northern beaches council

PLANNING PROPOSAL

Amend the Land Zoning Map and Height of Buildings Map within Pittwater Local Environmental Plan 2014 applying to part Lots 11, 12 and 13 DP 1092788 and Lot 5 DP 736961

Amend the dwelling yield provisions within Pittwater Local Environmental Plan 2014 Part 6 Clause 6.1(3).

September 2017

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PART 1: OBJECTIVES OR INTENDED OUTCOMES

The principal objective of the Planning Proposal is to amend Pittwater Local Environmental Plan (LEP) 2014 to enable the creation of the southern portion of the planned Central Local Park. A secondary objective is to enable the development of the remaining land for housing in an orderly and economic manner.

These two objectives will be achieved by amending the following provisions of Pittwater LEP 2014:

1. The Land Zoning Map to rezone part Lots 11 and 12 DP 1092788 and part Lot 5 DP 736961 and Lot 13 DP 1092788 from R3 Medium Density Residential to RE1 Public Recreation.
2. The Height of Building Map to 8.5m for the land to be rezoned RE1 Public Recreation and 10.5m for the part of Lot 5 DP 736961 zoned R3 Medium Density Residential.
3. The dwelling yield provisions contained in Part 6 Clause 6.1(3).

Council is seeking delegation to exercise the LEP making powers delegated under Section 59 of the *Environmental Planning and Assessment Act 1979* in regard to this Planning Proposal.

PART 2: EXPLANATION OF PROVISIONS

The Table below outlines the proposed amendment to Pittwater LEP 2014 and a description of the proposed amendment.

Table 1: Proposed amendments to Pittwater Local Environmental Plan 2014

	Proposed Amendment	**Description**
1	Amendments to the Land Zoning Map – Sheet LZN_012	Rezone part Lot 11 DP 1092788 from R3 Medium Density Residential to RE1 Public Recreation
		Rezone part Lot 12 DP 1092788 from R3 Medium Density Residential to RE1 Public Recreation
		Rezone part Lot 5 DP 736961 from R3 Medium Density Residential to RE1 Public Recreation
		Rezone Lot 13 DP 1092788 from R3 Medium Density Residential to RE1 Public Recreation
2	Amendment to Height of Buildings Map – Sheet HOB_12	Amend maximum height applying to part Lot 11 DP 1092788 proposed to be zoned RE1 Public Recreation from 10.5m to 8.5m
		Amend maximum height applying to part Lot 12 DP 1092788 proposed to be zoned RE1 Public Recreation from 10.5m to 8.5m
		Amend maximum height applying to part Lot 5 DP 736961 zoned R3 Medium Density Residential from 8.5m to 10.5m. (Note: This proposed change applies to land that is currently zoned R3 Medium Density Residential)
		Amend maximum height applying to Lot 13 DP 1092788 proposed to be zoned RE1 Public Recreation from 10.5m to 8.5m
3	Amendments to Part 6, Clause 6.1(3)	The text related to Sectors 901A; 901C and 901 G; and 9 Fern Creek Road in the table in Part 6 Clause 6.1(3) is to be amended as follows: ~~Sector 901A — Not more than 192 dwellings or less than 156 dwellings~~ ~~Sector 901C & 901G — Not more than 28 dwellings or less than 23 dwellings~~ ~~9 Fern Creek Road — No dwellings~~ Sector 901A — Not more than 190 dwellings or less than 154 dwellings (Note: This amendment is required as Lot 13 DP 1092788 is contained within Sector 9 of the Warriewood Valley Release Area and has a pro rata dwelling allocation of 2 dwellings. This Planning Proposal removes all potential for dwellings on Lot 13 as the site will be entirely zoned RE1 Public Recreation) Sector 901C, 901G and 9 Fern Creek Rd — Not more than 33 dwellings or less than 26 dwellings

PART 3: JUSTIFICATION

Section A Need for the Planning Proposal

1. Is the planning proposal a result of any strategic study or report?

No the Planning Proposal is not the result of a specific strategic study or report.

However, the Planning Proposal is supported by numerous existing studies such as the *Warriewood Valley Strategic Review Report 2013* and *Warriewood Valley Strategic Addendum Report 2014*.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. A Planning Proposal is the best and only means to achieve the objectives and intended outcomes to enable amendments to be made to the mapping within Pittwater Local Environmental Plan 2014 and dwelling yield provisions in Part 6 Clause 6.1(3) of Pittwater Local Environmental Plan 2014.

Section B Relationship to Strategic Planning Framework

3. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

A Plan for Growing Sydney

A Plan for Growing Sydney (APfGS) released in December 2014 is the NSW Government's plan for the future of the Sydney Metropolitan Area over the next 20 years. The Plan identifies key challenges facing Sydney including a population increase of 1.6 million by 2034, the need for 689,000 new jobs and 664,000 new homes by 2031. The Plan identifies the Government's vision for Sydney which is for a strong global city and a great place to live.

To achieve this vision, the Government has set down goals that Sydney will be:

- 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.

To achieve these goals, APfGS sets out directions and actions as well as priorities for each subregion. The relevant directions with respect to this Planning Proposal are outlined below, with a commentary on the Planning Proposal's consistency.

APfGS aims to provide new housing stock around public transport nodes and within areas close to public transport, retail and commercial centres and community facilities.

The site is within Sector 9 of Warriewood Valley Release Area. The Planning Proposal facilitates Council's preferred open space layout for the area as well as unlocking housing opportunities.

The Planning Proposal is consistent with the APfGS in the following ways:

Goal and Direction APfGS	**Planning Proposal Consistency**
Goal 2 A City of housing choice, with homes that meet our needs and lifestyles. APfGS focuses on providing increased and diverse housing in well-serviced areas. Direction 2.1.1 Accelerate housing supply and local housing choice.	The Planning Proposal facilitates the development of land zoned R3 Medium Density for housing. The Planning Proposal provides new housing in a planned greenfield precinct.
Goal 3 Sydney's great place to live. Direction 3.3 – Create healthy built environments.	The Planning Proposal will facilitate an attractive public space through the provision of a Central Local Park. The northern portion of Central Local Park has already been delivered and is approx. 2.13Ha with 1.14Ha exclusive of the inner creek line corridor. The southern section will complete Central Local Park. The area of the southern section is approx. 1.8Ha with 9882m^2 exclusive of the inner creek line.

Goal and Direction APfGS	Planning Proposal Consistency
	9 Fern Creek Road is approximately 11,590m^2. Excluding the inner creek line the area of 9 Fern Creek Road is approx. 9273m^2. Under the Planning Proposal the area of the proposed southern section of Central Local Park is approx. 9882m^2 just over 600m^2 more than what would have been delivered if 9 Fern Creek was zoned entirely RE1 Public Recreation. The two halves of Central Local Park will ultimately be connected via a pedestrian bridge and work as one large green space serving the local residents. The Central Local Park will contribute to a healthy built environment and increased liveability for residents in Warriewood.

Towards our Greater Sydney 2056

In November 2016, the Greater Sydney Commission released a draft amendment to the Metropolitan Strategy for public comment. This draft amendment entitled "*Towards our Greater Sydney 2056*" (draft Metropolitan Strategy). The Commission is required to complete a review of the current Metropolitan Strategy by the end of 2017. The draft Metropolitan Strategy is a step in that review process and has been exhibited together with the draft District Plans (discussed below) so that both can be finalised concurrently.

The Planning Proposal remains consistent with the draft Metropolitan Strategy. Since release of the current Metropolitan Strategy, projections for growth have been revised upwards, with the middle scenario now requiring 725,000 additional dwellings between 2016-2036 (a 9% increase).

Whilst acknowledged as a very modest contribution, the Planning Proposal will contribute to achieving this growth within a planned urban release area. Regardless of the degree of contribution there is nothing within the Planning Proposal that is contrary to or inconsistent with the objectives of "*Towards our Greater Sydney 2056".*

Assessment Criteria

A Guide to preparing planning proposals (2016) establishes Assessment Criteria to be considered in the justification of a Planning Proposal. The Assessment Criteria is considered below.

Consideration of the Planning Proposal against the Assessment Criteria of 'A Guide to preparing planning proposals'.

Criteria	**Assessment**
(a) Does the proposal have strategic merit? Is it:	
Consistent with the relevant regional plan outside of the Greater Sydney Region, the relevant district plan within the Greater Sydney Region, or corridor/precinct plans applying to the site, including any draft regional, district or corridor/precinct plans released for public comment, **or**	In November 2016, the Greater Sydney Commission released the draft North District Plan (Draft NDP) for public comment. The draft NDP is one of six draft District Plans developed by the Greater Sydney Commission for each of Sydney's planning districts. The Plan outlines a range of priorities and actions that are broadly categorised as creating: • A productive city; • A liveable city; and • A sustainable city. The Planning Proposal contributes to the creation of a 'liveable' and 'sustainable' city. In terms of liveability, it is considered that the Planning Proposal contributes to improved housing diversity and choice, creating great places to live and responding to peoples need for services in the form of increased open space. Action L3: Councils to increase housing capacity across the District is specifically met albeit as a very modest contribution. In terms of sustainability, it is considered that the future development of the open space component will enhance the existing natural environment by improving the landscape and protecting and enhancing biodiversity. Both of these attributes are overarching priorities in the sustainability priorities and actions in the North District plan. In terms of the future development of the housing it is considered that the they can be designed and implemented (via the development application process) with acceptable impacts on the existing natural environment. In terms of productivity, the Planning Proposal does not permit employment land however the planned residential component has access to local jobs, goods and services within 30 minutes of the subject site.
Consistent with the relevant local council strategy that has been endorsed by the Department, **or**	The relevant strategic study is the *Warriewood Valley Strategic Review Report 2013* (Review Report). The Review Report carried out by the former Pittwater Council and NSW Department of Planning and Infrastructure was endorsed by the Director General of the Department on 1 May 2013, and was adopted by Council on 12 June 2013.

Criteria	Assessment
	The focus of the Review Report was to investigate, amongst other things, intensification of residential densities in the as-yet undeveloped lands, particularly those identified as having the potential for intensification of development having regard to the land capability assessment undertaken as part of the Review Report. 9 Fern Creek was identified as having potential for intensification of development.[1] However, it was excluded from an allocated dwelling yield at the time. Following the adoption of the Strategic Review, further investigations were carried out under the *Warriewood Valley Strategic Review Addendum Report 2014*. The subject sites were all given a Land Capability classification identifying their suitability for development. 9 Fern Creek Road was identified as having the potential for a maximum density of 32 dwellings/ha and a minimum of 25 dwellings/ha, however 9 Fern Creek Road was not allocated a dwelling yield as the parcel was purchased by Council for recreation purposes. The Planning Proposal is consistent with the *Warriewood Valley Strategic Review Report 2013* and the Warriewood Valley Strategic Review Addendum Report 2014.
Responding to a change in circumstances, such as the investment in new infrastructure or changing demographic trends that have not been recognised by existing planning controls.	In this case the Criteria is not applicable to the Planning Proposal.
(b) Does the proposal have site-specific merit, having regard to the following:	
The natural environment (including known significant values, resources or hazards),	The Planning Proposal involves, amongst other things, the rezoning of R3 Medium Density Residential land to RE1 Public Recreation Land. The Planning Proposal will enable the creation of the southern portion of Central Local Park with a greater publicly owned riparian zone buffer between future residential development and Fern Creek. Part of the site is identified on the Biodiversity Map within Pittwater LEP 2014 generally following the creekline and riparian corridor. The Planning Proposal will provide greater protection to the land identified on the Biodiversity Map by bringing it into Council ownership.
The existing uses, approved uses, and likely future uses of land in the vicinity of the proposal; and	The Planning Proposal is consistent with the adjoining land uses. To the north of the site is the northern half of Central Local Park. The proposed RE1 Public

[1] Page 3-4 *Warriewood Valley Strategic Review Report 2013*

Criteria	Assessment
	Recreation land will complete the southern section of the planned Central Local Park. The surrounding zoned residential land is generally undeveloped however when ultimately developed will all be of a similar density and built form.
The services and infrastructure that are or will be available to meet the demands arising from the proposal and any proposed financial arrangements for infrastructure provision.	The Planning Proposal will deliver the Central Local Park that will serve the nearby community. The future residential development will be served by existing services to the site. The specific infrastructure requirements will be assessed at DA stage however it is not anticipated that the residential development will create any additional demand for infrastructure and services not already planned and catered for. The development is anticipated under the current Warriewood Valley Section 94 Contributions Plan Amendment 16 – Revision 2. As background, there is a Memorandum of Understanding (MOU) between Frasers (land owner) and Council (land owner) that was signed in October 2015 outlining amongst other things, the undergrounding of the overhead powerlines, road construction and stormwater construction. Following on from the MOU a Deed of Agreement was signed between Frasers and Council and represented the final agreed position between both parties. Council at its meeting 19 March 2016 outlined the infrastructure provisions that Council and Frasers have agreed to: • Frasers will fund and construct both the extension of Fern Creek Road and the construction of a new east-west road connecting Fern Creek Road with the eastern half of Sector 9. • Frasers will fund and construct the section of stormwater infrastructure that is required to be located within the Fern Creek Road extension. • Council will fund and construct the section of stormwater infrastructure between Fern Creek Road (as constructed by Frasers) and Fern Creek. • The cost of undergrounding the high voltage power lines that current run along the parties' common boundary at 9 and 12 Fern Creek Road will be shared equally. The details relating to these arrangements will be

Criteria	Assessment
	captured in a Planning Agreement. A draft Planning Agreement was submitted in January 2017 as part of the updated Planning Proposal information however it was subsequently withdrawn in April 2017. Council has confirmed that a Planning Agreement will be lodged with a subsequent Development Application for subdivision in the near future.

Accordingly, it is considered that the Planning Proposal has strategic merit as well as site-specific merit in accordance with this assessment criterion above.

4. Is the planning proposal consistent with the council's local strategy or other local strategic plan?

Warriewood Valley Landscape Masterplan & Design Guidelines (November 2016)

The *Warriewood Valley Landscape Masterplan & Design Guidelines* (November 2016) details Council's intention that the Central Local Park be generally linear in shape, with a central bulge either side of Fern Creek, connected by a pedestrian/cyclist bridge, and providing for passive recreation opportunities.

Warriewood Valley Strategic Review Report 2013 and the Warriewood Valley Strategic Review Addendum Report 2014

The *Warriewood Valley Strategic Review Report 2013* (Review Report). The Review Report carried out by the former Pittwater Council and NSW Department of Planning and Infrastructure was endorsed by the Director General of the Department on 1 May 2013, and was adopted by Council on 12 June 2013.

The focus of the Review Report was to investigate, amongst other things, the intensification of residential densities in the as-yet undeveloped lands, particularly those identified as having the potential for intensification of development having regard to the land capability assessment undertaken as part of the Review Report. 9 Fern Creek was identified as having potential for intensification of development.[2]

More specifically the *Warriewood Valley Strategic Review Addendum Report 2014* is the basis for the proposed dwelling yields for the subject land. The Addendum Report indicated that 9 Fern Creek Road is suitable to be developed at a density range of 25-32 dwellings per hectare, however at the time 9 Fern Creek Rd was excluded from an allocated dwelling yield due to its identification as recreation.

The developable area for 9 Fern Creek Road (Lot 5 DP 736961) under the Planning Proposal is 5374.3m^2, Therefore, at 25 – 32 dwellings/Ha the range of a maximum of 17 dwellings and a minimum of 13 dwellings for 9 Fern Creek Road is a reasonable and logical methodology to determine the dwelling capacity of the land based on densities established by the various environmental investigations and reviews undertaken as part of the Warriewood Valley Strategic Review Addendum Report 2014.

[2] Page 3-4 *Warriewood Valley Strategic Review Report 2013*

The proposed allocation of dwelling yields over the four sites is summarised in Table 2 below as well as the current minimum and maximum yields compared to what is proposed against each property.

Table 2: Allocation of Current and Proposed Dwelling Yields

Property Description	Existing Min Dwelling Yield (PLEP 2014)	Existing Max Dwelling Yield (PLEP 2014)	Developable Area (m2) under Planning Proposal	Min Dwelling Yield (indicative individual Lot based on developable area of Planning Proposal)	Max Dwelling Yield (indicative individual Lot based on developable area of Planning Proposal)	Net Increase or Decrease of dwellings (indicative individual lots)	As proposed under the Planning Proposal amendment	Dwelling yields identified in WVS Review Report or WVSR Addendum Report
11 Fern Creek Rd (Lot 11 DP 1092788) 901G	Not more than 28 dwellings or less than 23		3174	3	3	Decrease of 12 dwellings (max) and decrease of 10 dwellings (min)	Not more than 33 dwellings or less than 26 dwellings***	10/ha min and max
12 Fern Creek Rd (Lot 12 DP 1092788) 901C			4075.8	10	13			25/ha min 32/ha max
9 Fern Creek Rd (Lot 5 DP 736961)	0	0	5374.3	13	17	Increase of 17 dwellings (max) and increase of 13 dwellings (min)		25/ha min 32/ha max
13 Fern Creek Rd (Lot 13 DP 1092788) (part) 901A	2*	2*	0	0**	0**	Decrease 2 dwellings (max and min)	0	25/ha min 32/ha max
Total	**25**	**30**	**9024.1**	**26**	**33**	**3 dwelling maximum increase overall**		

*Warriewood Valley Strategic Review Addendum Report – Table 6 *Pro-rata yield for individual parcels in sector 901A* Page 46

**Pittwater LEP 2014 will be amended to reduce the dwelling yield in 901A from 'Not more than 192 dwellings or less than 156 dwellings' to 'Not more than 190 dwellings or less than 154 dwellings'.

***The Planning Proposal proposes that Sectors 901C, 901G and 9 Fern Creek Road be developed together therefore the minimum dwelling yield and maximum dwelling yield are shown combined for the 3 sectors.

There is a potential maximum dwelling yield increase of 3 dwellings over what is currently permitted under Pittwater LEP 2014 for Sectors 901C, 901G and 9 Fern Creek Road if any future development develops at the maximum dwelling yield of 33 dwellings. The potential maximum 3 dwelling increase is unlikely to have any material effect on the capacity of infrastructure. Further, the additional 3 dwellings will still remain below the RMS cap of 2544 dwellings recommended as part of traffic modelling previously undertaken.

Table 3 below summarises the allocation of proposed dwellings on each lot on a pro rata basis.

Table 3: Allocation of Proposed Dwelling Yields (Pro Rata)

Property Description	Developable Area (m2)	Minimum Dwelling Yield	Maximum Dwelling Yield	Dwelling yields identified in WVSR Addendum Report
Lot 11 DP 1092788	3174	3	3	10/ha min and max
Lot 12 DP 1092788	4075.8	10	13	25/ha min 32/ha max
Lot 5 DP 736961	5374.3	13	17	25/ha min 32/ha max
Lot 13 DP 1092788	0	0	0	25/ha min 32/ha max
Total		**26**	**33**	

5. Is the planning proposal consistent with applicable State Environmental Planning Policies?

Consistency with the applicable State Environmental Planning Policies and Deemed State Environmental Planning Policy is discussed below. (see **Appendix 1**).

6. Is the planning proposal consistent with applicable Ministerial Directions (Section 117 Directions)?

The Planning Proposal is generally consistent with the applicable Ministerial Directions. Where there are inconsistencies, justification has been provided addressing how the inconsistency can be waived consistent with the Directions (see **Appendix 2**).

Section C Environmental, social and economic impact

7. 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 Planning Proposal involves, amongst other things, the rezoning of R3 Medium Density Residential land to RE1 Public Recreation Land. The overall development footprint (as reflected by the R3 Medium Density Residential zone under Pittwater LEP 2014) will be reduced and a larger area for the southern portion of Central Local Park will be delivered.

The revised open space layout will also facilitate the improvement of the existing biodiversity connection between the Fern Creek corridor and the Ingleside Escarpment and enable land identified with constraints adjacent to the creekline, including land identified on the Biodiversity Map, to be greater protected by the proposed RE1 Public Recreation zone. It is therefore unlikely that this Planning Proposal will result in adverse impacts on critical habitat or threatened species, populations or ecological communities or their habitats.

Any future development applications will require assessment under Section 79C of the *Environmental Planning and Assessment Act 1979* and will be subject to the provisions and development controls under Pittwater LEP 2014 and Pittwater 21 DCP.

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

Contamination

A Land Contamination report was required as part of the Gateway Determination. A copy of the contamination report titled *Phase 1 and Phase 2 Contamination Investigation Proposed Residential Subdivision, Subdivision, Public Reserve and Open Space - Lots 11-13 DP 1092788 and Lot 5 DP 736961* and prepared by GeoEnviro Consultancy Pty Ltd is provided at **Appendix 3**. The contamination report has been drafted generally in accordance with *State Environmental Planning Policy No. 55 – Remediation of Land*.

The Land Contamination report does not include an assessment of Lot 13 due to the site not being accessible to a backhoe or personnel due to thick vegetation. Council's Environmental Health Unit noted this and responded:

> *"…..the report states that no activities had not been present within the site for the last 20 years and test pit investigation was undertaken surrounding Lot 13, it is satisfied that the contamination risk is low. Additionally, Environmental Health concurs with the email received from Steven Lawler, Executive Manager Parks & Recreation on 13 September 2017, indicating that '*Council has been provided with sufficient details of the condition of the lands and no further investigations are required at 13 Fern Creek. Noting where the logs were taken on 9 Fern Creek and the native vegetation along creek line I believe we do not need to carry out further investigation to determine the condition of the ground at this location.'
>
> *Nevertheless, Environmental Health recommends that further investigation is required at the Development Application stage for the residential development and site remediation is to be undertaken (if required) prior to any built form development to ensure that the land is safe for its intended use".* (It is noted that Lot 13 is proposed to be entirely zoned RE1 Public Recreation, therefore no residential development will occur at this site)

As a condition of Gateway Determination, the Department recommended that the Planning Proposal be sent to the Environmental Protection Authority for consultation.

Flooding

The Gateway Determination required additional information confirming the suitability of the Planning Proposal in relation to flooding. Additional information was received from the applicant and is held at **Appendix 4**.

The additional information relates predominately to the residential land and was considered by Council's Natural Environment and Climate Change Unit and the following response was received:

> "Additional information has been provided by GLN Planning in relation to overland flooding that traverses the site under future projected climatic conditions. The advice notes that the area proposed to remain as R3 Medium Density Residential is not affected by the adopted Flood Planning Area and is considered consistent with S117 4.3, particularly Section 6.
>
> This assessment appears reasonable, the adopted Flood Planning Area does not impact the area proposed to remain R3 Medium Density Residential. Any future Development Application can adequately address future climatic conditions through either cut and fill or appropriate future floor levels for development".

In regard to the RE1 Public Recreation zoned land the site adjoins Fern Creek on the northern boundary that has been identified as flood prone land.

Development controls within Pittwater 21 DCP prohibit vertical structures to be erected on land comprising the creek line corridor. Development controls also require that the creek line corridor be engineered to convey the 1% AEP flood. This land is required to be rehabilitated and subsequently dedicated to Council in accordance with the Warriewood Valley Section 94 Contributions Plan. This portion of land is proposed to be zoned RE1 Public Recreation and will be Council land under the terms of the land swap deed.

Further, any future development application will require assessment under Section 79C of the *Environmental Planning and Assessment Act 1979* and will be subject to the provisions and development controls under Pittwater LEP 2014 and Pittwater 21 DCP, including those related to bushfire prone land, waste management, biodiversity, contamination, geotechnical hazards, heritage and traffic. Development planning and construction issues would need to be addressed in detail in any future development application for the site.

9. How has the planning proposal adequately addressed any social and economic effects?

The main social effect of the Planning Proposal is a positive one resulting in increased local open space in Council's preferred configuration for Central Local Park. The Planning Proposal would result in an increase of approximately 600m^2 more public open space for the community compared to what would be achieved on the current lot (9 Fern Creek Road) in Council's ownership.

Further, the future open space will add to the recreational enjoyment of the community strengthening liveability for the residents of Warriewood Valley.

The main economic effect is unlocking the development opportunities in Sector 9 which is important to ensuring the timely delivery of infrastructure under the *Warriewood Valley Section 94 Contributions Plan Amendment 16 Revision 2*.

As this Planning Proposal will facilitate the extension of Central Local Park and enable residential development in a form similar to adjoining properties it is unlikely to have any negative social or economic effects.

Section D State and Commonwealth interests

10. Is there adequate public infrastructure for the planning proposal?

Local infrastructure, to meet the needs of the current and expected future population of the Warriewood Valley community, is planned for and funded through the *Warriewood Valley Section 94 Contributions Plan Amendment 16 Revision 2*.

The Planning Proposal proposes a maximum of 3 additional dwellings. The extra dwellings are considered minor and will be accommodated under existing infrastructure provisions. Further the additional 3 dwellings will still remain below the RMS cap of 2544 dwellings recommended as part of traffic modelling previously undertaken.

11. What are the views of state and Commonwealth public authorities consulted in accordance with the Gateway Determination?

The preliminary views of the NSW Rural Fire Service and Office of Water were received during the non-statutory exhibition period.

A condition of Gateway Determination required consultation with the following public authorities during statutory exhibition:

- Office of Environment and Heritage
- NSW Rural Fire Service
- NSW Environmental Protection Agency
- NSW Office of Water

Council has formally consult with these above public authorities and will report the findings in any future report to Council.

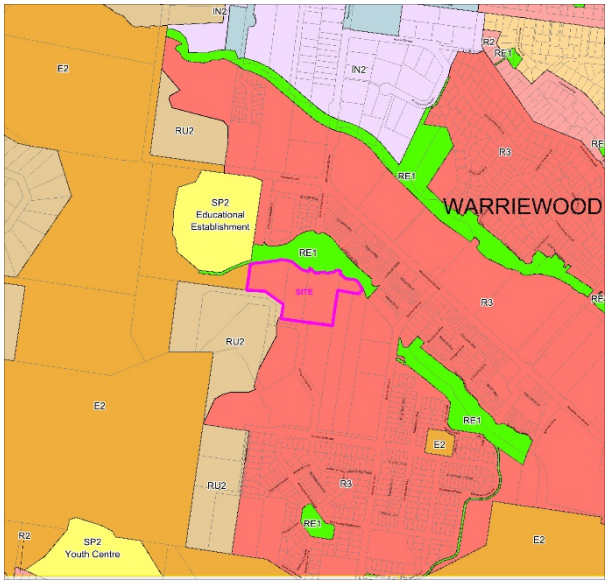
PART 4: MAPPING

The current Land Zoning Map (Sheet LZN_012) and Height of Building (Sheet HOB_12) are contained at **Appendix 5**.

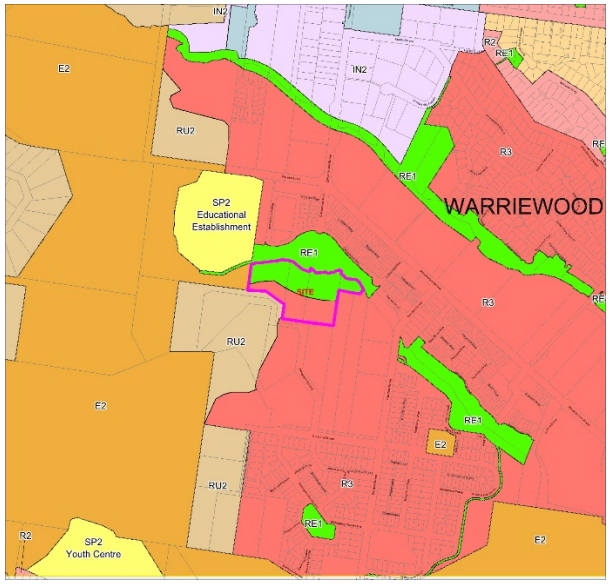
The proposed amended maps for Land Zoning Map (Sheet LZN_012) and Height of Building (Sheet HOB_12are contained at **Appendix 6**.

For information purposes, an excerpt of the maps are reproduced below.

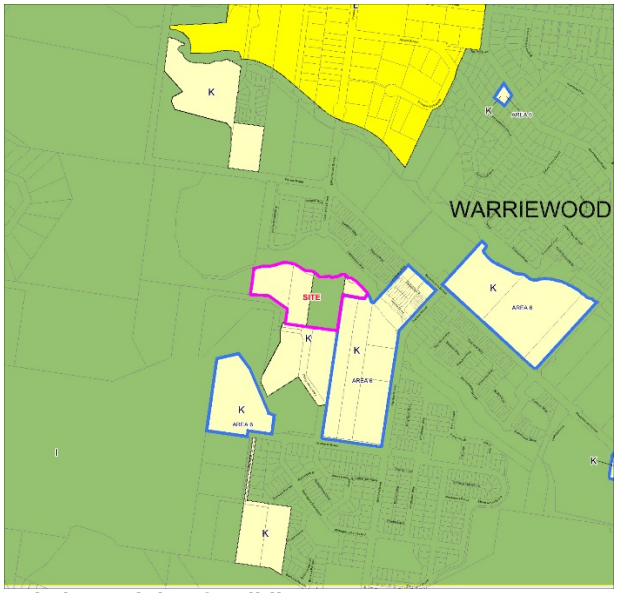
Land Zoning Map



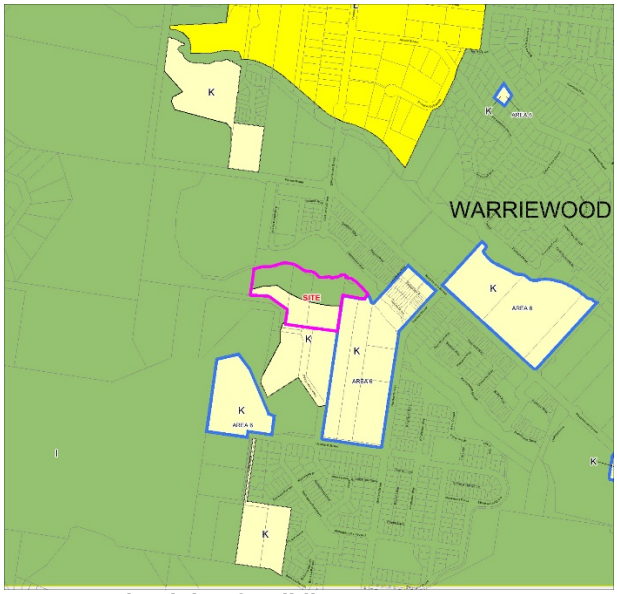
Existing Land Use Zoning Map



Proposed Land Use Zoning Map



Existing Height of Building Map



Proposed Height of Building Map

PART 5: COMMUNITY CONSULTATION

Background

Prior to the issuing of the Gateway Determination and Council's resolution of 30 May 2017, the Planning Proposal was placed on preliminary exhibition (non-statutory) consultation from 25 March 2017 to 10 April 2017.

Landowners were notified within the Warriewood Valley suburb (1757 in total) as well as the Warriewood Residents Association. An advertisement was placed in the Manly Daily (25 March 2017) and a site notice was displayed at the site throughout the notification period. The application documents were made available electronically on Council's website and in hard copy in Customer Service Centres at Manly, Dee Why, Mona Vale and Avalon. Six written responses were received from the community.

Notification letters were sent to the following State Agencies:

- NSW Rural Fire Service – submission received
- NSW Office of Water – submission received
- Ausgrid

The Proposal was also referred to the following Council Business Units:

- Parks & Reserves
- Transport & Urban – Traffic Engineering
- Natural Environment and Climate Change

The responses received from members of the community, State agencies and internal Council Business Units are detailed in the Council report 30 May 2017.

Further, Council has undertaken significant community consultation during the course of the negotiations for the land swap that has culminated with this Planning Proposal.

Statutory Exhibition

The Gateway Determination issues by the Department of Planning and Environment on 7 July 2017 includes conditions relating to further community consultation. Specifically Condition 2 requires that the Planning Proposal is made publicly available for 28 days.

Condition 3 of the Gateway Determination requires Council to consult with the following public authorities:

- Office of Environment and Heritage
- NSW Rural Fire Service
- NSW Environmental Protection Agency
- NSW Office of Water

The results from the consultation will be reported to Council in a future report.

PART 6: PROJECT TIMELINE

Planning Proposal Milestone	Timeframe	Anticipated Completion Date
Date of Gateway Determination	6 weeks from Council decision to forward Planning Proposal to Gateway	Gateway Determination received 7 July 2017
Completion of required technical information – preliminary Land Contamination report and Flood Study	6 weeks from date of Gateway Determination	Mid September 2017
Government agency consultation	Any required formal consultation will occur concurrent with public exhibition	End September 2017
Public exhibition	6 weeks	23 September - 3 November 2017
Consideration of submissions	2 weeks from close of public exhibition	Mid November 2017
Consideration of proposal post-exhibition and report to Council	4 weeks from close of public exhibition	December 2017
Date of submission to DP&E for rezoning preparation and LEP amendment to be made	Following Council decision to finalise LEP	Immediately after Council Meeting
DPE Preparation of LEP	To be determined by DPE	January 2018
Notification of LEP/LEP comes into force	1 week from DPE making plan	February 2018

Appendix 1: Consideration of SEPPS

Consistency with the applicable State Environmental Planning Policies and Deemed State Environmental Planning Policy is discussed below.

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
SEPP No 1 – Development Standards	NO	N/A	
SEPP No 14 – Coastal Wetlands	NO	N/A	
SEPP No 19 – Bushland in Urban Areas	NO	N/A	
SEPP No 21 – Caravan Parks	NO	N/A	
SEPP No 26 – Littoral Rainforests	NO	N/A	
SEPP No 30 – Intensive Agriculture	NO	N/A	
SEPP No 32 – Urban Consolidation (Redevelopment of Urban Land)	NO	N/A	
SEPP No 33 – Hazardous and Offensive Development	NO	N/A	
SEPP No 36 – Manufactured Home Estates	NO	N/A	
SEPP No 39 – Spit Island Bird Habitat	NO	N/A	
SEPP No 44 Koala Habitat Protection	NO	N/A	
SEPP No 50 – Canal Estate Development	NO	N/A	
SEPP No 55 – Remediation of Land	YES	NO	See comment under table A Land Contamination report was required as part of the Gateway Determination. A copy of the contamination report titled *Phase 1 and Phase 2 Contamination Investigation Proposed Residential Subdivision Development Lots 11-13 DP 1092788 and Lot 5 DP 736961* and prepared by GeoEnviro Consultancy Pty Ltd is provided at **Appendix 3**. The contamination report has been drafted generally in accordance with *State Environmental Planning Policy No. 55 – Remediation of Land*.

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
			The Land Contamination report does not include an assessment of Lot 13 due to the site not being accessible to a backhoe or personnel due to thick vegetation. Council's Environmental Health Unit noted this and responded: *"…..*the report states that no activities had not been present within the site for the last 20 years and test pit investigation was undertaken surrounding Lot 13, it is satisfied that the contamination risk is low. Additionally, Environmental Health concurs with the email received from Steven Lawler, Executive Manager Parks & Recreation on 13 September 2017, indicating that '*Council has been provided with sufficient details of the condition of the lands and no further investigations are required at 13 Fern Creek. Noting where the logs were taken on 9 Fern Creek and the native*

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
			vegetation along creek line I believe we do not need to carry out further investigation to determine the condition of the ground at this location.' Nevertheless, Environmental Health recommends that further investigation is required at the Development Application stage for the residential development and site remediation is to be undertaken (if required) prior to any built form development to ensure that the land is safe for its intended use". As a condition of Gateway Determination, the Department recommended that the Planning Proposal be sent to the Environmental Protection Authority for consultation.
SEPP No 62 – Sustainable Aquaculture	NO	N/A	
SEPP No 64 – Advertising and Signage	YES	YES	
SEPP No 65 – Design and Quality of Residential Flat Development	YES	YES	
SEPP No 70 – Affordable Housing (Revised Schemes)	YES	YES	
SEPP No 71 – Coastal	NO	N/A	

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
Protection			
SEPP (Affordable Rental Housing) 2009	YES	YES	
SEPP (Building Sustainability Index: BASIX) 2004	YES	YES	
SEPP (Exempt and Complying Development Codes) 2008	YES	YES	
SEPP (Housing for Seniors or People with a Disability) 2004	YES	YES	
SEPP (Infrastructure) 2007	YES	YES	
SEPP (Major Development)	NO	N/A	
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	NO	N/A	
SEPP (Miscellaneous Consent Provisions) 2007	NO	N/A	
SEPP (Rural Lands) 2008	NO	N/A	
SEPP (Transitional Provisions) 2011	NO	N/A	
SEPP (State and Regional Development) 2011	NO	N/A	
SEPP (Sydney Drinking Water) 2011	NO	N/A	
SEPP (Sydney Region Growth Centres) 2006	NO	N/A	
SEPP (Three Ports) 2013	NO	N/A	
SEPP (Western Sydney Employment Area) 2009	NO	N/A	
SEPP (Western Sydney Parklands) 2011	NO	N/A	
SEPP (Urban Renewal) 2010	NO	N/A	

SEPP No 55 – Remediation of Land

A Land Contamination report was required as part of the Gateway Determination. A copy of the contamination report titled *Phase 1 and Phase 2 Contamination Investigation Proposed Residential Subdivision Development Lots 11-13 DP 1092788 and Lot 5 DP 736961* and prepared by GeoEnviro Consultancy Pty Ltd is provided at **Appendix 3**. The contamination report has been drafted generally in accordance with *State Environmental Planning Policy No. 55 – Remediation of Land*.

The Land Contamination report does not include an assessment of Lot 13 due to the site not being accessible to a backhoe or personnel due to thick vegetation. Council's Environmental Health Unit noted this and responded:

> *"…..*the report states that no activities had not been present within the site for the last 20 years and test pit investigation was undertaken surrounding Lot 13, it is satisfied that the contamination risk is low. Additionally, Environmental Health concurs with the email received from Steven Lawler, Executive Manager Parks & Recreation on 13 September 2017, indicating that '*Council has been provided with sufficient details of the condition of the*

lands and no further investigations are required at 13 Fern Creek. Noting where the logs were taken on 9 Fern Creek and the native vegetation along creek line I believe we do not need to carry out further investigation to determine the condition of the ground at this location.'

Nevertheless, Environmental Health recommends that further investigation is required at the Development Application stage for the residential development and site remediation is to be undertaken (if required) prior to any built form development to ensure that the land is safe for its intended use".

As a condition of Gateway Determination, the Department recommended that the Planning Proposal be sent to the Environmental Protection Authority for consultation.

The following is a list of the deemed SEPP's (formerly Sydney Regional Environmental Plans) relevant to the Northern Beaches Local Government Area.

Title of deemed SEPP, being Sydney regional Environmental Plan (SREP)	**Applicable**	**Consistent**	**Reason for inconsistency**
SREP No 20 – Hawkesbury-Nepean River (No 2 – 1997)	YES	YES	

Appendix 2: Consideration of Section 117 Directions

1 Employment and Resources

	Direction	Applicable	Consistent
1.1	Business and Industrial Zones	NO	N/A
1.2	Rural Zones	NO	N/A
1.3	Mining, Petroleum Production and Extractive Industries	NO	N/A
1.4	Oyster Aquaculture	NO	N/A
1.5	Rural Lands	NO	N/A

Justification for inconsistency with NIL

2 Environment and Heritage

	Direction	Applicable	Consistent
2.1	Environmental Protection Zones	NO	N/A
2.2	Coastal Protection	NO	N/A
2.3	Heritage Conservation	NO	N/A
2.4	Recreation Vehicle Areas	NO	N/A
2.5	Application of E2 and E3 Zones and the Environmental Overlays in Far North Coast LEPs	NO	N/A

Justification for inconsistency with NIL

3 Housing, Infrastructure and Urban Development

	Direction	Applicable	Consistent
3.1	Residential Zones	YES	YES
3.2	Caravan Parks and Manufactured Home Estates	NO	N/A
3.3	Home Occupations	YES	YES
3.4	Integrating Land Use and Transport	YES	YES
3.5	Development Near Licensed Aerodromes	NO	N/A
3.6	Shooting Ranges	NO	N/A

Justification for inconsistency with NIL

4 Hazard and Risk

	Direction	Applicable	Consistent
4.1	Acid Sulphate Soils	YES	YES
4.2	Mine Subsidence and Unstable Land	NO	N/A
4.3	Flood Prone Land	YES	NO
4.4	Planning for Bushfire Protection	YES	NO

Justification for Inconsistency with Direction 4.3

The northern portion of the Planning Proposal adjoins Fern Creek on the northern boundary that has been identified as flood prone lands. This portion of land is proposed to be zoned RE1 Public Recreation and will be under the Council owned land under the terms of the land swap deed.

Any future Development Application must address future climatic conditions in accordance with Council policies including Council's Development Control Plan.

Justification for Inconsistency with Direction 4.4
Lot 11 DP1092788 of the Planning Proposal is identified as Bush Fire Prone under Council's Bush Fire Prone Lands Map.

This Planning Proposal is inconsistent with this direction in so far as consultation after Gateway has not yet occurred with the NSW Rural Fire Service. Consultation will be undertaken during the statutory exhibition period where the NSW Rural Fire Services will ensure the Planning Proposal complies with specific requirements of this Direction. Notwithstanding, Council has undertaken preliminary consultation during its non-statutory notification period with NSW Rural Fire Service. The NSW Rural Fire service raised no objection to the Planning Proposal subject to a requirement that the future residential subdivision of the land complies with *Planning for Bushfire Protection 2006*.

5 Regional Planning

	Direction	Applicable	Consistent
5.1	Implementation of Regional Strategies	NO	N/A
5.2	Sydney Drinking Water Catchments	NO	N/A
5.3	Farmland of State and Regional Significance on NSW Far North Coast	NO	N/A
5.4	Commercial and Retail Development along the Pacific Hwy, North Coast	NO	N/A
5.5	Development in the vicinity of Ellalong, Paxton and Millfield	NO	N/A
5.8	Second Sydney Airport: Badgerys Creek	NO	N/A
5.9	North West Rail Link Corridor Strategy	NO	N/A
5.10	Implementation of Regional Plans	YES	YES

Justification for inconsistency: NIL

6 Local Plan Making

	Direction	Applicable	Consistent
6.1	Approval and Referral Requirements	YES	YES
6.2	Reserving Land for Public Purposes	YES	YES
6.3	Site Specific Purposes	YES	NO

Justification for inconsistency with Direction 6.3
The Planning Proposal seeks to amend the existing dwelling yield provision applying to the subject land. The application of the dwelling yield provisions within the Pittwater LEP 2014 is well established for the Warriewood Valley Release Area. The dwelling yield provisions in Part 6 of the Pittwater LEP 2014 were translated from Pittwater LEP 1993 and are not new provisions. This Planning Proposal merely amends Part 6.

7 Metropolitan Planning

	Direction	Applicable	Consistent
7.1	Implementation of the Metropolitan Strategy	YES	YES
7.2	Implementation of Greater Macarthur Land Release Investigation	NO	N/A
7.3	Parramatta Road Corridor Urban Transformation Strategy	NO	N/A

Justification for inconsistency: Nil

Appendix 3: Contamination Report

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown, NSW 2148, Australia
PO Box 1543, Macquarie Centre. North Ryde, NSW 2113
ABN: 62 084 294 762
Tel: (02) 9679 8733
Fax: (02) 9679 8744
Email: geoenviro@exemail.com.au

Report

Phase 1 and 2 Contamination Investigation
Proposed Residential Subdivision, Public Reserve and Open Space.
Lots 11-13 DP 1092788 and Lot 5 DP 736961,
Nos 9-13 Fern Creek Road
Warriewood NSW

Prepared for
Frasers Property Australia
Level 2, 1C Homebush Bay Drive
RHODES NSW 2138

Ref: JE17655A-r1(rev)
September 2017

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown, NSW 2148, Australia
PO Box 1543, Macquarie Centre. North Ryde, NSW 2113

ABN: 62 084 294 762
Tel: (02) 9679 8733
Fax: (02) 9679 8744
Email: geoenviro@exemail.com.au

4th September 2017

Our Ref: JE17655A-r1

Frasers Property Australia
Level 2, 1C Homebush Bay Drive
RHODES NSW 2138

Attention: Mr Chris Koukoutaris

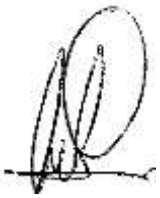
Dear Sir

Re Phase 1 and 2 Contamination Investigation
Proposed Residential Subdivision , Public Reserve and Open Space
Lot 11-13 DP 1092788 and Lot 5 DP 736961,
No 9-13 Fern Creek Road, Warriewood

We are pleased to submit our Phase 1 and 2 Contamination report for the proposed residential subdivision, public reserve and open space to be created at the above address.

Should you have any queries, please contact the undersigned.

Yours faithfully
GeoEnviro Consultancy Pty Ltd



Solern Liew CPEng (NPER)
Director

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1. INTRODUCTION

This report presents the results of a Phase 1 and 2 contamination assessment for the site identified as Lots 11-13 DP 1092788 and Lot 5 DP 736961, No 9-13 Fern Creek Road, Warriewood, as shown on Drawing No 1. The investigation was commissioned by Mr Chris Koukoutaris of Frasers Property Australia. The scope of this assessment was carried out in general accordance with our proposal referenced PE17284A dated 26th June 2017.

We understand that the proposed development will include the subdivision of the site into residential lots and creation of a public reserve and a creek corridor as shown on the attached Drawing No 1. It is understood that Frasers Property Australia is the registered proprietor of Lots 11-13 DP 1092788 (ie No 11-13 Fern Creek Road) with Lot 5 DP 736961 (ie No 9 Fern Creek Road) currently owned by Northern Beaches Council. A land swap between Frasers Property Australia and Northern Beaches Council is proposed as shown on the attached Drawing No 1.

The objective of this study was to determine if significant subsurface soil contamination is likely to exist on site that may present a risk to human health and/or the environment as a result of previous and current land use.

2. SCOPE OF WORK

This contamination assessment was performed in general conformance with our understanding of the guidelines by the Australian and New Zealand Conservation Council (ANZECC), the NSW Environment Protection Authority (NSW EPA) and the NSW EPA.

The scope of work conducted consisted of:

- A review of available information on the site history from aerial photographs and historical titles search from NSW Land and Property Information (LPI),
- A search of records on previous notices issued by NSW EPA.
- A search of information on Groundwater Boreholes in the area from the NSW Natural Resource Atlas (NRA)
- A review of Pittwater Council's Section 149(2) Zoning Certificates

- An inspection of the site to identify apparent or suspected areas of contamination,
- A review of published information on the subsurface conditions in the general area,
- A sampling and laboratory analysis program to detect the presence or otherwise of the contaminants of concern,

3. SITE INFORMATION

3.1 Site Location

The site is situated at the northern end of Fern Creek Road in Warriewood and is referred to as Lots 11-13 DP 1092788 and Lot 5 DP 736961, No 9-13 Fern Creek Road Warriewood. The site is irregular in shape extending about 300m in an east-westerly direction and about 150m in a north-southerly direction. Total site area is about 3.0 hectares. Refer to Drawing No 2 for site locality.

The site is within the jurisdiction of Pittwater Council, Parish of Narrabeen and County of Cumberland.

The site is situated predominantly within a relatively new residential area with immediate surrounding properties consisting of semi-rural properties and bushland to the west.

3.2 Site Topography and Geological Setting

The site is situated on gently undulating terrain with ground surface within the site generally sloping towards the north to Fern Creek at angles of less than 3 degrees.

The 1:100,000 Soil Landscape of Sydney Series 9130 (Reference 1) prepared by the Soil Conservation Services of NSW indicates the site to be underlain by swamp soil belonging to the Warriewood landscape group consisting of deep Quaternary Sands

The 1:100,000 Geological Map of Sydney (Reference 2) indicates the underlying bedrock to consist of interbedded laminite, shale, and quartz, to lithic-quartz sandstone of the Newport Formation.

3.3 Hydrogeology

Groundwater is expected to flow in a general northerly and north easterly direction towards Fern Creek immediately north of the site.

Our search of the NSW Department Infrastructure, Planning and Natural Resources groundwater database for the region identified four available data point within 1km from the site and is summarised below.

Groundwater Number	Authorised Uses	Northing	Easting	Standing Water Level (m)	Water Bearing Zones (m)	Final Depth (m)
GW106697	Monitoring Bore	6271144	342028	-	-	3.0
GW106698	Monitoring Bore	6271246	342028	-	-	3.0
GW106699	Monitoring Bore	6271130	341907	-	-	3.0
GW108034	Test Bore	6271295	341892	0.9	-	2.5

Based on the groundwater bore search, groundwater within the site is not considered a resource. Reference should be made to Appendix C for details of the groundwater search.

3.4 Site Inspection and Description

A site visit was carried out on the 7th July 2017 by an environmental scientist to observe existing site features and identify obvious or suspected areas of potential contamination. Reference should be made to Drawing No 2 for site features plan.

At the time of our investigation, all properties were vacant except No 9 Fern Creek Road which was used as a horse agistment with a horse enclosure and metal shed towards the rear of the property. No 11 had heavy vegetation with No 13 densely covered with trees and restricted access. No 12 was cleared of trees with a drainage and transmission line easement along the common property boundary with No 9. There was a long fill stockpile on property No 12 which may have originated from the excavation of the drainage construction. Reference should be made to Appendix A for Site Photographs.

The following is a brief description of the site features.

Site Feature	Description
A	General storage and dumping area for horse trailers, car trailer, trailer home, plastic chairs, outdoor equipment, BBQ, lawnmower and tyres.
B	Fenced off horse paddock and metal horse pen.
C	Metal storage shed with a timber goat enclosure to the rear. Storage for horse equipment, stock feed, straw bales, plastic bins, and plastic and metal drums.
D	Drainage and transmission line easement.
E	Fill mound approximately average 1m high. Fill possibly originated from adjacent drainage construction.

3.5 Aerial Photographs

A review of aerial photographs taken in 1951 to 2007 was carried out. The following is a summary of the observations made from the review;

Year	Reference	Description
1951	471-13 Run 27	The site appeared to be part of a larger parcel of land with no visibly defined site boundaries. Market gardening activities were prominent within the site in particular at the central portion of the site. There were some glasshouses constructed at the central northern portion of the site with a small dam evident at the north-eastern corner of No 11 along the alignment of Fern Creek. There were some small buildings constructed at the north-eastern corner of the site. The surrounding properties and region were of similar land use with glasshouses and market gardens.
1961	NSW 1052 5158 Run 22	The site boundaries were not formed with the site having similar land use since the 1950s. More glass houses were constructed within the site with market gardening still occurring. The small buildings and dam were still evident. There was little to no change within the surrounding properties or region.
1982	NSW 3260 108 Run 14	Agricultural activities within the site appeared to have diminished with only the glass houses on property No 11 still evident. The dam and small buildings within the site were still evident. Glasshouses and market gardening activities within the surrounding properties and region slowly diminished with some residential properties evident.

Year	Reference	Description
2003	Google Earth	The site was predominantly vacant with the site boundaries formed. The dam was still evident along the alignment of Fern Creek at the north-eastern corner of property No 11. Some surface rubbish was evident at the northern portion of property No 12 with the metal shed (Site Feature C) constructed on property No 9. Property No 13 appeared to have been used possibly as a market garden with dark patches on the surface possibly plastic sheeting. Some glasshouses were still evident on the surrounding properties although the region was mainly occupied by residential properties with a new subdivision 300m south of the site.
2007	Google Earth	The majority of the site had similar conditions since 2003 with the market garden on property No 13 removed. Some earthworks had occurred at the northern boundary of the site for Fern Creek with the boundary of the creek corridor visible. The previous dam was situated along the alignment of Fern Creek. The metal shed (Site Feature C) was still evident with no land use within the site.

3.6 Historical Land Titles

Description of historical information on the previous owners of the site was obtained from NSW Land & Property Information (LPI). The information can often be linked to possible land uses and provides an indication of potential contamination on the site. The following is a summary of information obtained of current and previous proprietors (refer to Appendix C).

As regards Lot 11 D.P. 1092788

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
02.07.1912 (1912 to 1922)	Joseph Kentigern Heydon (no occupation listed)	Vol 2267 Fol 101
04.04.1922 (1922 to 1923)	Charles Palmer (Builder)	Vol 2267 Fol 101 Now Vol 3348 Fol 178
24.10.1923 (1923 to 1924)	Henry John Vale (Engineer)	Vol 3348 Fol 178
28.07.1924 (1924 to 1927)	Sydney Cowell Steel (Freeholder)	Vol 3348 Fol 178
13.10.1927 (1927 to 1927)	Henry Delabene Keown (Investor)	Vol 3348 Fol 178
27.10.1927 (1927 to 1929)	Greater Sydney Estates Limited	Vol 3348 Fol 178
14.05.1929 (1929 to 1930)	Australian Mortgages Limited	Vol 3348 Fol 178
11.06.1930 (1930 to 1939)	Euphemia Movia Harbinson (Married Woman)	Vol 3348 Fol 178
23.02.1939 (1939 to 1942)	John Franicevich (Fruiterer) Joseph Kalajizich (Smallgoods Vendor) Andro Papac (Market Gardener)	Vol 3348 Fol 178 Now Vol 5308 Fol's 111 to 113
02.01.1942 (1942 to 1972)	Joseph Kalajizich (Farmer)	Vol 5308 Fol's 111 to 113 Now Vol 5310 Fol 96
15.05.1972 (1972 to 2003)	Kalsons Pty Limited	Vol 5310 Fol 96 Now 1/18303
03.02.2003 (2003 to Date)	# Australand Holdings Limited	1/18303 Now 11/1092788

As regards Lot 12 D.P. 1092788

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
02.07.1912 (1912 to 1922)	Joseph Kentigern Heydon (no occupation listed)	Vol 2267 Fol 101
04.04.1922 (1922 to 1923)	Charles Palmer (Builder)	Vol 2267 Fol 101 Now Vol 3348 Fol 178
24.10.1923 (1923 to 1924)	Henry John Vale (Engineer)	Vol 3348 Fol 178
28.07.1924 (1924 to 1927)	Sydney Cowell Steel (Freeholder)	Vol 3348 Fol 178
13.10.1927 (1927 to 1927)	Henry Delabene Keown (Investor)	Vol 3348 Fol 178
27.10.1927 (1927 to 1929)	Greater Sydney Estates Limited	Vol 3348 Fol 178
14.05.1929 (1929 to 1930)	Australian Mortgages Limited	Vol 3348 Fol 178
11.06.1930 (1930 to 1942)	Euphemia Movia Harbinson (Married Woman)	Vol 3348 Fol 178
12.02.1942 (1942 to 1968)	Matteo Tanzabel (Farmer)	Vol 3348 Fol 178 Now Vol 5325 Fol 173
04.04.1968 (1968 to 1970)	Josippa Tanzabel (Widow) (Also known as Josippa Tancabel) (Section 94 Application not investigated)	Vol 5325 Fol 173
18.04.1970 (1970 to 1977)	Mattsons Pty Limited	Vol 5325 Fol 173
18.04.1977 (1977 to 1983)	Kulnamock Pastoral Pty Limited	Vol 5325 Fol 173
17.11.1983 (1983 to 2001)	Ilija Lakajev Now Ilia Lakaev Gloria Lakajev Now Gloria Lakaev	Vol 5325 Fol 173 Now 2/18303
24.12.2001 (2001 to Date)	# Australand Holdings Limited	2/18303 Now 12/1092788

As regards Lot 5 D.P. 736961

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
19.03.1910 (1910 to 1922)	Warriewood Limited	Vol 2045 Fol 47
17.11.1922 (1922 to 1925)	Harry Ussher (Gardener)	Vol 2045 Fol 47 Now Vol 3415 Fol 11
22.01.1925 (1925 to 1941)	James Austin Longley (Market Gardener)	Vol 3415 Fol 11
18.03.1941 (1941 to 1959)	Elsie Campbell Longley (Widow) Edgar James Andrew Longley (Market Gardener) (Application by Transmission not investigated)	Vol 3415 Fol 11 Now Vol 5557 Fol's 129 & 130
15.01.1959 (1959 to 1970)	Stevan Dobrich (Market Gardener) Bosiljka Dobrich (Married Woman)	Vol 5557 Fol's 129 & 130 Now 7679 Fol 179
23.12.1970 (1970 to 1986)	A.S.L. Finance Pty. Limited Now A.S.L. Developments Limited (Receivers and Managers Appointed	7679 Fol 179 Now 5/736961
28.11.1986 (1986 to 2002)	Gordon Geoffrey Begg (Company Director)	5/736961
09.09.2002 (2002 to 2003)	Avjennings Limited	5/736961
02.06.2003 (2003 to 2008)	Stockland Development Pty Limited	5/736961
12.06.2008 (2008 to Date)	# Pittwater Council	5/736961

3.7 NSW EPA Records

A search of NSW OEH contaminated land register and licensing register indicate the site to have no records kept under the Contaminated Land Management Act 1997 and Environmentally Hazardous Chemical Act 1985. Refer to Appendix C for details of the NSW EPA search.

3.8 Section 149 (2) Zoning Certificate

A copy of the Section 149 (2) certificate was obtained from Pittwater Council to determine conditions applicable to the site in relation to the Contaminated Land Management Act 1997 and Contaminated Land Management Amendment Act 2009. Reference may be made to the certificate attached in Appendix C.

The certificate indicates the following;

- The site is not within land declared to be an investigation area or remediation site under Part 3 of that Act.
- The site is not subject to an investigation order or a remediation order within the meaning of the Act
- The site is not the subject of a voluntary investigation proposal (or voluntary remediation proposal) the subject of the Environmental Protection Authority's agreement under Section 19 or 26 of that Act.
- The site is not the subject of a site audit statement within the meaning of Part 4 of that Act

4. POTENTIAL FOR CONTAMINATION

4.1 On-Site Source

Agricultural Activities

Based on land title documents and historical aerial photographs, the site was used extensively for agricultural activities such as market gardening as early as the 1940s with glasshouses. There appeared to be a decrease in large scale agricultural activities in the 1980s with some minor glasshouses still evident. At the time of the investigation, the majority of the site was vacant with No 9 being used as a horse agistment.

Common chemicals that are used in agricultural activities are Organochlorine Pesticides (OCP), Organophosphorus Pesticides (OPP), herbicides and fungicides. OCP is the most persistent of these chemicals, with residues lasting in the environment up to 20 years, whilst OPP, herbicides and fungicides are less persistent in the environment and therefore not considered significant. Fertilisers used in market gardens can also contain heavy metals which are more persistent in the environment.

As agricultural activities did not appear to have been present within the site for the last 20 years, the risk of contamination from previous agricultural activities is considered low.

Buried Rubbish Fill

The site was generally found to be underlain by topsoil and topsoil/fill overlying natural sandy soil. Some fill up to 1.5m thick was encountered in TP 7, 10, 12 to 14, 23, 27, 28 and 32. The long fill stockpile (Site Feature E) was found to consist of fine to medium grained Sand, Clayey Sand and Ripped Sandstone as revealed by TP 18 and 20. Some foreign inclusions including pavers, concrete fragments, glass, plastic, hose and steel reinforcements were encountered in TP 7, 8, 11, 13, 35 and 36.

Though buried rubbish fill was not encountered in the other test pits, it is still possible for buried fill and rubbish fill to be present within the site in areas between test pit locations and along the banks of the creek along the northern portion of the site, noting that this part of the site was not accessible to the investigation machine.

In addition to the above, the site had a few glass houses in the past (Since 1951) and based on our previous investigation, pockets of glass fragments were encountered along the banks of the creek in the previous residential development of the adjoining Sector 8.

As the origin of fill is unknown, it is possible for the fill to be contaminated with common contaminants such as heavy metals (As, Cd, Cr, Cu, Zn, Ni, Hg and Pb), Organochlorine Pesticides (OCP), Polychlorinated Biphenyls (PCB), Total Petroleum Hydrocarbons (TRH), Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAH) and asbestos.

On this basis, the site has a potential to be impacted by buried rubbish including glass and asbestos.

Existing Shed and Previous Buildings (Glass Houses)

The site has a shed (Site Feature C) at the rear of property No 9 used for general storage of miscellaneous items. It is possible for this shed to have been used for storage of agricultural chemicals and mechanical fluids at some stages in the past. There is also a possibility of leakage or accidental spillage of mechanical fluids in the workshops from machinery maintenance works. Common contaminants include Lead, Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethyl Benzene and Xylene (BTEX) and Polycyclic Aromatic Hydrocarbons (PAH).

On this basis, there is a risk for this area to have some contamination associated with leakage of chemicals/fuel or accidental spillage of chemicals/fuel from maintenance of machinery. If contamination exists, it is likely to be confined to the immediate vicinity of the sheds and within the upper subsurface profiles.

4.2 Off-Site Source

The adjoining property to the south consists of current subdivision development with the eastern property vacant. As the site is situated on gently undulating terrain and is about the same level as surrounding properties, the risk of off-site migration of contaminants into the subject site from runoff from the adjoining neighbouring properties is considered low

5. SAMPLING, ANALYTICAL AND QUALITY PLAN

5.1 Overview

The sampling analytical and quality plan has been developed in order to ensure that the data collected for this investigation is representative for the site assessment decisions. The plan has been completed in general accordance with the NSW EPA guidelines (Reference 3 and 8) and includes;

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

5.2 Data Quality Objectives

The purpose of establishing Data Quality Objectives (DQO) is to ensure that the field investigations and subsequent analyses are undertaken in a way that enables the collection and reporting of reliable data on which to base the assessment.

A process for establishing DQOs for a site has been defined by the US EPA. That process has been adopted within the Australian Standard: AS 4482.1-2005 and referenced by the *National Environment Protection (Assessment of Site Contamination) Measure* (NEPC, 1999*)* and the *Guidelines for the NSW Site Auditor Scheme, 2nd ed (*NSW DEC, 2006).

The DQO process, involves the following seven steps:

Step 1 State the problem;

The detailed site investigation is being undertaken in order to ascertain the current contamination status of the sites whether contamination present at the site may pose an unacceptable health and/or environmental risk under the current land use (residential) and whether the sites are suitable for the proposed residential development.

Step 2 Identify the decision;

The site investigations are to identify areas of environmental concerns which may be the source of potential contamination. To assess the suitability of the site for future residential use, decisions are to be made based on the following questions

- Is contamination present in soil at concentrations above the applicable approved guidelines?
- Where contamination has occurred, does it have the potential to adversely impact on human health and/or environmental receptors?
- Does the site appear suitable (from a contamination perspective) for the current and future proposed land use?

Step 3 Identify inputs to the decision;

Data to be inputted to the decision making process will include:

- Information gained from a review of existing information;
- Soil sampling at nominated locations (where access is available) across the site.
- Laboratory analytical results for relevant to the area of environmental concerns.
- Appropriate screening-level criteria (investigation thresholds) for soil and
- Quantitative data gained via intrusive sampling and analytical works
- Assessment of the suitability of the data obtained from sampling an analyses as measured against data quality indicators (DQIs).
- Assessment of analytical results against site suitable human health criteria.

Step 4 Define the study boundaries;

The lateral boundaries of the study area are the site boundaries, as depicted on the drawings.

The vertical boundary with respect to soil shall be the depth of the deepest soil borehole

Step 5 Develop a decision rule;

Project analytical data will be compared to appropriate NSW EPA prepared or endorsed guidelines for various land use. If the concentration of contaminants in the soils 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.

On the basis of this initial comparison, plus an assessment of potential contaminant exposure pathways, a decision will be made as to whether or not the contamination may pose a potential risk, warranting management and/or remediation.

Step 6 Specify limits on decision errors; and

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.

Step 7 Optimise the design for obtaining data.

The sampling program was designed with reference to the desktop works completed for the, sites and the known layout of site infrastructure. The sampling program was designed to target, those areas of the site where potential contamination was identified as being most likely

5.3 Data Quality Indicators

To minimise the potential for decision errors, Data Quality Indicators (DQIs) have been determined, for completeness, comparability, representativeness, precision and accuracy as detailed below;

The DQIs for sampling techniques and laboratory analysis of collected samples defines the acceptable level of error required for this investigation.

The data quality objectives will be assessed by reference to data quality indicators as follows:

- **Completeness** - defined as the percentage of measurements made which are judged to be valid measurements. To ensure data set completeness, the following is required:
  - Confirmation that all sampling methodology was completed in general accordance with GeoEnviro sampling quality assurance plan.
  - Chain of Custody and receipt forms.
  - Results from all Laboratory QA/QC samples (Lab blanks, matrix spikes, lab duplicates).
  - NATA accreditation stamp on all laboratory reports
- **Comparability** - is the confidence that data may be considered to be equivalent for each sampling and analytical event. It provides a qualitative parameter expressing the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.

  Data comparability is maintained by ensuring that:

  - All site sampling events are undertaken following methodologies outlined in GeoEnviro Sampling Quality Assurance Plan and published guidelines.
  - NATA accredited laboratory methodologies shall be followed on all laboratory testing.
- **Representativeness** - expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples in an appropriate pattern across the site, and by using an adequate number of sample locations to characterise the site. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.

It should be noted that the soil sampling program for the current study has been limited, and does not comply with the "*minimum sampling points required for site characterisation based on detecting circular contaminant hotspots by using a systematic sampling pattern*" (Table A, NSW EPA *Sampling Design Guidelines).*

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs.

$$RPD(\%) = [|C_0 - C_d| / C_0 + C_d)] \times 200$$

Where Co = Analyte concentration of the original sample
Cd = Analyte concentration of the duplicate sample

GeoEnviro adopts nominal acceptance criteria of 30% RPD for field duplicates and splits for inorganics and nominal acceptance criteria of 50% RPD for field duplicates and splits for organics, however it is noted that this will not always be achieved, particularly in heterogenous soil or fill materials, or at low analyte concentrations

- **Accuracy** - measures the bias in a measurement system or a quantitative measure of the closeness of reported date to the true value. Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analysis techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards.

The nominal "acceptance limits" on laboratory control samples are defined as follows:

– Laboratory spikes – 70-130% for metals / inorganics 60-140% for organics.

– Laboratory duplicates – <30% for metals / inorganics, <50% for organics.

– Laboratory blanks – <practical quantitation limit.

Accuracy of field works is assessed by examining the level of contamination detected in field and equipment blanks. Blanks should return concentrations of all organic analytes as being less than the practical quantitation limit of the testing laboratory

6. INVESTIGATION METHODOLOGY

6.1 Field Investigation

Field investigation included excavation of thirty-seven test pits (TP 1 to TP 37) across the site on the 7th July 2017 at accessible locations. The test pits were excavated using a rubber tyred backhoe to depths ranging from 0.5m to 2.7m below existing ground surface. The test pit locations are shown on Drawing No 3. The majority of the creek corridor (Drawing No 1) which includes the entire Lot 13 was not accessible to the backhoe or personnel due to thick vegetation and bushes.

The test pits were observed for groundwater during and upon completion of the excavation. The field results together with details of the strata encountered are presented in Table 1.

Environmental soil samples were collected in duplicate from surface and at lower depths. GeoEnviro Consultancy's standard procedures were used for sampling and more information on the procedures adopted is provided in Appendix B.

The majority of the samples were made in to a composite in groups of three for the purpose of laboratory analysis. Care was taken to ensure that the samples used in the composite were similar in geology and origin. A composite schedule is presented in Table 2. Individual samples were also taken for laboratory analysis.

6.2 Laboratory Analysis

As part of the soil sampling program, selected soil samples were submitted to the nominated contracted laboratory for analysis of contaminants of potential concern consisting of the following;

- Heavy metals - Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Lead (Pb), Nickel (Ni) and Zinc (Zn)
- Organochlorine Pesticides (OCP).
- Polychlorinated Biphenyls (PCB)
- Total Recoverable Hydrocarbons (TRH)
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX) and Naphthalene
- Polycyclic Aromatic Hydrocarbon (PAH)
- Asbestos
- pH

Selected soil samples were made into a composite in groups of three for the purpose of laboratory analysis. Care was taken to ensure that the samples used in the composite were similar in geology and origin. Individual samples were also taken for laboratory analysis. The soil analytical schedule completed is presented in Table 2. The following is a summary of analysis undertaken;

Analytes	**No of Samples**	**Samples**	
Heavy Metals, OCP, PCB TPH/BTEX/PAH and asbestos	10 discrete samples	TP 7 (0.0-0.1), TP 12 (0.0-0.1), TP 14 (0.1-0.2), TP 15 (0.0-0.1), TP 16 (0.0-0.1), TP 18 (0.0-0.1), TP 20 (0.0-0.1), TP 23 (0.0-0.1), TP 27 (0.0-0.1) and TP 32 (0.0-0.1)	
Heavy Metals, OCP, PCB	6 Composite samples	C1	TP 1 (0.0-0.1); TP 2 (0.0-0.1); TP 3 (0.0-0.1)
		C2	TP 4 (0.0-0.1); TP 5 (0.0-0.1); TP 9 (0.0-0.1)
		C3	TP 19 (0.0-0.1); TP 21 (0.0-0.1); TP 22 (0.0-0.1)
		C4	TP 24 (0.0-0.1): TP 25 (0.0-0.1); TP 26 (0.0-0.1)
		C5	TP 31 (0.0-0.1): TP 33 (0.0-0.1); TP 34 (0.0-0.1)
		C6	TP 35 (0.0-0.1): TP 36 (0.0-0.1); TP 37 (0.0-0.1))

Soil analysis was performed by Envirolab Services Pty Ltd, a laboratory accredited by the National Association of Testing Authorities (NATA) for the tests performed. The analytical results and methods employed are presented in the Laboratory Test Report in Appendix D.

7. SUBSURFACE CONDITIONS

Reference should be made to the attached Table 1 for a summary of subsurface profiles encountered in each test pit locations. The following is a summary of subsurface conditions noted;

Topsoil/Fill

Topsoil/Fill was encountered in all test pits except TP 27 consisting predominantly of fine to medium grained Silty Sand. Some glass fragments were encountered in TP 35 and 36.

The topsoil/fill was generally found to have thickness of between 100mm and 500mm.

Fill and Fill Stockpile

Fill was encountered in TP 7, 8, 10 to 14, 23, 27, 28 and 32 consisting of fine to medium grained Sand, Clayey Sand and Ripped Sandstone. In TP 18 and 20 in the fill stockpile (Site Feature E), fine to medium grained Sand was encountered.

The fill in TP 11 was found to contain a significant amount of rubbish including plastic, hose, steel reinforcements and glass fragments. Some minor inclusions including a paver, concrete, glass and plastic fragments were encountered in TP 7, 8 and 13.

The fill was found to have thickness ranging from 0.2m and 1.5m thick and generally assessed to be dry. The fill in TP 23 was found to be moist to wet.

Based on our previous involvement on surrounding developments (eg Sector 8 and 11) some rubbish fill was encountered along the creek.

Natural Soil

Underlying the topsoil, topsoil/fill and fill, natural soil was encountered in all test pits consisting predominantly of fine to medium grained Sand, Silty Sand and Clayey Sand. Some medium plasticity Silty Clay was encountered towards the south-western portion of the site in TP 19, 21 and 22 at a depth of about 0.4m below existing ground surface. The natural sand and clayey soils were generally found to be dry to moist.

Bedrock

Bedrock was not encountered in any of the test pits which were taken to a maximum depth of about 2.7m below existing ground surface.

Groundwater

All test pits were found to be dry during and shortly upon completion of the site investigation. Some minor seepage was encountered in TP 23 at a depth of about 1.3m below existing ground surface.

8. RESULTS OF THE INVESTIGATION

8.1 Environmental

8.1.1 Assessment Criteria

The results of laboratory analyses for this investigation were compared with published Australian contamination assessment criteria. These Criteria were originally presented in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, January 1992 (ANZECC/NHMRC Guidelines, Reference 3). The NSW EPA endorsed the use of these guidelines for the assessment of contaminated sites.

More recent guidelines such as those published by the NSW EPA and National Environmental Health Forum (NEHF) (Reference 5) are commonly used to assess contaminant concentrations. The NEHF criteria which was recently updated by the National Environment Protection Council Service Corporation (NEPC) in the National Environmental Protection (Assessment of Contaminated Sites) Measure (NEPM) – Schedule B1 (Reference 6) includes health based soil investigation levels (HBILs) and this was adopted by NSW EPA in May 2014.

HBILs are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1 or 'screening') of an assessment of potential risks to human health from chronic exposure to contaminants. They are intentionally conservative and are based on a reasonable worst-case scenario

For the purpose of assessing the contamination status of the site, the criteria for the most sensitive landuse, that being HIL A residential with garden/accessible soil, has been adopted as the Site Criteria. The criteria for public open space such as parks, playgrounds and playing fields (HIL C) was also included in this assessment for comparison.

The more recent updates to the NEPM criteria (Reference 6) have included Health Screening Levels (HSL) developed by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) leading to the adoption of health criteria for TRH, BTEX and PAH. The HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures and they apply to different soil types and depths below surface up to 4 m depth.

For the purpose of assessing the contamination status of the site for TRH, BTEX and PAH, the HSL A and B (Low to high density residential) have been adopted.

The NEPC also includes EIL criteria for the protection of species based on 95% survival and these criteria are based on average background concentrations (ABC) for individual sites and added contaminant levels (ACL) calculated from survival rates for various species to contaminant exposures in different settings. For ecological levels for TPH, BTEX and PAH, the NEPC has provided ecological screening level (ESL) for the assessment. The EIL and ESL criteria have been included in the relevant tables as a sensitivity measure for the protection of ecological diversity within the site.

The results of laboratory analysis of individual samples have been directly compared with the Criteria. The results of laboratory analysis for the composites have been compared with 'modified criteria' by dividing the Criteria with the number of sub-samples forming the composite. The relevant criteria are presented in the summary table of results (Table 3 to 8).

8.1.2 Laboratory Results

Heavy Metals

A total of six composite samples and ten individual samples were analysed for a range of heavy metals consisting of As, Cd, Cr, Cu, Pb, Hg, Ni and Zn. All concentrations of heavy metals in all composite samples were found to be within the modified EIL and modified HBILs A levels. The laboratory analysis of individual samples were all found to be below the Site Criteria except TP 15 which was found to have a slightly elevated Zinc level of 540mg/kg above the EIL Criteria of 305mg/kg. The results are summarised in Table 3.

Organochlorine Pesticides (OCP)

A total of six composite samples and ten individual samples were analysed for a range of organochlorine pesticides. All concentrations of OCP were found to be below detection limits or with low concentrations within the Site Criteria. The results are summarised in Table 4.

Polychlorinated Biphenyls (PCB)

A total of six composite samples and ten individual samples were analysed for a range of Polychlorinated Biphenyls. All concentrations of PCB were found to be below the detection limits or within low concentrations within the Site Criteria. The results are summarised in Table 5.

Total Recoverable Hydrocarbons (TRH)

A total of ten individual samples were analysed for TRH. All concentrations of TRH were found to be below the detection limits therefore within the Site Criteria. The results are summarised in Table 6.

Benzene, Toluene, Ethyl Benzene and Xylene (BTEX) and Naphthalene

A total of ten individual samples were analysed for BTEX and Napthalene. All samples analysed were found to have concentrations of BTEX and Napthalene below laboratory detection limits and therefore within the Site Criteria except TP 7 which was found to have a slight total PAH of 1.1mg/kg below the Site Criteria of 300mg/kg. The results are summarised in Table 6.

Polycyclic Aromatic Hydrocarbons (PAH)

A total of ten individual samples were analysed for PAH. All samples analysed were found to have concentrations of PAH below laboratory detection limits or with low concentrations within the Site Criteria. The results are summarised in Table 7.

Asbestos

A total of ten soil samples were analysed for the presence of Asbestos. All soil samples did not detect respirable asbestos fibres. The results are summarised Table 8.

8.1.3 Quality Assurance/ Quality Control (QA/QC)

Chain of Custody Forms and Preservation

The fieldwork for this investigation was carried out in accordance with GeoEnviro Consultancy's Standard procedures. This included collection of samples in new glass jars, preservation of samples in ice chests and transport of samples to the contract laboratory under chain of custody documentation. Refer to Appendix A.

Field Duplicates

A duplicate sample (Duplicate A) was prepared from the primary sample TP 7 (0.0-0.1m) and analysed. Refer to Table 9 for details.

The Relative Percentage Difference (RPD) values between primary and the duplicate sample was calculated to assess the results. A zero RPD means perfect agreement of results between the primary and duplicate sample whilst an RPD above 200% indicates total disagreement in results.

The maximum RPD value obtained for heavy metals (ie Ni) is 50.0%. The RPD values for OCP, PCB, TRH, BTEX and PAH could not be calculated because the results were below laboratory detection limits in both primary and duplicate samples.

The internal laboratory QA/QC results which are presented in the laboratory certificates in Appendix D are considered acceptable based on the duplicate and control samples analysed. The overall results suggest that the laboratory analysis carried out is reliable for this assessment.

Laboratory QA

Envirolab Services carried out internal QA/QC procedures which normally includes one or more of the following;

- Preparation and analysis of duplicate and triplicate samples to assess precision of laboratory results,
- A spike and duplicate spike is prepared for each sample batch. This involves spiking a sample with a known concentration of contaminant to verify the absence of matrix effects and to assess precision,
- Analysis of sample batch as reagent blanks to monitor reagent purity and as an over-all procedural blank. Reagent blank will also be run after samples with a high concentration to prevent carry over.
- A surrogate is added to all samples to monitor sample matrix effects throughout all analytical stages by calculating the % recovery at the completion of the analysis.

The laboratory control results are included in the laboratory test reports in Appendix D

QA/QC Assessment

The QA/QC indicators either all complied with the required standards or showed variations that would have no significant effect on the quality or interpretation of the data. It is therefore assessed that for the purposes of this analysis, the QA/QC results are adequate and the quality of the data is acceptable for use in this contamination assessment.

9. ASSESSMENT AND RECOMMENDATIONS

This contamination assessment of the property referred to as Lot 11-13 DP 1092788 and Lot 5 DP 736961, No 9-13 Fern Creek Road, Warriewood was performed by GeoEnviro Consultancy in order to investigate the likelihood of ground contamination on the site.

We understand that the proposed development will include the subdivision of the site into residential lots, public reserve and a creek corridor as shown on the attached Drawing No 1. It is understood that Frasers Property Australia is the registered proprietor of Lots 11-13 DP 1092788 (ie No 11-13 Fern Creek Road) with Lot 5 DP 736961 (ie No 9 Fern Creek Road) currently owned by Northern Beaches Council. A land swap between Frasers Property Australia and Northern Beaches Council is proposed as shown on the attached Drawing No 1.

The investigation consisted of a review of site history, a site inspection and soil sampling and analysis program.

Based on our historical review, the site was used for agricultural purposes such as market gardening with some glass houses since the 1940s and through to the 1980s and 1990s. In the early 2000s agricultural activities appeared to have ceased with the site largely vacant. There was a previous dam situated at the north-eastern corner of property No 11 but was found to be within the alignment of Fern Creek.

At the time of our investigation, property No 9 was used as a horse agistment with the remainder of the properties vacant. No 11 and 13 were heavily vegetated with dense tree coverage and thick bush/vegetation cover the northern portion of the site designated as the creek corridor.

A site investigation was carried out involving test pit excavation at thirty-seven locations (TP 1 to 37). The majority of the creek corridor (Drawing No 1) which includes the entire Lot 13 was not accessible to the backhoe or personnel due to thick vegetation and bushes due to the dense tree vegetation.

The test pit investigation revealed the site to be generally underlain by topsoil and topsoil/fill overlying natural sandy soil with some Silty Clay encountered in TP 19, 21 and 22. Fill was encountered in TP 7, 9, 10, 12 to 14, 23, 27, 28 and 32 consisting of fine to medium grained Sand, Clayey Sand and Ripped Sandstone. In TP 18 and 20 which were excavated in the fill stockpile, fine to medium grained Sand was encountered. Some minor inclusions including a paver, concrete, glass and plastic fragments were encountered in TP 7, 8, 13, 35 and 36. A significant amount of rubbish fill including plastic, hose, steel reinforcement and glass fragments were encountered in TP 11.

Selected samples were analysed for a range of potential contaminants consisting of Heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine pesticides, Polychlorinated Biphenyls, Total Recoverable Hydrocarbons, Benzene, Toluene, Ethyl Benzene and Xylene, Polycyclic Aromatic Hydrocarbons and asbestos. The results were interpreted by comparison with guideline Criteria recommended by the NSW EPA. The laboratory test results indicate all samples analysed for concentrations of contaminants of concern were found to be negligible or within the Site Criteria. A slight concentration of Zinc of 540mg/kg above the EIL Criteria of 305mg/kg was encountered in TP 15 but was assessed to be negligible.

Based on the results of the investigation, we are of the opinion that the site has a low risk of gross ground chemical contamination, however, the site was found to be impacted some buried rubbish fill.

To ensure suitability of the site for the proposed residential development, public reserve and open space, site remediation is required for the area found to be impacted by some rubbish fill (eg TP 7, 8, 11, 13, 35 and 36). Typically, site remediation would include the following;

- Excavation of all topsoil/fill and fill to expose natural sandy soil. All fill containing rubbish (in particular glass and asbestos) should be isolated from clean fill as much as possible.
- In the event where buried bonded asbestos fragments are encountered during site excavation, an unexpected asbestos finds protocol as detailed in Appendix E should be initiated.
- Depending on the quantity of fill, the asbestos impacted fill should be appropriately disposed off site to a NSW EPA approved landfill in accordance to Workcover and other regulatory requirements.

- Fill with minor asbestos inclusion may be screened and the cleaned fill may be reuse on site. The NEPM 2013 (Reference 6) provides a guideline on health screening levels for asbestos in soil which may be classified in three types of asbestos; Bonded asbestos-containing-material (ACM), Fibrous asbestos (FA) and Asbestos fines (AF).
- All clean fill intended to be reused on site should be validated by laboratory analysis to ensure suitability of the material for reuse on site

In addition to the above, the following issues relating to site contamination which need to be addressed prior to development are as follows;

- Validation sampling must also be carried out beneath the previous shed (Site Feature C) after demolition and removal has occurred to ensure contamination is not present beneath the existing structures. Should contamination be present, remediation and validation will be required to ensure the site is made suitable for the proposed subdivision development
- All other surface rubbish material not mentioned above and asbestos material where encountered on site should be appropriate disposed off-site to an OEH approved landfill.
- Though buried rubbish fill cells (including glass and asbestos) were not encountered in other test pit locations, it may still exist in between test pit locations noting that test pit investigation on the creek corridor was not carried out due to thick vegetation making this area inaccessibility to the backhoe. All buried rubbish fill if encountered during construction should be excavated and disposed off-site to an OEH approved landfill.
- Should bonded asbestos be encountered during construction works, all works should cease and an "Unexpected Asbestos Finds Protocol" as outlined in Appendix E should be initiated. Should asbestos be encountered, the asbestos impacted fill should be disposed to a landfill as "Special Waste- Asbestos.
- All fill material requiring off-site disposal should be laboratory tested and characterised in accordance with NSW EPA guidelines (Reference 16).
- All site remediation and validation works should be carried out under the supervision of an environmental consultant and this should include soil sampling and validation sampling to ensure these areas are adequately remediated.

10. LIMITATIONS

The findings contained in this report are the results of discreet/specific sampling methodologies used in accordance with normal practices and standards. There is no investigation which is thorough enough to preclude the presence of material which presently, or in future, may be considered hazardous to the site. The site has been the subject of dumping of rubbish fill in the past and the scope of this report do not cover for future dumping and burial of such material on the subject site.

As regulatory evaluation criteria are constantly updated, concentrations of contaminants presently considered low, may in the future fall short of regulatory standards that require further investigation/redemption.

The statements presented in these documents are intended to advise you of what should be your realistic expectations of this report, and to present you with recommendations on how to minimise the risks associated with the ground works for this project. The document is not intended to reduce the level of responsibility accepted by GeoEnviro Consultancy Pty Ltd, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing. Attached in Appendix F are documents entitled "Important Information about Your Environmental Site Assessment" and Explanatory Notes in conjunction with which this report must be read, as it details important limitations regarding the investigation undertaken and this report.

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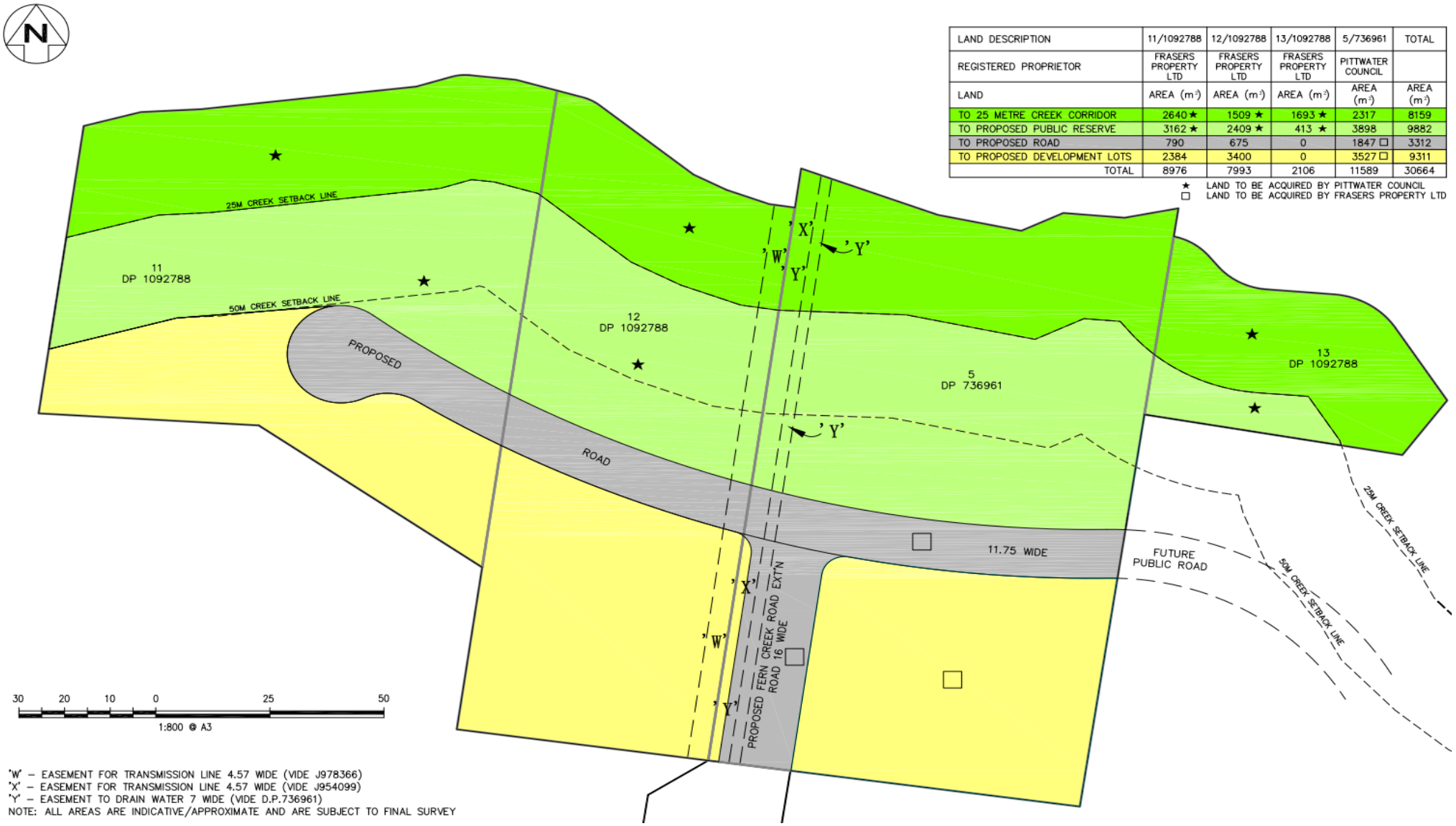


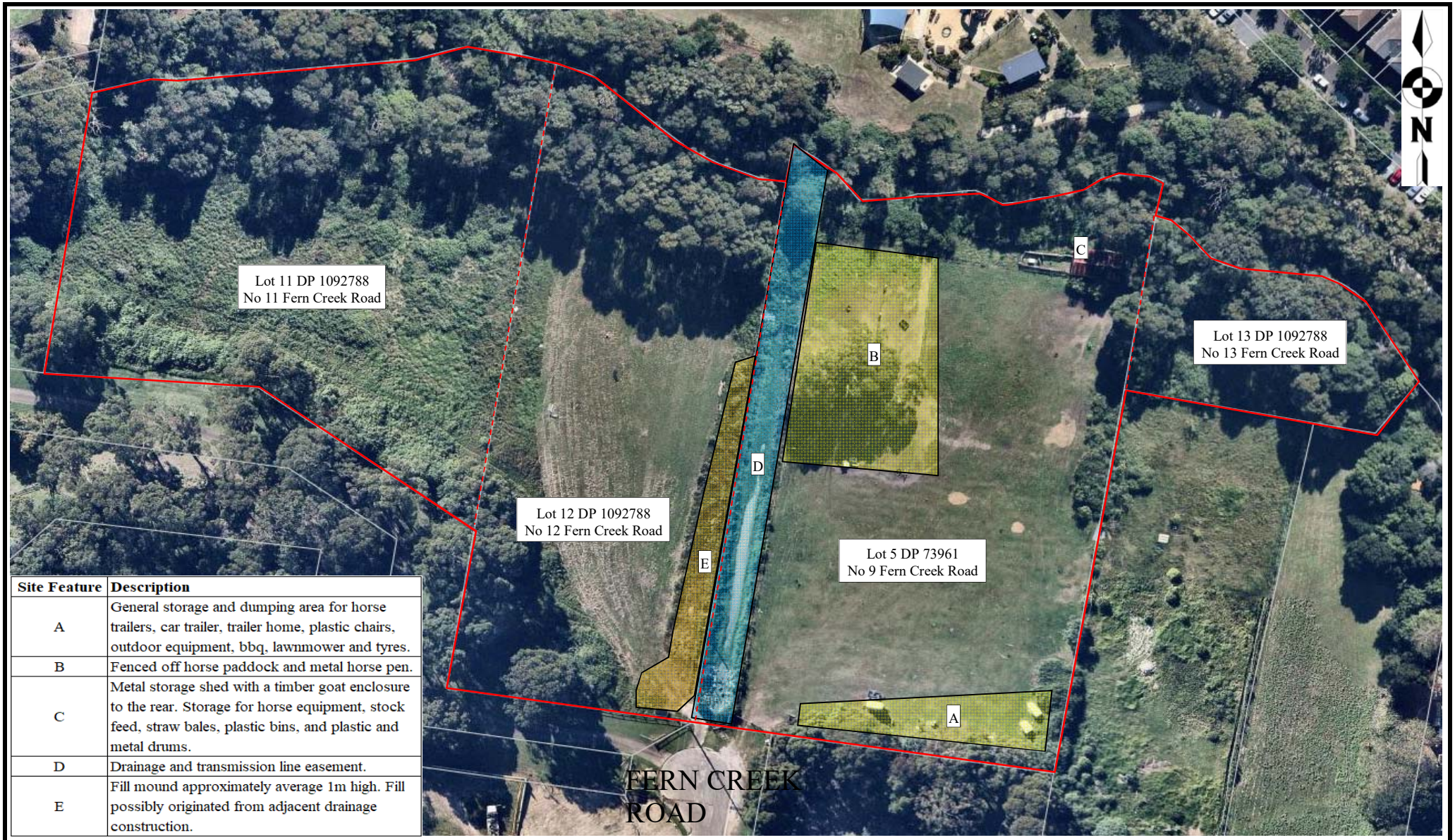
LAND DESCRIPTION	11/1092788	12/1092788	13/1092788	5/736961	TOTAL
REGISTERED PROPRIETOR	FRASERS PROPERTY LTD	FRASERS PROPERTY LTD	FRASERS PROPERTY LTD	PITTWATER COUNCIL	
LAND	AREA (m^2)	AREA (m^2)	AREA (m^2)	AREA (m^2)	AREA (m^2)
TO 25 METRE CREEK CORRIDOR	2640 ★	1509 ★	1693 ★	2317	8159
TO PROPOSED PUBLIC RESERVE	3162 ★	2409 ★	413 ★	3898	9882
TO PROPOSED ROAD	790	675	0	1847 □	3312
TO PROPOSED DEVELOPMENT LOTS	2384	3400	0	3527 □	9311
TOTAL	8976	7993	2106	11589	30664

★ LAND TO BE ACQUIRED BY PITTWATER COUNCIL
□ LAND TO BE ACQUIRED BY FRASERS PROPERTY LTD

'W' – EASEMENT FOR TRANSMISSION LINE 4.57 WIDE (VIDE J978366)
'X' – EASEMENT FOR TRANSMISSION LINE 4.57 WIDE (VIDE J954099)
'Y' – EASEMENT TO DRAIN WATER 7 WIDE (VIDE D.P.736961)
NOTE: ALL AREAS ARE INDICATIVE/APPROXIMATE AND ARE SUBJECT TO FINAL SURVEY

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 21/7/17	Frasers Property Australia	
Checked By: SL	Date: 21/7/17	9-13 Fern Creek Road Warriewood	
Revision By:	Date:	Propoesd Development and Landswap Plan	
Scale: Not to Scale	A3	Project No: JE17655A	Drawing No: 1



Site Feature	Description
A	General storage and dumping area for horse trailers, car trailer, trailer home, plastic chairs, outdoor equipment, bbq, lawnmower and tyres.
B	Fenced off horse paddock and metal horse pen.
C	Metal storage shed with a timber goat enclosure to the rear. Storage for horse equipment, stock feed, straw bales, plastic bins, and plastic and metal drums.
D	Drainage and transmission line easement.
E	Fill mound approximately average 1m high. Fill possibly originated from adjacent drainage construction.

Legend

A Site Feature

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 21/7/17	Frasers Property Australia	
Checked By: SL	Date: 21/7/17	9-13 Fern Creek Road Warriewood	
Revision By:	Date:	Site Locality and Features Plan	
Scale: Not to Scale	A3	Project No: JE17655A	Drawing No: 2

Legend

Test Pit

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 21/7/17	Frasers Property Australia
Checked By: SL	Date: 21/7/17	9-13 Fern Creek Road Warriewood
Revision By:	Date:	Test Pit Location Plan
Scale: Not to Scale	A3	Project No: JE17655A / Drawing No: 3

Test Pit Number	Depth (m)	Profile Type	Description
1	0.00-0.20	Topsoil/Fill	Silty Sand: fine to medium grained, brown with 1x glass fragment, dry
	0.20-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
	0.60-0.80	Natural	(SP) Sand: fine to medium grained, brown, dry
2	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-1.20	Natural	(SP) Sand: fine to medium grained, grey white, dry
	1.20-2.50	Natural	(SP) Sand: fine to medium grained, brown yellow, dry
3	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
4	0.00-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
5	0.00-0.35	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.35-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry
6	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
7	0.00-0.20	Fill	Sand: fine to medium grained, brown with some gravel and 1x paver, dry
	0.20-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
8	0.00-0.30	Fill	Sand: fine to medium grained, brown with some gravel and trace of concrete fragments, dry
	0.30-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry
9	0.00-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
10	0.00-0.20	Fill	Clayey Sand: fine to medium grained, brown orange, dry
	0.20-0.35	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.35-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry
11	0.00-0.50	Topsoil/Fill	Silty Sand: fine to medium grained, brown with 1x plastic piece, black and blue plastic tarps, green hose and 1x piece steel reo, dry
	0.50-0.80	Natural	(SP) Sand: fine to medium grained, grey white, dry

Note:

PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 1 of 4)

SUMMARY OF SOIL PROFILE

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Prepared By: AT Date: 31/07/2017
Checked By: SG Date: 31/07/2017

Test Pit Number	Depth (m)	Profile Type	Description
12	0.00-0.40	Fill	Sand: fine to medium grained, brown with some clay and gravel, dry
	0.40-0.70	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.70-0.90	Natural	(SP) Sand: fine to medium grained, grey white, dry
13	0.00-0.30	Fill	Sand: fine to medium grained, brown with some clay and gravel, 1x glass fragment and 1x plastic pot, dry
	0.30-0.70	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.70-0.90	Natural	(SP) Sand: fine to medium grained, grey white, dry
14	0.00-0.10	Topsoil/Fill	Silty Sand: fine to medium grained, brown, with 1x plastic pot, dry
	0.10-0.40	Fill	Clayey Sand: fine to medium grained, brown orange
	0.40-0.55	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.55-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry
15	0.00-0.20	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.20-0.50	Natural	(SP) Sand: fine to medium grained, grey white, dry
16	0.00-0.10	Topsoil/Fill	Silty Sand: fine to medium grained, brown grey, dry
	0.10-0.40	Natural	(SP) Sand: fine to medium grained, grey white, dry
17	0.00-0.20	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.20-0.40	Natural	(SP) Sand: fine to medium grained, grey white, dry
18	0.00-0.30	Fill Stockpile	Sand: fine to medium grained, brown with gravel and some cobble, dry
	0.30-0.60	Topsoil/Fill	Silty Sand: fine to medium grained, brown grey, dry
	0.60-0.90	Natural	(SP) Sand: fine to medium grained, grey white, dry
19	0.00-0.25	Topsoil	Silty Sand: fine to medium grained, brown, dry
	0.25-0.50	Natural	(SM) Silty Sand: fine to medium grained, light brown, dry
	0.50-0.80	Natural	(CI) Silty Clay: medium plasticity, light brown orange, dry to moist, very stiff PP=270-300kPa
20	0.00-0.90	Fill Stockpile	Sand: fine to medium grained, brown grey, dry
	0.90-1.20	Topsoil/Fill	Silty Sand: fine to medium grained, brown grey, dry
	1.20-1.50	Natural	(SP) Sand: fine to medium grained, grey white, dry
21	0.00-0.25	Topsoil	Silty Sand: fine to medium grained, brown, dry
	0.25-0.40	Natural	(SM) Silty Sand: fine to medium grained, light brown, dry
	0.40-0.60	Natural	(CI) Silty Clay: medium plasticity, light brown orange, dry to moist

Note:

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MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 2 of 4)

SUMMARY OF SOIL PROFILE

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Test Pit Number	Depth (m)	Profile Type	Description
22	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-0.40	Natural	(SM) Silty Sand: fine to medium grained, light brown, dry to moist
	0.40-0.60	Natural	(CI) Silty Clay: medium plasticity, light brown orange, dry to moist
23	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-1.50	Fill	Clayey Sand: fine to medium grained, light brown grey, moist to wet (seepage encountered at 1.3m)
	1.50-2.70	Natural	(SC) Clayey Sand: fine to medium grained, light brown orange red, dry to moist
24	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-0.60	Natural	(SP) Sand: fine to medium grained, grey white, dry
25	0.00-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry
26	0.00-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.80	Natural	(SP) Sand: fine to medium grained, grey white, dry
27	0.00-0.80	Fill	Ripped Sandstone: fine to coarse grained, grey brown, dry
	0.80-1.10	Natural	(SP) Sand: fine to medium grained, brown yellow, dry
28	0.00-0.20	Fill	Sand: fine to medium grained, brown with gravel, dry
	0.20-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry
29	0.00-0.10	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.10-0.50	Natural	(SP) Sand: fine to medium grained, grey white, dry
30	0.00-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.40-0.60	Natural	(SC) Clayey Sand: fine to medium grained, brown yellow, dry (cemented)
31	0.00-0.20	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.20-0.50	Natural	(SP) Sand: fine to medium grained, grey white, dry
	0.50-2.40	Natural	(SC) Clayey Sand: fine to medium grained, light brown orange, dry to moist
32	0.00-0.25	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.25-0.90	Fill	Ripped Sandstone: fine to coarse grained, brown, dry
	0.90-1.20	Natural	(SP) Sand: fine to medium grained, grey white, dry

Note:

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PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 3 of 4)

SUMMARY OF SOIL PROFILE

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Test Pit Number	Depth (m)	Profile Type	Description
33	0.00-0.30	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.30-0.70	Natural	(SP) Sand: fine to medium grained, brown yellow, dry
34	0.00-0.20	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry
	0.20-0.50	Natural	(SP) Sand: fine to medium grained, grey white, dry
35	0.00-0.20	Topsoil/Fill	Silty Sand: fine to medium grained, brow with 1x glass fragment, dry to moist
	0.20-0.40	Natural	(SP) Sand: fine to medium grained, grey white, dry
	0.40-0.70	Natural	(SP) Sand: fine to medium grained, brown yellow, dry
36	0.00-0.40	Topsoil/Fill	Silty Sand: fine to medium grained, brow with 4x glass fragment, dry to moist
	0.40-0.80	Natural	(SM) Silty Sand: fine to medium grained, light brown grey, dry to moist
	0.80-1.10	Natural	(CI) Silty Clay: medium plasticity, light brown orange red, dry to moist
37	0.00-0.35	Topsoil/Fill	Silty Sand: fine to medium grained, brown, dry to moist
	0.35-0.70	Natural	(SP) Sand: fine to medium grained, grey white, dry to moist

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TABLE 1 (Page 4 of 4)

SUMMARY OF SOIL PROFILE

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Sample	Depths (m)	Sample Date	Sample Type	Composite Schedule Depths (m)			Analysis													
							pH	Heavy Metals								OCP	PCB	TRH	BTEX	PAH	Asbestos
								As	Cd	Cr	Cu	Pb	Hg	Ni	Zn						
C1	0.0-0.1	7/07/2017	Soil	TP 1 (0.0-0.1 m)	TP 2 (0.0-0.1 m)	TP 3 (0.0-0.1 m)	o	o	o	o	o	o	o	o	o	o	o				
C2	0.0-0.1	7/07/2017	Soil	TP 4 (0.0-0.1 m)	TP 5 (0.0-0.1 m)	TP 9 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o	o				
C3	0.0-0.1	7/07/2017	Soil	TP 19 (0.0-0.1 m)	TP 21 (0.0-0.1 m)	TP 22 (0.0-0.1 m)	o	o	o	o	o	o	o	o	o	o	o				
C4	0.0-0.1	7/07/2017	Soil	TP 24 (0.0-0.1 m)	TP 25 (0.0-0.1 m)	TP 26 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o	o				
C5	0.0-0.1	7/07/2017	Soil	TP 31 (0.0-0.1 m)	TP 33 (0.0-0.1 m)	TP 34 (0.0-0.1 m)	o	o	o	o	o	o	o	o	o	o	o				
C6	0.0-0.1	7/07/2017	Soil	TP 35 (0.0-0.1 m)	TP 36 (0.0-0.1 m)	TP 37 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o	o				
TP7	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP12	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP14	0.1-0.2	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP15	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP16	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP18	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP20	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP23	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP27	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP32	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	o
Duplicate A	0.0-0.1	7/07/2017	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o	

Note: O denotes tested

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TABLE 2

Analytical Program

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Composite Sample

Sample	Depths (m)	pH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
C1	0.0-0.1	7.0	<4	<0.4	11	25	53	<0.1	2	76
C2	0.0-0.1		<4	<0.4	8	9	35	<0.1	<1	26
C3	0.0-0.1	6.0	<4	<0.4	4	7	18	<0.1	<1	25
C4	0.0-0.1		5	<0.4	8	13	24	<0.1	2	66
C5	0.0-0.1	6.3	<4	<0.4	4	5	8	<0.1	1	41
C6	0.0-0.1		<4	<0.4	4	13	12	<0.1	2	97
Modified HBILs 'A' Criteria			**33**	**7**	**33 (VI)**	**200**	**100**	**13**	**133**	**2467**
Modified HBILs 'C' Criteria			**100**	**30**	**100 (VI)**	**5667**	**200**	**27**	**400**	**10000**
Modified EIL Criteria*			**35**		**66**	**36**	**375**		**11**	**102**

Individual Samples

Sample	Depths (m)	pH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP7	0.0-0.1		<4	<0.4	9	7	12	<0.1	5	26
TP12	0.0-0.1		<4	<0.4	10	9	16	<0.1	2	35
TP14	0.1-0.2		<4	<0.4	9	1	7	<0.1	2	10
TP15	0.0-0.1		<4	0.7	6	34	40	<0.1	6	***540***
TP16	0.0-0.1		<4	<0.4	5	2	10	<0.1	1	37
TP18	0.0-0.1		<4	<0.4	3	5	16	<0.1	<1	24
TP20	0.0-0.1		5	<0.4	9	6	18	<0.1	2	26
TP23	0.0-0.1		<4	<0.4	2	5	14	<0.1	<1	18
TP27	0.0-0.1		<4	0.6	5	5	16	<0.1	3	37
TP32	0.0-0.1		<4	<0.4	8	11	42	<0.1	3	85
Duplicate A	0.0-0.1		<4	<0.4	11	6	12	<0.1	3	36
HBILs 'A' Criteria			**100**	**20**	**100 (VI)**	**600**	**300**	**40**	**400**	**7400**
HBILs 'C' Criteria			**300**	**90**	**300 (VI)**	**17000**	**600**	**80**	**1200**	**30000**
EIL Criteria*			**105**	**NA**	**197**	**107**	**1125**	**NA**	**32**	**305**

EIL Derivation

ABC[3]	**5**	**NA**	**7**	**12**	**25**	**NA**	**2**	**55**
ACL[4]	**100**	**NA**	**190**	**95**	**1100**	**NA**	**30**	**250**

Notes

1) All results are expressed as mg/kg and pH (units).

2) Figures in bold exceed the modified HBILs 'A' or HBIL 'A' Criteria

3) Figures in bold italics that are underlined exceed the modified HBILs 'C' or HBIL 'C' Criteria

4) Figures in bold italics exceed the modified EIL or EIL Criteria

5) Ambient Background Concentrations

6) Added Contaminant Limits

* EIL = ABC+ACL

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TABLE 3
Summary of Analytical Results - Heavy Metals

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Composite Sample

Sample	Depths (m)	HCB	alpha-BHC	gamma-BHC	beta-BHC	Heptachlor	delta-BHC	Aldrin	Heptachlor Epoxide	gamma-Chlordane	alpha-chlordane	Endosulfan I	pp-DDE	Dieldrin	Endrin	pp-DDD	Endosulfan II	pp-DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor	Total OCP
C1	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
C2	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C3	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C4	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C5	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C6	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Modified HBILs 'A' Criteria		**3**				**2**		**2**		**17**		**90**	**80**	**2**	**3**	**80**		**80**			**100**	
Modified HBILs 'C' Criteria		**3.333**				**3**		**3**		**23.3**		**113**	**133**	**3**	**7**	**133**		**133**			**133**	

Individual Sample

Sample	Depths (m)	HCB	alpha-BHC	gamma-BHC	beta-BHC	Heptachlor	delta-BHC	Aldrin	Heptachlor Epoxide	gamma-Chlordane	alpha-chlordane	Endosulfan I	pp-DDE	Dieldrin	Endrin	pp-DDD	Endosulfan II	pp-DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor	Total OCP
TP7	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP12	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP14	0.1-0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP15	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP16	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP18	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP20	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP23	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP27	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP32	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Duplicate A	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
HBILs 'A' Criteria		**10**				**6**		**6**		**50**		**270**	**240**	**6**	**10**	**240**		**240**			**300**	
HBILs 'C' Criteria		**10**				**10**		**10**		**70**		**340**	**400**	**10**	**20**	**400**		**400**			**400**	

Notes

1) All results are expressed as mg/kg and pH (units).

2) Figures in bold italics exceed the modified HBILs 'A' or HBIL 'A' Criteria

3) Figures in bold italics and underlined exceed the modified HBILs 'C' or HBIL 'C' Criteria

GeoEnviro Consultancy

TABLE 4

Summary of Analytical Results - OCP

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Composite Sample

Sample	Depths (m)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Total PCB
C1	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C2	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C3	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C4	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C5	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C6	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Modified HBILs 'A' Criteria									**0.3**
Modified HBILs 'C' Criteria									**0.33**

Individual Sample

Sample	Depths (m)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Total PCB
TP7	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP12	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP14	0.1-0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP15	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP16	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP18	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP20	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP23	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP27	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP32	0.0-0.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	ND
Duplicate A	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
HBILs 'A' Criteria									**1**
HBILs 'C' Criteria									**1**

Notes

1) All results are expressed as mg/kg and pH (units).

2) Figures in bold exceed the modified HBILs 'A' or HBIL 'A' Criteria

3) Figures in bold italics exceed the modified HBILs 'C' or HBIL 'C' Criteria

GeoEnviro Consultancy

TABLE 5
Summary of Analytical Results - PCB

Frasers Property Australia
Proposed Residential Subdivision Development
9-13 Fern Creek Road Warriewood

Sample	Depths (m)	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	C_{10}-C_{36}	F1 (4) C_6-C_{10}	F2 (5) $>C_{10}$-C_{16}	F3 C_{16}-C_{34}	F4 C_{34}-C_{40}	Volatile Organic Compounds (VOC)					
											Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene
TP7	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP12	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP14	0.1-0.2	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP15	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP16	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP18	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP20	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP23	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP27	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP32	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
Duplicate A	0.0-0.1	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
NSW DEC (1994)		**65**				**1000**					**1**	**1.4**	**3.1**	**14**		
HSLs 'A and B' Criteria (SAND)	**0m to <1m**						**45**	**110**			**0.5**	**160**	**55**	**40**		**3**
	1m to <2m						**70**	**240**			**0.5**	**220**		**60**		
	2m to < 4m						**110**	**440**			**0.5**	**310**		**95**		
	4m+						**200**				**0.5**	**540**		**170**		
ESL Criteria							**180**	**120**	**1300**	**5600**	**65**	**105**	**125**	**45**		

Notes

1) All results are expressed as mg/kg unless otherwise specified

2) Figures in bold exceed the NSW DEC criteria

3) ND Not detected

4) F1 is C_6-C_{10} minus the sum of the BTEX concentrations

5) F2 is $>C_{10}$-C_{16} Minus Napthalene

6) Figures in bold italics that have been underlined exceed the HSLs 'A and B' Criteria

7) Figures in bold italics exceed the ESL Criteria

GeoEnviro Consultancy

TABLE 6
Summary of Analytical Results - TRH and VOC

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Sample	Depths (m)	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ	Total PAHs
TP7	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	<0.1	0.1	<0.5	1.1
TP12	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP14	0.1-0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP15	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP16	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP18	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP20	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP23	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP27	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
TP32	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.8
Duplicate A	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2	<0.1	0.1	<0.2	0.08	<0.1	<0.1	<0.1	<0.5	0.48
HBILs 'A' Criteria		**3**															**3***	**300**
HBILs 'C' Level																	**3***	**300**
ESL Criteria													0.7					

Notes

1) All results are expressed as mg/kg

2) Figures in bold that have been underlined exceed the HBILs 'A' Criteria

3) Figures in bold italics that have been underlined exceed the HBILs 'C' Criteria

4) Figures in bold italic exceed the ESL Criteria

* B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products

PAH Species	TEF
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b+j)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Benzo(g,h,i)perylene	0.01
Chrysene	0.01
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-c,d)pyrene	0.1

GeoEnviro Consultancy

TABLE 7
Summary of Analytical Results - PAH

Frasers Property Australia
Proposed Residential Subdivision Development
9-13 Fern Creek Road Warriewood

Sample	Depths (m)	Asbestos
TP7	0.0-0.1	<0.1g/kg
TP12	0.0-0.1	<0.1g/kg
TP14	0.1-0.2	<0.1g/kg
TP15	0.0-0.1	<0.1g/kg
TP16	0.0-0.1	<0.1g/kg
TP18	0.0-0.1	<0.1g/kg
TP20	0.0-0.1	<0.1g/kg
TP23	0.0-0.1	<0.1g/kg
TP27	0.0-0.1	<0.1g/kg
TP32	0.0-0.1	<0.1g/kg
HBILs 'A' Criteria		**0.01% / 0.001%** [1]
HBILs 'C' Criteria		**0.01% / 0.001%** [1]

Note: ND = Not detected

Measured in %w/w

1) Bonded Asbestos Contaminaint Material / Fiberous Asbestos and Asbestos Fines

2) Figures in bold italics exceed the HBILs 'A' Criteria

3) Figures in bold italics exceed the HBILs 'C' Criteria

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TABLE 8

Summary of Analytical Results - Asbestos

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

Sample	Depths (m)	Metals							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP 7	0.00-0.10	<4	<0.4	9	7	12	<0.1	5	26
Duplicate A	-	<4	<0.4	11	6	12	<0.1	3	36
Relative Percentage Difference (RPD)		ND	ND	20.0	15.4	0.0	ND	50.0	32.3

Sample	Depths (m)	OCP	PCB	TRH	BTEX	PAH
TP 7	0.00-0.10	ND	ND	ND	ND	ND
Duplicate A	-	ND	ND	ND	ND	ND
Relative Percentage Difference (RPD)		NA	NA	NA	NA	NA

Notes

1) All results are expressed as mg/kg .

2) ND - Not Detected

3) NA - Not Applicable

GeoEnviro Consultancy

TABLE 9
Summary of Analytical Results - Quality Assurance

Frasers Property Australia

Proposed Residential Subdivision Development

9-13 Fern Creek Road Warriewood

APPENDIX A

Site Photographs

Photgraph 1: Property No 12 looking north,vacant with some grass cover, the long fill stockpile (Site Feature E) and transmission line and drainage easement (Site Feature D) at the eastern boundary.

Photograph 2: Looking west into property No 11 with thick vegetation.

Photograph 3: Property No 9 looking north. Used as horse agistment with horse enclosures (Site Feature B) in the background.

Photograph 4: Front of property No 9, storage area (Site Feature A) with horse trailers, trailers and plastic chairs visible.

Photograph 5: Rear of property No 9, metal shed with timber goat enclosure at the rear (Site Feature C)

Photograph 6: Looking east to property No 13, dense trees and vegetation with no access available.

APPENDIX B

Quality Assurance and Control Plan

QUALITY ASSURANCE AND CONTROL

A detailed Quality Assurance/Quality Control (QA/QC) assessment, including the collection and analysis of quality control samples, was completed for the data arising from the analysis of soil samples, in order to determine the suitability of the data for use in the assessment of site conditions. This included the collection of lab duplicates

Field Investigation Procedure

All fieldwork was conducted in general accordance with GHD's Standard Field Operating Procedures (FOP), which are aimed at collecting environmental samples using uniform and systematic methods, as required by GHD's Quality Assurance system. Key requirements of these procedures are as follows:

- Field staff - all field investigations were conducted by staff with sufficient and appropriate site specific training with the experience to assess and document field conditions and undertake the investigation tasks in accordance with relevant procedures. Soil types shall be recorded in accordance with the geotechnical classifications detailed in AS1726-1993 Geotechnical Site Investigations. A field log shall record the following but not limited to the following information;
    - Profile type – fill, natural, bedrock etc
    - Depths of profile type
    - Soil classification including composition, properties and characteristics.
    - Groundwater conditions.
    - Depths of samples collected.
    - Unusual or unexpected conditions including odour, colour etc.
- Field Documentation - included photographs, a field logbook to record an account of daily works and events including works start/end time, weather, presence of odours and/or dust, calibration results and checks and sample details.
- A visual and olfactory assessment was made on samples for the potential presence of contamination indicators or asbestos. Field screened for volatile organic compounds may also undertaken using a Photo-Ionisation Detector (PID).

- Notes are collected included the location and extent of fill and features such as seepage, moisture, water bearing zones, depth of groundwater tables, discolouration, staining, odours and other indications of contamination. This information was recorded on the field borehole logs.
- Decontamination procedures - included the use of new disposable gloves for the collection of each sample, decontamination of the sampling equipment between each sampling location (using DECON90 where required) and the use of dedicated sampling containers provided by the laboratory.
- Sample procedures - collected samples were immediately transferred into laboratory supplied jars of appropriate composition and preservation for the required analysis. The sample containers were transferred to a chilled cooler for sample preservation prior to and during shipment to the testing laboratory.
- Duplicate samples were collected included blind duplicates. These were coded duplicate samples submitted to the primary laboratory for analysis as individual samples without any indication to the laboratory that they have been duplicated.
- Each sample was assigned an individual sample identification number that began with a location code and site number designation for the specific sample type and sample location number. The sampling depth or interval indicates the discrete depth or interval at which the sample was taken below the surface to the nearest 0.1 metre.

Sample Custody

A Laboratory Test Request & Chain of Custody (COC) form shall be completed for each sample set collected. The form is maintained as a record of sample collection, transfer, shipment and receipt by the laboratory. When physical possession of samples is transferred, both the individual relinquishing the samples and the individual receiving them shall sign, date and record the time on the COC.

Any samples damage shall be reported to the field personnel so that resampling could take place.

Laboratory Program

The contracted laboratory used their internal procedures and NATA accredited methods in accordance with their quality assurance system. GeoEnviro reviewed the laboratory reports to ensure that the laboratory analytical methods and limits of reporting are acceptable for the analysis required. Laboratory quality control procedures used during the project include:

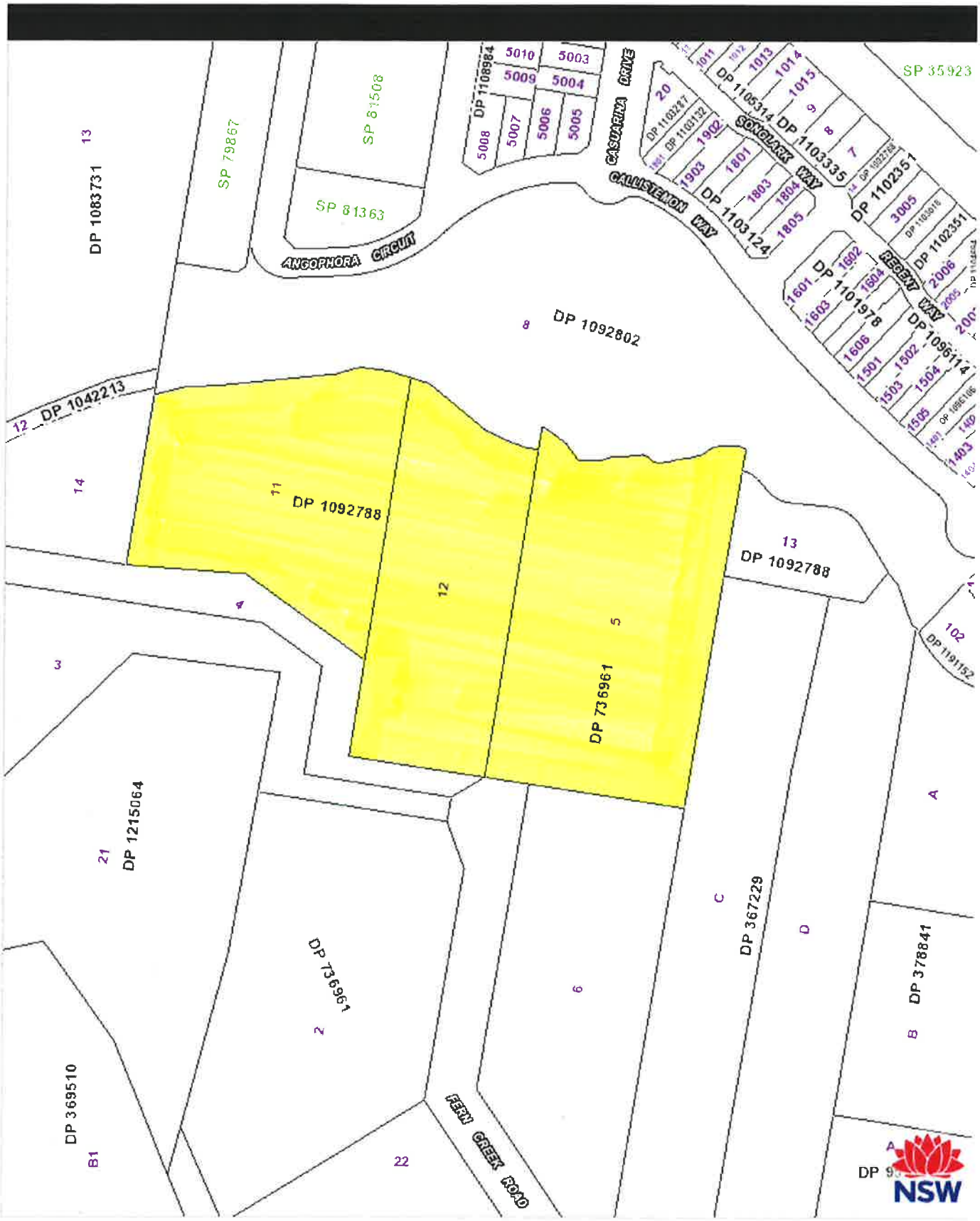
- **Laboratory duplicate samples**: Duplicate sub samples collected by the laboratory from one sample submitted for analytical testing at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch. A laboratory duplicate provides data on the analytical precision and reproducibility of the test result.
- **Certified reference standards**: A reference standard of known (certified) concentration is analysed along with a batch of samples. The Certified Reference Standard (CRS) or Laboratory Control Spike provides an indication of the analytical accuracy and the precision of the test method and is used for inorganic analyses.
- **Spiked samples**: An authentic field sample is spiked by adding an aliquot of known concentration of the target analyte(s) prior to sample extraction and analysis. A spike documents the effect of the sample matrix on the extraction and analytical techniques. Spiked samples will be analysed for each batch where samples are analysed for organic chemicals of concern.
- **Surrogate standard/spikes**: These are organic compounds which are similar to the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. These surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Surrogate Standard/Spikes provide a means of checking that no gross errors have occurred during any stage of the test method leading to significant analyte loss.

- **Laboratory blank**: Usually an organic or aqueous solution that is as free as possible of analytes of interest to which is added all the reagents, in the same volume, as used in the preparation and subsequent analysis of the samples. The reagent blank is carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample.

The contracted laboratory conducted an assessment of the laboratory QC program internally; however the results were independently reviewed and assessed by GeoEnviro.

APPENDIX C

Land Title, NSW EPA, Section 149 and Groundwater Borehole Searches



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PLAN FORM 2

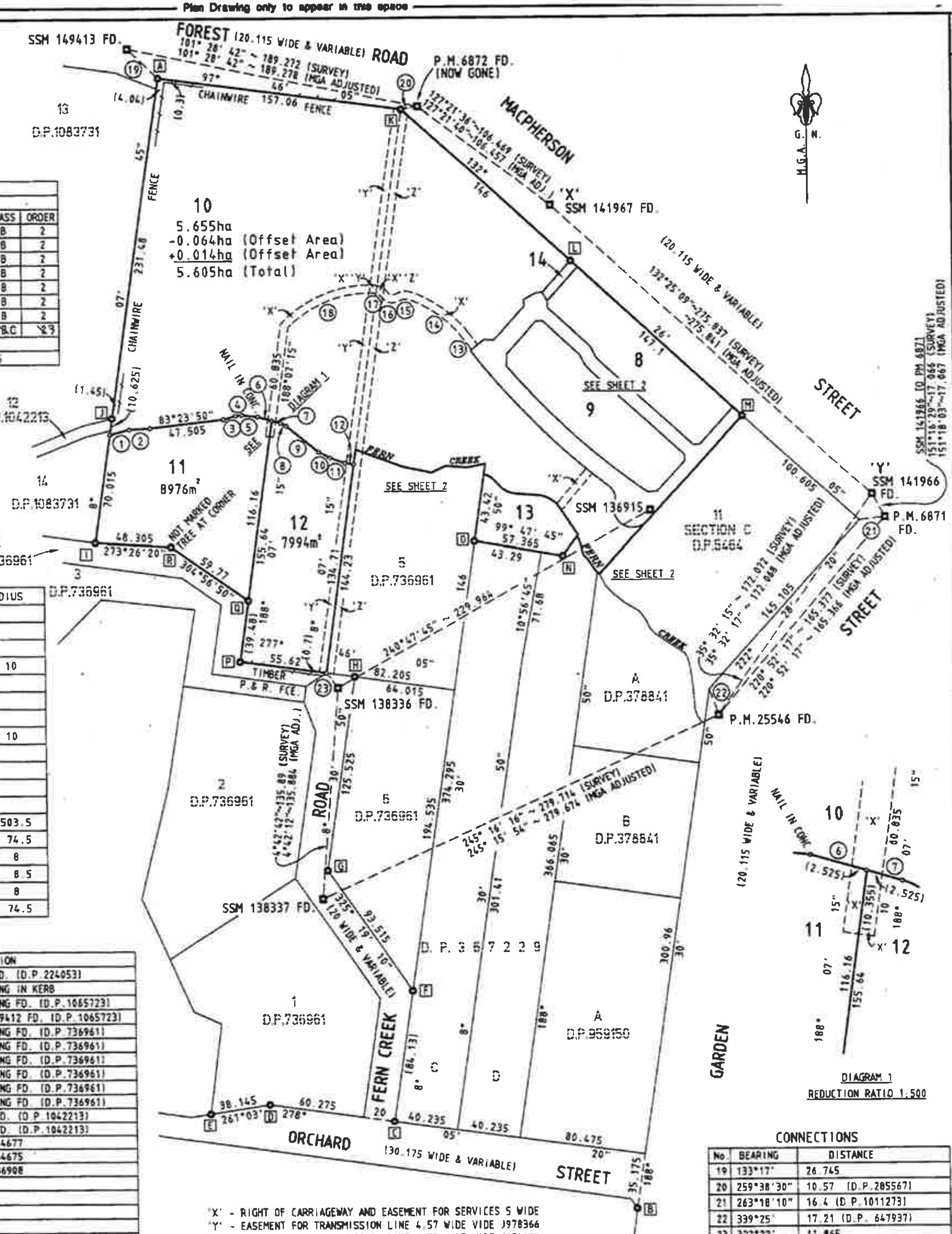
Plan Drawing only to appear in this space

SIGNATURES, SEALS AND STATEMENTS of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

Executed by
AUSTRALAND HOLDINGS LTD
ABN 12 008 443 696
By its Attorney [signature]
Under Power of Attorney Book 4408
No. 705 in the presence of: [signature]

SEE NOTE REGARDING FERN CREEK BOUNDARY ON SHEET 2

SURVEYING REGULATION 2001 CLAUSE 32(2)					
M.G.A. COORDINATES					
MARK	EASTING	NORTHING	ZONE	CLASS	ORDER
P.M.6871	341 576.155	6 271 395.103	56	B	2
P.M.6872	341 279.737	6 271 660.719	56	B	2
P.M.25546	341 467.956	6 271 270.068	56	B	2
SSM.138336	341 225.106	6 271 288.471	56	B	2
SSM.138337	341 213.965	6 271 153.057	56	B	2
SSM.141966	341 567.960	6 271 410.072	56	B	2
SSM.141967	341 364.344	6 271 596.123	56	B	2
SSM.149413	341 094.262	6 271 698.381	56	B.C	2/3
COMBINED SCALE FACTOR 0.999908					
SOURCE-S.C.I.M.S. DATED 27th OCTOBER 2005					



No.	BEARING	CHORD	ARC	RADIUS
1	75°00'20"	12.955		
2	87°00'05"	13.185		
3	73°02'25"	8.1		
4	84°36'	4.01	4.035	10
5	96°09'40"	10.19		
6	106°09'10"	9.35		
7	106°09'10"	5.94		
8	117°36'30"	3.97	4	10
9	129°04'	26.62		
10	116°59'25"	8.12		
11	110°09'55"	9.985		
12	98°27'40"	5.715		
13	322°31'05"	8.425	8.425	503.5
14	306°34'55"	42.11	42.69	74.5
15	264°48'30"	6.85	7.08	8
16	280°44'35"	11.22	12.25	8.5
17	296°40'35"	6.85	7.08	8
18	248°11'15"	58.535	60.155	74.5

Table: SHORT & CURVED BOUNDARIES

CNR.	BEARING	DISTANCE	DESCRIPTION
A	187°46'	0.455	G.I.P. FD. (D.P.224053)
A	223°37'	6.17	D.H.& WING IN KERB
B	278°30'45"	6.015	D.H.& WING FD. (D.P.1065723)
B	235°00'20"	5.655	S.S.M.149412 FD. (D.P.1065723)
C	8°10'	9.775 (BY ME)	D.H.& WING FD. (D.P.736961)
D	359°34'20"	16.405	D.H.& WING FD. (D.P.736961)
E	7°04'20"	5.48	D.H.& WING FD. (D.P.736961)
F	76°55'	9.765 & 17.185	D.H.& WING FD. (D.P.736961)
G	76°55'	2.98 & 10.245	D.H.& WING FD. (D.P.736961)
H	53°07'30"	12.43 & 29.815 (BY ME)	D.H.& WING FD. (D.P.736961)
I	85°40'20"	7.105 (BY ME)	G.I.P. FD. (D.P.1042213)
J	87°26'05"	25.57 (BY ME)	G.I.P. FD. (D.P.1042213)
K	358°24'45"	0.87	S.S.M.144677
L	183°50'40"	8.225	S.S.M.144675
M	182°36'10"	5.315	S.S.M.136908
N	163°46'30"	1.565	G.I.P.
O	213°45'15"	3.975	G.I.P.
P	230°38'30"	0.625	G.I.P.
Q	276°38'	8.44	G.I.P.
R	27°56'50"	7.18	G.I.P.

Table: SCHEDULE OF REFERENCE MARKS

No.	BEARING	DISTANCE
19	133°17'	26.745
20	259°38'30"	10.57 (D.P.285567)
21	263°18'10"	16.4 (D.P.1011273)
22	339°25'	17.21 (D.P.647937)
23	322°22'	11.865

Table: CONNECTIONS

'X' - RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 5 WIDE
'Y' - EASEMENT FOR TRANSMISSION LINE 4.57 WIDE VIDE J978366
'Z' - EASEMENT FOR TRANSMISSION LINE 4.57 WIDE VIDE J954099

Department of Lands Approval

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

Signature: ....
Date: ....
File Number: ....
Office: ....

Subdivision Certificate

I certify that the Provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed Subdivision set out herein
*Insert 'subdivision' or 'new road'

* Authorised Person/General Manager/Accredited Certifier
Consent Authority: Pittwater Council
Date of Endorsement: 29.05.06
Accreditation No.
Subdivision Certificate no. P06/06
File no. N0210/04

Note:
When the plan is to be lodged electronically in the Land Titles Office, it should include a signature in an electronic or digital format approved by the Registrar-General.
*Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 1710-E-0-1

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DP1092788

Registered: [stamp] 11-7-2006
C.A. SEE CERTIFICATE
Title System: TORRENS
Purpose: SUBDIVISION
Ref. Map: U1864-62#, U1864-64#
Last Plans: DP18303, DP334543, DP328260, DP659528

PLAN
OF SUBDIVISION OF LOTS 1 & 2 D.P.18303, LOTS A, B & C D.P.328260, LOT B D.P.334543, LOT 1 D.P.593363 AND LOT 12 D.P.659528
Lengths are in metres. Reduction Ratio 1:2000

LGA: PITTWATER
Suburb/Locality: WARRIEWOOD
Parish: NARRABEEN
County: CUMBERLAND

This is sheet 1 of my plan in 2 sheets. (Delete if inapplicable)

Surveying Regulation 2001
I, GRAHAM JOHN HALL
of CRAIG & RHODES PTY LTD
16-18 CAMBRIDGE ST, EPPING 2121
a surveyor registered under the Surveying Act 2002, certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation 2001 and was completed on 10th JANUARY 2005
The survey relates to ....
(specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)
Signature [signature] Dated 7/3/06
Surveyor registered under the Surveying Act 2002
Datum Line: 'X'-'Y' Type: Urban/Rural

Plans used in preparation of survey / compilation

D.P.5464	D.P.367229	D.P.773829
D.P.18303	D.P.378841	D.P.959150
D.P.224053	D.P.593363	D.P.1011273
D.P.285567	D.P.647935	D.P.1042213
D.P.328260	D.P.647937	D.P.1065723
D.P.334543	D.P.659528	D.P.1083731
D.P.350798	D.P.736961	

PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 AS AMENDED AND IN TERMS OF THE ACCOMPANYING INSTRUMENT IT IS INTENDED

TO CREATE:
1. RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 5 WIDE
2. RESTRICTION ON THE USE OF LAND
3. POSITIVE COVENANT

TO RELEASE:
1. RIGHT FOR DRAINS OR PIPELINES (VIDE C676454)
2. RIGHT OF WAY AND CARRIAGE WAY (VIDE C676454)

IT IS INTENDED TO DEDICATE TO THE PUBLIC AS ROAD:-
1. CALLISTEMON WAY
2. LOMANDRA WAY
3. REGENT WAY
4. SONGLARK WAY

IT IS INTENDED TO DEDICATE LOT 14 TO THE PUBLIC AS TEMPORARY ROAD.

CAD REF. 17105-8-0-1(1)

PLAN FORM 3 — To be used in conjunction with Plan Form 2 — WARNING:CREASING OR FOLDING WILL LEAD TO REJECTION

DP1092788

Registered: 11.7.2006

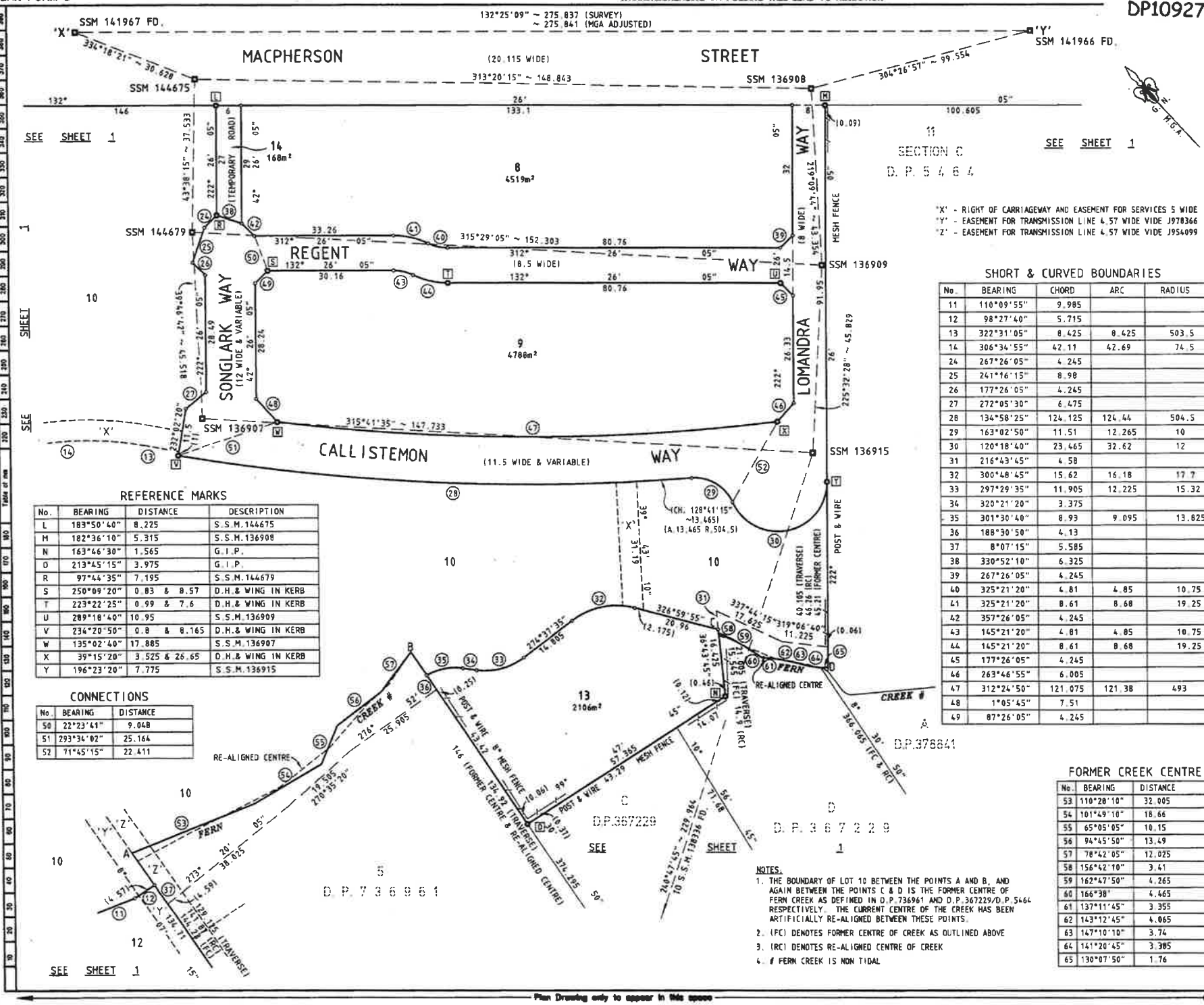
This is sheet 2 of my plan in 2 sheets dated 10th JANUARY 2006

Surveyor registered under Surveyor Act 1929

This is sheet 2 of the plan of 2 sheets covered by Subdivision Certificate No. of

Authorised Person/General Manager/Accredited Certifier

For use where space is insufficient in any panel on Plan Form 2.



"X" - RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 5 WIDE
"Y" - EASEMENT FOR TRANSMISSION LINE 4.57 WIDE VIDE J978366
"Z" - EASEMENT FOR TRANSMISSION LINE 4.57 WIDE VIDE J954099

REFERENCE MARKS

No.	BEARING	DISTANCE	DESCRIPTION
L	183°50'40"	8.225	S.S.M.144675
M	182°36'10"	5.315	S.S.M.136908
N	163°46'30"	1.565	G.I.P.
O	213°45'15"	3.975	G.I.P.
R	97°44'35"	7.195	S.S.M.144679
S	250°09'20"	0.83 & 8.57	D.H.& WING IN KERB
T	223°22'25"	0.99 & 7.6	D.H.& WING IN KERB
U	289°18'40"	10.95	S.S.M.136909
V	234°20'50"	0.8 & 8.165	D.H.& WING IN KERB
W	135°02'40"	17.885	S.S.M.136907
X	39°15'20"	3.525 & 26.65	D.H.& WING IN KERB
Y	196°23'20"	7.775	S.S.M.136915

CONNECTIONS

No.	BEARING	DISTANCE
50	22°23'41"	9.048
51	293°34'02"	25.164
52	71°45'15"	22.411

SHORT & CURVED BOUNDARIES

No.	BEARING	CHORD	ARC	RADIUS
11	110°09'55"	9.985		
12	98°27'40"	5.715		
13	322°31'05"	8.425	8.425	503.5
14	306°34'55"	42.11	42.69	74.5
24	267°26'05"	4.245		
25	241°16'15"	8.98		
26	177°26'05"	4.245		
27	272°05'30"	6.475		
28	134°58'25"	124.125	124.44	504.5
29	163°02'50"	11.51	12.265	10
30	120°18'40"	23.465	32.62	12
31	216°43'45"	4.58		
32	300°48'45"	15.62	16.18	17.7
33	297°29'35"	11.905	12.225	15.32
34	320°21'20"	3.375		
35	301°30'40"	8.93	9.095	13.825
36	188°30'50"	4.13		
37	8°07'15"	5.585		
38	330°52'10"	6.325		
39	267°26'05"	4.245		
40	325°21'20"	4.81	4.85	10.75
41	325°21'20"	8.61	8.68	19.25
42	357°26'05"	4.245		
43	145°21'20"	4.81	4.85	10.75
44	145°21'20"	8.61	8.68	19.25
45	177°26'05"	4.245		
46	263°46'55"	6.005		
47	312°24'50"	121.075	121.38	493
48	1°05'45"	7.51		
49	87°26'05"	4.245		

FORMER CREEK CENTRE

No.	BEARING	DISTANCE
53	110°28'10"	32.005
54	101°49'10"	18.66
55	65°05'05"	10.15
56	94°45'50"	13.49
57	78°42'05"	12.025
58	156°42'10"	3.41
59	162°47'50"	4.265
60	166°38'	4.465
61	137°11'45"	3.355
62	143°12'45"	4.065
63	147°10'10"	3.74
64	141°20'45"	3.385
65	130°07'50"	1.76

NOTES:
1. THE BOUNDARY OF LOT 10 BETWEEN THE POINTS A AND B, AND AGAIN BETWEEN THE POINTS C & D IS THE FORMER CENTRE OF FERN CREEK AS DEFINED IN D.P.736961 AND D.P.367229/D.P.5464 RESPECTIVELY. THE CURRENT CENTRE OF THE CREEK HAS BEEN ARTIFICIALLY RE-ALIGNED BETWEEN THESE POINTS.
2. (FC) DENOTES FORMER CENTRE OF CREEK AS OUTLINED ABOVE
3. (RC) DENOTES RE-ALIGNED CENTRE OF CREEK
4. # FERN CREEK IS NON TIDAL

Reduction Ratio: 1:600

Plan Drawing only to appear in this space

SURVEYORS REFERENCE: 1710-8-0-1

CAD REF: 17105-8-0-1121

PLAN FORM 2

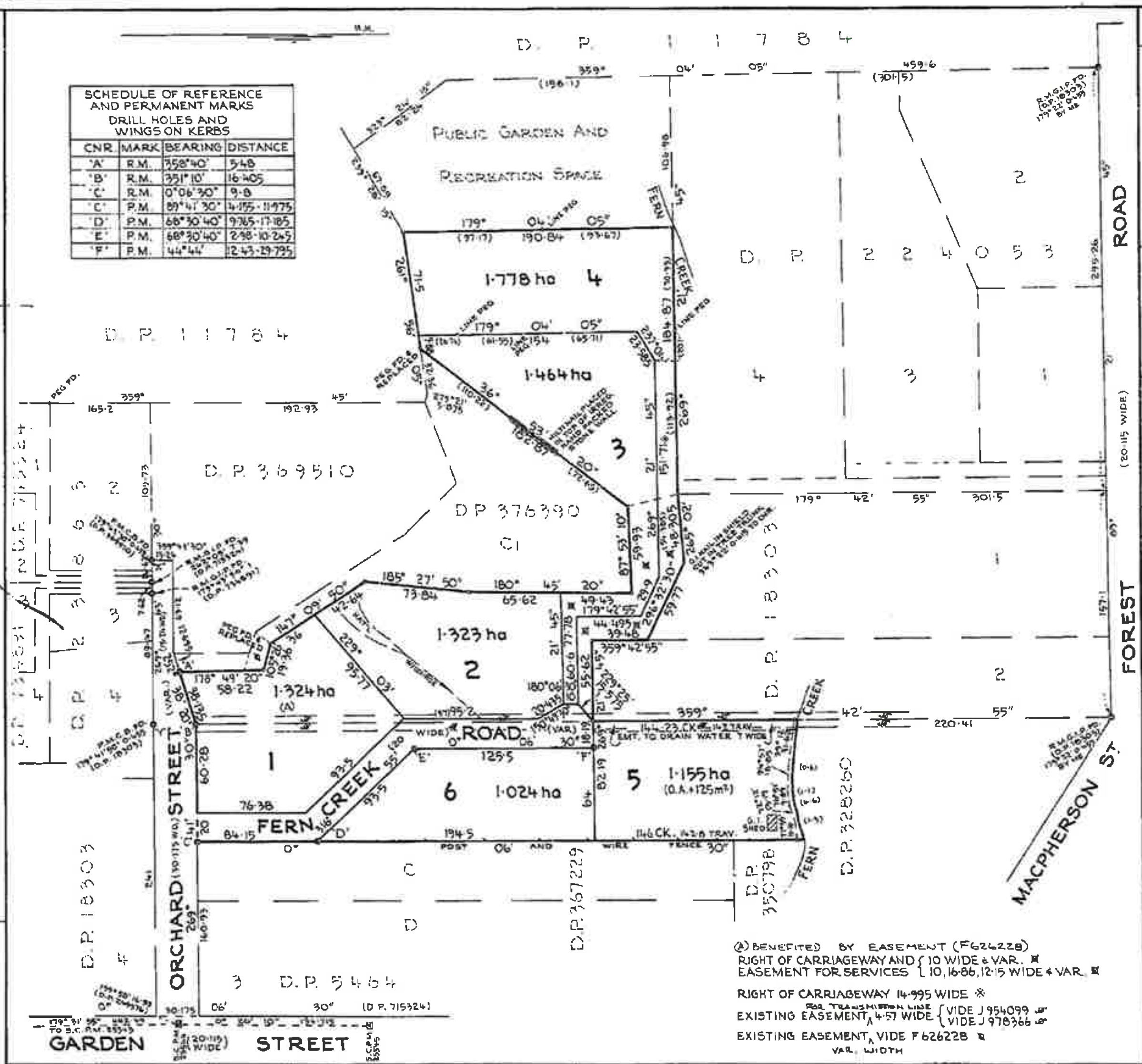
Plan Drawing only to appear in this space

*OFFICE USE ONLY

Signatures and seals only.

Signed by ANTHONY HOUSTON EWART NEWIN and GARY FELSTEAD WARHURST Receivers and Managers of A.S.L.DEVELOPMENTS LIMITED (Receivers and Managers Appointed) by their Attorney JOHN BERESFORD HARKNESS who declares that:-
(a) he has no notice of the revocation of the appointment of the Receivers and Managers Registered No: 674 Book 3351; and
(b) he has no notice of the revocation of the Power of Attorney registered No. 677 Book 3354 under which he executes this instrument.

J. B. HARKNESS



SCHEDULE OF REFERENCE AND PERMANENT MARKS DRILL HOLES AND WINGS ON KERBS

CNR.	MARK	BEARING	DISTANCE
'A'	R.M.	358°40'	5·48
'B'	R.M.	331°10'	16·405
'C'	R.M.	0°06'30"	9·8
'C'	P.M.	89°41'30"	4·155 · 11·975
'D'	P.M.	68°30'40"	9·765 · 17·185
'E'	P.M.	68°30'40"	2·98 · 10·245
'F'	P.M.	44°44'	12·43 · 29·795

D.P. 736961

Registered: 13-10-1986

C.A. Nº 8867 of 17-9-1986

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U1867-64*

Last Plan: D.P. 5464 D.P. 337891

PLAN OF SUBDIVISION OF PART LOT B IN D.P. 337891 AND LOT 1 SECN.C D.P. 5464

Reduction Ratio 1: 2000 Lengths are in metres.

Shire: WARRINGAH

Locality: WARRIEWOOD

Parish: NARRABEEN

County: CUMBERLAND

~~This is sheet 1 of my plan in sheets.~~ (Delete if inapplicable).

I, JOHN BARRY BYRNE of J.B.BYRNE & ASSOCS. NARRABEEN a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made *(1) by me ~~(2)~~ in accordance with the Survey Practice Regulations, 1933, and was completed on 4-9-1986

Signature

Surveyor registered under Surveyors Act, 1929, as amended. Datum Line of Azimuth: "X"-"Y" *Strike out either (1) or (2). Present date of survey.

Panel for use only for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.

IT IS INTENDED TO DEDICATE THE NEW ROAD HEREON TO THE PUBLIC, SUBJECT TO THE EASEMENTS CREATED BY J 954099.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919-1964 IT IS INTENDED TO CREATE:-
1. RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES.
2. RIGHT OF CARRIAGEWAY 14·995 WIDE.
3. EASEMENT TO DRAIN WATER 7 WIDE.

*and as set out in the accompanying instrument signed by the Council

Council Clerk's Certificate

I hereby certify that —
(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and
*(b) the requirements of section 34B of the Metropolitan Water, Sewerage and Drainage Act, 1924, as amended, ~~Hunter District Water, Sewerage and Drainage Act, 1938, as amended~~
have been complied with by the applicant in relation to the proposed Subdivision (insert "new road", "subdivision" or "consolidated lot") set out herein

Subdivision No. 8867

Date 17th September 1986

(Signature) Council Clerk

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the area of operations of the Metropolitan Water Sewerage and Drainage Board and the Hunter District Water Board.
†Delete if inapplicable.

M.P.D.

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

SURVEYOR'S REFERENCE 3631 L

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day.

14th October, 1986

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
3/7/2017 9:21AM

FOLIO: 1/18303

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 5310 FOL 96

Recorded	Number	Type of Instrument	C.T. Issue
18/12/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
30/6/1989		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
12/12/1991	E124349	DEPARTMENTAL DEALING	
28/9/1994		AMENDMENT: LOCAL GOVT AREA	
7/8/2001	7833578	CAVEAT	
3/2/2003	9342672	WITHDRAWAL OF CAVEAT	
3/2/2003	9342673	TRANSFER	EDITION 1
17/3/2003	9455811	MORTGAGE	EDITION 2
23/6/2004	AA741891	DISCHARGE OF MORTGAGE	EDITION 3
11/7/2006	DP1092788	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

Licence: 01-05-025
Licensee: R.S. Davis & Davis

(1)

TRANSFER

New South Wales
Real Property Act 1900

9342673J

PRIVACY NOTE: this information is legally required and will bec

STAMP DUTY

Office of State Revenue use only

NEW SOUTH WALES DUTY
28-01-2003 0001263963-001
SECTION 18(2)
DUTY $ **********2.00

(A) TORRENS TITLE

If appropriate, specify the part transferred
1/18303

(B) LODGED BY

Delivery Box	Name, Address or DX and Telephone	CODES
996s	R.S. Davis & Davis DX 598 Sydney Tel: (02) 9232-3899 Reference (optional): RD:RD:42017	T TW (Sheriff)

(C) TRANSFEROR

KALSONS PTY LIMITED ACN 000 941 140

(D) CONSIDERATION The transferor acknowledges receipt of the consideration of $8,000,000.00 and as regards

(E) ESTATE The land specified above transfers to the transferee an estate in fee simple.

(F) SHARE TRANSFERRED

(G) Encumbrances (if applicable) 1. 2. 3.

(H) TRANSFEREE

AUSTRALAND HOLDINGS LIMITED ACN 008 443 696

(I) ~~TENANCY:~~

DATE 31 January 2003

(J) Certified correct for the purposes of the Real Property Act 1900 And executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appears(s) below pursuant to the authority specified.
Corporation: **KALSONS PTY LIMITED ACN 000 941 140**
Authority: Directors

Signature of authorised person:
Name of authorised person: John Kalazich
Office held: Director

Signature of authorised person:
Henry Kalazich
Name of authorised person:
Office held: Director

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

Signature:

Signatory's name: Ralph Sydney Davis
Signatory's capacity: Solicitor for Transferee

ALL HANDWRITING MUST BE IN BLOCK CAPITALS

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
3/7/2017 9:19AM

FOLIO: 11/1092788

First Title(s): VOL 2267 FOL 101
Prior Title(s): 1/18303

Recorded	Number	Type of Instrument	C.T. Issue
11/7/2006	DP1092788	DEPOSITED PLAN	FOLIO CREATED EDITION 1
14/11/2006	DP1092802	DEPOSITED PLAN	EDITION 2

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 11/1092788

SEARCH DATE	TIME	EDITION NO	DATE
3/7/2017	9:35 AM	2	14/11/2006

LAND

LOT 11 IN DEPOSITED PLAN 1092788
AT WARRIEWOOD
LOCAL GOVERNMENT AREA NORTHERN BEACHES
PARISH OF NARRABEEN COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1092788

FIRST SCHEDULE

AUSTRALAND HOLDINGS LIMITED

SECOND SCHEDULE (1 NOTIFICATION)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
3/7/2017 9:22AM

FOLIO: 2/18303

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 5325 FOL 173

Recorded	Number	Type of Instrument	C.T. Issue
18/12/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
4/7/1989		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
28/1/1994	I981314	DISCHARGE OF MORTGAGE	
28/1/1994	I981315	MORTGAGE	EDITION 1
20/5/1994	U282523	CAVEAT	
15/8/1994	U351124	REQUEST	
28/9/1994		AMENDMENT: LOCAL GOVT AREA	
8/2/1995	O3611	DISCHARGE OF MORTGAGE	
8/2/1995	O3612	CHANGE OF NAME	
8/2/1995	O3613	MORTGAGE	EDITION 2
7/8/1995	0439746	DISCHARGE OF MORTGAGE	EDITION 3
5/5/1999	5798278	MORTGAGE	EDITION 4
28/2/2001	7444584	CAVEAT	
24/12/2001	8233434	WITHDRAWAL OF CAVEAT	
24/12/2001	8233435	DISCHARGE OF MORTGAGE	
24/12/2001	8233436	TRANSFER	EDITION 5
21/5/2002	8612967	MORTGAGE	EDITION 6
23/6/2004	AA741887	DISCHARGE OF MORTGAGE	EDITION 7
11/7/2006	DP1092788	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

Form: 01T
Licence: 01-05-025
Licensee: R.S. Davis & Davis

(1)

TRANSFER

New South Wales
Real Property Act 1900

8233436H

STAMP DUTY

PRIVACY NOTE: this information is legally required and will b

Office of State Revenue use only

NEW SOUTH WALES DUTY
20-12-2001 0000849078-001
SECTION 18(2)
DUTY $ **********2.00

(A) TORRENS TITLE

If appropriate, specify the part transferred
2/18303

(B) LODGED BY

Delivery Box	Name, Address or DX and Telephone
996s	R.S. Davis & Davis DX 598 Sydney Tel: (02) 9232-3899 Reference (optional): RD:RD:42016

CODES
T
TW
(Sheriff)

(C) TRANSFEROR

ILIA LAKAEV AND GLORIA LAKAEV

(D) CONSIDERATION
(E) ESTATE

The transferor acknowledges receipt of the consideration of $4,890,000.00 and as regards the land specified above transfers to the transferee an estate in fee simple.

(F) SHARE TRANSFERRED

(G) Encumbrances (if applicable) 1. 2. 3.

(H) TRANSFEREE

AUSTRALAND HOLDINGS LIMITED A.C.N. 008 443 696

(I)

TENANCY:

DATE 20 December 2001

(J) I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:
Name of witness: Ian Simpson
Address of witness: 103A Arncliffe

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

Signature of transferor: I. Lakaev
G. Lakaev

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

Signature:

Signatory's name: Ralph Sydney Davis
Signatory's capacity: Solicitor for Transferee

ALL HANDWRITING MUST BE IN BLOCK CAPITALS

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
3/7/2017 9:20AM

FOLIO: 12/1092788

First Title(s): VOL 2267 FOL 101
Prior Title(s): 2/18303

Recorded	Number	Type of Instrument	C.T. Issue
11/7/2006	DP1092788	DEPOSITED PLAN	FOLIO CREATED EDITION 1
14/11/2006	DP1092802	DEPOSITED PLAN	EDITION 2

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 12/1092788

SEARCH DATE	TIME	EDITION NO	DATE
3/7/2017	9:35 AM	2	14/11/2006

LAND

LOT 12 IN DEPOSITED PLAN 1092788
AT WARRIEWOOD
LOCAL GOVERNMENT AREA NORTHERN BEACHES
PARISH OF NARRABEEN COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1092788

FIRST SCHEDULE

AUSTRALAND HOLDINGS LIMITED

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 J978366 EASEMENT FOR TRANSMISSION LINE 4.57 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
3/7/2017 9:12AM

FOLIO: 5/736961

First Title(s): OLD SYSTEM
Prior Title(s): VOL 7679 FOL 179

Recorded	Number	Type of Instrument	C.T. Issue
14/10/1986	DP736961	DEPOSITED PLAN	FOLIO CREATED EDITION 1
28/10/1986	W577838	DEPARTMENTAL DEALING	EDITION 2
6/11/1986	W601121	DEPARTMENTAL DEALING	EDITION 3
28/11/1986	W634759	TRANSFER	EDITION 4
24/5/1988	X567514	MORTGAGE	EDITION 5
13/1/1993	I42502	MORTGAGE	EDITION 6
26/8/1994	U566407	DISCHARGE OF MORTGAGE	EDITION 7
22/9/1994		AMENDMENT: LOCAL GOVT AREA	
28/11/2001	8153682	APPLICATION FOR REPLACEMENT CERTIFICATE OF TITLE	EDITION 8
9/9/2002	8936051	DISCHARGE OF MORTGAGE	
9/9/2002	8936052	TRANSFER	EDITION 9
2/6/2003	9663471	TRANSFER	EDITION 10
12/6/2008	AE15396	TRANSFER	EDITION 11
8/12/2016	AK985293	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

RP 13a
1985

STAMP DUTY [redacted]

W634759

$******1.00 STAMP DUTY 10/11/86 30055

TRANSFER

REAL PROPERTY ACT, 1900

T

C8	1 of 1	X
$ 35		

R1/1.

DESCRIPTION OF LAND
Note (a)

Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
IDENTIFIER 5/736961	WHOLE	AT WARRIEWOOD

TRANSFEROR
Note (b)

A.S.L. DEVELOPMENTS LIMITED (RECEIVERS AND MANAGERS APPOINTED) formerly A.S.L. Finance Pty. Limited

(the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of $205,000

ESTATE
Note (c)

and transfers an estate in fee simple
in the land above described to the TRANSFEREE

TRANSFEREE
Note (d)

GORDON GEOFFREY BEGG of 3 River Street, Bellevue Hill, Company Director

OFFICE USE ONLY: S

TENANCY
Note (e)

as joint tenants/tenants in common

PRIOR ENCUMBRANCES
Note (f)

subject to the following PRIOR ENCUMBRANCES 1. .... 2. .... 3. ....

DATE 21st November 1986

EXECUTION
Note (g)

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

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

[signature]
Signature of Witness

Solicitor
Name of Witness (BLOCK LETTERS)

Sydney
Address and occupation of Witness

Signed by Anthony Houston Ewart Kewin and Gary Felstead Warhurst Receivers and Managers of A.S.L. DEVELOPMENTS LIMITED (RECEIVERS & MANAGERS APPOINTED) by their Attorney JOHN BERESFORD HARKNESS who declares that:-

(a) he has no notice of the revocation of the appointment of the Receivers & Managers registered No. 674 Book 3351; and

(b) he has no notice of the revocation of the Power of Attorney registered NO. 677 Book 3354 under which he executes this instrument.

[signature]
J.B. HARKNESS

Note (g)

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

.... Signature of Witness

.... Name of Witness (BLOCK LETTERS)

.... Address and occupation of Witness

[signature]
PAUL A. BROWN
Signature of Transferee
Solicitor

TO BE COMPLETED BY LODGING PARTY
Notes (h) and (i)

LODGED BY PAUL A BROWN & Co
DX 3911
ANNANDALE

Delivery Box Number 1021 K

LOCATION OF DOCUMENTS

CT	OTHER	
		Herewith.
		In L.T.O. with
		Produced by

OFFICE USE ONLY 32

Checked	Passed	REGISTERED -19
[initials]		28 NOV 1986
Signed	Extra Fee	

Secondary Directions		
Delivery Directions	CT	LP

T35
S

Form: 01T
Release: 2.1
www.lpi.nsw.gov.au

TRANSFER

New South Wales
Real Property Act 1900

8936052H

PRIVACY NOTE: ~~this information is legally required and will be~~

STAMP DUTY

Office of State Revenue use only — OFFICE OF STATE REVENUE (N.S.W. TREASURY)
CLIENT No. 52020 — STAMP No. 380
STAMP DUTY $2- — SIGNATURE R. Brock
TRANSACTION No. 02/36/26 — DATE 6/9/02
ASSESSMENT DETAILS:

(A) **TORRENS TITLE** 5/736961

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
421X	Hunt & Hunt Level 15, 1 Macquarie Place, Sydney NSW 2000 DX 214 Sydney (02) 9391.3000 Reference: TJL:8298482 ~~1128024445~~	T TW (Sheriff)

(C) **TRANSFEROR** Gordon Geoffrey BEGG

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 2,425,904.00 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable):

(H) **TRANSFEREE** AVJENNINGS LIMITED (ACN 004 501 503)

(I) **TENANCY:**

(J) **DATE**

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:

Name of witness: Paul Brown

Address of witness:

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

Signature of transferor:

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

Signature:

Signatory's name: Timothy L'Orange
Signatory's capacity: transferee's solicitor

All handwriting must be in block capitals.

Form: 01T
Release: 2
www.lpi.nsw.gov.au

(1)

TRANSFER

New South Wales
Real Property Act 1900

9663471F

PRIVACY NOTE: this information is legally required and will become part of the public record

STAMP DUTY

Office of State Revenue use only

NEW SOUTH WALES DUTY
16-05-2003 0001392658-001
SECTION 18(2)
DUTY $ **********2.00

(A) **TORRENS TITLE** 5/736961

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
122J	JOHN BLAKE Reference: 9 FERN CREEK RD	T TW (Sheriff)

(C) **TRANSFEROR** AVJENNINGS LIMITED (ACN 004 601 503)

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 2,854,000.00 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable):

(H) **TRANSFEREE** STOCKLAND DEVELOPMENT PTY LIMITED (ACN 000 064 835)

(I) **TENANCY:**

(J) **DATE**

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:

Name of witness: FAY FINNISS
Address of witness: 11-13 BROOKHOLLOW AVE
BAULKHAM HILLS

FOR AND ON BEHALF OF ~~AVJENNINGS HOLDINGS LIMITED~~ AVJENNINGS LIMITED ~~GRAFT PTY LIMITED AND HYMILL PTY LIMITED~~ BY ITS ATTORNEY ANN MAREE FULLER PURSUANT TO POWER OF ATTORNEY REGISTERED No. 555 BOOK 4358 AND DECLARE THAT WE HAVE NO NOTICE OF REVOCATION

Certified correct for the purposes of the Real Property Act 1900 by the person(s) named below who signed this instrument pursuant to the power of attorney specified.

Signature of attorney:

Attorney's name: ~~SEE ANNEXURE "A"~~
Signing on behalf of:
Power of attorney-Book:
-No.:

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

Signature:

Signatory's name: PHILLIP ALLAN HEPBURN
Signatory's capacity: transferee's solicitor

All handwriting must be in block capitals.

17

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 5/736961

SEARCH DATE	TIME	EDITION NO	DATE
3/7/2017	9:34 AM	11	12/6/2008

LAND

LOT 5 IN DEPOSITED PLAN 736961
AT WARRIEWOOD
LOCAL GOVERNMENT AREA NORTHERN BEACHES
PARISH OF NARRABEEN COUNTY OF CUMBERLAND
TITLE DIAGRAM DP736961

FIRST SCHEDULE

PITTWATER COUNCIL (T AE15396)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
* 2 J594099 EASEMENT FOR TRANSMISSION LINE 4.57 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 DP736961 EASEMENT TO DRAIN WATER AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

PSH-GROLLY-JE17655A PRINTED ON 3/7/2017

NSW Office of Water
Work Summary

GW108034

Licence: 10BL600129 **Licence Status:** CANCELLED

Authorised Purpose(s): TEST BORE
Intended Purpose(s): TEST BORE

Work Type: Bore
Work Status:
Construct.Method: Hand Auger
Owner Type:

Commenced Date: **Final Depth:** 2.50 m
Completion Date: 26/05/2006 **Drilled Depth:** 2.50 m

Contractor Name: B & B DRILLING INC
Driller: Michael Gerard Barrett
Assistant Driller:

Property: FOLEY 16 MACPHERSON ST WARRIEWOOD 2101 NSW **Standing Water Level:** 0.900
GWMA: - **Salinity:**
GW Zone: - **Yield:**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBE	CUMBE.37	4 553816
Licensed:	CUMBERLAND	NARRABEEN	Whole Lot 4//553816

Region: 10 - Sydney South Coast **CMA Map:**
River Basin: - Unknown **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6271295.0 **Latitude:** 33°41'11.5"S
Elevation Source: Unknown **Easting:** 341892.0 **Longitude:** 151°17'39.3"E

GS Map: - **MGA Zone:** 0 **Coordinate Source:** Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	2.50	90			Hand Auger

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)

Geologists Log
Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.50	0.50	TOPSOIL	Topsoil	
0.50	1.00	0.50	CLAY	Clay	
1.00	1.40	0.40	GREY SANDY CLAY	Sandy Clay	
1.40	1.70	0.30	GREY SAND	Sand	
1.70	2.50	0.80	STIFF GREY CLAY	Clay	

Remarks

07/06/2011: Karla Abbs, 7-Jun-2011: Corrected invalid rock type in drillers log

***** End of GW108034 *****

NSW Office of Water
Work Summary

GW106699

Licence: 10BL164182 **Licence Status:** ACTIVE

Authorised Purpose(s): MONITORING BORE
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status:
Construct.Method: Auger
Owner Type:

Commenced Date:
Completion Date: 11/10/2004
Final Depth: 3.00 m
Drilled Depth: 3.00 m

Contractor Name: ENVIRONMENTAL & GEOTECHNICAL
Driller: Geoff Trippett
Assistant Driller:

Property: ANGLIAN RETIREMENT VILLAGES 10-14 MACPHERSON ST WARRIEWOOD 2102
GWMA: -
GW Zone: -
Standing Water Level:
Salinity:
Yield:

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBE	CUMBE.37	22 5464
Licensed:	CUMBERLAND	NARRABEEN	Whole Lot 22//5464

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6271130.0
Easting: 341907.0
Latitude: 33°41'16.9"S
Longitude: 151°17'39.8"E

GS Map: -
MGA Zone: 0
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	3.00	100			Auger
1		Annulus	(Unknown)	0.95	3.00				Graded
1	1	Casing	P.V.C.	0.00	3.00	60			Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.50	3.00	60		1	Porous Concrete, SL: 1.5mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)

Geologists Log
Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.20	0.20	FILL	Fill	
0.20	0.60	0.40	WEATHERED SANDSTONE	Sandstone	

0.60	1.00	0.40	CLAYEY SAND	Clayey Sand	
1.00	1.80	0.80	CLAY,GREY BLACK	Clay	
1.80	2.00	0.20	CLAY BROWN	Clay	
2.00	3.00	1.00	CLAYEY SAND	Clayey Sand	

Remarks

11/03/2011: Karla Abbs, 11-Mar-2011: Replaced invalid codes in Drillers Log

***** End of GW106699 *****

NSW Office of Water
Work Summary

GW106698

Licence: 10BL164182 **Licence Status:** ACTIVE

Authorised Purpose(s): MONITORING BORE
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status:
Construct.Method: Auger
Owner Type:

Commenced Date:
Completion Date: 11/10/2004
Final Depth: 3.00 m
Drilled Depth: 3.00 m

Contractor Name: ENVIRONMENTAL & GEOTECHNICAL
Driller: Geoff Trippett
Assistant Driller:

Property: ANGLIAN RETIREMENT VILLAGES 10-14 MACPHERSON ST WARRIEWOOD 2102
GWMA: -
GW Zone: -
Standing Water Level:
Salinity:
Yield:

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBE	CUMBE.37	22 5464
Licensed:	CUMBERLAND	NARRABEEN	Whole Lot 22//5464

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6271246.0
Easting: 342028.0
Latitude: 33°41'13.2"S
Longitude: 151°17'44.5"E

GS Map: -
MGA Zone: 0
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	3.00	100			Auger
1		Annulus	(Unknown)	0.95	3.00				Graded
1	1	Casing	P.V.C.	0.00	3.00	60			Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.50	3.00	60		1	Porous Concrete, SL: 1.5mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)

Geologists Log
Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.10	0.10	FILL,SANDY CLAY	Fill	
0.10	0.50	0.40	FILL WEATHERED SANDSTONE	Fill	

0.50	1.20	0.70	SANDY CLAY	Invalid Code	
1.20	1.80	0.60	CLAYEY SAND	Invalid Code	
1.80	3.00	1.20	SANDY CLAY,LIGHT GREY	Invalid Code	

Remarks

***** End of GW106698 *****

NSW Office of Water
Work Summary

GW106697

Licence: 10BL164182 **Licence Status:** ACTIVE

Authorised Purpose(s): MONITORING BORE
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status:
Construct.Method: Auger
Owner Type:

Commenced Date: **Final Depth:** 3.00 m
Completion Date: 10/10/2004 **Drilled Depth:** 3.00 m

Contractor Name: ENVIRONMENTAL & GEOTECHNICAL
Driller:
Assistant Driller:

Property: ANGLIAN RETIREMENT VILLAGES 10-14 MACPHERSON ST WARRIEWOOD 2102 **Standing Water Level:**
GWMA: - **Salinity:**
GW Zone: - **Yield:**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBE	CUMBE.37	22 5464
Licensed:	CUMBERLAND	NARRABEEN	Whole Lot 22//5464

Region: 10 - Sydney South Coast **CMA Map:**
River Basin: - Unknown **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6271144.0 **Latitude:** 33°41'16.5"S
Elevation Source: Unknown **Easting:** 342028.0 **Longitude:** 151°17'44.5"E

GS Map: - **MGA Zone:** 0 **Coordinate Source:** Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	3.00	100			Auger
1		Annulus	(Unknown)	0.90	3.00				
1	1	Casing	P.V.C.	0.00	3.00	60			Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.50	3.00	60		1	Stamped, PVC, SL: 1.5mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)

Geologists Log
Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.20	0.20	FILL	Fill	
0.20	0.50	0.30	FILL, WEATHERED SANDSTONE	Fill	

0.50	1.20	0.70	FILL, WEATHERED SANDSTONE & CLAY	Fill	
1.20	2.00	0.80	CLAY GREY, FIRM	Clay	
2.00	3.00	1.00	CLAY GREY,SOFT SATURATED	Clay	

Remarks

***** End of GW106697 *****

Groundwater data

allwaterdata.water.nsw.gov.au/water.stm

Department of Primary Industries
Office of Water

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glossary and metadata

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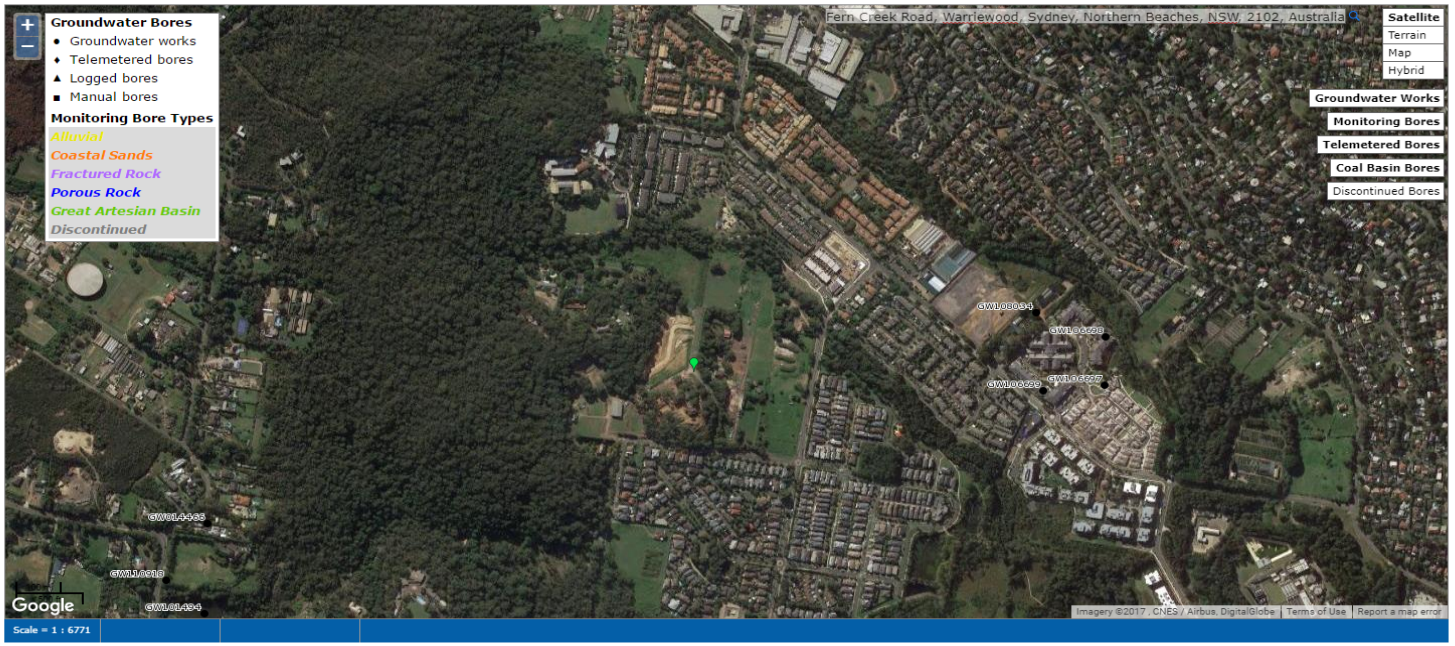
Map | Info



Search results

Your search for:LGA: Pittwater Council

Matched 7 notices relating to 3 sites.

Search Again

Refine Search

Suburb	Address	Site Name	Notices related to this site
MONA VALE	Polo Ave, Perak STREET	Caltex Investigation Area	1 former
MONA VALE	79 Barrenjoey Road, 2 Polo Avenue, 6 Polo Avenue, 45 Bassett STREET	Former Caltex service station and adjacent properties	3 former
MONA VALE	58 Darley STREET	Mona Vale Bus Depot	4 current

25 July 2017

NORTHERN BEACHES COUNCIL | Pittwater

Section 149 Pt 2 Planning Certificate
Environmental Planning & Assessment Act, 1979

Applicant: ADRIAN TEJADA
UNIT 5, 39-41 FOURTH AVENUE
BLACKTOWN

Cert. No: e149Pt2/17/0603
Cert. Date: 30 June 2017
Fee: $53.00
Property No: 92776

Your Reference: JE17655A

Address of Property: 11 FERN CREEK ROAD
WARRIEWOOD NSW 2102

Description of Property: Lot 11 DP 1092788

Strata Unit Details (if applicable):

County: Cumberland **Parish:** Narrabeen

***NOTE**:*

The zoning information in this certificate is based on the lot and plan number referred to in this Certificate. If the lot and plan number is not the current description of the land then this Certificate will be incorrect. Persons relying on this Certificate should satisfy themselves by reference to the Title Deed that the land to which this Certificate relates is identical to the land the subject of the enquiry.

A reference in this certificate to any instrument, including Pittwater Local Environmental Plan 2014, is a reference to that instrument, as amended.

Northern Beaches Council

All correspondence to be addressed to Interim General Manager:
Village Park,
1 Park Street,
MONA VALE NSW

P O Box 882
MONA VALE NSW 1660

DX 9018 MONA VALE

Telephone (02) 9970 1111
Facsimile (02) 9970 1200
Internet: www.pittwater.nsw.gov.au
Email: pittwater_council@pittwater.nsw.gov.au

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The prescribed matters required by Section 149 (2) of the Environmental Planning & Assessment Act are as follows and relate to the subject land at the date of this certificate.

RELEVANT PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

EP&A Regulations 2000
Schedule 4 Clause 1

LOCAL ENVIRONMENTAL PLAN

EP&A Regulations 2000
Schedule 4 Clause 1 (1)

Pittwater Local Environmental Plan 2014

PROPOSED LOCAL ENVIRONMENTAL PLANS

EP&A Regulations 2000
Schedule 4 Clause 1 (2)

Draft Pittwater Local Environmental Plan (LEP) 2014 (PP0002/15)

The objectives of this Planning Proposal are to amend the Pittwater LEP 2014 to:

- Rectify anomalies and discrepancies, and improve the clarity of the written instrument and maps.
- Implement or amend provisions consistent with the draft Pittwater LEP as publicly exhibited and/or adopted by Council, where certain provisions were altered or not included when the plan was made.
- Make other minor amendments relating to individual sites.

Please note that some proposed amendments broadly apply to the former Pittwater area; your property may not be directly affected by an amendment in this Planning Proposal. For more information, please see http://yoursay.northernbeaches.nsw.gov.au/Minoramendmentsplep2

Note: *Where no information has been provided under the heading "*PROPOSED LOCAL ENVIRONMENTAL PLANS*", Council is unaware of any Proposed Local Environmental Planning Instrument that is or has been the subject of community consultation or on public exhibition under the Act, applying to the land.*

STATE ENVIRONMENTAL PLANNING POLICIES AND PROPOSED STATE ENVIRONMENTAL PLANNING POLICIES

EP&A Regulations 2000
Schedule 4 Clause 1 (1) & (2)

SEPP NO. 1 - Development Standards
(Note: This SEPP does not apply to PLEP 2014)
SEPP NO. 19 - Bushland in Urban Areas
SEPP NO. 21 - Caravan Parks
SEPP NO. 30 - Intensive Agriculture
SEPP NO. 33 - Hazardous and Offensive Development
SEPP NO. 44 - Koala Habitat Protection
SEPP NO. 50 - Canal Estate Development
SEPP NO. 55 - Remediation of Land
SEPP NO. 62 - Sustainable Aquaculture
SEPP NO. 64 - Advertising and Signage
SEPP NO. 65 - Design Quality of Residential Flat Development
SEPP NO. 70 - Affordable Housing (Revised Schemes)

SEPP - (Housing for Seniors or People With a Disability) 2004
SEPP - Building Sustainability Index: BASIX
SEPP - (State Significant Precincts) 2005
SEPP - (Mining, Petroleum Production & Extractive Industries) 2007
SEPP - (Miscellaneous Consent Provisions) 2007
SEPP - (Infrastructure) 2007
SEPP - (Affordable Rental Housing) 2009
SEPP - (Exempt & Complying Development Codes) 2008
SEPP (State & Regional Development) 2011

Deemed SEPP - Hawkesbury-Nepean River (No. 2 - 1977)

DEVELOPMENT CONTROL PLANS

EP&A Regulations 2000
Schedule 4 Clause 1 (3)

Pittwater 21 Development Control Plan
The purpose of this plan is to provide best practice standards for development.

ZONING AND LAND USE UNDER RELEVANT LEPS

EP&A Regulations 2000
Schedule 4 Clause 2

LAND ZONING MAP

EP&A Regulations 2000
Schedule 4 Clause 2 (a), (b), (c) & (d)

The following information identifies the purposes for which development may be carried out with or without development consent and the purposes for which the carrying out of development is prohibited, for all zones affecting the land as identified on the maps to which Pittwater Local Environmental Plan 2014 applies.

Zone R3 Medium Density Residential

2 Permitted without consent

Home businesses; Home occupations

3 Permitted with consent

Attached dwellings; Bed and breakfast accommodation; Boarding houses; Building identification signs; Business identification signs; Child care centres; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Group homes; Health consulting rooms; Home-based child care; Home industries; Multi dwelling housing; Neighbourhood shops; Places of public worship; Residential flat buildings; Respite day care centres; Roads; Secondary dwellings; Semi-detached dwellings; Seniors housing; Serviced apartments; Veterinary hospitals

4 Prohibited

Any development not specified in item 2 or 3

ADDITIONAL PERMITTED USES FOR WHICH DEVELOPMENT IS PERMISSIBLE WITH DEVELOPMENT CONSENT - SCHEDULE 1

Additional permitted uses, if any, for which development is permissible with development consent pursuant to Clause 2.5 and Schedule 1 of Pittwater Local Environmental Plan 2014;-

Note: *Where no additional permitted uses have been listed under the heading "ADDITIONAL PERMITTED USES FOR WHICH DEVELOPMENT IS PERMISSIBLE WITH DEVELOPMENT CONSENT", then clause 2.5 of Pittwater Local Environmental Plan 2014 is inapplicable to the land the subject of this certificate.*

FURTHER PLANNING CONTROLS

EP&A Regulations 2000
Schedule 4 Clause 2 (e) (f) (g) (h)

Note: *Where no information has been provided under the heading "*FURTHER PLANNING CONTROLS*", then such information is inapplicable to the land the subject of this certificate.*

ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

EP&A Regulations 2000
Schedule 4 Clause 2A

Note: *Where no information has been provided under the heading "*ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006*", then such information is inapplicable to the land the subject of this certificate.*

COMPLYING DEVELOPMENT

EP&A Regulations 2000
Schedule 4 Clause 3

The following notations relate to the extent to which the land is land on which complying development may or may not be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

GENERAL HOUSING CODE

Complying development under the General Housing Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

Note: *Further zone based limitations may apply. See State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 clause:*
3.1 Land to which code applies
This code applies to development that is specified in clauses 3.2-3.5 on any lot in Zone R1, R2, R3, R4 or RU5 that:

(a) has an area of at least 200m2, and
(b) has a width, measured at the building line fronting a primary road, of at least 6m.

RURAL HOUSING CODE

Complying development under the Rural Housing Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

Note: *Further zone based limitations may apply. See State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 clause:*
3A.1 Land to which code applies

This code applies to development that is specified in clauses 3A.2-3A.5 on lots in Zone RU1, RU2, RU3, RU4, RU6 and R5.

HOUSING ALTERATIONS CODE

Complying development under the Housing Alterations Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

GENERAL DEVELOPMENT CODE

Complying development under the General Development Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

COMMERCIAL AND INDUSTRIAL ALTERATIONS CODE

Complying development under the Commercial & Industrial (Alterations) Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

COMMERCIAL AND INDUSTRIAL (NEW BUILDINGS AND ADDITIONS) CODE

Complying development under the Commercial & Industrial (New Buildings and Additions) Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

Note: *Further zone based limitations may apply. See State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 clause:*
5A.1 Land to which code applies
This code applies to development that is specified in clause 5A.2 on any lot in Zone B1, B2, B3, B4, B5, B6, B7, B8, IN1, IN2, IN3, IN4 or SP3.

SUBDIVISION CODE

Complying development under the Subdivision Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

DEMOLITION CODE

Complying development under the Demolition Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

FIRE SAFETY CODE

Complying development under the Fire Safety Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

***Note**: State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 ("SEPP") must be read and applied in conjunction with Pittwater Local Environmental Plan 2014.*

COASTAL PROTECTION

EP&A Regulations 2000
Schedule 4 Clause 4

The Council has not been notified by the Department of Finance, Services and Innovation that the land is affected by the operation of section 38 or 39 of the Coastal Protection Act 1979.

CERTAIN INFORMATION RELATING TO BEACHES AND COASTS

EP&A Regulations 2000
Schedule 4 Clause 4A

1) Council is not aware of any order made under Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works to the land the subject of this certificate, or on public land adjacent to that land.

2) Council has not been notified under section 55X of the *Coastal Protection Act 1979* that temporary coastal protection works have been placed on the land subject of this certificate, or on public land adjacent to that land.

ANNUAL CHARGES UNDER LOCAL GOVERNMENT ACT 1993 FOR COASTAL PROTECTION SERVICES THAT RELATE TO EXISTING COASTAL PROTECTION WORKS

EP&A Regulations 2000
Schedule 4 Clause 4B

Council is not aware of any charges under section 496B of the *Local Government Act 2014* for coastal protection services levied upon land the subject of this certificate.

MINE SUBSIDENCE

EP&A Regulations 2000
Schedule 4 Clause 5

The land has not been proclaimed to be a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

EP&A Regulations 2000
Schedule 4 Clause 6

(a) The land is not affected by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993.
(b) The land is not affected by any road widening or road realignment under Pittwater Local Environmental Plan 2014.

(c) The land is not affected by any road widening or road realignment under any resolution of Council.

Note: *The Roads and Maritime Services may have proposals that are not referred to in this item. For advice about affectation by RMS proposals, contact the Roads and Maritime Services.*

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

EP&A Regulations 2000
Schedule 4 Clause 7

Council has adopted a number of policies with regard to various hazards or risks which may restrict development. The identified hazard or risk and the respective Council policies which affect the property, if any, are listed below.

Bushfire Hazard/Risk
This land is identified on a Bush Fire Prone Land map certified by the Commissioner of the NSW Rural Fire Service as being bush fire prone land as per the Rural Fires and Environmental Assessment Legislation Amendment Act 2002 No 67. The requirements of the NSW Rural Fire Service document *Planning for Bushfire Protection* apply to this land. For further information please contact Warringah Pittwater District Rural Fire Service.

The property is not affected by any other policy adopted by any other planning authority and notified to the Council for the express purpose of its adoption by that authority being referred to in planning certificates that restricts development of the property because of the likelihood of land slip, bushfire, tidal inundation, subsidence or any other risk (other than flooding):

Note: *The absence of a policy to restrict development of the land because of the likelihood of any other risk does not imply that the land is free from risk. Detailed investigation carried out in conjunction with the preparation or assessment of an application may result in the Council imposing restrictions on development that are not identified above.*

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

EP&A Regulations 2000
Schedule 4 Clause 7A

Yes, development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development of the purposes of group homes or seniors housing) is subject to flood related development controls.

Yes, development on the land or part of the land for any other purpose is subject to flood related development controls.

LAND RESERVED FOR ACQUISITION

EP&A Regulations 2000
Schedule 4 Clause 8

This land is not affected by any provisions within Pittwater Local Environmental Plan 2014 that would provide for the acquisition of the land by a public authority, as referred to in section 27 of the Act.

CONTRIBUTIONS PLANS

EP&A Regulations 2000
Schedule 4 Clause 9

Warriewood Valley Release Area Section 94 Contributions Plan Amendment 16 Revision 2 - in force 4 Feb 2017
This Plan was approved by Council to levy contributions towards the provision, extension or augmentation of public amenities and public services that will, or are likely to be, required as a consequence of development in the Warriewood Valley Urban Release Area.

BIODIVERSITY CERTIFIED LAND
EP&A Regulations 2000
Schedule 4 Clause 9A

Note: *Where no information has been provided under the heading "*BIODIVERSITY CERTIFIED LAND*", then such information is inapplicable to the land the subject of this certificate.*

BIOBANKING AGREEMENTS
EP&A Regulations 2000
Schedule 4 Clause 10

Note: *Where no information has been provided under the heading "*BIOBANKING AGREEMENTS*", then Council is unaware of any such agreement applying to the land the subject of this certificate.*

BUSH FIRE PRONE LAND
EP&A Regulations 2000
Schedule 4 Clause 11

Part of the land the subject of this certificate is identified on a Bush Fire Prone Land map certified by the Commissioner of the NSW Rural Fire Service as being bush fire prone land as per the Rural Fires and Environmental Assessment Legislation Amendment Act 2002 No 67.

PROPERTY VEGETATION PLANS
EP&A Regulations 2000
Schedule 4 Clause 12

Note: *Where no information has been provided under the heading "*PROPERTY VEGETATION PLANS*", then such information is inapplicable to the land the subject of this certificate.*

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006
EP&A Regulations 2000
Schedule 4 Clause 13

Note: *Where no information has been provided under the heading "*ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006*", then such information is inapplicable to the land the subject of this certificate.*

DIRECTIONS UNDER PART 3A
EP&A Regulations 2000
Schedule 4 Clause 14

Note: *Where no information has been provided under the heading "*DIRECTIONS UNDER PART 3A*", then such information is inapplicable to the land the subject of this certificate.*

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING
EP&A Regulations 2000
Schedule 4 Clause 15

Note: *Where no information has been provided under the heading "*SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING*", then Council is unaware of any such site compatibility certificate applying to the land the subject of this certificate.*

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

EP&A Regulations 2000
Schedule 4 Clause 16

Note: *Where no information has been provided under the heading "*SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE*", then Council is unaware of any such site compatibility certificate applying to the land the subject of this certificate.*

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

EP&A Regulations 2000
Schedule 4 Clause 17

Note: *Where no information has been provided under the heading "*SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING*", then Council is unaware of any such site compatibility certificate applying to the land the subject of this certificate.*

PAPER SUBDIVISION INFORMATION

EP&A Regulations 2000
Schedule 4 Clause 18

Note: *Where no information has been provided under the heading "*PAPER SUBDIVISION INFORMATION*" then Council is unaware of any such development plan or subdivision order applying to the land the subject of this certificate.*

SITE VERIFICATION CERTIFICATES

EP&A Regulations 2000
Schedule 4 Clause 19

Note: *Where no information has been provided under the heading "*SITE VERIFICATION CERTIFICATES*", then Council is unaware of any such site verification certificate applying to the land the subject of this certificate.*

LOOSE-FILL ASBESTOS INSULATION

EP&A Regulations 2000
Schedule 4 Clause 20

Note: *Where no information has been provided under the heading "*LOOSE-FILL ASBESTOS INSULATION*", then Council is unaware of any such site verification certificate applying to the land the subject of this certificate.*

MATTERS ARISING UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997

Contaminated Land Management Act 1997
Section 59 (2)

Note: *Where no information has been provided under the heading "*MATTERS ARISING UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997*", then such information is inapplicable to the land the subject of this certificate.*

Persons relying on this certificate should read the environmental planning instruments referred to in this certificate.

MARK FERGUSON
Interim General Manager

NORTHERN BEACHES COUNCIL | Pittwater

Section 149 Pt 2 Planning Certificate
Environmental Planning & Assessment Act, 1979

Applicant: ADRIAN TEJADA
UNIT 5, 39-41 FOURTH AVENUE
BLACKTOWN

Cert. No: e149Pt2/17/0602
Cert. Date: 30 June 2017
Fee: $53.00
Property No: 77178

Your Reference: JE17655A

Address of Property: 9 FERN CREEK ROAD
WARRIEWOOD NSW 2102

Description of Property: Lot 5 DP 736961

Strata Unit Details (if applicable):

County: Cumberland **Parish:** Narrabeen

***NOTE**:*

The zoning information in this certificate is based on the lot and plan number referred to in this Certificate. If the lot and plan number is not the current description of the land then this Certificate will be incorrect. Persons relying on this Certificate should satisfy themselves by reference to the Title Deed that the land to which this Certificate relates is identical to the land the subject of the enquiry.

A reference in this certificate to any instrument, including Pittwater Local Environmental Plan 2014, is a reference to that instrument, as amended.

Northern Beaches Council

All correspondence to be addressed to Interim General Manager:
Village Park,
1 Park Street,
MONA VALE NSW

P O Box 882
MONA VALE NSW 1660

DX 9018 MONA VALE

Telephone (02) 9970 1111
Facsimile (02) 9970 1200
Internet: www.pittwater.nsw.gov.au
Email: pittwater_council@pittwater.nsw.gov.au

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The prescribed matters required by Section 149 (2) of the Environmental Planning & Assessment Act are as follows and relate to the subject land at the date of this certificate.

RELEVANT PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

EP&A Regulations 2000
Schedule 4 Clause 1

LOCAL ENVIRONMENTAL PLAN

EP&A Regulations 2000
Schedule 4 Clause 1 (1)

Pittwater Local Environmental Plan 2014

PROPOSED LOCAL ENVIRONMENTAL PLANS

EP&A Regulations 2000
Schedule 4 Clause 1 (2)

Draft Pittwater Local Environmental Plan (LEP) 2014 (PP0002/15)

The objectives of this Planning Proposal are to amend the Pittwater LEP 2014 to:

- Rectify anomalies and discrepancies, and improve the clarity of the written instrument and maps.
- Implement or amend provisions consistent with the draft Pittwater LEP as publicly exhibited and/or adopted by Council, where certain provisions were altered or not included when the plan was made.
- Make other minor amendments relating to individual sites.

Please note that some proposed amendments broadly apply to the former Pittwater area; your property may not be directly affected by an amendment in this Planning Proposal. For more information, please see http://yoursay.northernbeaches.nsw.gov.au/Minoramendmentsplep2

Note: *Where no information has been provided under the heading "*PROPOSED LOCAL ENVIRONMENTAL PLANS*", Council is unaware of any Proposed Local Environmental Planning Instrument that is or has been the subject of community consultation or on public exhibition under the Act, applying to the land.*

STATE ENVIRONMENTAL PLANNING POLICIES AND PROPOSED STATE ENVIRONMENTAL PLANNING POLICIES

EP&A Regulations 2000
Schedule 4 Clause 1 (1) & (2)

SEPP NO. 1 - Development Standards
(Note: This SEPP does not apply to PLEP 2014)
SEPP NO. 19 - Bushland in Urban Areas
SEPP NO. 21 - Caravan Parks
SEPP NO. 30 - Intensive Agriculture
SEPP NO. 33 - Hazardous and Offensive Development
SEPP NO. 44 - Koala Habitat Protection
SEPP NO. 50 - Canal Estate Development
SEPP NO. 55 - Remediation of Land
SEPP NO. 62 - Sustainable Aquaculture
SEPP NO. 64 - Advertising and Signage
SEPP NO. 65 - Design Quality of Residential Flat Development
SEPP NO. 70 - Affordable Housing (Revised Schemes)

SEPP - (Housing for Seniors or People With a Disability) 2004
SEPP - Building Sustainability Index: BASIX
SEPP - (State Significant Precincts) 2005
SEPP - (Mining, Petroleum Production & Extractive Industries) 2007
SEPP - (Miscellaneous Consent Provisions) 2007
SEPP - (Infrastructure) 2007
SEPP - (Affordable Rental Housing) 2009
SEPP - (Exempt & Complying Development Codes) 2008
SEPP (State & Regional Development) 2011

Deemed SEPP - Hawkesbury-Nepean River (No. 2 - 1977)

DEVELOPMENT CONTROL PLANS

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Schedule 4 Clause 1 (3)

Pittwater 21 Development Control Plan
The purpose of this plan is to provide best practice standards for development.

ZONING AND LAND USE UNDER RELEVANT LEPS

EP&A Regulations 2000
Schedule 4 Clause 2

LAND ZONING MAP

EP&A Regulations 2000
Schedule 4 Clause 2 (a), (b), (c) & (d)

The following information identifies the purposes for which development may be carried out with or without development consent and the purposes for which the carrying out of development is prohibited, for all zones affecting the land as identified on the maps to which Pittwater Local Environmental Plan 2014 applies.

Zone R3 Medium Density Residential

2 Permitted without consent

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3 Permitted with consent

Attached dwellings; Bed and breakfast accommodation; Boarding houses; Building identification signs; Business identification signs; Child care centres; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Group homes; Health consulting rooms; Home-based child care; Home industries; Multi dwelling housing; Neighbourhood shops; Places of public worship; Residential flat buildings; Respite day care centres; Roads; Secondary dwellings; Semi-detached dwellings; Seniors housing; Serviced apartments; Veterinary hospitals

4 Prohibited

Any development not specified in item 2 or 3

ADDITIONAL PERMITTED USES FOR WHICH DEVELOPMENT IS PERMISSIBLE WITH DEVELOPMENT CONSENT - SCHEDULE 1

Additional permitted uses, if any, for which development is permissible with development consent pursuant to Clause 2.5 and Schedule 1 of Pittwater Local Environmental Plan 2014;-

Note: *Where no additional permitted uses have been listed under the heading "ADDITIONAL PERMITTED USES FOR WHICH DEVELOPMENT IS PERMISSIBLE WITH DEVELOPMENT CONSENT", then clause 2.5 of Pittwater Local Environmental Plan 2014 is inapplicable to the land the subject of this certificate.*

FURTHER PLANNING CONTROLS

EP&A Regulations 2000
Schedule 4 Clause 2 (e) (f) (g) (h)

Note: *Where no information has been provided under the heading "*FURTHER PLANNING CONTROLS*", then such information is inapplicable to the land the subject of this certificate.*

ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

EP&A Regulations 2000
Schedule 4 Clause 2A

Note: *Where no information has been provided under the heading "*ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006*", then such information is inapplicable to the land the subject of this certificate.*

COMPLYING DEVELOPMENT

EP&A Regulations 2000
Schedule 4 Clause 3

The following notations relate to the extent to which the land is land on which complying development may or may not be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

GENERAL HOUSING CODE

Complying development under the General Housing Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

Note: *Further zone based limitations may apply. See State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 clause:*
3.1 Land to which code applies
This code applies to development that is specified in clauses 3.2-3.5 on any lot in Zone R1, R2, R3, R4 or RU5 that:

(a) has an area of at least 200m2, and
(b) has a width, measured at the building line fronting a primary road, of at least 6m.

RURAL HOUSING CODE

Complying development under the Rural Housing Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

Note: *Further zone based limitations may apply. See State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 clause:*
3A.1 Land to which code applies

This code applies to development that is specified in clauses 3A.2-3A.5 on lots in Zone RU1, RU2, RU3, RU4, RU6 and R5.

HOUSING ALTERATIONS CODE

Complying development under the Housing Alterations Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

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Complying development under the General Development Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

COMMERCIAL AND INDUSTRIAL ALTERATIONS CODE

Complying development under the Commercial & Industrial (Alterations) Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

COMMERCIAL AND INDUSTRIAL (NEW BUILDINGS AND ADDITIONS) CODE

Complying development under the Commercial & Industrial (New Buildings and Additions) Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

Note: *Further zone based limitations may apply. See State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 clause:*
5A.1 Land to which code applies
This code applies to development that is specified in clause 5A.2 on any lot in Zone B1, B2, B3, B4, B5, B6, B7, B8, IN1, IN2, IN3, IN4 or SP3.

SUBDIVISION CODE

Complying development under the Subdivision Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

DEMOLITION CODE

Complying development under the Demolition Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

FIRE SAFETY CODE

Complying development under the Fire Safety Code may be carried out on all of the land the subject of this certificate, in accordance with the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

***Note**: State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 ("SEPP") must be read and applied in conjunction with Pittwater Local Environmental Plan 2014.*

COASTAL PROTECTION

EP&A Regulations 2000
Schedule 4 Clause 4

The Council has not been notified by the Department of Finance, Services and Innovation that the land is affected by the operation of section 38 or 39 of the Coastal Protection Act 1979.

CERTAIN INFORMATION RELATING TO BEACHES AND COASTS

EP&A Regulations 2000
Schedule 4 Clause 4A

1) Council is not aware of any order made under Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works to the land the subject of this certificate, or on public land adjacent to that land.

2) Council has not been notified under section 55X of the *Coastal Protection Act 1979* that temporary coastal protection works have been placed on the land subject of this certificate, or on public land adjacent to that land.

ANNUAL CHARGES UNDER LOCAL GOVERNMENT ACT 1993 FOR COASTAL PROTECTION SERVICES THAT RELATE TO EXISTING COASTAL PROTECTION WORKS

EP&A Regulations 2000
Schedule 4 Clause 4B

Council is not aware of any charges under section 496B of the *Local Government Act 2014* for coastal protection services levied upon land the subject of this certificate.

MINE SUBSIDENCE

EP&A Regulations 2000
Schedule 4 Clause 5

The land has not been proclaimed to be a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

EP&A Regulations 2000
Schedule 4 Clause 6

(a) The land is not affected by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993.
(b) The land is not affected by any road widening or road realignment under Pittwater Local Environmental Plan 2014.

(c) The land is not affected by any road widening or road realignment under any resolution of Council.

Note: *The Roads and Maritime Services may have proposals that are not referred to in this item. For advice about affectation by RMS proposals, contact the Roads and Maritime Services.*

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

EP&A Regulations 2000
Schedule 4 Clause 7

Council has adopted a number of policies with regard to various hazards or risks which may restrict development. The identified hazard or risk and the respective Council policies which affect the property, if any, are listed below.

The property is not affected by any other policy adopted by any other planning authority and notified to the Council for the express purpose of its adoption by that authority being referred to in planning certificates that restricts development of the property because of the likelihood of land slip, bushfire, tidal inundation, subsidence or any other risk (other than flooding):

Note: *The absence of a policy to restrict development of the land because of the likelihood of any other risk does not imply that the land is free from risk. Detailed investigation carried out in conjunction with the preparation or assessment of an application may result in the Council imposing restrictions on development that are not identified above.*

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

EP&A Regulations 2000
Schedule 4 Clause 7A

Yes, development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development of the purposes of group homes or seniors housing) is subject to flood related development controls.

Yes, development on the land or part of the land for any other purpose is subject to flood related development controls.

LAND RESERVED FOR ACQUISITION

EP&A Regulations 2000
Schedule 4 Clause 8

This land is not affected by any provisions within Pittwater Local Environmental Plan 2014 that would provide for the acquisition of the land by a public authority, as referred to in section 27 of the Act.

CONTRIBUTIONS PLANS

EP&A Regulations 2000
Schedule 4 Clause 9

Warriewood Valley Release Area Section 94 Contributions Plan Amendment 16 Revision 2 - in force 4 Feb 2017

This Plan was approved by Council to levy contributions towards the provision, extension or augmentation of public amenities and public services that will, or are likely to be, required as a consequence of development in the Warriewood Valley Urban Release Area.

BIODIVERSITY CERTIFIED LAND
EP&A Regulations 2000
Schedule 4 Clause 9A

Note: *Where no information has been provided under the heading "*BIODIVERSITY CERTIFIED LAND*", then such information is inapplicable to the land the subject of this certificate.*

BIOBANKING AGREEMENTS
EP&A Regulations 2000
Schedule 4 Clause 10

Note: *Where no information has been provided under the heading "*BIOBANKING AGREEMENTS*", then Council is unaware of any such agreement applying to the land the subject of this certificate.*

BUSH FIRE PRONE LAND
EP&A Regulations 2000
Schedule 4 Clause 11

This land the subject of this certificate is not identified on a Bush Fire Prone Land map certified by the Commissioner of the NSW Rural Fire Service as being bush fire prone land as per the Rural Fires and Environmental Assessment Legislation Amendment Act 2002 No 67.

PROPERTY VEGETATION PLANS
EP&A Regulations 2000
Schedule 4 Clause 12

Note: *Where no information has been provided under the heading "*PROPERTY VEGETATION PLANS*", then such information is inapplicable to the land the subject of this certificate.*

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006
EP&A Regulations 2000
Schedule 4 Clause 13

Note: *Where no information has been provided under the heading "*ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006*", then such information is inapplicable to the land the subject of this certificate.*

DIRECTIONS UNDER PART 3A
EP&A Regulations 2000
Schedule 4 Clause 14

Note: *Where no information has been provided under the heading "*DIRECTIONS UNDER PART 3A*", then such information is inapplicable to the land the subject of this certificate.*

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING
EP&A Regulations 2000
Schedule 4 Clause 15

Note: *Where no information has been provided under the heading "*SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING*", then Council is unaware of any such site compatibility certificate applying to the land the subject of this certificate.*

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE
EP&A Regulations 2000
Schedule 4 Clause 16

Note: *Where no information has been provided under the heading "*SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE*", then Council is unaware of any such site compatibility certificate applying to the land the subject of this certificate.*

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

EP&A Regulations 2000
Schedule 4 Clause 17

Note: *Where no information has been provided under the heading "*SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING*", then Council is unaware of any such site compatibility certificate applying to the land the subject of this certificate.*

PAPER SUBDIVISION INFORMATION

EP&A Regulations 2000
Schedule 4 Clause 18

Note: *Where no information has been provided under the heading "*PAPER SUBDIVISION INFORMATION*" then Council is unaware of any such development plan or subdivision order applying to the land the subject of this certificate.*

SITE VERIFICATION CERTIFICATES

EP&A Regulations 2000
Schedule 4 Clause 19

Note: *Where no information has been provided under the heading "*SITE VERIFICATION CERTIFICATES*", then Council is unaware of any such site verification certificate applying to the land the subject of this certificate.*

LOOSE-FILL ASBESTOS INSULATION

EP&A Regulations 2000
Schedule 4 Clause 20

Note: *Where no information has been provided under the heading "*LOOSE-FILL ASBESTOS INSULATION*", then Council is unaware of any such site verification certificate applying to the land the subject of this certificate.*

MATTERS ARISING UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997

Contaminated Land Management Act 1997
Section 59 (2)

Note: *Where no information has been provided under the heading "*MATTERS ARISING UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997*", then such information is inapplicable to the land the subject of this certificate.*

Persons relying on this certificate should read the environmental planning instruments referred to in this certificate.

MARK FERGUSON
Interim General Manager

APPENDIX D

Laboratory Certificates – Contamination

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 171042

Client:

Geoenviro Consultancy Pty Ltd
PO Box 1543, Macquarie Centre
North Ryde
NSW 2113

Attention: Adrian Tejada

Sample log in details:

Your Reference:	**JE17655A,9-13 Fern Creek Road, Warriewood**
No. of samples:	35 soils
Date samples received / completed instructions received	10/07/2017 / 10/07/2017

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	17/07/17 / 17/07/17
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

ACCREDITED FOR TECHNICAL COMPETENCE

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	171042-25	171042-26	171042-27	171042-28	171042-29
Your Reference	---------- -	TP7	TP12	TP14	TP15	TP16
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ 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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	83	83	83	78	75

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	171042-30	171042-31	171042-32	171042-33	171042-34
Your Reference	---------- -	TP18	TP20	TP23	TP27	TP32
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ 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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	79	75	79	80

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	171042-35
Your Reference	---------- -	Duplicate A
Composite Reference	----------	--
Depth		0.0-0.1
Date Sampled		7/07/2017
Type of sample		Soil
Date extracted	-	12/07/2017
Date analysed	-	13/07/2017
TRHC$_6$ - C$_9$	mg/kg	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25
vTPHC$_6$ - C$_{10}$ 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
Total +ve Xylenes	mg/kg	<1
naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	83

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	171042-25	171042-26	171042-27	171042-28	171042-29
Your Reference	---------- -	TP7	TP12	TP14	TP15	TP16
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	93	88	86	88	90

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	171042-30	171042-31	171042-32	171042-33	171042-34
Your Reference	---------- -	TP18	TP20	TP23	TP27	TP32
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	87	88	87	87	86

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	171042-35
Your Reference	---------- -	Duplicate A
Composite Reference	----------	--
Depth		0.0-0.1
Date Sampled		7/07/2017
Type of sample		Soil
Date extracted	-	12/07/2017
Date analysed	-	13/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	88

PAHs in Soil						
Our Reference:	UNITS	171042-25	171042-26	171042-27	171042-28	171042-29
Your Reference	---------- -	TP7	TP12	TP14	TP15	TP16
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
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	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<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	0.1	<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	0.1	<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
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
Total +ve PAH's	mg/kg	1.1	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	109	95	96	94	96

PAHs in Soil						
Our Reference:	UNITS	171042-30	171042-31	171042-32	171042-33	171042-34
Your Reference	---------- -	TP18	TP20	TP23	TP27	TP32
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
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	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<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	<0.1	<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
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
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	94	94	95	94	94

PAHs in Soil		
Our Reference:	UNITS	171042-35
Your Reference	---------- -	Duplicate A
Composite Reference	----------	--
Depth		0.0-0.1
Date Sampled		7/07/2017
Type of sample		Soil
Date extracted	-	12/07/2017
Date analysed	-	13/07/2017
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	0.2
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	0.08
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
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
Total +ve PAH's	mg/kg	0.50
Surrogate p-Terphenyl-d14	%	96

Organochlorine Pesticides in soil						
Our Reference:	UNITS	171042-1	171042-2	171042-3	171042-4	171042-5
Your Reference	---------- -	C1	C2	C3	C4	C5
Composite Reference	----------	(7+8+9)	(10+11+12)	(13+14+15)	(16+17+18)	(19+20+21)
Depth		--	--	--	--	--
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017	14/07/2017	14/07/2017
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	%	84	84	82	84	84

Organochlorine Pesticides in soil						
Our Reference:	UNITS	171042-6	171042-25	171042-26	171042-27	171042-28
Your Reference	---------- -	C6	TP7	TP12	TP14	TP15
Composite Reference	----------	(22+23+24)	--	--	--	--
Depth		--	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017	14/07/2017	14/07/2017
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	%	83	84	82	90	85

Organochlorine Pesticides in soil						
Our Reference:	UNITS	171042-29	171042-30	171042-31	171042-32	171042-33
Your Reference	---------- -	TP16	TP18	TP20	TP23	TP27
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017	14/07/2017	14/07/2017
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	%	87	84	84	84	86

Organochlorine Pesticides in soil			
Our Reference:	UNITS	171042-34	171042-35
Your Reference	---------- -	TP32	Duplicate A
Composite Reference	----------	--	--
Depth		0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017
Type of sample		Soil	Soil
Date extracted	-	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	82	86

PCBs in Soil						
Our Reference:	UNITS	171042-1	171042-2	171042-3	171042-4	171042-5
Your Reference	---------- -	C1	C2	C3	C4	C5
Composite Reference	----------	(7+8+9)	(10+11+12)	(13+14+15)	(16+17+18)	(19+20+21)
Depth		--	--	--	--	--
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017	14/07/2017	14/07/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	84	84	82	84	84

PCBs in Soil						
Our Reference:	UNITS	171042-6	171042-25	171042-26	171042-27	171042-28
Your Reference	---------- -	C6	TP7	TP12	TP14	TP15
Composite Reference	----------	(22+23+24)	--	--	--	--
Depth		--	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017	14/07/2017	14/07/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	83	84	82	90	85

PCBs in Soil						
Our Reference:	UNITS	171042-29	171042-30	171042-31	171042-32	171042-33
Your Reference	---------- -	TP16	TP18	TP20	TP23	TP27
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017	14/07/2017	14/07/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	87	84	84	84	86

PCBs in Soil			
Our Reference:	UNITS	171042-34	171042-35
Your Reference	---------- -	TP32	Duplicate A
Composite Reference	----------	--	--
Depth		0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017
Type of sample		Soil	Soil
Date extracted	-	12/07/2017	12/07/2017
Date analysed	-	14/07/2017	14/07/2017
Aroclor 1016	mg/kg	<0.3	<0.1
Aroclor 1221	mg/kg	<0.3	<0.1
Aroclor 1232	mg/kg	<0.3	<0.1
Aroclor 1242	mg/kg	<0.3	<0.1
Aroclor 1248	mg/kg	<0.3	<0.1
Aroclor 1254	mg/kg	<0.3	<0.1
Aroclor 1260	mg/kg	<0.3	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.3	<0.1
Surrogate TCLMX	%	82	86

Acid Extractable metals in soil						
Our Reference:	UNITS	171042-1	171042-2	171042-3	171042-4	171042-5
Your Reference	---------- -	C1	C2	C3	C4	C5
Composite Reference	----------	(7+8+9)	(10+11+12)	(13+14+15)	(16+17+18)	(19+20+21)
Depth		--	--	--	--	--
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Arsenic	mg/kg	<4	<4	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	8	4	8	4
Copper	mg/kg	25	9	7	13	5
Lead	mg/kg	53	35	18	24	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	<1	<1	2	1
Zinc	mg/kg	76	26	25	66	41

Acid Extractable metals in soil						
Our Reference:	UNITS	171042-6	171042-25	171042-26	171042-27	171042-28
Your Reference	---------- -	C6	TP7	TP12	TP14	TP15
Composite Reference	----------	(22+23+24)	--	--	--	--
Depth		--	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.7
Chromium	mg/kg	4	9	10	9	6
Copper	mg/kg	13	7	9	1	34
Lead	mg/kg	12	12	16	7	40
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	5	2	2	6
Zinc	mg/kg	97	26	35	10	540

Acid Extractable metals in soil						
Our Reference:	UNITS	171042-29	171042-30	171042-31	171042-32	171042-33
Your Reference	---------- -	TP16	TP18	TP20	TP23	TP27
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Arsenic	mg/kg	<4	<4	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.6
Chromium	mg/kg	5	3	9	2	5
Copper	mg/kg	2	5	6	5	5
Lead	mg/kg	10	16	18	14	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	2	<1	3
Zinc	mg/kg	37	24	26	18	37

Acid Extractable metals in soil				
Our Reference:	UNITS	171042-34	171042-35	171042-36
Your Reference	---------- -	TP32	Duplicate A	TP7 - [TRIPLICATE]
Composite Reference	----------	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	07/07/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	12/07/2017	12/07/2017	12/07/2017
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	8	11	9
Copper	mg/kg	11	6	7
Lead	mg/kg	42	12	11
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	3
Zinc	mg/kg	85	36	22

Moisture						
Our Reference:	UNITS	171042-1	171042-2	171042-3	171042-4	171042-5
Your Reference	---------- -	C1	C2	C3	C4	C5
Composite Reference	----------	(7+8+9)	(10+11+12)	(13+14+15)	(16+17+18)	(19+20+21)
Depth		--	--	--	--	--
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Moisture	%	7.3	6.7	15	9.8	12

Moisture						
Our Reference:	UNITS	171042-6	171042-25	171042-26	171042-27	171042-28
Your Reference	---------- -	C6	TP7	TP12	TP14	TP15
Composite Reference	----------	(22+23+24)	--	--	--	--
Depth		--	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Moisture	%	14	7.1	11	11	13

Moisture						
Our Reference:	UNITS	171042-29	171042-30	171042-31	171042-32	171042-33
Your Reference	---------- -	TP16	TP18	TP20	TP23	TP27
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/07/2017	12/07/2017	12/07/2017	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Moisture	%	0.9	12	14	8.6	7.1

Moisture			
Our Reference:	UNITS	171042-34	171042-35
Your Reference	---------- -	TP32	Duplicate A
Composite Reference	----------	--	--
Depth		0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017
Type of sample		Soil	Soil
Date prepared	-	12/07/2017	12/07/2017
Date analysed	-	13/07/2017	13/07/2017
Moisture	%	11	7.9

Asbestos ID - soils						
Our Reference:	UNITS	171042-25	171042-26	171042-27	171042-28	171042-29
Your Reference	---------- -	TP7	TP12	TP14	TP15	TP16
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Sample mass tested	g	Approx. 55g	Approx. 60g	Approx. 50g	Approx. 30g	Approx. 35g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference:	UNITS	171042-30	171042-31	171042-32	171042-33	171042-34
Your Reference	---------- -	TP18	TP20	TP23	TP27	TP32
Composite Reference	----------	--	--	--	--	--
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Sample mass tested	g	Approx. 35g	Approx. 45g	Approx. 45g	Approx. 40g	Approx. 35g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Misc Inorg - Soil				
Our Reference:	UNITS	171042-1	171042-3	171042-5
Your Reference	---------- -	C1	C3	C5
Composite Reference	----------	(7+8+9)	(13+14+15)	(19+20+21)
Depth		--	--	--
Date Sampled		7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	14/07/2017	14/07/2017	14/07/2017
Date analysed	-	14/07/2017	14/07/2017	14/07/2017
pH 1:5 soil:water	pH Units	7.0	6.0	6.3

ESP/CEC				
Our Reference:	UNITS	171042-1	171042-3	171042-5
Your Reference	---------- -	C1	C3	C5
Composite Reference	----------	(7+8+9)	(13+14+15)	(19+20+21)
Depth		--	--	--
Date Sampled		7/07/2017	7/07/2017	7/07/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	13/07/2017	13/07/2017	13/07/2017
Date analysed	-	13/07/2017	13/07/2017	13/07/2017
Exchangeable Ca	meq/100g	3.3	1.7	3.2
Exchangeable K	meq/100g	<0.1	0.1	<0.1
Exchangeable Mg	meq/100g	0.38	0.43	0.46
Exchangeable Na	meq/100g	<0.1	<0.1	<0.1
Cation Exchange Capacity	meq/100g	3.7	2.2	3.7

Method ID	Methodology Summary
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.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ 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. 'TEQ 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. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Metals-020	Determination of various metals by ICP-AES.

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	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.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Date analysed	-			13/07/2017	171042-25	13/07/2017 || 13/07/2017	LCS-3	13/07/2017
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	171042-25	<25 || <25	LCS-3	99%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	171042-25	<25 || <25	LCS-3	99%
Benzene	mg/kg	0.2	Org-016	<0.2	171042-25	<0.2 || <0.2	LCS-3	95%
Toluene	mg/kg	0.5	Org-016	<0.5	171042-25	<0.5 || <0.5	LCS-3	84%
Ethylbenzene	mg/kg	1	Org-016	<1	171042-25	<1 || <1	LCS-3	102%
m+p-xylene	mg/kg	2	Org-016	<2	171042-25	<2 || <2	LCS-3	107%
o-Xylene	mg/kg	1	Org-016	<1	171042-25	<1 || <1	LCS-3	101%
naphthalene	mg/kg	1	Org-014	<1	171042-25	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	81	171042-25	83 || 80 || RPD: 4	LCS-3	82%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Date analysed	-			13/07/2017	171042-25	13/07/2017 || 13/07/2017	LCS-3	13/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	171042-25	<50 || <50	LCS-3	115%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	171042-25	<100 || <100	LCS-3	115%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	171042-25	<100 || <100	LCS-3	106%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	171042-25	<50 || <50	LCS-3	115%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	171042-25	<100 || <100	LCS-3	115%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	171042-25	<100 || <100	LCS-3	106%
Surrogate o-Terphenyl	%		Org-003	89	171042-25	93 || 88 || RPD: 6	LCS-3	108%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Date analysed	-			13/07/2017	171042-25	13/07/2017 || 13/07/2017	LCS-3	13/07/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	LCS-3	107%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	LCS-3	105%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	LCS-3	119%
Anthracene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	171042-25	0.2 || 0.2 || RPD: 0	LCS-3	108%
Pyrene	mg/kg	0.1	Org-012	<0.1	171042-25	0.2 || 0.3 || RPD: 40	LCS-3	108%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	171042-25	0.1 || 0.1 || RPD: 0	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	171042-25	0.1 || 0.1 || RPD: 0	LCS-3	120%
Benzo(b,j +k)fluoranthene	mg/kg	0.2	Org-012	<0.2	171042-25	0.2 || 0.2 || RPD: 0	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	171042-25	0.1 || 0.1 || RPD: 0	LCS-3	100%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	171042-25	0.1 || 0.1 || RPD: 0	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	171042-25	0.1 || 0.1 || RPD: 0	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	102	171042-25	109 || 99 || RPD: 10	LCS-3	125%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Date analysed	-			14/07/2017	171042-25	14/07/2017 || 14/07/2017	LCS-3	14/07/2017
HCB	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	75%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	97%
Heptachlor	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	101%
delta-BHC	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	97%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	100%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	100%
Dieldrin	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	109%
Endrin	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	100%
pp-DDD	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	102%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	LCS-3	74%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	86	171042-25	84 || 86 || RPD: 2	LCS-3	109%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Date analysed	-			14/07/2017	171042-25	14/07/2017 || 14/07/2017	LCS-3	14/07/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	LCS-3	101%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	171042-25	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	86	171042-25	84 || 86 || RPD: 2	LCS-3	84%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Date analysed	-			12/07/2017	171042-25	12/07/2017 || 12/07/2017	LCS-3	12/07/2017
Arsenic	mg/kg	4	Metals-020	<4	171042-25	<4 || 5	LCS-3	106%
Cadmium	mg/kg	0.4	Metals-020	<0.4	171042-25	<0.4 || <0.4	LCS-3	101%
Chromium	mg/kg	1	Metals-020	<1	171042-25	9 || 9 || RPD: 0	LCS-3	106%
Copper	mg/kg	1	Metals-020	<1	171042-25	7 || 17 || RPD: 83	LCS-3	106%
Lead	mg/kg	1	Metals-020	<1	171042-25	12 || 12 || RPD: 0	LCS-3	100%
Mercury	mg/kg	0.1	Metals-021	<0.1	171042-25	<0.1 || <0.1	LCS-3	104%
Nickel	mg/kg	1	Metals-020	<1	171042-25	5 || 3 || RPD: 50	LCS-3	100%
Zinc	mg/kg	1	Metals-020	<1	171042-25	26 || 24 || RPD: 8	LCS-3	101%
QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			14/07/2017	[NT]	[NT]	LCS-3	14/07/2017
Date analysed	-			14/07/2017	[NT]	[NT]	LCS-3	14/07/2017
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-3	102%
QUALITY CONTROL ESP/CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			13/07/2017	[NT]	[NT]	LCS-3	13/07/2017
Date analysed	-			13/07/2017	[NT]	[NT]	LCS-3	13/07/2017
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	101%
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	105%
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	99%

QUALITY CONTROL ESP/CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Exchangeable Na	meq/100 g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	106%
ESP	%	1	Metals-009	[NT]	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	171042-26	12/07/2017
Date analysed	-	[NT]	[NT]	171042-26	13/07/2017
TRHC$_6$ - C$_9$	mg/kg	[NT]	[NT]	171042-26	95%
TRHC$_6$ - C$_{10}$	mg/kg	[NT]	[NT]	171042-26	95%
Benzene	mg/kg	[NT]	[NT]	171042-26	93%
Toluene	mg/kg	[NT]	[NT]	171042-26	83%
Ethylbenzene	mg/kg	[NT]	[NT]	171042-26	97%
m+p-xylene	mg/kg	[NT]	[NT]	171042-26	102%
o-Xylene	mg/kg	[NT]	[NT]	171042-26	100%
naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	171042-26	78%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	171042-26	12/07/2017
Date analysed	-	[NT]	[NT]	171042-26	13/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	[NT]	[NT]	171042-26	106%
TRHC$_{15}$ - C$_{28}$	mg/kg	[NT]	[NT]	171042-26	106%
TRHC$_{29}$ - C$_{36}$	mg/kg	[NT]	[NT]	171042-26	83%
TRH>C$_{10}$-C$_{16}$	mg/kg	[NT]	[NT]	171042-26	106%
TRH>C$_{16}$-C$_{34}$	mg/kg	[NT]	[NT]	171042-26	106%
TRH>C$_{34}$-C$_{40}$	mg/kg	[NT]	[NT]	171042-26	83%
Surrogate o-Terphenyl	%	[NT]	[NT]	171042-26	95%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	171042-26	12/07/2017
Date analysed	-	[NT]	[NT]	171042-26	13/07/2017
Naphthalene	mg/kg	[NT]	[NT]	171042-26	100%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	171042-26	98%
Phenanthrene	mg/kg	[NT]	[NT]	171042-26	107%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	171042-26	95%
Pyrene	mg/kg	[NT]	[NT]	171042-26	99%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Chrysene	mg/kg	[NT]	[NT]	171042-26	109%
Benzo(b,j+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	171042-26	96%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	171042-26	116%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	171042-35	12/07/2017 || 12/07/2017	171042-26	12/07/2017
Date analysed	-	171042-35	14/07/2017 || 13/07/2017	171042-26	14/07/2017
HCB	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	171042-35	<0.1 || <0.1	171042-26	78%
gamma-BHC	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	171042-35	<0.1 || <0.1	171042-26	93%
Heptachlor	mg/kg	171042-35	<0.1 || <0.1	171042-26	97%
delta-BHC	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	171042-35	<0.1 || <0.1	171042-26	92%
Heptachlor Epoxide	mg/kg	171042-35	<0.1 || <0.1	171042-26	95%
gamma-Chlordane	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	171042-35	<0.1 || <0.1	171042-26	95%
Dieldrin	mg/kg	171042-35	<0.1 || <0.1	171042-26	104%
Endrin	mg/kg	171042-35	<0.1 || <0.1	171042-26	95%
pp-DDD	mg/kg	171042-35	<0.1 || <0.1	171042-26	99%
Endosulfan II	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	171042-35	<0.1 || <0.1	171042-26	73%
Methoxychlor	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	171042-35	86 || 102 || RPD: 17	171042-26	104%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	171042-35	12/07/2017 || 12/07/2017	171042-26	12/07/2017
Date analysed	-	171042-35	14/07/2017 || 13/07/2017	171042-26	14/07/2017
Aroclor 1016	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	171042-35	<0.1 || <0.1	171042-26	101%
Aroclor 1260	mg/kg	171042-35	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	171042-35	86 || 102 || RPD: 17	171042-26	84%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	171042-26	12/07/2017
Date analysed	-	[NT]	[NT]	171042-26	12/07/2017
Arsenic	mg/kg	[NT]	[NT]	171042-26	100%
Cadmium	mg/kg	[NT]	[NT]	171042-26	105%
Chromium	mg/kg	[NT]	[NT]	171042-26	101%
Copper	mg/kg	[NT]	[NT]	171042-26	109%
Lead	mg/kg	[NT]	[NT]	171042-26	97%
Mercury	mg/kg	[NT]	[NT]	171042-26	107%
Nickel	mg/kg	[NT]	[NT]	171042-26	102%
Zinc	mg/kg	[NT]	[NT]	171042-26	95%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	171042-28	12/07/2017 || 12/07/2017
Date analysed	-	171042-28	12/07/2017 || 12/07/2017
Arsenic	mg/kg	171042-28	<4 || <4
Cadmium	mg/kg	171042-28	0.7 || 1 || RPD: 35
Chromium	mg/kg	171042-28	6 || 6 || RPD: 0
Copper	mg/kg	171042-28	34 || 27 || RPD: 23
Lead	mg/kg	171042-28	40 || 40 || RPD: 0
Mercury	mg/kg	171042-28	<0.1 || <0.1
Nickel	mg/kg	171042-28	6 || 6 || RPD: 0
Zinc	mg/kg	171042-28	540 || 610 || RPD: 12

QUALITY CONTROL Misc Inorg - Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	171042-1	14/07/2017 || 14/07/2017
Date analysed	-	171042-1	14/07/2017 || 14/07/2017
pH 1:5 soil:water	pH Units	171042-1	7.0 || 6.6 || RPD: 6

Report Comments:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 171042-25 for Cu. Therefore a triplicate result has been issued as laboratory sample number 171042-36.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 171042- 25 to 34 were sub-sampled from jars provided by the client.

ESP: Where the exchangeable Sodium is less than the PQL and CEC is less than 10meq/100g, the ESP cannot be calculated.

PCB in soil: PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

Asbestos ID was analysed by Approved Identifier: Jessica Hie
Asbestos ID was authorised by Approved Signatory: Matt Mansfield

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

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.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Geoenviro Consultancy Pty Ltd
Attention	Adrian Tejada

Sample Login Details	
Your Reference	JE17655A,9-13 Fern Creek Road, Warriewood
Envirolab Reference	**171042**
Date Sample Received	10/07/2017
Date Instructions Received	10/07/2017
Date Results Expected to be Reported	**17/07/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	35 soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	13.2
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

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

Sample and Testing Details on following page

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

Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*pH 1:5 soil:water*	*ESP/CEC*	*On Hold*
C1---				✓	✓	✓		✓	✓	
C2---				✓	✓	✓				
C3---				✓	✓	✓		✓	✓	
C4---				✓	✓	✓				
C5---				✓	✓	✓		✓	✓	
C6---				✓	✓	✓				
TP1-0.0-0.1										✓
TP2-0.0-0.1										✓
TP3-0.0-0.1										✓
TP4-0.0-0.1										✓
TP5-0.0-0.1										✓
TP9-0.0-0.1										✓
TP19-0.0-0.1										✓
TP21-0.0-0.1										✓
TP22-0.0-0.1										✓
TP24-0.0-0.1										✓
TP25-0.0-0.1										✓
TP26-0.0-0.1										✓
TP31-0.0-0.1										✓
TP33-0.0-0.1										✓
TP34-0.0-0.1										✓
TP35-0.0-0.1										✓
TP36-0.0-0.1										✓
TP37-0.0-0.1										✓
TP7-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP12-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP14-0.1-0.2	✓	✓	✓	✓	✓	✓	✓			
TP15-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP16-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP18-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP20-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP23-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP27-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
TP32-0.0-0.1	✓	✓	✓	✓	✓	✓	✓			
Duplicate A-0.0-0.1	✓	✓	✓	✓	✓	✓				

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Laboratory Test Request/Chain of Custody Record

Job Details
Job Number: JE17655A
Client:
Project: Proposed Residential Subdivision Development
Location: 9-13 Fern Creek Road Warriewood

Sample Date: 07/07/2017
Sampled By: AT
Project Manager: SL
Store Location:

External Laboratory Details:
Laboratory name: Envirolab Services Pty Ltd
Address: 12 Ashley Street
Chatswood
Contact: Tania Notaris

Sampling Details				Sample Type		Test Required (\) / Test Performed(X)																							
Location		Depth (m)		Soil	Water	Metals (As Cd Cr Cu Pb Zn Ni Hg)	OCP / PCB		Combination 5	Combination 5a	Combination 12a		Asbestos		pH	EC	CEC/ESP	Cl / SO4	Resistivity										Keep Sample
171042		From	To																										
1	C1	-	-	DG		/	/								/		/												
2	C2	-	-	DG		/	/								/		/												
3	C3	-	-	DG		/	/								/		/												
4	C4	-	-	DG		/	/																						
5	C5	-	-	DG		/	/								/		/												
6	C6	-	-	DG		/	/																						

Relinquished by				Received By			
Laboratory	Name	Signature	Date	Laboratory	Name	Signature	Date
GeoEnviro Consultancy	Adrian Tejada		10/07/2017	ELS	JE		10.7.17

Legend

DB Disturbed Sample (Bulk, Plastic bag)
DS Disturbed Sample (Small, Plastic bag)
DG Disturbed Sample (Glass Jar)
STP Standard Penetration Test Sample
U50 Undisturbed Sample, 50mm Tube
U75 Undisturbed Sample, 75mm Tube
WG Water Sample, Amber Glass Jar
WP Water Sample, Plastic Bottle
Y Keep Sample
N Discard Sample

GEOENVIRO CONSULTANCY Pty Ltd

Composite Schedule

Location: 9-13 Fern Creek Road Warriewood Job No: JE17655A

Composite ID	Samples		
1 C1	7 TP 1 (0.0-0.1 m)	8 TP 2 (0.0-0.1 m)	9 TP 3 (0.0-0.1 m)
2 C2	10 TP 4 (0.0-0.1 m)	11 TP 5 (0.0-0.1 m)	12 TP 9 (0.0-0.1 m)
3 C3	13 TP 19 (0.0-0.1 m)	14 TP 21 (0.0-0.1 m)	15 TP 22 (0.0-0.1 m)
4 C4	16 TP 24 (0.0-0.1 m)	17 TP 25 (0.0-0.1 m)	18 TP 26 (0.0-0.1 m)
5 C5	19 TP 31 (0.0-0.1 m)	20 TP 33 (0.0-0.1 m)	21 TP 34 (0.0-0.1 m)
6 C6	22 TP 35 (0.0-0.1 m)	23 TP 36 (0.0-0.1 m)	24 TP 37 (0.0-0.1 m)

C:\\Lab\worksheet\w020 Form No. W020/Ver02/06/99

ENVIROLAB GROUP

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

Job No: 171042

Date Received: 10.7.17
Time Received: 1800
Received by: JE
Temp: Cool/Ambient 13.2°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Laboratory Test Request/Chain of Custody Record

Job Details
Job Number: JE17655A
Client:
Project: Proposed Residential Subdivision Development
Location: 9-13 Fern Creek Road Warriewood

Sample Date: 07/07/2017
Sampled By: AT
Project Manager: SL
Store Location:

External Laboratory Details:
Laboratory name: Envirolab Services Pty Ltd
Address: 12 Ashley Street
Chatswood
Contact: Tania Notaris

Sampling Details				Sample Type		Test Required (\) / Test Performed(X)																						
Location		Depth (m)		Soil	Water	Metals (As Cd Cr Cu Pb Zn Ni Hg)	OCP / PCB		Combination 5	Combination 5a	Combination 12a		Asbestos		pH	EC	CEC/ESP	Cl / SO4	Resistivity									Keep Sample
171042		From	To																									
25	TP 7	0.00	0.10	DG						/																		
26	TP 12	0.00	0.10	DG						/																		
27	TP 14	0.10	0.20	DG						/																		
28	TP 15	0.00	0.10	DG						/																		
29	TP 16	0.00	0.10	DG						/																		
30	TP 18	0.00	0.10	DG						/																		
31	TP 20	0.00	0.10	DG						/																		
32	TP 23	0.00	0.10	DG						/																		
33	TP 27	0.00	0.10	DG						/																		
34	TP 32	0.00	0.10	DG						/																		
35	Duplicate A	-	-	DG					/																			

Relinquished by				Received By			
Laboratory	Name	Signature	Date	Laboratory	Name	Signature	Date
GeoEnviro Consultancy	Adrian Tejada		10/07/2017	ELS	JG		10.7.17

Legend

DB Disturbed Sample (Bulk, Plastic bag)
DS Disturbed Sample (Small, Plastic bag)
DG Disturbed Sample (Glass Jar)
STP Standard Penetration Test Sample
U50 Undisturbed Sample, 50mm Tube
U75 Undisturbed Sample, 75mm Tube
WG Water Sample, Amber Glass Jar
WP Water Sample, Plastic Bottle

Y Keep Sample
N Discard Sample

APPENDIX E

Unexpected Asbestos Finds Protocol

Unexpected Asbestos Finds

If asbestos is detected in area not identified as containing asbestos prior to, or during, bulk excavation works the following 'Unexpected Finds Protocol' will apply:

- Upon discovery of suspected asbestos containing material, the site manager is to be notified and the affected area closed off by the use of barrier tape and warning signs. Warning signs shall be specific to Asbestos Hazards and shall comply with the Australian Standard 1319-1994 – Safety Signs for the Occupational Environment;
- Work shall comply with WorkCover requirements including *Working with Asbestos*, *2008*;
- An OHS consultant or a hygienist is to be notified to inspect the area and confirm the presence of asbestos and determine whether the asbestos is classified as friable or bonded asbestos and determine the extent of remediation works to be undertaken. A report detailing this information will be compiled by the OHS consultant and provided to the Site Manager (SM) (or his representative);
- The impacted soil will be classified and disposed of, as a minimum, as Special Waste (Asbestos) at an appropriately licensed facility. In dry and windy conditions the stockpile will be kept lightly wetted and may be covered with plastic sheet whilst awaiting disposal;
- All work associated with asbestos in soil will be undertaken by a contractor holding a class AS-1 Licence (friable) or AS2 Licence for bonded asbestos, as appropriate. WorkCover must be notified 7 days in advance of any asbestos works;
- Monitoring for airborne asbestos fibres is to be carried out during the soil excavation in asbestos contaminated materials;
- Documentary evidence (weighbridge dockets) of correct disposal is to be provided to the Principal (or their representative);
- At the completion of the excavation, a clearance inspection is to be carried out, soil samples taken and analysed for asbestos fibres followed by written certification provided by an OHS Consultant that the area is safe to be accessed and worked (with respect to asbestos impact). If required, the filling material remaining in the inspected area can be covered/ sealed by an appropriate physical barrier layer of non-asbestos containing material prior to sign–off;
- Details are to be recorded in the site record system;
- Following clearance by an OHS Consultant or hygenist, the area may be reopened for further excavation or construction work.

APPENDIX F

Important Information about your Environmental Site Assessment
Explanatory Notes

GeoEnviro Consultancy Pty Ltd
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Tel: (02) 9679 8733
Fax: (02) 9679 8744
Email: geoenviro@exemail.com.au

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

This Environmental Assessment Report was performed in general conformance with our understanding of the guidelines by the Australian and New Zealand Conservation Council (ANZECC), the Office of Environment and Heritage (OEH) and the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013).

These accompanying notes have been prepared by GeoEnviro Consultancy Pty Ltd, using guidelines prepared by ASFE; The Association of Engineering Firms Practising in the Geosciences. The notes are offered as an aid in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL SITE ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre- acquisition assessment on behalf of either a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has change, eg from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of, eg, a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to the assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible, quantify the risks which unrecognised contamination poses to the ongoing or proposed activity. Such risk may be both financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination within a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur, only the most likely contaminants are screened.

AN ENVIRONMANTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

Your environmental assessment report should not be used;

- When the nature of the proposed development is changed, eg, if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered, eg, if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

In order to avoid costly problems, you should ask your consultant to assess any changes in the project since the assessment and the implications, if any, to recommendations made in the assessment.

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientist and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason, site owner should retain the services of their consultants throughout the development stage of the project in order to identify variances, conduct additional tests which may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by GeoEnviro Consultancy Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, that approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data which may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs or specific individuals. An assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another civil engineer.

An assessment should not be used by other persons for any purpose, or by the client for a different purposes. No individual, other than the client, should apply an assessment, even for its intended purposes, without first conferring with the consultant. No person should apply an assessment for any purposes other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FORM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologist, based upon interpretation of field conditions and laboratory evaluation of field samples. Field logs normally provided in our reports and these should not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the test of the assessment. Should this occur, delays and disputes , or unanticipated costs may result.

To reduce the likelihood of boreholes and test pit logs misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion, therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claim being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.

EXPLANATORY NOTES

Introduction

These notes have been provided to amplify the geotechnical report with regard to investigation procedures, classification methods and certain matters relating to the Discussion and Comments sections. Not all notes are necessarily relevant to all reports.

Geotechnical reports are based on information gained from finite sub-surface probing, excavation, boring, sampling or other means of investigation, supplemented by experience and knowledge of local geology. For this reason they must be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods
The methods the description and classification of soils and rocks used in this report are based on Australian standard 1726, the SSA Site investigation Code, in general descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions. Identification and classification of soil and rock involves to a large extent, judgement within the acceptable level commonly adopted by current geotechnical practices.

Soil types are described according to the predominating particle size, qualified by the grading or other particles present (eg sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	Less than 0.002mm
Silt	0.002 to 0.6mm
Sand	0.6 to 2.00mm
Gravel	2.00m to 60.00mm

Soil Classification	Particle size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2.00mm
Gravel	2.00mm to 60.00mm

Cohesive soils are classified on the basis of strength, either by laboratory testing or engineering examination. The strength terms are defined as follows:

Classification	Undrained Shear Strength kPa
Very Soft	Less than 12
Soft	12 - 25
Firm	25 - 50
Stiff	50 - 100
Very Stiff	100 - 200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer test (CPT), as below:

Relative Dense	SPT 'N' Value (blows/300mm)	CPT Cone Value (q_c-Mpa)
Very Loose	Less than 5	Less than 2
Loose	5 - 10	2 - 5
Medium Dense	10 - 30	5 - 15
Dense	30 - 50	15 - 25
Very Dense	> 50	> 25

Rock types are classified by their geological names, together with descriptive terms on degrees of weathering strength, defects and other minor components. Where relevant, further information regarding rock classification, is given on the following sheet.

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

Disturbed samples taken during drilling provided information on plasticity, grained size, colour, type, moisture content, inclusions and depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin walled sample tube (normally know as U_{50}) into the soil and withdrawing a sample of the soil in a relatively undisturbed state. Such Samples yield information on structure and strength and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils. Details of the type and method of sampling are given in the report.

Field Investigation Methods
The following is a brief summary of investigation methods currently carried out by this company and comments on their use and application.

Hand Auger Drilling
The borehole is advanced by manually operated equipment. The diameter of the borehole ranges from 50mm to 100mm. Penetration depth of hand augered boreholes may be limited by premature refusal on a variety of materials, such as hard clay, gravels or ironstone.

Test Pits
These are excavated with a tractor-mounted backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3.0m for a backhoe and up to 6.0m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Care must be taken if construction is to be carried out near, or within the test pit locations, to either adequately recompact the backfill during construction, or to design the structure or accommodate the poorly compacted backfill.

Large Diameter Auger (eg Pengo)
The hole is advanced by a rotating plate or short spiral auger generally 300mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 05m) and are disturbed, but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers and is usually supplemented by occasional undisturbed tube sampling.

Continuous Spiral Flight Augers
The hole is advanced by using 90mm - 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling or insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the augers flights, but they are very disturbed and may be highly mixed with soil of other stratum.

Information from the drilling (as distinct from specific sampling by SPT or undisturbed samples) is of relatively low reliability due to remoulding, mixing or softening of samples by ground water, resulting in uncertainties of the original sample depth.

Continuous Spiral Flight Augers (continued)
The spiral augers are usually advanced by using a V - bit through the soil profile refusal, followed by Tungsten Carbide (TC) bit, to penetrate into bedrock. The quality and continuity of the bedrock may be assessed by examination of the recovered rock fragments and through observation of the drilling penetration resistance.

Non - core Rotary Drilling (Wash Boring)
The hole is advanced by a rotary bit, with water being pumped down the drill rod and returned up the annulus, carrying the cuttings, together with some information from the "feel" and rate of penetration.

Rotary Mud Stabilised Drilling
This is similar to rotary drilling, but uses drilling mud as a circulating fluid, which may consist of a range of products, from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg SPT and U_{50} samples).

Continuous Core Drilling
A continuous core sample is obtained using a diamond tipped core barrel. Providing full core recovery is achieved (which is not always possible in very weak rock and granular soils) this technique provides a very reliable (but relatively expensive) method of investigation. In rocks an NMLC triple tube core barrel which gives a core of about 50mm diameter, is usually used with water flush.

Portable Proline Drilling
This is manually operated equipment and is only used in sites which require bedrock core sampling and there is restricted site access to truck mounted drill rigs. The boreholes are usually advanced initially using a tricone roller bit and water circulation to penetrate the upper soil profile. In some instances a hand auger may be used to penetrate the soil profile. Subsequent drilling into bedrock involves the use of NMLC triple tube equipment, using water as a lubricant.

Standard Penetration Tests
Standard penetration tests are used mainly in non-cohesive soils, but occasionally also in cohesive soils, as a means of determining density or strength and of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289 "Methods of testing Soils for Engineering Purpose"- Test F31.

The test is carried out in a borehole by driving a 50mm diameter split sample tube under the impact of a 63Kg hammer with a free fall of 769mm. It is normal for the tube to be driven in three successive 150mm increments and the "N" value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rocks, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In a case where full penetration is obtained with successive blows counts for each 150mm of, say 4, 6, and 7 blows.

  as 4, 6, 7
  N = 13

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm.

  as 15,30/40mm

The results of the tests can be related empirically to the engineering properties of the soil. Occasionally the test methods is used to obtain samples in 50mm diameter thin walled samples tubes in clays. In these circumstances, the best results are shown on the bore logs in brackets.

Dynamic Cone Penetration Test
A modification to the SPT test is where the same driving system is used with a solid 60^0 tipped steel cone of the same diameter as the SPT hollow sampler. The cone can be continuously driven into the borehole and is normally used in areas with thick layers of soft clays or loose sand. The results of this test are shown as 'N_c' on the bore logs, together with the number of blows per 150mm penetration.

Cone Penetrometer Testing and Interpretation
Cone penetrometer testing (sometimes referred to as Dutch Cone-CPT) described in this report, has been carried out using an electrical friction cone penetrometer and the test is described in Australian Standard 1289 test F5.1.

In the test, a 35mm diameter rod with cone tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig, which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130mm long sleeve, immediately behind the cone. Transducer in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output on continuous chart recorders. The plotted results in this report have been traced from the original records. The information provided on the charts comprises:

- Cone resistance - the actual end bearing force divided by the cross sectional area of the cone, expressed in Mpa.
- Sleeve friction - the frictional force on the sleeve divided by the surface area, expressed in kPa.
- Friction ratio - the ratio of sleeve friction to cone resistance, expressed in percentage.

There are two scales available for measurement of cone resistance. The lower "A" scale (0-5Mpa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main "B" scale (0-50Mpa) is less sensitive and is shown as a full line.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative frictions in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and very soft clays, rising to 4% to 10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:

$$q_c \text{ (Mpa)} = (0.4 \text{ to } 0.6)\ N \text{ (blows per 300mm)}$$

In clays the relationship between undrained shear strength and cone resistance is commonly in the range:

$$q_c = (12 \text{ to} 18)\ C_u$$

Interpretation of CPT values can also be made to allow estimate of modulus or compressibility values to allow calculation of foundation settlements. Inferred stratification, as shown on the attached report, is assessed from the cone and friction traces, from experience and information from nearby boreholes etc.

Cone Penetrometer Testing and Interpretation continued
This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties and where precise information or soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometer (AS1289)
Portable dynamic cone penetrometer tests are carried out by driving a rod in to the ground with a falling weight hammer and measuring the blows per successive 100mm increments of penetration.

There are two similar tests, Cone Penetrometer (commonly known as Scala Penetrometer) and the Perth Sand Penetrometer. Scala Penetrometer is commonly adopted by this company and consists of a 16mm rod with a 20mm diameter cone end, driven with a 9kg hammer, dropping 510mm (AS 1289 Test F3.2).

Laboratory Testing
Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedures are given on the individual report forms.

Engineering Logs
The engineering logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, however, this is not always practicable or possible to justify economically. As it is, the boreholes represent only a small sample of the total sub-surface profile. Interpretation of the information and its application to design and construction should take into account the spacing of boreholes, frequency of sampling and the possibility of other than "straight line" variations between the boreholes.

Ground water
Where ground water levels are measured in boreholes, there are several potential problems:
- In low permeability soils, ground water although present, may enter the hole slowly, or perhaps not at all, during the investigation period.
- A localised perched water table may lead to a erroneous indication of the true water table.
- Water table levels will vary from time to time, due to the seasons or recent weather changes. They may not be the same at the time of construction as indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole if any water observations are to be made.

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

Engineering Reports
Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal is changed, say to a twenty storey building. If this occurs, the company will be pleased to review the report and sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of sub-surface conditions, discussions of geotechnical aspects and recommendations or suggestions for design and construction. However, the company cannot always anticipate or assume responsibility for:
- Unexpected variations in ground conditions. The potential for this will depend partly on bore spacing and sampling frequency.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of contractors responding to commercial pressures.

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

Site Anomalies
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company request immediate notification. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes
Attention is drawn to the document “Guidelines for the Provision of Geotechnical Information trader Documents”, published by the Institute of Engineers Australia. Where information obtained for this investigation is provided for tender purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or make additional copies of the report available for contract purpose, at a nominal charge.

Site Inspection

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

Review of Design
Where major civil or structural developments are proposed, or where only a limited investigation has been completed, or where the geotechnical conditions are complex, it is prudent to have the design reviewed by a Senior Geotechnical Engineer.

Appendix 4: GLN Additional Information Flooding Affectation

28 August 2017

Our Ref: 10524 flood.docx

General Manager
Northern Beaches Council
PO Box1336
DEE WHY NSW 2099

Your Ref: PP_2016_NBEACH_005_00

Attention: Sylvania Mok

By email: Sylvania.Mok@northernbeaches.nsw.gov.au

Dear Sylvania,

RE: **Planning Proposal Additional information Flood Affectation**

Property Lots 11, 12, & 13 DP 1092788 and Lot 5 DP 736961, Fern Creek Rd, Warriewood

This additional information is prepared in response to the Gateway Determination dated 7 July 2017 to confirm the suitability of the proposal in relation to flooding (condition 1. a))

The Proposal

The primary objective of the Planning Proposal is to rezone approximately 1.85 hectares of the northern portions of Lots 11, 12, & 13 DP 1092788 and Lot 5 DP 736961 (**the site**) from R3 Medium Density Residential to RE1 Public Recreation.

As explained in the Planning Proposal, the rezoning of the site will also result in a change in the current maximum dwelling yield on the site from 30 dwellings to 33 dwellings. Despite a reduction in land zoned R3 Medium Density Residential, an increase in dwelling yield arises because part of the site (Lot 5 in DP 736961 is currently owned by Council and was historically allocated a nil dwelling yield potential on an assumption that this part of the site was to be used for public reserve purposes. However, based on the findings of the 2012 Strategic Review and the 2014 Strategic Review Addendum, Lot 5 in DP 736961 was considered to have a capacity for 29.7 dwellings, substantially less than the 3 additional proposed dwellings (refer to pages 9-10 of the Planning Proposal). The intended effect of the Planning Proposal and the position of Lot 5 within the site is depicted on **Figure 1**.

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A Level 10, 70 Pitt Street Sydney NSW 2000 P GPO Box 5013, Sydney NSW 2001
T (02) 9249 4100 F (02) 9249 4111 E info@glnplanning.com.au
glnplanning.com.au

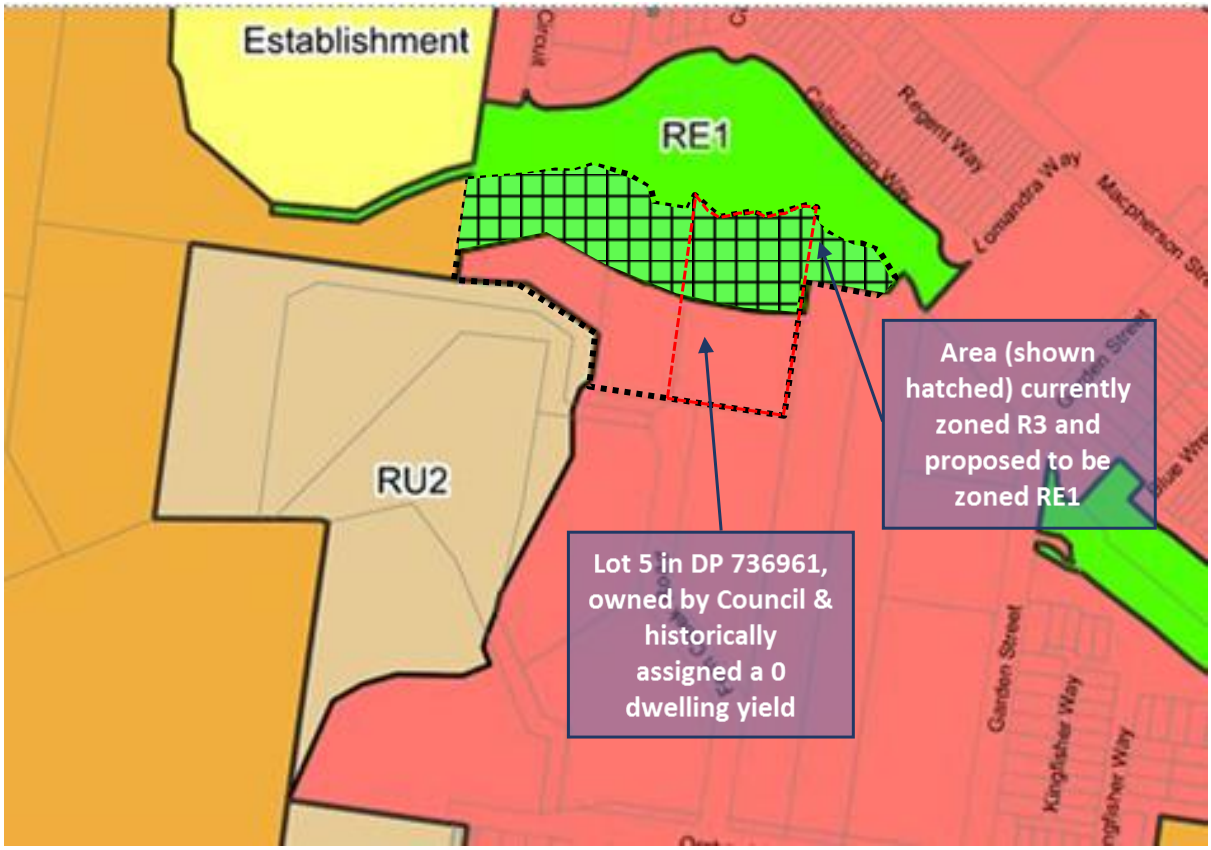


Figure 1: Intended Effect of Planning Proposal

Relevant Flood Risk Management Policies

S117 Direction 4.3 (Flood Prone Land) requires:

> ***4.3 Flood Prone Land***
>
> ***Objectives***
>
> *(1) The objectives of this direction are:*
>
> *(a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and*
>
> *(b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.*
>
> ***Where this direction applies***
>
> *(2) This direction applies to all relevant planning authorities that are responsible for flood prone land within their LGA. When this direction applies*
>
> *(3) This direction applies when a relevant planning authority prepares a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land. What a relevant planning authority must do if this direction applies*
>
> *(4) A planning proposal must include provisions that give effect to and are consistent with the NSW Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005 (including the Guideline on Development Controls on Low Flood Risk Areas).*
>
> *(5) A planning proposal must not rezone land within the flood planning areas from Special Use, Special Purpose, Recreation, Rural or Environmental Protection Zones to a Residential,*

Business, Industrial, Special Use or Special Purpose Zone.

(6) A planning proposal must not contain provisions that apply to the flood planning areas which:

(a) permit development in floodway areas,

(b) permit development that will result in significant flood impacts to other properties,

(c) permit a significant increase in the development of that land,

(d) are likely to result in a substantially increased requirement for government spending on flood mitigation measures, infrastructure or services, or

(e) permit development to be carried out without development consent except for the purposes of agriculture (not including dams, drainage canals, levees, buildings or structures in floodways or high hazard areas), roads or exempt development.

(7) A planning proposal must not impose flood related development controls above the residential flood planning level for residential development on land, unless a relevant planning authority provides adequate justification for those controls to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).

(8) For the purposes of a planning proposal, a relevant planning authority must not determine a flood planning level that is inconsistent with the Floodplain Development Manual 2005 (including the Guideline on Development Controls on Low Flood Risk Areas) unless a relevant planning authority provides adequate justification for the proposed departure from that Manual to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).

Consistency

(9) A planning proposal may be inconsistent with this direction only if the relevant planning authority can satisfy the Director-General (or an officer of the Department nominated by the Director-General) that:

(a) the planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005, or

(b) the provisions of the planning proposal that are inconsistent are of minor significance.

***Note**: "flood planning area", "flood planning level", "flood prone land" and "floodway area" have the same meaning as in the Floodplain Development Manual 2005.*

Council's Flood Information Request Report (dated 18 April 2017) shows that no part of the site is affected by the designated flood (ie 1% AEP + 0.5m freeboard) including overland flow extents.

The Floodplain Development Manual has been amended by the 2007 Flood Planning Direction (Planning System Circular PS 07-003) issued by the then Department of Planning. It states (pg.2):

This Guideline confirms that, unless there are exceptional circumstances, councils should adopt the 100 year flood as the FPL for residential development. In proposing a case for exceptional circumstances, a Council would need to demonstrate that a different FPL was required for the management of residential development due to local flood behaviour, flood history, associated flood hazards or a particular historic flood.

Unless there are exceptional circumstances, councils should not impose flood related development controls on residential development on land with a low probability of flooding, that is, land above the residential FPL (low flood risk areas)

Review of Proposal

The Planning Proposal (GLN 17.01.17, pg.4) refers to the Addendum Report to the adopted Warriewood Valley

Strategic Review Report 2012, stating:

> *The Addendum Report was informed by an opportunities and constraints analysis undertaken by Council, and updated flooding and bushfire information, including an additional analysis of the Narrabeen Lagoon Flood Study adopted in 2013 by the same consultant who produced the Warriewood Valley Strategic Review Hydrology Study 2011. Relevant environmental studies undertaken for the Strategic Review Report were also considered.*

The Planning Proposal (GLN 17.01.17, pg.33) addresses S117 Direction 4.3 (Flood Prone Land) as follows:

> *The site is adjoined by Fern Creek on the northern boundary which have been identified as flood prone lands.*
>
> *Development controls within Pittwater 21 DCP prohibit vertical structures to be erected on land comprising the creek line corridor. Development controls also require that the creek line corridor be engineered to convey the 1% AEP flood. This land is required to be rehabilitated and subsequently dedicated to Council in accordance with the Warriewood Valley Section 94 Contributions Plan. This portion of land is proposed to be zoned RE1 Public Recreation and will be Council land under the terms of the land swap deed.*

Council has provided a 'Flood Information Request – Common' report for No.s 9, 11, 12 and 13 Fern Creek Road, Warriewood. This shows that the area that would remain zoned R3 Medium Density Residential, including Lot 5 DP 736961 owned by Council, would be totally unaffected by the Flood Planning Level (ie 1% freeboard + freeboard) main stream flooding extent (**Figure 2**) and is totally unaffected by overland flow flooding. This report also shows that the part of the site proposed to remain zoned R3 is only marginally affected by the predicted future climate change Flood Planning Level (ie 1% freeboard + freeboard + climate change) extent (**Figure 3**).

Figure 2: Mainstream Flooding – FPL Extent (Source: Council Flood Information Request – Common' report dated 18 April 2017)

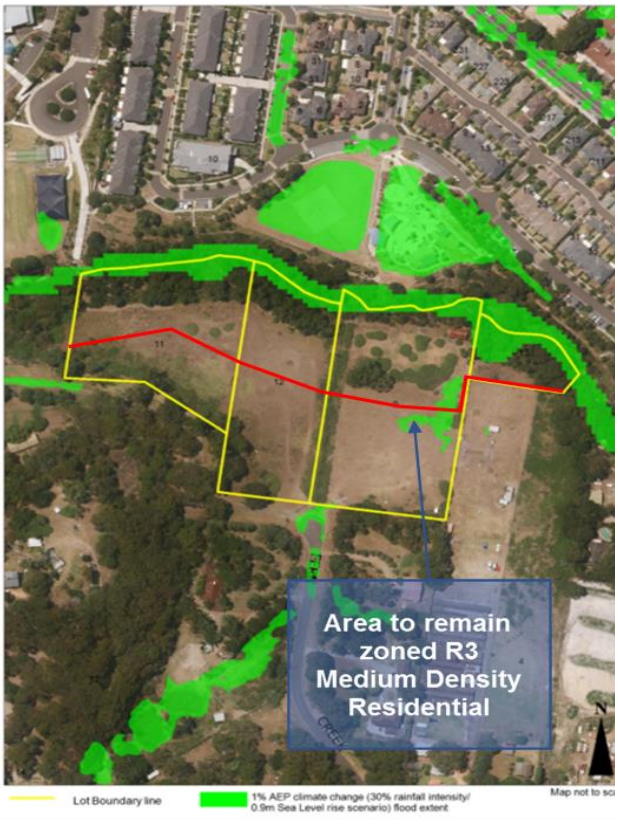


Figure 3: Mainstream Flooding – FPL Extent + Climate Change (Source: Council Flood Information Request – Common' report dated 18 April 2017 as adapted by GLN)

As the site is planned for greenfield urban development, it would be reasonable to expect that the future development of the site would consider climate change flood effects. Such a precautionary approach would be consistent with clause B3.12 of the Pittwater DCP 2014, that requires a flood assessment at the Development Application stage that takes into consideration climate change effects. While the DCP does not prescribe how to apply the outcome of such an assessment to a proposed development, a strict outcome would be to require earthworks, with balanced cut and fill below the FPL, so that all land developed for urban purposes was above the FPL + climate change extent. This is a matter that can relevantly be addressed at the development applicant stage, if required.

Conclusion

The Planning proposal is consistent all applicable flood risk management state government policies and Directions. The proposal involves a reduction in land zoned for housing development, and the creation of an open space zoned corridor between the creek and housing. None of the land to remain zoned for housing development is within the Flood Planning Level extent. However, when climate change considerations are factored in as small part of the area to remain zoned for housing development is affected.

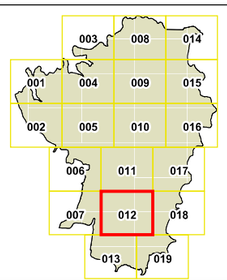
The Council DCP requires a consideration of climate change flood effects at the development application stage. While the DCP does not prescribe an outcome, the relatively minor affectation is a matter that could relevantly be addressed at the development application stage.

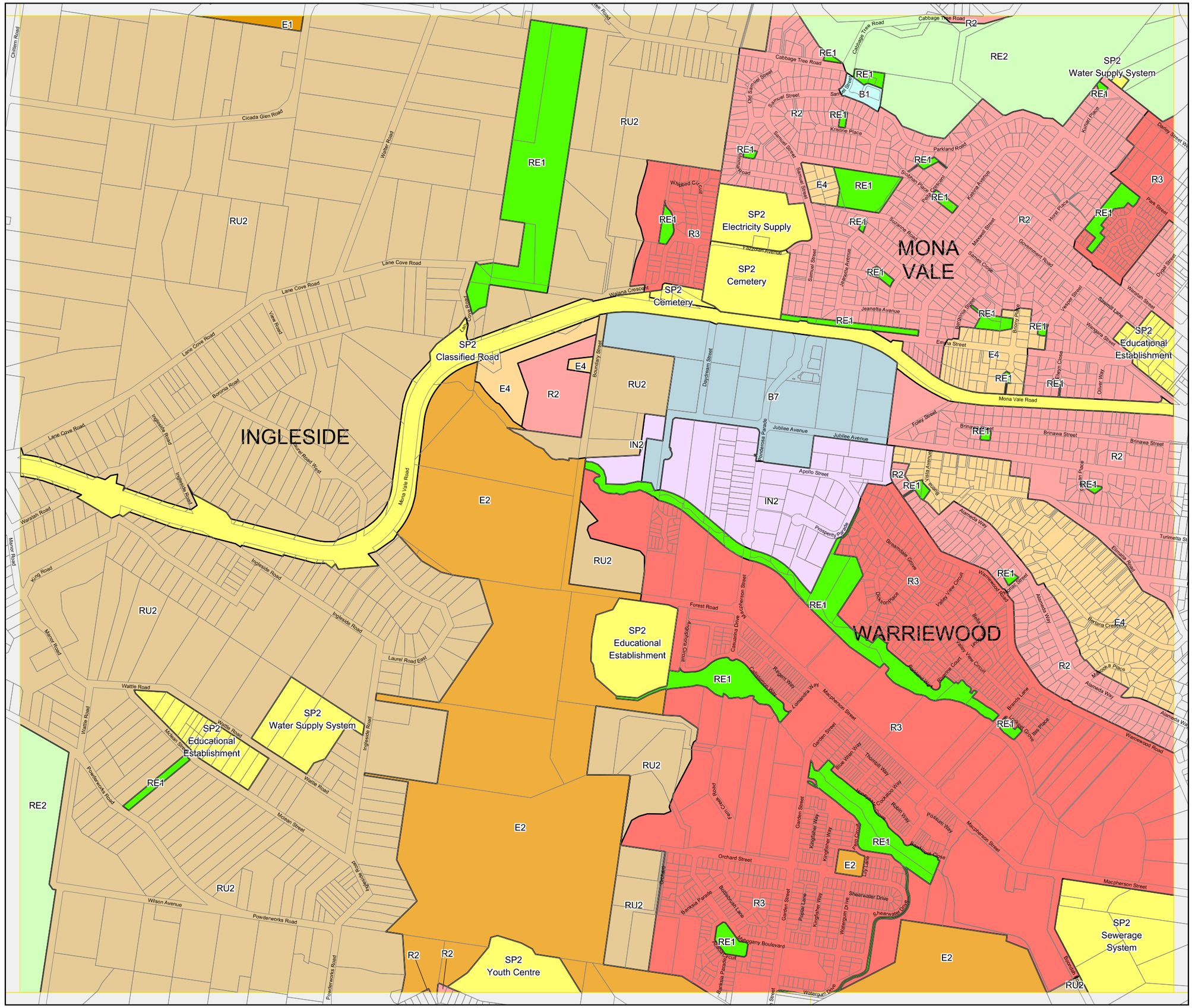
Yours faithfully

GLN PLANNING PTY LTD

PAUL GRECH
DIRECTOR

Appendix 5: Current LEP Maps





PITTWATER COUNCIL

Pittwater Local Environmental Plan 2014

Land Zoning Map - Sheet LZN_012

Zone

B1	Neighbourhood Centre
B2	Local Centre
B4	Mixed Use
B6	Enterprise Corridor
B7	Business Park
E1	National Parks and Nature Reserves
E2	Environment Conservation
E3	Environmental Management
E4	Environmental Living
IN2	Light Industrial
IN4	Working Waterfront
R2	Low Density Residential
R3	Medium Density Residential
R5	Large Lot Residential
RE1	Public Recreation
RE2	Private Recreation
RU2	Rural Landscape
SP1	Special Activities
SP2	Infrastructure
SP3	Tourist
W1	Natural Waterways
W2	Recreational Waterways

Cadastre

☐ Cadastre 7/7/2012
© Land & Property Information (LPI)

N
W E
S

0 100 200
metres

Projection: GDA 1994
MGA Zone 56

Scale: 1:10,000 @ A3

File Number: 6370_COM_LZN_012_010_20150911

Pittwater Local Environmental Plan 2014

Height of Buildings Map - Sheet HOB_012

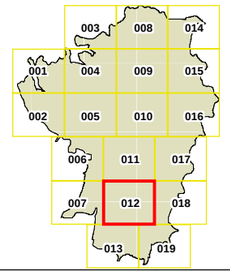
Maximum Building Height (m)

B	4
C	5
G	7
H	8
I	8.5
K	10.5
L	11
M	11.5
N	13

AREA 1	Refer Clause 4.3(5)
AREA 2	Refer Clause 4.3(5)
AREA 3	Refer Clause 4.3(5)
AREA 4	Refer Clause 4.3(5)
AREA 5	Refer Clause 4.3(7)
AREA 6	Refer Clause 4.3(10)

Cadastre

Cadastre 7/7/2012



N
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0 100 200
metres

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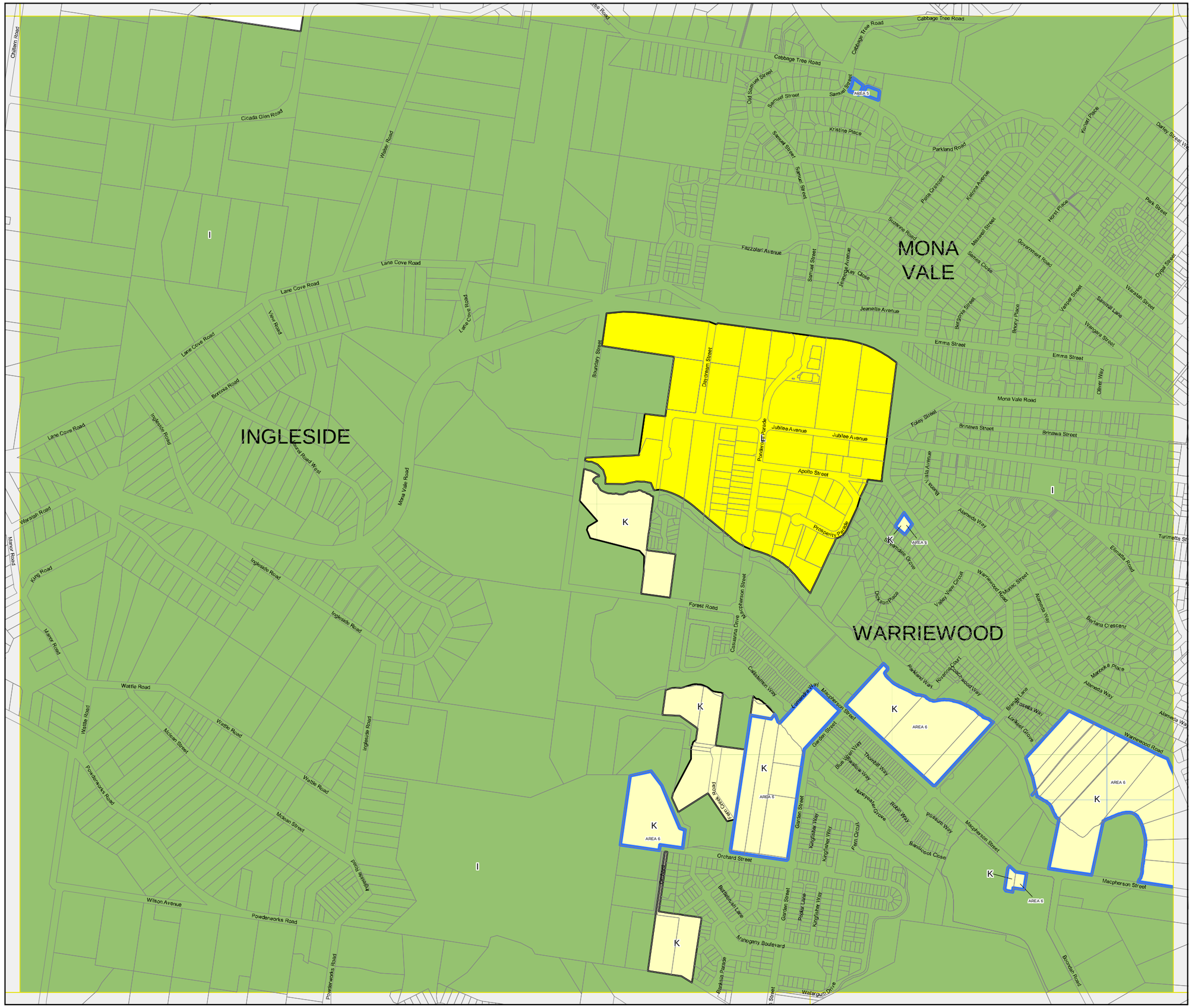

Appendix 6: Proposed LEP Map Amendments

Pittwater Local Environmental Plan 2014

DRAFT Land Zoning Map - Sheet LZN_012

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B4 Mixed Use
- B6 Enterprise Corridor
- B7 Business Park
- E1 National Parks and Nature Reserves
- E2 Environment Conservation
- E3 Environmental Management
- E4 Environmental Living
- IN2 Light Industrial
- IN4 Working Waterfront
- R2 Low Density Residential
- R3 Medium Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU2 Rural Landscape
- SP1 Special Activities
- SP2 Infrastructure
- SP3 Tourist
- W1 Natural Waterways
- W2 Recreational Waterways

Cadastre

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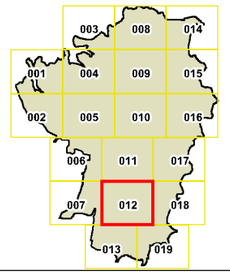


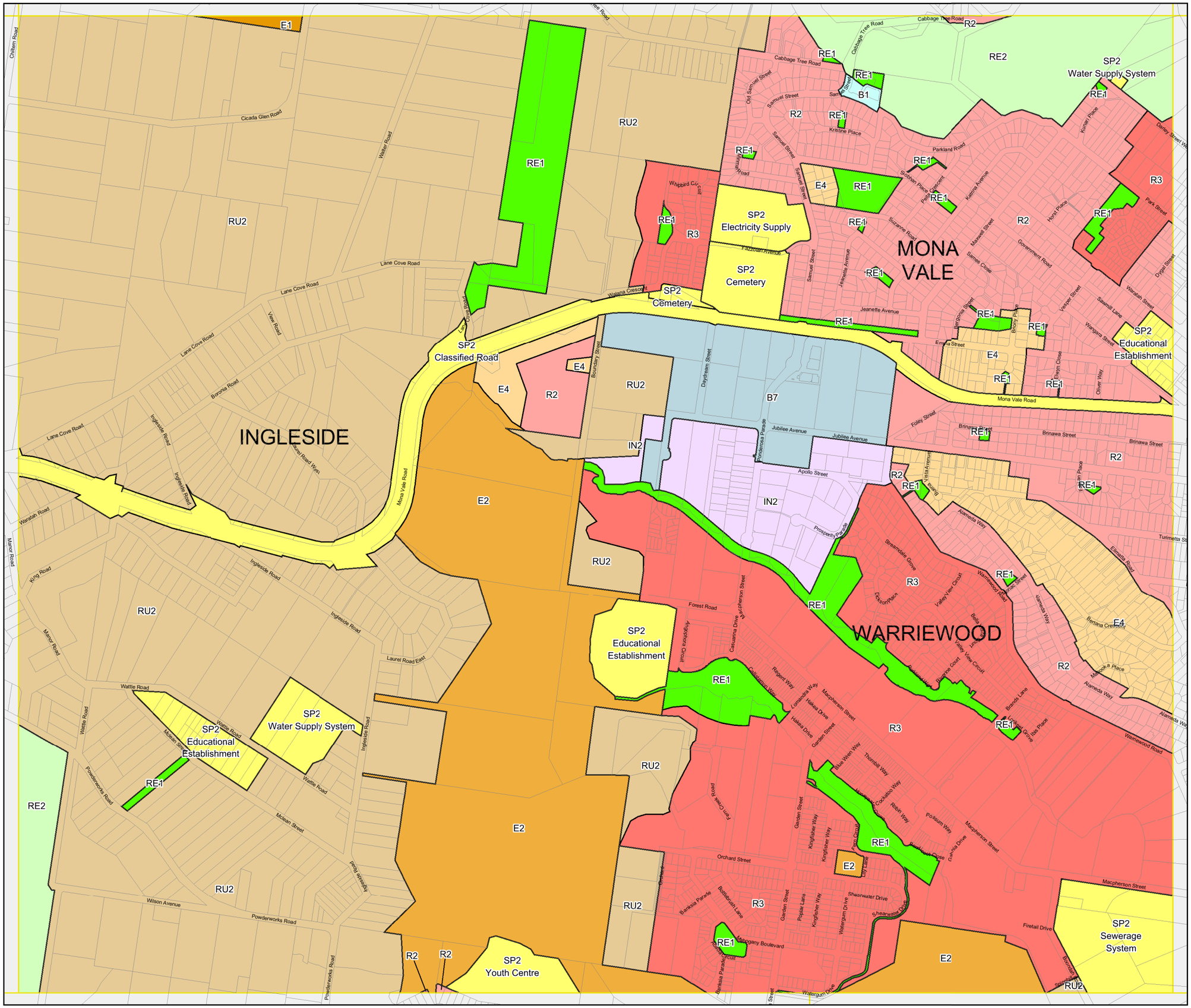
N W E S

0 100 200
metres

Scale: 1:10,000 @ A3

Projection: GDA 1994
MGA Zone 56

File Number: 6370_COM_LZN_012_010_20170428



Pittwater Local Environmental Plan 2014

DRAFT Height of Buildings Map - Sheet HOB_012

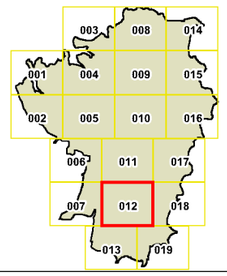
Maximum Building Height (m)

B	4
C	5
G	7
H	8
I	8.5
K	10.5
L	11
M	11.5
N	13

AREA 1	Refer Clause 4.3(2C)
AREA 2	Refer Clause 4.3(2C)
AREA 3	Refer Clause 4.3(2C)
AREA 4	Refer Clause 4.3(2C)
AREA 5	Refer Clause 4.3(2E)
AREA 6	Refer Clause 4.3(2F)

Cadastre

Cadastre 7/7/2012



N
W E
S

0 100 200
metres

Scale: 1:10,000 @ A3

Projection: GDA 1994
MGA Zone 56

File Number: 6370_COM_HOB_012_010_20170428