEAT	
20/2/2008	AD693451	APPLICATION FOR PREPARATION OF LAPSING NOTICE	
26/7/2016	DP1219123	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

harrington PRINTED ON 25/6/2019

Received: 25/06/2019 13:41:20

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:41PM

FOLIO: 2/1219123

First Title(s): OLD SYSTEM
Prior Title(s): 1/621005

Recorded	Number	Type of Instrument	C.T. Issue
26/7/2016	DP1219123	DEPOSITED PLAN	FOLIO CREATED EDITION 1
17/12/2016	AM7949	DISCHARGE OF MORTGAGE	
17/12/2016	AM7950	TRANSFER	
17/12/2016	AM7951	MORTGAGE	EDITION 2
30/8/2017	AM688282	DISCHARGE OF MORTGAGE	EDITION 3
4/12/2017	AM936428	CAVEAT	
6/3/2019	AP102677	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

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Received: 25/06/2019 13:41:06

[redacted]FICATE OF TITLE

NEW SOUTH WALES

[redacted]AL PROPERTY ACT, 1900

IVA No. 37093

Vol. 14737 Fol. 184

EDITION ISSUED

11 5 1982

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

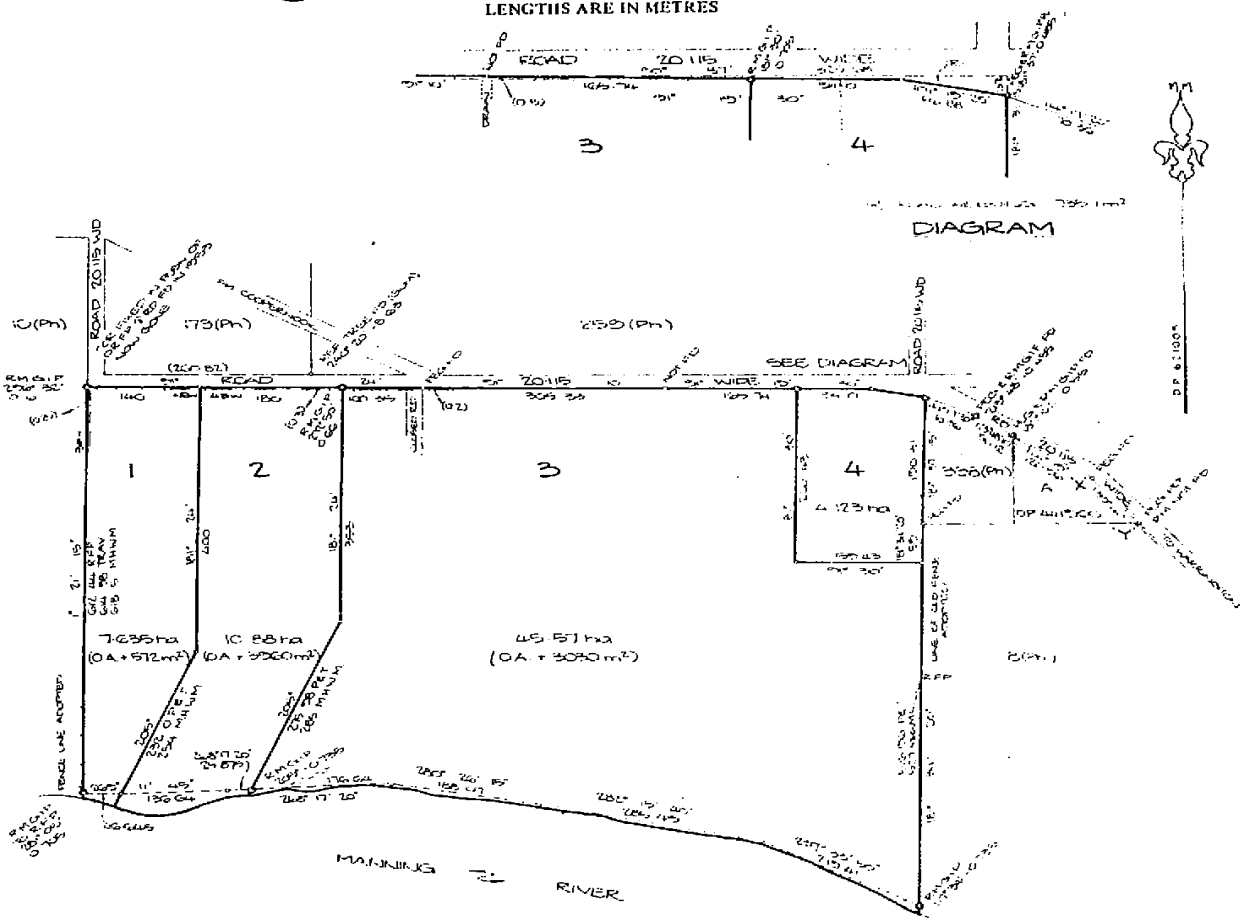
CANCELLED

Registrar General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

S Estate in Fee Simple in Lot 2 in Deposited Plan 621005 at Harrington in the City of Greater Taree Parish of Harrington County of Macquarie being part of Portion 3 granted to Alexander Newton and William Malcolm on 15-11-1852.

FIRST SCHEDULE

WILLIAM HERBERT SHEATHER.

GRY

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. CAUTION. The land within described is held subject to any subsisting interest (as defined in Section 28A Real Property Act, 1900). 11.5.1982

QG

Vol. 14737 Fol. 184

94137C 4.81 D. West, Government Printer

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	Registrar General
John Andrew Clark in ⅓ share, Paul Michael Simon in ⅓ share and Peter James Callaghan in ⅓ share as tenants in common by Transfer T218243. Registered 13-9-1982.	

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS	Registrar General	CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

T218243 TeR

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:42PM

FOLIO: 2/621005

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14737 FOL 184

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
14/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
19/10/1990	Z287741	MORTGAGE	EDITION 1
7/4/1993	I245065	REQUEST	
7/4/1993	I245066	DISCHARGE OF MORTGAGE	
7/4/1993	I245067	TRANSFER	
7/4/1993	I245068	MORTGAGE	
7/4/1993	I245069	MORTGAGE	EDITION 2
20/12/1993	I892041	CAVEAT	
11/8/1994	U523314	WRIT	
12/4/1995	O158489	CAVEAT	
9/11/1995	O497355	WITHDRAWAL OF CAVEAT	
9/11/1995	O672620	WITHDRAWAL OF CAVEAT	
9/11/1995	O489559	REQUEST	EDITION 3
22/12/1995	O793685	APPLICATION TO CANCEL RECORDING OF WRIT	
22/12/1995	O793686	DISCHARGE OF MORTGAGE	
22/12/1995	O793687	DISCHARGE OF MORTGAGE	
22/12/1995	O793688	TRANSFER	
22/12/1995	O793689	MORTGAGE	EDITION 4
2/4/1996	2058478	DISCHARGE OF MORTGAGE	EDITION 5
19/4/1999	5759131	DEPARTMENTAL DEALING	
24/11/2003	AA189092	CAVEAT	
4/5/2006	AC282733	WITHDRAWAL OF CAVEAT	
11/7/2006	AC435733	DEPARTMENTAL DEALING	

END OF PAGE 1 - CONTINUED OVER

SEARCH DATE
25/6/2019 1:42PM

FOLIO: 2/621005

Recorded	Number	Type of Instrument	C.T. Issue
4/7/2016	DP1219124	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

RP13 [redacted]

(1)

TRANSFER

Real Property Act, 1900

I 245067 V

B

Office of State Revenue use only

OFFICE OF STATE REVENUE N12
STAMP DUTY 130003
DUTY $ 2-00 1ST REC No 00262711

(A) LAND TRANSFERRED
Show no more than 20 References to Title.
If appropriate, specify the share transferred.

IDENTIFIER 2/621005

(B) LODGED BY

L.T.O. Box: 4SA

Name, Address or DX and Telephone: NATIONAL AUSTRALIA BANK LIMITED
National Australia Bank Limited
255 George Street, Sydney
237 - 1111 FAX 237 - 1284
REFERENCE (max. 15 characters): D06502

(C) TRANSFEROR PAUL MICHAEL SIMON AND PETER JAMES CALLAGHAN

(D) acknowledges receipt of the consideration of $120,000.00

and as regards the land specified above transfers to the transferee an estate in fee simple as to Transferor's two third interest.

(E) subject to the following **ENCUMBRANCES** 1. ~~Z25774~~ 2. .... 3. ....

(F) TRANSFEREE

JOHN ANDREW CLARK of Lot 2 Manor Road, Harrington

(G) **T** as joint tenants/tenants in common

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900. **DATE OF EXECUTION** 22nd February 1993

Signed in my presence by the transferor who is personally known to me.

[signature]
Signature of Witness

K. D. HERMANS
Name of Witness (BLOCK LETTERS)

Suite 30, 3-9 Terminus St, Castle Hill
Address of Witness

[signatures]
Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

....
Signature of Witness

....
Name of Witness (BLOCK LETTERS)

....
Address of Witness

[signature]
S. W. DAVIES
Solicitor for ~~Signature of~~ Transferee

INSTRUCTIONS FOR FILLING OUT THIS FORM ARE AVAILABLE FROM THE LAND TITLES OFFICE

CHECKED BY (office use only)

97-01T

LICENCE: 944N/0247/95

TRANSFER

Real Property Act, 1900

0
793688 B

Office of

(1)

N.S.W. STAMP DUTY
211295 0724 04 20105437B/03 $2.00

A) **LAND TRANSFERRED** — Identifier 2/621005

B) **LODGED BY**

L.T.O Box	Name, Address or DX and Telephone	REFERENCE (max 15 characters):
291J	A.A. MAAS	

C) **TRANSFEROR** PETER WILLIAM BROOKS as Trustee of the Bankrupt Estate of JOHN ANDREW CLARK

D) acknowledges receipt of the consideration of $331,000.00

and as regards the land specified above transfers to the Transferee an estate in fee simple

E) subject to the following **ENCUMBRANCES** 1. ..... 2. ..... 3. .....

F) **TRANSFEREE**

T TS (s713LGA) TW (Sheriff)	J & M MacDonald Pty Limited (ACN 000 269 812) as to a 35% share as tenant in common with J & M MacDonald Pty Limited as Trustee for J & M MacDonald Staff Superannuation Fund as to the remaining 65% share

G) **TENANCY:** (Lot 1)

H) We certify this dealing correct for the purposes of the Real Property Act,1900. **DATED** 19.12.95

Signed in my presence by the Transferor who is personally known to me.

R Wentworth Hill
Signature of Witness

ROBERT J HILL
Name of Witness

Levenbrook via Grafton NSW 2460
Address of Witness

Peter W Brooks
Signature of Transferor

Signed in my presence by the Transferee who is personally known to me.

.....
Signature of Witness

.....
Name of Witness

.....
Address of Witness

GLENN D. MAAS
SOLICITOR
TAREE

.....
Signature of Transferee's Solicitor
G D Maas

CHECKED BY (office use only)

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:41PM

FOLIO: 4/1219124

First Title(s): OLD SYSTEM
Prior Title(s): 2/621005

Recorded	Number	Type of Instrument	C.T. Issue
4/7/2016	DP1219124	DEPOSITED PLAN	FOLIO CREATED EDITION 1
26/7/2016	DP1219123	DEPOSITED PLAN	
8/12/2016	AK980890	TRANSFER	
8/12/2016	AK980891	MORTGAGE	EDITION 2
19/10/2017	AM818888	DISCHARGE OF MORTGAGE	EDITION 3
4/12/2017	AM936428	CAVEAT	
6/3/2019	AP102677	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

harrington PRINTED ON 25/6/2019

Received: 25/06/2019 13:41:07

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 4/1219124

SEARCH DATE	TIME	EDITION NO	DATE
26/6/2019	9:33 AM	3	19/10/2017

LAND

LOT 4 IN DEPOSITED PLAN 1219124
AT HARRINGTON
LOCAL GOVERNMENT AREA MID-COAST
PARISH OF HARRINGTON COUNTY OF MACQUARIE
TITLE DIAGRAM DP1219124

FIRST SCHEDULE

RIVERSIDE MANORS (HARRINGTON) PTY LTD (T AK980890)

SECOND SCHEDULE (7 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 DP1219124 RIGHT OF ACCESS 4 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 DP1219124 EASEMENT FOR SERVICES VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 DP1219124 POSITIVE COVENANT
5 DP1219124 EASEMENT FOR OVERHEAD POWER LINE(S) 20 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
6 DP1219123 EASEMENT FOR SERVICES APPURTENANT TO THE LAND ABOVE DESCRIBED
* 7 AM936428 CAVEAT BY BAYLINE INVESTMENTS (NSW) PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: PP DP271219 PP DP280078 PP DP280079
PP DP280080 PP DP280081 PP DP280082 PP DP280083
PP DP280084 PP DP280085 PP DP280086 PP DP280087
PP DP280088.

*** END OF SEARCH ***

harrington PRINTED ON 26/6/2019

Received: 26/06/2019 09:33:03

[redacted]

New South Wales

No. 1969/1962

Vol. 11153 Fol. 97
Registered 16-10-1969
Registrar General.

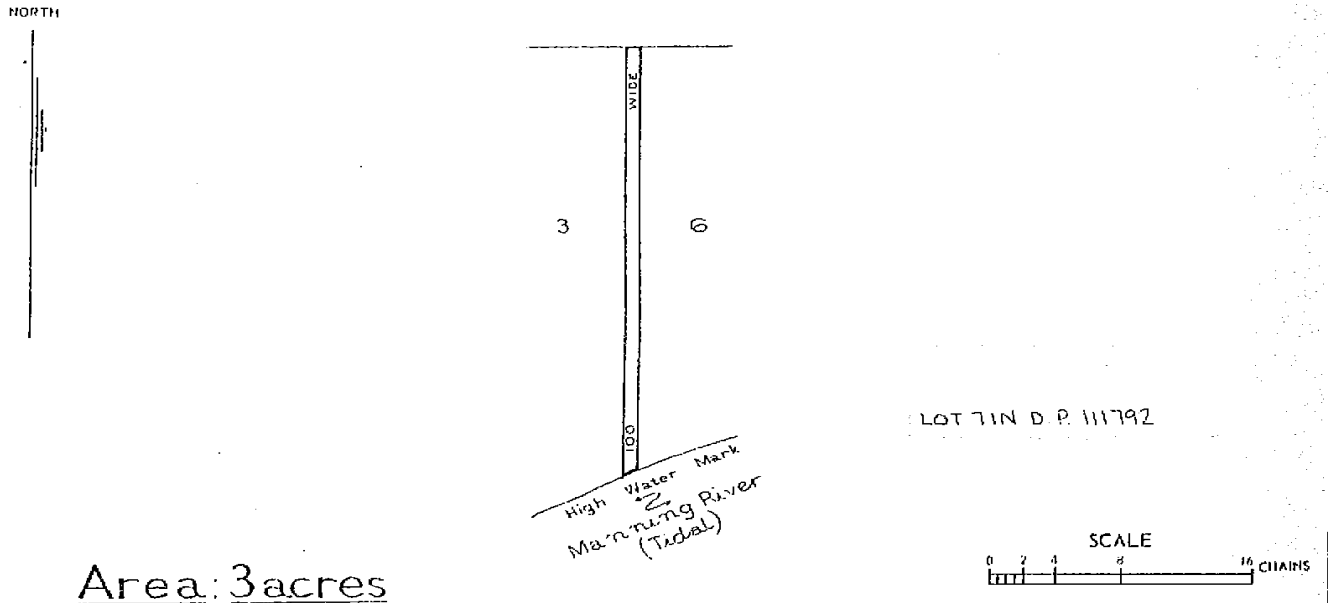
GRANT UPON PURCHASE OF UNNECESSARY ROAD

(Under the Public Roads Act, 1902)

ELIZABETH the SECOND, by the Grace of God of the United Kingdom, Australia and her other Realms and Territories Queen, Head of the Commonwealth, Defender of the Faith:—

To All to whom these Presents shall come, Greeting:—

Whereas WILLIAM HERBERT SHEATHER of Harrington Road Harrington in Our State of New South Wales (hereinafter called the GRANTEE) being the owner of land adjoining the land hereinafter described and intended to be hereby granted (formerly a road which was duly closed in accordance with the provisions of the Public Roads Act, 1902) agreed to have such land granted to him upon payment of the sum of seventy five dollars being the value thereof agreed upon between Our Minister for Lands and the GRANTEE AND WHEREAS the said sum has been duly paid and all things required by law to be done to entitle the GRANTEE to a Grant of the fee simple of the said land Subject to the Reservations and Exceptions hereinafter contained have been done and performed NOW THESE PRESENTS WITNESS That in consideration of the premises WE DO HEREBY GRANT unto the GRANTEE Subject to the Reservations and Exceptions hereinafter contained ALL THAT parcel of land containing by admeasurement three acres be the same more or less situated in the County of Macquarie Parish of Harrington Being the closed road separating portion 3 from portion 6



Area: 3 acres

As per Plan hereon TO HOLD unto the GRANTEE in fee simple PROVIDED NEVERTHELESS AND WE DO HEREBY RESERVE AND EXCEPT unto Us Our Heirs and Successors all minerals which the said Land contains with full power and authority for Us Our Heirs and Successors and such person or persons as shall from time to time be authorised by Us or Them to enter upon the said Land and to search for mine dig and remove the said minerals AND ALSO all such parts and so much of the said Land as may hereafter be required for public ways in over and through the same to be set out by Our Governor for the time being of Our said State or some person by him authorised in that respect with full power for Us Our Heirs and Successors and for Our Governor as aforesaid by such person or persons as shall be by Us Them or him authorised in that behalf to make and conduct all such public ways And the right of full and free ingress egress and regress into out of and upon the said Land for the several purposes aforesaid or any of them IN TESTIMONY WHEREOF We have caused this Our Grant to be Sealed with the Seal of Our said State

Witness Our Governor of Our State of New South Wales and its Dependencies in the Commonwealth of Australia, at Sydney in Our said State, this first day of October in the eighteenth year of Our Reign and in the year of Our Lord one Thousand nine hundred and sixty nine

A. A. Cuttle
Governor

FOR ENDORSEMENTS SEE PAGE 2

V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 11153 Fol 97

SCHEDULE OF REGISTERED PROPRIETORS

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
NEW CERTIFICATION OF TITLE ISSUED PER DP 621005 NO DEALING TO BE REGISTERED WITHOUT REFERENCE TO SURVEY DRAFTING BRANCH					

DP 621005

SCHEDULE OF ENCUMBRANCES ETC.

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		
			whole 24-5-1982 Deposited 621005 1/4 14737 183/186 Vide I.V.A. 37093 Consolidation					

(Page 2 of 2 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

[redacted]ICATE OF TITLE

NEW SOUTH WALES

[redacted]L PROPERTY ACT, 1900

14737185

IVA No. 37093 (Part)

Prior Title Vol. 11153 Fol. 97

Vol. 14737 Fol. 185

EDITION ISSUED

11 5 1982

14737 Fol. 185

(Page 1) Vol.

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

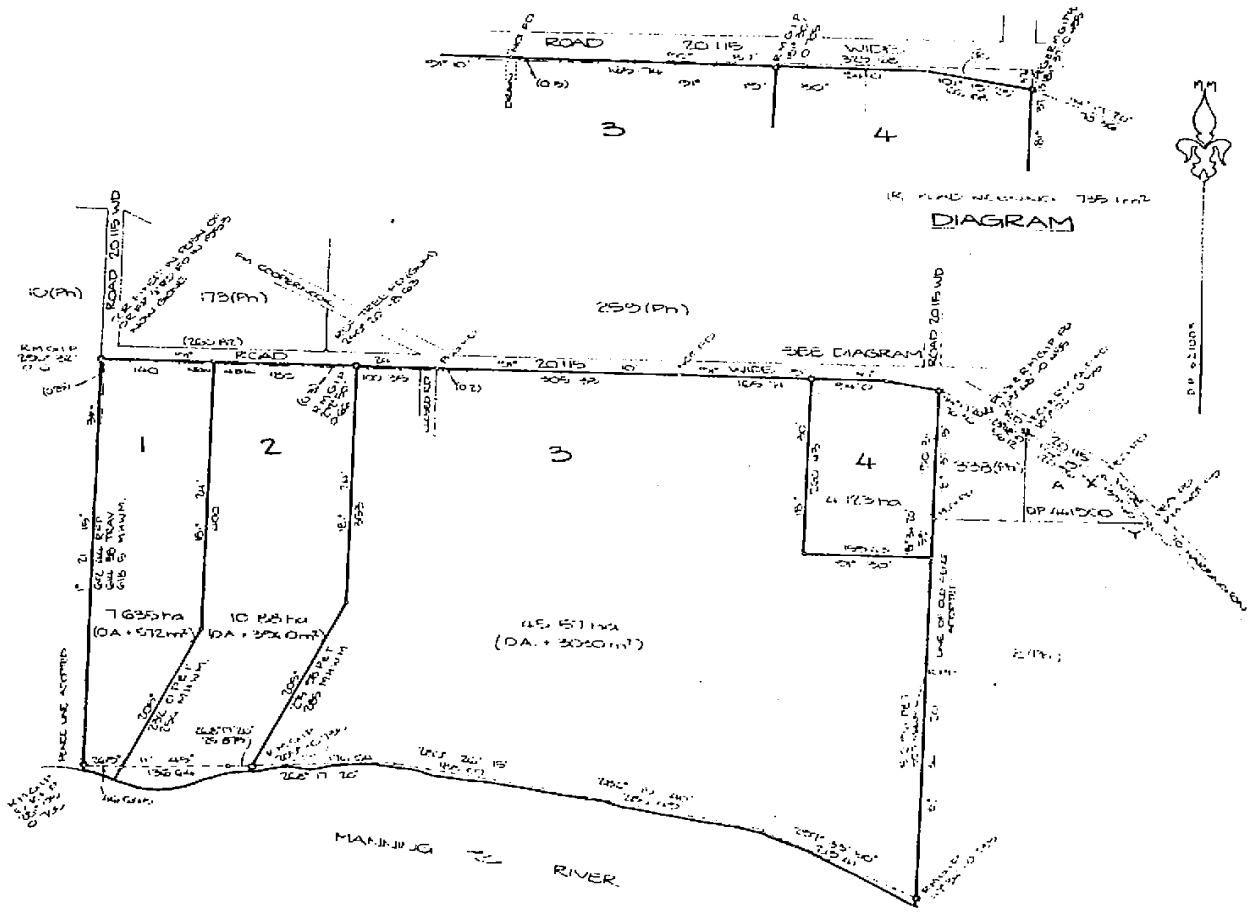
CANCELLED

Registrar General

SUPERSEDED FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 3 in Deposited Plan 621005 at Harrington in the City of Greater Taree Parish of Harrington County of Macquarie being part of Portion 3 granted to Alexander Newton and William Malcolm on 15-11-1852, Portion 6 and part of Portion 7 separately granted to Alexander Newton and William Malcolm on 12-8-1856 and Lot 7 in Deposited Plan 111792 granted by Crown Grant Volume 11153 Folio 97.EXCEPTING THEREOUT the minerals reserved by the Crown Grant for Lot 7 in Deposited Plan 111792.

FIRST SCHEDULE

~~WILLIAM HERBERT HEATHER.~~

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grants above referred to.
2. CAUTION. The land within described is held subject to any subsisting interest (as defined in Section 28A Real Property Act, 1900) affecting the part of the land above described comprised in Deed Book 2672 No. 453.

Vol. 14737 Fol. 185

94137C 4.81 D. West, Government Printer

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	Registrar General
Kenneth Edgar Billings and Shirley Margaret Billings as Joint Tenants by Transfer V75017. Registered 27-4-1984.	

CANCELLED

NO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS	Registrar General	CANCELLATION
V75018 Mortgage to William Herbert Sheather. Registered 27-4-1984.		

NOTATIONS AND UNREGISTERED DEALINGS

V75017 Transfer - 18 May 81

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:43PM

FOLIO: 3/621005

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14737 FOL 185

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
24/10/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
27/9/1994	U654845	DISCHARGE OF MORTGAGE	EDITION 1
27/2/1995	DP847223	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

harrington PRINTED ON 25/6/2019

Received: 25/06/2019 13:43:26

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:43PM

FOLIO: 31/847223

First Title(s): VOL 11153 FOL 97 OLD SYSTEM
Prior Title(s): 3/621005

Recorded	Number	Type of Instrument	C.T. Issue
27/2/1995	DP847223	DEPOSITED PLAN	FOLIO CREATED EDITION 1
26/8/2003	9912686	CAVEAT	
24/11/2003	AA189075	CAVEAT	
21/10/2004	DP1075021	DEPOSITED PLAN	
19/4/2005	DP1080881	DEPOSITED PLAN	
20/2/2008	AD693455	APPLICATION FOR PREPARATION OF LAPSING NOTICE	
6/4/2016	AK335885	WITHDRAWAL OF CAVEAT	
8/4/2016	DP1217806	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

harrington PRINTED ON 25/6/2019

Received: 25/06/2019 13:43:09

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
25/6/2019 1:41PM

FOLIO: 6/1217806

First Title(s): VOL 11153 FOL 97 OLD SYSTEM
Prior Title(s): 31/847223

Recorded	Number	Type of Instrument	C.T. Issue
8/4/2016	DP1217806	DEPOSITED PLAN	FOLIO CREATED EDITION 1
17/12/2016	AM7911	TRANSFER	
17/12/2016	AM7912	MORTGAGE	EDITION 2
30/8/2017	AM688283	DISCHARGE OF MORTGAGE	EDITION 3
4/12/2017	AM936428	CAVEAT	
6/3/2019	AP102677	DEPARTMENTAL DEALING	
1/4/2019	AP156194	WITHDRAWAL OF CAVEAT	
1/4/2019	AP159285	TRANSFER	EDITION 4
2/4/2019	AP161878	CAVEAT	

*** END OF SEARCH ***

harrington PRINTED ON 25/6/2019

Received: 25/06/2019 13:41:07

Form: 01T
Licence: 01-05-025
Licensee: LEAP Legal Software Pty Limited
Firm name: PATON HOOKE LAWYERS

TRANSFER

New South Wales
Real Property Act 1900

AM7911R

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY Office of State Revenue use only

Office of State Revenue
NSW Treasury
Client No: 1408011 3315
Duty: $10.00 Trans No 893265I-001
Asst details:

(A) **TORRENS TITLE** 6/1217806

(B) **LODGED BY**

Document Collection Box	Name, Address or DX, Telephone, and Customer Account Number if any
268D	SYDNEY LEGAL AGENTS - INFOTRACK LLP: 132579W Reference: Hooke/311677

CODES T TW

(C) **TRANSFEROR** Kenneth Edgar BILLINGS and Shirley Margaret BILLINGS

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $495,000.00 and as regards

(E) **ESTATE** the abovementioned land transfers to the transferee an estate in fee simple.

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable):

(H) **TRANSFEREE** Riverside Manors (Harrington) Pty Ltd ACN 167 219 801

(I) **TENANCY:**

DATE 29 November 2016

(J) I certify that I am an eligible witness and that the transferor signed this dealing in my presence. [See note* below]

Signature of witness:

Name of witness: ELIZABETH SHANAHAN
Address of witness: 25 ALBERT ST, TAREE NSW 2430

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferor: K. Billings Shirley M. Billings

Certified correct for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature:

Signatory's name: Philip Stroud
Signatory's capacity: Solicitor for the Transferee

(K) The transferee's solicitor certifies that the eNOS data relevant to this dealing has been submitted and stored under eNOS ID No. 1180436 Full name: Philip Stroud Signature:

*s 117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation.168911

ALL HANDWRITING MUST BE IN BLOCK CAPITALS.

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 6/1217806

SEARCH DATE	TIME	EDITION NO	DATE
26/6/2019	9:33 AM	4	1/4/2019

LAND

LOT 6 IN DEPOSITED PLAN 1217806
AT HARRINGTON
LOCAL GOVERNMENT AREA MID-COAST
PARISH OF HARRINGTON COUNTY OF MACQUARIE
TITLE DIAGRAM DP1217806

FIRST SCHEDULE

BLUE WATER (AUST) PTY LTD (T AP159285)

SECOND SCHEDULE (12 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 LAND EXCLUDES MINERALS WITHIN THE PART(S) SHOWN SO INDICATED IN THE TITLE DIAGRAM
3 DP1075021 EASEMENT TO DRAIN WATER 4 METRES WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
4 DP1075021 EASEMENT TO DRAIN WATER 3 METRES WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
5 DP1075021 EASEMENT TO DRAIN WATER 2 METRES WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
6 DP1080881 EASEMENT TO DRAIN WATER 2 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
7 DP1217806 RIGHT OF ACCESS 4 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
8 DP1217806 EASEMENT FOR SERVICES VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
9 DP1217806 RIGHT OF ACCESS 5 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
10 DP1217806 POSITIVE COVENANT
11 DP1217806 EASEMENT FOR OVERHEAD POWER LINE(S) 20 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
* 12 AP161878 CAVEAT BY RIVERSIDE MANORS (HARRINGTON) PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: PP DP271219 PP DP280078 PP DP280079
PP DP280080 PP DP280081 PP DP280082 PP DP280083
PP DP280084 PP DP280085 PP DP280086 PP DP280087

END OF PAGE 1 - CONTINUED OVER

NOTATIONS (CONTINUED)

PP DP280088.

*** END OF SEARCH ***

Received: 26/06/2019 09:33:03

NSW GOVERNMENT | SafeWork NSW

Locked Bag 2906, Lisarow NSW 2252
Customer Experience 13 10 50
ABN 81 913 830 179 | www.safework.nsw.gov.au

Our Ref: D19/150805

27 June 2019

Douglas Partners
Mr Joel Cowan
PO Box 5463
PORT MACQUARIE NSW 2444

Dear Mr Cowan

RE SITE: 56, 48, 26 Manor Rd, Harrington NSW

I refer to your site search request received by SafeWork NSW on 25 June 2019 requesting information on Storage of Hazardous Chemicals for the above site.

A search of the records held by SafeWork NSW has not located any records pertaining to the above-mentioned premises.

For further information or if you have any questions, please call us on 13 10 50 or email licensing@safework.nsw.gov.au

Yours sincerely

Customer Service Officer
Customer Experience - Operations
SafeWork NSW

Appendix D

Plans Supplied by Client

HARRINGTON WATERS LIFESTYLE VILLAGE

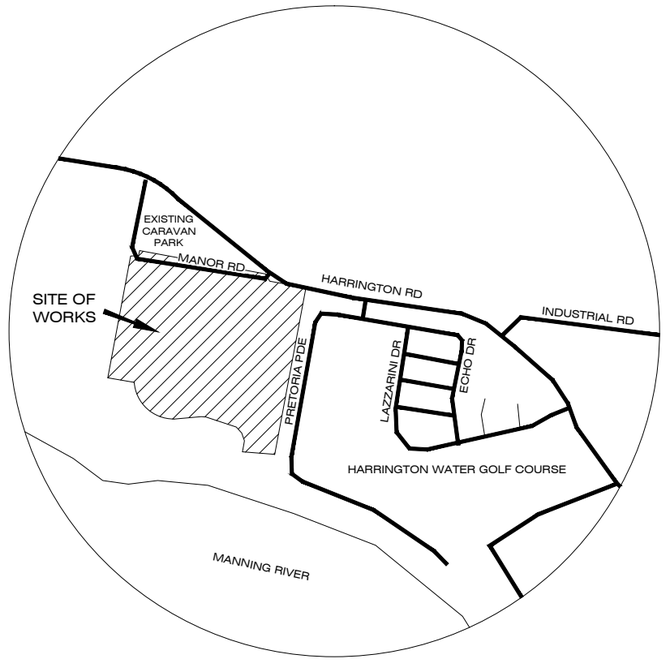
MANOR ROAD, HARRINGTON

DA DESIGN PLANS

ROAD, DRAINAGE & ASSOCIATED WORKS

Schedule of Drawings

Sheet	File Number	Description	Revision
1	21800138	TITLE PAGE, DRAWING INDEX & LOCALITY SKETCH	F
2	21800139	OVERALL LAYOUT PLAN	F
3	21800140	INDICATIVE STAGING PLAN	F
4	21800141	OVERALL DETAIL PLAN	F
5	21800142	DETAIL SHEET 1	F
6	21800143	DETAIL SHEET 2	F
7	21800144	DETAIL SHEET 3	F
8	21800145	DETAIL SHEET 4	F
9	21800146	GENERAL DETAILS & ROAD TYPICAL SECTIONS	F
10	21800147	ROAD LONGITUDINAL SECTIONS	F
11	21800148	ROAD LONGITUDINAL SECTIONS - SHEET 2	F
12	21800149	ROAD LONGITUDINAL SECTIONS - SHEET 3	F
13	21800150	ROAD LONGITUDINAL SECTIONS - SHEET 4	F
14	21800151	BASIN 1 DETAIL PLAN	F
15	21800152	BASIN 2 DETAIL PLAN	F
16	21800153	BASIN SECTIONS	F
17	21800154	TYPICAL DRAINAGE LONGITUDINAL SECTION	F
18	21800155	SITE CUT-FILL PLAN	F
19	21800156	TYPICAL EROSION & SEDIMENT CONTROL PLAN	F
20	21800157	TYPICAL SOIL & WATER MANAGEMENT PLAN NOTES	F

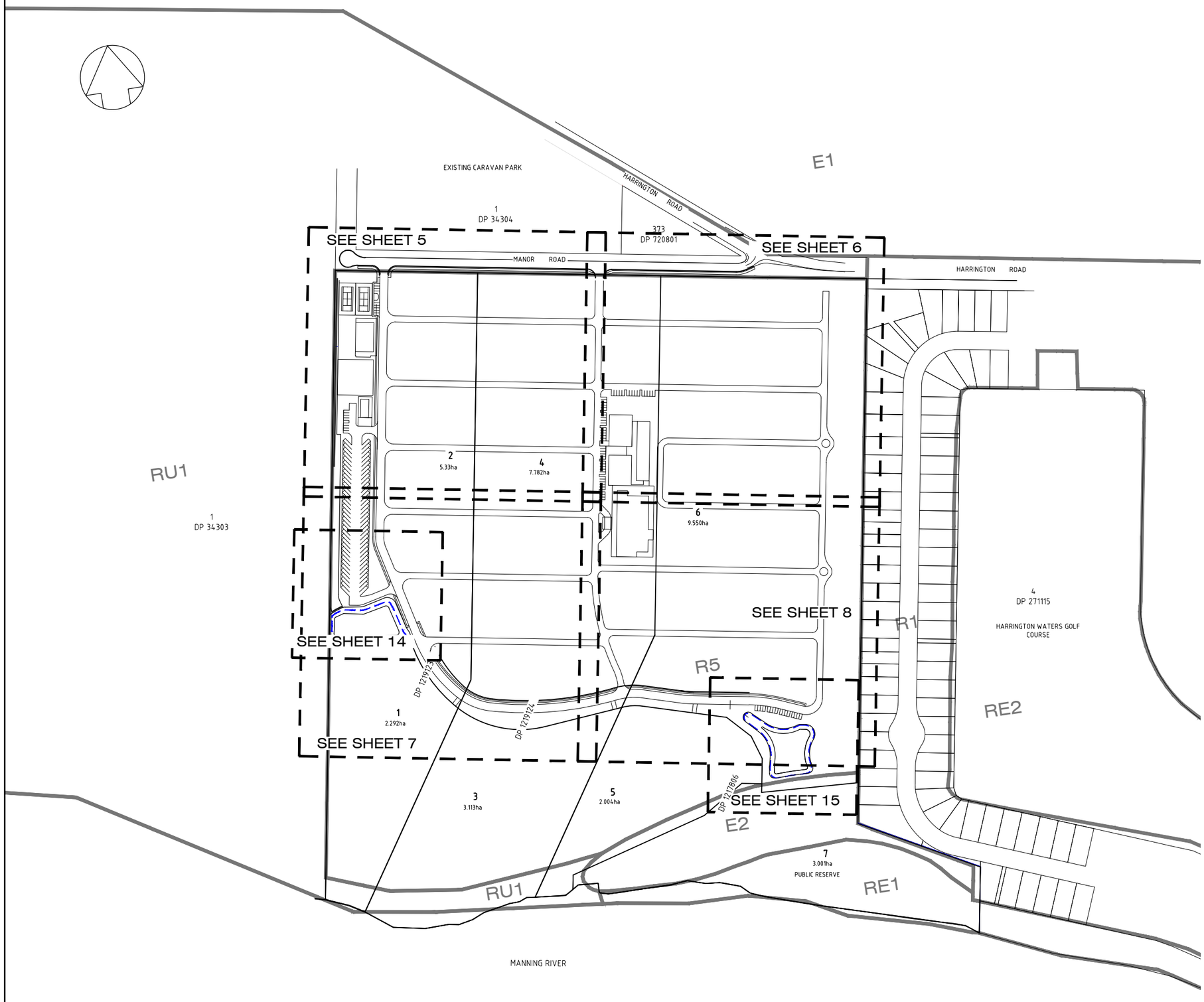


LOCALITY SKETCH

Designed By TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS IN ENGINEERING, SURVEYING & PLANNING
PO Box 580 RAYMOND TERRACE Phone (02) 4987 1500

FILE : 21800138
JOB No. : 217154
SHEET No. :1 of 20

S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg
Plotted 09:17 28/06/19



REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

* Denote the original signature and date when revision was issued.

TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
ENGINEERING, SURVEYING & PLANNING
2 Bourke St. P.O.Box 580
RAYMOND TERRACE 2324
Fax (02) 49871733 Phone (02) 49871500

OVERALL LAYOUT PLAN
HARRINGTON WATERS LIFESTYLE VILLAGE
MANOR ROAD, HARRINGTON
LOT 2 IN DP 1219123, 4 IN DP 1219124 & 6 IN DP 1217806

COUNCIL: MID COAST	REFERENCE: 21800139
PARISH	SHEET SIZE: A3
SCALE: 1:4000 on A3	SHEET No.: 2
DATE : Plotted 09:18 28/06/19	

CLIENT: Bayline Developments (NSW) Pty Ltd | JOB No.: 217154 | COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 , XREF [Base2 , XREF.dwg], Xref: CutFill XREF [CutFill XREF.dwg], Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg], Xref: 217154 , PRELIM DP [217154 , PRELIM DP.dwg], Xref: BaseRev C , XREF [BaseRev C , XREF.dwg]

STAGE 1 - 29 LOTS
STAGE 2 - 25 LOTS
STAGE 3 - 22 LOTS
STAGE 4 - 21 LOTS
STAGE 5 - 22 LOTS
STAGE 6 - 22 LOTS
STAGE 7 - 40 LOTS
STAGE 8 - 22 LOTS
STAGE 9 - 20 LOTS
STAGE 10 - 45 LOTS
STAGE 11 - 24 LOTS
TOTAL = 292 LOTS

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

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TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
ENGINEERING, SURVEYING & PLANNING
2 Bourke St. P.O.Box 580
RAYMOND TERRACE 2324
Fax (02) 49871733 Phone (02) 49871500

PROVISIONAL STAGING PLAN
HARRINGTON WATERS LIFESTYLE VILLAGE
MANOR ROAD, HARRINGTON
LOT 2 IN DP 1219123, 4 IN DP 1219124 & 6 IN DP 1217806

COUNCIL: MID COAST	REFERENCE: 21800140
PARISH	SHEET SIZE: A3
SCALE: 1:2000 on A3	SHEET No.: 3
DATE : Plotted 09:18 28/06/19	

CLIENT: Bayline Developments (NSW) Pty Ltd | JOB No.: 217154 | COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 , XREF [Base2 , XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 , PRELIM DP [217154 , PRELIM DP.dwg] Xref: BaseRev C , XREF [BaseRev C , XREF.dwg]

RU1

MANOR ROAD

PROPOSED WETLAND

PROPOSED WETLAND

PROPOSED WETLAND

TENNIS COURTS

CLUB HOUSE / GYM

BOWLING GREEN

MENS SHED

MAINT. SHED

CARAVAN PARKING

ENTRY FEATURE

ROAD 4 (PRIVATE ROAD)

ROAD 5 (PRIVATE ROAD)

ROAD 2 (PUBLIC ROAD)

ROAD 6 (PRIVATE ROAD)

ROAD 7 (PRIVATE ROAD)

ROAD 8 (PRIVATE ROAD)

ROAD 9 (PRIVATE ROAD)

ROAD 10 (PRIVATE ROAD)

ROAD 11 (PRIVATE ROAD)

ROAD 12 (PRIVATE ROAD)

ROAD 3 (PRIVATE ROAD)

VILLAGE GREEN

VILLAGE GREEN

RETAIL TENANCIES

REC CENTRE

5 metre buffer zone

5 metre buffer zone

R5

R5

E2

1
DP 34303

1
DP 1219123

3
DP 1219124

5
DP 1217806

CONSTRUCT DRIVEWAY TO REPLACE RIGHT OF CARRIAGEWAY

CONSTRUCT DRIVEWAY TO REPLACE RIGHT OF CARRIAGEWAY

CONSTRUCT DRIVEWAY TO REPLACE RIGHT OF CARRIAGEWAY

DRAINAGE PIPES TO BE CONSTRUCTED IN PROPOSED EASEMENT

LEGEND

- PROPOSED PIPE
- PROPOSED DRAIN
- PROPOSED BIOFILTER
- PROPOSED WETLAND

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

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TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

OVERALL DETAIL PLAN

SCALE : 0 10 20m
1:2000 for A3 sized plot

SHEET No. :4

JOB No. : 217154

FILE : 21800141

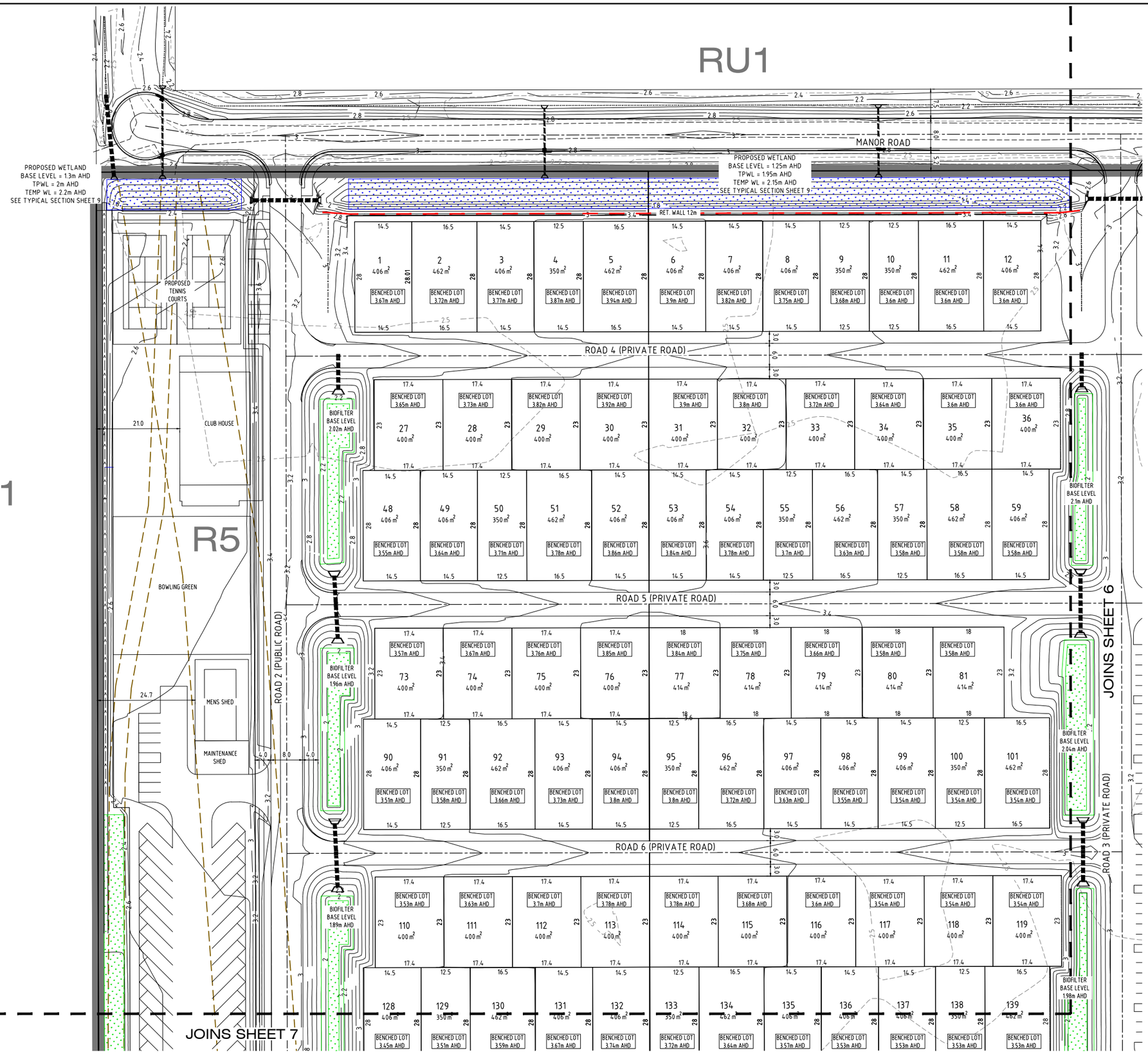
DATE : Plotted 11:36 08/07/19

SHEET SIZE: A3

COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]

BENCHING NOTES:
1. FINISHED FLOOR LEVEL OF DWELLINGS TO BE 170mm ABOVE BENCHED LOT LEVEL.



F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*
REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE

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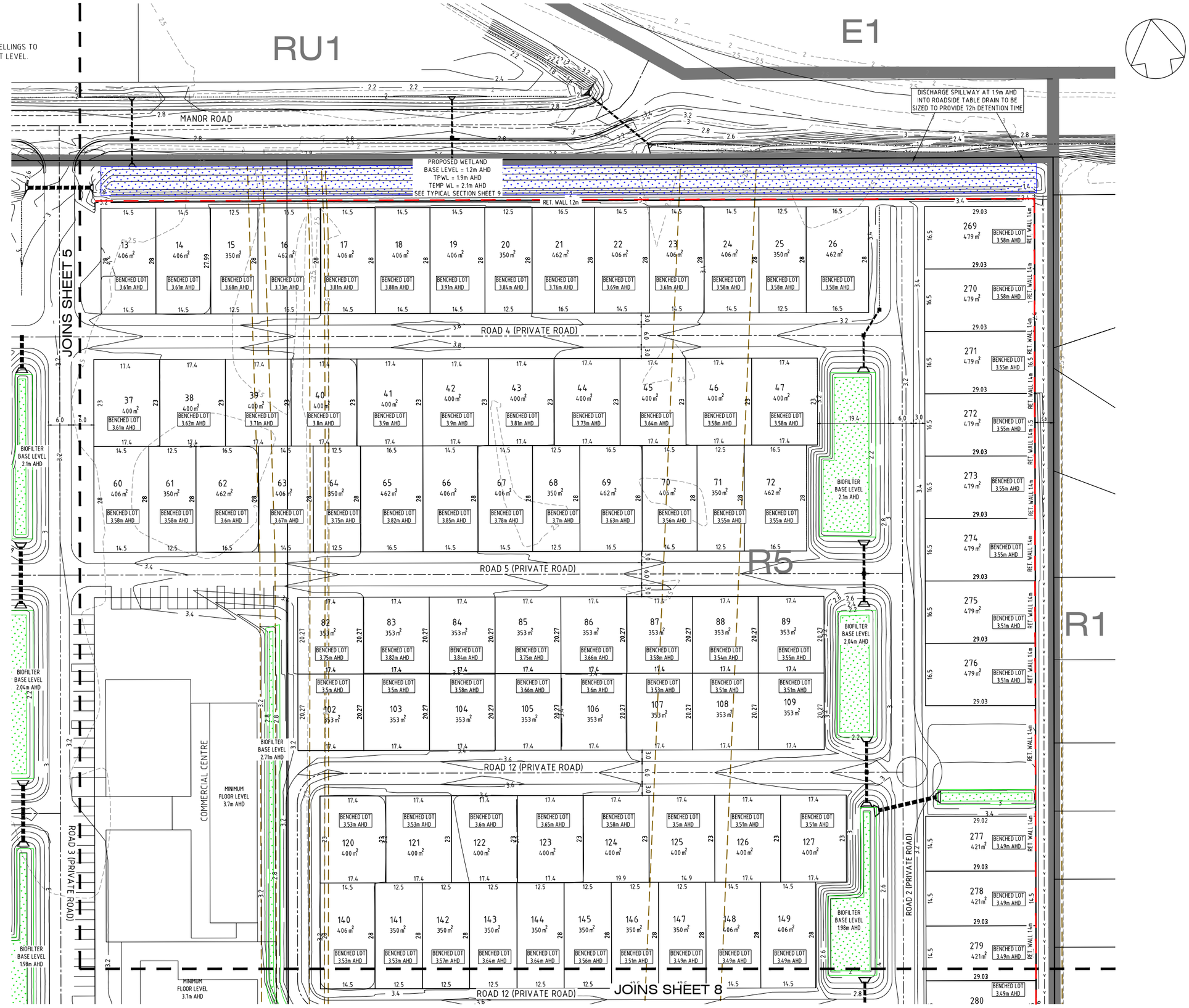
TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

DETAIL PLAN SHEET 1

SCALE : 1:1000 for A3 sized plot (1 0 10m)
SHEET No. :5
FILE : 21800142
SHEET SIZE: A3
JOB No. : 217154
DATE : Plotted 09:19 28/06/19
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]

BENCHING NOTES:
1. FINISHED FLOOR LEVEL OF DWELLINGS TO BE 170mm ABOVE BENCHED LOT LEVEL.



F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*
REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE

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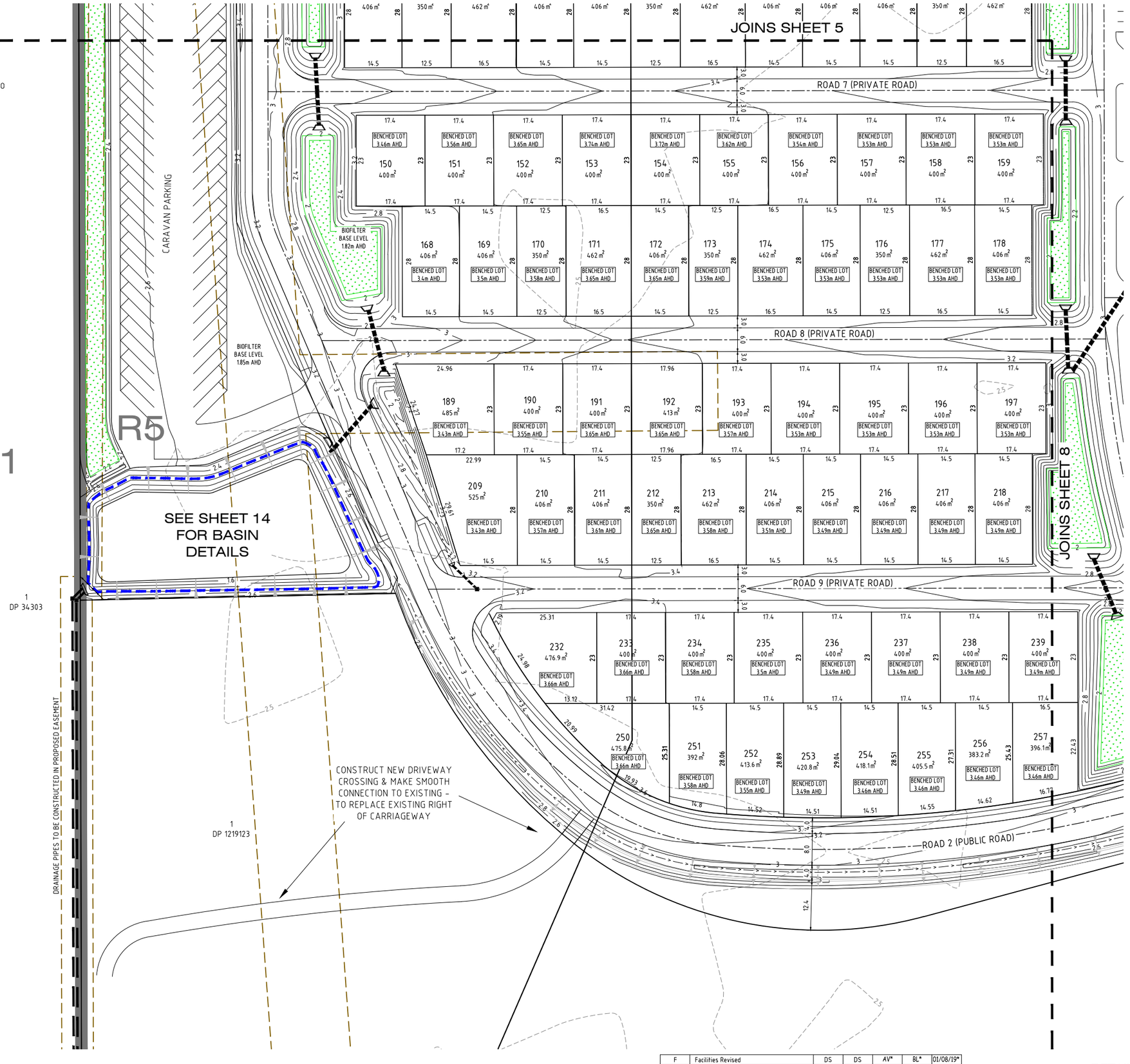
TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

DETAIL PLAN SHEET 2

SCALE : 1:2000 for A3 sized plot
SHEET No. :6
JOB No. : 217154
FILE : 21800143
DATE : Plotted 09:19 28/06/19
SHEET SIZE: A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

BENCHING NOTES:
1. FINISHED FLOOR LEVEL OF DWELLINGS TO BE 170mm ABOVE BENCHED LOT LEVEL.



REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

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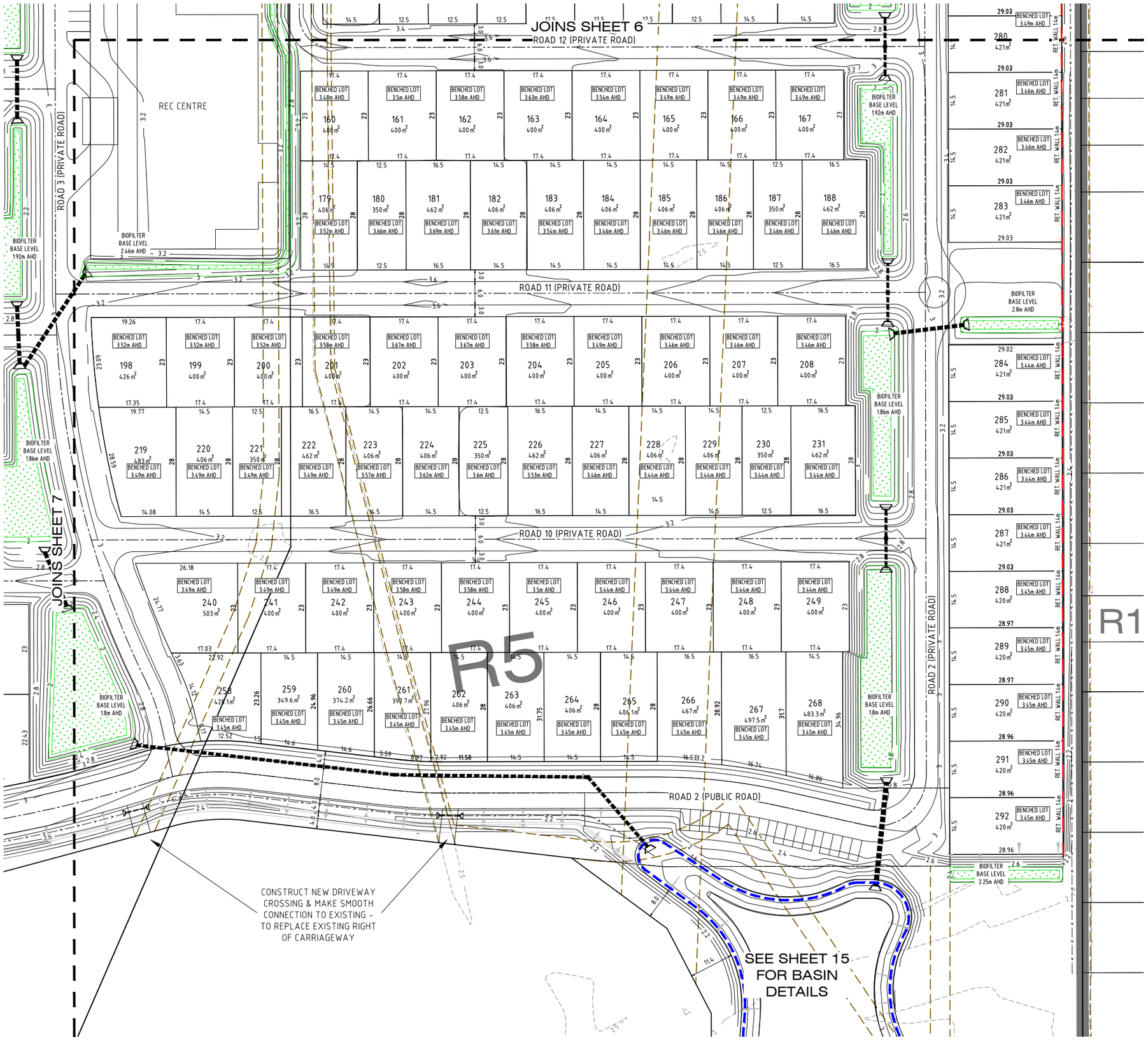
TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

DETAIL PLAN SHEET 3

SCALE : 1:2000 for A3 sized plot
SHEET No. :7
JOB No. : 217154
FILE : 21800144
DATE : Plotted 11:30 08/07/19
SHEET SIZE: A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

BENCHING NOTES:

1. FINISHED FLOOR LEVEL OF DWELLINGS TO BE 170mm ABOVE BENCHED LOT LEVEL.



REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

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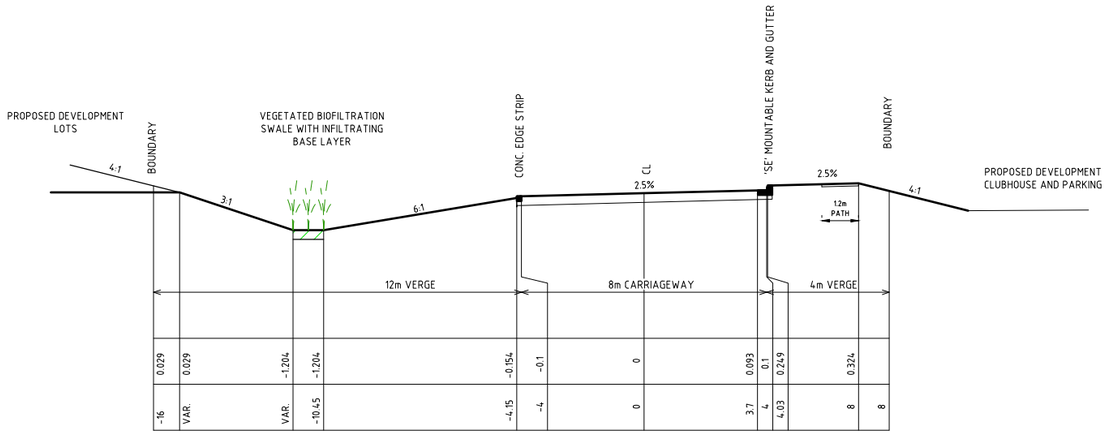
TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

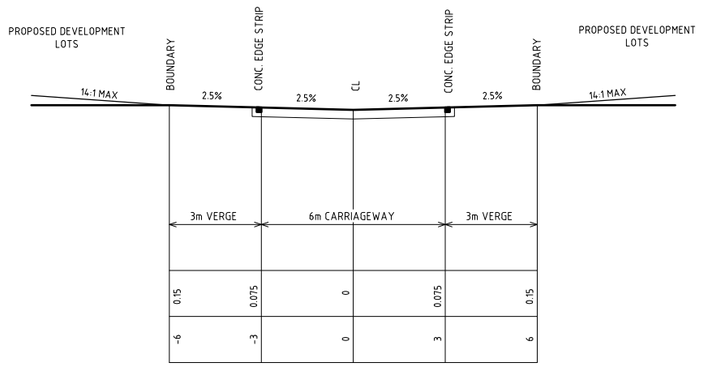
DETAIL PLAN SHEET 4

SCALE : 1:2000 for A3 sized plot	SHEET No. :8	FILE : 21800145	SHEET SIZE A3
	JOB No. : 217154	DATE : Plotted 11:31 08/07/19	
	COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg		

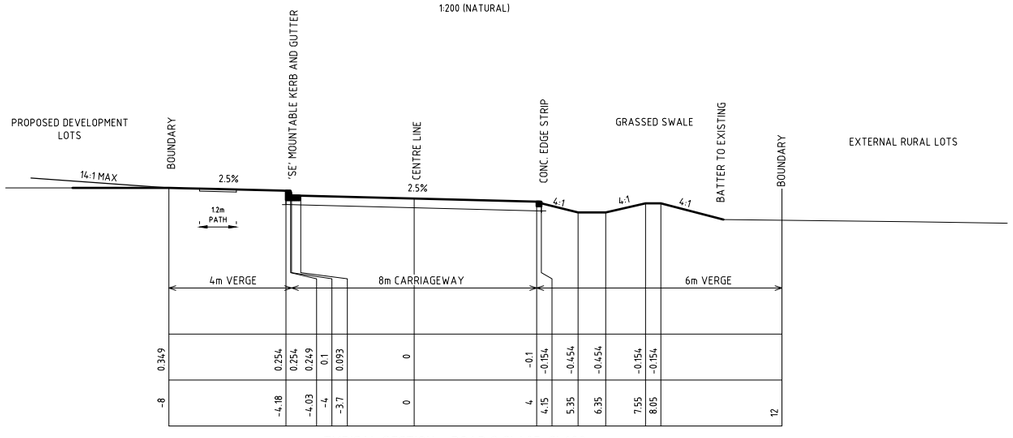
Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



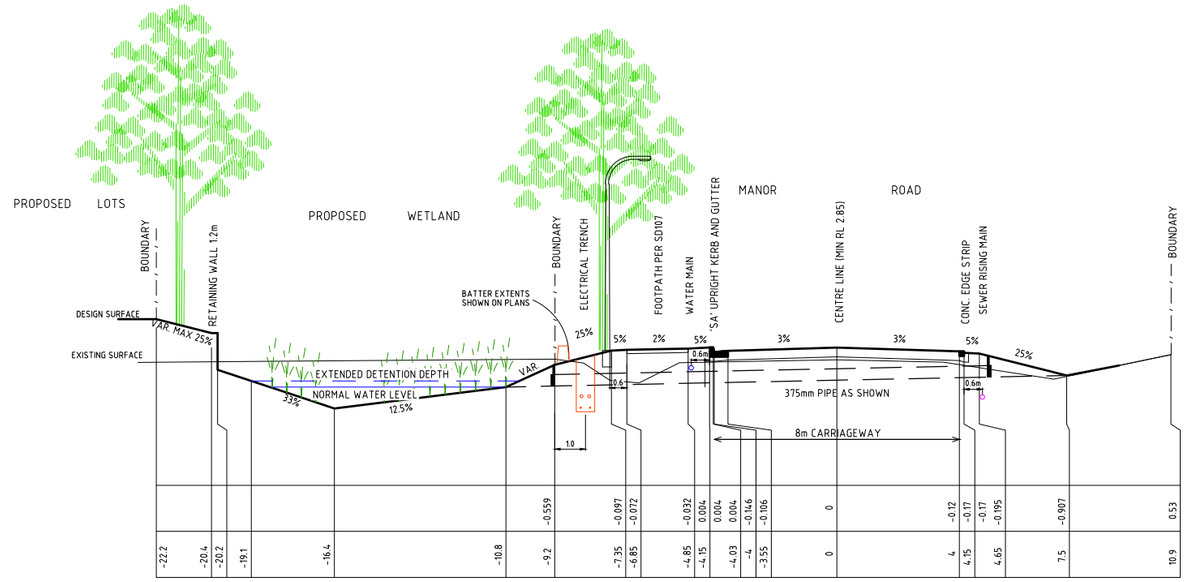
TYPICAL SECTION - ROAD 2 Ch60.0-Ch300
1:200 (NATURAL)



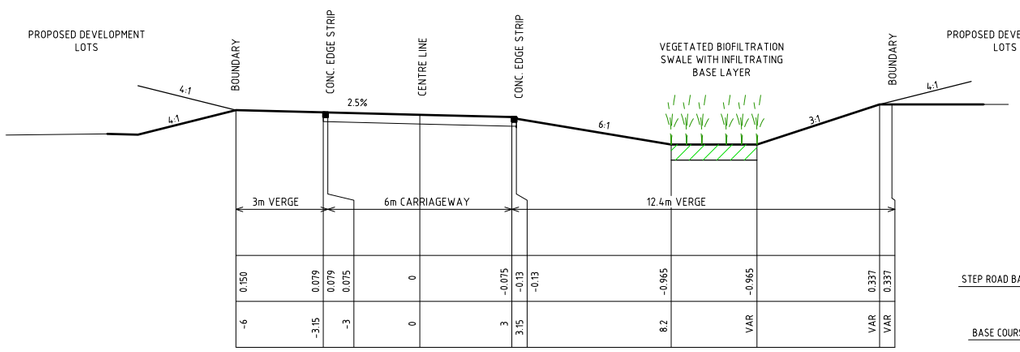
TYPICAL SECTION - ROADS 4 TO 12
1:200 (NATURAL)



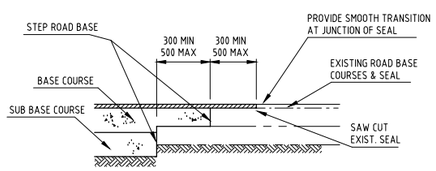
TYPICAL SECTION - ROAD 2 Ch405-Ch600
1:200 (NATURAL)



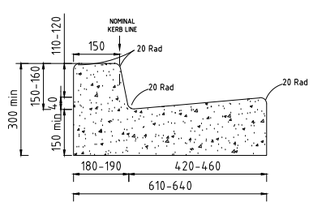
TYPICAL SECTION - MANOR ROAD UPGRADE
1:200 (NATURAL)



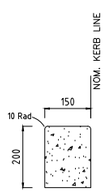
TYPICAL SECTION - ROAD 3 & ROAD 2 Ch799.6-Ch1220 (Mirrored)
1:200 (NATURAL)



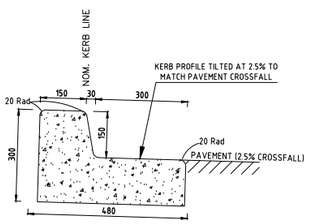
KEY JOINT DETAIL BETWEEN NEW & EXISTING PAVEMENT
NOT TO SCALE



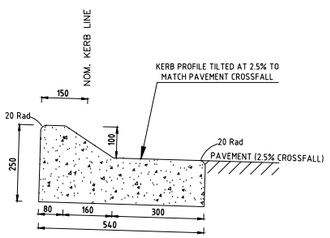
SA - KERB AND GUTTER
NOT TO SCALE
ALL DETAILS PER MCC STD. N0.0107



EDGE STRIP
NOT TO SCALE
ALL DETAILS PER MCC STD. No.0107



SL - BARRIER KERB
NOT TO SCALE
ALL DETAILS PER MCC STD. N0.0107



SE - MOUNTABLE KERB AND GUTTER
NOT TO SCALE
ALL DETAILS PER MCC STD. N0.0107

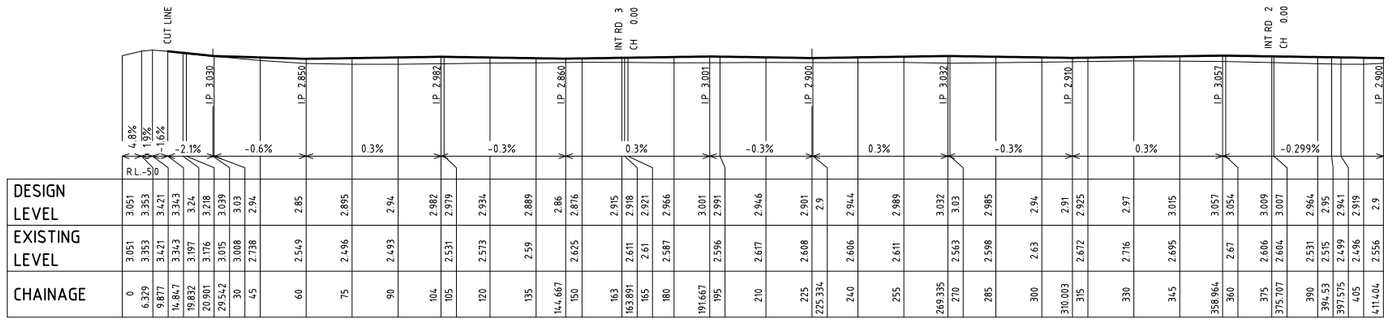
REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

* Denote the original signature and date when revision was issued.

TYPICAL SECTIONS & GENERAL DETAILS

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : AS SHOWN
SHEET No. :9
JOB No. : 217154
FILE : 21800146
DATE : Plotted 09:21 28/06/19
SHEET SIZE A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg



MANOR ROAD

H=1:2000 V=1:400

ROAD.No.2

H=1:2000 V=1:400

ROAD.No.2

H=1:2000 V=1:400

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

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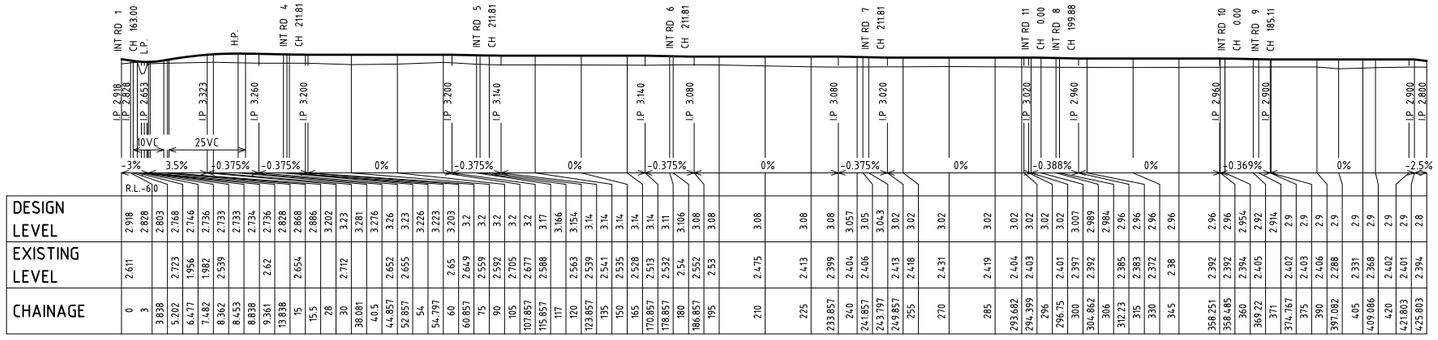
ROAD LONGITUDINAL SECTIONS

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : AS SHOWN
SHEET No. :10
JOB No. : 217154
FILE : 21800147
DATE : Plotted 09:21 28/06/19
SHEET SIZE A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



DESIGN LEVEL	EXISTING LEVEL	CHAINAGE
2.918	2.611	0
2.828		3
2.803		3.838
2.768	2.723	5.202
2.746	1.956	6.477
2.736	1.982	7.482
2.733	2.539	8.362
2.733		8.453
2.734		8.838
2.736	2.62	9.361
2.828		13.838
2.868	2.654	15
2.886		15.5
3.202		28
3.23	2.712	30
3.281		38.081
3.276		40.5
3.26	2.652	44.857
3.23	2.655	52.857
3.226		54
3.223		54.797
3.203	2.65	60
3.2	2.649	60.857
3.2	2.559	75
3.2	2.592	90
3.2	2.705	105
3.2	2.677	107.857
3.17	2.588	115.857
3.166		117
3.154	2.563	120
3.14	2.539	123.857
3.14	2.541	135
3.14	2.535	150
3.14	2.528	165
3.14	2.513	170.857
3.11	2.532	178.857
3.106	2.54	180
3.08	2.552	186.857
3.08	2.53	195
3.08	2.475	210
3.08	2.413	225
3.08	2.399	233.857
3.057	2.404	240
3.05	2.406	241.857
3.043		243.797
3.02	2.413	249.857
3.02	2.418	255
3.02	2.431	270
3.02	2.419	285
3.02	2.404	293.682
3.02	2.403	294.399
3.02		296
3.02	2.401	296.75
3.007	2.397	300
2.989	2.392	304.862
2.984		306
2.96	2.385	312.23
2.96	2.383	315
2.96	2.372	330
2.96	2.38	345
2.96	2.392	358.251
2.96	2.392	358.485
2.954	2.394	360
2.92	2.405	369.22
2.914		371
2.9	2.402	374.767
2.9	2.403	375
2.9	2.406	390
2.9	2.288	397.082
2.9	2.331	405
2.9	2.368	409.086
2.9	2.402	420
2.9	2.401	421.803
2.8	2.394	425.803

ROAD.No.3

H=1:2000 V=1:400

DESIGN LEVEL	EXISTING LEVEL	CHAINAGE
3.265	2.493	0
3.165	2.49	4
3.353	2.482	11.5
3.41		13.8
3.416	2.478	15
3.492	2.458	30
3.567	2.43	45
3.609	2.424	53.291
3.643	2.526	60
3.718	2.578	75
3.794	2.655	90
3.719	2.537	105
3.644	2.46	120
3.569	2.455	135
3.494	2.451	150
3.419	2.448	165
3.344	2.492	180
3.269	2.569	195
3.245		199.815
3.231	2.601	201.215
3.165	2.635	207.815
3.155		208.815
3.185	2.646	210
3.23	2.655	211.815
3.305	2.646	214.815
3.356	2.422	225
3.431	2.402	240
3.482	2.391	250.199
3.506	2.46	255
3.581	2.642	270
3.588	2.657	271.467
3.608	2.389	275.487
3.621	2.678	277.94
3.629	2.532	279.513
3.639	2.677	281.709
3.652	2.263	284.281
3.656	2.251	285
3.731	2.356	300
3.782		310.222
3.758	2.371	315
3.683	2.375	330
3.608	2.359	345
3.533	2.379	360
3.458	2.478	375
3.383	2.402	390
3.308	2.397	405
3.233	2.414	420
3.22		422.631
3.202	2.419	424.431
3.13	2.406	431.631
3.205	2.396	434.631

ROAD.No.4

H=1:2000 V=1:400

DESIGN LEVEL	EXISTING LEVEL	CHAINAGE
3.195	2.621	0
3.095	2.634	4
3.283	2.658	11.5
3.34		13.8
3.346	2.664	15
3.424	2.623	30
3.501	2.605	45
3.579	2.599	60
3.657	2.602	75
3.734	2.571	90
3.659	2.529	105
3.584	2.572	120
3.509	2.626	135
3.434	2.601	150
3.359	2.573	165
3.284	2.569	180
3.209	2.585	195
3.185		199.815
3.171	2.61	201.215
3.095	2.607	208.815
3.125	2.599	210
3.17	2.588	211.815
3.245	2.582	214.815
3.296	2.478	225
3.371	2.461	240
3.446	2.459	255
3.521	2.346	270
3.555	2.303	276.742
3.562	2.718	278.253
3.58	2.683	281.781
3.59	2.24	283.895
3.596	2.267	285
3.614	2.35	288.614
3.671	2.371	300
3.722		310.222
3.698	2.396	315
3.623	2.458	330
3.548	2.434	345
3.473	2.436	360
3.398	2.438	375
3.323	2.451	390
3.248	2.337	405
3.173	2.355	420
3.16		422.631
3.142	2.365	424.431
3.07	2.377	431.631
3.145	2.369	434.631

ROAD.No.5

H=1:2000 V=1:400

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

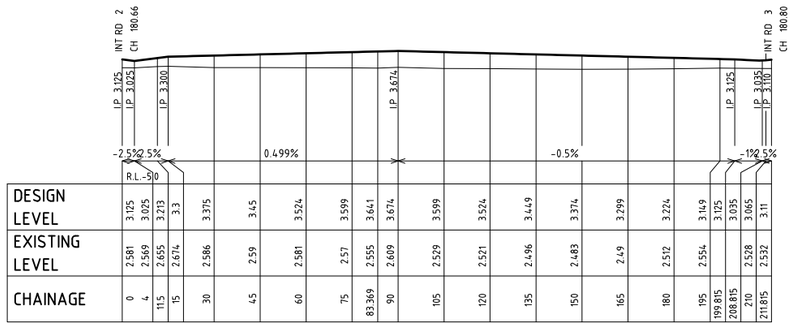
* Denote the original signature and date when revision was issued.

ROAD LONGITUDINAL SECTIONS

TATTERSALL
LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : AS SHOWN
SHEET No. :11
JOB No. : 217154
FILE : 21800148
DATE : Plotted 09:21 28/06/19
SHEET SIZE A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



DESIGN LEVEL	3.125	3.025	3.213	3.3	3.375	3.45	3.524	3.599	3.641	3.674	3.599	3.524	3.449	3.374	3.299	3.224	3.149	3.125	3.035	3.065	3.11
EXISTING LEVEL	2.581	2.569	2.655	2.674	2.586	2.59	2.581	2.57	2.555	2.609	2.529	2.521	2.496	2.483	2.49	2.512	2.554			2.528	2.532
CHAINAGE	0	4	11.5	15	30	45	60	75	83.369	90	105	120	135	150	165	180	195	199.815	208.815	210	211.815

ROAD.No.6

H=1:2000 V=1:400

DESIGN LEVEL	3.055	2.955	3.143	3.23	3.307	3.384	3.46	3.537	3.614	3.539	3.464	3.389	3.314	3.239	3.164	3.089	3.065	3.05	2.975	3.005	3.05
EXISTING LEVEL	2.677	2.663	2.636	2.624	2.575	2.583	2.606	2.632	2.615	2.548	2.507	2.476	2.471	2.474	2.443	2.418		2.413	2.407	2.406	2.406
CHAINAGE	0	4	11.5	15	30	45	60	75	90	105	120	135	150	165	180	195	199.815	201.27	208.815	210	211.815

ROAD.No.7

H=1:2000 V=1:400

DESIGN LEVEL	3	2.915	3.125	3.181	3.265	3.348	3.432	3.515	3.543	3.493	3.418	3.343	3.268	3.193	3.118	3.043	3.003	2.988	2.932	2.914	2.989
EXISTING LEVEL	2.528	2.526	2.522	2.523	2.539	2.515	2.504	2.498		2.469	2.468	2.465	2.466	2.459	2.434	2.398		2.375	2.379	2.384	2.392
CHAINAGE	0	4.348	12.741	15	30	45	60	75	80	90	105	120	135	150	165	180	187.875	189.39	195	196.872	199.875

ROAD.No.8

H=1:2000 V=1:400

DESIGN LEVEL	2.938	3.043	3.152	3.305	3.458	3.539	3.503	3.428	3.353	3.278	3.203	3.128	3.053	2.978	2.937	2.868	2.849	2.92
EXISTING LEVEL	2.515	2.513	2.506	2.468	2.423		2.433	2.429	2.421	2.418	2.379	2.346	2.355	2.364		2.388		2.405
CHAINAGE	0	4.348	15	30	45	52.862	60	75	90	105	120	135	150	165	173.108	180	181.938	185.108

ROAD.No.9

H=1:2000 V=1:400

DESIGN LEVEL	2.96	3.032	3.091	3.166	3.241	3.316	3.335	3.347	3.358	3.374	3.387	3.391	3.402	3.405	3.466	3.473	3.404	3.329	3.286	3.254	3.179	3.163	3.151	3.104	3.029	2.954	2.935	2.92	2.902	2.838	2.83	2.905
EXISTING LEVEL	2.392		2.443	2.405	2.507	2.334	2.163	2.187	2.669	2.631	2.095	2.074	2.129	2.281	2.242		2.183	2.129	2.249	2.228	2.214	2.216	2.114	2.123	2.139	2.163	2.168		2.175	2.186	2.187	2.185
CHAINAGE	0	3.125	15	30	45	60	63.723	66.056	68.275	71.597	74.14	75	77.141	77.746	90	91.249	105	120	128.523	135	150	153.269	155.483	165	180	195	198.773	201.773	203.573	210	210.773	213.773

ROAD.No.10

H=1:2000 V=1:400

DESIGN LEVEL	3.02	3.095	3.104	3.155	3.23	3.305	3.38	3.402	3.414	3.428	3.439	3.455	3.468	3.53	3.557	3.509	3.434	3.359	3.284	3.249	3.209	3.134	3.059	2.984	2.98	2.962	2.89	2.965
EXISTING LEVEL	2.403		2.417	2.42	2.387	2.354	2.268	2.229	2.644	2.632	2.172	2.211	2.308	2.287		2.256	2.251	2.241	2.381	2.434	2.27	2.312	2.333	2.196		2.183	2.15	2.142
CHAINAGE	0	3	4.871	15	30	45	60	64.487	66.712	69.668	71.725	75	77.635	90	95.407	105	120	135	150	157.005	165	180	195	210	210.815	212.615	219.815	222.815

ROAD.No.11

H=1:2000 V=1:400

F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*
REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE

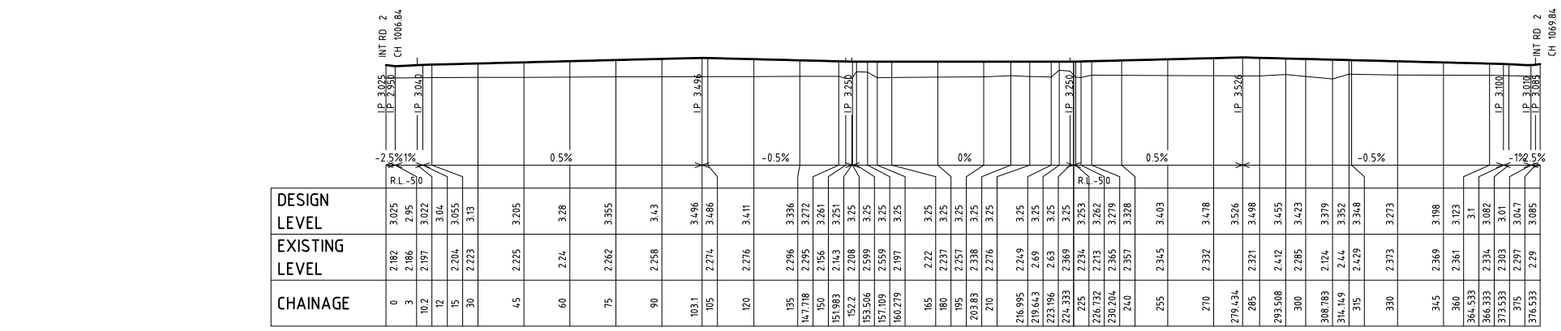
* Denote the original signature and date when revision was issued.

ROAD LONGITUDINAL SECTIONS

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : AS SHOWN	SHEET No. : 12	FILE : 21800149	SHEET SIZE
	JOB No. : 217154	DATE : Plotted 09:21 28/06/19	A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg			

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



DESIGN LEVEL	3.025	2.95	3.022	3.04	3.055	3.13	3.205	3.28	3.355	3.43
EXISTING LEVEL	2.182	2.186	2.197		2.204	2.223	2.225	2.24	2.262	2.258
CHAINAGE	0	3	10.2	12	15	30	45	60	75	90

DESIGN LEVEL	3.496	3.486	3.411	3.336	3.272	3.261	3.251	3.25	3.25	3.25
EXISTING LEVEL		2.274	2.276	2.296	2.295	2.156	2.143	2.208	2.599	2.559
CHAINAGE	103.1	105	120	135	147.718	150	151.983	152.2	153.506	157.109

DESIGN LEVEL	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
EXISTING LEVEL	2.197	2.22	2.237	2.257	2.338	2.276	2.249	2.69	2.63	2.369
CHAINAGE	160.279	165	180	195	203.83	210	216.995	219.643	223.196	224.333

DESIGN LEVEL	3.253	3.262	3.279	3.328	3.403	3.478	3.526	3.498	3.455	3.423
EXISTING LEVEL	2.234	2.213	2.365	2.357	2.345	2.332		2.321	2.412	2.285
CHAINAGE	225	226.732	230.204	240	255	270	279.434	285	293.508	300

DESIGN LEVEL	3.379	3.352	3.348	3.273	3.198	3.123	3.1	3.082	3.01	3.047	3.085
EXISTING LEVEL	2.124	2.44	2.429	2.373	2.369	2.361		2.334	2.303	2.297	2.29
CHAINAGE	308.783	314.149	315	330	345	360	364.533	366.333	373.533	375	376.533

ROAD.No.12

H=1:2000 V=1:400

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

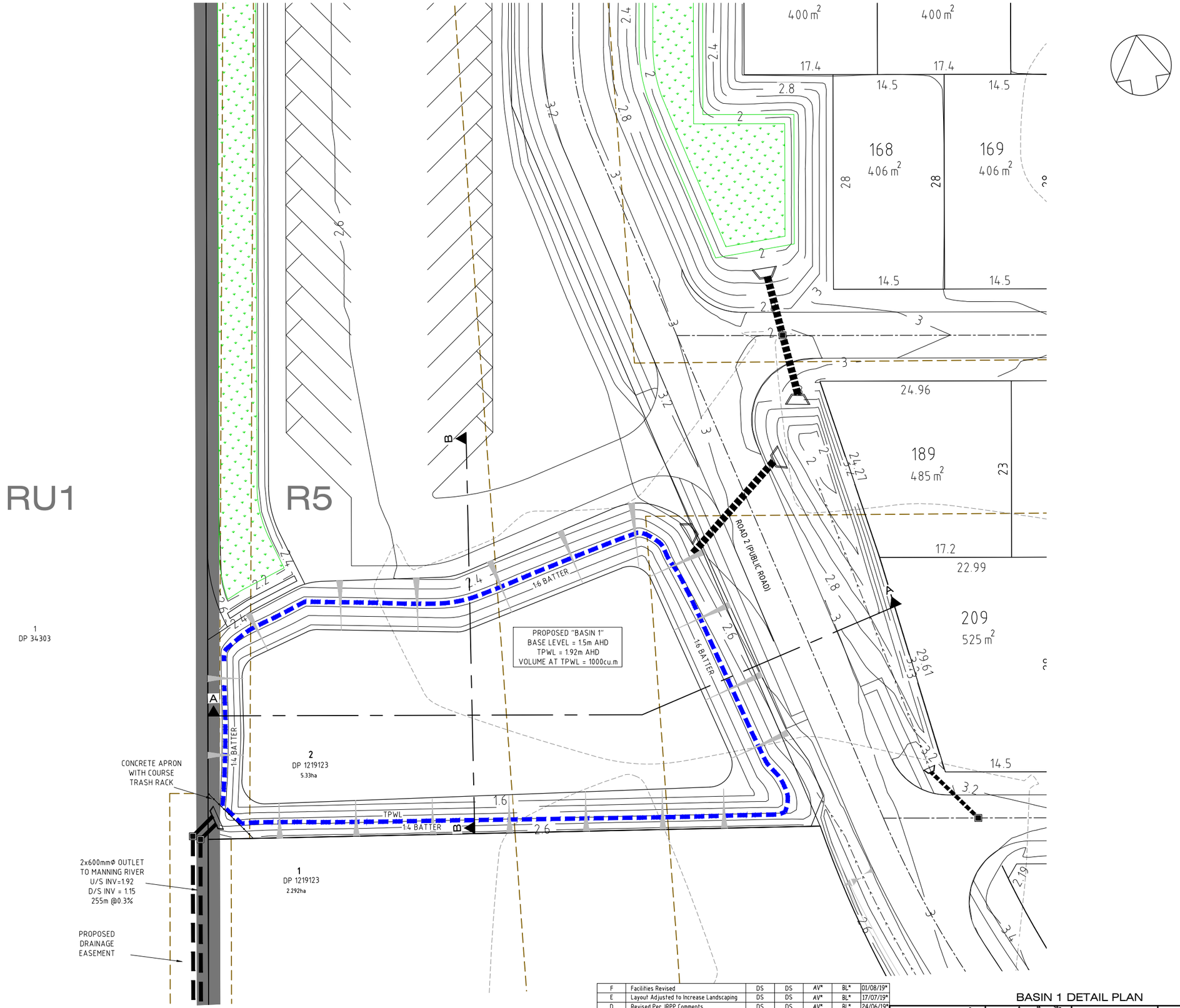
* Denote the original signature and date when revision was issued.

TATTERSALL
LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

ROAD LONGITUDINAL SECTIONS

SCALE : AS SHOWN
SHEET No. :13
JOB No. : 217154
FILE : 21800150
DATE : Plotted 09:22 28/06/19
SHEET SIZE A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

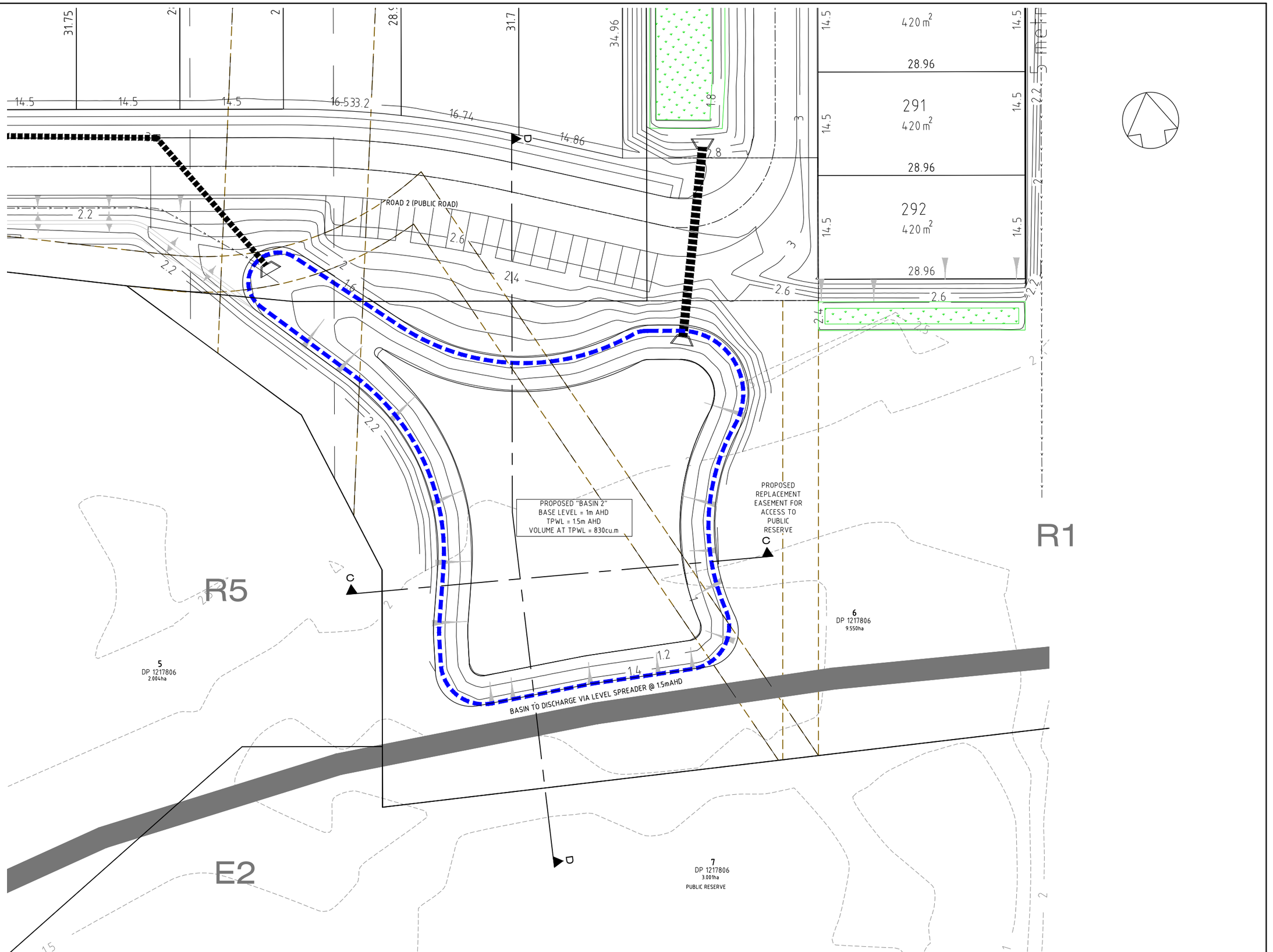
* Denote the original signature and date when revision was issued.

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

BASIN 1 DETAIL PLAN

SCALE : 1:2000 for A3 sized plot (0, 10, 20m)
SHEET No. : 14
JOB No. : 217154
FILE : 21800151
DATE : Plotted 09:22 28/06/19
SHEET SIZE : A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

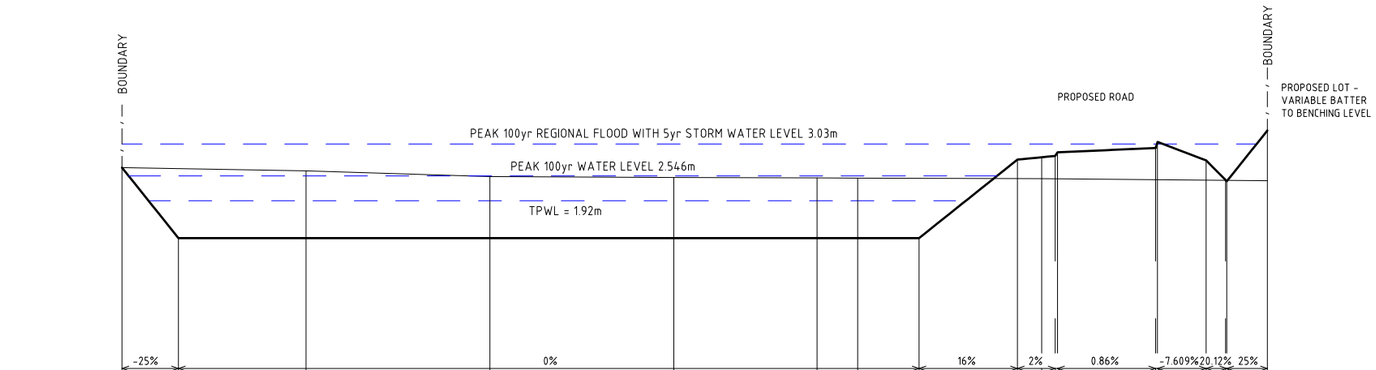
* Denote the original signature and date when revision was issued.

BASIN 2 DETAIL PLAN

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 1:2000 for A3 sized plot
SHEET No. : 15
JOB No. : 217154
FILE : 21800152
DATE : Plotted 09:22 28/06/19
SHEET SIZE : A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



DESIGN LEVEL	2.649	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.78	2.818	2.84	2.9	2.969	3.069	2.768	2.448	2.428	3.254
EXISTING LEVEL	2.649		2.597	2.504	2.488	2.482	2.479			2.469						2.442		2.435
CHAINAGE	0	4.6	15	30	45	56.681	60	65	73.025	75	76.101	76.3	84.3	84.45	88.412	90	90.101	93.408

SECTION A

H=1:500 V=1:100

DESIGN LEVEL	2.65	1.5	1.5	1.5	2.028	2.66	2.682	2.683	2.7
EXISTING LEVEL	2.509		2.501		2.452		2.586	2.596	2.652
CHAINAGE	0	4.5	15	26.5	30	34.188	44.119	45	52.737

SECTION B

H=1:500 V=1:100

DESIGN LEVEL	2.308	1.844	1.682	1.4	1.308	1	1	1	1	1	1	1.326	1.6	1.6	1.513	1.489
EXISTING LEVEL	2.308		1.787		1.788		1.713	1.684	1.58	1.531		1.52				1.489
CHAINAGE	0	11.592	12.563	14.255	15	17.498	30	33.576	35.022	45	47.394	50	52.194	53	53.347	60

SECTION C

H=1:500 V=1:100

DESIGN LEVEL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1	1	1	1	1	1	1	1	1	1	1.6	1.828	1.914	2.552	2.674	2.7	2.9	3.05	3.061	3.146
EXISTING LEVEL	0.816	0.871	1.392	1.441	1.458				1.667	1.683	1.84	1.866	1.98	2.296	2.326	2.297			2.14	2.133		2.083				2.099	2.106
CHAINAGE	0	4.607	9.233	13.798	15	21.9	22.9	26.9	28.798	30	43.798	45	48.877	58.798	60	63.272	65.8	70.6	73.798	75	83.934	88.798	89.85	97.85	98	98.463	101.947

SECTION D

H=1:500 V=1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

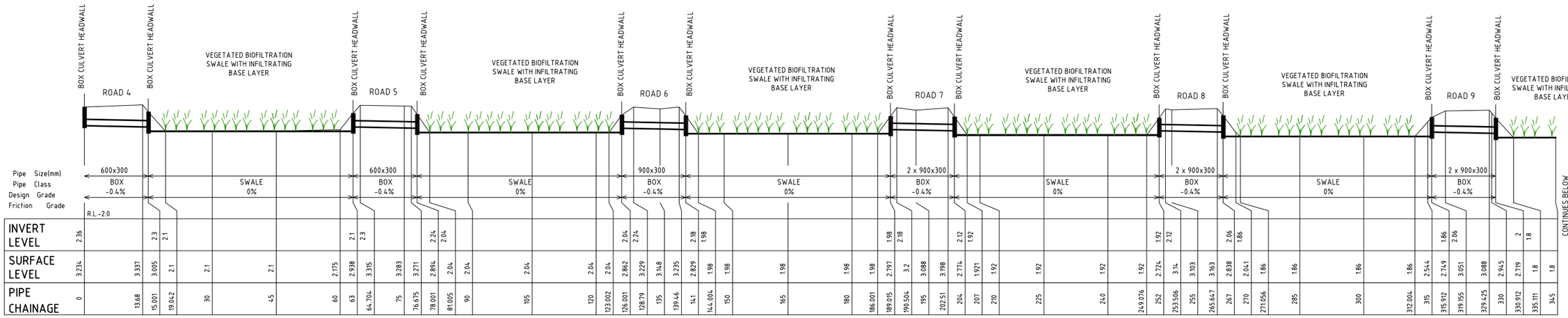
* Denote the original signature and date when revision was issued.

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

BASIN SECTIONS

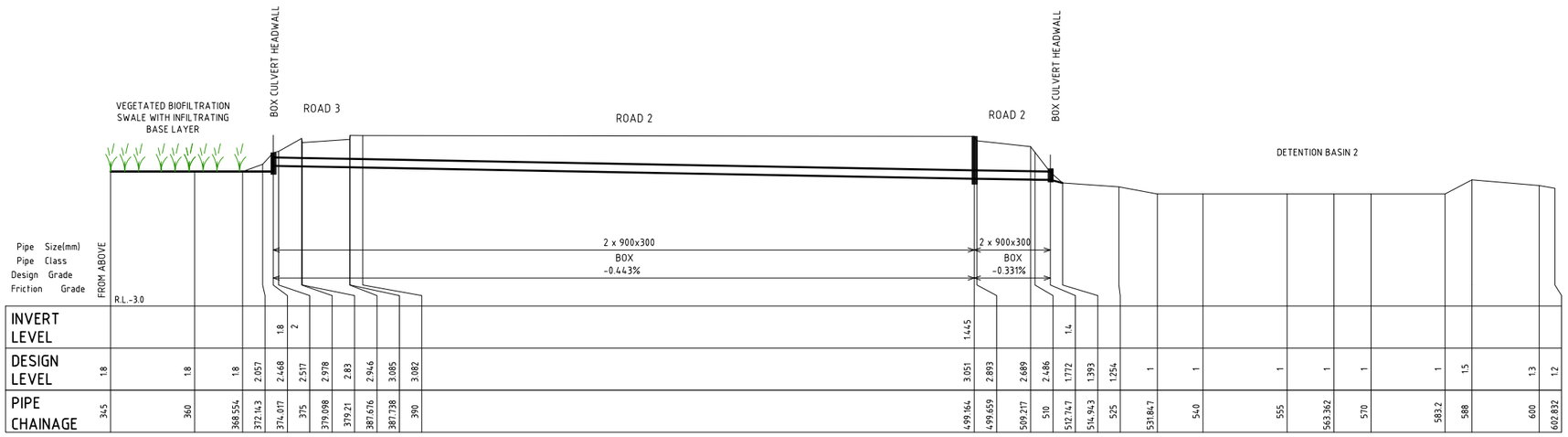
SCALE : 0 10 20m
1:2000 for A3 sized plot
SHEET No. :16
JOB No. : 217154
FILE : 21800153
DATE : Plotted 09:23 28/06/19
SHEET SIZE A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



ROAD 3 DRAINAGE LINE

H=1:1000 V=1:200



ROAD 3 DRAINAGE LINE

H=1:1000 V=1:200

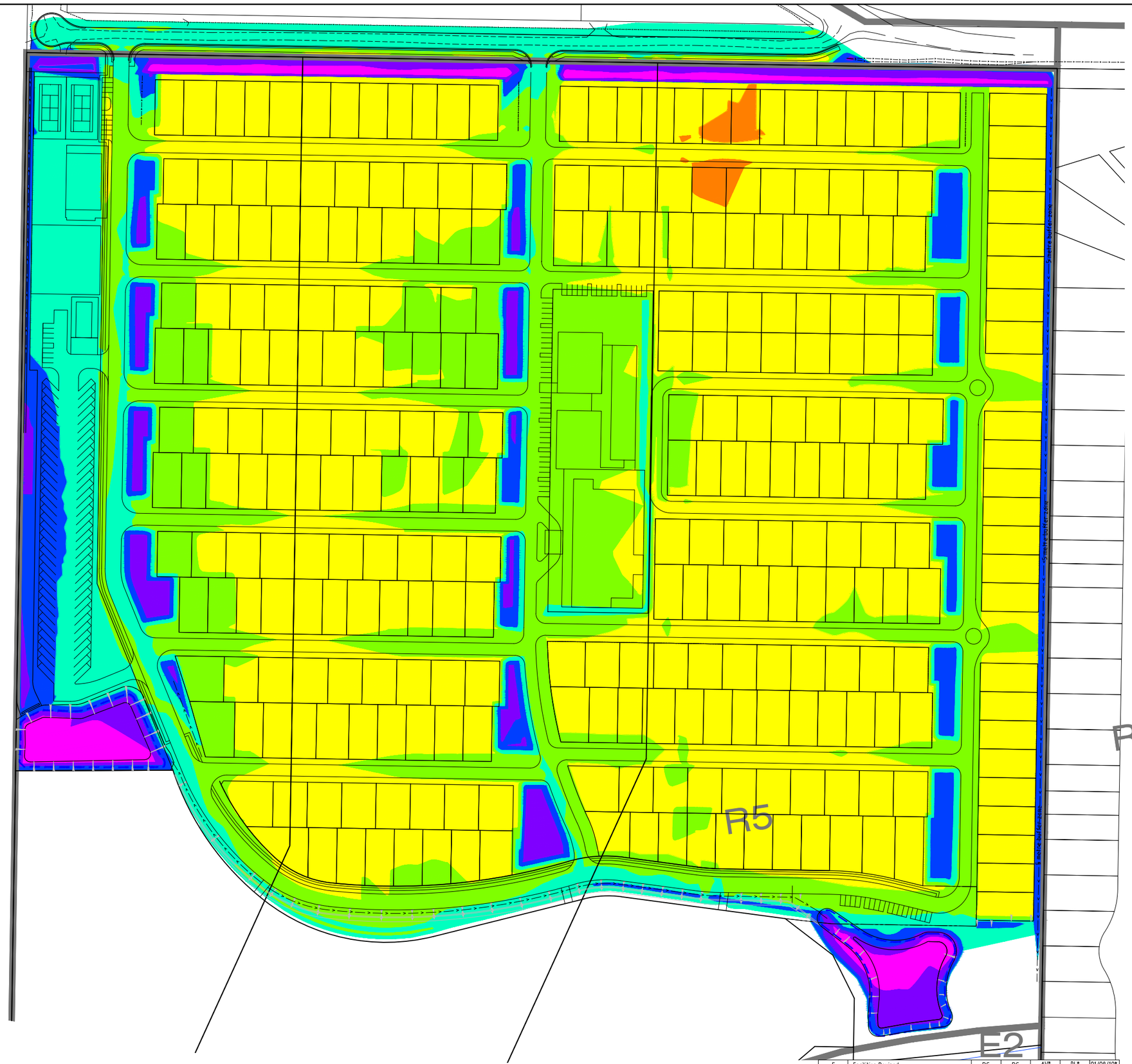
REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*
*	Denote the original signature and date when revision was issued.					

TYPICAL DRAINAGE SECTION

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : AS SHOWN
SHEET No. :17
JOB No. : 217154
FILE : 21800154
DATE : Plotted 09:23 28/06/19
SHEET SIZE: A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]



-1.5m to -1m
-1m to -0.5m
-0.5m to 0m
0m to 0.5m
0.5m to 1m
1m to 1.5m
1.5m to 2m

VOLUME SUMMARY

CUT	=	10,650 m³
FILL	=	198,000 m³
SELECT IMPORT	=	20,000 m³
NET	=	167,350 m³ SHORTFALL

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

* Denote the original signature and date when revision was issued.

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

CUT FILL PLAN

SCALE : 1:2000 for A3 sized plot
SHEET No. :18
JOB No. : 217154
FILE : 21800155
DATE : Plotted 09:23 28/06/19
SHEET SIZE A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]

STANDARD SYMBOLS
EROSION AND SEDIMENT CONTROL PLANS

Construction Barrier Fencing	BF
Sediment Fence	
Straw Bale Sediment Filter	
Soil Stock Pile	S.S.P. 1
Extent Of Works	EW

S.S.P. 1

S.S.P. 2

NOTE
FINAL LOCATION OF TEMPORARY SOIL STOCKPILE TO BE APPROVED BY COUNCIL PRIOR TO CONSTRUCTION

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

* Denote the original signature and date when revision was issued.

TYPICAL SOIL & WATER MANAGEMENT PLAN

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 0 10 20m
1:2000 for A3 sized plot

SHEET No. :19 | FILE : 21800156 | SHEET SIZE
JOB No. : 217154 | DATE : Plotted 09:24 28/06/19 | A3

COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Xref: Base2 XREF [Base2 XREF.dwg] Xref: CutFill XREF [CutFill XREF.dwg] Xref: Harrington Waters Lifestyle Master Plan [Harrington Waters Lifestyle Master Plan.dwg] Xref: 217154 PRELIM DP [217154 PRELIM DP.dwg] Xref: BaseRev C XREF [BaseRev C XREF.dwg]

SOIL & WATER MANAGEMENT NOTES

1. This plan is to be read in conjunction with other engineering plans and any written instructions that may be issued.

2. The contractor shall implement all soil erosion and sediment control measures prior to disturbance of the related catchment area and to the satisfaction of the Superintendent.

3. All positions shown are indicative only and are best determined on site in conjunction with the superintendent. Variations will be permitted to best suit the circumstances.

4. Cleared vegetation must be disposed of by :-
i) chipping or mulching for future landscaping and usage, or
ii) transport to an approved landfill facility.

5. Temporary crossbanks (bunds constructed with earth, straw bales or sandbags), shall be constructed during roadworks to limit slope length, where possible, to 80 metres. These shall be constructed immediately prior to forecast rain and during temporary closure of the site, including weekends.

6. Temporary rehabilitation should be undertaken on disturbed areas where works have stopped and soils are expected to remain exposed for two months.

7. Sediment barriers (e.g. sandbags or straw bales) should be located upstream of stormwater inlet pits prior to the road surface being paved and lands upslope being rehabilitated.

8. At the conclusion of each day sand bags are to be placed at the end of completed sections of road pavement to prevent scouring.

9. The contractor will inspect all erosion and pollution control works at least weekly and following every rainfall event greater than 5mm, providing particular attention to the following matters :
   (a) Ensure drains operate effectively and initiate repair as required.
   (b) Remove spilled sand (or other materials) from hazard areas, including lands closer than 5 metres from likely areas of concentrated or high velocity flows such as waterways and paved areas.
   (c) Ensure rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate.
   (d) Construct additional erosion and/or sediment control works as might become necessary to ensure the desired protection is given to downslope lands and waterways, i.e.,make ongoing changes to the plan.
   (e) Maintain erosion and sediment control measures in a functioning condition until all earthwork activities are completed and the site is rehabilitated.
   (f) Remove temporary soil conservation structures as a last activity in the rehabilitation program.

10. Utilise a single access only to the stock pile sites.

11. Drop inlets which do not outlet to silt traps shall be blocked until all works are completed.

12. Limit disturbed areas on site as much as possible at any one time, and stabilise competed areas as soon as practicable. Lands where works are not to continue for more than 20 working days must be rehabilitated. Such rehabilitation shall involve the spraying of a straw-bitumen mulch to the disturbed lands or equivalent.

13. Access areas limited to a maximum width of 10 (preferably 5) metres.

14. Conformity with this plan shall in no way reduce the responsibility of the Contractor to protect against water damage during the course of the contract.

15. Topsoil and spoil shall be stockpiled in non-hazard areas and protected from surface run-off by diversion drains or similar. Stockpiles shall be surrounded on downstream sides by silt fencing. Stockpiles shall be suitably compacted to inhibit erosion. Where the stockpiling period exceeds four (4) weeks, the stockpile shall be seeded to encourage vegetation growth.

16. Topsoil shall be respread and stabilised as soon as possible. Disturbed areas shall be left with a scarified surface to encourage water infiltration and assist keying in topsoil.

17. The contractor shall provide a turf strip behind all kerb and gutter at completion of footpath formation.

18. The contractor shall maintain grass cover until all works have been completed including the maintenance period, by frequent watering and mowing where required.

19. All drainage works shall be constructed and stabilised as quickly as possible to minimise risk of erosion.

20. Vehicular traffic shall be controlled during construction confining access where possible to proposed or existing road alignments plus 3 metres. Areas to be left undisturbed shall be marked off.

21. Site access shall be restricted to a nominated point. The construction of a shake-down area will be required at the entry to the site.

22. Facilities and/or equipment must be provided for the application of water to disturbed areas to minimise the generation of airborne dust from any area disturbed by construction activities.

23. Material removed from sediment control structures must be disposed of in a way that does not pollute waters or bushland.

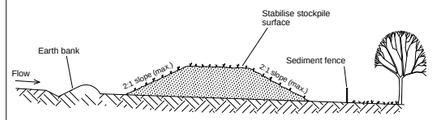
24. Waste disposal containers must be provided on site for the collection and disposal of all industrial and domestic type wastes generated on site.

25. Concrete wastes or washings from any concrete mixture or deliveries must not be deposited in any location where they can flow or be washed into waters.

26. Runoff from vehicle, construction plant or mobile plant maintenance and cleaning areas must be contained, collected and disposed of in a manner to prevent entry into any waters, including sediment retention ponds.

27. Fuelling of vehicles and construction plant must be carried out with an operator or driver present, and in a way that prevents any spillage occurring.

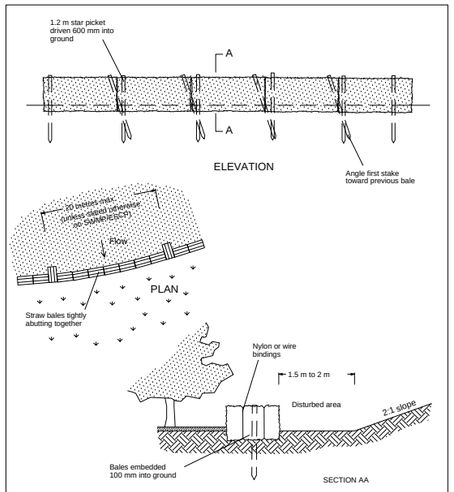
28. Prior to the controlled discharge (e.g. de-watering activities from excavations and sediment basins) of any water (groundwater or sediment laden water) from the site during construction, the following water quality objectives shall be achieved:
   * not exceed Total Suspended Solids of 50mg/L
   * not exceed Turbidity of 50 NTU
   * range within pH value of 6 to 8
   * be < 80% and > 20% saturation dissolved oxygen
   * have no odour or visible petro-chemical sheen
   * have no visible litter or waste matter
   * not contain any other contaminant, chemical or biological condition which causes any measurable adverse effect



Construction Notes

1. Place stockpiles more than 2m (preferably 5m) 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 2m in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Std Drawing 5-5) on the upslope side to divert water around stockpiles & sediment fences (Std Drawing 6-8) 1-2m downslope.

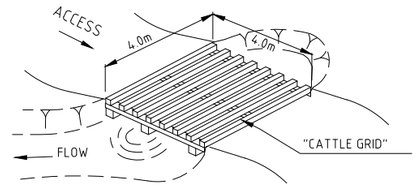
STOCKPILES SD 4-1



Construction Notes

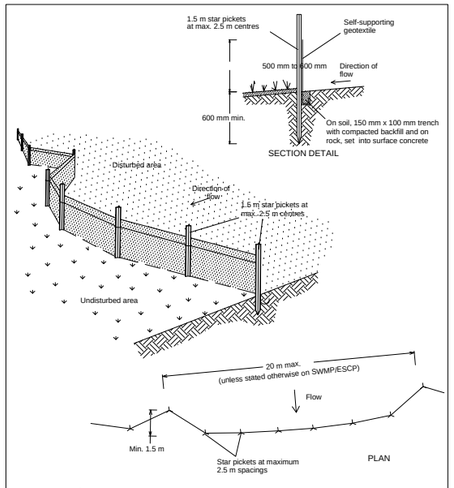
1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

STRAW BALE FILTER SD 6-7



TEMPORARY CONSTRUCTION EXIT SHAKE-DOWN FACILITY DETAIL (CATTLE GRID)

NOT TO SCALE



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit flow if concentrated at one point to 50 l/s in the design storm, usually the 10yr event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5m long star pickets into ground at 2.5m intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE SD 6-8

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
F	Facilities Revised	DS	DS	AV*	BL*	01/08/19*
E	Layout Adjusted to Increase Landscaping	DS	DS	AV*	BL*	17/07/19*
D	Revised Per JRPP Comments	DS	DS	AV*	BL*	24/06/19*
C	Updated Drainage Easement	DS	DS	AV*	BL*	19/02/19*

* Denote the original signature and date when revision was issued.

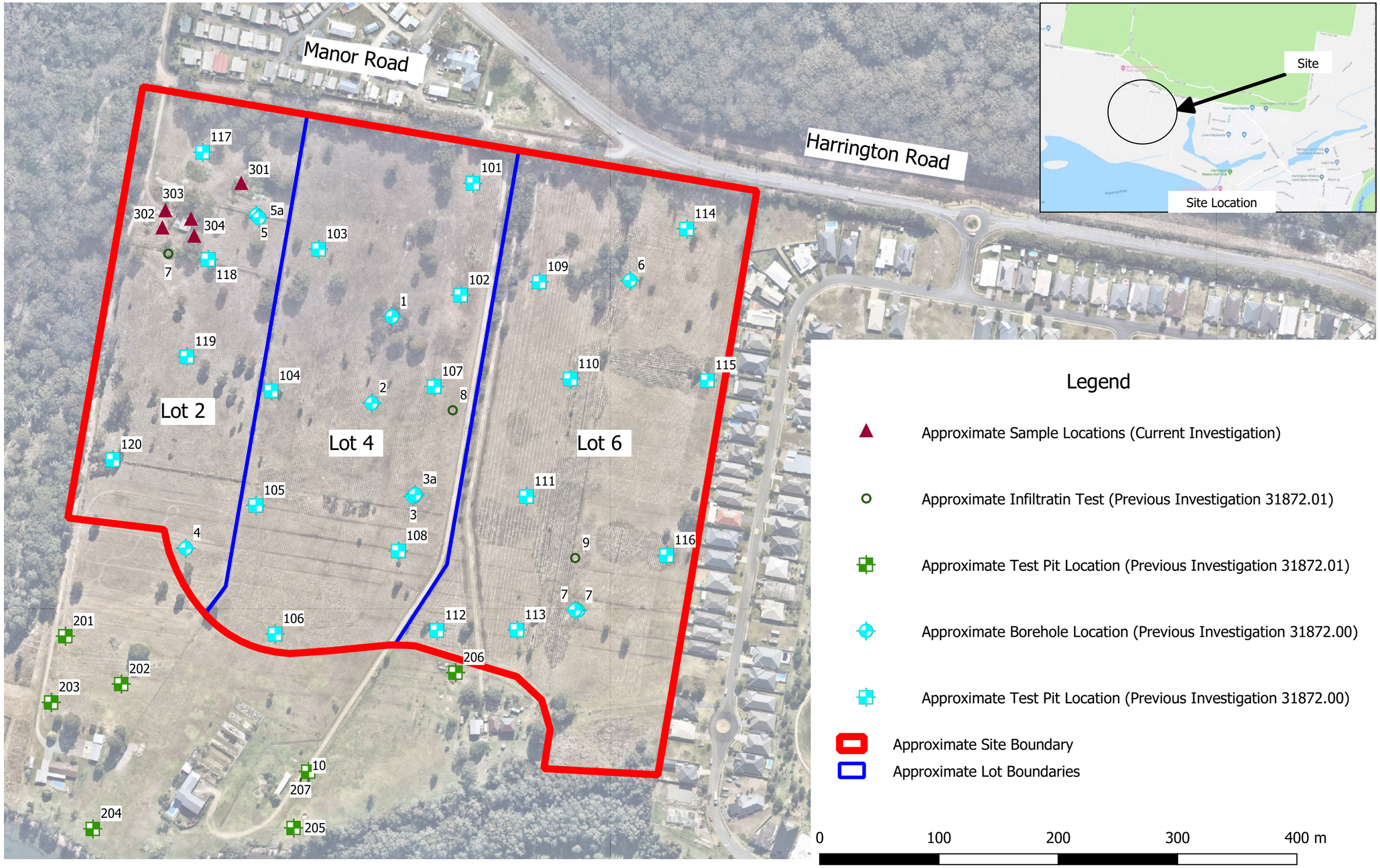
TYPICAL SOIL & WATER MANAGEMENT PLAN NOTES

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE :
SHEET No. :20
FILE : 21800157
SHEET SIZE
JOB No. : 217154
DATE : Plotted 09:24 28/06/19
A3
COMPUTER FILE : S:\projects\Harrington\dwg\217154_Harrington DA Plans.dwg

Appendix E

Drawing 1 – Site Location Plan
Drawing 2 – Observed Site Features during Walkover



Legend

- Approximate Sample Locations (Current Investigation)
- Approximate Infiltratin Test (Previous Investigation 31872.01)
- Approximate Test Pit Location (Previous Investigation 31872.01)
- Approximate Borehole Location (Previous Investigation 31872.00)
- Approximate Test Pit Location (Previous Investigation 31872.00)
- Approximate Site Boundary
- Approximate Lot Boundaries

0 100 200 300 400 m

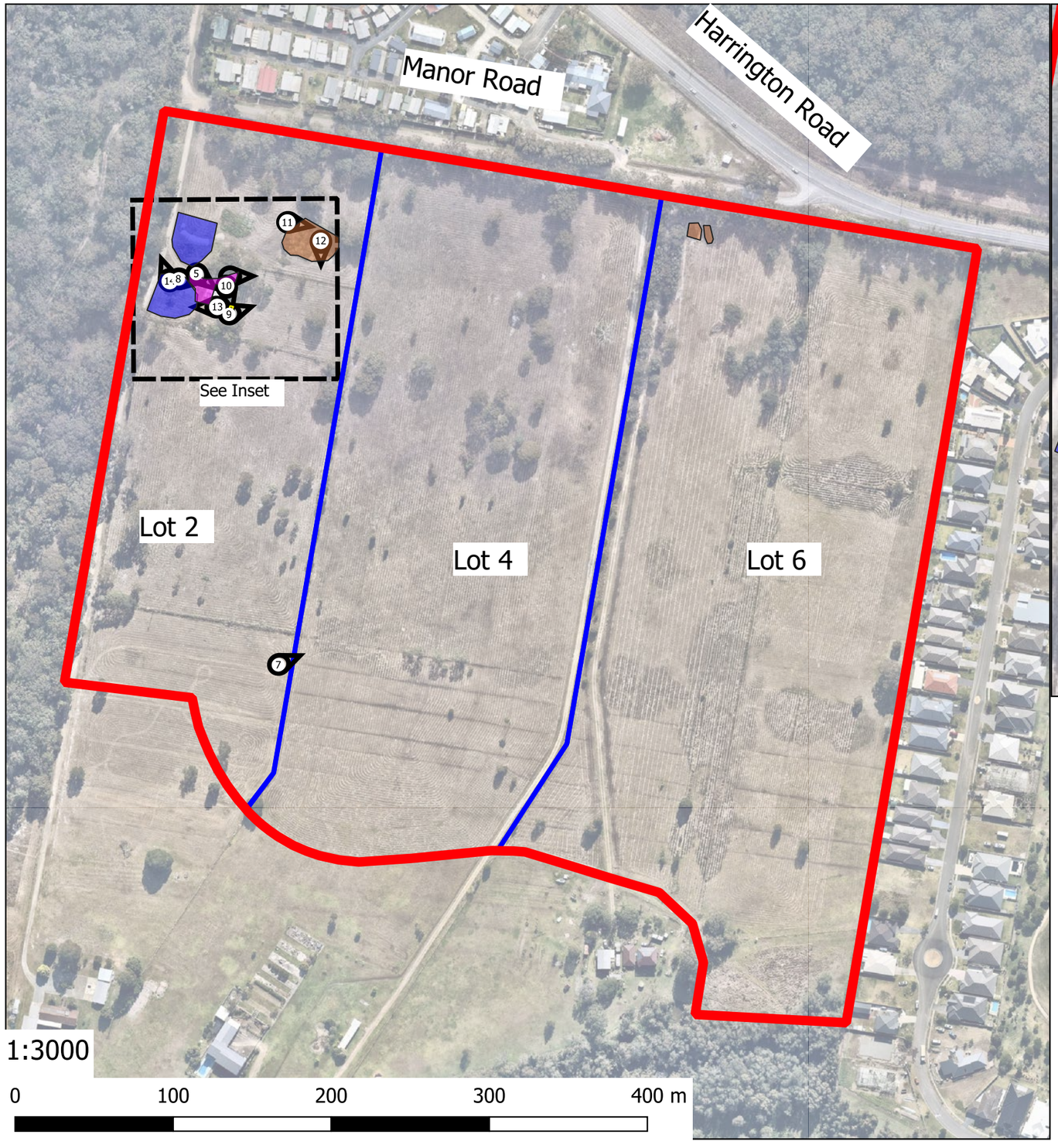
Douglas Partners
Geotechnics / Environment / Groundwater

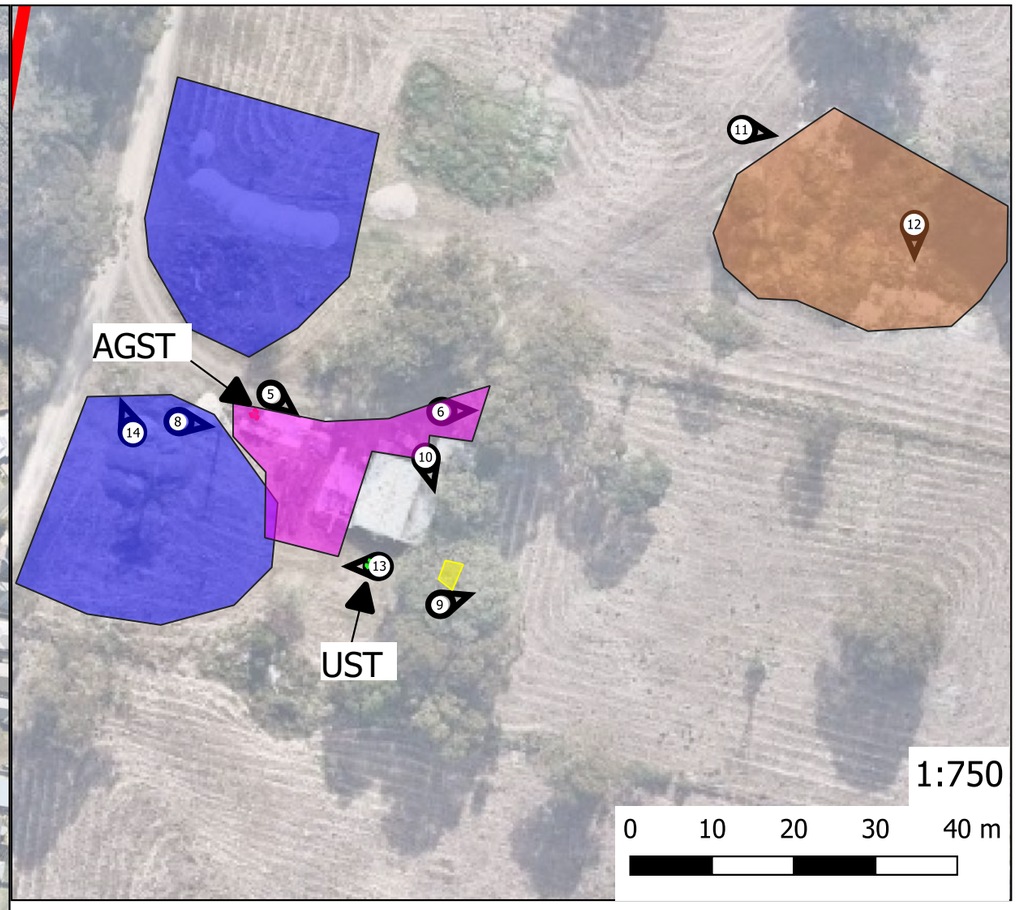
CLIENT: Bayline Homes and Developments		
OFFICE: Port Macquarie	DRAWN BY: JRC	
SCALE: 1:3000 @ A3	DATE: 08 July 2019	

TITLE: **Test Location Plan**
Proposed Harrington Waters Lifestyle Village
26, 48 and 56 Manor Road, Harrington

N

PROJECT:	31872.02
DRAWING No:	1
REVISION:	0





Legend

- Approximate Above Ground Fuel Storage Tank Location (AGST)
- Approximate Below Ground Tank (Concrete Septic Tank) (UST)
- Approximate Area of Stockpiled Construction Materials
- Approximate Area of Disturbed Ground
- Approximate Location Fibro Shed
- Approximate Location of Stockpiled Soil
- Approximate Site Boundary
- Approximate Lot Boundaries
- Approximate Photo Location

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Bayline Homes and Developments	
OFFICE: Port Macquarie	DRAWN BY: JRC
SCALE: See Drawing	DATE: 08 July 2019

TITLE: **Observed Site Features During Walkover**
Proposed Harrington Waters Lifestyle Village
26, 48 and 56 Manor Road, Harrington

PROJECT:	31872.02
DRAWING No:	2
REVISION:	0