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## Bayside Planning Panel

**1/05/2018**

Item No	<b>5.1</b>
Subject	<b>Planning Proposal: 119 Barton Street, Monterey</b>
Report by	Matthew Hardwick, Urban Planner
File	F17/902

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### Summary

In August 2017 City Planning Works submitted a draft Planning Proposal to Bayside Council for the purpose of rezoning land at 119 Barton Street, Monterey.

The draft Planning Proposal seeks to:

- rezone the land from RE2 Private Recreation zone to R3 Medium Density Residential zone
- introduce Development standards as follows:
  - apply a maximum Floor Space Ratio (FSR) development standard of 0.6:1
  - apply a maximum Height of Building development standard of 8.5m
  - apply a Minimum Lot Size development standard of 450m<sup>2</sup> for the subject land.

The proposal to rezone the subject land provides an opportunity for the site to be consistent with the zoning and development standards for the broader R3 Medium Density Residential zone in the immediate locality. The site currently has no FSR, Height of Building or Minimum lot size controls in the Local Environmental Plan.

Should the Planning Proposal be supported by Council and the NSW Department of Planning & Environment, the rezoning of the land would enable Development Applications to be considered by Council.

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### Officer Recommendation

That Bayside Planning Panel recommend to Council:

That pursuant to section 3.34 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) the draft Planning Proposal for land known as 119 Barton Street, Monterey be submitted to the Department of Planning & Environment (DPE) for a Gateway determination.

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### Background

Applicant:	City Planning Works
Proponent:	Monterey Equity Pty Ltd
Owner:	Monterey Equity Pty Ltd
Allotments subject to Planning Proposal:	Lot 2 DP 857520

The subject site previously accommodated the Sir Francis Drake Bowling Club. The site incorporates a total land area of approximately 7,218m<sup>2</sup>. An aerial photo (Figure 1) and relevant LEP extracts (Figures 2-5) for the site are provided below that describe the current planning controls. The subject site is shown outlined in red.



Figure 1 – Aerial Photo of Subject site

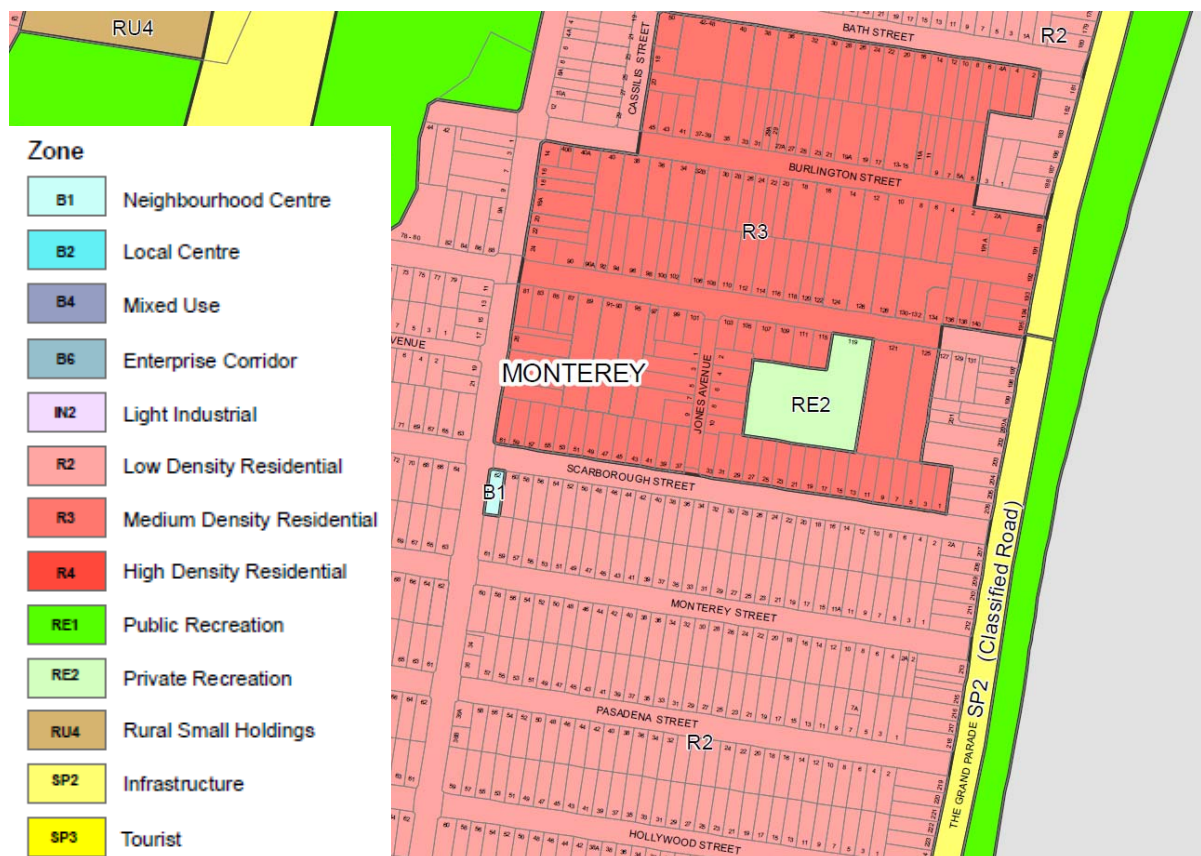


Figure 2 – RLEP 2011 Zoning (RE2 Private Recreation)



**Maximum Floor Space Ratio (n:1)**

D	0.5
F	0.6
N	1
S1	1.5
S2	1.8
T1	2
T2	2.2
U1	2.5
U2	2.85
V1	3
V2	3.1
V3	3.4
W	3.5
X	4
	Refer to Clause 4.4

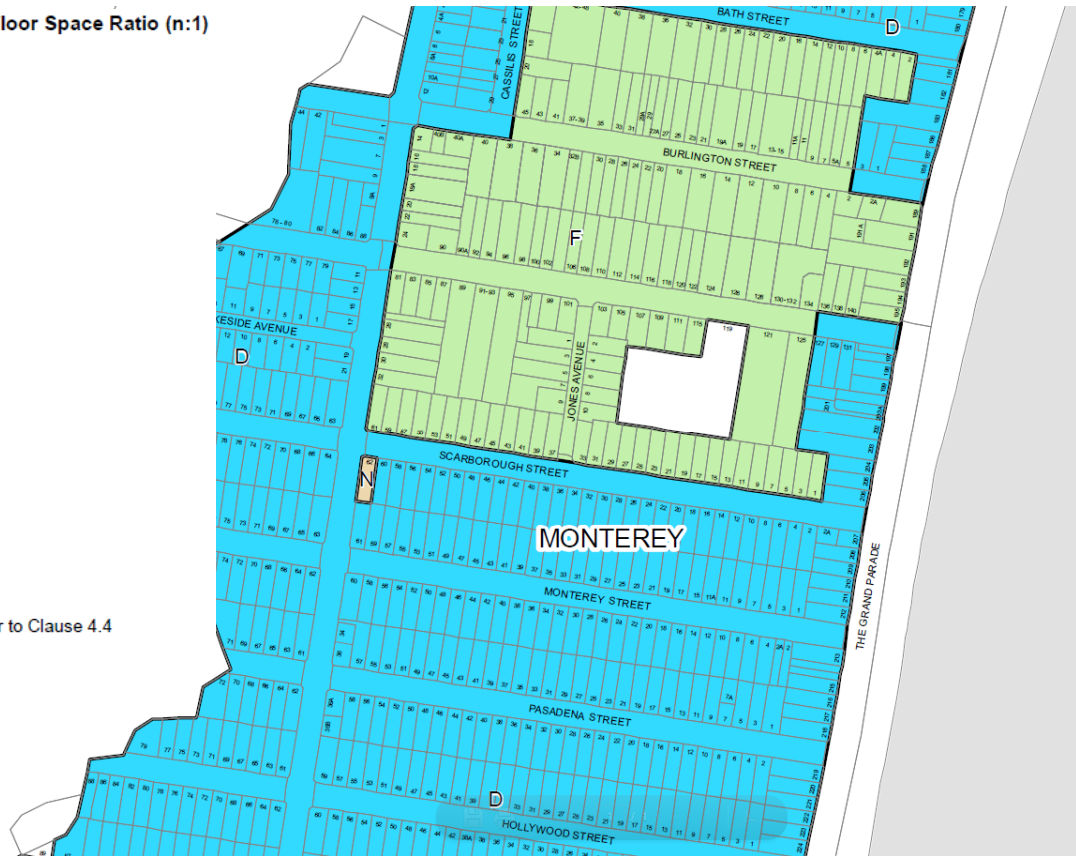


Figure 3 – RLEP 2011 Floor Space Ratio (N/A)

**Maximum Building Height (m)**

I	8.5
M	12
N1	13
N2	14.5
O1	15
O2	16
P1	17.5
P2	18
Q1	19
Q2	20.5
R1	21
R2	22
S	24
T1	26.5
T2	27
T3	28
T4	29
T5	29.5
U1	31
U2	33
X	46
Y	51
	Refer to Clause 4.3

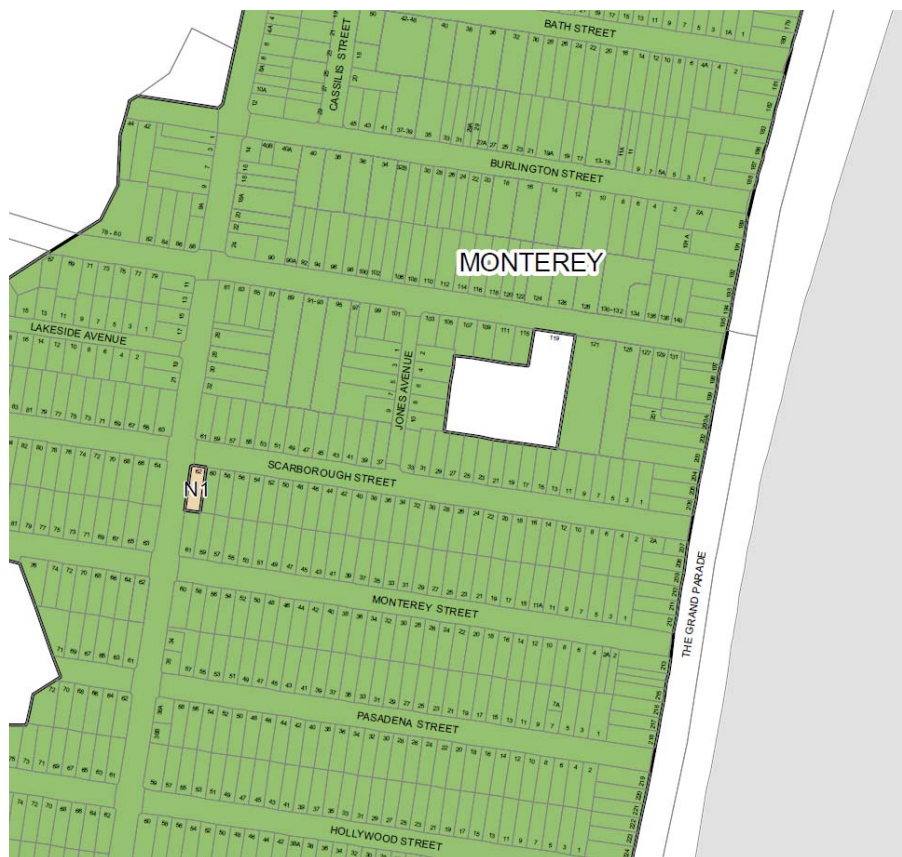


Figure 4 – RLEP 2011 Height of Building (N/A)

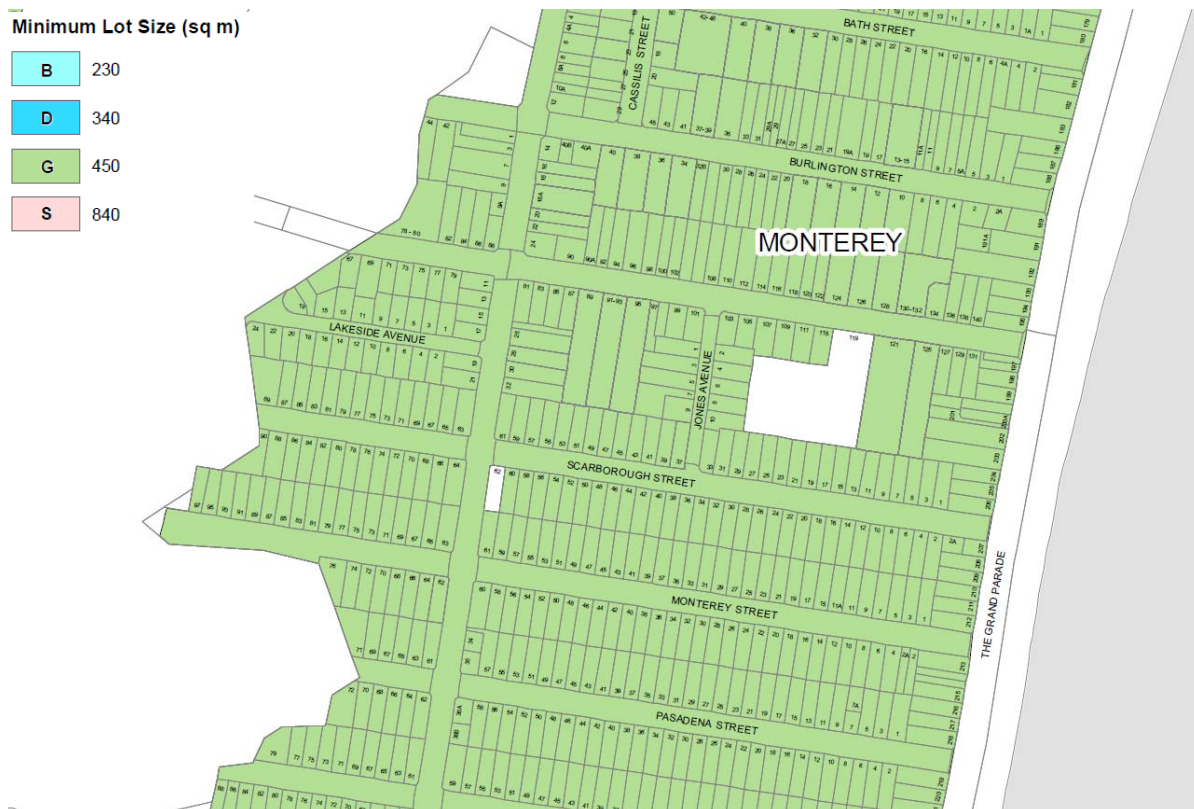


Figure 5 – RLEP Minimum Lot Size (N/A)

### Site Description

The subject site is legally known as Lot 2 DP 857520 and is located on the southern side of Barton Street, between Jones Avenue to the west and The Grand Parade to the East, in Monterey. The 7218sqm site is a battle axe shape with the handle frontage to Barton Street being approximately 34 metres.

### Surrounding Land Uses

Adjoining the site to the east are strata townhouse developments at 121 and 125 Barton Street, as well as similar townhouse developments at 89 – 95 Barton Street. Surrounding development is characterised predominately of detached single and double storey dwellings.

### Intent of Planning Proposal

To enable Development Applications to be considered by council for developments that would be consistent with the surrounding developments and proposed controls.

### Current Planning Controls

An extract of the relevant Rockdale LEP 2011 Zoning, Floor Space, Minimum Lot Size and Height maps for the site (outlined in red) and immediately surrounding land is provided in Figures 2 - 5.



## Planning Proposal Summary

The Planning Proposal (**Attachment 1**) seeks the following amendment to the Rockdale LEP 2011:

- Rezone the site from RE2 Private Recreation to R3 Medium Density Residential zone;
- Apply a maximum Floor Space Ratio (FSR) development standard of 0.6:1
- Apply a maximum Height of Building development standard of 8.5m
- Apply a Minimum Lot Size development standard of 450m<sup>2</sup> for the subject land.

Table 1 identifies a comparison of the current and proposed zoning and development standards for the site, based on the provisions of the Rockdale LEP 2011.

Table 1: Proposed changes to development standards

<b>119 Barton Street Monterey</b>		
<b>Development Standard</b>	<b>Existing</b>	<b>Proposed</b>
Zoning	RE2 Private Recreation	R3 Medium Density Residential
Height of Building	N/A	8.5m
Floor Space Ratio	N/A	0.6:1
Minimum Lot Size	N/A	450m <sup>2</sup>

## Planning Proposal Assessment

The site was formerly used as a bowling club, for private recreation purposes. Under the current RE2 Private Recreation zoning, there are no development standards that apply in relation to building height, floor space ratio or minimum lot size. The site is no longer used as a bowling club, and the Planning Proposal provides an opportunity to amend the zoning and development standards to enable consistency with the surrounding R3 Medium Density Residential zone, under the Rockdale LEP 2011. The proposed zoning and development standards identified in the Planning Proposal are considered to represent a logical and justifiable amendment to the Rockdale LEP 2011.

### ***Proposed Zoning***

The proposed R3 Medium Density Residential zone is considered to be the most logical zoning outcome for the subject land, given the consistency in zoning with the adjoining land, and uses.

### ***Proposed Floor Space Ratio***

The proposed application of a 0.6:1 Floor Space Ratio (FSR) to the subject land is considered appropriate for the site, as it is consistent with the existing FSR of 0.6:1 that applies to land surrounding the subject site.

### ***Proposed Height of Building***

The proposed application of an 8.5 metre height limit is considered appropriate for the subject site, as it is consistent with the existing height limit of 8.5 metres that applies to land surrounding the subject site.

### ***Proposed Minimum Lot Size***

The proposed application of a 450m<sup>2</sup> minimum lot size is considered appropriate for the subject site, as it is consistent with the surrounding land that has an existing minimum lot size of 450m<sup>2</sup>.

### ***Traffic and Vehicular Access***

An independent traffic consultant (Bitzios) reviewed the Traffic Report submitted with the Planning Proposal (**Attachment 2**) and raised no concerns about the impact a potential Development Application could have on the surrounding road network.

The report concluded that there are no traffic or transport issues identified that would preclude the consideration of a Development Application resulting from the Planning Proposal.

### ***Environmental Planning & Assessment Act 1979***

The NSW Department of Planning & Environment's *A Guide to Preparing Planning Proposals* - issued under s3.3 (3) of the *Environmental Planning and Assessment Act 1979* - provides guidance and information on the process for preparing Planning Proposals. The assessment of the submitted Planning Proposal by Council staff has been undertaken in accordance with the latest version of this *Guide* (dated August 2016).

### ***Section 9.1 Ministerial Directions***

Section 9.1 Ministerial directions (Section 9.1 directions) set out what a RPA must do if a S9.1 direction applies to a Planning Proposal, and provides details on how inconsistencies with the terms of a direction *may* be justified.

An assessment of the Planning Proposal against the applicable S9.1 directions is provided in Table 2 below:

Table 2: Planning Proposal consistency with S9.1 directions.

Ministerial Direction	Planning Proposal consistency with direction	Consistent
<b>3.1 Residential Zones</b>	<p><b>What a RPA must do:</b></p> <p>The RPA must include provisions that broaden the choice of building types, encourage the provision of housing that will make more efficient use of existing infrastructure and services.</p> <p><u>Comment:</u></p>	<b>YES</b>



Ministerial Direction	Planning Proposal consistency with direction	Consistent
	The Planning Proposal seeks to include provisions that will facilitate medium density in close proximity of existing transport infrastructure, open/recreation space, and nearby services.	
<b>3.4 Integrating Land Use and Transport</b>	<p><b>What a RPA must do:</b></p> <p>A Planning Proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of <i>Improving Transport Choice – Guidelines for planning and development (DUAP 2001)</i> (guidelines).</p> <p><u>Comment:</u></p> <p>The subject site is serviced by several bus services along Chuter Street and the Grand Parade, with connection to larger transport hubs such as Rockdale, and Kogarah as well as direct busses to the Sydney CBD.</p>	<b>YES</b>
<b>7.1 Implementation of A Plan for Growing Sydney</b>	<p><b>What a RPA must do:</b></p> <p>A RPA must ensure that a Planning Proposal is consistent with A Plan for Growing Sydney.</p> <p><u>Comment:</u></p> <p><b>Direction 2.1:</b> Aims to provide more housing and a diverse choice of housing as population growth accelerates.</p> <p><b>Direction 2.2:</b> Aims to facilitate urban infill projects, and urban renewal around transport corridors providing diverse housing close to jobs.</p> <p><b>Direction 2.3:</b> Aims to improve the choice of housing, as the needs of the population changes.</p> <p>Rezoning the subject site from RE2 to R3, reflecting the surrounding zone is considered consistent with Directions 2.1 and 2.3, as the proposal to seek medium density residential development has the potential to provide diversity in the local housing stock. The Planning Proposal enables development for medium density town houses to be considered.</p> <p>The Planning Proposal is consistent with Direction 2.2 as the current use of the site has been exhausted, the planning proposal will enable infill development, providing diverse housing stock within close proximity of public transport and the Kogarah Priority Health and Education Precinct.</p>	<b>YES</b>

### State Environmental Planning Policies (SEPPs)

An assessment of the Planning Proposal against the relevant SEPPs is provided in Table 3, below.

Table 3: Planning Proposal consistency with applicable SEPP's

Name of SEPP	Compliance of Planning Proposal with SEPP	Complies Y/ N
State Environmental Planning Policy	(1) <b>Clause 6 Contamination and remediation to be considered in zoning or rezoning proposal</b>	<b>YES</b>

Name of SEPP	Compliance of Planning Proposal with SEPP	Complies Y/ N
No 55- Remediation of Land (SEPP 55)	<p>(2) (1) In preparing an environmental planning instrument, a planning authority is not to include in a particular zone (within the meaning of the instrument) any land specified in subclause (4) if the inclusion of the land in that zone would permit a change of use of the land, unless:</p> <p>(3) (a) the planning authority has considered whether the land is contaminated, and</p> <p>(4) (b) if the land is contaminated, the planning authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and</p> <p>(5) (c) if the land requires remediation to be made suitable for any purpose for which land in that zone is permitted to be used, the planning authority is satisfied that the land will be so remediated before the land is used for that purpose.</p> <p><u>Comment:</u> The Planning Proposal included a Contamination Assessment (<b>Attachment 3</b>) which was referred to Council's Environmental Scientist, who provided the following comment:</p> <p><i>"No objections to the rezoning of the land from RE2 private recreation to R3 Medium Density subject to appropriate Phase 2 Detailed Site Assessment, RAP and Validation being required as part of any DA for development of the site, including at grade construction."</i></p>	

There are no other SEPP's applicable to the Planning Proposal.

### **Sydney Regional Environmental Plans (SREPs)**

There are no SREPs applicable to the Planning Proposal.

### **Strategic Planning Framework**

Regional, Sub-Regional and District Plans and Strategies include outcomes and specific actions for a range of different matters including housing and employment targets, and identify regionally important natural resources, transport networks and social infrastructure.

An assessment of the Planning Proposal's consistency with the relevant strategic plans is provided in Table 4, below.

Table 4: Strategic Planning Framework

Name of Strategic Plan	Directions, priorities, objectives and actions	Consistency Yes / N
<b>Regional Plans</b>		
A Plan for Growing Sydney	Refer to the assessment under the heading 'S9.1 directions', above	<b>YES</b>
Subregional Plans – A Plan for Growing Sydney - Central Subregion	Refer to the assessment under the heading 'S9.1 directions', above	<b>YES</b>



Name of Strategic Plan	Directions, priorities, objectives and actions	Consistency Yes / N
Greater Sydney Region Plan	<p><i>Objective 10:</i> Aims to have greater housing supply.</p> <p><i>Objective 11:</i> Aims to offer more diverse and affordable housing stock</p> <p><u>Comment:</u> The Planning Proposal is consistent with the Greater Sydney Regional Plan, as it would enable the consideration of medium density developments increasing the housing stocks, and allowing for more diverse housing stock.</p>	YES
<b>District Plans</b>		
Eastern City District Plan	<p><i>Planning Priority E5</i> Aims to increase housing stock, and offer great choice in housing.</p> <p><u>Comment:</u> As mentioned above; The Planning Proposal is consistent with the Eastern City District Plan, as it would enable the consideration of medium density developments increasing the housing stocks, and allowing for more diverse housing stock.</p>	YES
<b>Local Strategies</b>		
Rockdale Urban Strategy	<p><u>Strategy Principles:</u></p> <p><i>Residential Character:</i> Aims to ensure that precincts and streets are developed in ways that are consistent with and reinforce the overall character of their neighbourhood.</p> <p><u>Comment:</u> The locality is currently characterised by villa style medium density development, as well as detached single and double storey dwellings. The Planning Proposal is an opportunity to create consistency, and enforce the existing character on a site that has exhausted its previous use.</p>	YES
Rockdale Development Control Plan 2011 (DCP)	<p>The Planning Proposal is consistent and compatible with the Rockdale Development Control Plan 2011. The Planning Proposal will not preclude any potential Development Application from complying with the controls set out in the DCP.</p> <p><u>4.2 Streetscape and Site Context</u></p> <p><u>Comment:</u> The RDCP promotes a positive interrelationship between the building and the street. The objectives of the DCP are to ensure development respond to and relate to existing streetscape character.</p> <p>While this is a consideration for DA stage, the DCP will ensure the development is integrated, and complementary to the existing character of the locality.</p> <p><u>4.3 Open Space and Landscape Design</u></p> <p><u>Comment:</u> The site is compatible with the DCP controls relating to the use of appropriate landscaping to both provide privacy and enhance the streetscape.</p> <p><u>4.4.2 Solar Access</u></p> <p><u>Comment:</u> The planning Proposal would facilitate similar medium density developments as to what is surrounding the site. The FSR and Height controls, along with the DCP would facilitate adequate solar access both for neighbouring dwellings and any future development.</p>	

Name of Strategic Plan	Directions, priorities, objectives and actions	Consistency Yes / N
	<p><u>4.6 Car Parking, Access and Movement</u></p> <p><i>Comment:</i> The DCP will provide any future development application with controls to provide appropriate parking. The Planning Proposal is to reflect the surrounding zoning, height and FSR and is an appropriate size to allow accommodation of the required amount of parking and access.</p> <p><u>5.1 Low and Medium Density Residential</u></p> <p><i>Comment:</i> The Planning Proposal, will enable a medium density residential development. While the site only has a small street frontage, any development will be able to provide appropriate setbacks from the street.</p>	

### **Urban Context and Evaluation**

An Urban Design Report has been prepared (**Attachment 4**) for the subject Planning Proposal. The mass modelling included in the Urban Design Report includes an indicative maximum building envelope that could result from the amended development standards proposed for the subject land, whilst also modelling maximum developable envelopes for adjoining sites based on current development standards in the Rockdale LEP 2011. As stated in the previous section of this report, the Planning Proposal is seeking the same zoning and development standards that currently apply to all adjoining sites under the Rockdale LEP 2011.

The objectives of this Planning Proposal are to outline the proposed zoning and development standards for the site, not to identify a specific design outcome. However, if the Planning Proposal was to be supported by Council and the Department of Planning & Environment, and be finalised in the future, any proposed Development Application(s) would need to be supported by further detailed urban design analysis, to illustrate the specific design and intended built form outcome proposed for the subject land at that time.

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### **Financial Implications**

There are no financial implications applicable to this report.

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### **Community Engagement**

Should the Planning Proposal proceed through Gateway, community consultation will be undertaken in accordance with Section 3.34(2)(c) of the *Environmental Planning & Assessment Act 1979*. The specific requirements for community consultation will be listed in the Gateway determination, including any government agencies that are to be consulted.

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### **Attachments**

- 1 Planning Proposal
- 2 Traffic Report



- 3 Contamination Assessment
- 4 Urban Design Analysis

# **Planning Proposal**

**Rockdale Local Environmental Plan 2011**

**Rezoning of land at 119 Barton Street,  
Monterey to R3, Medium Residential Density**



August 2017

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## Table of revisions

<b>[Version]</b>	
<b>[Version]</b>	

## Introduction

This Planning Proposal explains the intended effect of, and justification, for the proposed amendment to *Rockdale Local Environmental Plan 2011 (Rockdale LEP 2011)*. It has been prepared in accordance with Section 55 of the *Environmental Planning and Assessment Act 1979* and the relevant Department of Planning and Environment guides, including 'A Guide to Preparing Local Environment Plans' and 'A Guide to Preparing Planning Proposals'.

## Background

Comprising the former Francis Drake Bowling Club, the site is a large battle axe lot at 119 Barton Street, Monterey. With a northern frontage of approximately 35 metres to Barton Street, the site has a total area of 7,218 sqm.

The site is proximate to commercial centres at Brighton-Le-Sands, 1.6km to the north, Ramsgate commercial centre 1.2km to the south and Kogarah commercial centre 1.5km to the north west. It is also 1.5km from the St George Hospital precinct which has been designated for major education/health development with employment of up to 10,000.

A site-specific zoning of RE2 Private Recreation applies to the subject land. However, the land lies within an R3 Medium Density Residential zone that surrounds it on all four sides.

This Planning Proposal seeks to amend the current zoning under RLEP 2011 from Private Recreation (RE2) to Medium Density Residential (R3) to make permissible the redevelopment of the subject land at 119 Barton Street.

Planning Proposal will be achieved by:

- Amending the Rockdale LEP 2011 Land Use Map for the former Sir Francis Drake Lawn Bowls Club at 119 Barton Street in accordance with Part 4 of this report.
- Establishing a Building Height that is consistent with the existing land uses of the subject area, i.e. 8.5m.
- Establishing an FSR that is the same as the surrounding area, currently 0.6:1 in the Rockdale LEP 2011.

An analytical study conducted by Rothelowman has produced a model for potential development yield and building typology. By way of example, this concept illustrates the capacity of the subject site to accommodate 28 two and three-bedroom townhouses under a fully compliant proposal with Council current guidelines for R3.

Rezoning of the site will not deprive the community of open space. The site was a private open space with its use limited to club members. Additionally, there is considerable open space 400m to the west at Scarborough Park, and 150m to the east, at Cook Park on the bay front.

The objective of the current scheme is to increase the number and diversity of dwellings in the subject area which is within proximity to an identified strategic centre. The relevant objectives of the Planning Proposal are as follows:

- *To provide increased housing consistent with the surrounding residential zoning of the locality*
- *To provide quality housing choices that are consistent with the existing zoning of the neighbourhood.*
- *Provide a feasible and sustainable economic use of the subject site.*

The proposal is compliant with all relevant SEPPs and the Minister's s117 Directions under the EPA Act.



## Part 1 - Objectives and Intended Outcomes

Currently, the subject site is underutilised and does not meet its full development potential. Located on the site is a redundant lawn bowls facility with a low capacity for improvement. Changes to the land use zoning and development standards identified below, will allow the site to potentially accommodate a residential development of high quality design. It is intended that the Planning Proposal form a site-specific amendment to the RLEP 2011.

The intended outcomes of the Planning Proposal are to amend *Rockdale LEP 2011* as follows:

- **Rezone the subject land to R3 Medium Density Residential (as is the land surrounding the site to all sides);**
- **Establish a site-specific maximum building height of 8.5 m (as is the land surrounding the site to all sides); and**
- **Establish a site-specific maximum floor space ratio (FSR) of 0.6:1 (as is the land surrounding the site to all sides).**

A site-specific zoning of RE2 Private Recreation applies to the subject land. However, the land lies within a R3 Medium Density Residential zone that surrounds it on all four sides.

Census statistics shows that houses in Monterey are dwellings primarily occupied by older people who are likely to be empty nesters remaining in family homes which are now larger than their needs in terms of bedroom numbers.

Regarding accessibility to modes of public transport for residents, the subject land lies within easy walking distance of bus services along Chuter Ave (270m west) and the Grand Parade (130m east). The Grand Parade is serviced by bus routes travelling north, Route 303 (Sans Souci to Circular Quay), and south, Route 478 (Ramsgate to Rockdale). An express service, Route X03, operates between Sans Souci and Circular Quay during peak periods Monday to Friday providing access to the city (Central Station) within 30 mins. Chuter Ave is serviced by Route 947 (operated by Transdev NSW), which runs between Hurstville to Kogarah.

The draft District Plans support the increase of housing across the Bayside LGA by monitoring the delivery of the five-year housing target of 10,150 dwellings while recognising significant growth in infill areas. Housing diversity and affordability are also major considerations in the strategic direction of LGAs located in the Central District. An increase in the proportion of people that are ageing and/or disabled has highlighted a need for the delivery of diverse housing which includes smaller homes, group homes, adaptable homes and aged care facilities.

*A Plan for Growing Sydney* (the Plan) anticipates that 664,000 new homes will be needed by 2031. The Plan highlights the importance of facilitating the movement of Sydney residents between their homes, their jobs, commercial centres and open spaces.

The proposal is consistent with the Plan as it will accelerate the delivery of housing to contribute to the State Government target of 664,000 homes by 2031 (direction 2.1). These homes will be provided within established centres supported by public transport, utilities, social infrastructure and employment opportunities within the Kogarah strategic centre, which lies approximately 1.6km from the subject site. The Kogarah priority health and education precinct is planned to provide at least 10,000 jobs (direction 2.2). The proposal will permit infill medium density development to meet the needs of growing number of small households within a locality otherwise dominated by detached dwelling houses (direction 2.3).

The proposal will provide an opportunity to revitalise an existing suburb through the redevelopment of a disused facility to create an improved streetscape (direction 3.1). Redevelopment of the site has the potential to encourage a healthy community through the provision of communal open space, sustainable design and end of journey facilities that encourage cycling in this relatively flat area (direction 3.3).

## **Section 117 Directions**

### *Direction 3.1 Residential Zones*

The first relevant s117 Direction is 3.1 – Residential Zones whose objectives are:

- (a) to encourage a variety and choice of housing types to provide for existing and future housing needs,*
- (b) to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and*
- (c) to minimise the impact of residential development on the environment and resource lands.*

The development of townhouses on the subject site will be consistent with the planning for the area which seeks medium density housing, will increase the choice of housing which is currently and predominantly single dwellings, and will make good use of existing open space and public transport infrastructure. Services such as water, sewerage and electricity are available in the street. No adverse impact on the environment at large will result from the infilling of residential development on the subject site.

### *Direction 3.4 Integrating land use and transport*

The objective of Direction 3.4 is to:

*ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:*

- (a) improving access to housing, jobs and services by walking, cycling and public transport, and*
- (b) increasing the choice of available transport and reducing dependence on cars, and*
- (c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and*
- (d) supporting the efficient and viable operation of public transport services, and*
- (e) providing for the efficient movement of freight. Where this direction applies*

A planning proposal must include provisions that are consistent with the principles of *Improving Transport Choice – Guidelines for planning and development (DUAP 2001)*, and *The Right Place for Business and Services – Planning Policy*<sup>1</sup>.

As mentioned above, the subject site is serviced by a number of bus services, along Chute Avenue and the Grand Parade. The proposal satisfies the objectives of Direction 3.4.

Though the planning proposal does change the existing RE2 – Private Recreation zoning to R3 - Residential, it will provide an increased and diverse supply of housing within approximately 2km of the Kogarah Strategic Health Centre. The proposal makes use of existing transport infrastructure and, therefore, it is consistent with the policy.

### *Direction 7.1 Implementation of A Plan for Growing Sydney*

Direction 7.1 applies to land within the former local government area of Rockdale. Its objective is to:

*give legal effect to the planning principles; directions; and priorities for subregions, strategic centres and transport gateways contained in A Plan for Growing Sydney.*

Refer to discussion regarding consistency with strategic direction under Part 3-B below.

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<sup>1</sup> Department of Planning and Environment. Policy Directions for Plan Making. (Page 17)

## Part 2 - Explanation of Provisions

### A – Provisions that are shown on control maps

#### 2.1 – land use zoning

The subject site is zoned RE2 Private Recreation under the Rockdale Local Environmental Plan 2011, the objectives of the RE2 Zone are as follows:

- *To enable land to be used for private open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*

Permissible and prohibited uses within the zone are summarised in Table 2 below. The former Francis Drake Bowling Club constituted development for the purpose of a registered club (outdoor). Residential development is prohibited within the RE2 zone.

TABLE 1: DEVELOPMENT STANDARDS UNDER ROCKDALE ENVIRONMENTAL PLAN 2011 - Part 2 Permitted or Prohibited Development	
CONTROL	PROPOSAL
<b>Clause 2</b> Permitted without consent	Roads
<b>Clause 3</b> Permitted with consent	Boat launching ramps; Building identification signs; Business identification signs; <b>Community facilities</b> ; Environmental facilities; Environmental protection works; Jetties; Kiosks; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Water supply systems
<b>Clause 4</b> Prohibited	Any development not specified in item 2 or 3

As mentioned above, the subject site is currently zoned RE2 – Private Recreation with the surrounding area being R3 – Medium Density Residential. Residential development under the current zoning is prohibited. Notwithstanding, this Planning Proposal is for the change in land use zoning from RE2 to R3, which is justified as it is consistent with the surrounding zoning and will accommodate a townhouse-style development such as the neighbouring site at 125 Barton Street.

#### 2.2 – Height of Building

Building height for the subject site is not currently prescribed under clause 4.3 in the RLEP 2011. Though the site is excluded from the Height of Buildings Map, the immediate area has a maximum height of 8.5m. The objectives of this clause are as follows:

- to establish the maximum limit within which buildings can be designed and floor space can be achieved,*
- to permit building heights that encourage high quality urban form,*
- to provide building heights that maintain satisfactory sky exposure and daylight to buildings, key areas and the public domain,*
- to nominate heights that will provide an appropriate transition in built form and land use intensity*

The Planning Proposal will establish a maximum building height of 8.5m, which is consistent with the prevailing height limit for the subject area. Amending the map referred to in clause 4.3 to include the subject site meets the above objectives.

## 2.3 – Floor Space Ratio (FSR)

FSR for the subject site is not currently prescribed under clause 4.4 in the RLEP 2011. Though the site is excluded from the FSR Map, the immediate area has a maximum FSR of 0.6:1. The objectives of this clause are as follows:

- (a) to establish the maximum development density and intensity of land use, accounting for the availability of infrastructure and generation of vehicular and pedestrian traffic, in order to achieve the desired future character of Rockdale,*
- (b) to minimise adverse environmental effects on the use or enjoyment of adjoining properties,*
- (c) to maintain an appropriate visual relationship between new development and the existing character of areas or locations that are not undergoing or likely to undergo a substantial transformation.*

Currently, the subject site is exempt from the RLEP 2011 Floor Space Ratio map (see figure 6). Amending the FSR of the site to a density that is consistent with the surrounding area will have no unreasonable adverse impact on the amenity, extent of overshadowing or privacy of the adjoining properties.

## B – All provisions

Development standards applicable to the subject land are summarised in Table 3 below.

TABLE 2: DEVELOPMENT STANDARDS UNDER ROCKDALE LOCAL ENVIRONMENTAL PLAN 2011	
CONTROL	PROPOSAL
<b>Clause 4.1</b> Minimum subdivision lot size	<b>Not relevant.</b> No amendment of Clause 4.1 is proposed.
<b>Clause 4.3</b> Building Height	<p><b>Not applicable.</b> The subject land is not identified on the Floor Space Ratio Map (Sheet HOB_005).</p> <p>A site-specific maximum building height of 8.5m, consistent with that permissible within the surrounding R3 medium density zone, is proposed to be applied to the subject land. Refer section <b>4 Mapping</b> below.</p>
<b>Clause 4.4</b> FSR	<p><b>Not applicable.</b> The subject land is not identified on the Floor Space Ratio Map (Sheet FSR_005).</p> <p>A site-specific maximum floor space ratio of 0.6:1, consistent with that permissible within the surrounding R3 medium density zone, is proposed to be applied to the subject land. Refer section <b>4 Mapping</b> below.</p>
<b>Clause 5.9</b> Preservation of trees or vegetation	<b>Not relevant.</b> No amendment of Clause 5.9 is proposed.



TABLE 2: DEVELOPMENT STANDARDS UNDER ROCKDALE LOCAL ENVIRONMENTAL PLAN 2011	
CONTROL	PROPOSAL
<b>Clause 5.10</b> Heritage conservation	<p>No amendment of Clause 5.10 is proposed.</p> <p>Subject land is not identified as a heritage item under this instrument nor does it lie within a conservation area identified on the RLEP 2011 Heritage Map (Sheet HER_005). The subject land does, however, lie within 150 metres of Cook Park along the Grand Parade to the east, which is identified as an item of local heritage significance (I168) under schedule 5 of RLEP 2011.</p>
<b>Part 6</b> Additional Local Provisions	<b>Not relevant.</b> No amendment of Part 6 is proposed.

## Control Maps

Tile 005 of *Rockdale LEP 2011* control maps shows land use zoning, FSR and Height of Building for the subject site. Proposed changes and the amended development control maps are provided under Part 4 'Mapping' below.

## Part 3 - Justification

### A Need for the planning proposal

#### A1 Is the planning proposal a result of any strategic study or report?

As noted below, the proposal meets many strategic objectives but the site is too small to have been featured in any strategic plans for the area.

#### Cook Park Plan of Management and Masterplan 2010

Cook Park is a large public recreation area that spans approximately 8 kilometers along the Botany Bay foreshore from the Cooks River to the mouth of the Georges River. Due to its size and local significance, Cook Park is the focal point for a number of suburbs on the western shore of Botany Bay. The Cook Park Plan of Management and Masterplan sets out the strategic direction for the park and minimising impacts from surrounding areas.

Part 5 of the Plan outlines the strategy for conserving the park's environment, heritage and character. This is relevant to the proposal as views of Botany Bay, through the park, are available along Barton Street. The proposed change of use will be consistent with the values of this section which outline the conservation of heritage, social and natural value, visual quality, and recreational space.

As a part of this proposal, the site will have a maximum building height of 8.5m with an FSR of 0.6:1. Strategies identified in the Plan, such as establishing green links and maintaining view corridors, have been recognised and are encompassed in the objectives, **Section 4.1**, below.



Figure 1: Extract – Cook Park – Plan of Management and Masterplan

## **Open Space & Recreation Strategy 2010**

In 2010, Rockdale City Council released a strategy to enhance the quality of open space and recreational areas. The Open Space & Recreation Strategy set goals that are consistent with the key strategic direction of The Rockdale City Plan 2009-2018. These goals are:

- A City with a Sense of Pride
- A Liveable City with Lifestyle Qualities
- A Connected and Accessible City
- A City with Viable Business and Employment Opportunities

### **A2 Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?**

Due to the very restrictive nature of the current zoning, RE2 Private Recreation, there is no other way to achieve economic and orderly use of the site other than by a rezoning.

## **B Relationship to strategic planning framework**

### **B1 Is the planning proposal consistent with the objectives and actions contained within the applicable regional, sub-regional or district plan or strategy (including any exhibited draft plans or strategies)?**

There are no detail strategies of sufficient detail to state that the proposal has been brought into existence following the adoption of such strategies. However, all of the more generalised strategies, such as the exhibited draft district plans, support a conversion of the subject site into a minor residential development (potentially 28 dwellings). It is completely consistent with surrounding zoning.

## **Draft District Plans**

The draft District Plans were put on exhibition by the Greater Sydney Commission (GSC) in November 2016 and follow the direction set by *A Plan for Growing Sydney*. Goals set out by the GSC have included the strategy of providing integrated and effective land use, transport and infrastructure over the next 20 years. The draft plans will also act as an intermediary plan between state and local policies. More specifically, the draft plans aim to manage the growth of the region by enhancing the local liveability and productivity of the six districts. Provisions for Bayside Council are outlined in the draft Central District Plan, which includes targets for housing and employment.

For the Central District, opportunities for job growth should be supported by facilitating the needs of innovative and creative industries. Consideration should be given to the full spectrum of economic activity including small start-ups which should incorporate efficient working arrangements that are in close proximity to home<sup>2</sup>.

Though Monterey is located within the Central District, it is situated approximately 1.5 km east of Kogarah which lies within the South District. The Kogarah strategic centre has been identified in the South District Plan as a health and education super precinct (Action P1 – South District)<sup>3</sup>. Development in Kogarah,

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<sup>2</sup> Greater Sydney Commission. Draft Central District Plan (p. 42-55, Rep.)

<sup>3</sup> Greater Sydney Commission. Draft South District Plan (p. 47-49, Rep.)

according to the draft plan, is apparently more important for Monterey than development further north around Sydney Airport. Objectives for managing the growth of the health and education precinct are as follows:

- *promote synergies between the St George Hospital and other health and education related activities*
- ***encourage land use that will support the growth of the Kogarah health and education super precinct and will cater for specialised housing demands from staff, students and health visitors*** (our emphasis)

The draft District Plans support the increase of housing across the Bayside LGA by monitoring the delivery of the five-year housing target of 10,150 dwellings while recognising significant growth in infill areas. Housing diversity and affordability are also major considerations in the strategic direction of LGAs located in the Central District. An increase in the proportion of people that are ageing and/or disabled has highlighted a need for the delivery of diverse housing which includes smaller homes, group homes, adaptable homes and aged care facilities.

## **A Plan for Growing Sydney**

*A Plan for Growing Sydney* (the Plan) anticipates that 664,000 new homes will be needed by 2031. The Plan highlights the importance of facilitating the movement of Sydney residents between their homes, their jobs, commercial centres and open spaces. Goals established by the Plan include the following (emphasis added):

- *A competitive economy with world-class services and transport;*
- ***A city of housing choice with homes that meet our needs and lifestyles;***
- ***A great place to live with communities that are strong, healthy and well connected; and***
- *A sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources.*

The proposal is consistent with the Plan as it will accelerate the delivery of housing to contribute to the State Government target of 664,000 homes by 2031 (direction 2.1). These homes will be provided within established centres supported by public transport, utilities, social infrastructure and employment opportunities within the Kogarah strategic centre, which lies approximately 1.6km from the subject site. The Kogarah priority health and education precinct is planned to provide at least 10,000 jobs (direction 2.2). The proposal will permit infill medium density development to meet the needs of growing number of small households within a locality otherwise dominated by detached dwelling houses (direction 2.3).

The proposal will provide an opportunity to revitalise an existing suburb through the redevelopment of a disused facility to create an improved streetscape (direction 3.1). Redevelopment of the site has the potential to encourage a healthy community through the provision of communal open space, sustainable design and end of journey facilities that encourage cycling in this relatively flat area (direction 3.3).



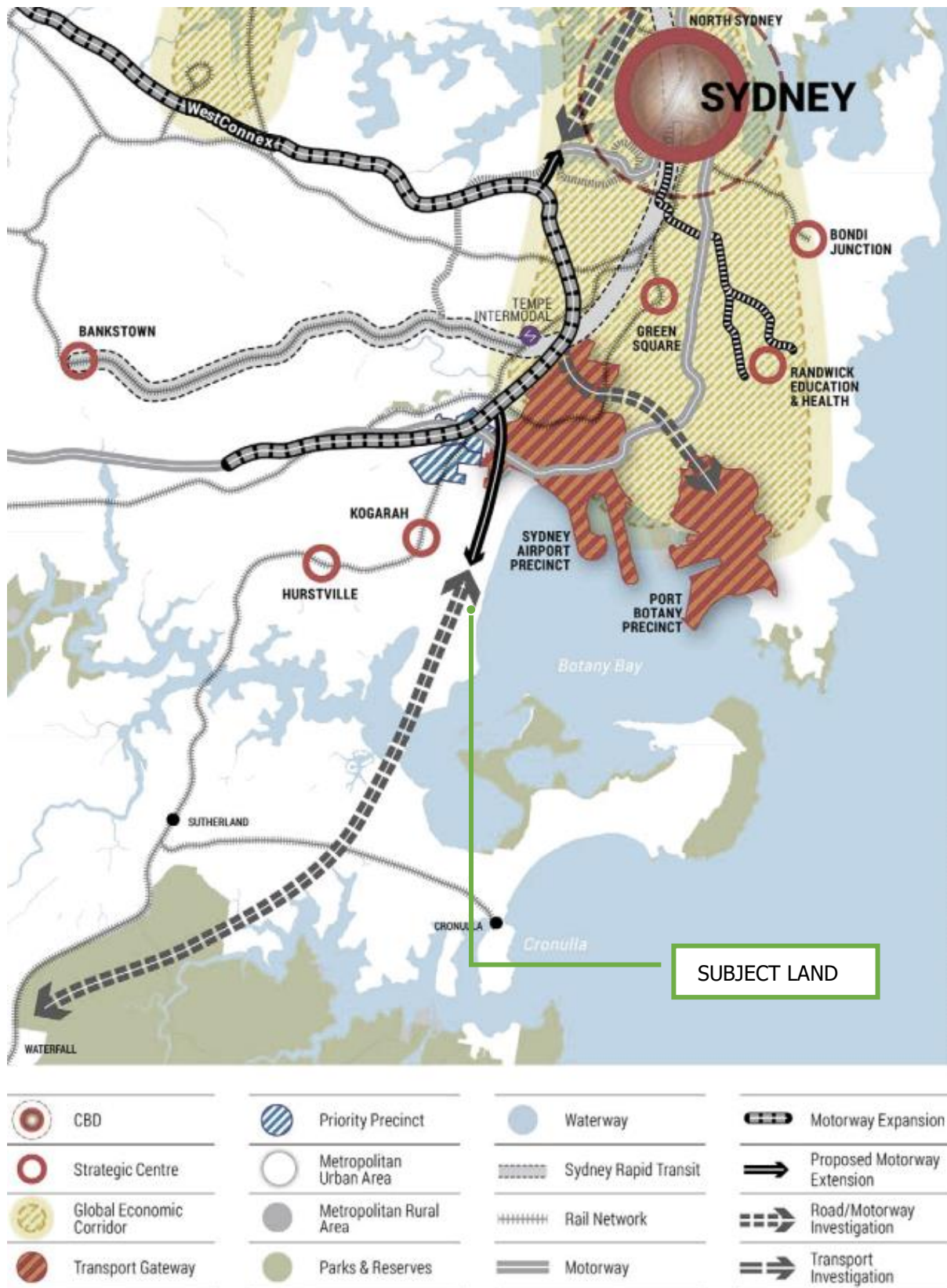


Figure 2: Extract from NSW Department of Planning's *Sydney Metropolitan Strategy: A Plan for Growing Sydney 2015* (p. 58).

**B2 Is the planning proposal consistent with the local council's Community Strategic Plan or other local strategic plan?**

To the extent possible for such a minor proposal, it is consistent with the former Rockdale's local strategy under which all of the surrounding land has been zoned Residential, R3, as is proposed in this case. There is no reason to believe that the strategy has changed following amalgamation of the Rockdale and Botany Bay City Councils into the Bayside Council.

**Community Strategic Plan 2013-2025**

The Community Strategic Plan's aim is to guide growth in the Rockdale LGA over a 12-year span. It will provide a strategic planning framework for a number of community outcomes that have been identified as council aspirations. The plan also provides a vision for how Rockdale City will encourage diverse development with effective housing choice and enhance opportunities for business growth.

*Outcome 2 - Quality natural and built environment*

<b>TABLE 3 – Rockdale Community Strategic Plan 2013-2025</b>		
<b>STRATEGY</b>	<b>PROPOSAL</b>	<b>COMPLIANCE</b>
2.1.1 Protect, preserve and promote the City's natural resources	The proposal and related development will be consistent with the existing features of the subject area and complement significant City resources such as the foreshore and Cook Park.	<b>Complies</b>
2.1.2 Demonstrate leadership in responding to climate change through action and adaptation	Rezoning of the site has the potential to accommodate 28 townhouse units which will include an efficient design, compliant with building sustainability requirements.	<b>Complies</b>
2.2.1 Ensure planning enables the provision of quality affordable housing	Does not apply to the subject development. Not proposed	<b>N/A</b>
2.2.2 Promote high quality, well designed and sustainable development and places that enhance the City	Proposed design of the dwellings will respond to contemporary SEPP 65 principles even though the project does not fall under SEPP 65. Design of the dwellings will be provided at a later DA stage.	<b>Complies</b>
2.3.1 Ensure waste minimisation to reduce the impact on the environment	Waste management plan will be provided at DA stage.	<b>Can comply</b>
2.4.1 Ensure that Rockdale's natural and built heritage and history is respected, protected and well maintained reflecting the rich and diverse past of both Aboriginal and European settlement	The subject site has not been identified as a heritage item and is not situated in a conservation area. The closest heritage item is Cook Park (I168), which is located approximately 200m to the west.	<b>N/A</b>
2.5.1 Ensure that the City's transport networks and infrastructure are well planned, integrated and maintained	As mentioned in section 2.3, the subject area is serviced by a number of bus routes along Chuter Ave toward the CBD and is situated approximately 2 km from Kogarah train station. Public transport is currently underutilized in the Monterey locality as 62.5% of residents use private vehicle as a mode of transportation.	<b>Can comply</b>

TABLE 3 – Rockdale Community Strategic Plan 2013-2025		
STRATEGY	PROPOSAL	COMPLIANCE
2.5.2 Ensure sustainable current and future transport needs of the community providing access to services and facilities and enabling active living.	As above.	N/A

### B3 Is the planning proposal consistent with applicable State Environmental Planning Policies (SEPPs)?

No SEPPs are contradicted by the planning proposal for the rezoning of the subject land that is totally encompassed by the existing low density residential development designated for conversion to medium density development. There is no inconsistency with the SEPPs.

Consistency with the State Environmental Planning Policies is provided in Table 4, below.

Table 4 - Consistency with State Environmental Planning Policies		
No.	Title	Consistency with Planning Proposal
1	Development Standards	(Repealed by <i>RLEP 2011</i> )
14	Coastal Wetlands	Not Applicable
15	Rural Landsharing Communities	Not Applicable
19	Bushland in Urban Areas	Not Applicable
21	Caravan Parks	Not Applicable
22	Shops and Commercial Premises	Not Applicable
26	Littoral Rainforests	Not Applicable
29	Western Sydney Recreation Area	Not Applicable
30	Intensive Aquaculture	Not Applicable
32	Urban Consolidation (Redevelopment of Urban Land)	(Repealed)
33	Hazardous and Offensive Development	Not Applicable
36	Manufactured Home Estates	Not Applicable
39	Spit Island Bird Habitat	Not Applicable
44	Koala Habitat Protection	Not Applicable
47	Moore Park Showground	Not Applicable
50	Canal Estate Development	Not Applicable
52	Farm Dams and Other Works in Land and Water Management Plan Areas	Not Applicable
55	Remediation of Land	The proposal will be assessed at the DA stage as there is no indication that site requires remediation.
59	Central Western Sydney Regional Open Space and Residential	Not Applicable
60	Exempt and Complying Development	(Repealed by <i>RLEP 2011</i> )
62	Sustainable Aquaculture	Not Applicable
64	Advertising and Signage	Not Applicable
65	Design Quality of Residential Flat Development	Not Applicable
70	Affordable Housing (Revised Schemes)	Not Applicable
71	Coastal Protection	Not Applicable
	(Affordable Rental Housing) 2009	Not Applicable
	(Building Sustainability Index: BASIX) 2004	The proposal will comply with the relevant

		requirements at the DA stage.
	(Exempt and Complying Development Codes) 2008	Not Applicable
	(Housing for Seniors or People with a Disability) 2004	Not Applicable
	(Infrastructure) 2007	Not Applicable
	(Kosciuszko National park Alpine Resorts) 2007	Not Applicable
	(Kurnell Peninsula) 1989	Not Applicable
	(Major Development) 2005	Not Applicable
	(Mining, Petroleum Production and Extractive Industries) 2007	Not Applicable
	(Miscellaneous Consent Provisions) 2007	Not Applicable
	(Penrith Lakes Scheme) 1989	Not Applicable
	(Rural Lands) 2008	Not Applicable
	(SEPP 53 Transitional Provisions) 2011	Not Applicable
	(State and Regional Development) 2011	Not Applicable
	(Sydney Drinking Water Catchment) 2011	Not Applicable
	(Sydney Region Growth Centres) 2006	Not Applicable
	(Three Ports) 2013	Not Applicable
	(Urban Renewal) 2010	Not Applicable
	(Western Sydney Employment Area) 2009	Not Applicable
	(Western Sydney Parklands) 2009	Not Applicable

See Table 5 below which reviews the consistency with the formerly named State Regional Environmental Plans, now identified as deemed SEPPs.

<b>Table 5 - Consistency with deemed State Environmental Planning Policies</b>		
<b>No.</b>	<b>Title</b>	<b>Consistency with Planning Proposal</b>
8	(Central Coast Plateau Areas)	Not Applicable
9	Extractive Industry (No.2 – 1995)	Not Applicable
16	Walsh Bay	Not Applicable
18	Public Transport Corridors	Not Applicable
19	Rouse Hill Development Area	Not Applicable
20	Hawkesbury-Nepean River (No.2 – 1997)	Not Applicable
24	Homebush Bay Area	Not Applicable
26	City West	Not Applicable
30	St Marys	Not Applicable
33	Cooks Cove	Not Applicable
	(Sydney Harbour Catchment) 2005	Not Applicable

#### **B4 Is the planning proposal consistent with applicable Ministerial Directions (s.117 directions)?**

The first relevant s117 Direction is 3.1 – Residential Zones whose objectives are:

- (a) to encourage a variety and choice of housing types to provide for existing and future housing needs,*
- (b) to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and*
- (c) to minimise the impact of residential development on the environment and resource lands.*

As noted above, the rezoning of the subject site to R3:

- will be consistent with the planning for area which seeks medium density housing,
- will increase the choice of housing which is currently and predominantly single dwellings, and
- will make good use of existing open space and public transport infrastructure.



Services such as water, sewerage and electricity are available in the street. No adverse impact on the environment at large will result from the infilling of residential development on the subject site.

The objectives of Direction 3.4, Integrating Land Use and Transport, are to:

*ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:*

- (a) improving access to housing, jobs and services by walking, cycling and public transport, and*
- (b) increasing the choice of available transport and reducing dependence on cars, and*
- (c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and*
- (d) supporting the efficient and viable operation of public transport services, and*
- (e) providing for the efficient movement of freight. Where this direction applies*

Through changing the existing RE2 – Private Recreation zoning to R3 - Residential, the proposal will provide an increased and diverse supply of housing within approximately 2km of the Kogarah Strategic Health Centre. As mentioned above, the subject site is well serviced by a number of bus routes, close to the site, along Chute Avenue and the Grand Parade. The proposal satisfies the objectives of Direction 3.4

Direction 7.1 - Implementation of A Plan for Growing Sydney, applies to land within the former local government area of Rockdale. Its objective is to:

*give legal effect to the planning principles; directions; and priorities for subregions, strategic centres and transport gateways contained in A Plan for Growing Sydney.*

As noted elsewhere in this report, the proposal is entirely consistent with the strategic direction sought for its locality.

See Table 6 below which reviews the consistency with the Ministerial Directions for LEPs under section 117 of the *Environmental Planning and Assessment Act 1979*.

**Table 6** - Consistency with applicable Ministerial Directions

#### **1. Employment and Resources**

<b>No.</b>	<b>Title</b>	<b>Consistency with Planning Proposal</b>
1.1	Business and Industrial Zones	Not Applicable
1.2	Rural Zones	Not Applicable
1.3	Mining, Petroleum Production & Extractive Industries	Not Applicable
1.4	Oyster Aquaculture	Not Applicable
1.5	Rural Lands	Not Applicable

#### **2. Environment and Heritage**

<b>No.</b>	<b>Title</b>	<b>Consistency with Planning Proposal</b>
2.1	Environmental Protection Zones	Not Applicable
2.2	Coastal Protection	Not Applicable
2.3	Heritage Conservation	Not Applicable
2.4	Recreation Vehicle Areas	Not Applicable

#### **3. Housing, Infrastructure and Urban Development**

<b>No.</b>	<b>Title</b>	<b>Consistency with Planning Proposal</b>
3.1	Residential Zones	It is consistent, see above.
3.2	Caravan Parks and Manufactured Home Estates	Not Applicable
3.3	Home Occupations	Not Applicable
3.4	Integrating land use and Transport	It is consistent, see above.
3.5	Development near Licensed Aerodromes	Not Applicable
3.6	Shooting ranges	Not Applicable

#### 4. Hazard and Risk

No.	Title	Consistency with Planning Proposal
4.1	Acid Sulfate Soils	Not Applicable
4.2	Mine Subsidence and Unstable Land	Not Applicable
4.3	Flood Prone Land	Not Applicable
4.4	Planning for Bushfire Protection	Not Applicable

#### 5. Regional Planning

No.	Title	Consistency with Planning Proposal
5.1	Implementation of Regional Strategies	Not Applicable
5.2	Sydney Drinking Water Catchments	Not Applicable
5.3	Farmland of State and Regional Significance on the NSW Far North Coast	Not Applicable
5.4	Commercial and Retail Development along the Pacific Highway, North Coast	Not Applicable
5.5	Development on the vicinity of Ellalong...	Not Applicable
5.6	Sydney to Canberra Corridor	Not Applicable
5.7	Central Coast	Not Applicable
5.8	Second Sydney Airport: Badgerys Creek	Not Applicable

#### 6. Local Plan Making

No.	Title	Consistency with Planning Proposal
6.1	Approval and Referral Requirements	Not Applicable
6.2	Reserving land for Public Purposes	Not Applicable
6.3	Site Specific Provisions	It is consistent, see above.

#### 7. Metropolitan Planning

No.	Title	Consistency with Planning Proposal
7.1	Implementation of A Plan for Growing Sydney	It is consistent, see above.

### C Environmental, social and economic impact

#### C1 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

The site is fully developed and does not accommodate any critical habitat, threatened species, etc.

#### C2 Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

No other environmental effects, other than those reported above, have been identified.

#### C3 How has the planning proposal adequately addressed any social and economic effects?

No other social or economic effects, other than those reported above, have been identified.

### D State and Commonwealth interests

#### D1 Is there adequate public infrastructure for the planning proposal?

As noted above, the locality is rich in public infrastructure, especially public transport and open space.

**D2 What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway determination?**

State and Commonwealth public authorities have not yet been consulted.

**E Conclusions**

**E1 Economic and orderly use of the site**

The objectives of the EPA Act include, at S5(a)(ii),

*the promotion and co-ordination of the orderly and economic use and development of land ...*

Formerly used as a bowling club which included a registered club encompassing the service of alcohol and a small number of gambling machines, the site use never-the-less fell into financial difficulties due to changing community preferences. This situation has been repeated in many locations throughout both Sydney and the nation as old pastimes give way to new and different choices. If the site could not make an economic return, even with its associated registered club, it is clear that no other similar use (tennis courts, croquet, etc) will be more successful.

If the economic and orderly use of the site is to be achieved, a rezoning to some other use than private recreation is required. The most obvious use is one that is the same as the area surrounding the site, Residential R3 with the same Building Height and FSR.

As noted above, there is strategic planning support for the provision of housing in the general area of the now Bayside City (formerly Rockdale City) and this site meets the necessary strategic imperatives of proximity to transport and the designated growth centres.

**E2 Impact of the proposal**

As may be seen from the proposal's architectural drawings, the very acceptable and not unreasonable impact of the proposal will fall upon those surrounding houses which have enjoyed the twin benefits of adjoining private open space and lack (thus far) of medium density redevelopment for which the locality has been designated. Development of the site as currently proposed may create minor privacy impacts, from the upper bedroom storeys of the proposed townhouses (subject to detailed design). Such an impact is within the range of that expected in any transition to medium density development. It will be no worse than if new development occurred next door rather than behind the existing houses.

Distances between windows of the proposed new and the existing will exceed the old AMCORD standard of 9m and the equivalent under the Apartment Design Guide of SEPP 65 (which itself is not applicable to the development). Adopting the development standards of the surrounding area will make all medium density housing in the area equal in impact and within the bounds framed by the zoning controls.

Based on the potential concept design, overshadowing will not be a general issue due to the favourable orientation of the site, the separation distances between new and proposed buildings and the limited building height of 8.5m.

### **E3 Summary conclusions**

- The proposal aligns exactly with the zoning surrounding the subject site on all four sides in terms of land use, density expressed in FSR, building height.
- Rezoning of the site will not deprive the community of open space. The site was a private open space with its use limited to club members. Additionally, there is considerable open space 400m to west at Scarborough Park, and 150m to the east, at Cook Park on the bay front.
- Demonstrably, as shown in the proposed architectural plans appended, development of the site is possible in accordance with all planning controls contained in the Rockdale LEP and DCP. This means that the impact of the proposal is within the acceptable bounds prescribed in the LEP and DCP.
- Development of the site will not give rise to unacceptable or unreasonable impacts on surrounding housing which is slated for redevelopment as medium density residential.
- Located between Chuter Avenue and The Grand Parade, the site is well served by bus routes. It is also proximate to the St George Hospital precinct which has been designated as a major health/education precinct under A Plan for Growing Sydney.
- The proposal is compliant with all relevant SEPPs and the Minister's s117 Directions under the EPA Act.

## Part 4 – Mapping

To assist the community in understanding the proposed amendment(s), the following maps are provided as part of this application:

- Site context map – this should identify the site(s) subject to the Planning Proposal;



**Figure 3:** Site and its surrounds. Extract from 'Urban Design Analysis' report prepared by Rothe Lowman, January 2016.

Figures 4 to 9 below illustrate the current control maps as well as proposed controls. The control maps that need to be amended subject to this planning proposal are land use zoning, height of building and floor space ratio.



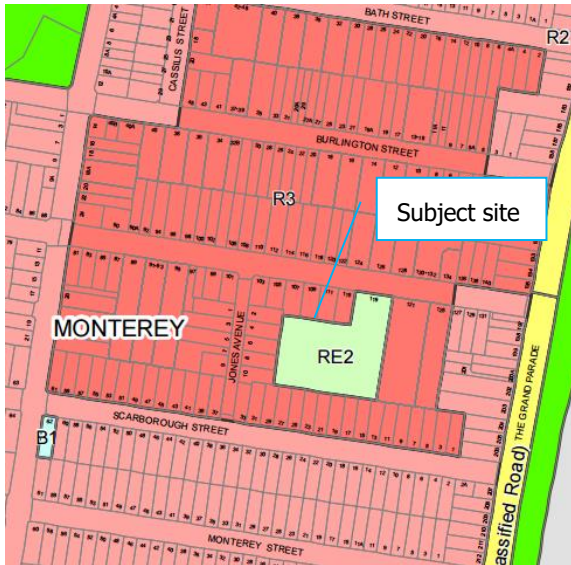


Figure 4: The land use zoning map as per RLEP 2011

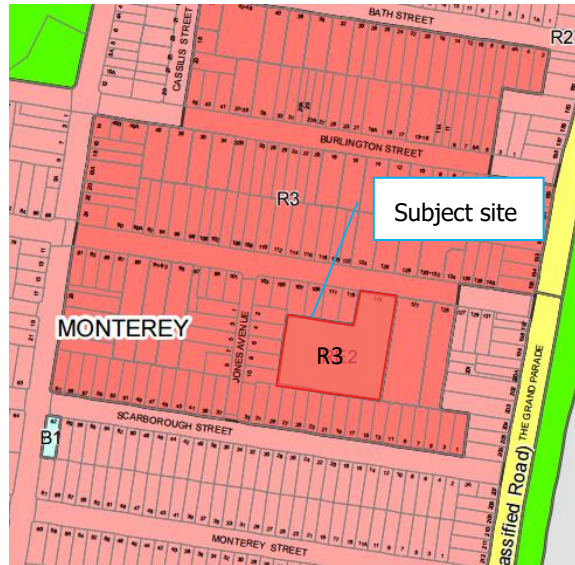


Figure 5: The proposed land use zoning map as amended

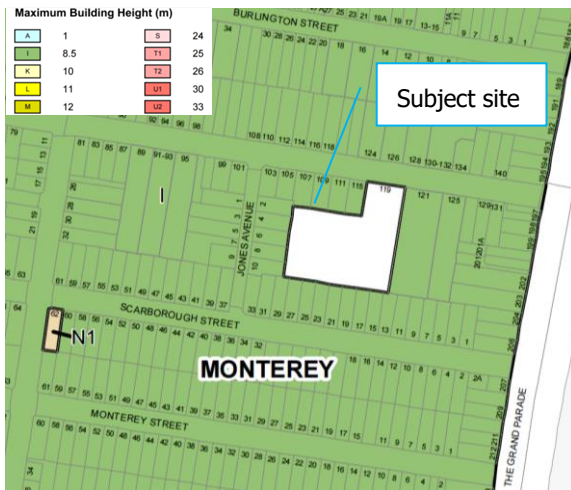


Figure 6: The height of building map as per RLEP 2011

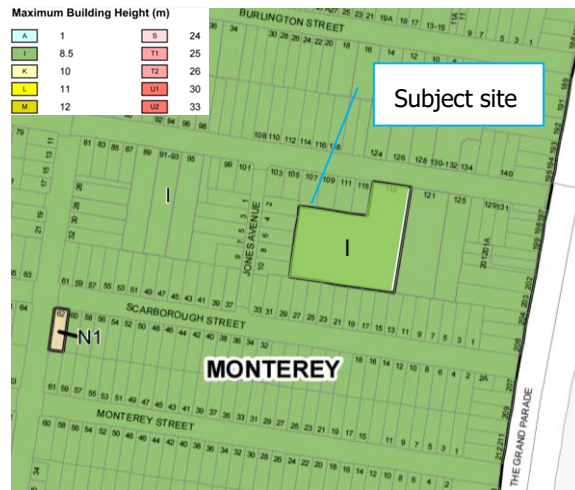


Figure 7: The proposed height of building map as amended

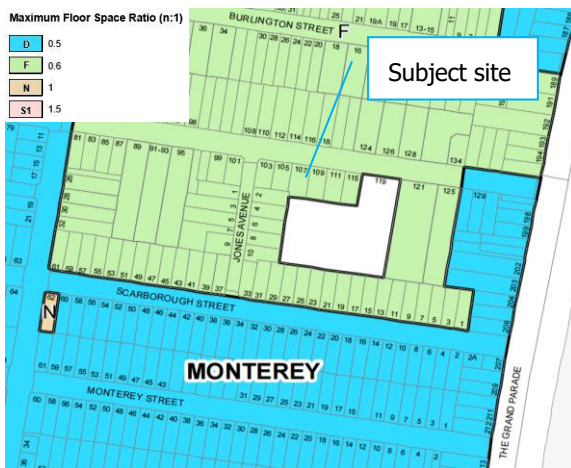


Figure 8: The floor space ratio as per RLEP 2011

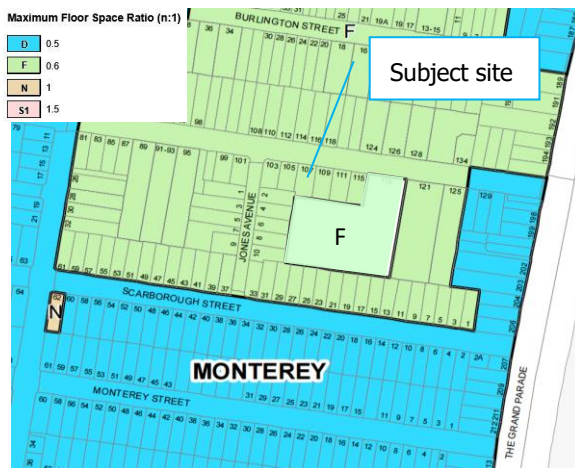


Figure 9: The proposed floor space ratio map as amended

## Part 5 - Community Consultation

Community consultation process will be defined post submission in consultation with Council's 'Place Outcomes' team.

## Part 6 – Project Timeline

The project timeline will be completed in consultation with Council's 'Place Outcomes' team after submission of the Planning Proposal.

The table below provides a proposed timeframe for the project.

**Table 7**– Approximate Project Timeline

<b>Task</b>	<b>Timing</b>
Date of Gateway determination	Will be discussed post submission
Anticipated timeframe for the completion of required technical information	Will be discussed post submission
Timeframe for government agency consultation (pre and post exhibition as required by Gateway determination)	Will be discussed post submission
Commencement and completion dates for public exhibition period	Will be discussed post submission
Dates for public hearing (if required)	Will be discussed post submission
Timeframe for consideration of submissions	Will be discussed post submission
Timeframe for the consideration of a PP following exhibition	Will be discussed post submission
Consideration of PP by Council (Council Meeting)	Will be discussed post submission
Date of submission to the department to finalise the LEP	Will be discussed post submission
Anticipated date RPA will make the plan (if delegated) or Anticipated date RPA will forward to the department for notification	Will be discussed post submission
Anticipated publication date	Will be discussed post submission



## Appendix 1 - Supporting environmental assessment, design and engineering studies

The Planning Proposal is supported by the urban design study and the following schematic master plan drawings prepared by Rothelowman:

Drawing No.	Issue/Rev	Description	Date
SK00.02	P2	Ground floor / level 1 masterplan	21/01/2016
SK00.03	P2	Level 2 masterplan	21/01/2016
SK00.04	P1	Solar analysis – Mar, Sep, Dec	21/01/2016
SK00.05	P1	Solar analysis – June	21/01/2016
SK01.01	P2	Townhouse Type A – Floor plans	21/01/2016
SK01.02	P2	Townhouse Type B – Floor plans	21/01/2016

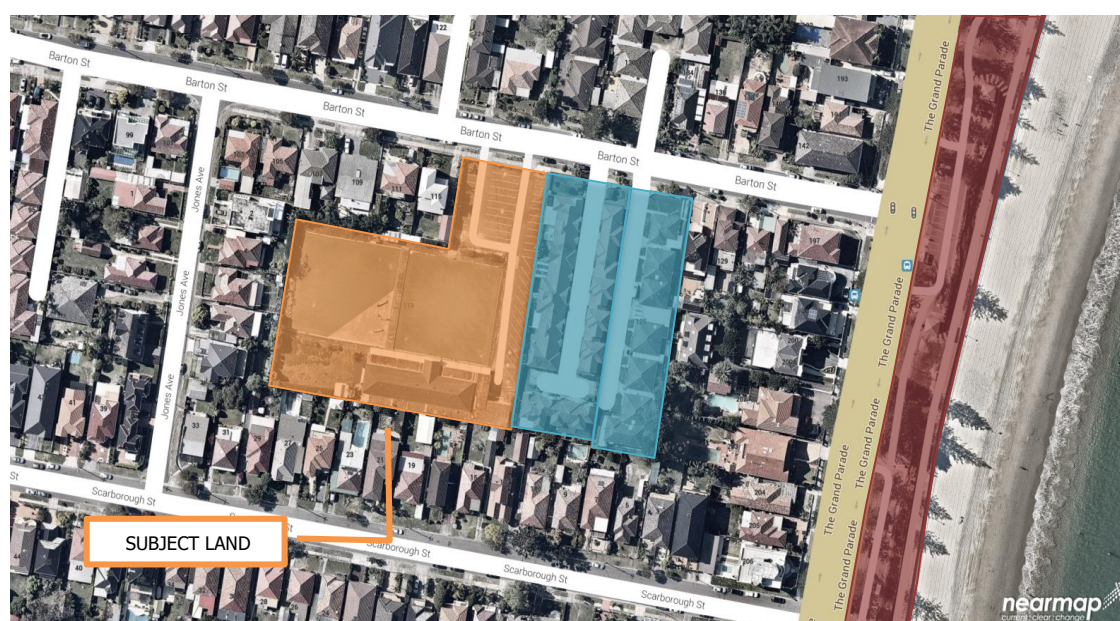
The following relevant documents are appended to this Proposal:

- Survey plan prepared by Project Surveyors dated 26 August, 2015;
- Geotechnical assessment report prepared by Douglas Partners dated 4 March, 2016;
- Stormwater management overview report and drawings prepared by ADG dated 9 March 2016;
- Traffic impact assessment prepared by Colston Budd Rogers & Kafes Pty Ltd dated February 2016

## Appendix 2 – Subject site, locality and regional context

### 2.1 Site description

The subject land, comprising the former Francis Drake Bowling Club, is a large battle axe lot known as 119 Barton Street, Monterey. It has the legal description of Lot 2 DP 857520. With a northern frontage of approximately 35 metres to Barton Street, the site has an eastern (side) boundary shared with the part one- part two-storey 'Oak Flats' townhouse development at 121 Barton Street. The irregular western (side) boundary measures approximately 155 metres and adjoins the rear yards of residential development at Nos. 107-115 Barton Street and Nos. 2-10 Jones Avenue. The southern (rear) boundary, approximately 95 metres in length, abuts the rear yards of residential development at 13-29 Scarborough Street. The total area of the site is approximately 7,218 sqm. The location and context of the site are shown in the aerial photograph below.



#### Legend

- Subject land, 119 Barton Street
- Cook Park, The Grand Parade (I168)
- Adjoining medium-density residential development

The Francis Drake Bowling Club ceased operations on March 23, 2015. Remaining on the site is a single-storey building comprising club/event space. Also on the site are two bowling greens and an at-grade parking area accommodating 53 parking spaces as well as a loading zone. Soft landscaping within the site is limited, confined for the most part to the south west corner of the site. There are no significant trees existing on the site. The property is currently occupied by St Pope Kyrillos VI & St Habib Girgis Coptic Orthodox Church.

The land is zoned **RE2 Private Recreation** under the *Rockdale Local Environmental Plan 2011* (RLEP 2011). It is not identified as a heritage item under this instrument nor does it lie within a conservation area identified on the RLEP 2011 Heritage Map (Sheet HER\_005). The subject land does, however, lie within proximity of Cook Park along the Grand Parade 150 metres to the east, which is identified as an item of local heritage significance (I168) under schedule 5 of RLEP 2011.

## 2.2 Surrounding development and land uses

A site-specific zoning of RE2 Private Recreation applies to the subject land. However, the land lies within a R3 Medium Density Residential zone that surrounds it on all four sides. Surrounding the R3 zone is an area zoned R2 Low Density Residential. In spite of the R3 zoning, residential development in the immediate context of the subject land is dominated by single and two-storey detached dwellings with the exception of medium density developments at 123 Barton Street and 125 Barton Street, east of the subject site, comprising the Oaks Flats townhouse development and a seven-villa development, respectively. There are some newer houses on Grand Parade but those in the streets away from the bay front are generally older and less changed.

150m to the east of the subject land is Cook Park, which provides accessible public green space adjoining Lady Robinsons Beach and the foreshore of Botany Bay. Public open space is also located 400m to the west at Scarborough Park and the AS Tanner Reserve. The latter parks surround Scarborough Ponds and the Toomevara Lane Chinese Market Gardens.

Nearby commercial centres include the Brighton-Le-Sands commercial centre 1.6km to the north, Ramsgate commercial centre 1.2km to the south and Kogarah commercial centre 1.5km to the north west. Isolated commercial uses such as cafes and other eateries are scattered along Chuter Avenue and the Grand Parade.



### Legend

- Subject land
- R3 Medium Density Residential zone
- Cook Park, The Grand Parade (I168)
- Public Open Space
- Early education facilities, Bambino's Kindergarten and the Montessori By-the-Bay



### 2.2.1 *Development typical of the locality*



Two-storey dwelling at 115 Barton St, Image: Googlemaps



Single-storey dwelling at 126 Barton St, Image: Googlemaps



Townhouse development at 121 Barton St, Image: Googlemaps

## 2.3 Regional context and transport

### 2.3.1 Population and census statistics

Monterey is a small suburb in southern Sydney, 15 km south of the Sydney CBD in the local government area of Bayside City and is part of the St George area. Monterey extends to President Avenue in the north and Emmaline Street to the south. The mostly residential suburb is bounded by the shores of Botany Bay to the east and Scarborough Park to the west. Commercial uses are scattered along Chuter Avenue and the Grand Parade. At the time of the 2011 census, Monterey had a population of 4,344 persons with a median age of 40 years compared to a median age of 35 years in the metropolitan region<sup>4</sup>.

At 2011, Monterey contained a total of 1,943 dwellings with an average household size of 2.43 persons compared to 2.7 persons across Metropolitan Sydney (as per ABS, Sydney – Significant Urban Area). There is a greater proportion of single person households in Monterey relative to New South Wales, 28.2% and 22.3% respectively (refer TABLE 1 below). Notwithstanding, Monterey has less than half the number of single-bedroom dwellings compared with Greater Sydney.

**TABLE 8: COMPARISON OF HOUSEHOLD COMPOSITION (MONTEREY/ METRO SYDNEY)**

HOUSEHOLD COMPOSITION	MONTEREY %	METRO SYDNEY %
Family households	68.8	73.2
Single person households	28.2	22.3
Group households	2.9	4.5

**TABLE 9: COMPARISON OF DWELLING COMPOSITION (MONTEREY/ METRO SYDNEY)**

DWELLING COMPOSITION	MONTEREY %	METRO SYDNEY %
0 bedroom (includes bedsitters)	0.9	1.0
1 bedroom	2.6	7.0
2 bedroom	41.1	25.9
3 bedroom	34.4	36.2
4 bedroom	19.1	28.0
Not stated	1.9	1.8

The conclusion we draw from the statistics and the characteristics of the houses in Monterey is that dwellings tend to be occupied by older people who are likely to be empty nesters remaining in family homes which are now larger than their needs in terms of bedroom numbers.

### 2.3.2 Transport

The subject land lies 2.4 km from Kogarah Railway Station to the north west, well outside of the 800m (ten minute) pedestrian catchment relevant for considerations of modal split<sup>5</sup>.

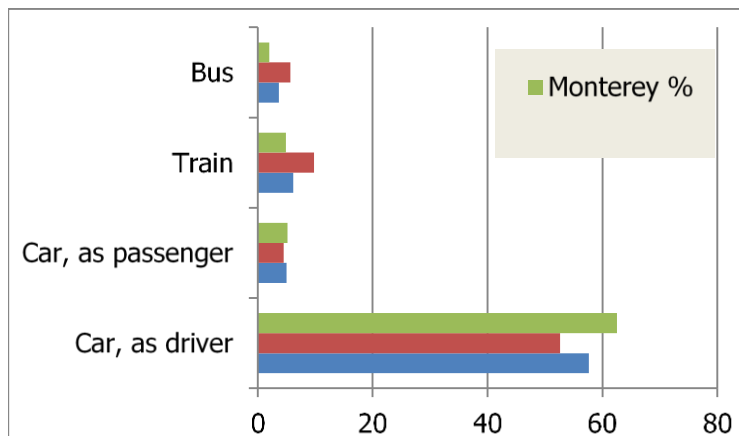
However, the subject land lies within easy walking distance of bus services along Chuter Ave (270m west) and the Grand Parade (130m east). The Grand Parade is serviced by bus routes travelling north, Route 303 (Sans Souci to Circular Quay), and south, Route 478 (Ramsgate to Rockdale). An

<sup>4</sup> Australian Bureau of Statistics, 2011 Census QuickStats: Monterey (NSW), accessed 07 Oct, 2015, at [http://www.censusdata.abs.gov.au/census\\_services/getproduct/census/2011/quickstat/SSC11578?opendocument&navpos=220](http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/SSC11578?opendocument&navpos=220)

<sup>5</sup> NSW Department of Planning, 2004, *Planning Guidelines for Walking and Cycling*, accessed [http://www.planning.nsw.gov.au/plansforaction/pdf/guide\\_pages.pdf](http://www.planning.nsw.gov.au/plansforaction/pdf/guide_pages.pdf)

express service, Route X03, operates between Sans Souci and the Circular Quay during peak periods Monday to Friday providing access to the city (Central Station) within 30 mins. Chuter Ave is serviced by Route 947 (operated by Transdev NSW), which runs between Hurstville to Kogarah.

At the 2011 Census, the most common method of travel to work for employed residents of Monterey was by car, 62.5% as driver and 5.2% as passenger. The location of bus and train services, as discussed above, is not reflected in greater usage by Monterey residents of bus services in combination with train services compared with Metropolitan Sydney as a whole (refer figure 3 below). 15.5% of employed people in Monterey travelled to work on public transport compared with 21.4% across the Sydney region.



**Figure 3:** Comparison of journey to work modal split – Monterey, Metro Sydney and NSW



## Appendix 3 – 3D study model

An analytical study conducted by Rothelowman has produced a model for development yield and building typology. This concept illustrates the capacity of the subject site to accommodate 28 two and three-bedroom townhouses, as shown in Figures 10 and 11 below.



Figure 10 – 3D study model, looking south – north



Figure 11 – 3D study model, looking north – south



## Appendix 4 – Rockdale Development Control Plan 2011

TABLE 10 – Rockdale Development Control Plan 2011		
CONTROL	PROPOSAL	COMPLIANCE
<p>4.3.1 (8) Landscape Area Landscaped areas, as defined in Rockdale LEP, must be provided at the following rates: Low and medium density residential – 25% of site area</p> <p>Required: 3 Bedroom dwellings – <math>219 \text{ sqm} \times 0.25 = 56 \text{ sqm}</math> 2 Bedroom dwellings – <math>121.5 \text{ sqm} \times 0.25 = 30.4 \text{ sqm}</math></p>	<p>Proposed landscaped areas have been provided in accordance with the relevant requirements for two and three bedroom dwellings under the Rockdale DCP. 2 bedroom dwellings will have a minimum of 40.5 sqm per unit, while 3 bedroom dwellings will provide a generous minimum of 108 sqm per unit.</p>	<b>Complies</b>
<p>4.3.2 Private Open Space Each dwelling must be provided with a minimum private open space area as specified in the following table: Multi Dwelling Housing 2 bedroom – 40m<sup>2</sup> 3 bedroom – 50m<sup>2</sup></p>	<p>Private open space, in accordance with the requirements of this section, is considered for the proposed new dwellings on the subject site.</p> <p>See drawing SK00.02 of proposed schematic masterplan by Rothelowman architects.</p>	<b>Complies</b>
<p>4.3.3 Communal Open Space The development must provide a communal area for the benefits of its residents at the rate of 5m<sup>2</sup> for each dwelling within the development. <math>28 \text{ dwellings} \times 5 \text{m}^2/\text{dwelling} = 140 \text{m}^2</math></p>	<p>A recreation area, located adjacent to the visitor car parking, is proposed to provide approximately 175m<sup>2</sup> of communal open space.</p>	<b>Complies</b>
<p>4.6 Car parking, access and movement</p> <p>Parking Rates Development is to provide on-site parking in accordance with the following rates:</p> <ul style="list-style-type: none"> <li>• 1 space/studio, 1 and 2 bedrooms apartments – <math>15 \times 1 = 15 \text{ spaces}</math></li> <li>• 2 spaces/3 bedrooms apartments or more - <math>13 \times 2 = 26 \text{ spaces}</math></li> <li>• Visitor parking: 1 space/5 Dwellings – <math>41/5 = 8.2 \text{ spaces}</math></li> </ul> <p>Total spaces required: 49.2</p>	<p>Provision of car parking per dwelling is compliant with DCP requirements.</p> <p>Visitor car parking is non-compliant by 2 spaces.</p> <p>6 visitor spaces provided 8 visitor spaces required</p>	<p><b>Complies</b></p> <p><b>Does not comply</b></p>

HEYMANN COHEN

REPORT ON THE TRAFFIC  
ASPECTS OF PLANNING  
PROPOSAL FOR 119 BARTON  
STREET, MONTEREY

FEBRUARY 2016

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## I. INTRODUCTION

- I.1 Colston Budd Rogers and Kafes Pty Ltd has been commissioned by Heymann Cohen to prepare a report examining the traffic implications of a planning proposal to allow residential development on the bowling club site (currently used by the Coptic Church) at 119 Barton Street, Monterey. The site location is shown in Figure 1.
- I.2 The proposed rezoning would allow for 28 townhouses (15 x two bedroom units and 13 x three bedroom units) with internal road, on-site parking and access from Barton Street. 47 parking spaces (41 residential and 6 visitor) are proposed.
- I.3 This report assesses the traffic implications of the planning proposal through the following chapters:
- Chapter 2 - describing the existing conditions; and
  - Chapter 3 - assessing the traffic implications of the planning proposal.

## 2. EXISTING CONDITIONS

### Site Location and Road Network

- 2.1 The subject bowling club site is currently occupied by a Coptic Church. The site is located within the block bounded by The Grand Parade, Barton Street, Scarborough Street and Jones Avenue. It has frontage and access to/from Barton Street and is surrounded by residential dwellings.
- 2.2 The road network in the vicinity of the site includes The Grand Parade, Barton Street, Scarborough Street and Jones Avenue. The Grand Parade travels in a north-south direction located east of the site. It is a divided road providing two lanes in each direction with right turn bays provided. In the vicinity of the site The Grand Parade is subject to a 60km/h speed limit with no stopping restrictions applying on both sides. The Grand Parade and Barton Street form a signalised intersection east of the site.
- 2.3 Barton Street is located north of the site (forming the northern site frontage). Barton Street travels in an east-west direction between The Grand Parade to the east and Rocky Pont Road to the west. Barton Street provides one traffic lane and one parking lane in both directions and is subject to a 50km/h speed limit. Barton Street provided access to the subject bowling club site.
- 2.4 Scarborough Street is located south of the site and travels in an east-west direction between The Grand Parade to the east and its termination at a cul-de-sac near Scarborough Park to the west. Scarborough Street provides one traffic lane and one parking lane in both directions and is subject to a 50km/h speed limit.
-

- 2.5 Jones Avenue is located west of the site, travelling in a north-south direction between Barton Street and Scarborough Street. It provides for two way traffic flow with kerb side parking on both sides. Jones Avenue is subject to a 50/km/h speed zoning and forms 'T'-junctions with Barton Street to the north and Scarborough Street to the south.

### Traffic Flows

- 2.1 Traffic generated by the proposed development will have its greatest effects during the weekday morning and afternoon peak period. In order to gauge traffic conditions, counts were undertaken at the following intersections:

- The Grand Parade/Barton Street; and
- Barton Street/Jones Avenue.

- 2.2 The results are summarised in Table 2.1 and Figures 2 and 3.

<b>Table 2.1: Existing Two-Way (Sum of Both Directions) Peak Hour Traffic Flows</b>		
<b>Road</b>	<b>Weekday Morning</b>	<b>Weekday Afternoon</b>
The Grand Parade		
– north of Barton Street	2,910	4,300
– south of Barton Street	2,780	3,995
Barton Street		
– west of The Grand Parade	210	340
– west of Jones Avenue	230	345
Jones Avenue		
– south of Barton Street	30	15

- 2.3 Examination of Table 2.1 reveals that:



- 
- 
- ❑ The Grand Parade carried some 2,780 to 4,300 vehicles per hour (two way) during the weekday morning and afternoon peak periods;
  - ❑ Barton Street carried some 210 to 345 vehicles per hour (two way) during the weekday morning and afternoon peak periods; and
  - ❑ Jones Avenue carried some 15 to 30 vehicles per hour (two way) during the weekday afternoon and weekend midday peak periods.

### Intersection Operations

2.4 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The intersections of Barton Street with The Grand Parade and Jones Avenue have been analysed using the SIDRA computer program. SIDRA analyses intersections controlled by traffic signals, roundabouts and signs.

2.5 SIDRA provides a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):

- ❑ For traffic signals, the average delay per vehicle in seconds is calculated as  $\text{delay}/(\text{all vehicles})$ , for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14        =    "A"    Good

15 to 28      =    "B"    Good with minimal delays and spare capacity

---



---

29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays. Roundabouts require other control mode.
>70	=	"F"	Unsatisfactory and requires additional capacity

- For give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Acceptable delays and spare capacity
29 to 42	=	"C"	Satisfactory but accident study required
43 to 56	=	"D"	Near capacity and accident study required
57 to 70	=	"E"	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

2.6 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.

2.7 The SIDRA analysis found that the signal controlled intersection of The Grand Parade/Barton Street operates with average delays for the highest delayed

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movement of some 27 seconds per vehicle during the weekday afternoon peak hour. This represents a level of service B, a good level of service.

- 2.8 The priority controlled 't'-intersection of Barton Street/Jones Avenue operates with average delays for the highest delayed movement of some 15 seconds per vehicle during the weekday afternoon peak hour. This represents a level of service A/B, a good level of service.

#### Public Transport

- 2.9 Public transport is provided by Sydney Buses and Transdev NSW. Sydney Buses operate routes 303 (City to Sans Souci), X03 (City to Sans Souci (express)) and 478 (Rockdale Station to Miranda) along The Grand Parade. Transdev NSW operates route 947 (Hurstville to Kogarah via Ramsgate and Bells Point) along Chuter Avenue.
- 2.10 Bus stops are located within the vicinity of the site on either side of The Grand Parade at the intersection with Barton Street (east of the site) and on Chuter Avenue near the intersection with Barton Street (west of the site). Footpaths are provided along Barton Street, The Grand Parade and Chuter Avenue.
- 2.11 Overall, the site has good access to regular public transport services with bus stops located within 300 metres walking distance of the subject site.
-

### 3. IMPLICATIONS OF PLANNING PROPOSAL

3.1 The proposed rezoning would allow for 28 townhouses (15 x two bedroom units and 13 x three bedroom units) with internal road, on-site parking and access from Barton Street. 47 parking spaces (41 residential and 6 visitor) are proposed. This chapter assesses the implications of the planning proposal through the following sections:

- ❑ public transport;
- ❑ parking provision;
- ❑ access and internal layout;
- ❑ traffic effects; and
- ❑ summary.

#### Public Transport

3.2 As previously discussed, the site is located close (within 300 metres walking distance) of regular bus services that operate along The Grand Parade and Chuter Avenue. These bus services provide links to City, Hurstville, Kogarah, Rockdale, Miranda and surrounding areas. The site is therefore accessible by public transport. The planning proposal will increase residential densities close to existing public transport services.

#### Parking Provision

3.3 Parking requirements for the planning proposal have been estimated using Rockdale City Council DCP 2011. The DCP requires 1 space per two bedroom

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unit and 2 spaces per three bedroom unit and 1 space per 5 dwellings for visitor parking.

- 3.4 The development proposes to provide 28 townhouses comprising 15 x two bedroom units and 13 x three bedroom units. Adopting the rates provided by the Rockdale City Council DCP 2011, the planning proposal would require the provision of 47 parking spaces (41 residential and 6 visitor spaces). It is proposed to provide 47 parking spaces.
- 3.5 Thus the proposed parking provision satisfies the requirements Rockdale City Council DCP 2011.

#### Access and Internal Layout

- 3.6 Vehicular access is proposed from Barton Street via a 6.5 metre wide entry/exit driveway located on the eastern side of the site frontage to Barton Street. The proposed driveway will comply with the requirements of AS2890.1-2004 (with respect to width, grades and provision of pedestrian sight lines). An internal road is proposed, providing access to the residential townhouses.
- 3.7 Residential parking spaces will be provided within separate garages attached to each individual townhouse. Visitor parking spaces will be provided at ground and will be a minimum of 2.5 metres wide by 5.4 metres long. Accessible car parking spaces will be a minimum of 2.4 metres wide by 5.4 metres long to be accompanied with an adjacent shared area with the same dimensions. Spaces located next to walls will be a further 300mm wider. The minimum aisle width will be 5.8 metres and a further 300mm wider where a wall is located immediately adjacent the parking aisle. Dead end aisles will have a one metre extension for
-

appropriate accessibility to end spaces. Height clearance will be a minimum of 2.2 metres generally, with 2.5 metres over disabled spaces. These dimensions are considered appropriate, being in accordance with AS2890.1-2004 and AS2890.6-2009.

- 3.8 With regard to servicing, larger vehicles (such as garbage collection vehicles) are proposed to undertake servicing on site within a designated loading area via the proposed internal road, a turning area will be provided to enable the service vehicles to enter and exit the site in a forward direction. Servicing by other vehicles (such as tradesman vehicles or similar van sized vehicles) will be undertaken by either parking on site (if parking is available) or in Barton Street using the available on-street parking.
- 3.9 Overall the proposed access arrangements, parking layout, internal circulation and service arrangements are considered appropriate.

#### Traffic Effects

- 3.10 The RMS Guideline provides traffic generation rates for medium density residential developments of between 0.4 to 0.5 vehicle trips per hour for smaller units (up to two bedrooms) and 0.5 to 0.65 vehicle trips per hour for larger units (up to three bedrooms). With a mix of two and three bedroom townhouses being proposed, a rate of 0.5 has been adopted and is considered appropriate for this development. Using this rate the planning proposal would generate some 15 vehicles per hour two-way during the morning and afternoon peak hours.
- 3.11 This additional traffic has been assigned to the adjoining road network and would result in traffic flow increases on Barton Street of some 5 to 10 vehicles per hour
-



(two-way). This is a low increase, equivalent to an average of only one vehicle every six to twelve minutes at peak times. Such a low traffic generation would not have noticeable effects on the operation of the surrounding road network.

### Summary

3.12 In summary, the main points relating to the transport implications of the proposed development are:

- i) The subject site is accessible by regular bus services with bus stops located within 300 metres walking distance of the site;
- ii) the proposed parking provision satisfies the requirements of Rockdale City Council DCP 2011;
- iii) access and internal layout will be provided in accordance with AS 2890.1-2004 and AS2890.6-2009;
- iv) the proposed development would result in a minor increase in traffic during the morning and afternoon peak periods on the surrounding road network; and
- v) the surrounding road network can accommodate traffic from the proposed development with no noticeable effects on the surrounding road network.

Monterey Equity Pty Ltd

C/- Donald Cant Watts Cork



Contamination Assessment:  
Lot 2, DP857520,  
119 Barton Street, Monterey, NSW

ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT  
MANAGEMENT



P1706332JR01V01  
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**All enquiries regarding this project are to be directed to the Project Manager.**

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# **1 Overview**

## **1.1 Introduction**

This report, prepared by Martens and Associates (MA), documents a contamination assessment which includes a preliminary site investigation (PSI) with limited testing to support a rezoning application to allow future residential subdivision of 119 Barton Street, Monterey, NSW ('the site').

The location of the site is shown in PS01-AZ06, Attachment A.

## **1.2 Objectives**

Investigation objectives include:

- Identification of historic and current potentially contaminating site activities.
- Evaluation of areas of environmental concern (AEC) and associated contaminants of potential concern (COPC) within investigation area.
- Assess identified AECs and associated COPCs.
- Assess potential sources of site contamination identified in the preliminary investigation.
- Provide comment on suitability of investigation area for future development use, and where required, provide recommendations for remediation.

## **1.3 Project Scope**

Scope of work included:

- Site walkover inspection to assess existing land condition and potential for site contamination.
- Review of 6 historical aerial photographs to assess past land use.
- Review of relevant Bayside Council historical database data (eg. BCC DA/BA history).

- Review of other relevant databases (SafeWork NSW and NSW EPA).
- Identification of AECs & COPCs.
- Conduct soil sampling in AECs. Sampling undertaken in general accordance with NSW EPA (1995) Site Sampling Guidelines. Investigations completed using hand methods (for surface samples) and hydraulic drill rig and push tube (for boreholes).
- Laboratory testing of soil contaminants of potential concern (COPC) within each AEC. For QA/QC purposes, duplicates and trip spike/blank samples were collected and analysed.
- Findings of the intrusive soil investigation documented in general accordance with NSW OEH (2011) and NEPM (1999, amended 2013).

#### **1.4 Abbreviations**

AEC – Area of environmental concern

ASC NEPM – Assessment of site contamination (National Environmental Protection Measure)

BA – Building application

BC – Bayside Council

BTEXN – Benzene, toluene, ethyl benzene, xylene and naphthalene

COPC – Contaminants of potential concern

DA – Development application

DEC – NSW Department of Environment and Conservation

DP – Deposited Plan

DPI – NSW Department of Primary Industries

DQI – Data quality indicators

DQO – Data quality objective

EIL – Ecological Investigation Levels



EPA – NSW Environment Protection Authority

EQL – Estimated quantitation limit

ESL – Ecological Screening Levels

HIL – Health investigation level

HM – Heavy metal

HSL – Health screening level

LGA – Local government area

MA – Martens and Associates Pty Ltd

mAHD – Metres Australian height datum

NATA – National Association of Testing Authorities

OCP – Organochloride pesticides

OEH – NSW Office of Environment and Heritage

OPP – Organophosphate pesticides

PAH – Polycyclic aromatic hydrocarbons

PSI – Preliminary site investigation

RPD – Relative percentage difference – difference between two values  
divided by the average

SAC – Site acceptance criteria

SAQP – Sampling analytical and quality plan

SOP – Standard operating procedure

TRH – Total recoverable hydrocarbons

## 2 Site Description

### 2.1 Site Location and Existing Land Use

Site information is summarised in Table 1, and site location and general surrounds shown in PS01-AZ06, Attachment A.

**Table 1:** Site background information.

Item	Description / Detail
Site address, lot/DP, and approximate area	119 Barton Street, Monterey, NSW (Lot 2, DP857520) – 7,202 m <sup>2</sup> (Approx.)
Local Government Area (LGA)	Bayside Council (BC)
Current land use	Site is currently a recreational bowling green, club house and car park.
Proposed land use	Residential.
Site description	The lot currently has two bowling greens, a bowling club in the southern portion of the site and a carpark in the northeast portion of the site.
Surrounding land uses	The site is bordered by Barton Street to the north and residential properties to the east, south and west.
Topography	Site is generally flat. Site elevations range from approximately 6 mAHD in the northeast corner of the site to approximately 5 mAHD in the western border of the site.
Expected geology	<p>The Sydney 1:100,000 Geological Series Sheet 9130 (1983) indicates that the site is underlain by quaternary deposits comprised of quartz sand, minor shell content, interdune (swale) silt and fine sand.</p> <p>The NSW Environment and Heritage eSPADE website identifies the site as having soils of the Tuggerah soil landscape, consisting of deep (&gt;200 cm) podzols on dunes and podzols/humus podzol intergrades on swales.</p>
Site drainage	A stormwater planning assessment completed by ADG Engineers Australia Pty Ltd (2016) concluded that all stormwater runoff generated at the site is contained within the site boundaries and is discharged via infiltration into sandy soils.
Sensitive receptors	<p>Future site residents and visitors.</p> <p>Site workers during future construction works.</p> <p>Surrounding residential site occupants.</p>

## 2.2 Hydrogeology

Review of the NSW Department of Primary Industries (DPI) Water's database provided the following information for the five closest groundwater bores (with relevant information) to the site (Table 2).

**Table 2:** Available hydrogeological information.

Groundwater Bore Identification	Direction and Distance	Standing Water Level (m)	Intended Use	Water Bearing Zone Substrate
GW100520	On site	NE <sup>1</sup> (7 mBGL)	Recreation	ND <sup>2</sup>
GW106456	Approximately 15 m south	NE <sup>1</sup> (6 mBGL)	Domestic	ND <sup>2</sup>
GW108549	Approximately 10 m east	5.0 mBGL	Domestic	Sand
GW108550	Approximately 10 m east	5.0 mBGL	Domestic	Sand
GW108652	Approximately 15 m east	5.0 mBGL	Domestic	Sand

### **Notes**

<sup>1</sup> NE – Groundwater not encountered (maximum depth of well).

<sup>2</sup> ND – No data available.

Borehole investigations undertaken by MA encountered groundwater at depths of 1.4 – 3.0 mBGL.

In consideration of hydrogeological information at the site, it is unlikely that groundwater is a significant potential contamination pathway.

## 3 Site Background Assessment

### 3.1 Historical Site Records Review

Four records exist at Bayside Council (BC) for development applications and building plans at the site (Table 3). BC correspondence is provided in Attachment B.

**Table 3:** Site history information.

Year	Record No.	Description
1995	BA-1995/696	Construction of outbuilding shed.
1995	BA-1995/736	Building application for villas and townhouses (13 units).
1996	BA-1996/134	Club additions.
2008	DA-2008/195	Minor alterations to club.

### 3.2 NSW EPA Records

No notices for the suburb of Monterey or nearby suburbs were listed under the Contaminated Land Management Act (1997) or the Environmentally Hazardous Chemicals Act (1985).

One record within the Monterey area is identified on the list of NSW contaminated sites notified to the EPA (Table 4).

**Table 4:** Available EPA contaminated lands record information.

Suburb	Address	Details	Distance/ Orientation From Site
Monterey/Kogarah	Scarborough Park South	Former landfill	Southwest, approximately 700 m

The above site is at a lower elevation than the subject site. Due to distance to the site and local hydrological characteristics, it is unlikely that the above site would have caused near surface soil contamination at the subject site.

### 3.3 Historical Aerial Photograph Review

Historical aerial photographs taken of the site during 1943, 1961, 1975, 1991, 2009 and 2018 were reviewed to investigate historic site land uses (Table 5). Copies of aerial photographs are provided in Attachment A. Photos indicate that the site may have used as a recreational bowling green since some time before 1961. Historical aerals did not indicate any other site use.

**Table 5:** Historic aerial photograph observations 1943 – 2018

Year	Site	Surrounding Land Use
1943	The site appears unused, a potential pond (approximately 1500 m <sup>2</sup> ) is present in the eastern portion of the site. Rest of the site has scattered bushes and is undeveloped.	Residential properties to the north, east and south. Cleared, vacant land to the west and south east of the site.
1961	Site has been developed into bowling greens with bowling club in the southern portion of the site and carpark in the northern portion of the site.	Lot immediately east of the site is also being used as part of the bowling green development. Continued residential development in all directions.
1975	Little change from previous.	Little change from previous.
1991	Little change from previous.	Little change from previous.
2009	Bowling green area along the eastern boundary has been redeveloped into additional carpark space.	Lot immediately east of the site (previously part of the bowling green) has been redeveloped into residential housing.
2018	Little change from previous.	Little change from previous.

### 3.4 Walkover Site Inspection

Site walkover was conducted on 14 February, 2018 by an experienced MA environmental engineer in conjunction with PSI investigations. Observations are summarised below.

- Timber and brick clad bowling club along the southern boundary of the site.
- Asphalt driveway and carpark in the north and eastern portions of the site.
- Two artificial turf bowling greens in the central portion of the site.

- Brick and galvanised metal sheds in the northern portion of the site, directly north of existing bowling greens.
- Stockpile of timber, plastic and glass immediately west of brick and galvanised sheds in the northern portion of the site.
- Site likely filled for levelling purposes (primarily under bowling greens and carpark).

## 4 Potential for Contamination

### 4.1 Areas of Environmental Concern/Contaminants of Potential Concern

Our assessment of site AECs and COPCs (Table 6) for the investigation area is made on the basis of available site history, aerial photograph interpretation and site walkover. A map showing locations of identified AECs is provided in Attachment C.

**Table 6:** Areas of environmental concern and contaminants of potential concern.

AEC <sup>1</sup>	Potential for Contamination	COPC
AEC A – Existing bowling club	Pesticides and heavy metals may have been used underneath building for pest control. Building may include potential asbestos containing material (PACM) and/or lead based paints.	HM, OCP/OPP and asbestos.
AEC B – Former pond	Former site pond has been filled in for construction of bowling club and encountered during geotechnical investigations (Douglas Partners, 2016). Fill of unknown origin and quality has been used.	HM, TRH, BTEXN, PAH, OCP/OPP and asbestos.
AEC C (entire site) – Site filling	Fill of unknown origin and quality was, likely used for site levelling purposes. Fill of unknown origin and quality has been used.	HM, OCP/OPP.
AEC D – Bowling greens	Prior to construction of artificial turf bowling greens, herbicides and pesticides are likely to have been used.	HM, OCP/OPP.

**Notes**

<sup>1</sup> Locations identified on AEC map in Attachment C.

### 4.2 Sensitive Receptors and Exposure Pathways

Table 7 provides a summary of identified sensitive receptors and potential exposure pathways connecting receptors to identified AECs and COPCs outlined in Table 6.

**Table 7:** Summary of receptors and potential pathways.

Receptor	Pathway
<u>Human Receptors:</u>	
<ul style="list-style-type: none"><li>○ Future site residents and visitors.</li><li>○ Site workers during future construction works.</li><li>○ Surrounding residents.</li></ul>	<ul style="list-style-type: none"><li>○ Dermal contact.</li><li>○ Oral ingestion of potentially contaminated soil.</li></ul>
<u>Environmental Receptors</u>	
<ul style="list-style-type: none"><li>○ Monterey Park (approximately 400 m west).</li><li>○ Botany Bay (approximately 300 m east)</li><li>○ Existing site flora and fauna.</li></ul>	<ul style="list-style-type: none"><li>○ Migration in contaminated runoff.</li><li>○ Direct contact with site flora and fauna.</li></ul>

#### 4.3 Preliminary site investigation conclusions

Results of the site history review indicate that the site may have used as a recreational bowling club since some time before 1961. Historical information did not indicate any other site use. The following potential contamination sources are noted:

- Existing bowling club may have the potential to have introduced contaminants in the form of asbestos (as a construction material), pesticides (pest control), hydrocarbon (fuels and oils) and heavy metals (paints, pest control).
- Fill used across the site for levelling purposes and to fill the former pond is of unknown origin and quantity and may contain contaminants.

Overall, the investigation area is considered to have a medium risk of contamination and poses a potential risk of harm to human health and environment under proposed development conditions. As a result, assessment of the identified AECs was undertaken and a summary of results is outlined in the following sections.



## 5 Site Sampling Overview

### 5.1 Objectives

The sampling plan's development was guided by NSW EPA (1995) *Sampling Design Guidelines* and a risk based assessment. Assessment addressed each of the identified AEC and associated COPCs identified in Table 6. Results of the site testing were assessed against site acceptance criteria (SAC) developed with reference to ASC NEPM (1999, amended 2013).

The objective of site sampling is to assess the COPC (Section 4.1) and determine suitability for the proposed subdivision.

The soil sampling and borehole location map is shown in Attachment D. Borehole logs are provided in Attachment E.

### 5.2 Reference Guidelines

This assessment is prepared in general accordance with the following guidelines:

- ASC NEPC (1999, amended 2013) National Environmental Protection Measure, (NEPM 1999, amended 2013).
- NSW EPA (2017) 3<sup>rd</sup> Ed. Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme.
- NSW EPA (1995) *Sampling Design Guidelines*.
- NSW OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.

## 6 Sampling, Analytical and Quality Plan (SAQP)

A SAQP has been developed to ensure that data collected for the soil sampling regime is representative and provides a robust basis for site assessment decisions. Preparation of the SAQP has been completed in general accordance with ASC NEPM (1999, amended 2013) methodology and includes:

- Data quality objectives.
- Sampling methodologies and procedures.
- Field screening methods.
- Sample handling, preservation and storage procedures.
- Analytical QA/QC.

### 6.1 Data Quality Objectives (DQO)

Data quality objectives (DQO) have been prepared as statements specifying qualitative and quantitative data required to support project decisions. DQO have been prepared in general accordance with NSW EPA (2017) and US EPA (2006) guidelines and are presented in Table 8.

**Table 8:** Data quality objectives for the assessment of soil investigations.

<b>Step 1 Stating the Problem</b>	The proposed development will include residential land use with access to soil. Therefore the site must be deemed suitable to accommodate the proposed land use. This assessment is required to assess risk posed by AECs and COPC to onsite and offsite sensitive receptors.
<b>Step 2 Identifying the Decision(s)</b>	Historical investigations have identified AECs which may be the source of contamination including buildings, bowling greens and fill present at the site. To assess the suitability of the site for future residential use, decisions are to be made based on the following questions: <ul style="list-style-type: none"><li>○ Is site soil quality suitable for the intended land use?</li><li>○ Has previous or current site use impacted the quality of site soils posing a human health risk during intended future land use including construction phase?</li><li>○ Do site soils require remediation or management to prior to onsite residential land use?</li></ul>
<b>Step 3 Identification of Inputs to the Decision</b>	The inputs to the assessment of site soil quality will include: <ul style="list-style-type: none"><li>○ Soil sampling at nominated locations (where access is available) across the site.</li><li>○ Laboratory analytical results for relevant COPC.</li><li>○ Assessment of analytical results against site suitable human health and ecological risk criteria.</li></ul>

<b>Step 4 Study Boundary Definitions</b>	<p>Study boundaries are as follows:</p> <ul style="list-style-type: none"> <li>o Lateral – Lateral boundary of the assessment is defined by the site boundary as indicated in Attachment A.</li> <li>o Vertical – Vertical boundary will be governed by the maximum depth reached during subsurface investigations.</li> <li>o Temporal – At this stage of investigation, only one round of sampling has been undertaken.</li> </ul>
<b>Step 5 Development of Decision Rules</b>	<p>The decision rule for this investigation are as follows:</p> <p>If the concentration of contaminants in the soil data exceeds the adopted assessment criteria; an assessment of the need to further investigate, remediate and / or manage the onsite impacts in relation to the proposed development will be undertaken.</p>
<b>Step 6 Specification of Limits on Decision Errors</b>	<p>Guidance found in ASC NEPM (1999 amended 2013) Schedule B2 regarding 95% upper confidence limit (UCL) states that the 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than or equal to this value. Therefore a decision can be made based on a probability that 95% of the data collected will satisfy the site acceptance criteria. A limit on decision error will be 5% that a conclusive statement may be incorrect.</p>
<b>Step 7 Optimisation of Sampling Design</b>	<p>Proposed sampling locations shall provide even coverage across identified AECs on the site. Sampling shall attempt to ensure that critical locations are assessed, sampled, and analysed for appropriate contaminants of concern.</p> <p>Soil sampling locations were set using a combined judgemental and grid pattern across the site.</p>

## 6.2 Data Quality Indicators (DQI)

In accordance with NSW DEC (2006), the investigation data set has been compared with Data Quality Indicators (DQI) outlined in Table 9 to ensure that collected data meets the project needs and that DQOs have been met.

**Table 9:** Data Quality Indicators.

<b>Assessment Measure (DQI)</b>	<b>Comment</b>
<b>Precision</b> – A measure of the variability (or reproducibility) of data.	<p>Precision is assessed by reviewing blind field duplicated sample set through the calculation of relative percent difference (RPD). Data precision is deemed acceptable where results are 10 x the EQL, and where RPDs are less than 50% (10-30 x EQL) or 30% (&gt;30 x EQL). Exceedance of this range is still considered acceptable where heterogeneous materials are sampled.</p>
<b>Accuracy</b> – A measure of the closeness of reported data to the "true value".	<p>Data accuracy is assessed by:</p> <ul style="list-style-type: none"> <li>o Method blanks.</li> <li>o Field spikes and blanks.</li> <li>o Laboratory control samples.</li> <li>o Matrix spikes.</li> </ul>

Assessment Measure (DQI)	Comment
<b>Representativeness</b> – The confidence that data are representative of each media present on the site.	<p>To ensure data representativeness the following field and laboratory procedures are followed:</p> <ul style="list-style-type: none"> <li>o Ensure that the design and implementation of the sampling program has been completed in accordance with MA standard operating procedures (SOP).</li> <li>o Blank samples shall be used during field sampling to ensure no cross contamination or laboratory artefacts.</li> <li>o Ensure that all laboratory hold times are met and that sample handling and transport is completed in accordance with MA SOP.</li> </ul>
<b>Completeness</b> – A measure of the amount of usable data from a data collection activity.	<p>To ensure data set completeness, the following is required:</p> <ul style="list-style-type: none"> <li>o Confirmation that all sampling methodology was completed in general accordance with MA SOP.</li> <li>o COC and receipt forms.</li> <li>o Results from all Laboratory QA/QC samples (Lab blanks, matrix spikes, lab duplicates).</li> <li>o NATA accreditation stamp on all laboratory reports.</li> </ul>
<b>Comparability</b> - The confidence that data may be considered to be equivalent for each sampling and analytical event.	<p>Data comparability is maintained by ensuring that:</p> <ul style="list-style-type: none"> <li>o All site sampling events are undertaken following methodologies outlined in MA SOP and published guidelines.</li> <li>o NATA accredited laboratory methodologies shall be followed on all laboratory testing.</li> </ul>

### 6.3 Investigation and Sampling Methodology and Quality Assurance / Quality Control

Site investigation and soil sampling methodology (Table 10) was completed to meet the project DQOs.

**Table 10:** Investigation and sampling methodology.

Activity	Detail / Comments
Fieldworks	<p>Contamination investigations were completed on 14 February 2018, and involved:</p> <ul style="list-style-type: none"> <li>o Excavation of 10 boreholes using a 4WD ute-mounted hydraulic rig (in carpark and driveway) and hand-operated push tube (bowling greens and grassed area).</li> <li>o Collection of soil samples from the auger or push tube for laboratory testing and future reference.</li> <li>o Collection of surface soil samples by hand for laboratory testing and future reference.</li> </ul> <p>Testing and sample locations are provided in Attachment D.</p>
Soil and sediment sampling	<p>Soil sampling was completed by the supervising MA environmental engineer using a new nitrile glove covered hand. All equipment was decontaminated between sampling locations where required.</p> <p>Each sample was placed into a laboratory-supplied, acid-rinsed 250mL glass jar, labelled with a unique identification number and no headspace</p>

Activity	Detail / Comments
	to limit volatile loss. A clean pair of gloves was used for each sample.
QA / QC sampling	Duplicate samples were collected for intra-laboratory analysis at a rate of approximately 1 per 10 primary samples. 2 soil duplicate samples were collected during investigations. A trip blank and trip spike sample was used during sampling.
Sample handling and transportation	Sample collection, storage and transport were conducted according to MA SOP. Collected samples were placed immediately into an ice chilled cooler-box. Samples were dispatched to NATA-accredited laboratories under chain of custody documentation within holding times.

A review of QA/QC procedure has been completed and is presented in the data validation report (Attachment F). The report concludes that data is suitable for the purposes of the assessment.

#### 6.4 Laboratory Analytical Suite

Laboratory analysis was carried out by Envirolab Pty Ltd a NATA accredited laboratory. Laboratory analytical documentation is presented in Attachment G.

Site AEC areas were tested for the COPC in Table 11.

**Table 11:** Summary of primary soil laboratory analyses.

COPC	Number of Primary Samples Analysed
BTEXN	11
TRH	11
PAH	11
Heavy metals <sup>1</sup>	11
OCP/OPP	11
pH <sup>2</sup>	3
CEC <sup>2</sup>	3

**Notes:**

<sup>1</sup> Heavy metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc.

<sup>2</sup> pH and CEC are not COPCs but were assessed to allow for calculation of site specific EILs.

## 7 Site Assessment Criteria

### 7.1 Overview

The site assessment criteria (SAC) adopted for this assessment have been derived from the following source:

- ASC NEPM (1999, amended 2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).

Guideline values for individual contaminants analysed for this assessment are presented in laboratory tables in Attachment H.

Table 12 summarises the applicability of the SAC adopted for this investigation.

**Table 12:** Summary of SAC.

Media	Adopted Guidelines	Applicability
Soil	ASC NEPM (1999, amended 2013)	<u>Health Investigation Levels (HILs)</u> HIL A – residential land use with access to soil. <u>Ecological Investigation Levels (EIL)<sup>1</sup></u> Site EILs have been calculated using methodology outlined in ASC NEPM (1999, amended 2013). Conservative values for soil physiochemical properties (pH and CEC) have been used in EIL calculations. Ambient background concentrations (ABC) have been taken from Olszowy et al. (1995) for aged contamination in low traffic areas in NSW. <u>Environmental Screening Levels (ESLs)</u> Urban residential and public open spaces. <u>Health Screening Levels (HSLs)</u> HSL A – Low density residential land use for sand (ASC NEPM 1999, amended 2013) have been adopted as a conservative measure. <u>Management Limits</u> TRH management levels have been adopted based on the proposed future land use.

**Notes:**

<sup>1</sup> See Section 7.2 for discussion on adopted EILs.

## 7.2 Adopted EILs

3 soil samples were analysed for physiochemical properties (pH and CEC) as part of the laboratory analytical suite. Site specific EILs for heavy metals calculated for the site were found to be above the ambient background concentrations observed within natural soil samples sent for laboratory analysis. As a majority of the site was observed to contain fill material between depths of 0.3 – 1.9 mBGL and no natural topsoil was observed onsite, calculated site specific EILs for subsoil are considered overly conservative as SAC.

Adopted EILs for the site are calculated based on conservative physiochemical properties (pH of 4.0 and CEC of 5 cmol<sub>c</sub>/kg) adopted from NEPM (1999, amended 2013) Table 1B(1).

## 8 Laboratory Analytical Results

Table 13 summarises the results of soil laboratory analysis. Detailed tabulated results showing individual sample concentrations compared to adopted SACs are shown in Attachment H. Laboratory analytical documentation is available in Attachment G.

**Table 13:** Summary of soil laboratory results.

Analyte	Results Compared to SAC
Heavy Metals	<p><u>HILs</u></p> <p>Lead exceeded the adopted HIL (300 mg/kg) at <b>6332/BH101/1.5 (1,700 mg/kg)</b>.</p> <p><u>EIL</u></p> <p>Lead exceeded the adopted EIL (1,100 mg/kg) at <b>6332/BH101/1.5 (1,700 mg/kg)</b>.</p> <p>Copper exceeded the adopted EIL (55 mg/kg) at <b>6332/BH101/1.5 (860 mg/kg)</b> and <b>6332/BH103/0.2 (57 mg/kg)</b>.</p> <p>Nickel exceeded the adopted EIL (35 mg/kg) at <b>6332/BH106/0.4 (46 mg/kg)</b>.</p> <p>Zinc exceeded adopted EIL (350 mg/kg) at <b>6332/BH101/1.5 (1,200 mg/kg)</b>.</p>
TPH/BTEXN	<p><u>HILs</u></p> <p>All results below SAC.</p> <p><u>EIL</u></p> <p>All results below SAC.</p> <p><u>ESL</u></p> <p>All results below SAC.</p> <p><u>HSL</u></p> <p>All results below SAC.</p> <p><u>Management Limits</u></p> <p>All results below SAC.</p>
OCP/OPP	<p><u>HILs</u></p> <p>All results below SAC.</p> <p><u>EIL</u></p> <p>All results below SAC.</p>



Analyte	Results Compared to SAC
TRH	<u>HILs</u> All results below SAC. <u>EIL</u> All results below SAC. <u>ESL</u> All results below SAC. <u>HSL</u> All results below SAC. <u>Management Limits</u> All results below SAC.
PAH	<u>HILs</u> Carcinogenic PAHs exceeded the adopted HIL (3 mg/kg) at <b>6332/BH101/1.5 (4.05 mg/kg)</b> . <u>EIL</u> All results below SAC. <u>ESL</u> Benzo(a)pyrene exceeded the adopted ESL (0.7 mg/kg) at <b>6332/BH101/1.5 (3.1 mg/kg)</b> . <u>HSL</u> All results below SAC.

## 9 Discussions

### 9.1 Samples Exceeding SAC

Soil sample 6332/BH101/1.5 (with SAC exceedances for heavy metals and PAH) was located within fill material underlying the existing carpark. Elevated contaminant concentrations are likely a result of anthropogenic material within the uncontrolled fill. Based on site testing, contamination was observed to be limited to this fill layer underlying the carpark. Soil sample 6332/BH101/2.0, located within natural soils beneath the contaminated layer was found to be below all adopted SAC.

Minor EIL exceedances at 6332/BH103/0.2 and 6332/BH106/0.4 are likely a result of anthropogenic material within fill. These SAC exceedances are addressed via a 95% upper confidence limit (UCL) analysis (Section 9.2).

No other exceedances of SAC were observed within fill material underlying the existing bowling greens or grassed area to the west of the bowling club.

### 9.2 95% UCL Analysis

To assess minor EIL exceedances of nickel and copper within fill material at the site, a 95% UCL analysis has been undertaken for samples taken from the site. Sample 6332/BH101/1.5 has not been included in UCL calculations as contaminant concentrations exceed 250% of the adopted EIL for nickel. UCL calculations are provided in Attachment I and are summarised below.

**Table 14:** Summary of UCL analysis.

COPC	Maximum Value (mg/kg)	EIL (mg/kg)	95% UCL (mg/kg)
Nickel	46	35	27.4
Copper	57	55	37.6

95% UCL for nickel and copper provide concentrations below the adopted EIL for the site. As a result, these exceedances are not considered a significant risk and do not require further remediation or management.

### **9.3 Data Gaps**

It is noted that, due to access restrictions, soils underlying the existing bowling club at the site (AEC A) have not been tested. It is recommended that additional assessment and sampling of this AEC is undertaken following demolition of the existing structures. This can be completed during the remediation stage.

### **9.4 Acid Sulphate Soils (ASS)**

The NSW Environment and Heritage eSPADE website identifies the site as Class 4 acid sulphate soil (ASS) risk. Boreholes undertaken as part of a geotechnical investigations (Douglas Partners, 2016) observed fill to a maximum depth of 1.2 mBGL and groundwater entering between 2.5 and 3.0 mBGL.

If the proposed development is to be constructed on-grade, it is unlikely that ASS soils are to be encountered during construction or excavation of fill material (if required). However, if any excavation beyond 2.0 mBGL (i.e. for a basement) or lowering of the water table is proposed as part of the development, ASS soils may pose a potential risk and are to be considered.

## 10 Conclusion and Discussions

SAC exceedances for heavy metals (lead, copper and zinc) and PAHs (benzo(a)pyrene and carcinogenic PAHs) were observed within fill material at one sampling location (6332/BH101/1.5), which may pose a potential risk to future human and environmental receptors at the site. It is recommended that a remedial action plan (RAP) be prepared for the site to address SAC exceedances within fill underlying the existing carpark at the site.

It is recommended that, following demolition of existing site structures, additional soil testing be conducted to address identified investigation constraints (Section 9.3) and data gaps within the CSM. Furthermore, analysis of all data (including new data from dwelling footprint) is to be undertaken using 95 % UCL confirmation limit to assess significance of ESL and EIL exceedances.

We consider that the site can be made suitable for proposed residential development provided that a RAP is developed and implemented accordingly. A likely remediation strategy may involve the removal and offsite disposal of identified contaminated soil considered to pose an unacceptable site risk. The RAP is to outline waste management requirements in light of any additional investigations or unexpected finds.

Following remediation works, a validation report is required to be prepared to confirm site suitability for the proposed development.

Prior to any soil being removed from site, a formal waste classification assessment in accordance with NSW EPA Waste Classification Guidelines (2014) is required.

## 11 Limitations Statement

This contamination assessment was undertaken in line with current industry standards.

It is important, however, to note that no land contamination study can be considered to be a complete and exhaustive characterisation of a site nor can it be guaranteed that any assessment shall identify and characterise all areas of potential contamination or all past potentially contaminating land-uses. This is particularly the case on sites where additional assessment work and remediation is identified as being required. Therefore, this report should not be read as a guarantee that no further contamination shall be found on the site. Should material be exposed in future which appears to be contaminated or inconsistent with natural site soils, additional testing may be required to determine the implications for the site.

Martens & Associates Pty Ltd has undertaken this assessment for the purposes of the current development proposal. No reliance on this report should be made for any other investigation or proposal. Martens & Associates accepts no responsibility, and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.

## References

- Bayside Council – DA/BA/CC records (2018).
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- SEPP 55 *Remediation of Land*.

## **12      Attachment A – Historic Aerial Photographs and Site Location**





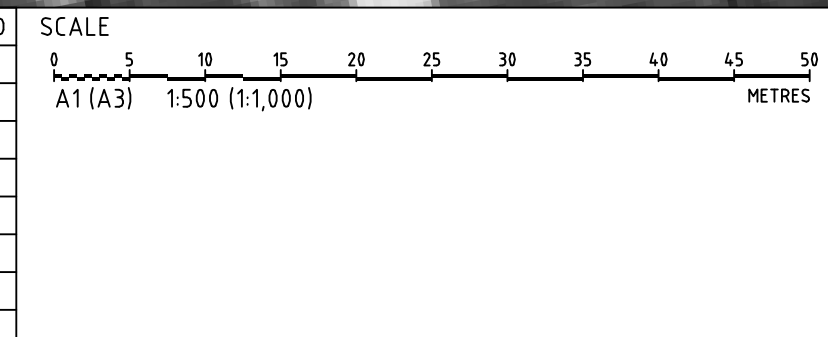




KEY

APPROXIMATE SITE BOUNDARY

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	CHECK AND APPROVED	13/3/2018	KW	RM	GT	GT
A	INITIAL RELEASE	07/03/2018	KW	RM		



GRID

DATUM

PROJECT MANAGER

JF

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PROJECT NAME/PLANSET TITLE

DETAILED SITE INVESTIGATION

CONTAMINATION ASSESSMENT

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Geotechnical  
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Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE				
HISTORICAL AERIAL 1961 SOURCE: LPI				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1706332	PS01	R02	PS01-AZ02	B

PRINTED: 13/03/2018 - USER: NAME

A1 / A3 LANDSCAPE (A1L\_C\_002.0.01)

DRAWING ID: P1706332-PS01-R02-AZ02 0 5 10 15 20 25 30 35 40 45 50



[illegible]

SCALE

0 5 10 15 20 25 30 35 40 45 50

A1 (A3) 1:500 (1:1,000)

METRES

GRID	DATUM	PROJECT MANAGER
		JF
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CLIENT	MONTEREY EQUITY PTY LTD.
PROJECT NAME/PLANSET TITLE	<p>DETAILED SITE INVESTIGATION</p> <p>CONTAMINATION ASSESSMENT</p> <p>119 BARTON STREET, MONTEREY, NSW</p>

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DRAWING TITLE				
<p style="text-align: center;">HISTORICAL AERIAL 1975</p> <p style="text-align: center;">SOURCE: LPI</p>				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1706332	PS01	R02	PS01-AZ03	B





REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD	<div>SCALE</div> <div><div><div>0</div><div>5</div><div>10</div><div>15</div><div>20</div><div>25</div><div>30</div><div>35</div><div>40</div><div>45</div><div>50</div></div><div>A1 (A3) 1:500 (1:1,000)</div><div>METRES</div></div>	GRID	DATUM	PROJECT MANAGER	CLIENT	<div><div><div><div></div><div><div><div>martens</div><div>&amp; Associates Pty Ltd</div></div></div><div>Consulting Engineers</div><div>Environment</div><div>Water</div><div>Geotechnical</div><div>Civil</div></div></div><div>Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9959 Fax: (02) 9476 8767 Email: mail@martens.com.au Internet: www.martens.com.au</div></div>	DRAWING TITLE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
B	CHECK AND APPROVED	13/3/2018	KW	RM	GT	GT		<div>DISCLAIMER &amp; COPYRIGHT</div> <div>This plan must not be used for construction unless signed as approved by principal certifying authority.</div> <div>All measurements in millimetres unless otherwise specified.</div> <div>This drawing must not be reproduced in whole or part without prior written consent of Martens &amp; Associates Pty Ltd</div> <div>(C) Copyright Martens &amp; Associates Pty Ltd</div>	JF	MONTEREY EQUITY PTY LTD.	PROJECT NAME/PLANSET TITLE		DETAILED SITE INVESTIGATION	CONTAMINATION ASSESSMENT	119 BARTON STREET, MONTEREY, NSW	HISTORICAL AERIAL 1991																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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KEY

APPROXIMATE SITE BOUNDARY

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	CHECK AND APPROVED	13/3/2018	KW	RM	GT	GT
A	INITIAL RELEASE	07/03/2018	KW	RM		

SCALE

0 5 10 15 20 25 30 35 40 45 50

A1 (A3) 1:500 (1:1,000) METRES

GRID

DATUM

PROJECT MANAGER

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DRAWING TITLE

HISTORICAL AERIAL 2009

SOURCE: NEARMAP

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1706332	PS01	R02	PS01-AZ05	B





KEY

APPROXIMATE SITE BOUNDARY

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	CHECK AND APPROVED	13/3/2018	KW	RM	GT	GT
A	INITIAL RELEASE	07/03/2018	KW	RM		

SCALE

0 5 10 15 20 25 30 35 40 45 50

A1 (A3) 1:500 (1:1,000) METRES

GRID

DATUM

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DRAWING TITLE				
HISTORICAL AERIAL 2018				
SOURCE: NEARMAP				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1706332	PS01	R02	PS01-AZ06	B

DRAWING ID: P1706332-PS01-R02-AZ06



## 13      **Attachment B – Bayside Council Correspondence**

## Robert Mehaffey

---

**From:** Andrew Mesthos  
**Sent:** Wednesday, 7 February 2018 4:05 PM  
**To:** Robert Mehaffey  
**Subject:** FW: 119 Barton Street Monterey

---

**From:** Leanne McKinnon [<mailto:Leanne.McKinnon@bayside.nsw.gov.au>]  
**Sent:** Wednesday, 7 February 2018 3:41 PM  
**To:** Andrew Mesthos <[amesthos@martens.com.au](mailto:amesthos@martens.com.au)>  
**Subject:** 119 Barton Street Monterey

Dear Andrew

In response to your recent request regarding 119 Barton Street Monterey. I advise these are the relevant files:

- DA-2008/195** Carry out minor alterations and additions to change room, handicap entry ramp and upgrade kitchen and bar.
- BA-1995/696** Outbuilding shed Class 10
- BA-1996/134** Club additions to club Class 6
- BA-1995/736** Building Application villas & townhouses 13 units class 2

Regards

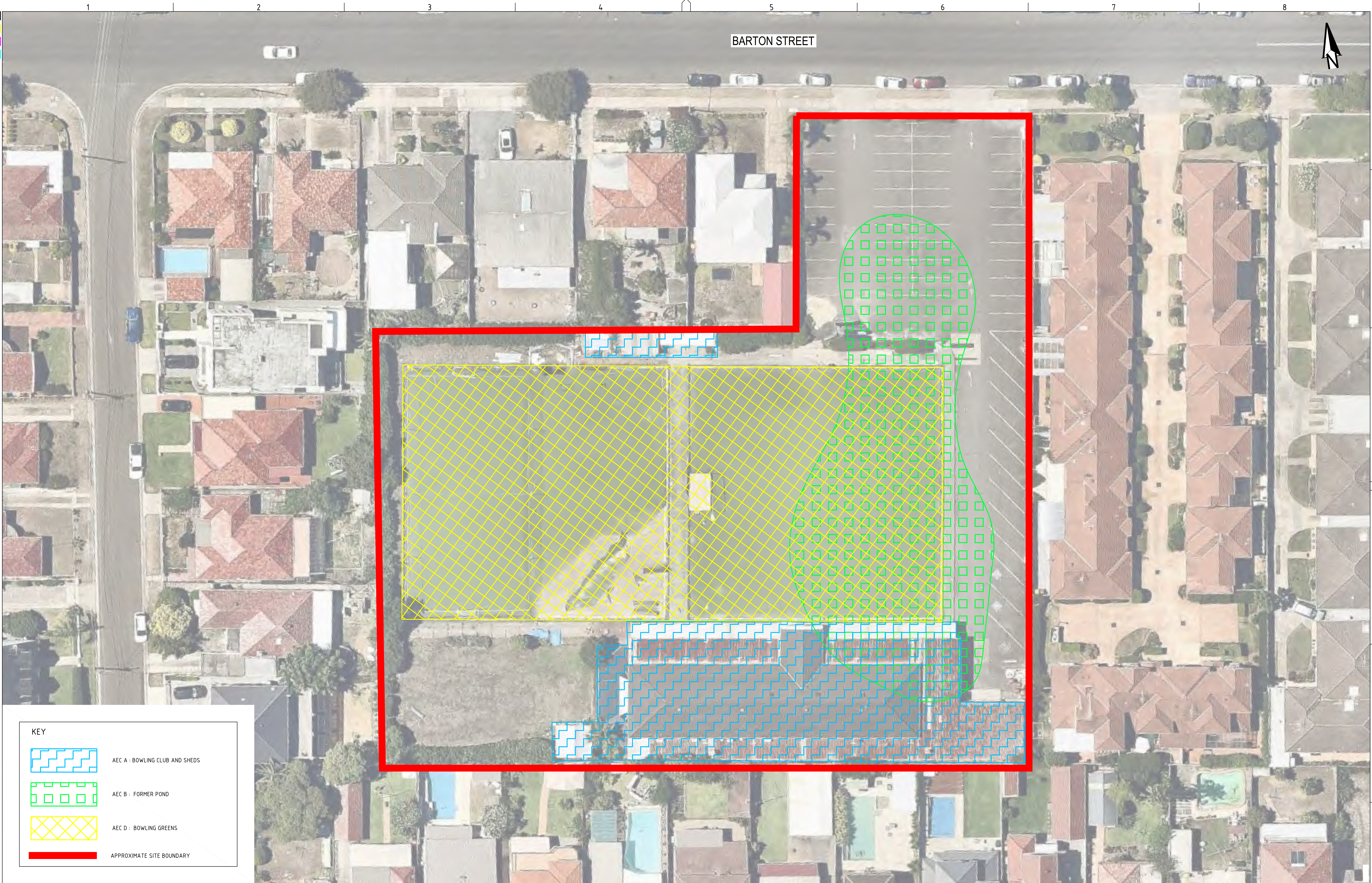


**Leanne McKinnon** Information Officer  
444-446 Princes Highway, Rockdale NSW 2216  
**T** 02 9562 1682  
**E** [leanne.mckinnon@bayside.nsw.gov.au](mailto:leanne.mckinnon@bayside.nsw.gov.au) **W** [www.bayside.nsw.gov.au](http://www.bayside.nsw.gov.au)

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## 14      Attachment C – AEC Map





KEY

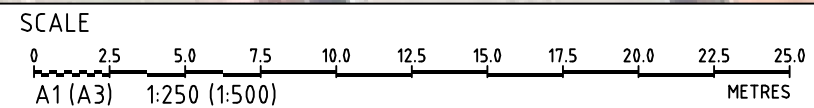
AEC A : BOWLING CLUB AND SHEDS

AEC B : FORMER POND

AEC D : BOWLING GREENS

APPROXIMATE SITE BOUNDARY

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	CHECK AND APPROVED	13/3/2018	KW	RM	GT	GT
A	INITIAL RELEASE	07/03/2018	KW	RM	GT	



GRID

DATUM

PROJECT MANAGER  
JF

CLIENT  
MONTEREY EQUITY PTY LTD.

PROJECT NAME/PLANSET TITLE  
DETAILED SITE INVESTIGATION  
CONTAMINATION ASSESSMENT  
119 BARTON STREET, MONTEREY, NSW

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DRAWING TITLE				
AEC MAP SOURCE: NEARMAP				
PROJECT NO. P1706332	PLANSET NO. PS01	RELEASE NO. R02	DRAWING NO. PS01-AZ07	REVISION B



## 15      **Attachment D – Sampling Plan**





KEY

AEC A - BOWLING CLUB AND SHEDS

AEC B - FORMER POND

AEC D - BOWLING GREENS

INDICATIVE BOREHOLE LOCATION

INDICATIVE SURFACE SAMPLE LOCATION

APPROXIMATE SITE BOUNDARY

REV		DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD	<div>SCALE</div> <div><div><div>0</div><div>2.5</div><div>5.0</div><div>7.5</div><div>10.0</div><div>12.5</div><div>15.0</div><div>17.5</div><div>20.0</div><div>22.5</div><div>25.0</div></div><div>A1 (A3) 1:250 (1:500)</div><div>METRES</div></div>	GRID	DATUM	PROJECT MANAGER	CLIENT	<div><div><div><div></div></div><div><div><div><div></div></div><div><div></div></div></div><div><div><div><div></div></div><div><div></div></div></div></div><div>Consulting Engineers</div><div>Environment</div><div>Water</div><div>Geotechnical</div><div>Civil</div></div><div>Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767</div><div>Email: mail@martens.com.au Internet: www.martens.com.au</div></div></div>	DRAWING TITLE			
B	CHECK AND APPROVED		13/3/2018	KW	RM	GT	GT		JF	MONTEREY EQUITY PTY LTD.		SAMPLING PLAN SOURCE: NEARMAP					
A	INITIAL RELEASE		07/03/2018	KW	RM	GT			<div>DISCLAIMER &amp; COPYRIGHT</div> <div>This plan must not be used for construction unless signed as approved by principal certifying authority.</div> <div>All measurements in millimetres unless otherwise specified.</div> <div>This drawing must not be reproduced in whole or part without prior written consent of Martens &amp; Associates Pty Ltd.</div> <div>(C) Copyright Martens &amp; Associates Pty Ltd</div>		<div>PROJECT NAME/PLANSET TITLE</div> <div>DETAILED SITE INVESTIGATION CONTAMINATION ASSESSMENT</div> <div>119 BARTON STREET, MONTEREY, NSW</div>		<div>PROJECT NO.</div> <div>P1706332</div> <div>PLANSET NO.</div> <div>PS01</div> <div>RELEASE NO.</div> <div>R02</div> <div>DRAWING NO.</div> <div>PS01-JZ00</div> <div>REVISION</div> <div>B</div>				
A1 / A3 LANDSCAPE [A1Lc_v02.0.01]								DRAWING ID: P1706332-PS01-R02-JZ00									



## 16      **Attachment E – Borehole Logs**



CLIENT	Monterey Equity Pty Ltd	COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH102</b>  Sheet 1 OF 1 PROJECT NO. P1706332	
PROJECT	Contamination Assessment	LOGGED	RM	CHECKED			
SITE	119 Barton St, Monterey, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	4WD ute-mounted hydraulic drill rig	EASTING		RL SURFACE	3.7 m	DATUM	AHD
EXCAVATION DIMENSIONS	ø100 mm x 2.00 m depth	NORTHING		ASPECT	-	SLOPE	<2%

Drilling					Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	M	Not Encountered	0.10						ASPHALT.				PAVEMENT
			3.60	6332/BH102/0.2/S/1 D 0.20 m			SP	FILL: Gravelly SAND, dark brown, medium grained, with trace concrete.				FILL	
			0.40										
			3.30	6332/BH102/0.5/S/1 D 0.50 m			SP	FILL: SAND, grey, fine to medium grained.		L			
			0.80										
			2.90	6332/BH102/0.9/S/1 D 0.90 m			SP	SAND, yellow/white, medium grained.		M		RESIDUAL SOIL	

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS




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**Engineering Log -  
BOREHOLE**

MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P1706332BH101.9H110V01.GPJ <<DrawingFile>> 07/03/2018 12:37 8.30.004 D:\git\Lab and In Situ Tool - OGD [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13]

CLIENT		Monterey Equity Pty Ltd		COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH103</b>				
PROJECT		Contamination Assessment		LOGGED	RM	CHECKED		Sheet 1 OF 1				
SITE		119 Barton St, Monterey, NSW		GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A	PROJECT NO. P1706332				
EQUIPMENT		4WD ute-mounted hydraulic drill rig		EASTING		RL SURFACE	3.7 m	DATUM	AHD			
EXCAVATION DIMENSIONS		ø100 mm x 2.50 m depth		NORTHING		ASPECT	-	SLOPE	<2%			
Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	M	Not Encountered	0.10						ASPHALT.			PAVEMENT
			3.60	6332/BH103/0.2/S/1 D 0.20 m			SP	FILL: Gravelly SAND, dark brown, medium grained, with trace concrete.		L	FILL	
			0.40									
			3.30	6332/BH103/0.5/S/1 D 0.50 m			SP	SAND, grey, fine to medium grained.			RESIDUAL SOIL	
			1.00									
			2.70	6332/BH103/1.1/S/1 D 1.10 m			SP	SAND, grey/white, medium grained.		M		
			2							MD		
			2.50						Hole Terminated at 2.50 m			2.50: Investigation limited.
			3									
			4									
			5									
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS												
 <b>MARTENS &amp; ASSOCIATES PTY LTD</b> Suite 201, 20 George St. Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au						<b>Engineering Log - BOREHOLE</b>						

MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P1706332BH101.9H110V01.GPJ <DrawingFile>> 07/03/2018 12:37 8.30.004 D:\git\Lab and In Situ Tool - DGD [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13]

CLIENT	Monterey Equity Pty Ltd			COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH104</b>	
PROJECT	Contamination Assessment			LOGGED	RM	CHECKED		Sheet 1 OF 1	
SITE	119 Barton St, Monterey, NSW			GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A	PROJECT NO. P1706332	
EQUIPMENT	4WD ute-mounted hydraulic drill rig			EASTING		RL SURFACE	3.8 m	DATUM	AHD
EXCAVATION DIMENSIONS	ø100 mm x 5.50 m depth			NORTHING		ASPECT	-	SLOPE	<2%

Drilling			Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	M		3.75		6332/BH104/0.2/S/1 D 0.20 m			SP	ASPHALT. FILL: SAND, grey, with trace gravels.		L		PAVEMENT FILL
			0.50 3.30		6332/BH104/0.7/S/1 D 0.70 m			SP	SAND, grey, fine to medium grained.		M		RESIDUAL SOIL
	L		1										
			2										
			3								MD		
			4								W		
	M		5										
			5.50						Hole Terminated at 5.50 m				5.50: Investigation limited.

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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**Engineering Log -  
BOREHOLE**



MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P1706332BH101.9H110V01.GPJ <DrawingFile>> 07/03/2018 12:37 8.30.004 D:\git\Lab and In Situ Tool - DGD [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13

CLIENT	Monterey Equity Pty Ltd			COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF BH105							
PROJECT	Contamination Assessment			LOGGED	RM	CHECKED		Sheet 1 OF 1							
SITE	119 Barton St, Monterey, NSW			GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A	PROJECT NO. P1706332							
EQUIPMENT	4WD ute-mounted hydraulic drill rig			EASTING		RL SURFACE	4.3 m	DATUM	AHD						
EXCAVATION DIMENSIONS	ø100 mm x 2.50 m depth			NORTHING		ASPECT	-	SLOPE	<2%						
Drilling			Sampling		Field Material Description										
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
AD/T			13/02/18	4.25	6332/BH105/0.15/S/1 D 0.15 m			SP	ASPHALT.			PAVEMENT			
				0.30					FILL: Gravelly SAND, brown/grey, fine grained.			FILL			
				4.00					6332/BH105/0.4/S/1 D 0.40 m			SP	SAND, grey, fine grained.	Grading to yellow.	RESIDUAL SOIL
				1											
				1.50											
2.80	2	2.50	Hole Terminated at 2.50 m	2.50: Investigation limited.											
3															
4															
5															





EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS



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Engineering Log -  
BOREHOLE

CLIENT	Monterey Equity Pty Ltd	COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH106</b>  Sheet 1 OF 1 PROJECT NO. P1706332	
PROJECT	Contamination Assessment	LOGGED	RM	CHECKED			
SITE	119 Barton St, Monterey, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	Push Tube	EASTING		RL SURFACE	3.7 m	DATUM	AHD
EXCAVATION DIMENSIONS	1.50 m depth	NORTHING		ASPECT	-	SLOPE	<2%

Drilling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT	L			0.15	6332/BH106/0.1/S/1 D 0.10 m			SC	FILL: Clayey SAND, grey/brown, coarse.	D	MD		FILL
				3.55	6332/BH106/0.25/S/1 D 0.25 m			SP	FILL: SAND, white, coarse.				
				0.35	6332/BH106/0.4/S/1 D 0.40 m			SP	FILL: Gravelly SAND, grey, coarse.				
				3.35	6332/BH106/0.4/S/1 D 0.40 m			SP	FILL: Gravelly SAND, dark grey/black, medium grained.		L		
				0.55	6332/BH106/0.65/S/1 D 0.65 m			SP	SAND, white/yellow, fine to medium grained.		M		RESIDUAL SOIL
			1								MD		
				1.50									
		13/02/18							Hole Terminated at 1.50 m				1.50: Investigation limited.
			2										
			3										
			4										
			5										

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS



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**Engineering Log -  
BOREHOLE**

CLIENT	Monterey Equity Pty Ltd	COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH107</b>  Sheet 1 OF 1 PROJECT NO. P1706332	
PROJECT	Contamination Assessment	LOGGED	RM	CHECKED			
SITE	119 Barton St, Monterey, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	Push Tube	EASTING		RL SURFACE	3.7 m	DATUM	AHD
EXCAVATION DIMENSIONS	1.50 m depth	NORTHING		ASPECT	-	SLOPE	<2%

Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT	L	Not Encountered	3.65		6332/BH107/0.1/S/1 D 0.10 m			SC	FILL: Clayey SAND, grey/brown, coarse. FILL: SAND, white, coarse.	D	MD	FILL
			0.25			SP						
			0.35		6332/BH107/0.3-0.4/S/1 D 0.30 m			SP	FILL: Gravelly SAND, grey, coarse. FILL: Gravelly SAND, dark grey/black, medium grained.		L	RESIDUAL SOIL
			0.45			SP						
			3.25		6332/BH107/0.6/S/1 D 0.60 m			SP	SAND, white/yellow, fine to medium grained.	M	MD	
			1.50									
			2						Hole Terminated at 1.50 m			1.50: Investigation limited.
			3									
			4									
			5									

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**Engineering Log -  
BOREHOLE**

CLIENT	Monterey Equity Pty Ltd	COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH108</b>  Sheet 1 OF 1 PROJECT NO. P1706332	
PROJECT	Contamination Assessment	LOGGED	RM	CHECKED			
SITE	119 Barton St, Monterey, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	Push Tube	EASTING		RL SURFACE	3.7 m	DATUM	AHD
EXCAVATION DIMENSIONS	1.50 m depth	NORTHING		ASPECT	-	SLOPE	<2%

Drilling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT	L	Not Encountered			6332/BH108/0.05/S/1 D 0.05 m			SC	FILL: Clayey SAND, grey/brown, coarse.	D	MD		FILL
			3.60				SP	FILL: SAND, white, coarse.					
			0.40		6332/BH108/0.3/S/1 D 0.30 m			SP	FILL: Gravelly SAND, grey, coarse.		L		
			3.25		6332/BH108/0.6/S/1 D 0.60 m			SP	FILL: Gravelly SAND, dark grey/black, medium grained.				RESIDUAL SOIL
							SP	SAND, white/yellow, fine to medium grained.					
			1						M		MD		
				1.50									
			2						Hole Terminated at 1.50 m				1.50: Investigation limited.
			3										
			4										
			5										

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**Engineering Log -  
BOREHOLE**

CLIENT	Monterey Equity Pty Ltd	COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH109</b>  Sheet 1 OF 1 PROJECT NO. P1706332	
PROJECT	Contamination Assessment	LOGGED	RM	CHECKED			
SITE	119 Barton St, Monterey, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	Push Tube	EASTING		RL SURFACE	3.7 m	DATUM	AHD
EXCAVATION DIMENSIONS	1.50 m depth	NORTHING		ASPECT	-	SLOPE	<2%

Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT	L	Not Encountered	0.15		6332/BH109/0.1/S/1 D 0.10 m			SC	FILL: Clayey SAND, grey/brown, coarse.	D	MD	FILL
			3.55		6332/BH109/0.25/S/1 D 0.25 m			SP	FILL: SAND, white, coarse.			
			0.30					SP	FILL: Gravelly SAND, grey, coarse.		L	
			3.35		6332/BH109/0.5/S/1 D 0.50 m			SP	FILL: Gravelly SAND, dark grey/black, medium grained.			RESIDUAL SOIL
								SP	SAND, white/yellow, fine to medium grained.			
			1						M	MD		
			1.50									
			2						Hole Terminated at 1.50 m			1.50: Investigation limited.
			3									
			4									
			5									

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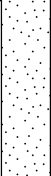


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**Engineering Log -  
BOREHOLE**

CLIENT	Monterey Equity Pty Ltd	COMMENCED	14/02/2018	COMPLETED	14/02/2018	REF <b>BH110</b>  Sheet 1 OF 1 PROJECT NO. P1706332	
PROJECT	Contamination Assessment	LOGGED	RM	CHECKED			
SITE	119 Barton St, Monterey, NSW	GEOLOGY	Hawkesbury Sandstone	VEGETATION	N/A		
EQUIPMENT	Push Tube	EASTING		RL SURFACE	4.3 m	DATUM	AHD
EXCAVATION DIMENSIONS	1.50 m depth	NORTHING		ASPECT	-	SLOPE	<2%

Drilling					Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
PT	L	Not Encountered		4.30	6332/BH110/0.05/S/1 D 0.05 m			SP	FILL: SAND, brown, fine grained, with rootlets, gravels.		L	FILL / TOPSOIL	
				0.50									FILL
				3.80									
				0.75	6332/BH110/0.6/S/1 D 0.60 m			SP	FILL: Gravelly SAND, dark grey/black, medium grained, with trace brick fragments.	M	RESIDUAL SOIL		
				3.55									
			1		6332/BH110/0.8/S/1 D 0.80 m			SP	SAND, yellow, medium grained.		MD		
			1.50										
			2						Hole Terminated at 1.50 m			1.50: Investigation limited.	
			3										
			4										
			5										

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**Engineering Log -  
BOREHOLE**

## 17      **Attachment F – Data Validation Report**

**DATA VALIDATION REPORT: 119 Barton Rd, Monterey, NSW**
**1. Sample Handling**

- a. Were sample holding times met?
- b. Were samples in proper custody between the field and reaching the laboratory?
- c. Were the samples properly and adequately preserved?
- d. Were the samples received by the laboratory in good condition?

Yes	No
	(Comments below)
✓	
✓	
✓	
✓	

**COMMENTS**


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**Sample handling is:**

- ✓ **Satisfactory**
- Partially Satisfactory**
- Unsatisfactory**



**DATA VALIDATION REPORT: 119 Barton Rd, Monterey, NSW**
**2. Precision / Accuracy Statement**

- a. Was a NATA registered laboratory used?
- b. Did the laboratory perform the requested tests?
- c. Were laboratory methods adopted NATA endorsed?
- d. Were appropriate test procedures followed?
- e. Were reporting limits satisfactory?
- f. Was the NATA Seal on the reports?
- g. Were reports signed by an authorised person?

Yes	No (Comments below)
✓	
✓	
✓	
✓	
✓	
✓	
✓	

**COMMENTS**


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**Precision / Accuracy of the  
Laboratory Report:**

✓

**Satisfactory**
**Partially  
Satisfactory**
**Unsatisfactory**

**DATA VALIDATION REPORT: 119 Barton Rd, Monterey, NSW**
**3. Field Quality Assurance / Quality Control (QA/QC)**

a. Number of Primary Samples analysed  
*(does not include duplicates)*

b. Number of days of sampling

c. Number and Type of QA/QC Samples analysed

Intra-Laboratory Field Duplicates

Inter-Laboratory Field triplicates

Trip Blanks

Field Rinsate

Other (Field Blanks, Spikes, etc.)

Media	Number
Soil:	14
Water:	-
Material	-
	1
Soil	Water
2	
-	
1	
-	
1	

**Comments**

Trip spike/blank used

**DATA VALIDATION REPORT: 119 Barton Rd, Monterey, NSW**
**Field Duplicates**

Adequate Numbers of intra-laboratory field duplicates analysed?

Adequate Numbers of inter-laboratory field duplicates analysed?

Were field duplicate RPDs within Control Limits?

- i. Organics
- ii. Metals / Inorganics
- iii. Nutrients

Yes	No (Comments below)
✓	
-	-
	N/A
	✓
	N/A

**COMMENTS**

RPDs were exceeded in duplicate samples 6332/DUP101 (copper) and 6332/DUP102 (lead, arsenic, mercury and zinc) . This is likely attributed to heterogenous fill material being sampled. All RPD sample exceedances are below the adopted SAC with the exception of 6332/BH101 for copper. For copper that exceeds the EIL, the higher value (35 mg/kg) has been adopted for 95% UCL analysis to ensure data validation.



**DATA VALIDATION REPORT: 119 Barton Rd, Monterey, NSW**
**Summary of Quality Assurance / Quality Control (QA/QC)**

QA/QC Type	Satisfactory	Partially Satisfactory	Unsatisfactory
Sample handling	✓		
Precision / Accuracy of the Laboratory Report	✓		
Field QA / QC	✓		
Laboratory Internal QA / QC	✓		

**Data Usability**

1. Data directly usable ✓
2. Data usable with the following corrections/modifications  
(see comment below)
3. Data not usable.

**COMMENTS**


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Field Duplicates (SOIL)  
Filter: SDG in('ENVIRI

SDG		ENVIROLAB 2018-02-14T00:00:00		ENVIROLAB 2018-02-14T00:00:00		ENVIROLAB 2018-02-14T00:00:00		ENVIROLAB 2018-02-14T00:00:00	
Field ID		6332/BH101		6332/DUP101	RPD	6332/BH110		6332/DUP102	RPD
Sampled Date/Time		13/02/2018		13/02/2018		13/02/2018		13/02/2018	

Chem_Gr	ChemNam	Units	EQL						
Inorganics	Moisture	%	0.1	11.0	9.7	13	2.3	2.6	12
Lead	Lead	mg/kg	1	28.0	26.0	7	32.0	13.0	84
Metals	Arsenic	mg/kg	4	<4.0	<4.0	0	<4.0	12.0	100
	Cadmium	mg/kg	0.4	<0.4	<0.4	0	<0.4	<0.4	0
	Chromium	mg/kg	1	8.0	9.0	12	9.0	8.0	12
	Copper	mg/kg	1	35.0	24.0	37	8.0	10.0	22
	Mercury	mg/kg	0.1	<0.1	<0.1	0	1.7	3.5	69
	Nickel	mg/kg	1	14.0	12.0	15	3.0	3.0	0
	Zinc	mg/kg	1	26.0	28.0	7	40.0	89.0	76

\*RPDs have only been considered where a concentration is greater than 1 times the EQL.  
\*\*High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 ( > 30 x EQL) )  
\*\*\*Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

## 18      **Attachment G – Laboratory Analytical Documentation**



## CERTIFICATE OF ANALYSIS 185170

### Client Details

<b>Client</b>	Martens & Associates Pty Ltd
<b>Attention</b>	Robert Mehaffey, Gray Taylor
<b>Address</b>	Suite 201, 20 George St, Hornsby, NSW, 2077

### Sample Details

<b>Your Reference</b>	<b><u>P1706332 - 119 Barton St Monterey DSI</u></b>
<b>Number of Samples</b>	41 soil
<b>Date samples received</b>	14/02/2018
<b>Date completed instructions received</b>	14/02/2018

### 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

<b>Date results requested by</b>	21/02/2018
<b>Date of Issue</b>	20/02/2018
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### **Results Approved By**

Dragana Tomas, Senior Chemist  
 Jeremy Faircloth, Organics Supervisor  
 Long Pham, Team Leader, Metals

#### **Authorised By**



David Springer, General Manager

## vTRH(C6-C10)/BTEXN in Soil

Our Reference		185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference	UNITS	6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	19/02/2018	19/02/2018	19/02/2018	19/02/2018	19/02/2018
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	<25	<25	<25	<25	<25
vTPH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	100	99	107	104

## vTRH(C6-C10)/BTEXN in Soil

Our Reference		185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference	UNITS	6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	19/02/2018	19/02/2018	19/02/2018	19/02/2018	19/02/2018
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	<25	<25	<25	<25	<25
vTPH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	106	109	104	112	105

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		185170-39	185170-40
Your Reference	UNITS	Trip Blank	Trip Spike
Depth		-	-
Date Sampled		13/02/2018	13/02/2018
Type of sample		soil	soil
Date extracted	-	15/02/2018	15/02/2018
Date analysed	-	19/02/2018	19/02/2018
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	[NA]
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	<25	[NA]
vTPH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25	[NA]
Benzene	mg/kg	<0.2	95%
Toluene	mg/kg	<0.5	95%
Ethylbenzene	mg/kg	<1	98%
m+p-xylene	mg/kg	<2	96%
o-Xylene	mg/kg	<1	97%
naphthalene	mg/kg	<1	[NA]
Total +ve Xylenes	mg/kg	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	102	102



## svTRH (C10-C40) in Soil

Our Reference		185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference	UNITS	6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	18/02/2018	18/02/2018	18/02/2018	18/02/2018	18/02/2018
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<100	140	170	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100	120	140	<100	<100
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100	240	260	<100	<100
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	240	260	<50	<50
Surrogate o-Terphenyl	%	79	82	85	79	79

## svTRH (C10-C40) in Soil

Our Reference		185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference	UNITS	6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	18/02/2018	18/02/2018	18/02/2018	18/02/2018	18/02/2018
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100	<100	<100	<100	<100
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	80	80	78	82	83

PAHs in Soil						
Our Reference		185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference	UNITS	6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.5	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.8	4.3	0.3	<0.1	<0.1
Anthracene	mg/kg	0.2	0.8	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	1.3	8.3	0.3	<0.1	<0.1
Pyrene	mg/kg	1.3	7.9	0.3	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.5	2.3	0.2	<0.1	<0.1
Chrysene	mg/kg	0.7	3.2	0.2	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.9	4.9	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.53	3.1	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	2.6	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	2.9	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	7.1	41	1.3	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.7	4.6	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.8	4.6	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.8	4.6	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	97	96	88	94	95

PAHs in Soil						
Our Reference		185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference	UNITS	6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.6	<0.1	<0.1	<0.1	0.3
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	<0.1	<0.1	<0.1	0.1
Pyrene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	1.6	<0.05	<0.05	<0.05	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	91	93	94	95	85



Organochlorine Pesticides in soil						
Our Reference		185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference	UNITS	6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	96	88	93	95

Organochlorine Pesticides in soil						
Our Reference		185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference	UNITS	6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Surrogate TCMX	%	91	95	95	96	96

Organophosphorus Pesticides						
Our Reference		185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference	UNITS	6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	96	88	93	95

Organophosphorus Pesticides						
Our Reference		185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference	UNITS	6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	91	95	95	96	96



## Acid Extractable metals in soil

Our Reference		185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference	UNITS	6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Arsenic	mg/kg	<4	13	<4	<4	<4
Cadmium	mg/kg	<0.4	3	<0.4	<0.4	<0.4
Chromium	mg/kg	8	29	6	<1	2
Copper	mg/kg	35	860	57	1	3
Lead	mg/kg	28	1,700	15	1	4
Mercury	mg/kg	<0.1	0.5	<0.1	<0.1	0.2
Nickel	mg/kg	14	25	21	<1	4
Zinc	mg/kg	26	1,200	12	<1	6

## Acid Extractable metals in soil

Our Reference		185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference	UNITS	6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	7	5	9	4
Copper	mg/kg	15	<1	2	8	4
Lead	mg/kg	19	1	3	32	75
Mercury	mg/kg	<0.1	<0.1	<0.1	1.7	0.2
Nickel	mg/kg	46	1	2	3	5
Zinc	mg/kg	15	5	17	40	9

Acid Extractable metals in soil			
Our Reference		185170-37	185170-38
Your Reference	UNITS	6332/DUP101	6332/DUP102
Depth		-	-
Date Sampled		13/02/2018	13/02/2018
Type of sample		soil	soil
Date prepared	-	15/02/2018	15/02/2018
Date analysed	-	15/02/2018	15/02/2018
Arsenic	mg/kg	<4	12
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	9	8
Copper	mg/kg	24	10
Lead	mg/kg	26	13
Mercury	mg/kg	<0.1	3.5
Nickel	mg/kg	12	3
Zinc	mg/kg	28	89

Moisture						
Our Reference	UNITS	185170-1	185170-4	185170-10	185170-11	185170-18
Your Reference		6332/BH101	6332/BH101	6332/BH103	6332/BH103	6332/BH106
Depth		0.15	1.5	0.2	0.5	0.25
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
Moisture	%	11	23	13	9.0	9.5

Moisture						
Our Reference	UNITS	185170-19	185170-21	185170-28	185170-32	185170-33
Your Reference		6332/BH106	6332/BH107	6332/BH109	6332/BH110	6332/BH110
Depth		0.4	0.1	0.1	0.05	0.60.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/02/2018	15/02/2018	15/02/2018	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018	16/02/2018	16/02/2018	16/02/2018
Moisture	%	16	7.3	8.6	2.3	2.5

Moisture			
Our Reference	UNITS	185170-37	185170-38
Your Reference		6332/DUP101	6332/DUP102
Depth		-	-
Date Sampled		13/02/2018	13/02/2018
Type of sample		soil	soil
Date prepared	-	15/02/2018	15/02/2018
Date analysed	-	16/02/2018	16/02/2018
Moisture	%	9.7	2.6



Method ID	Methodology Summary
<b>Inorg-008</b>	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
<b>Metals-020</b>	Determination of various metals by ICP-AES.
<b>Metals-021</b>	Determination of Mercury by Cold Vapour AAS.
<b>Org-003</b>	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.
<b>Org-003</b>	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).
<b>Org-005</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
<b>Org-005</b>	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.
<b>Org-008</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
<b>Org-012</b>	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.

Method ID	Methodology Summary
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-8	[NT]
Date extracted	-			15/02/2018	1	15/02/2018	15/02/2018		15/02/2018	[NT]
Date analysed	-			19/02/2018	1	19/02/2018	19/02/2018		19/02/2018	[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-016	<25	1	<25	<25	0	104	[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-016	<25	1	<25	<25	0	104	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	116	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	101	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	88	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	108	[NT]
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	95	[NT]
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	105	1	99	102	3	104	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	33	19/02/2018	19/02/2018		[NT]	[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-016	[NT]	33	<25	<25	0	[NT]	[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-016	[NT]	33	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	33	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	33	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	33	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	33	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	33	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	33	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	33	105	110	5	[NT]	[NT]



QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			14/02/2018	1	15/02/2018	15/02/2018		14/02/2018	[NT]
Date analysed	-			18/02/2018	1	18/02/2018	18/02/2018		18/02/2018	[NT]
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-003	<50	1	<50	<50	0	108	[NT]
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-003	<100	1	<100	<100	0	92	[NT]
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-003	<100	1	<100	<100	0	123	[NT]
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-003	<50	1	<50	<50	0	108	[NT]
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-003	<100	1	<100	<100	0	92	[NT]
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-003	<100	1	<100	<100	0	123	[NT]
Surrogate o-Terphenyl	%		Org-003	82	1	79	79	0	85	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	33	18/02/2018	18/02/2018		[NT]	[NT]
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-003	[NT]	33	<50	<50	0	[NT]	[NT]
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-003	[NT]	33	<100	<100	0	[NT]	[NT]
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-003	[NT]	33	<100	<100	0	[NT]	[NT]
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-003	[NT]	33	<50	<50	0	[NT]	[NT]
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-003	[NT]	33	<100	<100	0	[NT]	[NT]
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-003	[NT]	33	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	33	83	83	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			15/02/2018	1	15/02/2018	15/02/2018		15/02/2018	[NT]
Date analysed	-			16/02/2018	1	16/02/2018	16/02/2018		16/02/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	92	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	97	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	0.8	0.6	29	97	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	1	0.2	0.1	67	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	1.3	0.8	48	97	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	1	1.3	0.8	48	97	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	0.5	0.3	50	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	0.7	0.4	55	115	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	0.9	0.6	40	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	0.53	0.3	55	89	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.2	40	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.2	40	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	94	1	97	92	5	91	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	33	16/02/2018	16/02/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	33	0.3	0.2	40	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	33	0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	33	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	33	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	33	85	86	1	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			15/02/2018	1	15/02/2018	15/02/2018		15/02/2018	[NT]
Date analysed	-			16/02/2018	1	16/02/2018	16/02/2018		16/02/2018	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	99	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	78	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	70	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	91	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	85	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	98	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	86	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	84	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	65	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	81	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	98	1	98	93	5	101	[NT]



QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	33	16/02/2018	16/02/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	33	96	95	1	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			15/02/2018	1	15/02/2018	15/02/2018		15/02/2018	[NT]
Date analysed	-			16/02/2018	1	16/02/2018	16/02/2018		16/02/2018	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	98	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	88	[NT]
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	107	[NT]
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	93	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	116	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	92	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	98	[NT]
Surrogate TCMX	%		Org-008	98	1	98	93	5	101	[NT]

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	33	16/02/2018	16/02/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	33	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	33	96	95	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			15/02/2018	1	15/02/2018	15/02/2018		15/02/2018	[NT]
Date analysed	-			15/02/2018	1	15/02/2018	15/02/2018		15/02/2018	[NT]
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	102	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	99	[NT]
Chromium	mg/kg	1	Metals-020	<1	1	8	6	29	101	[NT]
Copper	mg/kg	1	Metals-020	<1	1	35	29	19	101	[NT]
Lead	mg/kg	1	Metals-020	<1	1	28	27	4	97	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	91	[NT]
Nickel	mg/kg	1	Metals-020	<1	1	14	14	0	94	[NT]
Zinc	mg/kg	1	Metals-020	<1	1	26	25	4	97	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	33	15/02/2018	15/02/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	33	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	33	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	33	4	4	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	33	4	4	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	33	75	77	3	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	33	0.2	0.3	40	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	33	5	4	22	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	33	9	11	20	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	4	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	4	15/02/2018	15/02/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	4	13	11	17	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	4	3	2	40	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	4	29	30	3	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	4	860	880	2	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	4	1700	1800	6	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	4	0.5	0.4	22	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	4	25	31	21	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	4	1200	1300	8	[NT]	[NT]



QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	32	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	32	15/02/2018	15/02/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	32	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	32	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	32	9	11	20	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	32	8	9	12	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	32	32	44	32	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	32	1.7	1.8	6	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	32	3	3	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	32	40	39	3	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	38	15/02/2018	15/02/2018		[NT]	[NT]
Date analysed	-			[NT]	38	15/02/2018	15/02/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	38	12	12	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	38	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	38	8	8	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	38	10	10	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	38	13	15	14	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	38	3.5	3.3	6	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	38	3	3	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	38	89	97	9	[NT]	[NT]

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

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.



## Report Comments

PAHs in Soil 1/1d: - The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Additional Testing									
Name		P1706332 - 119 Barton St, Monterey DSI							
Martens Contact Officer		Robert Mehaffey		Contact Email		rmehaffey@martens.com.au			
Sampling and Shipping		Sample Date	13 February 2018	Dispatch Date	14 February 2018	Turnaround Time		standard	
		Our Reference	P1706332COC01V01		Shipping Method (X)	Hand	Post	Courier	X
		On Ice (X)	X	No Ice (X)		Other (X)			
Laboratory									
Name		EnviroLab							
Sample Delivery Address		12 Ashley Street, Chatswood							
Delivery Contact		Name	Aileen	Phone	9910 6200	Fax		Email	ahie@envirolabservices.com.au
Please Send Report By (X)		Post		Fax		Email	X	Reporting Email Address	rmehaffey@martens.com.au, gtaylor@martens.com.au

Sample ID	Combo 5b	8HM	BTEX	TRH	HOLD
1 6332/BH101/0.15	X				
2 6332/BH101/0.7					X
3 6332/BH101/1.2					X
4 6332/BH101/1.5	X		EnviroLab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200		X
5 6332/BH101/2.0					X
6 6332/BH102/0.2					X
7 6332/BH102/0.5			Job No: 185170		X
8 6332/BH102/0.9					X
9 6332/BH102/1.8					X
10 6332/BH103/0.2	X		Date Received: 14.2.18		
11 6332/BH103/0.5	X		Time Received: 11:45		
12 6332/BH103/1.1			Received by: JE 19.1.18		
13 6332/BH104/0.2			Tents: Cool/Ambient		X
14 6332/BH104/0.7			Cooling: Ice/Icepack		X
15 6332/BH105/0.15			Security: Intact/Broken/None		X
16 6332/BH105/0.4					X
17 6332/BH106/0.1					X
18 6332/BH106/0.25	X				
19 6332/BH106/0.4	X				
20 6332/BH106/0.65					X

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> mail@martens.com.au  
> www.martens.com.au  
MARTENS & ASSOCIATES P/L  
ABN 85 070 240 890 ACN 070 240 890

Rec'd ELS JE  
14.2.18 11:45



185170

SOIL ANALYSIS CHAIN OF CUSTODY

Page of

Sample ID	Combo 5b	8HM	BTEX	TRH	HOLD
21 6332/BH107/0.1	X				
22 6332/BH107/0.3-0.4					X
23 6332/BH107/0.6					X
24 6332/BH107/1.45					X
25 6332/BH108/0.05					X
26 6332/BH108/0.3					X
27 6332/BH108/0.6					X
28 6332/BH109/0.1	X				
29 6332/BH109/0.25					X
30 6332/BH109/0.5					X
31 6332/BH109/1.0					X
32 6332/BH110/0.05	X				
33 6332/BH110/0.6	X				
34 6332/BH110/0.8					X
35 6332/SS101					X
36 6332/SS102					X
37 6332/DUP101		X			
38 6332/DUP102		X			
39 Trip Blank					
40 Trip Spike			X	X	

Extra 41 BH105/2.0  
JE  
Rec'd JE 14/2/18

## Aileen Hie

---

**From:** Robert Mehaffey <rmehaffey@martens.com.au>  
**Sent:** Wednesday, 21 February 2018 2:40 PM  
**To:** Ken Nguyen  
**Cc:** Gray Taylor; Aileen Hie  
**Subject:** RE: Results for Registration 185170 P1706332 - 119 Barton St Monterey DSI  
**Attachments:** 185170-coc.pdf

Hi Ken,

Can we please get some additional testing completed:

5 ○ 6332/BH101/2.0 – Tested for Combo 5b

Standard turnaround time please.

Let me know if there are any issues.

Best regards,

Robert Mehaffey  
Environmental Engineer  
BEng (Civil)/Environmental



Martens & Associates Pty Ltd  
Suite 201, 20 George St  
Hornsby, NSW 2077  
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F + 61 2 9476 8767  
[www.martens.com.au](http://www.martens.com.au)

Envirolab Ref: 185170A  
Due: 28/2/18  
Std T/A.

---

**From:** Ken Nguyen [mailto:KNguyen@envirolab.com.au]  
**Sent:** Tuesday, 20 February 2018 8:00 PM  
**To:** Lara Tintinger; Robert Mehaffey; Gray Taylor  
**Subject:** Results for Registration 185170 P1706332 - 119 Barton St Monterey DSI

Please refer to attached for:  
a copy of the Certificate of Analysis  
a copy of the COC/paperwork received from you  
ESDAT Extracts  
an Excel or .csv file containing the results  
a copy of the Invoice  
Please note that a hard copy will not be posted.

We have a new reporting format and would welcome your feedback. [Sydney@envirolab.com.au](mailto:Sydney@envirolab.com.au)

Enquiries should be made directly to:  
[customerservice@envirolab.com.au](mailto:customerservice@envirolab.com.au)



## **CERTIFICATE OF ANALYSIS 185170-A**

### **Client Details**

<b>Client</b>	Martens & Associates Pty Ltd
<b>Attention</b>	Robert Mehaffey
<b>Address</b>	Suite 201, 20 George St, Hornsby, NSW, 2077

### **Sample Details**

<b>Your Reference</b>	<b><u>P1706332 - 119 Barton St Monterey DSI</u></b>
<b>Number of Samples</b>	Additional Testing on 1 Soil
<b>Date samples received</b>	14/02/2018
<b>Date completed instructions received</b>	21/02/2018

### **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.

### **Report Details**

<b>Date results requested by</b>	28/02/2018
<b>Date of Issue</b>	26/02/2018
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### **Results Approved By**

Dragana Tomas, Senior Chemist  
 Long Pham, Team Leader, Metals  
 Steven Luong, Senior Chemist

#### **Authorised By**



David Springer, General Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date extracted	-	22/02/2018
Date analysed	-	22/02/2018
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	<25
vTPH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	99

svTRH (C10-C40) in Soil		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date extracted	-	22/02/2018
Date analysed	-	23/02/2018
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<100
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	77



PAHs in Soil		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date extracted	-	22/02/2018
Date analysed	-	22/02/2018
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	97

Organochlorine Pesticides in soil		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date extracted	-	22/02/2018
Date analysed	-	23/02/2018
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	94

Organophosphorus Pesticides		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date extracted	-	22/02/2018
Date analysed	-	23/02/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	94

Acid Extractable metals in soil		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date prepared	-	22/02/2018
Date analysed	-	22/02/2018
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	2
Copper	mg/kg	11
Lead	mg/kg	30
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	16



Moisture		
Our Reference		185170-A-5
Your Reference	UNITS	6332/BH101
Depth		2.0
Date Sampled		13/02/2018
Type of sample		soil
Date prepared	-	22/02/2018
Date analysed	-	22/02/2018
Moisture	%	5.7

Method ID	Methodology Summary
<b>Inorg-008</b>	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
<b>Metals-020</b>	Determination of various metals by ICP-AES.
<b>Metals-021</b>	Determination of Mercury by Cold Vapour AAS.
<b>Org-003</b>	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.
<b>Org-003</b>	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).
<b>Org-005</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
<b>Org-005</b>	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.
<b>Org-008</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
<b>Org-012</b>	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.

Method ID	Methodology Summary
<b>Org-014</b>	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
<b>Org-016</b>	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.
<b>Org-016</b>	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-1	[NT]
Date extracted	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Date analysed	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	111	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	108	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	105	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	110	[NT]	[NT]	[NT]	[NT]	105	[NT]



QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Date analysed	-			23/02/2018	[NT]	[NT]	[NT]	[NT]	23/02/2018	[NT]
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-003	82	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Date analysed	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	113	[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]	125	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	109	[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]	111	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	118	[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]	114	[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]	113	[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	104	[NT]	[NT]	[NT]	[NT]	124	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Date analysed	-			23/02/2018	[NT]	[NT]	[NT]	[NT]	23/02/2018	[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]	85	[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]	88	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	94	[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]	89	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	95	[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]	103	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	124	[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]	105	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	97	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Date analysed	-			23/02/2018	[NT]	[NT]	[NT]	[NT]	23/02/2018	[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]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Chlorpyrifos-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]	106	[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]	112	[NT]
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Surrogate TCMX	%		Org-008	97	[NT]	[NT]	[NT]	[NT]	102	[NT]



QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Date analysed	-			22/02/2018	[NT]	[NT]	[NT]	[NT]	22/02/2018	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

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.

## Aileen Hie

---

**From:** Robert Mehaffey <rmehaffey@martens.com.au>  
**Sent:** Friday, 16 February 2018 3:29 PM  
**To:** Aileen Hie  
**Cc:** Gray Taylor  
**Subject:** RE: 6332 COC  
**Attachments:** P1706332JCOC01V01.pdf

Hi Aileen,

Could we please also get the following additional testing completed for these samples:

- 12 ○ 6332/BH103/1.1 – tested for CEC and pH.
- 20 ○ 6332/BH106/0.65 – tested for CEC and pH.
- 3A ○ 6332/BH110/0.8 – tested for CEC and pH.

Please let me know if there are any issues.

Best regards,

Robert Mehaffey  
Environmental Engineer  
BEng (Civil/Environmental)



Martens & Associates Pty Ltd  
Suite 201, 20 George St  
Hornsby, NSW 2077  
P + 61 2 9476 9999  
F + 61 2 9476 8767  
[www.martens.com.au](http://www.martens.com.au)

EnviroLab Ref: 185170 B  
Due: 28/2/18

---

**From:** Robert Mehaffey  
**Sent:** Tuesday, 13 February 2018 3:37 PM  
**To:** 'Aileen Hie'  
**Cc:** Gray Taylor  
**Subject:** 6332 COC

Hi Aileen,

Please find attached COC for job P6332, samples will be sent to Envirolab tomorrow morning.

Let me know if there are any issues.

Best regards,

Robert Mehaffey  
Environmental Engineer  
BEng (Civil/Environmental)



## **CERTIFICATE OF ANALYSIS 185170-B**

### **Client Details**

<b>Client</b>	Martens & Associates Pty Ltd
<b>Attention</b>	Robert Mehaffey
<b>Address</b>	Suite 201, 20 George St, Hornsby, NSW, 2077

### **Sample Details**

<b>Your Reference</b>	<b><u>P1706332 - 119 Barton St Monterey DSI</u></b>
<b>Number of Samples</b>	Additional Testing on 3 Soils
<b>Date samples received</b>	14/02/2018
<b>Date completed instructions received</b>	16/02/2018

### **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.

### **Report Details**

<b>Date results requested by</b>	28/02/2018
<b>Date of Issue</b>	28/02/2018
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### **Results Approved By**

Leon Ow, Chemist  
 Nick Sarlamis, Inorganics Supervisor

#### **Authorised By**



David Springer, General Manager

CEC				
Our Reference		185170-B-12	185170-B-20	185170-B-34
Your Reference	UNITS	6332/BH103	6332/BH106	6332/BH110
Depth		1.1	0.65	0.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil
Date prepared	-	27/02/2018	27/02/2018	27/02/2018
Date analysed	-	27/02/2018	27/02/2018	27/02/2018
Exchangeable Ca	meq/100g	<0.1	0.3	0.3
Exchangeable K	meq/100g	<0.1	<0.1	<0.1
Exchangeable Mg	meq/100g	<0.1	<0.1	<0.1
Exchangeable Na	meq/100g	<0.1	<0.1	<0.1
Cation Exchange Capacity	meq/100g	<1	<1	<1

Misc Inorg - Soil				
Our Reference		185170-B-12	185170-B-20	185170-B-34
Your Reference	UNITS	6332/BH103	6332/BH106	6332/BH110
Depth		1.1	0.65	0.8
Date Sampled		13/02/2018	13/02/2018	13/02/2018
Type of sample		soil	soil	soil
Date prepared	-	27/02/2018	27/02/2018	27/02/2018
Date analysed	-	27/02/2018	27/02/2018	27/02/2018
pH 1:5 soil:water	pH Units	5.3	7.2	6.8

Method ID	Methodology Summary
<b>Inorg-001</b>	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
<b>Metals-009</b>	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.



QUALITY CONTROL: CEC					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			27/02/2018	[NT]	[NT]	[NT]	[NT]	27/02/2018	[NT]
Date analysed	-			27/02/2018	[NT]	[NT]	[NT]	[NT]	27/02/2018	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]

**Client Reference: P1706332 - 119 Barton St Monterey DSI**

QUALITY CONTROL: Misc Inorg - Soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/02/2018	[NT]	[NT]	[NT]	[NT]	27/02/2018	[NT]
Date analysed	-			27/02/2018	[NT]	[NT]	[NT]	[NT]	27/02/2018	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]

## Result Definitions

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Measurement Uncertainty estimates are available for most tests upon request.



## 19      **Attachment H – Laboratory Summary Tables**

[illegible]

[illegible]

	Lead	Metals						
	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	1	4	0.4	1	1	0.1	1	1
NEPM 2013 Table 1A(1) HILs Res A Soil	300	100	20		6000	40	400	7400
Site Specific EIL	1100	100		410	55		35	350

Field_ID	Sample_Depth_Avg								
6332/BH101	0.15	28	<4	<0.4	8	35	<0.1	14	26
6332/BH101	1.5	1700	13	3	29	860	0.5	25	1200
6332/BH101	2	30	<4	<0.4	2	11	<0.1	<1	16
6332/BH103	0.2	15	<4	<0.4	6	57	<0.1	21	12
6332/BH103	0.5	1	<4	<0.4	<1	1	<0.1	<1	<1
6332/BH106	0.25	4	<4	<0.4	2	3	0.2	4	6
6332/BH106	0.4	19	<4	<0.4	6	15	<0.1	46	15
6332/BH107	0.1	1	<4	<0.4	7	<1	<0.1	1	5
6332/BH109	0.1	3	<4	<0.4	5	2	<0.1	2	17
6332/BH110	0.05	32	<4	<0.4	9	8	1.7	3	40
6332/BH110	0.6	75	<4	<0.4	4	4	0.2	5	9

**Statistical Summary**

Number of Results	11	11	11	11	11	11	11	11
Number of Detects	11	1	1	10	10	4	9	10
Minimum Concentration	1	<4	<0.4	<1	<1	<0.1	<1	<1
Minimum Detect	1	13	3	2	1	0.2	1	5
Maximum Concentration	1700	13	3	29	860	1.7	46	1200
Maximum Detect	1700	13	3	29	860	1.7	46	1200
Average Concentration	173	3	0.45	7.1	91	0.27	11	122
Median Concentration	19	2	0.2	6	8	0.05	4	15
Standard Deviation	507	3.3	0.84	7.7	256	0.49	14	358
Number of Guideline Exceedances	1	0	0	0	2	0	1	1
Number of Guideline Exceedances(Detects Only)	1	0	0	0	2	0	1	1



## 20      Attachment I – UCL Calculations

1	Gamma UCL Statistics for Uncensored Full Data Sets			
2				
3	User Selected Options			
4	Date/Time of Computation	ProUCL 5.15/03/2018 12:09:50 PM		
5	From File	WorkSheet.xls		
6	Full Precision	OFF		
7	Confidence Coefficient	95%		
8	Number of Bootstrap Operations	2000		
9				
10				
11	C0			
12				
13	General Statistics			
14	Total Number of Observations	10	Number of Distinct Observations	9
15			Number of Missing Observations	0
16	Minimum	1	Mean	13.7
17	Maximum	57	Median	6
18	SD	18.37	SD of logged Data	1.404
19	Coefficient of Variation	1.341	Skewness	1.854
20				
21	Gamma GOF Test			
22	A-D Test Statistic	0.362	Anderson-Darling Gamma GOF Test	
23	5% A-D Critical Value	0.758	Data appear Gamma Distributed at 5% Significance Level	
24	K-S Test Statistic	0.177	Kolmogorov-Smirnov Gamma GOF Test	
25	5% K-S Critical Value	0.276	Data appear Gamma Distributed at 5% Significance Level	
26	Data appear Gamma Distributed at 5% Significance Level			
27				
28	Gamma Statistics			
29	k hat (MLE)	0.731	k star (bias corrected MLE)	0.579
30	Theta hat (MLE)	18.73	Theta star (bias corrected MLE)	23.67
31	nu hat (MLE)	14.63	nu star (bias corrected)	11.57
32	MLE Mean (bias corrected)	13.7	MLE Sd (bias corrected)	18.01
33			Approximate Chi Square Value (0.05)	4.948
34	Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	4.22
35				
36	Assuming Gamma Distribution			
37	95% Approximate Gamma UCL (use when n>=50)	32.05	95% Adjusted Gamma UCL (use when n<50)	37.57
38				
39	Suggested UCL to Use			
40	95% Adjusted Gamma UCL	37.57		
41				
42	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
43	Recommendations are based upon data size, data distribution, and skewness.			
44	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
45	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
46				

1	Gamma UCL Statistics for Uncensored Full Data Sets			
2				
3	User Selected Options			
4	Date/Time of Computation	ProUCL 5.15/03/2018 12:10:09 PM		
5	From File	WorkSheet.xls		
6	Full Precision	OFF		
7	Confidence Coefficient	95%		
8	Number of Bootstrap Operations	2000		
9				
10				
11	C1			
12				
13	General Statistics			
14	Total Number of Observations	10	Number of Distinct Observations	8
15			Number of Missing Observations	0
16	Minimum	1	Mean	9.8
17	Maximum	46	Median	3.5
18	SD	14.34	SD of logged Data	1.36
19	Coefficient of Variation	1.463	Skewness	2.158
20				
21	Gamma GOF Test			
22	A-D Test Statistic	0.605	Anderson-Darling Gamma GOF Test	
23	5% A-D Critical Value	0.76	Data appear Gamma Distributed at 5% Significance Level	
24	K-S Test Statistic	0.237	Kolmogorov-Smirnov Gamma GOF Test	
25	5% K-S Critical Value	0.277	Data appear Gamma Distributed at 5% Significance Level	
26	Data appear Gamma Distributed at 5% Significance Level			
27				
28	Gamma Statistics			
29	k hat (MLE)	0.708	k star (bias corrected MLE)	0.562
30	Theta hat (MLE)	13.84	Theta star (bias corrected MLE)	17.43
31	nu hat (MLE)	14.16	nu star (bias corrected)	11.24
32	MLE Mean (bias corrected)	9.8	MLE Sd (bias corrected)	13.07
33			Approximate Chi Square Value (0.05)	4.733
34	Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	4.025
35				
36	Assuming Gamma Distribution			
37	95% Approximate Gamma UCL (use when n>=50)	23.28	95% Adjusted Gamma UCL (use when n<50)	27.38
38				
39	Suggested UCL to Use			
40	95% Adjusted Gamma UCL	27.38		
41				
42	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
43	Recommendations are based upon data size, data distribution, and skewness.			
44	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
45	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
46				

# Urban Design Analysis

119 BARTON ST, MONTEREY, NSW

FEBRUARY 2018



## Project Contact

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Principal

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The Urban Design Analysis Report has been prepared in support of a Planning Proposal for a development at 119 Barton Street Monterey, NSW.

The purpose of the report is to analyse the site and its urban context so as to inform the design principles for the development. These design principles are tested in concept scenarios, demonstrating the ability of the site to support:

- A variation to rezone the subject land to R3 Medium Density Residential

This report will show that the proposed development meets the objectives of the Rockdale Development Control Plan in the following ways

- Sustainably accommodate population growth in an appropriate medium density location within close proximity to public transport
- Deliver high quality articulation of built form on a masterplanned site and well designed dwelling spaces

DEVELOPMENT SUMMARY AREA SCHEDULE				
	HEIGHT	SITE AREA	DEVELOPMENT GFA	DEVELOPMENT FSR
119 BARTON STREET	2 STOREYS	7218sqm	4330sqm	0.6:1

## 2.0 Urban Context Site Analysis

The following pages describe the current and physical attributes of the Rockdale Precinct in order to best contextualise and define location specific initiatives for the project site.

The section considers:

- Overall Context Analysis
- Site Context & Vehicular Network
- Public Transport & Pedestrian Movement
- Topography
- Built form Height Context
- Site Constraints Analysis
- Site Opportunities Analysis
- Views of Existing Site

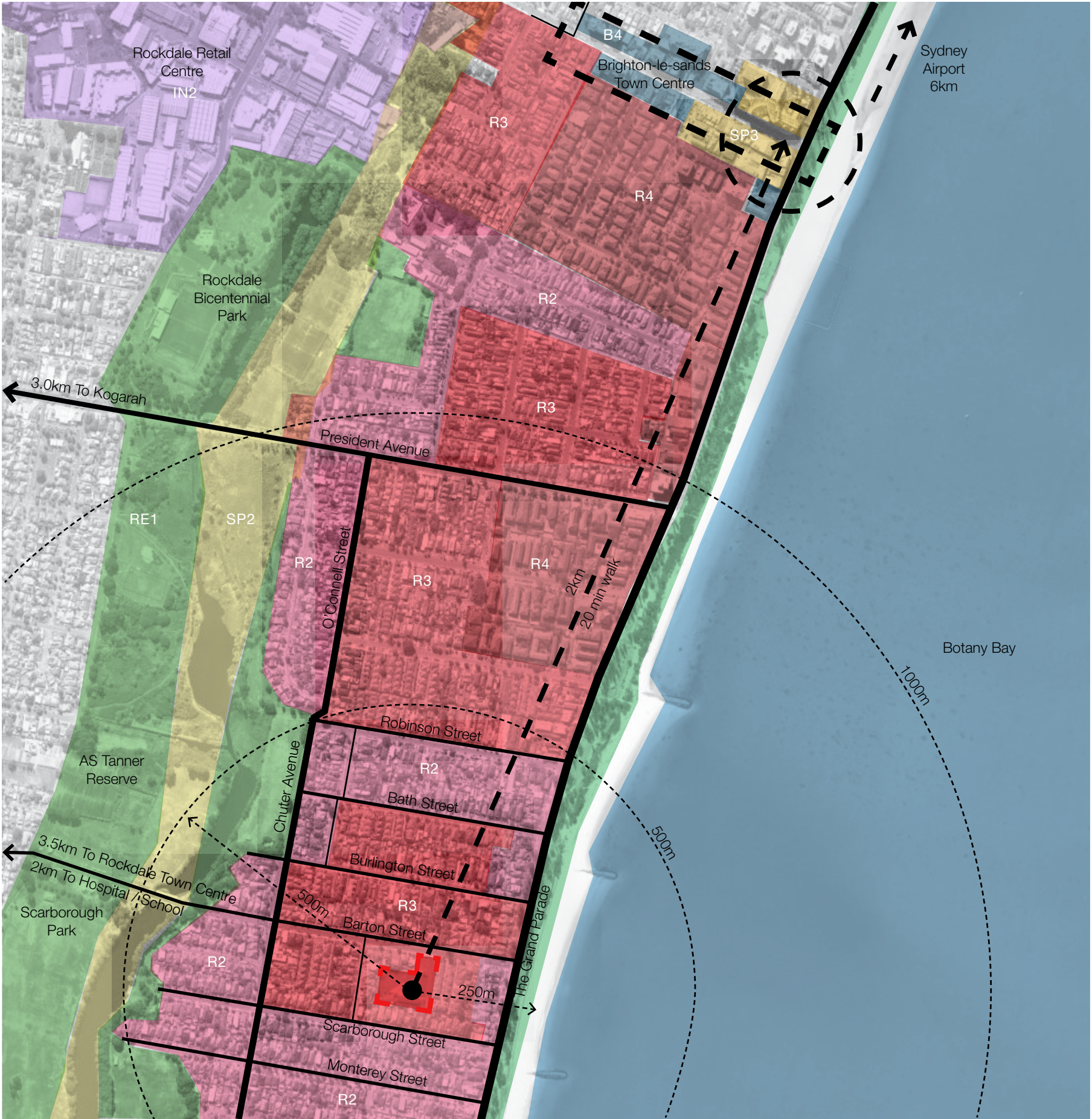


119 Barton Street, Monterey is located 15km's south of Sydney Central Business District, 5km's from Sydney Airport and 2km's from Brighton le Sands. The site is well positioned to provide a high level of local amenity with nearby mixed-use environments supporting current and future community needs.

The site has good access to Sydney's bus network with connections to the train network at nearby Rockdale.

Legend

- Subject Site
- B4 - Mixed-Use
- IN2 - Light Industrial
- R2 - Low Density Residential
- R3 - Medium Density Residential
- R4 - High Density Residential
- RE1 - Public Recreation
- SP2 - Infrastructure
- SP3 - Tourist





The Grand Parade is the dominant vehicular connection between Brighton-le Sands to the North and the Taren Point Bridge crossing to the South

The East-West streets service mainly the local community



Legend

- Subject Site
- Major Road
- Primary Road
- Local road
- Traffic Controlled Pedestrian Crossing
- Public Carpark





The site has access to buses providing direct access to Circular Quay via Westfield Eastgardens, Surry Hills and Martin Place, Sydney. Nearby buses also connect the subject site with Miranda and Rockdale.

Buses operate along both The Grand Parade and Chuter Avenue

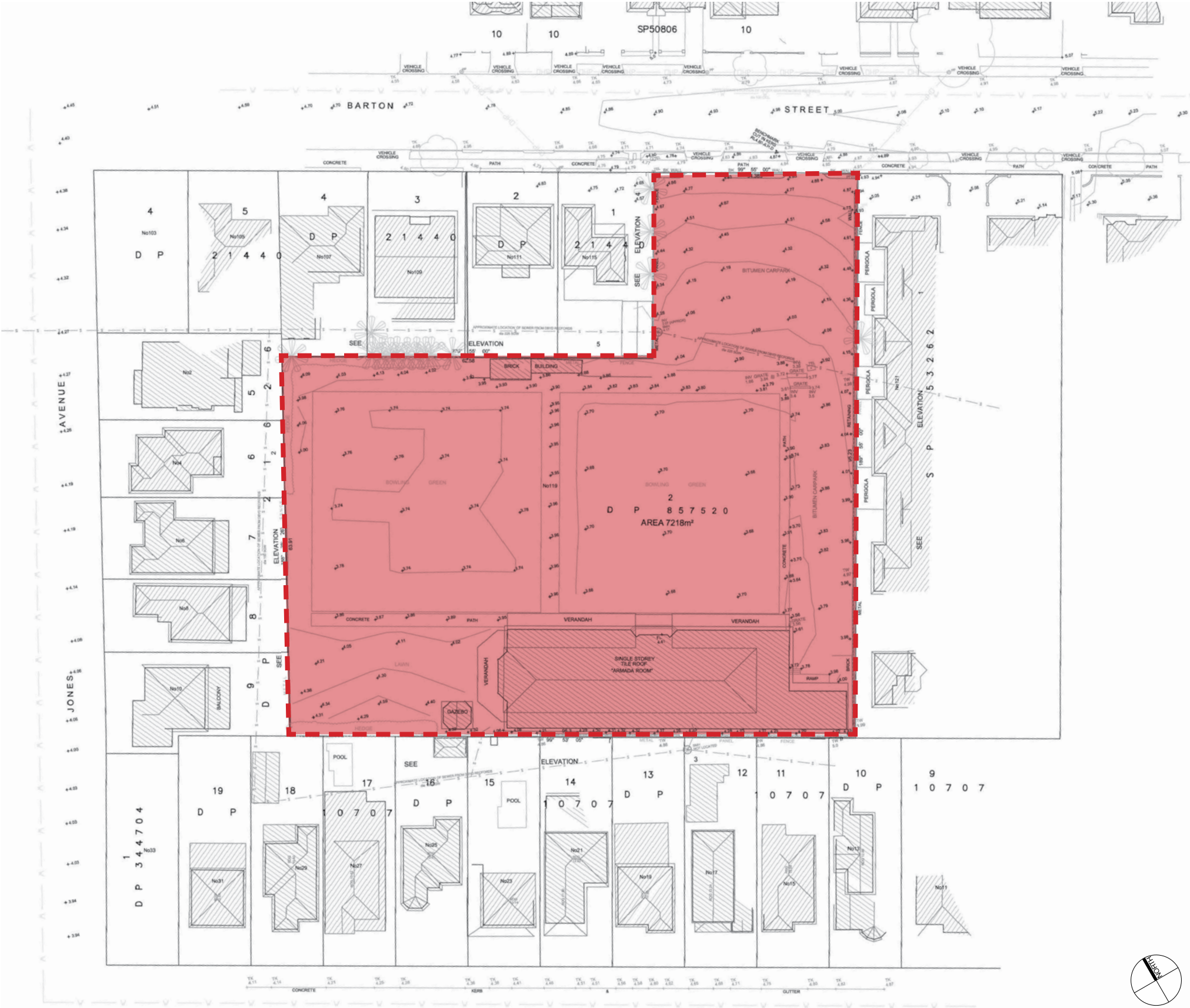


Legend

- Subject Site
- Bus Stop
- Off-Road Cycle Routes
- On-Road Cycle Routes
- Traffic Controlled Pedestrian Crossing
- Bus Route 3
- Bus Route 303
- Bus 479
- Bus 947









The subject site sits within a well-established local residential neighbourhood comprising of a mixture of single and double storey houses and some early strata title development. The surrounding land zoning is R3 and R2



Legend

- Subject Site
- 1 Storey Dwelling
- 2 Storey Dwelling
- 3 Storey Dwelling
- Multi-Unit / Strata Title 1 / 2 Storey Dwelling
- Industrial / Commercial

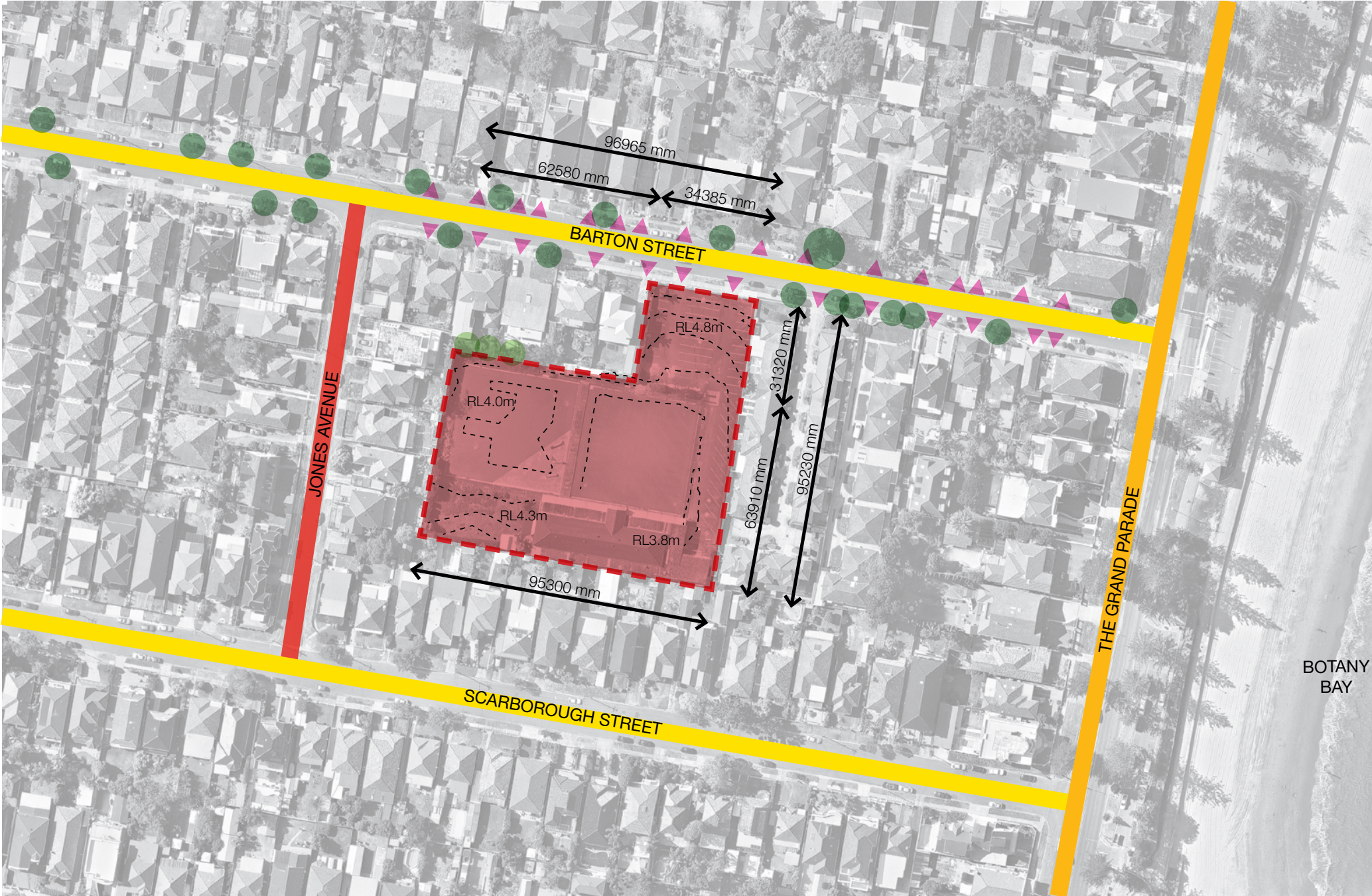




The existing streetscape is still very much a low rise, low density residential typology.

The Street is punctuated with driveways accessing individual properties and there are a few sporadically placed street trees. There is no consistency of planting across the immediate context.

The street is serviced with footpaths on both sides



Legend

- Subject Site

Major Road

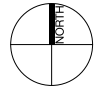
Primary Road

Local Road
- Contour Lines (Indicative) RL shown in metres AHD

Existing Driveway Crossover Locations

Existing Street Tree Locations

Trees on Adjacent Site





There is a gradual fall across the site from Barton Street to the south-east corner of the site. The remainder of the site is relatively flat.

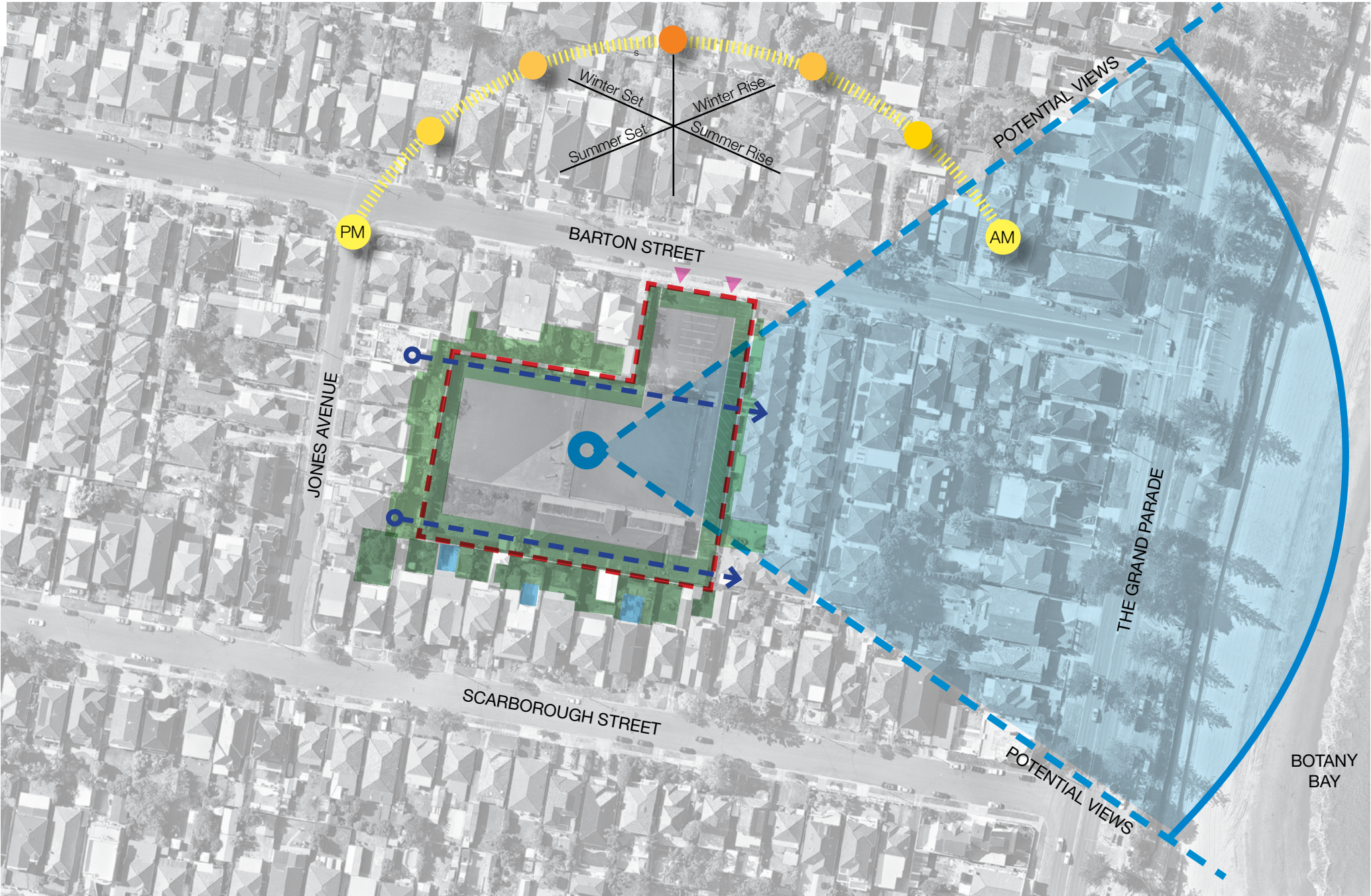
The site sits in a well-established neighbourhood with limited examples of multi unit- subdivision.



Legend

- |  |   |  |  |
|--|---|--|--|
|  | Subject Site  |  | Adjacent Low Scale Residential Buildings         |
|  | Potential Windows on Neighbouring Property          |  | Private Open Sapce in Neighbouring Property      |
|  | Min. 4.5m Side Setback from Boundary                |  | In-ground Swimming Pool in Neighbouring Property |
|  | Min. 3.0m Rear Setback from Boundary (Ground Floor) |  |  |
|  | 6.0m Rear Setback from Boundary (First Floor)       |  |  |

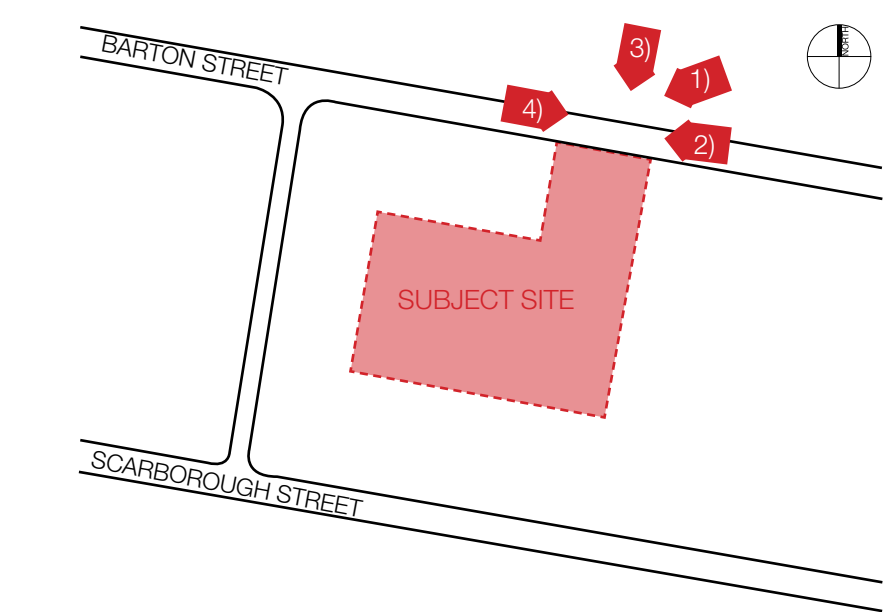




- Subject Site
- Existing Driveway Crossover Locations
- Private Open Space in Neighbouring Property
- Potenital Private Open Space in Subject Site
- Existing Views Maintained







1) VIEW TO SOUTH WEST



2) VIEW TO WEST



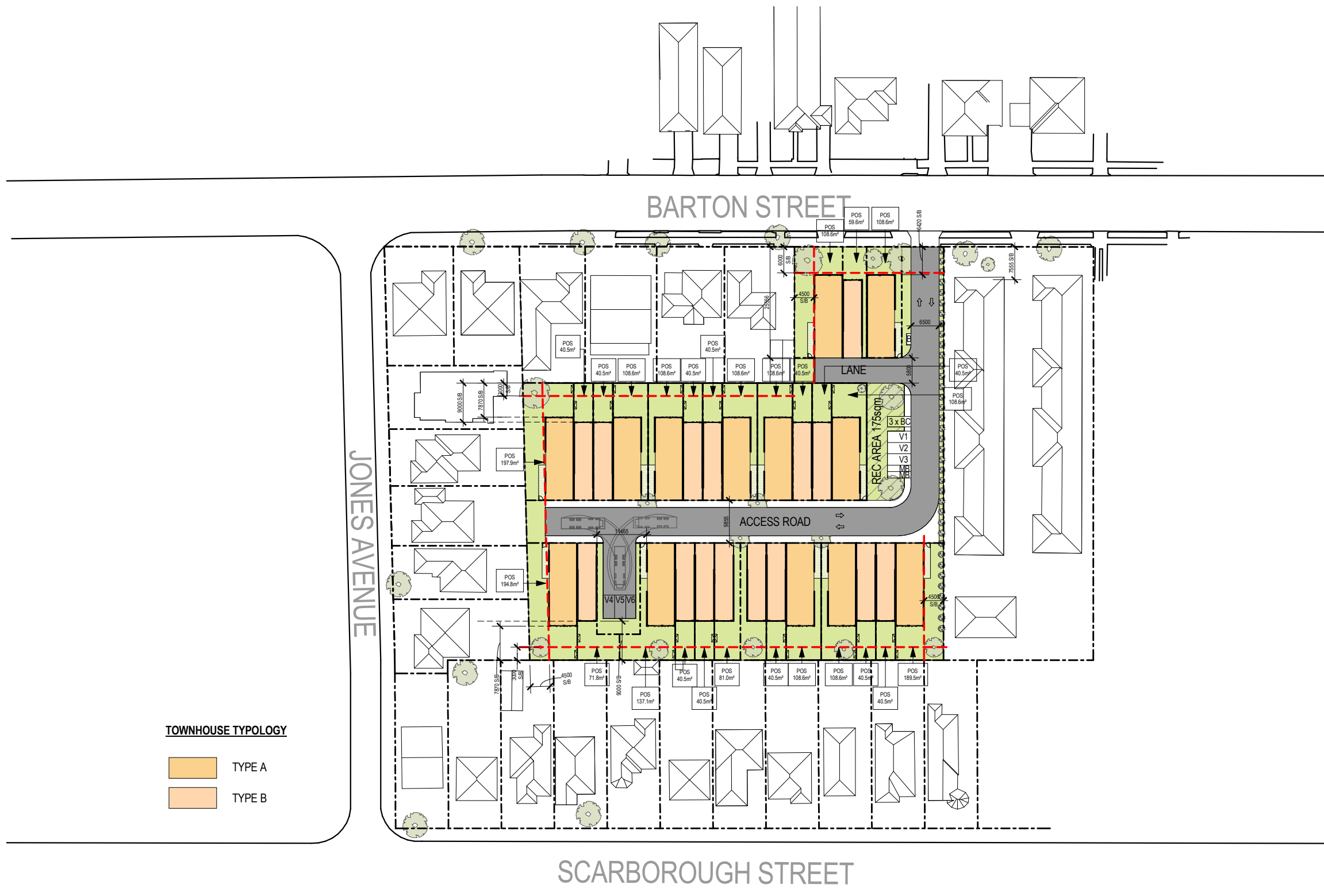
3) VIEW OF ENTRANCE OF SITE



4) VIEW TO EAST



# Proposed Schematic Masterplan



PRELIMINARY

Revisions	P1	17/12/15	PRELIMINARY ISSUE	JF
	P2	21/01/16	PRELIMINARY - FOR INFORMATION	JF
	P3	17/01/18	FINAL ISSUE FOR SUBMISSION	DT

Project  
**TOWNHOUSE DEVELOPMENT**  
119 Barton Street, Monterey, NSW

Drawing  
**GROUND FLOOR/LEVEL 1 MASTERPLAN**

Project No  
**215416**

Date  
**21/01/16**

Author  
**JF,GT**

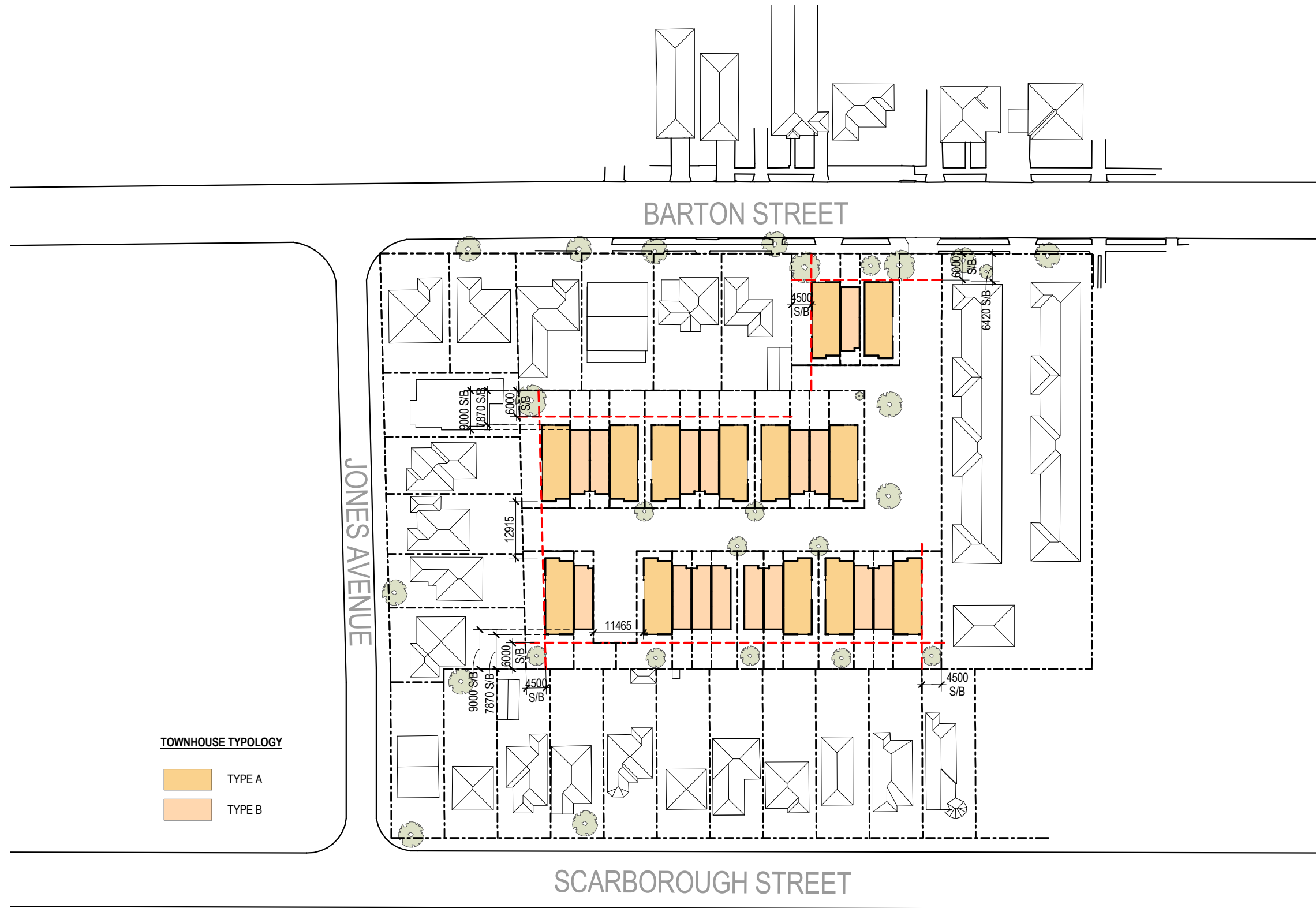
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**1 : 1000**

Drawing No.  
**SK00.02 P3**

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**TOWNHOUSE TYPOLOGY**

- TYPE A
- TYPE B

## PRELIMINARY

Revisions	P1	17/12/15	PRELIMINARY ISSUE	JF
	P2	21/01/16	PRELIMINARY - FOR INFORMATION	JF
	P3	17/01/18	FINAL ISSUE FOR SUBMISSION	DT

Project  
**TOWNHOUSE DEVELOPMENT**  
119 Barton Street, Monterey, NSW

Drawing  
**LEVEL 2 MASTERPLAN**

Project No  
**215416**

Date  
**21/01/16**

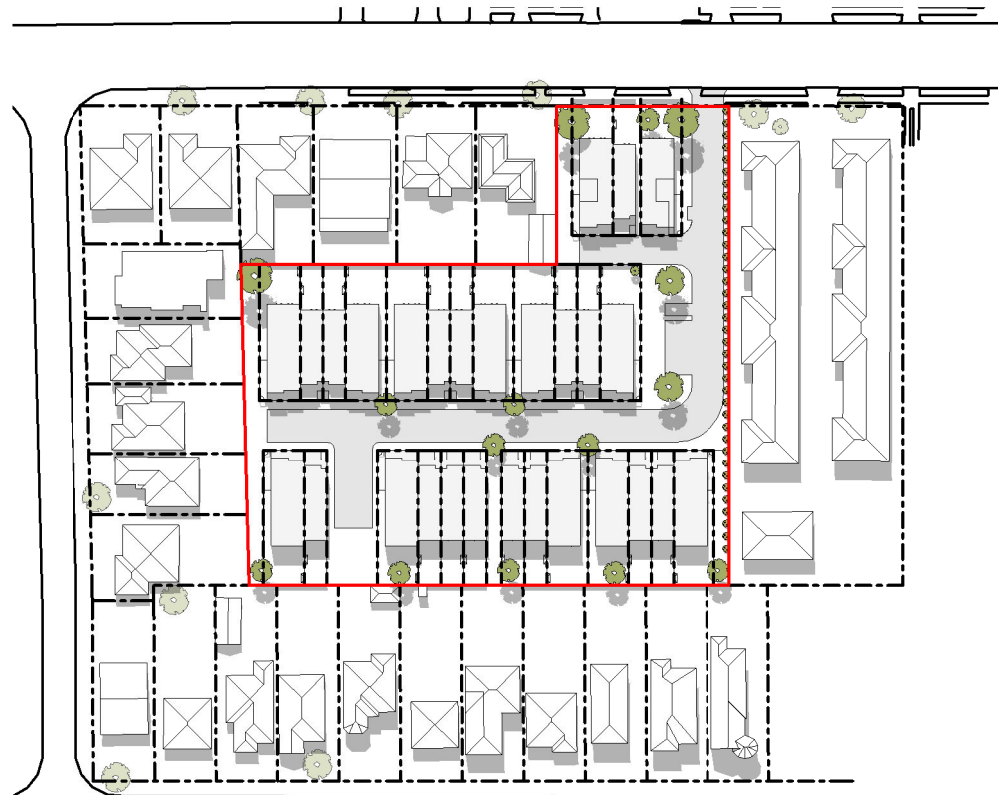
Author  
**JF,GT**

Scale: @ A3  
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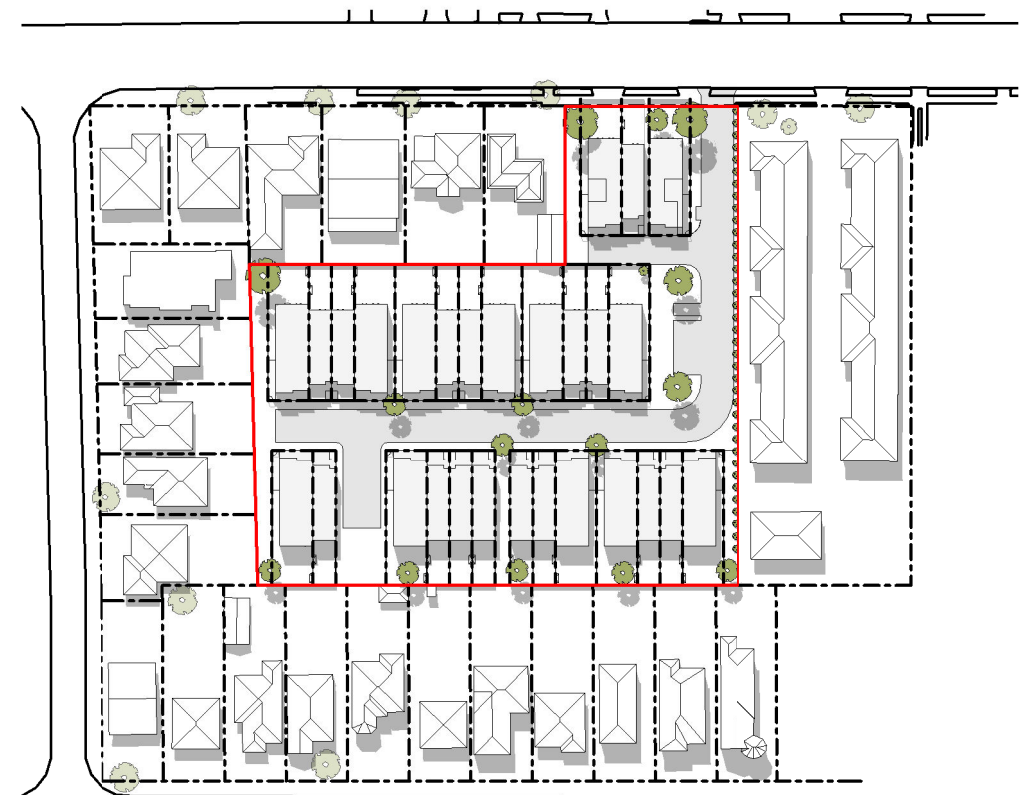
Drawing No.  
**SK00.03 P3**

**rothelowman**

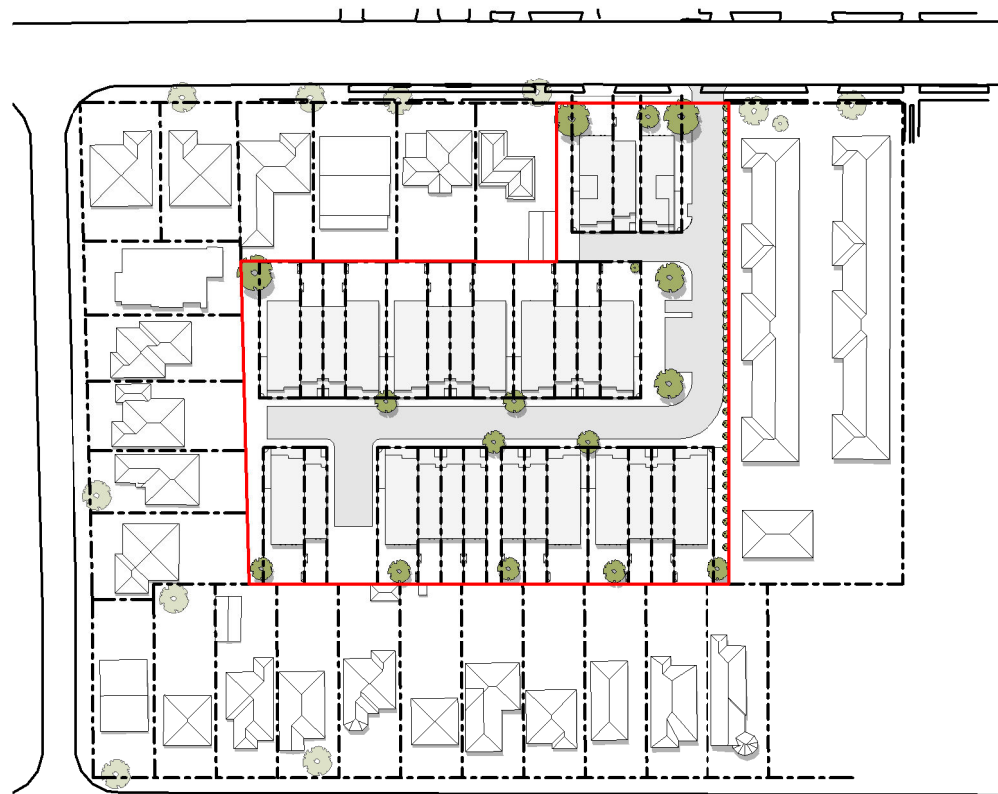
Brisbane, Melbourne, Sydney  
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21 MARCH 12pm - SOLAR ANALYSIS



21 SEP 12pm - SOLAR ANALYSIS



21 DEC 12pm - SOLAR ANALYSIS

## PRELIMINARY

Revisions	P1	21/01/16	PRELIMINARY - FOR INFORMATION	JF
	P2	17/01/18	FINAL ISSUE FOR SUBMISSION	DT

Project  
**TOWNHOUSE DEVELOPMENT**  
119 Barton Street, Monterey, NSW

Drawing  
**SOLAR ANALYSIS - MAR, SEP, DEC**

Project No  
**215416**

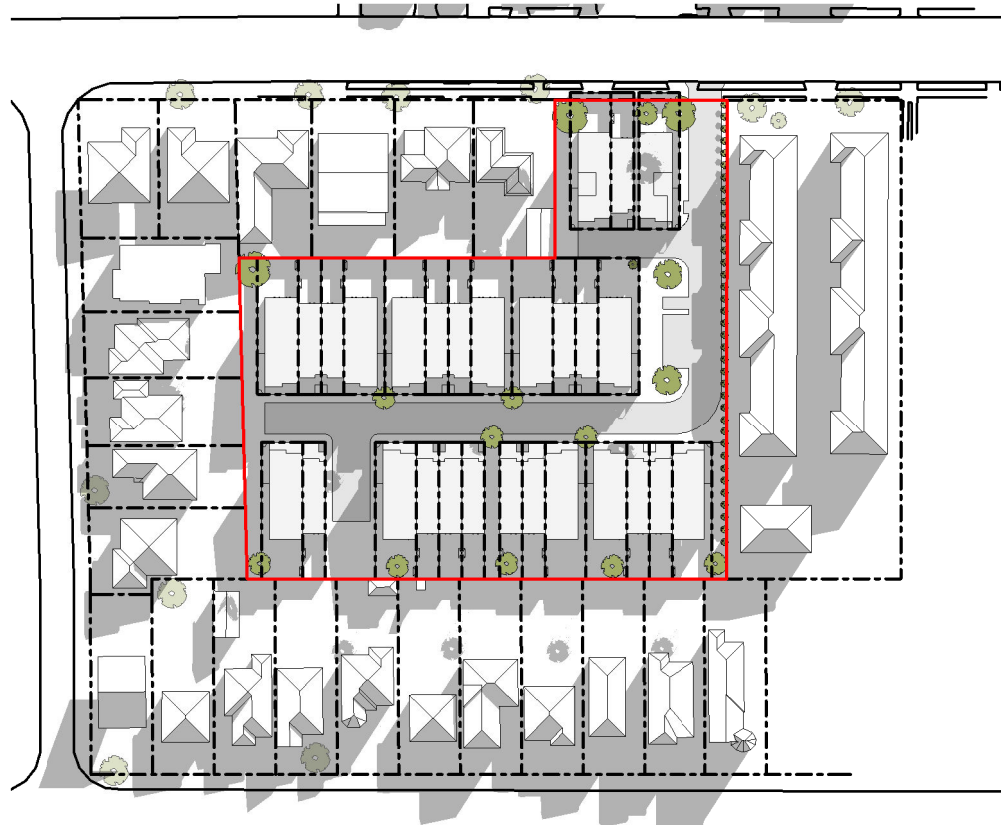
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**21/01/16**

Author  
**JF,GT** Scale: @ A3  
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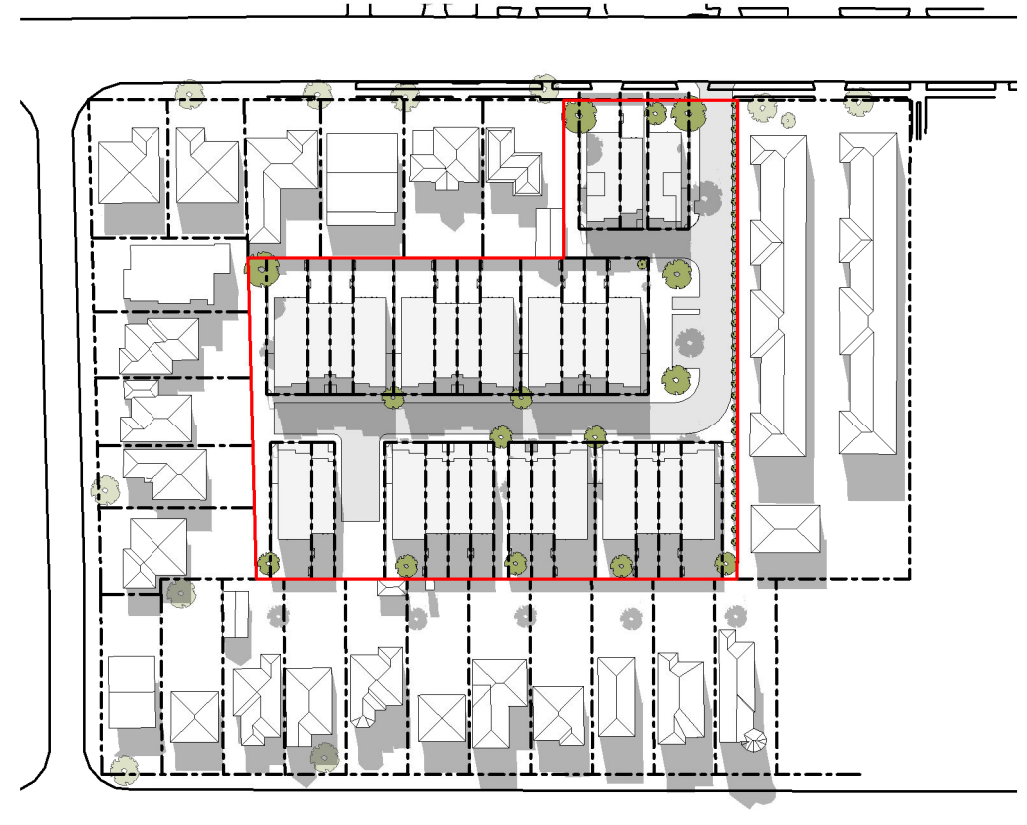
Drawing No.  
**SK00.04 P2**

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21 JUNE 9am - SOLAR ANALYSIS



21 JUNE 12pm - SOLAR ANALYSIS



21 JUNE 3pm - SOLAR ANALYSIS

## PRELIMINARY

Revisions	P1	21/01/16	PRELIMINARY - FOR INFORMATION	JF
	P2	17/01/18	FINAL ISSUE FOR SUBMISSION	DT

Project  
**TOWNHOUSE DEVELOPMENT**  
119 Barton Street, Monterey, NSW

Drawing  
**SOLAR ANALYSIS - JUNE**

Project No  
**215416**

Date  
**21/01/16**

Author  
**JF,GT** Scale: @ A3  
**1 : 1500**

Drawing No.  
**SK00.05 P2**

**rothelowman**





JUNE 21 09:00AM



JUNE 21 11:00AM



JUNE 21 10:00AM



JUNE 21 12:00AM





JUNE 21 01:00PM



JUNE 21 03:00PM



JUNE 21 02:00PM





NE OVERVIEW





NW OVERVIEW





SE OVERVIEW





SW OVERVIEW