

Criteria	Assessment
	<p>Following on from the MOU a Deed of Agreement was signed between Frasers and Council and represented the final agreed position between both parties.</p> <p>Council at its meeting 19 March 2016 outlined the infrastructure provisions that Council and Frasers have agreed to:</p> <ul style="list-style-type: none"> • 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. <p>The details relating to these arrangements will be 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was submitted in January 2017 as part of the updated Planning Proposal information however it was subsequently withdrawn in April 2017.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.</p>

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 5374.3m², 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 600m² 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 further 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

Further consultation has been carried out with each of the above four State agencies as well as, Sydney Water. Responses have been received from all five State agencies.

The comments provided are discussed within the Final Assessment Report to be considered by Council at the 19 December 2017 meeting. There were no adverse issues raised by the State agencies that prevent the Planning Proposal proceeding.

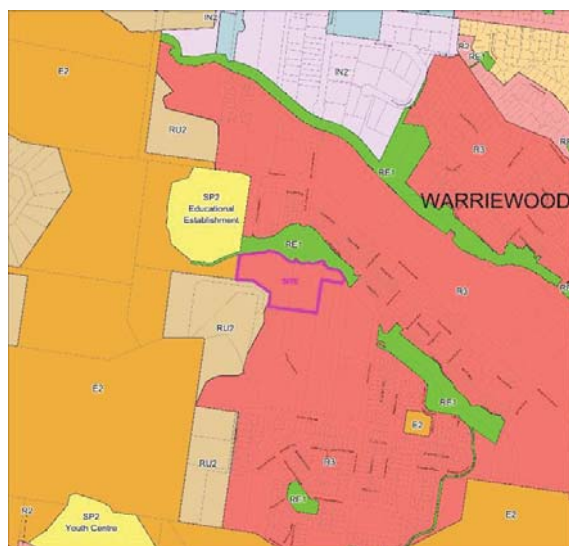
PART 4: MAPPING

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

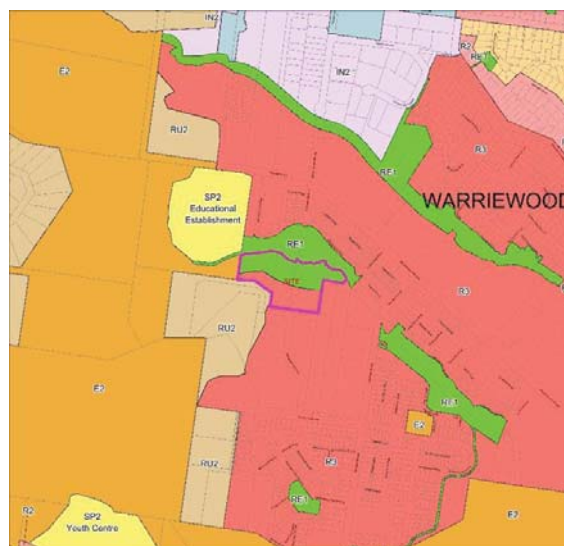
The proposed amended maps for Land Zoning Map (Sheet LZN_012) and Height of Building (Sheet HOB_12) are contained at **Appendix 6**.

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 Planning Proposal was placed on statutory notification for a period of 41 days from 23 September – 3 November 2017.

Landowners were notified within the Warriewood Valley (1994 in total) suburb as well as the Warriewood Residents Association. An advertisement was placed in the Manly Daily (23 September

2017) and a site notice was displayed at the site. The application documents were made available electronically on Council's website and in hard copy at each of Council's Customer Service Centres.

Letters were sent to the following State Agencies, and the first five agencies responded:

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

State Agency submissions raised no objection to the proposal and most importantly there were no outstanding issues or matters that would preclude Council from supporting the Planning Proposal.

Comments from the following Council Business Units were received:

- Environmental Health
- Transport Network
- Natural Environment and Climate Change
- Property Commercial and Tourist Assets

The responses received from members of the State agencies, internal Council Business Units and the community are provided in the Final Assessment Report to be considered at the Council meeting 19 December 2017.

6 written responses were received from the community including one submission from the Warriewood Residents Association.

Below is a summary of the themes of the community submissions:

- Overdevelopment of Warriewood
- Planning Proposal process
- Increase to the Height of Buildings
- Dwelling allocation
- Future park design - involvement of the community
- Land Contamination
- Future Voluntary Planning Agreement
- Costs and allocation of s.94CP monies
- Environmental issues

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
Submission to Department and PCO to prepare draft instrument	Following Council decision to finalise LEP	Immediately after Council Meeting
RPA to make plan	4 weeks from Council decision to finalise LEP	January 2018
Notification of LEP comes into force	1 week from RPA making plan	March 2018

Appendix 1: Consideration of SEPPs

The following SEPP's are relevant to the Pittwater Local Government Area. The Table identifies which of the relevant SEPPs apply to the Planning Proposal (or not) and if applying, is the Planning Proposal consistent with the provisions of the SEPP.

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
SEPP No 1 – Development Standards	YES	YES	
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 33 – Hazardous and Offensive Development	NO	N/A	
SEPP No 36 – Manufactured Home Estates	NO	N/A	
SEPP No 44 Koala Habitat Protection (noting that there is also a review of SEPP 44)	YES	YES	
SEPP No 50 – Canal Estate Development	NO	N/A	
SEPP No 55 – Remediation of Land	YES	NO	See comment under table
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 Protection	NO	N/A	
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	

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
SEPP (Infrastructure) 2007	YES	YES	
SEPP (State Significant Precinct) 2005	NO	N/A	
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	NO	N/A	
SEPP (Miscellaneous Consent Provisions) 2007	YES	YES	
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 (EPA) for consultation. The EPA responded with a more generic response to Council’s contamination responsibilities. The EPA response has been summarised and can be found in the Final Assessment Report that will be considered by Council 19 December 2017.

Council has the opportunity in subsequent development applications to action any recommendations of the GeoEnviron Consultancy Pty Ltd report including any site remediation recommendations in *Section 9 Assessment and Recommendations* of the report.

The first Development Application to be lodged will be a subdivision application, to subdivide the whole of the land into two (2) lots. This Development Application provides Council with the opportunity to action the recommendations of the Land Contamination report relating to the future Public Recreation component of the proposal.

Subsequently any future Development Application for residential development should include further investigation of site remediation as per the report.

The inconsistency therefore is very minor in nature.

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	YES

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.

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

Appendix 4: GLN Additional Information Flooding Affection

Appendix 5: Current LEP Maps

Appendix 6: Proposed LEP Map Amendments

Proposed changes to LEP Mapping

Pittwater Local Environmental Plan 2014

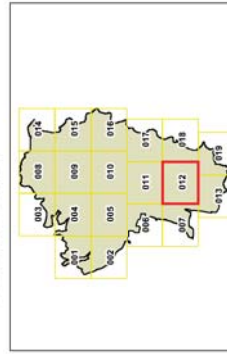
DRAFT Land Zoning Map - Sheet LZN_012

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B4 Mixed Use
- B6 Enterprise Corridor
- B7 Business Park
- E1 National Parks and Nature Reserves
- E2 Environmental 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

Cadastral

Cadastre 7/7/2012
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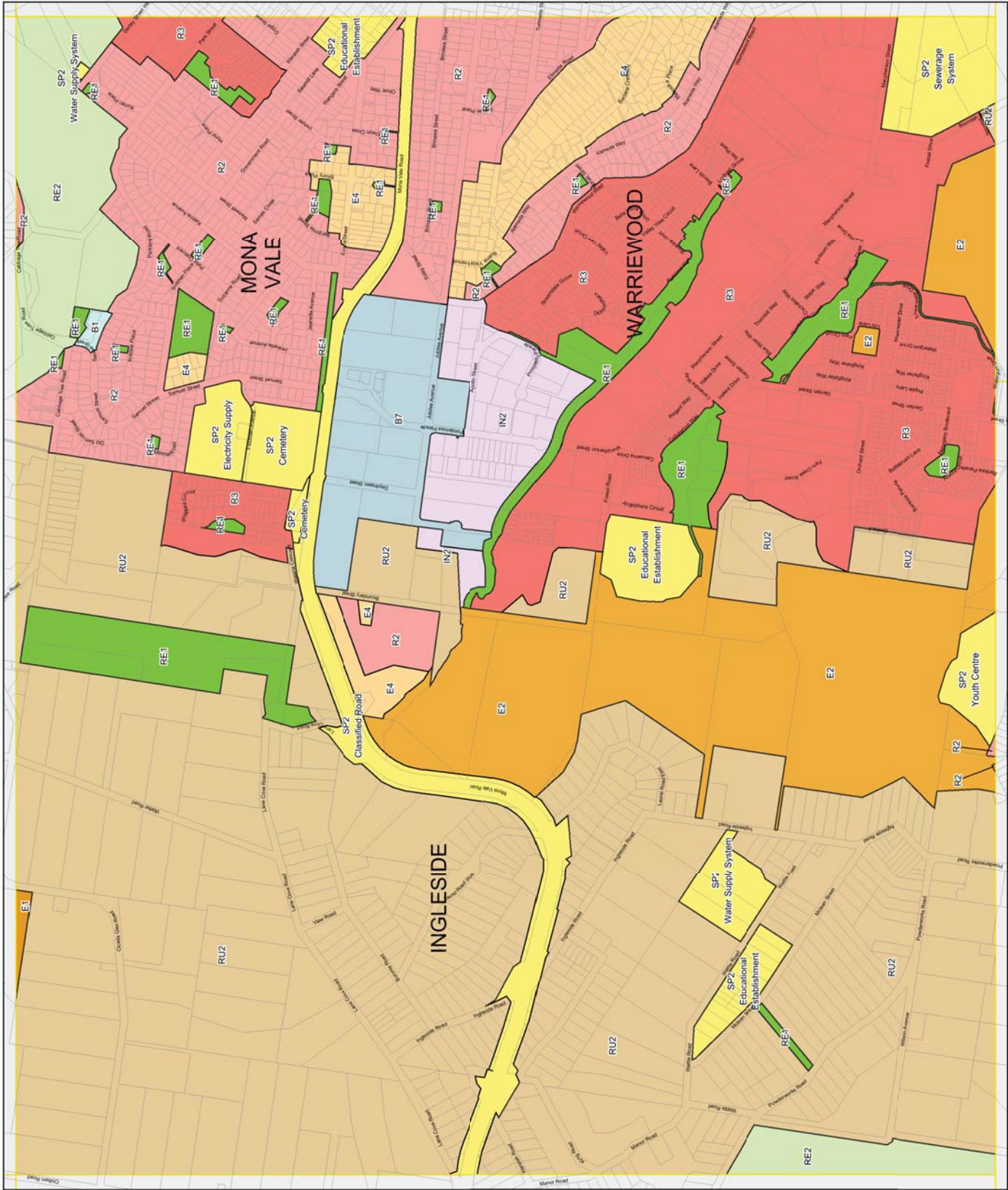


0 100 200
metres

Scale: 1:10,000 @ A3

Projection: GDA 1984
MGA Zone 56

File Number: 6870_COM_LZN_012_20170428





Pittwater Local Environmental Plan 2014

DRAFT Height of Buildings Map - Sheet HOB_012

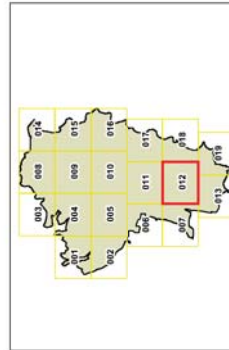
Maximum Building Height (m)

B	4
C	5
G	7
H	8
I	8.5
K	10.5
L	11
M	11.5
N	13

AREA1	Refer Clause 4.3(2C)
AREA2	Refer Clause 4.3(2C)
AREA3	Refer Clause 4.3(2C)
AREA4	Refer Clause 4.3(2C)
AREA5	Refer Clause 4.3(2E)
AREA6	Refer Clause 4.3(2F)

Cadastral

Cadastral 7/7/2012
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Scale: 1:10,000 @ A3
Projection: GDA 1984
MGA Zone 56

File Number: 6870_COM_HOB_012_010_20170408

APPENDIX 7

Phase 1 and 2 Contamination Investigation Proposed Residential Subdivision, Public Reserve and Open Space Lots 11-13 DP 1092788 and Lot 5 DP 736961 prepared by GeoEnviro Consultancy Pty Ltd



GeoEnviro Consultancy Pty Ltd

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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

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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	<p>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.</p> <p>The surrounding properties and region were of similar land use with glasshouses and market gardens.</p>
1961	NSW 1052 5158 Run 22	<p>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.</p> <p>There was little to no change within the surrounding properties or region.</p>
1982	NSW 3260 108 Run 14	<p>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.</p> <p>Glasshouses and market gardening activities within the surrounding properties and region slowly diminished with some residential properties evident.</p>

Year	Reference	Description
2003	Google Earth	<p>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.</p> <p>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.</p>
2007	Google Earth	<p>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.</p>

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 and 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 C_0 = Analyte concentration of the original sample
 C_d = 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 data 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	<div>C1</div> <div>TP 1 (0.0-0.1); TP 2 (0.0-0.1); TP 3 (0.0-0.1)</div> <div>C2</div> <div>TP 4 (0.0-0.1); TP 5 (0.0-0.1); TP 9 (0.0-0.1)</div> <div>C3</div> <div>TP 19 (0.0-0.1); TP 21 (0.0-0.1); TP 22 (0.0-0.1)</div> <div>C4</div> <div>TP 24 (0.0-0.1); TP 25 (0.0-0.1); TP 26 (0.0-0.1)</div> <div>C5</div> <div>TP 31 (0.0-0.1); TP 33 (0.0-0.1); TP 34 (0.0-0.1)</div> <div>C6</div> <div>TP 35 (0.0-0.1); TP 36 (0.0-0.1); TP 37 (0.0-0.1))</div>

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 Naphthalene. All samples analysed were found to have concentrations of BTEX and Naphthalene 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 overall 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 appropriately 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 inaccessible 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	PITWATER 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 BITWATER 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



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Date: 21/7/17

Checked By: SL

Date: 21/7/17

Revision By:

Date:

Scale: Not to Scale

A3

Project No: JE17655A

Drawing No: 1

Fraser's Property Australia

9-13 Fern Creek Road Warriewood

Proposed Development and Landswap Plan



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



Site Feature



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Fraser's Property Australia

9-13 Fern Creek Road Warrivood

Site Locality and Features Plan

Project No: JE 17655A

Drawing No: 2

Drawn By: AT

Date: 21/7/17

Checked By: SL

Date: 21/7/17

Revision By:

Date:

Scale: Not to Scale

A3



Legend



Test Pit



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Fraser's Property Australia

9-13 Fern Creek Road Warriewood

Test Pit Location Plan

Project No: JE17655A

Drawing No: 3

Drawn By: AT

Date: 21/7/17

Checked By: SL

Date: 21/7/17

Revision By:

Date:

Scale: Not to Scale

A3

Form No. R012/Ver02/06/07

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

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

Note:

PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit



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

Note:

PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit



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

Note:

PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit



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			Analysis													
				Depths (m)			pH	Heavy Metals								PCB	TRH	BTEX	PAH	Asbestos
				TP 1 (0.0-0.1 m)	TP 2 (0.0-0.1 m)	TP 3 (0.0-0.1 m)		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)	0	0	0	0	0	0	0	0	0	0				
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)	0	0	0	0	0	0	0	0	0	0	0			
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)	0	0	0	0	0	0	0	0	0	0	0			
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)	0	0	0	0	0	0	0	0	0	0	0			
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)	0	0	0	0	0	0	0	0	0	0	0			
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)	0	0	0	0	0	0	0	0	0	0	0			
TP7	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP12	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP14	0.1-0.2	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP15	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP16	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP18	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP20	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP23	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP27	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP32	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duplicate A	0.0-0.1	7/07/2017	Soil				0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: 0 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

ABC³		5	NA	7	12	25	NA	2	55
ACL⁴		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

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

Composite Sample

Sample	Depths (m)	Total OCP																		
		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
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
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
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
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
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
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
Modified HBILs 'A' Criteria		3			2			17	90	80	2	3	80				80			100
Modified HBILs 'C' Criteria		3,333			3			23.3	113	133	3	7	133				133			133

Individual Sample

Sample	Depths (m)	Analytical Sample																Total OCP			
		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
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
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
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
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
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
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
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
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
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
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
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
HBILs 'A' Criteria		10					6			50	270	240	6	10	240		240			300	
HBILs 'C' Criteria		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



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TABLE 4
Summary of Analytical Results - OCP

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

Composite Sample

Sample	Depths (m)	Archohlor 1016	Archohlor 1221	Archohlor 1232	Archohlor 1242	Archohlor 1248	Archohlor 1254	Archohlor 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)	Archohlor 1016	Archohlor 1221	Archohlor 1232	Archohlor 1242	Archohlor 1248	Archohlor 1254	Archohlor 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



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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		95			
		2m to < 4m		110		440				0.5		310		95		170			
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 C₆-C₁₀ minus the sum of the BTEX concentrations
- 5) F2 is >C₁₀-C₁₆ Minus Naphthalene
- 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



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TABLE 6
Summary of Analytical Results - TRH and VOC

Fraser's 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																
HBILs 'C' Level																		
ESL Criteria																		

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 italics 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 TEQ, given below, and summing these products



GeoEnviro
Consultancy

Fraser's Property Australia
Proposed Residential Subdivision Development
9-13 Fern Creek Road Warriewood

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

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 Contaminant Material / Fibrous Asbestos and Asbestos Fines

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

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



**GeoEnviro
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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
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TABLE 9
Summary of Analytical Results - Quality Assurance

Fraser's Property Australia
Proposed Residential Subdivision Development
9-13 Fern Creek Road Warriewood

APPENDIX A

Site Photographs



Photograph 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:

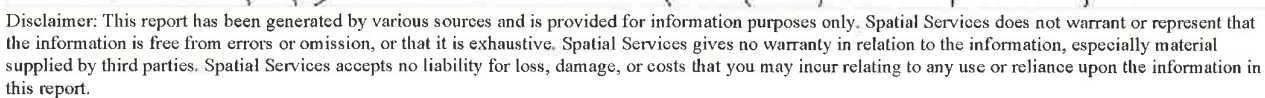
- **Laboratory duplicate samples:** Duplicate sub samples collected by the laboratory from one sample submitted for analytical testing at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch. A laboratory duplicate 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



Executed by
AUSTRALAND HOLDINGS LTD
ABN 12 008 443 696
By its Attorney Griffiths Smith By
Under Power of Attorney Book 4408
No. 105 in the presence of:

Faculty
Signature

in approving this plan earth's

Signature _____

Date _____

File Number: _____

Office: _____

Subdivision Certificates

I certify that the Provisions of a TOU of the Environmental Protection and Assessment Act 1979 have been adhered in relation to the proposed

Subdivision

*Don't mention or use real

2. Authorised person/Member/Authenticated Client

Ocasional customer PLS. JAMES C. GILBERT
 Date of Purchase 29.05.06
 Accredited to PNB/1

DATE: 11/20/04

Within this 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 of the relevant jurisdiction.

SUPPLYING AGENCY: 1710-6-0-1

SEE NOTE REGARDING FERN CREEK BOUNDARY ON SHEET 2

SSM 149413 FD.

FOREST 120-115 WIDE & VARIABLE

Dr. J.

0015

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M. G. (CONDOM) LINES									
	MAX	ERECTING	MORPHING	5A	6A	7A	8A	9A	10A
P.M. 4832	3.41	5.51	1.55	6.31	3.95	1.03	5.9	0	2
P.M. 4832	3.41	7.07	2.71	6.31	6.40	7.18	5.6	0	2
P.M. 19358	3.41	6.45	4.82	6.31	3.10	4.48	5.6	0	2
P.M. 19358	3.41	225	1.08	6.31	3.88	7.71	5.6	0	2
SPM 138337	3.41	2.71	9.65	6.31	1.52	6.57	5.6	0	2
SPM 119964	3.41	5.07	9.65	6.31	4.02	0.72	2.8	0	2
SPM 119964	3.41	3.41	3.44	6.31	6.96	3.23	5.6	0	2
SPM 194913	3.41	0.31	2.62	6.31	2.71	5.92	3.8	0	2

SHORT & CURVED BOUNDARIES

No.	BEARING	CHORD	ARC	ROAD US
1	75°00'20"	12.955		
2	87°00'05"	13.185		
3	73°02'25"	8.1		
4	84°36'	4.01	4.025	10
5	94°09'40"	10.19		
6	104°09'10"	9.35		
7	104°09'10"	5.94		
8	117°36'30"	3.97	4	10
9	128°04'	26.62		
10	114°59'25"	8.12		
11	110°09'55"	9.985		
12	98°27'40"	5.715		
13	312°21'00"	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"	50.335	60.155	74.5

SCHEDULE OF REFERENCE MARKS

ONE	SEMI-ONE	DISTANCE	DESCRIPTION
A	187.46	0.555	G.I.P. FD. (D.P. 2246323)
B	218.29	6.517	D.H.E. WIND. IN K888
C	278.30	6.015	D.H.E. WIND. FD. (D.P. 1055732)
D	233.00	2.0	D.H.E. WIND. FD. (D.P. 1065773)
E	8.10	9.755	D.H.E. WIND. FD. (D.P. 1384961)
F	359.14	15.165	D.H.E. WIND. FD. (D.P. 1384961)
G	7.04	5.64	D.H.E. WIND. FD. (D.P. 1384961)
H	74.55	9.965 & 1.7	D.H.E. WIND. FD. (D.P. 1384961)
I	74.55	2.768 & 10.245	D.H.E. WIND. FD. (D.P. 1384961)
J	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
K	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
L	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
M	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
N	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
O	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
P	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
Q	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
R	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
S	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
T	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
U	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
V	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
W	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
X	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
Y	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
Z	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AA	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AB	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AC	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AD	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AE	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AF	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AG	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AH	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AI	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AJ	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AK	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AL	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AM	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AN	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AO	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AP	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AQ	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AR	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AS	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AT	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AU	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AV	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AW	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AX	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AY	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
AZ	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BA	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BB	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BC	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BD	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BE	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BF	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BG	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BH	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BI	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BJ	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BK	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BL	85.42	12.43 & 2.9	D.H.E. WIND. FD. (D.P. 1384961)
BM	85.42	12.43 &	

FOREST 120-115 WIDE & VARIABLE

Dr. J.

0015

Register:	11-1, 2nd
CA	SEE CERTIFICATE
Trm System	TORRENS
Purpose:	SUBDIVISION
Ref. Map	U1864-62, U1864-64
Legal Plans	DP18301, DP334143 DP378150, DP639726
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. 393365 AND LOT 12	
D.P. 655928	

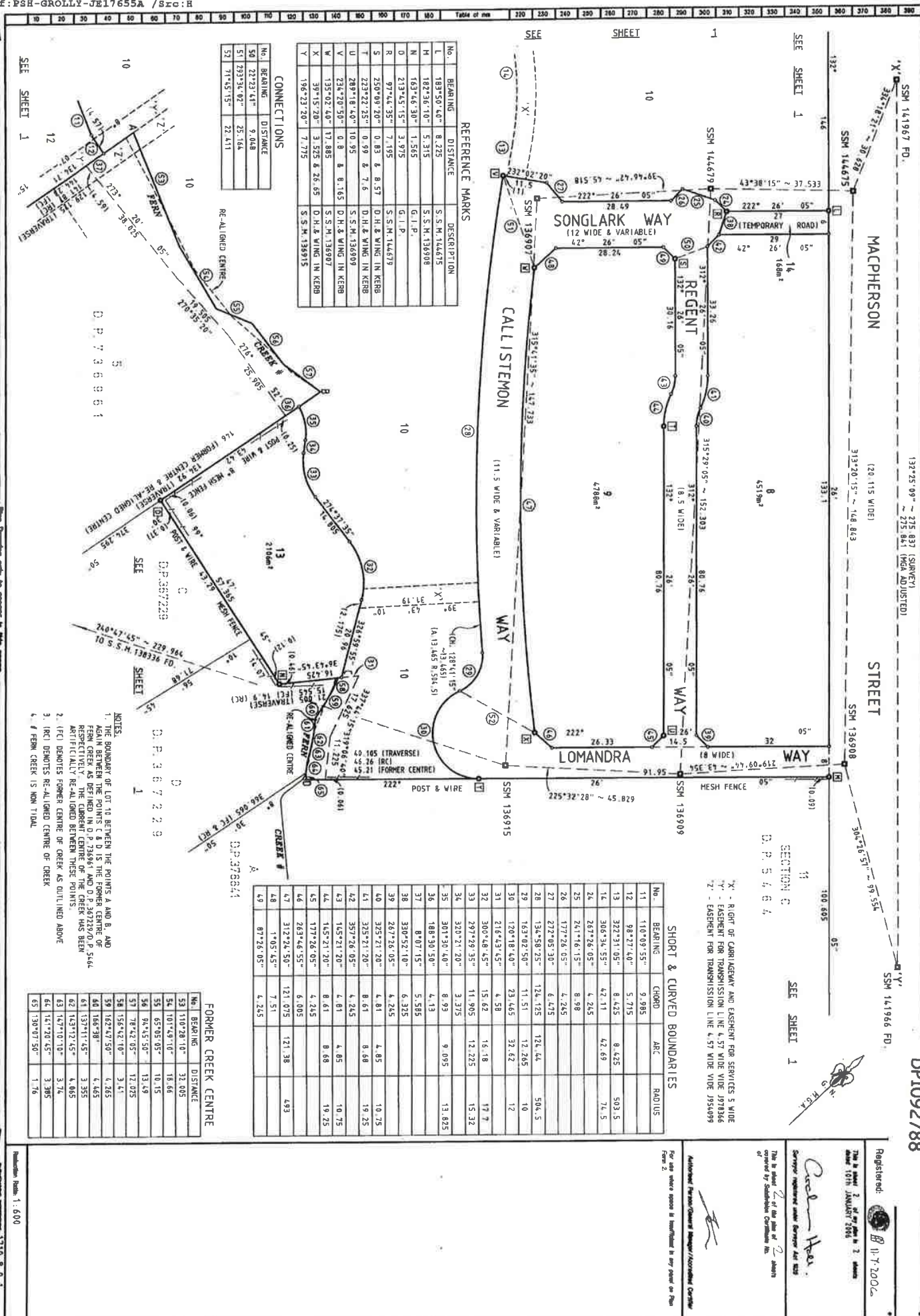
		TOTAL OF MS	790	280	230	260
SAC	SFO					
SAC	SFTD					

WARNING: CRASHING OR FOLDING WILL LEAD TO REJECTION.

Age	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Age	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

0

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



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

Any entries preceded by an asterix do not appear on the current edition of the certificate of title.
 Warning: the information appearing under notations has not been formally recorded on the Register.
 Hazlett Information Services hereby certifies that the information contained in this document has been provided electronically by the Registrar-General in
 accordance with Section 96B(2) of the Real Property Act 1900.
 Level 4, 122 Castlereagh Street, Sydney 2000 - DX 1078 SYDNEY
 PHONE: (02) 9261 5211 FAX: (02) 9264 7752
 www.hazlett.com.au



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

TRANSFER

New South Wales
Real Property Act 1900



9342673J

PRIVACY NOTE: this information is legally required and will be

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

Reference (optional): RD:RD:42017

CODES

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) TRANSFEE

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:

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

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

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www.hazlett.com.au



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 ***

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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	03611	DISCHARGE OF MORTGAGE	
8/2/1995	03612	CHANGE OF NAME	
8/2/1995	03613	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

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 www.hazlett.com.au



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

TRANSFER

New South Wales
Real Property Act 1900



STAMP DUTY

PRIVACY NOTE: this information is legally required and will b
Office of State Revenue use only

8233436H

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 Name, Address or DX and Telephone
Box R.S. Davis & Davis
996s 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

The transferor acknowledges receipt of the consideration of \$4,890,000.00 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 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:

Address of witness:

[Handwritten signature]
Ian Simpson
103A Angus Rd
IC

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

Signature of transferor:

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

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 ***

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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 ***

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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 ***

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[Privacy Statement](#) | site designed by: [Vision and Beyond Pty Ltd](#)

IMP 13/00
1985

STAMP DUTY



W634759

TRANSFER

REAL PROPERTY ACT, 1900

CA 1 of 1
\$ 35

R111

DESCRIPTION
OF LAND
Note (a)

TRANSFEROR
Note (b)

ESTATE
Note (c)

TRANSFeree
Note (d)

TENANCY
Note (e)

PRIOR
ENCUMBRANCES
Note (f)

EXECUTION
Note (g)

Note (g)

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

OFFICE USE ONLY

Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
IDENTIFIER 5/736961	WHOLE	AT WARRIEWOOD
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
and transfers an estate in fee simple
in the land above described to the TRANSFeree

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

OFFICE USE ONLY

S

as joint tenants/tenants in common

subject to the following PRIOR ENCUMBRANCES 1.

2.

3.

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 BERESFORDHARKNESS who declares
that:-

DATE 21st November 1986

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

Name of Witness (BLOCK LETTERS)

Address and occupation of Witness

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

(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.
674 Book 3354 under which he executes
this instrument.

J.B. HARKNESS

PAUL A. BROWN

Signature of Transferee
Solicitor

LODGED BY		PAUL A BROWN to DX 3911 ANNANDALE		LOCATION OF DOCUMENTS	
Delivery Box Number		1021 K		CT	OTHER
Checked	Passed	REGISTERED	-19		Herewith.
<i>[Signature]</i>			28 NOV 1986		In L.T.O. with
Signed	Extra Fee			Secondary Directions	Produced by
				Delivery Directions	CT LP

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. Brook
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	T TW (Sheriff)
Reference: TJL:8298482 112882445		

(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:

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:
Signatory's capacity:

Timothy L'Orange
transferee's solicitor

All handwriting must be in block capitals.

Page 1 of 1
number additional
pages sequentially

Land and Property Information NSW.

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

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

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

JOHN BLAKE

122J

Reference: 9 FERN CREEK RD

CODES

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.

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 witness:

[Signature]

Signature of attorney:

[Signature]

Name of witness:

FAY FINNISS

Attorney's name:

SEE ANNEXURE "A"

Address of witness:

11-13 BROOKHOLLOW AVE

Signing on behalf of:

Power of attorney-Book:

-No.:

BAULKHAM HILLS

FOR AND ON BEHALF OF AVJENNINGS
HOLDINGS LIMITED AVJENNINGS
LIMITED GRANT PTY LIMITED AND
HAYWARD 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 for the purposes of the Real Property Act
1900 by the person whose signature appears below.

Signature:

[Signature]

Signatory's name:

PHILLIP ALLAN HEPBURN

Signatory's capacity:

transferee's solicitor

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 ***

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www.hazlett.com.au



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:

Completion Date: 26/05/2006

Final Depth: 2.50 m

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: -

GW Zone: -

Salinity:

Yield:

Site Details

Site Chosen By:

County
Form A: CUMBE
Licensed: CUMBERLAND

Parish
CUMBE.37
NARRABEEN

Cadastre
4 553816
Whole Lot 4//553816

Region: 10 - Sydney South Coast

CMA Map:

River Basin: - Unknown
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6271295.0
Easting: 341892.0

Latitude: 33°41'11.5"S
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 *****

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

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

Standing Water Level:

GWMA: -
GW Zone: -

Salinity:
Yield:

Site Details

Site Chosen By:

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

Region: 10 - Sydney South Coast

CMA Map:

River Basin: - Unknown
Area/District:

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 *****

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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

Standing Water Level:

GWMA: -
GW Zone: -

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

CMA Map:

River Basin: - Unknown
Area/District:

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)
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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 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

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:
Completion Date: 10/10/2004

Final Depth: 3.00 m
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: -
GW Zone: -

Salinity:
Yield:

Site Details

Site Chosen By:

County
Form A: CUMBE
Licensed: CUMBERLAND

Parish
CUMBE.37
NARRABEEN

Cadastre
22 5464
Whole Lot 22//5464

Region: 10 - Sydney South Coast

CMA Map:

River Basin: - Unknown
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6271144.0
Easting: 342028.0

Latitude: 33°41'16.5"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)	0.90	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 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

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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

Page 1 of 1

25 July 2017

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**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:
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1 Park Street,
MONA VALE NSW
P O Box 882
MONA VALE NSW 1660
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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.

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:	<u>JE17655A,9-13 Fern Creek Road, Warriewood</u>
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

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:



David Springer
General Manager

Envirolab Reference: 171042
Revision No: R 00



vTRH(C6-C10)/BTEXN in Soil	UNITS	171042-25	171042-26	171042-27	171042-28	171042-29
Our Reference:	-----	TP7	TP12	TP14	TP15	TP16
Your Reference	-					
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	UNITS	171042-30	171042-31	171042-32	171042-33	171042-34
Our Reference:	-----	TP18	TP20	TP23	TP27	TP32
Your Reference	-					
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 (>C ₁₀ -C ₄₀)	mg/kg	<50
Surrogate o-Terphenyl	%	88

PAHs in Soil Our Reference: Your Reference Composite Reference Depth Date Sampled Type of sample	UNITS ----- - -----	171042-25 TP7	171042-26 TP12	171042-27 TP14	171042-28 TP15	171042-29 TP16
		--	--	--	--	--
		0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.0-0.1
		7/07/2017	7/07/2017	7/07/2017	7/07/2017	7/07/2017
		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: Your Reference Composite Reference Depth Date Sampled Type of sample	UNITS ----- - -----	171042-30 TP18 -- 0.0-0.1 7/07/2017 Soil	171042-31 TP20 -- 0.0-0.1 7/07/2017 Soil	171042-32 TP23 -- 0.0-0.1 7/07/2017 Soil	171042-33 TP27 -- 0.0-0.1 7/07/2017 Soil	171042-34 TP32 -- 0.0-0.1 7/07/2017 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 <i>p</i> -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+veDDT+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+veDDT+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+veDDT+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+veDDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	82	86

PCBs in Soil Our Reference: Your Reference	UNITS ----- -	171042-1 C1	171042-2 C2	171042-3 C3	171042-4 C4	171042-5 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: Your Reference	UNITS ----- -	171042-6 C6	171042-25 TP7	171042-26 TP12	171042-27 TP14	171042-28 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	UNITS	171042-29	171042-30	171042-31	171042-32	171042-33
Our Reference:	-----	TP16	TP18	TP20	TP23	TP27
Your Reference	-					
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	UNITS	171042-34	171042-35
Our Reference:	-----	TP32	Duplicate A
Your Reference	-		
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	UNITS	171042-1	171042-2	171042-3	171042-4	171042-5
Our Reference:	-----	C1	C2	C3	C4	C5
Your Reference	-					
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	UNITS	171042-6	171042-25	171042-26	171042-27	171042-28
Our Reference:	-----	C6	TP7	TP12	TP14	TP15
Your Reference	-					
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	UNITS	171042-29	171042-30	171042-31	171042-32	171042-33
Our Reference:	-----	TP16	TP18	TP20	TP23	TP27
Your Reference	-					
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	UNITS	171042-34	171042-35	171042-36
Our Reference:	-----	TP32	Duplicate A	TP7 -
Your Reference	-			[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	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected	Organic fibres detected	Organic fibres detected	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	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected	Organic fibres detected	Organic fibres detected	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

MethodID	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.

MethodID	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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH(C10-C40) in Soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Misc Inorg - Soil						Base II Duplicate II %RPD		
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	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
ESP/CEC						Base II Duplicate II %RPD		
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/100 g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	101%
Exchangeable K	meq/100 g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	105%
Exchangeable Mg	meq/100 g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-3	99%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
ESP/CEC						Base II Duplicate II %RPD		
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%

QUALITYCONTROL 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%
QUALITYCONTROL 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%
QUALITYCONTROL 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.

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

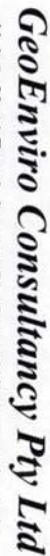
Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

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

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	✓	✓	✓	✓	✓	✓				



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

[illegible]



Composite Schedule

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

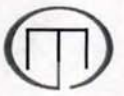
Composite		ID		Samples	
1	C1	7	TP 1 (0.0-0.1 m)	8	TP 2 (0.0-0.1 m)
2	C2	10	TP 4 (0.0-0.1 m)	11	TP 5 (0.0-0.1 m)
3	C3	13	TP 19 (0.0-0.1 m)	14	TP 21 (0.0-0.1 m)
4	C4	16	TP 24 (0.0-0.1 m)	17	TP 25 (0.0-0.1 m)
5	C5	19	TP 31 (0.0-0.1 m)	20	TP 33 (0.0-0.1 m)
6	C6	22	TP 35 (0.0-0.1 m)	23	TP 36 (0.0-0.1 m)
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

Form No. W020/Ver02/06/99

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

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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

Location

Depth (m)

Soil

Water

Test Required (Y)

Test Performed (X)

171042

From	To	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
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

Laboratory

Name

Signature

Date

Received By

Laboratory

Name

Signature

Date

GeoEnviro Consultancy

Adrian Tejada

10/07/2017

ELJ

JE

10.3.17

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 hygienist, 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

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

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 ENVIRONMENTAL 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	2.00mm 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.

$$\begin{aligned} &\text{as 4, 6, 7} \\ &N = 13 \end{aligned}$$

- 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.

$$\text{as 15,30/40mm}$$

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° 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.



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).

November 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 has been granted 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)	<p>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:</p> <p>Sector 901A Not more than 192 dwellings or less than 156 dwellings</p> <p>Sector 901C & 901G Not more than 28 dwellings or less than 23 dwellings</p> <p>9 Fern Creek Road No dwellings</p> <p>Sector 901A Not more than 190 dwellings or less than 154 dwellings</p> <p>(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)</p> <p>Sector 901C, 901G and 9 Fern Creek Rd Not more than 33 dwellings or less than 26 dwellings</p>

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
<i>Goal 2 A City of housing choice, with homes that meet our needs and lifestyles.</i> APfGS focuses on providing increased and diverse housing in well-served 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.
<i>Goal 3 Sydney's great place to live.</i> 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 approximately 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
	<p>9 Fern Creek Road is approximately 11,590m². Excluding the inner creek line the area of 9 Fern Creek Road is approximately 9273m². Under the Planning Proposal the area of the proposed southern section of Central Local Park is approximately 9882m² just over 600m² more than what would have been delivered if 9 Fern Creek was zoned entirely RE1 Public Recreation.</p> <p>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.</p> <p>The Central Local Park will contribute to a healthy built environment and increased liveability for residents in Warriewood.</p>

Draft Our Greater Sydney 2056 – A metropolis of three cities (2017)

In October 2017 the Greater Sydney Commission released for comment the draft Greater Sydney Region Plan. The draft Greater Sydney Region Plan proposes a Metropolis of three unique but connected cities – Western Parkland City, Central River City and Eastern Harbour City (that includes the Northern Beaches area).

There are four key layers that work together to turn the three cities vision into the reality of a metropolis of three, 30-minute cities:

- Landscape
- Housing and Great Places
- Jobs
- Connectivity

The purpose of the draft Greater Sydney Region Plan is to:

- set a 40-year vision (up to 2056) and establish a 20-year plan to manage growth and change for Greater Sydney in the context of economic, social and environmental matters
- inform district and local plans and the assessment of planning proposals
- assist infrastructure agencies to plan and deliver for growth and change and to align their infrastructure plans to place-based outcomes
- inform the private sector of the vision for Greater Sydney and infrastructure investments required to manage growth
- inform and engage the wider community so the draft Plan can best reflect the values and aspirations of all.

The Planning Proposal was on exhibition at the time the draft Region Plan was released. The Planning Proposal must however be assessed against this draft Region Plan.

The Planning Proposal is consistent with the draft Region Plan in the following ways.

Direction and Metrics	Objective	Planning Proposal Consistency
<p>A city for people</p> <p>Celebrating diversity and putting people at the heart of planning</p>	<p>Objective 7 – Communities are healthy resilient and socially connected</p>	<p>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 approximately 2.13ha with 1.14ha exclusive of the inner creek line corridor.</p> <p>The southern section will complete Central Local Park. The area of the southern section is approximately 1.8ha with 9882m² exclusive of the inner creek line.</p> <p>9 Fern Creek Road is approximately 11,590m². Excluding the inner creek line the area of 9 Fern Creek Road is approximately 9273m². Under the Planning Proposal the area of the proposed southern section of Central Local Park is approx. 9882m² just over 600m² more than what would have been delivered if 9 Fern Creek was zoned entirely RE1 Public Recreation.</p> <p>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.</p> <p>The Central Local Park will contribute to a healthy built environment and increased liveability for residents in Warriewood. The park will deliver an inclusive place for people of all ages supporting a socially connected community.</p>
<p>Housing the city</p> <p>Giving people housing choices</p>	<p>Objective 10 - Greater housing supply</p>	<p>The Planning Proposal facilitates the development of land zoned R3 Medium Density for housing.</p> <p>An albeit modest, maximum 3 additional dwellings may</p>

Direction and Metrics	Objective	Planning Consistency	Proposal
		result from the Planning Proposal.	
A city of great places Designing places for people	Objective 12 - Great places that bring people together	The Planning Proposal provides open space and medium density housing in a planned, walkable environment creating a 'great place' for the community.	

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	<p>In October 2017 during the exhibition of this Planning Proposal, the Greater Sydney Commission released the draft North District Plan (Draft NDP) for public comment. The draft NDP is one of five draft District Plans developed by the Greater Sydney Commission for each of Sydney's planning districts. The draft NDP contain four key themes of infrastructure and collaboration, liveability, productivity and sustainability.</p> <p>The Planning Proposal contributes to the creation of 'liveability', 'productivity' and 'sustainability'.</p> <p>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.</p> <p>Specific Liveability Planning Priorities are listed below: Planning Priority N3 – Providing services and social infrastructure to meet people's changing needs Planning Priority N4 – Fostering healthy, creative, culturally rich and socially connected communities Planning Priority N5 – Providing housing supply, choice and affordability, with access to jobs and services Planning Priority N6 – Creating and renewing great places and local centres, and respecting the District's heritage</p> <p>In terms of productivity, the Planning Proposal does not increase employment land however the planned residential component has access to jobs, goods and services within 30 minutes of the subject site.</p>

Criteria	Assessment
	<p>Specific Productivity Planning Priorities are listed below: Planning Priority N12 - Delivering integrated land use and transport planning and a 30-minute city</p> <p>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 enhancing biodiversity. Both of these attributes are overarching priorities in the sustainability priorities and actions in the draft North District plan. In terms of the future development of the housing it is considered that they can be designed and implemented (via the development application process) with acceptable impacts on the existing natural environment.</p> <p>Specific Sustainability Planning Priorities are listed below: Planning Priority N20 – delivering high quality open space.</p>
Consistent with the relevant local council strategy that has been endorsed by the Department, or	<p>The relevant strategic study is the <i>Warriewood Valley Strategic Review Report 2013</i> (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.</p> <p>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.</p> <p>Following the adoption of the Strategic Review, further investigations were carried out under the <i>Warriewood Valley Strategic Review Addendum Report 2014</i>. 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.</p> <p>The Planning Proposal is consistent with the <i>Warriewood Valley Strategic Review Report 2013</i></p>

¹ Page 3-4 Warriewood Valley Strategic Review Report 2013

Criteria	Assessment
	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),	<p>The Planning Proposal involves, amongst other things, the rezoning of R3 Medium Density Residential land to RE1 Public Recreation Land.</p> <p>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.</p> <p>Part of the site is identified on the Biodiversity Map within Pittwater LEP 2014 generally following the creek line and riparian corridor. The Planning Proposal will provide greater protection to the land identified on the Biodiversity Map by bringing it into Council ownership.</p>
The existing uses, approved uses, and likely future uses of land in the vicinity of the proposal; and	<p>The Planning Proposal is consistent with the adjoining land uses.</p> <p>To the north of the site is the northern half of Central Local Park. The proposed RE1 Public Recreation land will complete the southern section of the planned Central Local Park.</p> <p>The surrounding zoned residential land is generally undeveloped however when ultimately developed will all be of a similar density and built form.</p>
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.	<p>The Planning Proposal will deliver the Central Local Park that will serve the nearby community.</p> <p>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.</p> <p>The development is anticipated under the current Warriewood Valley Section 94 Contributions Plan Amendment 16 – Revision 2.</p> <p>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.</p>

Criteria	Assessment
	<p>Following on from the MOU a Deed of Agreement was signed between Frasers and Council and represented the final agreed position between both parties.</p> <p>Council at its meeting 19 March 2016 outlined the infrastructure provisions that Council and Frasers have agreed to:</p> <ul style="list-style-type: none"> <li>• 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. <li>• Frasers will fund and construct the section of stormwater infrastructure that is required to be located within the Fern Creek Road extension. <li>• Council will fund and construct the section of stormwater infrastructure between Fern Creek Road (as constructed by Frasers) and Fern Creek. <li>• 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. <p>The details relating to these arrangements will be 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.</p>

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 5374.3m², 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 600m² 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 further 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

Further consultation has been carried out with each of the above four State agencies as well as, Sydney Water. Responses have been received from all five State agencies.

The comments provided are discussed within the Final Assessment Report to be considered by Council at the 19 December 2017 meeting. There were no adverse issues raised by the State agencies that prevent the Planning Proposal proceeding.

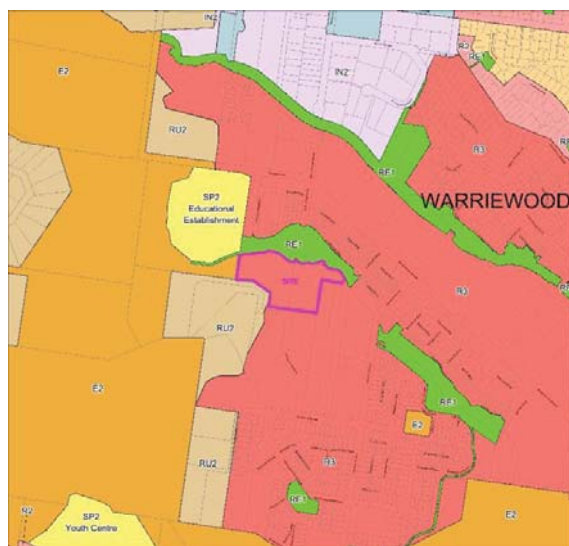
PART 4: MAPPING

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

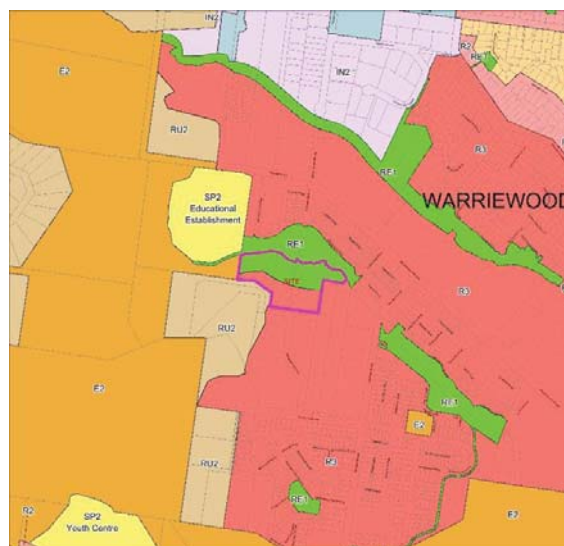
The proposed amended maps for Land Zoning Map (Sheet LZN_012) and Height of Building (Sheet HOB_12) are contained at **Appendix 6**.

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 Planning Proposal was placed on statutory notification for a period of 41 days from 23 September – 3 November 2017.

Landowners were notified within the Warriewood Valley (1994 in total) suburb as well as the Warriewood Residents Association. An advertisement was placed in the Manly Daily (23 September

2017) and a site notice was displayed at the site. The application documents were made available electronically on Council's website and in hard copy at each of Council's Customer Service Centres.

Letters were sent to the following State Agencies, and the first five agencies responded:

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

State Agency submissions raised no objection to the proposal and most importantly there were no outstanding issues or matters that would preclude Council from supporting the Planning Proposal.

Comments from the following Council Business Units were received:

- Environmental Health
- Transport Network
- Natural Environment and Climate Change
- Property Commercial and Tourist Assets

The responses received from members of the State agencies, internal Council Business Units and the community are provided in the Final Assessment Report to be considered at the Council meeting 19 December 2017.

6 written responses were received from the community including one submission from the Warriewood Residents Association.

Below is a summary of the themes of the community submissions:

- Overdevelopment of Warriewood
- Planning Proposal process
- Increase to the Height of Buildings
- Dwelling allocation
- Future park design - involvement of the community
- Land Contamination
- Future Voluntary Planning Agreement
- Costs and allocation of s.94CP monies
- Environmental issues

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
Submission to Department and PCO to prepare draft instrument	Following Council decision to finalise LEP	Immediately after Council Meeting
RPA to make plan	4 weeks from Council decision to finalise LEP	January 2018
Notification of LEP comes into force	1 week from RPA making plan	March 2018

Appendix 1: Consideration of SEPPs

The following SEPP's are relevant to the Pittwater Local Government Area. The Table identifies which of the relevant SEPPs apply to the Planning Proposal (or not) and if applying, is the Planning Proposal consistent with the provisions of the SEPP.

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
SEPP No 1 – Development Standards	YES	YES	
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 33 – Hazardous and Offensive Development	NO	N/A	
SEPP No 36 – Manufactured Home Estates	NO	N/A	
SEPP No 44 Koala Habitat Protection (noting that there is also a review of SEPP 44)	YES	YES	
SEPP No 50 – Canal Estate Development	NO	N/A	
SEPP No 55 – Remediation of Land	YES	NO	See comment under table
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 Protection	NO	N/A	
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	

Title of State Environmental Planning Policy (SEPP)	Applicable	Consistent	Reason for inconsistency or otherwise
SEPP (Infrastructure) 2007	YES	YES	
SEPP (State Significant Precinct) 2005	NO	N/A	
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	NO	N/A	
SEPP (Miscellaneous Consent Provisions) 2007	YES	YES	
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 (EPA) for consultation. The EPA responded with a more generic response to Council’s contamination responsibilities. The EPA response has been summarised and can be found in the Final Assessment Report that will be considered by Council 19 December 2017.

Council has the opportunity in subsequent development applications to action any recommendations of the GeoEnviron Consultancy Pty Ltd report including any site remediation recommendations in *Section 9 Assessment and Recommendations* of the report.

The first Development Application to be lodged will be a subdivision application, to subdivide the whole of the land into two (2) lots. This Development Application provides Council with the opportunity to action the recommendations of the Land Contamination report relating to the future Public Recreation component of the proposal.

Subsequently any future Development Application for residential development should include further investigation of site remediation as per the report.

The inconsistency therefore is very minor in nature.

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	YES

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.

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

Appendix 4: GLN Additional Information Flooding Affection

Appendix 5: Current LEP Maps

Appendix 6: Proposed LEP Map Amendments

Pittwater 21 DCP amendment as exhibited and recommended for adoption

TABLE OF AMENDMENTS to Pittwater 21 Development Control Plan (P21 DCP)
Associated with Planning Proposal for 9, 11, 12 & 13 Fern Creek Rd, Warriewood (PP0002/16)

The following table is to be read in conjunction with the exhibited P21 DCP document.

Please note that amendments made to the P21 DCP are shown in **red** text within the exhibited P21 DCP document.

Note: effectively, the amendment made is only to Control C6.11 - *Additional Specifications for development of Sector 901A to 901H*

Change #	Page Number	Where is the amendment located in the Addendum Report?	What Amendments are to be made?	Amendment details
#1	299	Last sentence of paragraph under bolded heading <i>'Land for Public Recreation'</i>	Make 'Indicative Layout Plans' singular	Replace 'Indicative Layout Plans' with (singular) <i>'Indicative Layout Plan'</i>
#2	299	Bolded heading <i>'Indicative Layout Plan 1 with 9 Fern Creek unchanged'</i> AND map below this heading	Delete heading and the map as this plan is now obsolete as a result of Planning Proposal (PP0002/16)	Delete the bolded heading and the map beneath it
#3	300	Bolded heading <i>'Indicative Layout Plan 2 with linear park'</i> AND Map beneath this heading	Remove '2' in heading AND Make changes to 9, 11, 12 & 13 Fern Creek Rd on Map 4 to reflect outcomes of Planning Proposal (PP0002/16)	Replace bolded heading 'Indicative Layout Plan 2 with linear park' with <i>"Indicative Layout Plan with Linear Park"</i> Revised plan for 9, 11, 12 & 13 Fern Creek Rd, to show new zoning boundaries and apply respective colour indication to these affected lots. (See exhibited DCP Amendment document for full details of the revised map)

C6.11 Additional Specifications for development of Sector 901A to 901H

Land to which this control applies

Land labelled Sectors 901A, 901B, 901C, 901D, 901E, 901F, 901G, 901H and 9 Fern Creek Road on the Pittwater Local Environmental Plan 2014 Urban Release Area Map.

Uses to which this control applies

Development of a sector, buffer area or development site in a Release Area, including built form and land subdivision (built form is not limited to residential).

Subdivision of a sector, buffer area or development site in a Release Area.

Outcomes

To efficiently utilise land to achieve the target dwelling yield.

Development occurs in an orderly manner.

All residential lots achieve a high level of amenity.

Ensure the conservation of natural vegetation and biodiversity.

Continue the network of multifunctional creekline corridors addressing the creek, floodway, flora and fauna habitat, water quality treatment, cyclist and pedestrian access, drainage and linking the Warriewood escarpment with Warriewood Wetlands and Narrabeen Lagoon.

Ensure an integrated approach to water management.

To provide an equitable, logical, legible and safe internal road layout.

To ensure safety of all road users.

The needs for public recreation and open space are met.

The risk to life and property from the threat of bushfire is minimised.

Controls

Development/subdivision of land identified as flora and fauna conservation area

A comprehensive site analysis for land identified as a flora and fauna conservation area on the Indicative Layout Plans within this control, is to be provided taking into account the characteristics as part of the subdivision design process. This will involve an arborist report identifying all significant vegetation. This analysis should take into account the final development which will occur on the site as a result of the subdivision. The analysis and resultant subdivision design should address the following issues:

- the slope, topography and any natural features (e.g. creeklines);
- trees and vegetation (particularly trees worthy of retention);
- view lines from within the proposed lots and from adjoining properties;
- solar access to the proposed lots;
- the side, rear and front setbacks of future dwellings and structures;
- boundaries and development on adjoining properties;
- the visual impact of built development which will occur as a result of the subdivision process (height, bulk and scale, visual impact of buildings);
- the provision of vehicular access to the future buildings on the proposed lots;
- the provision of landscaping and/or recreation space for each proposed lot;
- the provision of onsite car parking on each proposed lot;
- the provision of services to each lot, including sewerage, water, electricity; communications and gas (where available); and
- the provision of emergency services to each lot (bushfire, fire brigade, ambulance).

An additional requirement for this land involves the nomination of a building envelope on each proposed lot, shown on the Plan of Subdivision, clearly demonstrating that a dwelling can be accommodated wholly within the building envelope based on the following:

- optimum retention of significant trees and bushland;
- vehicular access;
- provision of services;
- provision of water management facilities;
- provision of emergency services;
- safety from hazards; and
- a building which achieves the desired character of the area, setbacks to boundaries and the site coverage requirements for individual lots.

The Building Envelope Plan should be at a legible scale and include the following elements:

- the maximum permissible building envelope (including site coverage for Complying Development Certificates), specifying setbacks, storeys and articulation zones;
- landscaped areas and deep soil areas;
- the preferred location of private open space;
- the driveway location and location of any hardstand areas;
- the garage size (single or double) and location; and
- zero lot line boundaries.

Other elements that may be relevant in accounting for the building envelope for each lot include:

- extent of basement car parking;
- retaining walls;
- easements;
- for corner lots, the preferred entry/frontage;
- frontage where vehicular access is not permitted; and
- special fencing requirements.

Upon approval of the subdivision a Section 88B instrument will be attached to the lot restricting the built form to the approved Plan of Subdivision incorporating the building envelope for each individual lot.

Development and subdivision of existing small and narrow lots

Site amalgamations provide greater opportunity to deliver better quality urban design outcomes. Sectors or development sites with an effective lot width less than 60 metres should pursue opportunities for site amalgamation to facilitate orderly planning and the efficient use of land. The Indicative Layout Plans included further in this control identifies Council's preferred site amalgamations.

Development of Sector 901H

Any development of Sector 901H as part of the development of the adjoining sites is to ensure that access to 4 and 5 Fern Creek Road is not impeded in accordance with the "Isolation of Sites" Planning Principle.

Internal Road Network

The internal road network within Sector 901 should be consistent with the Indicative Layout Plans within this Control.

The road connection between Garden Street and Fern Creek Road is to be designed to lower vehicle speeds to minimise its attractiveness as a short cut from properties on the western fringe of the sector to Garden Street.

All internal roads within Sector 901 must be designed with traffic calming devices to lower vehicle speeds, which may incorporate pavement treatment and enhanced landscaping. The provision of safe crossing areas is required.

Access and Street Presentation to Existing Public Roads

Garden Street (Classified as a "Sub-Arterial Street" under the Warriewood Valley Roads Masterplan)

A new "Local Street" with direct access off Garden Street is to be provided generally in accordance with the Indicative Layout Plans below, and designed and constructed in accordance with the relevant specifications and cross section for a Local Street under the Warriewood Valley Roads Masterplan.

The location of the intersection with Garden Street will generally be in accordance with the Indicative Layout Plans and will be subject to the assessment of traffic safety issues and the provision of necessary road improvement works.

All dwellings fronting Garden Street must present to Garden Street as the primary street frontage. No additional vehicle access including driveways will be permitted onto Garden Street.

Orchard Street (Classified as a "Collector Street" under the Warriewood Valley Roads Masterplan)

Any road access to Orchard Street (between Fern Creek Road and Garden Street) will be limited to a left in/left out arrangement.

Vehicular access is restricted to only part of Orchard Street (refer to the Indicative Layout Plans at the end of this control). Where permitted, shared driveways off Orchard Street are encouraged to maximise the opportunities for on-street kerb side parking.

Fern Creek Road (Classified as a "Local Street" under the Warriewood Valley Roads Masterplan)

Shared driveways off Fern Creek Road are encouraged to maximise the opportunities for on-street kerb side parking.

Location of Pedestrian and Cycleway Network

The alignment of the pedestrian and cycleway network is to be generally in accordance with the Indicative Layout Plans below, consistent with the *Warriewood Valley Landscape Masterplan and Design Guidelines* (Public Domain).

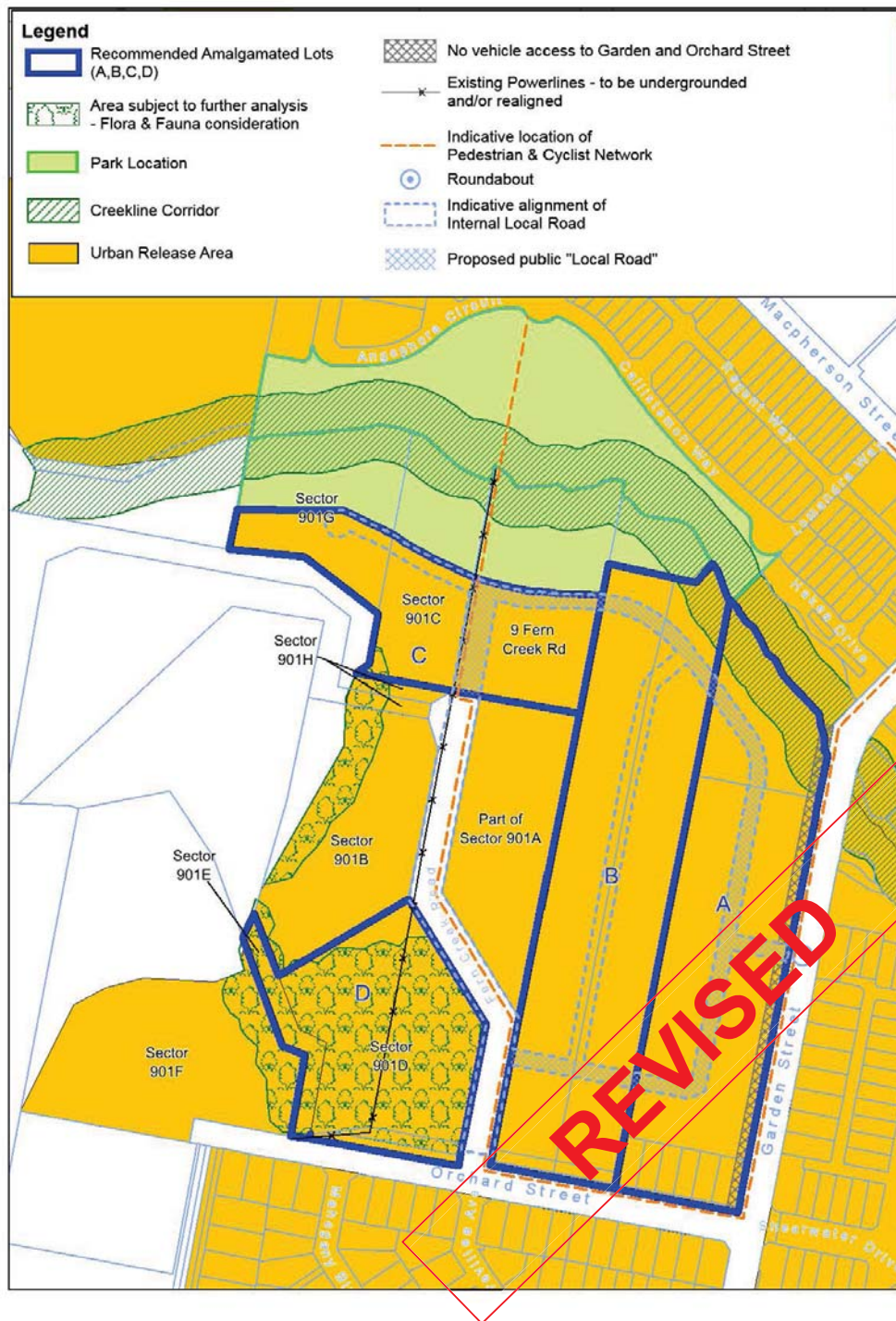
Land for Public Recreation

Approximately 1 hectare of land is to be provided adjacent to the creekline corridor for passive open space. This open space area is to be connected to the internal road and pedestrian cycleway networks generally in accordance with the ~~Indicative Layout Plans~~ **Indicative Layout Plan** within this Control.

Indicative Layout Plan 1 with 9 Fern Creek unchanged



Indicative Layout Plan 2 with Linear Park



Variations
Nil

Advisory Notes

This control must be read in conjunction with the general design requirements for subdivision and proposals for lots below a certain size, being control C6.8 and C6.9 respectively.

Control C6.5 stipulates the provision of utilities and infrastructure and provides a variation for the undergrounding of 33,000k Volt powerlines.

Amendments to WVSR Addendum Report as recommended for adoption (with Post-exhibition minor changes)

Warriewood Valley Strategic Review Addendum Report



ADOPTED 17 NOVEMBER 2014

draft amendments made - public exhibition (Sept 2017)

www.northernbeaches.nsw.gov.au

WARRIEWOOD VALLEY STRATEGIC REVIEW ADDENDUM REPORT 2014

Amendment no.	Date	Description	Status
1	28 May 2014	Draft Warriewood Valley Strategic Review Addendum Report presented to Council on 2 June 2014 for public exhibition	Draft
2	4 June 2014	Draft Warriewood Valley Strategic Review Addendum Report endorsed by Council on 2 June 2014 for public exhibition. Amended consistent with Council resolution of 2 June 2104 to correct typographical/mapping errors.	Exhibited Draft
3	11 November 2014	Draft Warriewood Valley Strategic Review Addendum Report amended post exhibition. Presented to Council on 17 November 2014 for adoption.	Final Draft
4	17 November 2014	Warriewood Valley Strategic Review Addendum Report adopted by Council at meeting held on 17 November 2014.	Adopted by Council
5	23 November 2017	Warriewood Valley Strategic Review Addendum Report amended as a result of Planning Proposal (PP0002/16) enabling the creation of the southern portion of the Planned Central Local Park. A secondary objective was to enable the development of the remaining land in an orderly and economic fashion resulting in the density provision changes over 9, 11, 12 and 13 Fern Creek Road.	Exhibited Draft Statutory Exhibition for PP0002/16

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Executive Summary



Photo by: Amanda Clarke 2011

Chapter 1

1.0 Executive Summary

Pittwater Council (Council), following consideration of matters arising from the public exhibition, has finalised the *Warriewood Valley Strategic Review Addendum Report* (Addendum Report).

1.1 Background and purpose

In June 2013 Council adopted the *Warriewood Valley Strategic Review Report 2012* (2012 Strategic Review) as the contemporary planning framework for the majority of undeveloped residential lands in the Warriewood Valley Release Area (Release Area).

The 2012 Strategic Review re-examined the *Warriewood Valley Planning Framework 2010* (2010 Planning Framework). The review process aimed to identify residential lands with development capability greater than their designated capability under the 2010 Planning Framework. The 2012 Strategic Review also investigated development opportunities in the Southern Buffer.

As a result of significant environmental constraints, existing development or current use, several sectors within the Release Area were not considered by the 2012 Strategic Review or identified with a forward path.

The purpose of this Addendum Report is to identify and recommend a forward path for these remaining sectors.

1.2 The review process

1.2.1 Identification of sectors to be reviewed

A preliminary review of land parcels within the Release Area identified the sectors without a forward path following the completion of the 2012 Strategic Review.

Until this review, these sectors have retained their land use designation under the 2010 Planning Framework, with the onus on individual landowners to alter the zoning of their land through the lodgement of a Planning Proposal.

In addition several sectors were not discussed in the 2012 Strategic Review as they were considered to be developed. Some of these sectors have been re-considered within the Addendum Report to ensure a contemporary forward path for all properties within the Release Area is provided. Additionally Sector 801 was re-examined given it was the preferred location, under the 2010 Planning Framework, for the Focal Neighbourhood Centre.

These sectors and their reason for exclusion under the 2012 Strategic Review are identified in **Table A**.

Table A: Sectors subject to further review

Sector	Property Address	Reason for exclusion from 2012 Strategic Review
172	1A Boondah Road	Investigated however unresolved or outstanding issues remain.
173	9A Boondah Road	
174	9 Boondah Road	
Southern Buffer	2, 4, 6 Jacksons Road and 1, 2, 2A, 3, 4A, 6, 8, 10, 12 Boondah Road	
120-122 Mona Vale Road	120 and 122 Mona Vale Road	
10A.1	Portion of 115 Orchard Street	
10A.2	Portion of 111, 111A and 113 Orchard Street	
901A	204 and 206 Garden Street, 2, 2A, 4, 4A, 6 and 6A Orchard Street and 9, 10 and 13 Fern Creek Road	
901C	12 Fern Creek Road	
901D	1 Fern Creek Road	
901E	Portion of 12 Orchard Street	
901G	11 Fern Creek Road	
901H	Portion of 4 & 5 Fern Creek Road	
102	185 Warriewood Road	Not investigated due to employment generating land use designation or zone.
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	
104	3 Harris Street	
105	15 Jubilee Avenue	
702	10 Jubilee Avenue	
3	14 Macpherson Street	Not investigated as they were considered to be developed.
201	4 Walana Crescent	
202	14 Walana Crescent	
203	3 Harrier Place	
204	79 Cabbage Tree Road	
802	5 Forest Road (Mater Maria Catholic College)	
10C	194 Garden Street	
Buffer Area 2	6-12 Macpherson Street	

1.2.2 Opportunities and constraints analysis

Following the identification process, a desktop analysis of opportunities and constraints was undertaken to determine the most suitable future development. The following factors were considered during the review to determine the most appropriate land use and a suitable forward path for each of the sectors:

- Known environmental affectations,
- Zoning under the *Pittwater Local Environmental Plan 2014* (PLEP 2014),
- Existing development on the site and likelihood of redevelopment,
- Outcomes and recommendations of various development assessments previously undertaken for particular sites,
- Recommendations of Council's contemporary strategic and land use planning policies.

With regard to the investigation of environmental affectations, a land capability assessment was undertaken based on Council's available mapping data. This considered environmental constraints including bushfire (updated with the adopted *Pittwater 2013 Bush Fire Prone Land Map*), flooding (updated with the adopted *Narrabeen Lagoon Flood Study 2013*), biodiversity and slope.

During the exhibition of the Addendum Report the *Pittwater Local Environmental Plan 2014* (PLEP 2014) was published and came into effect on 27 June 2014. The provisions of the published PLEP 2014 were considered in finalising the Addendum Report.

1.3 Recommendations

The opportunities and constraints analysis identified a number of sectors constrained by environmental factors or their existing land uses, as well as other relatively less constrained sectors with future development opportunities.

Based on the analysis undertaken, the Addendum Report recommends a number of amendments to the Warriewood Valley Release Area boundary, including removing some properties. It also recommends changes to the land uses designated for particular sectors under the 2010 Planning Framework, reflecting the current development constraints and opportunities.

The Release Area will be reduced from approximately 199 hectares to approximately 195 hectares.

The recommended approach for each individual sector is summarised in **Table B**. These recommendations will, effected in 2015 with the adoption of the Addendum Report, results in a net increase of 17 dwellings within the Release Area. Additional 3 dwellings result following the Planning Proposal (PP0002/16), described in **Table C**.

1.4 Provision of infrastructure and services

The recommendations ~~will~~, effected in 2015 with the adoption of the Addendum Report, results in a net increase of 17 dwellings within the Release Area. Additional 3 dwellings result following the Planning Proposal (PP0002/16), described in **Table C**.

This relatively minor increase in dwelling yield is unlikely to have a significant impact on the requirements for infrastructure and services in the Release Area. The additional yield is able to be accommodated through a minor amendment to the *Warriewood Valley Section 94 Contributions Plan* (Section 94 Plan).

1.5 Conclusion

The Addendum Report has provided an opportunity to re-examine the opportunities and constraints affecting the remaining sectors in the Release Area based on the most current information available. The Addendum Report re-evaluates the sector boundaries and the land uses for these sectors.

The recommended forward path for each sector has considered the relevant environmental constraints and the patterns of existing development, and will result in appropriate levels of development within the Release Area.

The Addendum Report, supported by an opportunities and constraints analysis based on contemporary information, is consistent with the community's expectations for the Release Area and will ensure continuity across Council's strategic and land use planning documents.

Table B: Summary of recommendations

Sector	Property Address	2010 Planning Framework Land Use Designation	Recommendations	Additional Dwellings
102	185 Warriewood Road	Industrial	Employment Generating land use designation recommended. Recommend landowners pursue opportunities to amalgamate to facilitate development.	-
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	Industrial	Employment Generating land use designation recommended. Recommend landowners pursue opportunities to amalgamate to facilitate development.	-
104	3 Harris Street	Industrial	Employment Generating land use designation recommended.	-
105	15 Jubilee Avenue	Industrial	Employment Generating land use designation recommended. Recommend landowners pursue opportunities to amalgamate to facilitate development.	-
172	1A Boondah Road	Conservation/Open Space	Amend Release Area boundary to include property within Southern Buffer sector. Passive Recreation land use designation recommended.	-
173	9A Boondah Road	Employment Generating	Remove from Release Area.	-
174	9 Boondah Road	Employment Generating	Remove from Release Area.	-

Sector	Property Address	2010 Planning Framework Land Use Designation	Recommendations	Additional Dwellings
Southern Buffer	2 and 4 Jacksons Road and 2, 2A, 3, 4A, 6, 8, 10, 12 Boondah Road	Employment Generating and Conservation/Open Space	Recreation Area land use designation recommended.	-
	1 Boondah Road	Employment Generating	Infrastructure land use designation recommended.	-
	6 Jacksons Road	Employment Generating	No development potential due to environmental affectations.	-
702	Portion of 10 Jubilee Avenue	Employment Generating	Remove from Release Area.	-
201	4 Walana Crescent	Traditional Residential	Remove from Release Area.	0
202	Portion of 14 Walana Crescent	Traditional Residential	Residential – Low Density land use designation recommended. Reduce yield from 4 dwellings to 1 dwelling. ¹	-3
203	Portion of 3 Harrier Place	Traditional Residential	Residential – Low Density land use designation recommended. Maintain maximum yield of 4 dwellings. ²	0
204	Portion of 79 Cabbage Tree Road	Traditional Residential	Remove from Release Area.	0
Buffer Area 2 and Sector 3	4 -16 Macpherson Street	Medium Density Residential	Recommend sector boundaries be amended to amalgamate these sectors. Retain land use designation.	0
801	23B Macpherson Street	Medium Density Residential	Residential – Medium Density and Focal Neighbourhood Centre land use designation recommended.	0

¹ Sector 20 Masterplan allocated 4 dwellings to this property.

² Sector 20 Masterplan allocated 4 dwellings to this property.

Sector	Property Address	2010 Planning Framework Land Use Designation	Recommendations	Additional Dwellings
802	Portion of 5 Forest Road	Medium Density Residential	Infrastructure land use designation recommended. Entire land parcel to be rezoned to SP2 Infrastructure (Educational Establishment).	0
9 Fern Creek Road	9 Fern Creek Road	Mixed Residential	Recreation land use designation recommended. ³	0
901A	204 & 206 Garden Street, 2, 2A, 4, 4A, 6 & 6A Orchard Street and 9 -10 & 13 Fern Creek Road	Mixed Residential	Clarify the dwelling yield allocation for each land parcel within the sector. ⁴	0
901C and G	11 & 12 Fern Creek Road	Mixed Residential	Recommend that Sectors 901C and 901G be required to be developed together. ⁵	0 ⁶
901H	Portion of 4 & 5 Fern Creek Road	Mixed Residential	Recommend sector boundary be amended to identify only the battle-axe handles of the properties as within the Release Area. Residential – Medium Density land use designation recommended for battle-axe handles. Recommend battle-axe handles be rezoned R3 Medium Density Residential and a maximum yield of 3 dwelling be attributed. Remainder of the original sector to be removed from the Release Area.	3
10A.1	Portion of 115 Orchard Street	Mixed Residential	Remove from Release Area.	0

³ Table C now applies as a result of Planning Proposal (PP0002/16), effecting the change in land use designation(s)

⁴ Result of Planning Proposal (PP0002/16) rezoned 13 Fern Creek Rd to RE1 Public Recreation with no dwelling yield

⁵ Table C now applies as a result of PP0002/16

⁶ As a result of Planning Proposal (PP0002/16), there is a change in additional dwellings. See Table C

Sector	Property Address	2010 Planning Framework Land Use Designation	Recommendations	Additional Dwellings
10A.2	Portion of 111, 111A and 113 Orchard Street	Mixed Residential	Remove from Release Area.	0
10C ⁷	194 Garden Street (Seaside Residential Aged Care Facility)	Mixed Residential	Residential – Low Density land use designation recommended	17
120 and 122 ⁸	120 and 122 Mona Vale Road	Conservation/Open Space <i>Not originally identified as a development sector within Release Area</i>	Recommend to be identified as two separate sectors. Residential - Low Density land use designation recommended for Sector 120 (known as Clause 6.2 on Urban Release Area Map). Conservation land use designation recommended for Sector 122.	0
Creek line corridor land within Buffer Area 1 subsectors	23 to 53A Warriewood Road inclusive	Creek line corridor - Subject to environmental constraints	Recommend that only 25 metre corridor either side of the creek centreline be identified as Creek Line Corridor.	-
Additional Dwellings				17

⁷ Sector 10C was unintentionally omitted from Table B, however was detailed elsewhere in the Addendum Report adopted on 17 November 2014

⁸ Properties rezoned by Joint Regional Planning Panel Sydney East (acting as the Relevant Planning Authority). In rezoning the land, the no maximum yield was allocated; rather minimum lot size provisions apply.

Table C: Revised dwelling yields affecting Sectors 901A (part), 901C, 901G & 9 Fern Creek Rd as a result of Planning Proposal (PP0002/16)

Property Description (Lot, DP)	Sector	Developable Area (m2)**	Density Range identified prior to 2015+	Min Dwelling Yield		Max Dwelling Yield		Net Increase or Decrease of dwellings	As a result of Planning Proposal (PP0002/16)
				Pre*	Post*	Pre*	Post*		
Southern portion of 9 Fern Creek Rd (Lot 5, DP 736961) 11 Fern Creek Rd (Lot 11, DP 1092788) 12 Fern Creek Rd (Lot 12, DP 1092788)	9 Fern Creek Rd 901G 901C	5,374 3,174 4,075	25/ha min 32/ha max 10/ha min and max 25/ha min 32/ha max	0	13	0	17	Increase of 17 dwellings (max) Increase of 13 dwellings (min)	Not more than 33 dwellings or less than 26 dwellings
				23		28		Decrease of 12 dwellings (max) Decrease of 10 dwellings (min)	
				2		0		Decrease of 2 dwellings (max and min)	
13 Fern Creek Rd (Lot 13, DP 1092788)	(formerly) Part of 901A	0	25/ha min 32/ha max	2	0	2	0		0 (now designated for 'Public Recreation')
Total		12,623		25	26	30	33	Overall increase of 3 dwellings	26 (Minimum) to 33 (Maximum)

* "Pre" – pre-Planning Proposal (PP0002/16); "Post" – post-Planning Proposal (PP0002/16)

** Developable area is the individual site area designated for "residential" only

 + **Prior to 2015** means when Warriewood Valley Strategic Review 2012 was adopted on 12 June 2013 or when Warriewood Valley Strategic Review Addendum Report 2014 was adopted on 17 November 2014

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Why are we undertaking the Warriewood Valley Strategic Review Addendum?



Photo by: Amanda Clarke 2011

Chapter 2

2.0 Why are we undertaking the Warriewood Valley Strategic Review Addendum Report?

2.1 Completion of *Warriewood Valley Strategic Review Report 2012*

The Warriewood Valley Strategic Review 2012 (2012 Strategic Review) was commenced in 2011 in response to the Planning Assessment Commission's (PAC) approval of the development at 79-91 Macpherson Street, Warriewood⁹ under the former Part 3A provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

In approving the development, the PAC recommended that Council and the then Department of Planning and Infrastructure review the dwelling densities, height controls, the current transport network and necessary improvement works, and infrastructure demands in Warriewood Valley and the surrounding area. The PAC recommended that the review seek to clarify the subregional role of Warriewood Square, how it relates to the rest of Warriewood Valley, the potential for higher density residential development and the opportunity for employment-generating developments adjacent to Warriewood Square.

The 2012 Strategic Review investigated all residential sectors within the Release Area considered undeveloped, as well as land within the Southern Buffer. Sectors designated for non-residential development (with the exception of the Southern Buffer) were not investigated.

For the majority of undeveloped residential sectors, the 2012 Strategic Review found that residential densities up to a maximum of 32 dwellings per developable hectare could be achieved. **Table 1** details the sectors afforded this change under the 2012 Strategic Review, as well as those sectors completed prior to the commencement of the 2012 Strategic Review, requiring no further investigation.

Some undeveloped sectors, due to significant environmental constraints were not recommended a forward path under the 2012 Strategic Review, however have been rezoned since the completion of the review.¹⁰ These sectors are discussed further in this report to confirm their forward path. These sectors are listed in **Table 2**.

For the remaining sectors not identified with a forward path under the 2010 Strategic Review Council's resolution of 12 June 2013 identified that a future review would be undertaken to address these. **Tables 3** and **4** identify these sectors.

Table 3 lists the remaining undeveloped residential sectors that due to significant constraints were not investigated or identified with a forward path under the 2012 Strategic Review. This table also includes Sector 801, which while designated with a forward path in terms of its potential for residential development, was not considered in terms of the location for the Focal Neighbourhood Centre for the Release Area.

Table 4 lists the remaining undeveloped land identified as employment generating sectors under the 2010 Planning Framework. This includes the Southern Buffer, which due to the significant environmental constraints and divergent landowner expectations, was not recommended a future land use designation under the 2012 Strategic Review.

⁹ Property known as 14-18 Boondah Road, Warriewood at time of approval.

¹⁰ Council resolution of 12 June 2013.

Table 1: Sectors afforded a forward path under 2012 Strategic Review or completed prior to the review

Sector	Density (dwellings/developable hectare) ¹¹	Zoning under the PLEP 2014	Development Considered Complete?
1	15	R3 Medium Density Residential	Yes (Pre 2012)
101	26	R3 Medium Density Residential	No
2	15	R3 Medium Density Residential	Yes (Pre 2012)
301	32	R3 Medium Density Residential	No
302	32	R3 Medium Density Residential	No
303	32	R3 Medium Density Residential	No
501	32	R3 Medium Density Residential	No
6	N/A - Designated for employment generating development	IN2 Light Industrial	Yes (Pre-2012)
701	N/A - Designated for employment generating development	B7 Business Park	Yes (Pre-2012)
8	25	R3 Medium Density Residential	Yes (Pre 2012)
801	32	R3 Medium Density Residential	No
901A	32	R3 Medium Density Residential	No
901B	32	R3 Medium Density Residential	No
901C	32	R3 Medium Density Residential	No
901F	10	R3 Medium Density Residential	No

¹¹ Developable area is the site area excluding the creek line corridor land.

Sector	Density (dwellings/developable hectare) ¹²	Zoning under the PLEP 2014	Development Considered Complete
9 Fern Creek Road	0	R3 Medium Density Residential	No
10	15	R3 Medium Density Residential	Yes (Pre 2012)
10B	20	R3 Medium Density Residential	No
11	25	R3 Medium Density Residential	Yes (Pre 2012)
12	15	R3 Medium Density Residential	Yes (Pre 2012)
12A	21 ¹³	R3 Medium Density Residential	Yes (Pre 2012)
20	Less than 10	R3 Medium Density Residential	Yes (Pre 2012)
Buffer Area 1A	20	R3 Medium Density Residential	Yes (Pre 2012)
Buffer Area 1B	32	R3 Medium Density Residential	No
Buffer Area 1C	32	R3 Medium Density Residential	No
Buffer Area 1D	32	R3 Medium Density Residential	No
Buffer Area 1E	32	R3 Medium Density Residential	No
Buffer Area 1F	32	R3 Medium Density Residential	No
Buffer Area 1G	32	R3 Medium Density Residential	No
Buffer Area 1H	32	R3 Medium Density Residential	No
Buffer Area 1I	32	R3 Medium Density Residential	No

¹² Developable area is the total site area excluding the creek line corridor land, measured as 25 metres either side of the creek centreline.

¹³ Developed prior to Sector 12 master plan.

Sector	Density (dwellings/developable hectare) ¹⁴	Zoning under the PLEP 2014	Development Considered Complete
Buffer Area 1J	32	R3 Medium Density Residential	No
Buffer Area 1K	32	R3 Medium Density Residential	No
Buffer Area 1L	32	R3 Medium Density Residential	No
Buffer Area 1M	0	R3 Medium Density Residential	No
Buffer Area 2A	25	R3 Medium Density Residential	No
Buffer Area 3A	60 ¹⁵	R3 Medium Density Residential	Yes (Pre 2012)
Buffer Area 3B	32	R3 Medium Density Residential	No

¹⁴ Developable area is the total site area excluding the creek line corridor land, measured as 25 metres either side of the creek centreline.

¹⁵ Development approved by Planning Assessment Commission under Part 3A of EP&A Act 1979 (provision now repealed).

Table 2: Sectors rezoned following completion of 2012 Strategic Review

Sector	Density (Dwellings/developable hectare) ¹⁶	Zoning under the PLEP 2014	Reason for Rezoning
901D and 901E	10	R3 Medium Density Residential	Forward path adopted by Council on 12 June 2013. Rezoned in accordance with Council decision of 12 June 2013.
901G	10	R3 Medium Density Residential	Forward path adopted by Council on 12 June 2013. Rezoned in accordance with Council decision of 12 June 2013.
120 Mona Vale Road	Undefined. The property is identified on the Minimum Lot Size map, allowing the property to be subdivided to a range of lot sizes.	Part E4 Environmental Living and R2 Low Density Residential	Rezoned by Joint Regional Planning Panel Sydney East (acting as the Relevant Planning Authority). A portion of site (creekline corridor zoned E2 Environment Conservation) is identified on the Land Reservation Acquisition Map under PLEP 2014.
122 Mona Vale Road	-	E2 Environmental Conservation	Rezoned by Joint Regional Planning Panel Sydney East (acting as the Relevant Planning Authority). The entire site is identified on the Land Reservation Acquisition Map under PLEP 2014.

¹⁶ Developable area is the total site area excluding the creek line corridor land, measured as 25 metres either side of the creek centreline.

Table 3: Remaining residential sectors identified for review

Sector	Land Use Designation as per 2010 Planning Framework	Density (Dwellings/developable hectare) ¹⁷ for original 'whole of sector' ¹⁸	Zoning under the PLEP 2014	Reason for consideration
3 & Buffer Area ²	Medium Density Residential	25 (Sector 3 and Buffer Area 2)	R3 Medium Density Residential	Anomaly due to development across sector boundaries.
801	Medium Density Residential Identified as location for the Focal Neighbourhood Centre	25 (Sector 8)	R3 Medium Density Residential Schedule 1 Additional Permitted Use ¹⁹	Sector not confirmed as location for Focal Neighbourhood Centre.
802	Medium Density Residential	25 (Sector 8)	RU2 Rural Landscape	Current land use inconsistent with Land Use Designation.
901A	Mixed Residential	25 (Sector 9)	R3 Medium Density Residential	Uncertainty surrounding dwelling yield allocation for individual properties within sector
901C	Mixed Residential	25 (Sector 9)	R3 Medium Density Residential	Sector required to be developed with 901G
901G	Mixed Residential	25 (Sector 9)	R3 Medium Density Residential	Sector required to be developed with 901C
901H	Mixed Residential	25 (Sector 9)	RU2 Rural Landscape	No outcome under 2012 Strategic Review.
10A.1	Mixed Residential	15 (Sector 10)	RU2 Rural Landscape	No outcome under 2012 Strategic Review.

¹⁷ Developable area is the total site area excluding the creek line corridor land, measured as 25 metres either side of the creek centreline.

¹⁸ The 'whole of sector' approach was established for the Release Area under the *Draft Warriewood Valley Planning Framework 1997* and retained until the 2012 Strategic Review. A maximum density was historically allocated across a whole sector, acknowledging that the development within the sector may occur at a range of dwelling densities based on the characteristics and constraints within the sector.

¹⁹ Schedule 1, Clause 20 permits development for the purposes of restaurants and cafes and permits neighbourhood shops larger in floor area than otherwise permitted under PLEP 2014.

Sector	Land Use Designation as per 2010 Planning Framework	Density (Dwellings/developable hectare) ²⁰ for original 'whole of sector' ²¹	Zoning under the PLEP 2014	Reason for consideration
10A.2	Mixed Residential	15 (Sector 10)	RU2 Rural Landscape	No outcome under 2012 Strategic Review.
10C	Mixed Residential	15 (Sector 10)	R3 Medium Density Residential	Capacity to be redeveloped.
201	Traditional Residential	8 (Sector 20)	SP2 Infrastructure (Cemetery)	Current use inconsistent with Land Use Designation.
203	Traditional Residential	8 (Sector 20)	R3 Medium Density Residential	Residue lot of Sector 20.
204	Traditional Residential	Not rezoned with rest of Sector 20	RU2 Rural Landscape	Residue lot of Sector 20.

²⁰ Developable area is the total site area excluding the creek line corridor land, measured as 25 metres either side of the creek centreline.

²¹ The 'whole of sector' approach was established for the Release Area under the *Draft Warriewood Valley Planning Framework 1997* and retained until the 2012 Strategic Review. A maximum density was historically allocated across a whole sector, acknowledging that the development within the sector may occur at a range of dwelling densities based on the characteristics and constraints within the sector.

Table 4: Employment generating sectors identified for review

Sector	Land Use Designation under 2010 Planning Framework	Zoning of land within the Release Area under the PLEP 2014	Reason for consideration
102	Industrial	IN2 Light Industrial	Undeveloped residue lot of Stage 1 Release
103	Industrial	IN2 Light Industrial	Undeveloped residue lot of Stage 1 Release
104	Industrial	IN2 Light Industrial	Undeveloped residue lot of Stage 1 Release
105	Industrial	IN2 Light Industrial	Undeveloped residue lot of Stage 1 Release
172	Conservation/Open Space	RE1 Public Recreation	No outcome under 2012 Strategic Review.
173	Employment Generating	SP2 Infrastructure (Sewerage System)	No outcome under 2012 Strategic Review.
174	Employment Generating	SP2 Infrastructure (Sewerage System)	No outcome under 2012 Strategic Review.
Southern Buffer	Employment Generating	Part RU2 Rural Landscape, SP2 Infrastructure (Public Administration Building), RE1 Public Recreation and SP2 Infrastructure (Community Facility)	No outcome under 2012 Strategic Review.

2.2 Review of other Pittwater-wide policies and studies since the completion of the 2012 Strategic Review

2.2.1 Narrabeen Lagoon Flood Study 2013

A review of the *Narrabeen Lagoon Flood Study 1990* commenced in 2010.

*Narrabeen Lagoon Flood Study 2013*²² was adopted in November 2013. The study resulted in a slight increase in flood levels from the previously adopted design flood conditions for Narrabeen Lagoon. This information has been incorporated in the flood mapping layer utilised for the composite capability map for this report.

The updated flooding information has also been reflected in minor amendments to Council's planning documents, including the *Pittwater 21 Development Control Plan*, relevant Section 149(2) notations and the Narrabeen Creek Sea Level Rise Investigation Area.

2.2.2 Pittwater Bushfire Prone Lands Map

Council's bushfire mapping was updated in 2013 in accordance with the *Rural Fires Act 1997* and *Environmental Planning and Assessment Amendment Act 2008*.

The *Bushfire Prone Lands Map for Pittwater 2013* was adopted by Council in March 2013 and certified by the Rural Fire Service in June 2013. These maps have been used to inform the composite capability map developed for this report.

2.2.3 Pittwater Public Open Space and Recreation Strategy 2014

In 2012, Council commenced a review of the *Pittwater Open Space, Bushland and Recreation Strategy 2000* and aimed at:

- Enhancing existing public open space, sport and recreation networks,
- Encouraging social ownership and the desire to protect and use networks in such a way that enhance Pittwater's natural areas and cultural heritage.
- Expanding public open space, sport and recreation networks for the benefit of future generations that considers the needs of the community for social interaction, public health, provision of access for all, and that are sustainable in economic and environmental terms.
- Improving the quality of public open space through upgrading and managing existing networks as well as consideration given to purchasing additional land and the sale of surplus land. In particular, additional land for sports fields is required to service the growing population.

The *Pittwater Public Space and Recreation Strategy 2014* (Open Space Strategy) identifies:

- Opportunities to, where feasible, upgrade and expand the public open space network for the benefit of the broader community,
- The need to promote programs that support social interaction, access for all and are sustainable in economic and environmental terms,

²² BMT WBM (2013) *Narrabeen Lagoon Flood Study 2013*, prepared for Warringah and Pittwater Councils.

- Provision of well designed, safe open spaces that protect and enhance the natural environment, identify cultural heritage and consider aesthetics, sustainability and 'sense of place',
- The need to improve equity in the distribution of public open space and recreational opportunities,
- Provision of multi-use spaces that promote intergenerational use including additional opportunities for an ageing population and for children and young people.

Specific recommendations are proposed for tourism opportunities and for the following public spaces:

- Nature Conservation Areas,
- Walking, Cycling and Equestrian Tracks,
- Ocean Beaches,
- Foreshore Reserves and Waterways,
- Large Developed Parks,
- Structured Sports and Recreation Areas,
- Sports fields,
- Indoor Sports and Recreation Facilities,
- Village Greens, Culture and Leisure.

The Open Space Strategy confirms that there is a significant undersupply of recreation areas in the Pittwater Local Government Area (LGA). The review recognised the importance of the release areas (being Warriewood Valley and Ingleside) providing places for recreation and other facilities to meet the needs of their incoming populations to ensure that the demands of any additional population do not further exacerbate the existing shortage of recreation areas.

This strategy was adopted by Council on 13 October 2014.

2.3 Moving from the *Warriewood Valley Planning Framework 2010*

For those lands not identified with a forward path under the 2012 Strategic Review, listed in **Tables 3 and 4** above, the 2010 Planning Framework continued to apply as the planning strategy for these sectors. The 2010 Planning Framework specifies a land use designation and, for residential sectors, a maximum residential density.

In accordance with Council's resolution of 12 June 2013, a review of the 2010 Planning Framework as it applies to the remaining lands in the Release Area is necessary to confirm a contemporary forward path for all sectors.

The Addendum Report seeks to identify the forward path for the sectors identified in **Tables 3 and 4**. The Addendum Report also seeks to clarify and correct anomalies that have arisen as sectors within the Release Area have been progressively rezoned and developed.

2.4 Warriewood Valley Section 94 Contributions Plan

At its meeting of 12 June 2013, Council in adopting the 2012 Strategic Review also directed that a review of the Section 94 Plan be undertaken to articulate additional infrastructure commensurate with the development anticipated in Warriewood Valley under the 2012 Strategic Review. At the time, among the other additional infrastructure requirements, Council was advised of the increase in open space requirements, particularly the quantum of active open space land for sports fields.

The review of the Section 94 Plan included the consideration of the recommendations of the *Warriewood Valley Strategic Review Economic Feasibility Study* (Hill PDA, 2011).²³

2.5 Forward Path

The Addendum Report will be a supplement to the 2012 Strategic Review, so as to achieve a single comprehensive document applying to all undeveloped lands in the Warriewood Valley Release Area.

The 2012 Strategic Review, together with the Addendum Report, supersede the 2010 Planning Framework, and form the strategic planning framework for the development of land in the Release Area.

²³ Hill PDA (2011) *Warriewood Valley Strategic Review Economic Feasibility Study*, prepared for NSW Department of Planning and Infrastructure and Pittwater Council.

The Review Process



Photo by: Amanda Clarke 2011

Chapter 3

3.0 The Review Process

3.1 Identifying the land to be reviewed

The PAC's determination report (2010) advocated for a '*...comprehensive study of all undeveloped sites in the Valley including the future role of Warriewood Centre and the development potential around the centre...*'

The 2012 Strategic Review identified a forward path for undeveloped lands that were capable of intensified residential development, generally at a density up to 32 dwellings per developable hectare.

A review of all land parcels in Warriewood Valley was undertaken to identify the sites not afforded a forward path following the completion of the 2012 Strategic Review. In addition several sectors were not investigated by the 2012 Strategic Review as they were considered to be developed. These sectors have been further investigated to ensure a forward path for all properties within the Release Area is provided.

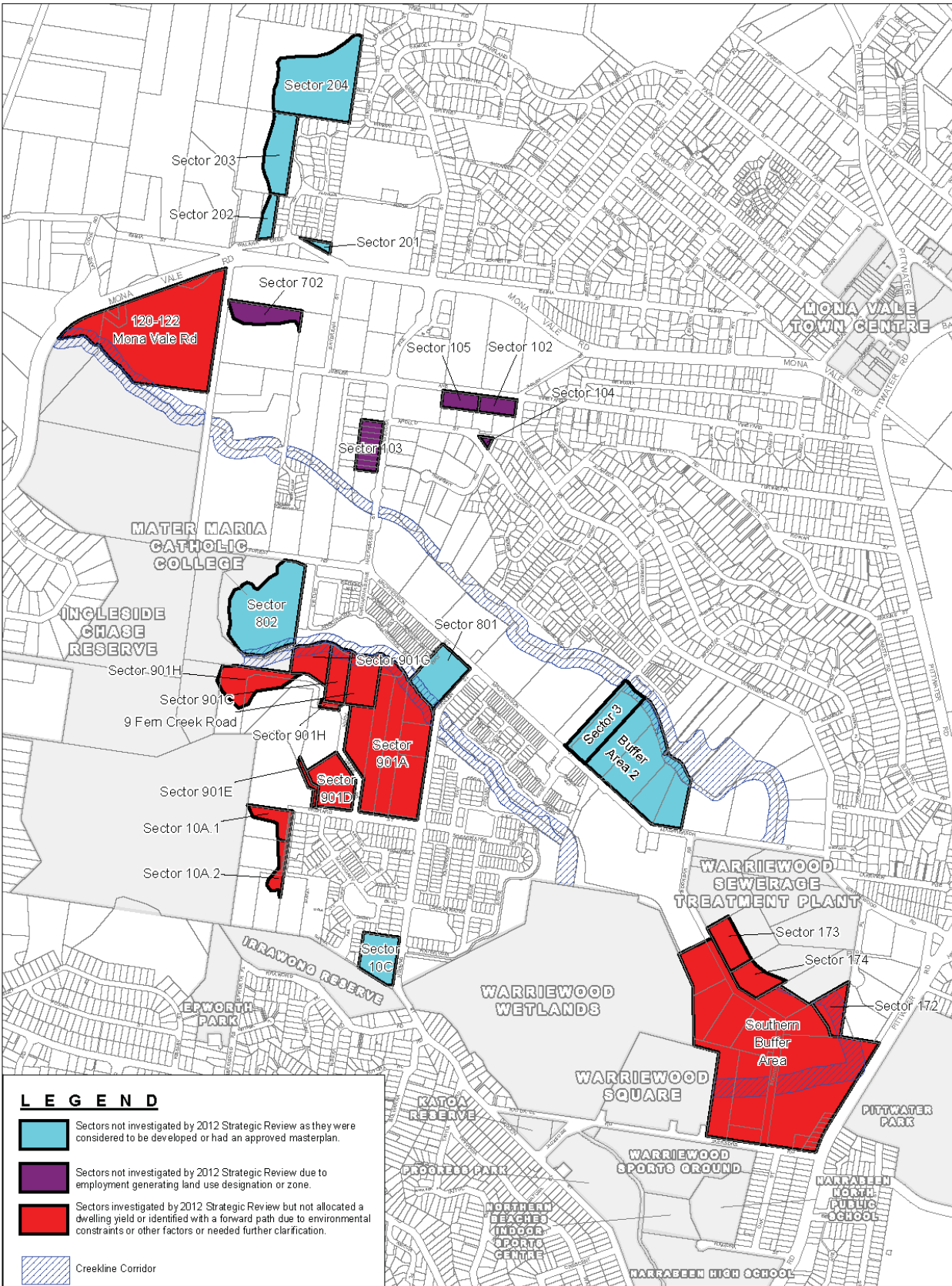
Based on the 2012 Strategic Review's Undeveloped Lands Map,²⁴ the following criteria were used to identify the sites subject to this review:

- Sites investigated by the 2012 Strategic Review but outstanding or unresolved issues remain,
- Sites not investigated by 2012 Strategic Review due to employment generating land use designation under 2010 Planning Framework or zone,
- Sites not investigated by the 2012 Strategic Review because they were considered to be developed or had an approved masterplan applying to the site.

The sectors identified for review are depicted in **Map 1**.

²⁴ Pittwater Council and Department of Planning & Infrastructure (2012) *Warriewood Valley Strategic Review Report 2012*, Map 2, p. 29.

Map 1: Land to be reviewed (corresponds with Sectors listed in Tables 3 & 4)



3.2 Factors considered during the opportunities and constraints analysis

The following factors were considered during the desktop review to determine the most appropriate land use and a suitable forward path:

- Known environmental affectations,
- Zoning under the PLEP 2014,²⁵
- Existing development on the site and likelihood of redevelopment,
- Outcomes and recommendations of various development assessments previously undertaken for particular sites,
- Recommendations of Council's contemporary strategic and land use planning policies.

The process for assessing known environmental affectations is discussed in more detail in Section 3.3.

3.3 Process for assessing environmental affectations

The land capability mapping exercise utilised for the 2012 Strategic Review was again used for this review to assess environmental affectations. Since the completion of the 2012 Strategic Review, Council has acquired more current flooding and bushfire data. This information has been incorporated into the bushfire and flooding map layers which were utilised for land capability mapping exercise undertaken for this review (see **Appendix 1**).

The land capability mapping process builds geographical layers to produce a visual representation of areas with lower or higher levels of development capability. Seventeen individual base map layers have been prepared for the Pittwater Local Government Area, each map representing an environmental, economic or social characteristic that influences land use decisions. The map layers also identify issues that should be addressed in the future management of the land. The following layers were used to prepare the overall Composite Capability Map.

- Bushfire (*updated based on Bushfire Prone Lands Map for Pittwater 2013 adopted by Council on 4 March 2013 and certified by the Rural Fire Service on 17 June 2013*),
- Flooding (*updated based on Narrabeen Lagoon Flood Study 2013 adopted by Council on 4 November 2013*),
- Acid sulphate soils,
- Biodiversity,
- Climate change including sea level rise,
- Coastal processes,
- Cultural (heritage value),
- Estuarine processes,
- Foreshores and water bodies,
- Geotechnical,
- Proximity to ridgelines,
- Proximity to watercourses,
- Sewer availability,
- Slope,
- Water availability.

²⁵ *Pittwater Local Environmental Plan 2014* (PLEP 2014) was published and came into effect on 27 June 2014. The provisions of the published LEP were considered in finalising this report.

The constraints map layers have been divided into the following three classes:

- **Class A: Low restriction to intensification of development.**
Existing development may require generic management prescriptions to achieve sustainable land use. Intensification of development must be confined to defined targets to maintain sustainability.
- **Class B: Moderate restriction to intensification of development.**
Existing development forms require generic management prescriptions to achieve sustainable land use. Any intensification needs site specific investigation and must address constraints.
- **Class C: Significant restriction to intensification of land use.**
Existing development forms require site specific and detailed management prescription to achieve sustainable land use. Any intensification must fully address each specific constraint.

The map layers are combined into a single layer to form a Composite Capability Map, categorising the land in terms of its level of development capability. The land capability classifications are outlined in **Table 5**.

Table 5: Land capability classifications

Map Classification	Level of Capability	Categories from Composite Maps
1	Most	All A's: areas of land that were mapped as suitable for development or intensification.
2	More	All A and B: areas of land that were mapped as having at least one moderate constraint to development or intensification.
3	Moderate	Only have one instance of C: areas of land that were mapped as having one severe constraint to development or intensification.
4	Less	Two instances of C: areas of land that were mapped as having two instances of a severe constraint to development or intensification.
5	Least	Three or more instances of C: areas of land that were mapped as having three or more severe constraints to development or intensification.

For the purpose of this review, the Composite Capability Map produced did not include the proximity to centres and public transport links base map layers as these issues will not significantly affect the development capability of the land. This is consistent with the approach applied for the 2012 Strategic Review.

The outcomes of the land capability exercise are discussed in Chapter 4. The Composite Capability Map produced for this review is depicted in Chapter 4 in **Map 2**.

3.4 Community engagement process

A strategy for community engagement was devised for this review based on Council's Community Engagement Policy and Procedures. The strategy includes the following:

- Notification to all affected landowners of the recommendations of the draft Addendum Report, inviting them to meet with Council staff to discuss the recommendations for their property,
- Notification to the local community representative group which represents the interest of Warriewood Valley landowners advising them of the release of the draft Addendum Report,
- Media releases and website updates,
- Advertisement in the local newspaper advising of the exhibition of the draft Addendum Report, and
- Public exhibition of the draft Addendum Report for a minimum of 28 days.

The implementation of the strategy has ensured that all stakeholders in the community, whether affected directly or indirectly by the recommendations of the draft Addendum Report, were adequately informed and provided with opportunities to voice their concerns.

3.5 Probity Advisor

It was identified that probity issues could arise from the mixed ownership of land in the Warriewood Valley Release Area, being Crown, Council and privately owned land. A probity advisor was engaged to oversee the governance established for the completion of this review and to prevent real and perceived conflicts of interest.

The scope of works undertaken by the probity advisor includes:

- Providing probity advice and services in relation to the public exhibition of the draft Addendum Report,
- Attending meetings with landowners during the exhibition period where it is deemed there may be a potential conflict of interest, and
- Overseeing the submission review process and, where necessary, providing advice on key decisions associated with finalising the Addendum Report.

The probity advisor has audited the processes undertaken in finalising this report and prepared a Probity Report that accompanies the Addendum Report.

Results



Photo by: Amanda Clarke 2011

4.0 Results

4.1 Summary of results

The desktop review identified a number of sectors constrained by environmental affectations or by their existing development or land uses. The most significant constraints included the following:

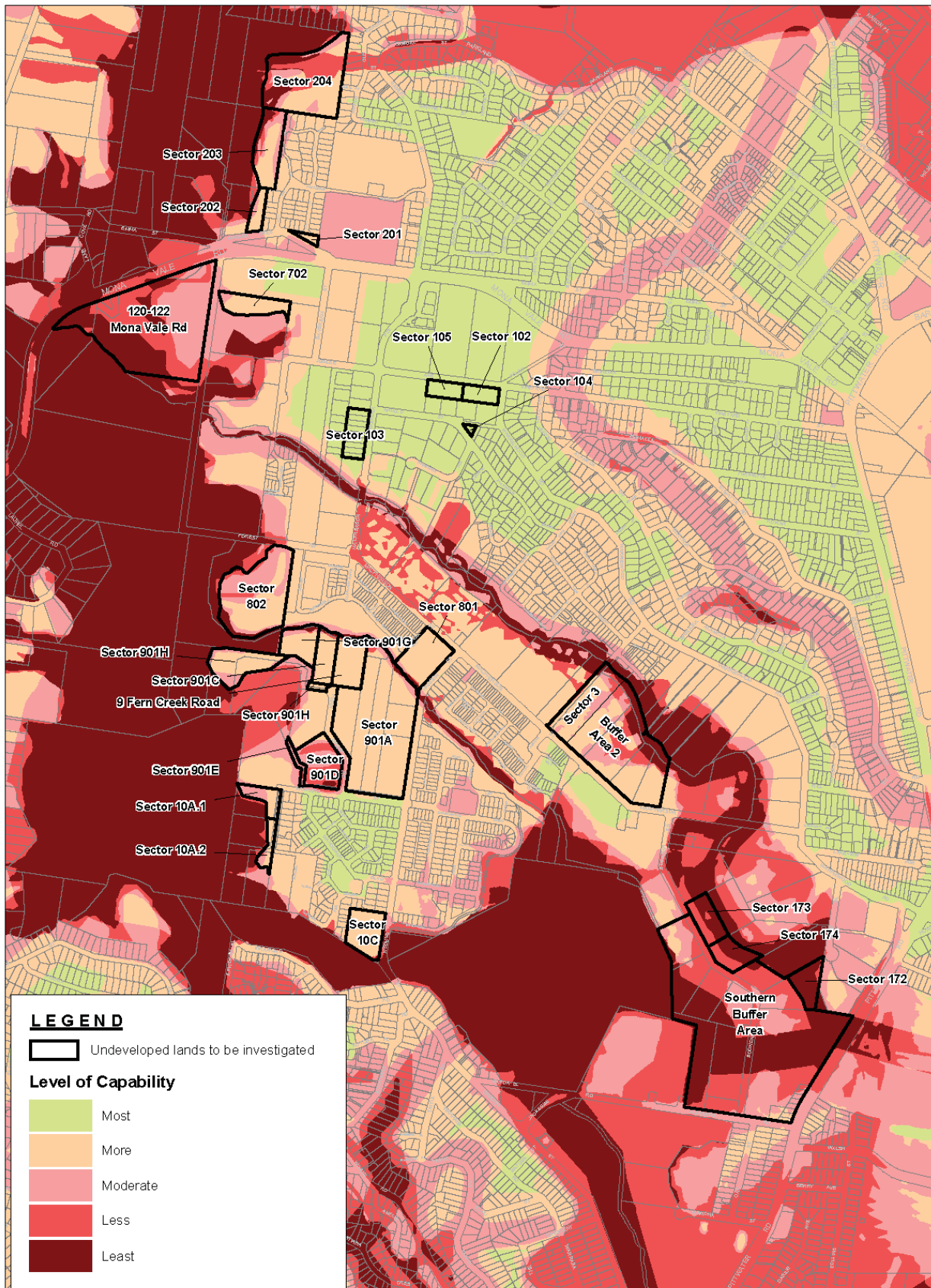
- Bushfire,
- Flooding,
- Access,
- Biodiversity,
- Site configuration and size.

Conversely, other sectors were relatively less constrained and identified as having future development opportunities.

The land capability assessment undertaken for this review has produced a Composite Capability Map depicted in **Map 2**.

This chapter summarises the outcomes of the opportunities and constraints analysis process (as described in Section 3.2 and 3.3) undertaken for each sector.

The detailed opportunities and constraints analysis for individual sectors is contained in **Appendix 2**.

Map 2: Composite Capability Map

4.2 Undeveloped sectors with limited capacity for development

The desktop review identified undeveloped lands on the fringe of the Release Area with limited capacity for development due to bushfire, biodiversity, topography and access constraints due to their proximity to the Ingleside Chase Reserve. These undeveloped lands are:

- Sector 201 and 204,
- Sector 702,
- Sector 901H,
- Sectors 10A.1 and 10A.2.

The following sections discuss these sectors in more detail.

4.2.1 Sectors 201 and 204

Sector 201, currently designated for future residential development, is a triangular shaped allotment used by/for Mona Vale cemetery. It is zoned SP2 Infrastructure (Cemetery) under the PLEP 2014. It is unlikely to be developed in accordance with the prescribed land use designation under the 2010 Planning Framework.

Sector 204 currently contains the AVEO Peninsular Gardens Retirement Village. This is a subsidiary sector of Sector 20 and was not afforded a density under the approved masterplan for Sector 20. It was considered to be developed at the time the Sector 20 masterplan was produced. Given this and as the property is heavily vegetated, bushfire prone and flood affected, it is unlikely that Sector 204 will be redeveloped in the future.

4.2.2 Sector 702

Sector 702, currently designated for employment generating development, is a rural zoned residue of Sector 7. The development potential of Sector 702 for future employment is unlikely given the property comprises part of the Pittwater Uniting Church. For development on Sector 702 to be realised, it will require excising this portion of land from the current land parcel with provision for safe and viable access from Jubilee Avenue.

4.2.3 Sector 901H

The land capability of Sector 901H is diverse. The majority of Sector 901H, adjacent to the Ingleside Chase Reserve, is significantly constrained due to bushfire hazards and proximity to dense vegetation, and has no likely prospects for urban development.

Conversely, the battle-axe handles of Sector 901H (being the portion of the driveways of 4 & 5 Fern Creek Road within the Release Area) are less constrained. The development potential of this portion of the sector may be realised, with the size of the battle-axe handles being 1,138m². If developed, access to 4 and 5 Fern Creek Road must be ensured. Better development outcomes will be achieved if the battle-axe handles of Sector 901H are developed with either 901B or 901C. The onus will be on land owners for these sectors to work collaboratively and contemplate amalgamation with the adjoining sectors.

Since the exhibition of the Addendum Report, a development application has been lodged for Sector 901B, which did not incorporate Sector 901H. In the event that the amalgamation is not possible, any development at this location must address how access will be retained for 4 and 5 Fern Creek Road as well as incorporate other environmental and associated infrastructure requirements, such as water management, into their proposal.

4.2.4 Sectors 10A.1 and 10A.2

The development potential of Sectors 10A.1 and 10A.2 is particularly limited due to their proximity to dense vegetation and bushfire hazards. Given these constraints, in addition to the size and configuration of these sites, there is little potential for these sectors to be developed for urban purposes.

4.3 Residential sectors with development potential and/or requiring clarification

The following sectors have been identified with development potential and have either been recommended with a forward path under the Addendum Report or their forward path previously identified needs clarification. These sectors include the following:

- Sectors 202 and 203,
- Sector 10C,
- Sectors 901D and 901E, and 901C and 901G,
- Sector 801,
- 120 and 122 Mona Vale Road,
- Sector 3 and Buffer Area 2, and
- 802.

The following sections discuss these sectors in more detail.

4.3.1 Sectors 202 and 203

Sectors 202 and 203 are considered constrained, however have been largely cleared of significant vegetation and are large enough to achieve some development potential. Nonetheless, Sector 203 has some significant access issues due to its topography. Whilst Sector 202 has adequate access and the portion within the Release Area is primarily cleared, it has recently been developed for a single dwelling and there is little potential for any future redevelopment. However, it is recognised that these sectors may have opportunities for low density development subject to these constraints being adequately addressed.

4.3.2 Sector 10C

Sector 10C a residue parcel of Sector 10. It was developed as seniors living development prior to the master planning of Sector 10. Sector 10C is an underutilised site and possesses few constraints. This sector adjoins Irrawong Reserve and is at the southern entrance of Warriewood Valley. Sector 10C has potential to be redeveloped at a similar scale to neighbouring developments. During the 2012 Strategic Review process the landowners of Sector 10C expressed their desire to redevelop this property.

4.3.3 Sectors 901D and 901E, and 901C and 901G

Sector 901D is constrained by biodiversity, visual impact issues and high voltage overhead cables while Sector 901E comprises a battle-axe handle only. It was recognised during the 2012 Strategic Review that there was

potential for Sectors 901D and 901E including the Orchard Street road reserve (north-east portion) to conglomerate, enabling more appropriate setbacks to constraints while maximising development potential across these sectors (up to 16 dwellings).

Sector 901G being a land-locked parcel, is located between the Ingleside Chase Reserve and Sector 901C. Given that Sectors 901G and 901C are under the same ownership it was recommended that they develop together (with the majority of the development being placed on 901C, in recognition of the asset protection zone and creekline buffer requirements constraining development of Sector 901G).²⁶

These sectors were rezoned for residential development, consistent with Council's decision of 12 June 2013.

4.3.3.1 Sectors 901C, 901G & 9 Fern Creek Road

On 19 March 2016 Council endorsed the concept masterplan for the southern component of Central Local Park as an indicative plan only (and depicted in Figure 1), in terms of the land use arrangement of the concept open space / park areas on Sectors 901C, 901G and 9 Fern Creek Road.

²⁶ Both parcels owned by the same owner at 12 June 2013 Council decision.

Figure 1: Concept Masterplan for the Central Local Park (Council endorsed on 19 March 2016)



The Planning Proposal (PP0002/16) facilitates the agreed vision of March 2016 as expressed in Figure 1, by providing a more linear open space, configuration on the southern side of Fern Creek, and residential development opportunity on the balance of the properties.

4.3.4 Sector 801 and location of Focal Neighbourhood Centre

The 2010 Planning Framework identified 23B Macpherson Street (now known as Sector 801) as the preferred site for the Focal Neighbourhood Centre (FNC). The FNC with a gross floor area between 855m²-2,222m² is planned to be developed to meet the retail needs of the incoming population. It is intended to provide goods and services in the form of a small general store, Post Office and coffee shop for example. This is reflected in Schedule 1 of the PLEP 2014.²⁷

This sector is permitted to develop up to 32 dwellings per developable hectare in accordance with 2012 Strategic Review recommendations.

In July 2011 development consent was granted for the construction of an infill affordable housing development consisting of 46 residential townhouses and a Focal Neighbourhood Centre. This development is currently under construction. The Focal Neighbourhood Centre, approved as part of this development, satisfies the planned location of Focal Neighbourhood Centre.

4.3.5 120 and 122 Mona Vale Road

The properties 120 (identified as Clause 6.2 on the Urban Release Area Map under the PLEP 2014) and 122 Mona Vale Road are significantly constrained. The sites are affected by environmental constraints, being slip, bushfire, and significant vegetation, and the sites contain the upper reaches of Narrabeen Creek. Access is limited to a single driveway from Mona Vale Road and a right of carriageway from 10 Jubilee Avenue.

120 Mona Vale Road was identified in Warriewood Valley Release Area through a Council decision in 2007.

At the time of preparing the draft Addendum Report the Joint Regional Planning Panel Sydney East (JRPP) was in the process of progressing a Planning Proposal to rezone 120 and 122 Mona Vale Road.²⁸ These properties have now been rezoned via an amendment to the PLEP 2014 (identified as Clause 6.2 on Urban Release Area Map).²⁹

The amendment zoned the property 120 Mona Vale Road part E4 Environmental Living, R2 Low Density Residential and E2 Environment Conservation (portion containing the creek line corridor). The property 122 Mona Vale Road has been zoned entirely E2 Environment Conservation.

4.3.6 Anglican Retirement Village development within Sector 3 and Buffer Area 2

Originally several properties comprised Sector 3 and Buffer Area 2.

Formerly Sector 3 comprised:

- 20 Macpherson Street (now known as Sector 301)
- 18 Macpherson Street (now known as Sector 302)
- 16 Macpherson Street (now known as Sector 303)
- 14 Macpherson Street (now known as Sector 3)

²⁷ Schedule 1, Clause 20 permits development for the purposes of restaurants and cafes and permits neighbourhood shops larger in floor area than otherwise permitted under PLEP 2014.

²⁸ The JRPP was nominated as the Relevant Planning Authority for the Planning Proposal lodged for 120-122 Mona Vale Road as Council did not support the initial Planning Proposal application.

²⁹ PLEP 2014, Amendment 1.

Formerly Buffer Area 2 comprised:

- 6 to 12 Macpherson Street (now known as Buffer Area 2)
- 4 Macpherson Street (now known as Buffer Area 2a)

Prior to the 2012 Strategic Review, the pre-planning for these properties had envisaged a 'whole of sector' density of 25 dwellings per developable hectare.

In April 2006 development consent was granted to construct the Anglican Retirement Village (ARV) seniors living development across 6 to 14 Macpherson Street. This development, straddling across part of the former Sector 3 and part of former Buffer Area 2, was approved under the former *State Environmental Planning Policy No.5 Seniors Living* and was slightly above the anticipated density.

As the ARV development was partially completed when the 2012 Strategic Review commenced, the properties now named Sector 3 (14 Macpherson Street) and Buffer Area 2 (6-12 Macpherson Street) were not reviewed.

The remaining undeveloped sectors being Sectors 301, 302, 303 and Buffer Area 2A were reviewed under the 2012 Strategic Review. The density of up to 32 dwellings per developable hectare was recommended for Sectors 301, 302 and 303 enabling each sector to develop to that density. The density recommended for Buffer Area 2A was 22 dwellings per developable hectare.

PLEP 2014 allocated dwelling yields for Sector 3 and Buffer Area 2, representing a density of up to 25 dwellings per developable hectare in accordance with the 2010 Planning Framework; while the yield allocated to Sectors 301, 302, 303 and Buffer Area 2a was in accordance with the 2012 Strategic Review recommendations.

Given that the overall ARV development is nearing completion, Sector 3 and Buffer Area 2 are unlikely to be redeveloped in the short to medium term.

4.3.7 Existing development on Sector 802

Mater Maria Catholic College is located on Sector 802. The sector is a residue of the master planned sector known as Sector 8. The current land use designation for Sector 802 is part 'Medium Density Residential', part 'Conservation/Open Space'. Given the existing development precludes any future residential development; the land use designation should be changed to reflect the existing use.

4.4 Southern Buffer and Sectors 172, 173 and 174

The 2012 Strategic Review investigated development opportunities for the Southern Buffer (including Sectors 172, 173 and 174) however due to the significant environmental constraints and divergent landowner expectations, no future land use was recommended for this area. The 2012 Strategic Review invited landowners, either individually or collectively, to pursue development opportunities for their lands through the lodgement of a Planning Proposal addressing, as a minimum, the constraints identified during the 2012 Strategic Review.

The 2012 Strategic Review identified flooding as a major constraint to any future development. The majority of the properties within the Southern Buffer are low lying and are inundated during flood events. Flood depths reach approximately 1-2 metres above natural ground level across most of the Southern Buffer and flood events are

typically long in duration and influenced by backwater flooding from the Warriewood Wetlands and Narrabeen Lagoon. These findings were reiterated in the *Narrabeen Lagoon Flood Study 2013*.

4.4.1 Warriewood Valley Strategic Review Hydrology Study 2011

The *Warriewood Valley Strategic Review Hydrology Study 2011* (2011 Hydrology Study) undertaken for the 2012 Strategic Review classified land into developable land categories (based on criteria set out in the 2011 Hydrology Study) and recommended land uses for each category. The recommended land uses for each category are as follows:

- Category A: “No aged care facilities, retirement villages, educational establishments, child care centres and other essential services,”
- Category B: “Most land uses are permitted... assuming that they comply with relevant policies on floor levels and other constraints.”
- Category D: “Most land uses are permitted... assuming that they comply with relevant policies on floor levels and other constraints.”
- Category F: “Sporting fields and recreational areas are the only land use recommended.”
- Category G: “Commercial and industrial land uses recommended.”
- *Note: No areas within the Release Area are classified Category C or E.*

In relation to the Southern Buffer, the Study classified:

- Northern section as part Category B and part Category D.
- Southern section (at junction of Jacksons Road and Pittwater Road) as Category G.
- Remaining lands (being 2, 4 and 6 Jacksons Road; 1, 2, 2A, 3, 4A, 6, 8 and 10 Boondah Road; and Sectors 172, 173 and 174) as Category F.

This Study, in considering potential development opportunities, recommended the creation of two developable islands at the highest points within the sector. This was to be achieved through significant excavation and filling in parts of the sector. Under this scenario, the central areas of the Southern Buffer were determined suitable for open space only due to flood depths and flow path requirements.³⁰

Sector 172, being 7,792m² in area, containing significant vegetation and a section of Narrabeen Creek, is classified Category F and is the only remaining portion of Sector 17 not owned by Sydney Water or within the Warriewood Sewerage Treatment Plant.

Sectors 173 and 174, contain vegetation and are classified Category F. Sydney Water, as the owners of Sectors 173 and 174, has confirmed during the 2012 Strategic Review, that these sectors are required for works associated with the Sewerage Treatment Plant.

4.4.2 Recent review following adoption of the *Narrabeen Lagoon Flood Study 2013*

Due to revised flood modelling under the *Narrabeen Lagoon Flood Study 2013*, Cardno was commissioned to review the flood behaviour in the Southern Buffer area and have regard to the recommendations made for these lands under the 2011 Hydrology Study. The review identified that the

³⁰ Cardno (NSW/ACT) Pty Ltd (2011) *Warriewood Valley Strategic Review Hydrology Study*, prepared for Department of Planning & Infrastructure and Pittwater Council.

floor levels required for development would increase from the 2011 Hydrology Study. In addition the evacuation potential would not be improved. The review also confirmed that the majority of the Southern Buffer land continues to be classified as Category F consistent with the recommendations of the 2011 Hydrology Study. It reaffirmed the land uses recommended for Category F classification is sporting fields and recreational areas only.

4.4.3 Review of existing Council policies and studies

Council, in considering the recommendations of the 2012 Strategic Review, was advised there were additional infrastructure requirements commensurate with the additional demand as a result of the increased development. At that time, it was identified that up to 5 hectares of additional recreational area was required to be purchased.³¹

As outlined in Section 2.2.3, the *Pittwater Public Space and Recreation Strategy 2014* recognises the importance for the Release Areas (Warriewood Valley and Ingleside) to provide recreation areas and facilities to meet the needs of their incoming populations to ensure that the demands of any additional population do further exacerbate the existing shortage of recreation areas in the balance of the Pittwater LGA.

As outlined in Section 2.4, a review of local infrastructure commensurate with the increased dwellings forecast under the 2012 Strategic Review has been undertaken. The *Draft Warriewood Valley Section 94 Contributions Plan* identified the quantum of recreational area required for the total development anticipated in the Release Area. The *Draft Warriewood Valley Section 94 Contributions Plan*, taking into account what available land is remaining in and adjacent to Warriewood Valley, has identified land in the Southern Buffer as suitable for use as a recreation area. The aggregated site area of the identified lands in the Southern Buffer is close to the quantum required to be provided.

4.4.4 Planning Proposal lodged for privately owned lands in the Southern Buffer

A Planning Proposal has been lodged for the privately owned lands in the Southern Buffer, namely 6 Jacksons Road and 3, 6, 8, 10 and 12 Boondah Road, Warriewood. The proposal envisaged a large mixed use development within the sector comprising retail, commercial and residential uses.³² Don Fox Planning were commissioned by Council to undertake an assessment of the Planning Proposal.

The application was not supported for the following reasons:

- It did not meet the strategic objectives of the Draft North East Subregional Plan, SHOROC Employment Lands Study, Pittwater Local Planning Strategy and Warriewood Valley Strategic Review Report through the expansion of Warriewood Square shopping centre to provide a new town centre;
- It would result in unacceptable adverse outcomes for public open space and recreation areas within the Southern Buffer;
- It was inconsistent with Section 117 Direction 4.3 Flood Prone Land;
- The approach to managing flooding constraints to justify the urban zone on flood prone land was not supported;

³¹ Council Report to Item C5.1 entitled Warriewood Valley Strategic Review Report – Outcomes of public exhibition and final report, extraordinary Council meeting 12 June 2013, p. 26.

³² Planning Proposal application prepared by SJB Planning (NSW) Pty Ltd (March 2014). Council's reference number for this application is PP0007/13.

- It failed to retain and protect high value biodiversity land (including Endangered Ecological Communities (EEC's)) and provided insufficient justification for their removal or consideration of ecological recommendations;
- It was unable to achieve connectivity between the Site and adjoining commercial areas (including relocated Boondah Road and Vuko Place connection) on the basis of unacceptable ecological and traffic impacts;
- It did not address potential negative economic impacts upon surrounding retail centres, or address the potential oversupply of commercial floor space;
- The urban design outcomes of the Masterplan were not supported; and
- It did not adequately represent the interests of all affected land owners.³³

Additionally, Don Fox Planning recommended that any future planning proposal should incorporate all land within the Southern Buffer and also the Warriewood Square Shopping Centre site.

A Pre-Gateway Review request is currently being considered by the Department of Planning and Environment. To date, no decision has been made to this request.

4.5 Other employment generating sectors

All remaining employment generating lands, except for Sector 702 and the Southern Buffer including Sectors 172, 173 and 174, are already zoned to permit employment generating land uses. While they have few environmental affectations, they are constrained due to their size and configuration.

Sectors 102 and 105, while relatively small, are able to be developed on their own. Nonetheless, a better development outcome could be achieved if these sectors amalgamate.

Sector 103 is comprised of multiple small land parcels with an average site area of 910m², each with a different landowner. Given the size of individual land parcels, redevelopment of this sector can only be achieved through lot consolidation.

Sector 104, due to its size and configuration, is difficult to develop. There is however, a range of development uses permissible within the IN2 Light Industrial zone that may be able to be achieved within this relatively small site.

³³ Reasons for refusal as appeared in the Council determination issued 18 March 2014, in accordance with Council resolution of 17 March 2014.

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Recommendations



Photo by: Amanda Clarke 2011

Chapter 5

5.0 Recommendations

5.1 Introduction

The Addendum Report has reviewed the development potential of sectors that were excluded from the 2012 Strategic Review. The opportunities and constraints analysis has identified a number of sectors constrained by environmental factors or by their existing development or current use, as well as other relatively less constrained sectors with future development opportunities.

Due to significant environmental and developmental constraints affecting particular sectors, a number of sites are recommended to be removed from the Release Area or for more suitable land uses. This review has also identified other relatively less constrained sectors with opportunities for development.

Based on this analysis, the Addendum Report recommends a number of amendments to the Release Area boundary and the land uses designated for particular sectors under the 2010 Planning Framework. The review has also recommended the rezoning of two sectors and amendments to specific sector yields.

The Addendum Report also recommends amendments to the Warriewood Valley Release Area Map, Residential Density Map and Land Use Designation Map (see **Maps 3, 4 and 5** respectively).

5.2 Recommendations for residential sectors

5.2.1 Developed sectors (Sectors 802, 10C, Sector 3 and Buffer Area 2)

Sector 802 is constrained by the existing development on the site that is likely to preclude any future residential development. The land use designation of Sector 802 should be 'Infrastructure' rather than 'Residential - Medium Density' in recognition of the Mater Maria Catholic College on this site. It is recommended to rezone the entire site to an infrastructure zone, consistent with the zoning of other schools in the Pittwater LGA. The sector boundary is not proposed to be amended.

Sector 10C, consistent with landowner aspirations expressed during the exhibition of the 2012 Strategic Review, has potential to be developed for low density residential purposes, in keeping with the pattern and scale of the surrounding development. It is recommended that the sector be allocated a dwelling yield consistent with the adjoining Sector 10. This will ensure a consistent streetscape character is maintained along this section of Garden Street.

The Anglican Retirement Village (ARV) development, partially completed, straddles Sector 3 and Buffer Area 2. Given the approved development, it is appropriate to amalgamate these sectors (resulting in a revision of the sector boundary) and relabel it 'Buffer Area 2'. It is recommended that the new Buffer Area 2 have a land use designation of 'Residential - Medium Density', retaining the density of 25 dwellings per developable hectare allocated under the 2010 Planning Framework.

Detailed recommendations for the above listed sectors are in **Appendix 3**.

5.2.2 Undeveloped sectors to be removed from the Release Area (Sectors 201, 204, 10A.1 and 10A.2, and Part of 901H)

The majority of remaining undeveloped residential sectors are located on the fringe of the Release Area at the base of Ingleside Chase Reserve and therefore are limited in their ability to develop due to bushfire, geotechnical hazards and access issues. Several sectors are also unlikely to be redeveloped due to the existing development on the site or their current use.

Given the above, a number of sectors are recommended to be removed from the Release Area as they are unlikely to be developed for urban purposes in the future. These sectors include Sectors 201, 204, 10A.1, 10A.2 and the western portion of 901H.

Detailed recommendations for the above listed sectors are in **Appendix 3**.

5.2.3 Undeveloped sectors recommended for development (Sectors 202, 203, Revised 901H)

This review also identified a small number of other sectors, which, while constrained, are able to achieve low density development. These sectors are 202 and 203. It is recommended that a yield of 1 dwelling be allocated to Sector 202 and a yield of 4 dwellings be allocated to Sector 203.

This review has identified revised Sector 901H (comprising only the battle-axe portion) as having capacity to be developed in the future.

As discussed in section 4.2.4, the original Sector 901H consisting a bulb-shaped area immediately adjoining Ingleside Chase Reserve is significantly constrained and has limited prospects for urban development.

Redefining the sector to only comprise the battle-axe portion to facilitate development opportunity is reasonable so long as access to 4 and 5 Fern Creek Road is retained. Additionally, the size and shape of the battle-axe necessitates the revised Sector 901H being integrated with the adjoining sectors (901B or 901C) to facilitate better development outcomes. Any density allocated to the now revised Sector 901H needs to be consistent with adjoining sectors to provide incentive for amalgamation with Sector 901B and/or 901C to be realised.

In the event that amalgamation cannot be achieved, it will be difficult for this revised sector to develop on its own given its size, the associated infrastructure requirements as well as ensuring unimpeded access is available for 4 and 5 Fern Creek Road.

It is recommended that the sector boundary is revised to only contain the battle-axe portion of 4 and 5 Fern Creek Road (to be known as Sector 901H) and for the revised sector to be rezoned to allow residential development of up to 3 dwellings (representing a density of 32 dwellings per developable hectare identical to the adjoining sectors). It is also recommended that the revised Sector 901H be allocated a land use designation of 'Residential - Medium Density'. Nonetheless, the onus will be on landowners to negotiate opportunities for amalgamation to realise development potential on revised Sector 901H.

Detailed recommendations for the above listed sectors are in **Appendix 3**.

5.2.4 Sectors 901D and 901E, 901C and 901G

Concurrent to the adoption of the 2012 Strategic Review, Council agreed to rezone the following sectors:

- Sectors 901D and 901E (to be developed together and agreed to by landowners of these sectors), and
- 901G to be developed with 901C (under the same ownership),

and allocated a yield consistent with Council direction on 12 June 2013. The Addendum Report does not recommend any change to their existing zoning or yield however, reiterates the land use designation, reflecting Council's 2013 decision for these sectors.

The anticipated development of Sectors 901C and 901G has not been reflected in the PLEP 2014, appearing as separate sectors, contrary to Council's decision.³⁴ Accordingly it is recommended that Sectors 901C and 901G be identified in the PLEP 2014 together, with one yield³⁵, consistent with Council's 2013 decision.

5.2.5 120 and 122 Mona Vale Road

120 and 122 Mona Vale Road have already been rezoned via a Planning Proposal. Based on the approved zoning, 120 Mona Vale Road is recommended to have a 'Residential - Low Density' designation and 122 Mona Vale Road is recommended to have a 'Conservation' land use designation. There is no yield specified for this sector as it reverts to a minimum lot size map.

Detailed recommendations for the above listed sectors are in **Appendix 3**.

5.2.6 Sector 801

Sector 801, known as 23B Macpherson Street, was identified as the preferred site for the Focal Neighbourhood Centre in the 2010 Planning Framework. Development consent has been granted to develop this sector to include a Focal Neighbourhood Centre. Schedule 1 of the PLEP 2014 lists development for the purpose of restaurants, cafes and neighbourhood shops as additional permissible land uses for this sector reflecting the aspirations in the 2010 Planning Framework for this site. Under this circumstance, it is recommended that for Sector 801:

- the land use designation for this sector be altered to 'Residential-Medium Density and Focal Neighbourhood Centre', and
- Control C6.15 of Pittwater 21 DCP be amended to specifically identify 23B Macpherson Street (Sector 801) as the location for the Focal Neighbourhood Centre.

Detailed recommendations for the above listed sectors are in **Appendix 3**.

³⁴ Council's resolution of 12 June 2013.

³⁵ Updated following Council decision, see Section 5.2.8 - *Clarification of dwelling yield allocation within Sectors 901C, 901G and 9 Fern Creek Road*

5.2.6 5.2.7 Clarification of dwelling yield allocation within Sector 901A

The 2012 Strategic Review recommended Sector 901A have a density up to 32 dwellings per developable hectare and expressly allowed individual properties to develop to that density.

This sector has now been rezoned in accordance with those recommendations and allocated a total yield of 192 dwellings. This number represents the total sum of dwellings calculated on a pro-rata basis for the individual properties within the sector. The calculation below expresses how this number was determined.

$(\text{Developable area of land parcel} \times 32) / 10,000 = \text{Yield for individual land parcel per } 10,000\text{m}^2$

To provide certainty should individual parcels develop on their own, the pro-rata dwelling yield allocation of the individual land parcels within Sector 901A is identified in Table 6. **9 Fern Creek Road was rezoned as an individual sector, distinct from Sector 901A.**

In the development of these sites, it must be demonstrated that they are capable of developing on their own as well as demonstrating how the development (within individual parcels) will connect to adjoining future developments on adjoining properties. It will also need to be demonstrated how these development sites can be developed in an orderly manner in accordance with clause 5(a)(ii) of the EP&A Act 1979.

Table 6: Pro-rata dwelling yield for individual parcels in Sector 901A (UPDATED) ³⁶

Address	Developable Area ⁺ (m ²)	Density range	Minimum Yield	Maximum Yield	Comments
9 Fern Creek Road	9,297	25 to 32	0	0	This parcel was bought by Council for recreation purposes. Under the 2012 Strategic Review it was zoned R3 with no dwelling yield allocated against the parcel.
13 Fern Creek Road	606	25 to 32	2	2	-
6 Orchard Street	15,170	25 to 32	39	48	6 and 6A Orchard Street are to be developed together.
6A Orchard Street	284				
4 Orchard Street	10,496	25 to 32	27	33	4 and 4A Orchard Street are to be developed together.
4A Orchard Street	289				
206 Garden Street	3,149	25 to 32	8	10	-
204 Garden Street	7,082	25 to 32	18	23	-
2 Orchard Street	13,320	25 to 32	35	43	2 and 2A Orchard Street are to be developed together.
2A Orchard Street	573				
10 Fern Creek Road	10,240	25 to 32	27	33	-
TOTAL	60,063		156	192	

⁺ Individual site area excluding creek line corridor

³⁶ Table 6 shown hatched on 9 & 13 Fern Creek Road due to Planning Proposal as details in Section 5.2.8 - Clarification of dwelling yield allocation within Sectors 901C, 901G and 9 Fern Creek Road

5.2.8 Updated dwelling yield allocation - Sectors 901C, 901G & 9 Fern Creek Road

The Warriewood Valley Strategic Review Addendum Report (2014) as at 17 November 2014 recommended that sectors 901C and 901G be developed together. On 30 May 2017, Council resolved to progress Planning Proposal (PP0002/16), resulting in the portion of land deemed suitable for residential opportunity to be developed together to facilitate an optimal urban design outcome.

Conversely, the northern portions of Sectors 901C, 901G & 9 Fern Creek Road as well as 13 Fern Creek Road are more suited for passive recreation, the southern extension of the inner creekline corridor and the creation of the southern portion of the Planned Central Local Park. To provide clarity, the minimum and maximum dwelling yield for individual parcels in Sectors 901C, 901G and 9 Fern Creek Road is detailed in **Table 7**.

Table 7: “Pro-rata” dwelling yield for individual parcels in Sectors 901C, 901G and 9 Fern Creek Road

Address (Sector)		Developable Area (m ²)**	Density Range (dwellings / developable hectare)		Minimum Dwelling Yield		Maximum Dwelling Yield	
			Pre*	Post*	Pre*	Post*	Pre*	Post*
Southern Portion of	9 Fern Creek Road	5,374	25 to 32	25 to 32	0	13	0	17
	11 Fern Creek Rd (901G)	3,174	10	10	23	3	28	3
	12 Fern Creek Rd (901C)	4,075	25 to 32	25 to 32		10		13
13 Fern Creek Rd (formerly part of 901A)+		0	25 to 32	-	2	0	2	0
TOTAL		12,623			25	26	30	33

* “Pre” - pre-Planning Proposal - PP0002/16; “Post” – post-Planning Proposal- PP0002/16

** Developable area is the individual site area designated for “residential” only

+ 13 Fern Creek Rd removed from Sector 901A as a result of Planning Proposal (PP0002/16)

5.2.7 5.2.9 Facilitating quality medium density housing

The 2012 Strategic Review allows individual properties within sectors to develop on their own. At a density of 32 dwellings per developable hectare, the typical housing form is townhouses, terrace housing and low-rise residential flat buildings. Recent experience demonstrates a trend in land subdivision proposals for detached dwellings on lots less than 300m². At this lot size, even modest dwellings result in numerical non-compliance with the current Pittwater 21 DCP controls. In recognition of this issue, it is recommended that a comprehensive review of the Pittwater 21 DCP occur to provide updated controls that cater for dwellings on smaller lot sizes.

Until this review is complete it is recommended that integrated housing developments be pursued. Integrated housing, as a form of development incorporates land subdivision and dwellings on individual lots in the same

application. It facilitates detailed assessment of the subdivision of the land, provision of infrastructure and the design of dwellings on the smaller lots resulting in a more comprehensive consideration of the associated planning and built form outcomes.

5.3 Recommendations for the Southern Buffer and Sectors 172, 173 and 174

In light of contemporary information available since the completion of the 2012 Strategic Review, the Addendum Report has reviewed the opportunities and constraints in order to determine the most appropriate forward path for the Sectors 172, 173 and 174 and the broader Southern Buffer.

5.3.1 Recommended sector boundary re-alignment

Sector 172, formerly part of Sector 17, is the remaining portion of Sector 17 that is not owned by Sydney Water or within the Warriewood Sewerage Treatment Plant. This sector comprises a section of Narrabeen Creek and significant vegetation, and provides connectivity with the creekline corridor network to the Southern Buffer Sector. Rather than creating a single sector, its utility may be best served by being incorporated into the Southern Buffer Sector.

During the 2012 Strategic Review process Sydney Water confirmed, as the owner of Sectors 173 and 174 that these sectors are required for works associated with the Sewerage Treatment Plant. Given these circumstances, Sectors 173 and 174 are recommended to be removed from the Release Area. Concurrence for removal of Sectors 173 and 174 has now been received from Sydney Water.

5.3.2 Recommended land use designation

A review of the lands within the Southern Buffer based on the *Narrabeen Lagoon Flood Study 2013*, identified that the floor levels required for development would increase. The Category F classification for the majority of land in the Southern Buffer remains. Under this category the land uses recommended are restricted to sporting fields and recreational areas.

The property 1 Boondah Road currently contains Council's Operations Centre and is not likely to be relocated in the near future. It is zoned SP2 Infrastructure (Public Administration Building) and it is recommended that this property be designated 'Infrastructure' and still remain in the Southern Buffer Sector.

Sector 172 contains significant vegetation, a portion of the Narrabeen Creek and is bushfire prone land. Its environmental constraints are noted however, this sector provides connectivity with the creekline corridor network in the Release Area. As such, it is recommended that the sector be given a 'Recreation' land use designation and be incorporated into the Southern Buffer sector. The property is already zoned RE1 Public Recreation under the PLEP 2014.

The properties 3, 6, 8, 10 and 12 Boondah Road are recommended to have a 'Recreation' land use designation for the following reasons:

- The planning of the Release Area was premised on infrastructure and services being provided for the incoming residents, delivered as development occurs in the Release Area and that the broader Pittwater

community will not fund the additional infrastructure and services required by the Release Area development.

- Council in considering the 2012 Strategic Review report identified that, as a result of increased development, additional active open space lands of approximately 4.6 hectares are still to be purchased for recreational uses. In adopting the 2012 Strategic Review, Council agreed to review among other documents, the *Warriewood Valley Section 94 Contributions Plan* to respond to the new development outcomes envisaged by that report.
- Council's recently completed review of the *Pittwater Public Space and Recreation Strategy* reaffirmed the philosophy articulated in the planning of the Release Area. It documented that release areas (Warriewood Valley and Ingleside) identify and purchase recreation areas to meet the demands of incoming populations. The Strategy recommends that:

"The ratio of 2.83 hectares per 1000 population has been applied to determine the provision of open space in the Warriewood Valley land release area. With an estimated incoming population of 6,777 people this equates to 19.1 hectares. Purchases to date include:

- 6.1 hectares of active open space;
- 3.99 hectares of passive open space; and
- 3.12 hectares of linear open space (30% of creek line corridors).

*It is intended that the remaining balance of 6.32 hectares comprises of 1.69 hectares of linear open space and 4.63 hectares of active open space. The 2.83 hectares per 1000 population is an industry standard and it is reasonable that Council determine the best possible mix of landscape settings to ensure the open space network meets the needs of the incoming population. The active open space component, by definition of its use, will consist of larger areas of flat land suitable for active recreation."*³⁷

- The assessment of the Planning Proposal for the privately owned land within the sector, in recognition of the sector's severe flood affectation, topography, proximity to existing recreational land as well as the current shortage of open space in Warriewood Valley, did not support a mixed use development on these lands. The assessment in so far as it related to suitability of this land for another purpose, concluded:

"The flood prone land within the Southern Buffer may be suitable for public open space and recreation purposes as it is subject to inundation, it adjoins existing public reserves (thus allowing sharing of infrastructure) and has access to valuable bore water irrigation. The topography of alternative areas within Pittwater LGA presents cost, infrastructure and maintenance issues.

Availability of public open space and recreation land areas across Pittwater LGA is limited by a number of factors. The Planning Proposal would result in the removal of strategically significant land from a precinct which presently suffers from an under supply of public

³⁷ *Pittwater Public Space and Recreation Strategy 2014, adopted August 2014, p. 79*

*open space and recreation land particularly for sports fields and will be subject to a future increase in demand for these areas.*³⁸

- Based on total development, approximately 4.6 hectares is required for sports fields (land quantum comprises playing surface, run out areas, curtilage for associated infrastructure and buffer zone to adjoining development.)
- The properties 3, 6, 8, 10 and 12 Boondah Road adjoin each other and have an aggregated site area of approximately 4.71 hectares.

6 Jacksons Road contains remnant Coastal Saltmarsh, being an Endangered Ecological Community, and a section of Narrabeen Creek. It is also bushfire prone land and is highly constrained by flooding and biodiversity (foreshore vegetation). Due to these constraints this property is recommended to have a land use designation of 'No development potential'.

The recommendations for the Southern Buffer and Sectors 172, 173 and 174 are detailed in **Appendix 4**.

5.4 Recommendations for other employment generating/industrial sectors

The major constraint to development of the remaining undeveloped employment generating sectors is lot size limitations and fragmented ownership. With all sectors already appropriately zoned and relatively unconstrained from environmental hazards, it is recommended that Sectors 102, 103, 104 and 105 retain their 'Employment Generating' land use designation. In order to facilitate timely development of these sectors, the land owners of Sectors 102, 105 and particularly 103 are encouraged to explore opportunities for amalgamation with adjoining land owners.

Conversely, Sector 702 is distinct from the other undeveloped employment generating sectors in terms of its environmental constraints. Sector 702 is a residual parcel of Sector 7, not rezoned as part of Sector 7 and is on separately owned land to that land comprising the major development for the sector. Given its size and shape, location, proximity to the escarpment and the property that contains Sector 702 is used for church purposes by the Uniting Church (the landowner); it is unlikely to be redeveloped for employment generating purposes. Removing this sector from the Release Area is recommended.

Detailed recommendations for each employment generating sector are in **Appendix 4**.

5.5 Additional dwellings and infrastructure requirements

The ~~recommendations not increase in dwellings, effected in 2015 with the adoption of the Addendum Report, results in a net increase of 17 dwellings within the Release Area. as a result of the Addendum Report is an additional 17 dwellings above the 2012 Strategic Review's total.~~ A summary of the additional dwellings recommended is outlined in **Appendix 3**. ~~Additional 3 dwellings result following the Planning Proposal (PP0002/16), as described in Appendix 3A.~~

Preliminary analysis indicates that this minor increase in dwelling yield can be accommodated within the Section 94 Plan. The Plan will need to be revised to account for the increased dwelling yield of 17 dwellings and resultant additional infrastructure and service requirements.

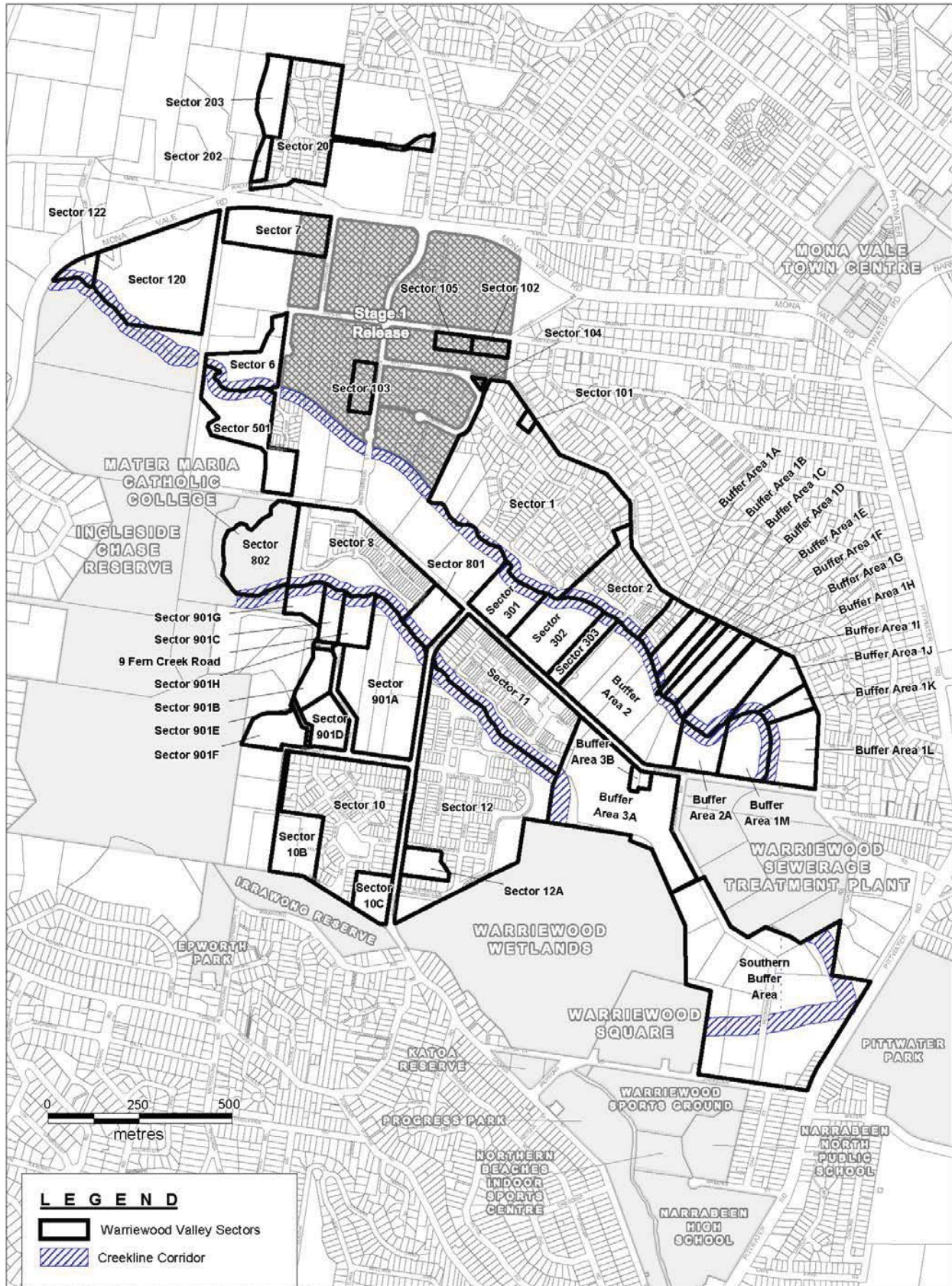
³⁸ Don Fox Planning Assessment of Planning Proposal PP007/13, March 2014, p. 68.

5.6 Realignment of creek line corridor

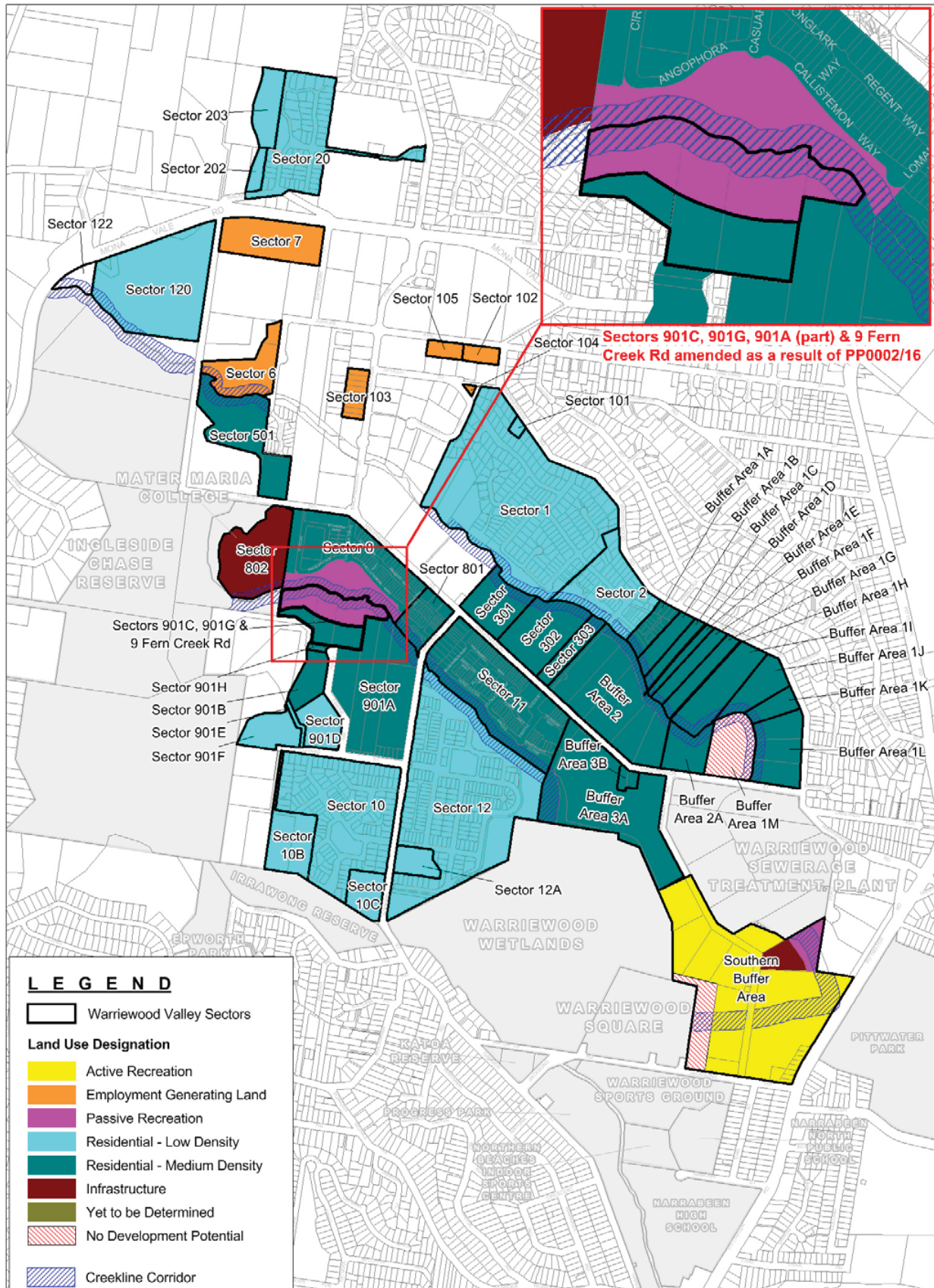
Integral to the development of Warriewood Valley is the definition of creek line corridor land in the Release Area. This is identified as land 25 metres either side of the centre line of the creek. The creekline within the Buffer Area 1 sub-sectors (Buffer Areas 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K and 1L) has been revised, consistent with the other portions of the creekline land in the Release Area already purchased or to be purchased under the Section 94 Plan.

It is recommended that the defined creekline corridor, as it applies to the sectors, be translated into the Urban Release Area map in PLEP 2014. This can only be achieved through a Planning Proposal.

Map 3: Warriewood Valley Release Area Map



Map 5: Land Use Designation Map (UPDATED)



Conclusion



Photo by: Amanda Clarke 2011

6.0 Conclusion

The Addendum Report has provided an opportunity to re-examine the opportunities and constraints affecting the remaining undeveloped land in the Warriewood Valley Release Area, including the Southern Buffer, based on the most current information available.

The recommended forward path for each sector has considered the applicable environmental affectations and the patterns of existing development and will result in appropriate levels of development within the Release Area. The recommendations, **effected in 2015 with the adoption** of the Addendum Report **will results** in a net increase of 17 dwellings in the Release Area. **Additional 3 dwellings result following the Planning Proposal (PP0002/16)**. This relatively minor additional development yield is able to be accommodated within the Release Area.

The Release Area will be reduced from approximately 199 hectares to approximately 195 hectares.

The Addendum Report, based on contemporary information and supported by an opportunities and constraints analysis, is consistent with the community's expectation for the Release Area and will ensure continuity across Council's strategic and land use planning documents.

The Addendum Report will supplement the 2012 Strategic Review, so as to achieve a single comprehensive document applying to all undeveloped land in Warriewood Valley. The Addendum Report, together with the 2012 Strategic Review, will become the strategic planning framework for all undeveloped land in the Warriewood Valley Release Area.

Appendices

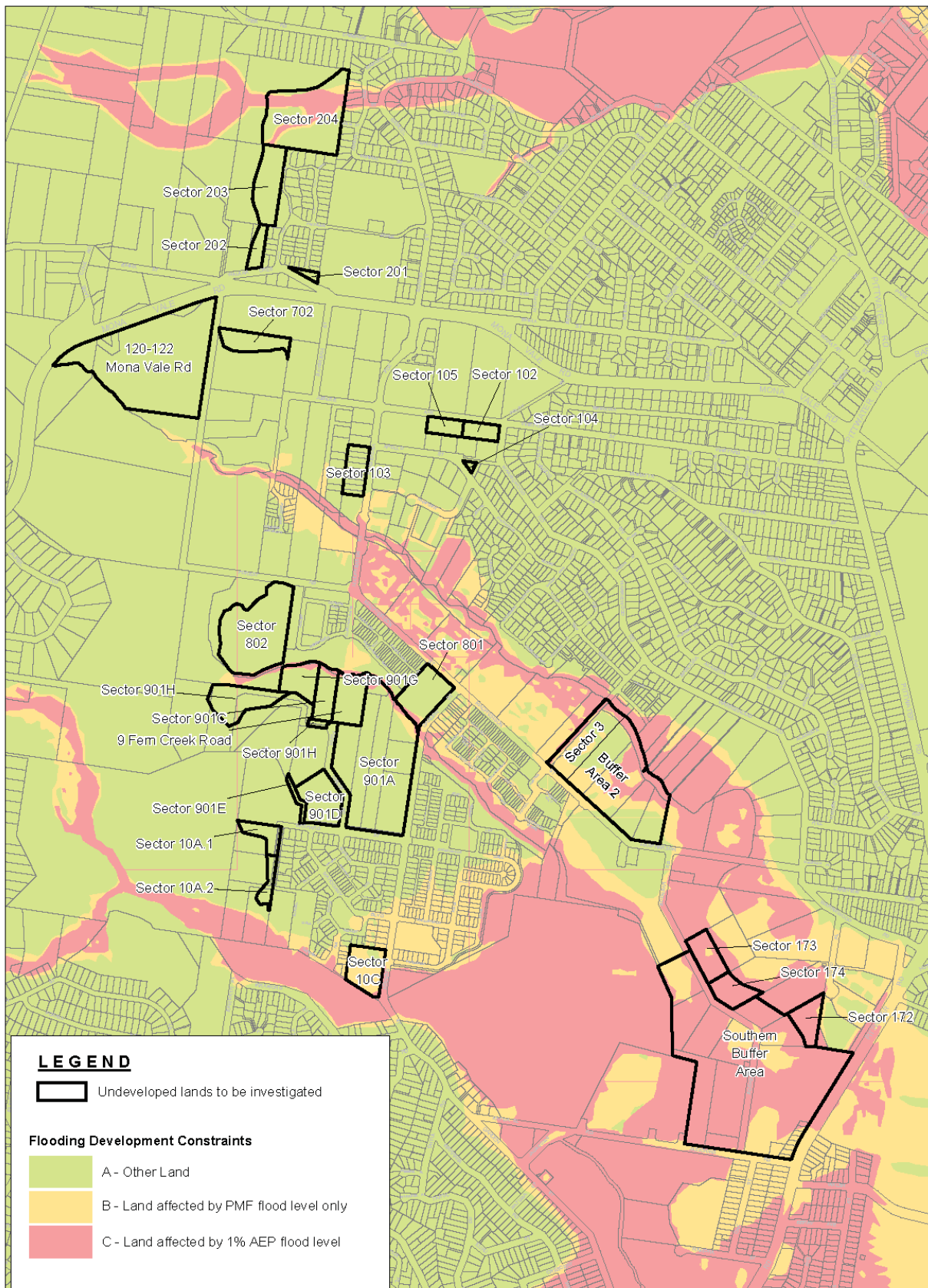


Photo by: Amanda Clarke 2011

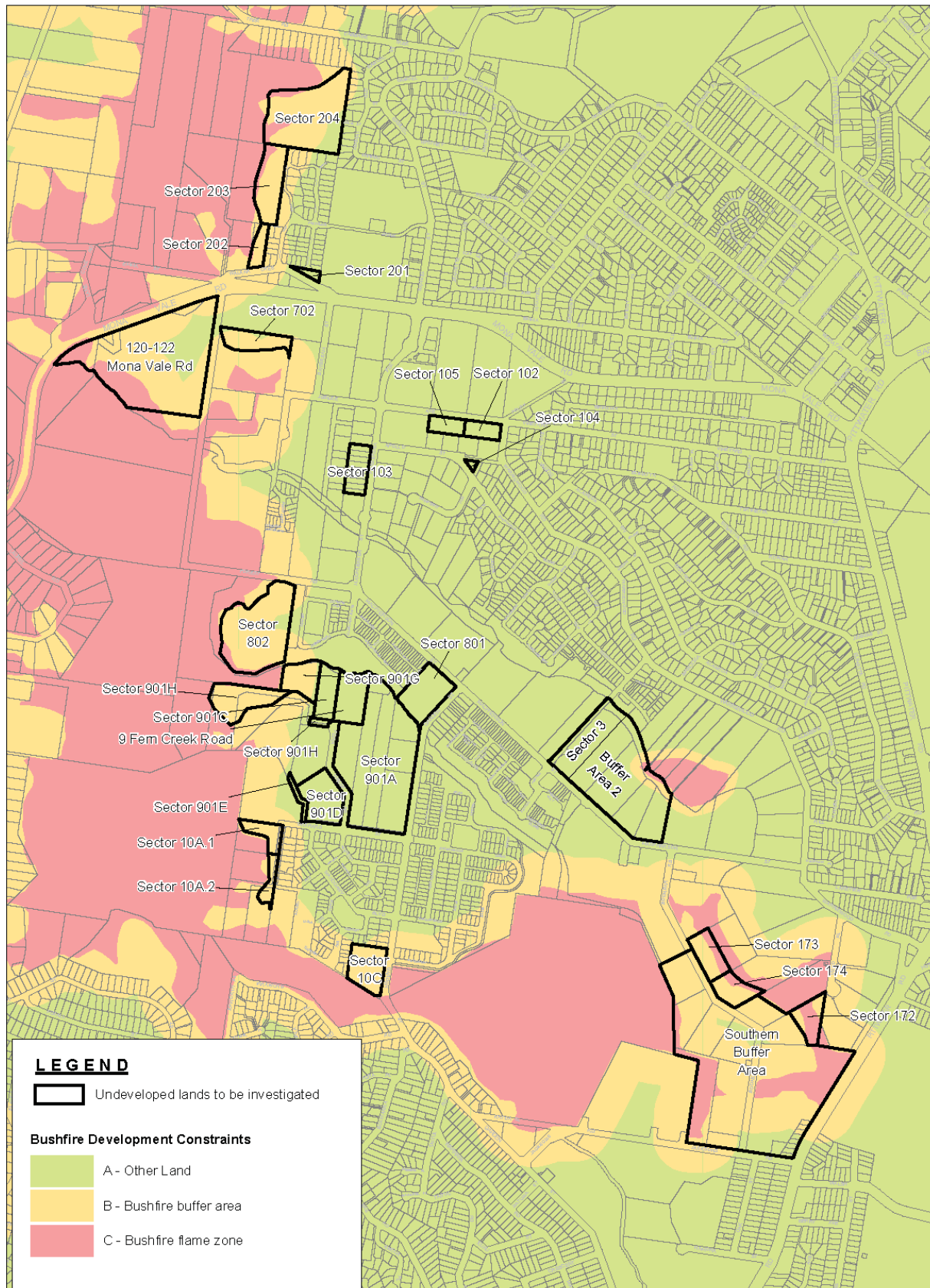
Appendix 1 to 4

Appendix 1: Updated Constraints Mapping

Map 6: Flooding Constraints Base Map – Updated based on Narrabeen Lagoon Flood Study 2013 (adopted by Pittwater Council on 4 November 2013)



Map 7: Bushfire Constraints Base Map – Updated based on Pittwater Bushfire Prone Lands Map 2013 (adopted by Council on 4 March 2013 and certified by the Rural Fire Service on 17 June 2013)



Appendix 2: Results Table

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ³⁹	Composite Capability map classification <i>Least to Most Capable</i>	Constraints and Opportunities	Comments
102	185 Warriewood Road	4,561	Private	Non-residential land use designation	Industrial	IN2 Light Industrial	Most	<ul style="list-style-type: none"> • Cleared • Flat • Regular in shape • Wide street frontage • Opportunity to amalgamate with adjoining site, Sector 105 	Few constraints to development.
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	8,199	Multiple private (5)	Non-residential land use designation	Industrial	IN2 Light Industrial	Most	<ul style="list-style-type: none"> • Small lot sizes with an average size of 910m² • Multiple landowners • Wide street frontage • Flat • Regular in shape 	Incentive to redevelop already by rezoning however redevelopment has been delayed due to land fragmentation. Unlikely to develop as individual parcels on speculation alone.
104	3 Harris Street	595	Private	Non-residential land use designation	Industrial	IN2 Light Industrial	Most	<ul style="list-style-type: none"> • Unusual shape (triangular) and small lot size for industrial development 	Whilst it is a small site the permissible uses under PLEP 2014 would still allow development to occur on the site.
105	15 Jubilee Avenue	4,562	Private	Non-residential land use designation	Industrial	IN2 Light Industrial	Most	<ul style="list-style-type: none"> • Cleared • Flat • Regular in shape • Wide street frontage • Opportunity to amalgamate with adjoining site, Sector 102 	Few constraints to development.
702	10 Jubilee Avenue	9,215	Uniting Church	Non-residential land use designation	Employment Generating Land	RU2 Rural Landscape	Moderate-More	<ul style="list-style-type: none"> • Biodiversity • Existing development on site 	This sector forms part of the Pittwater Uniting Church site. Given the existing development on the site, the sector is unlikely to be re-developed in the future for employment generating purposes.

³⁹ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴⁰	Composite Capability map classification Least to Most Capable	Constraints and Opportunities	Comments
172	1A Boondah Road	7,792	Pittwater Council	Environmental constraints/ other factors	Conservation/ Open Space	RE1 Public Recreation	Least	<ul style="list-style-type: none"> Biodiversity Flooding (Category F) Bushfire 	The sector is intersected by Narrabeen Creek and contains significant vegetation. The site should be conserved for passive recreation, which is consistent with the recommended land use of recreational areas under Category F ⁴¹ .
173	9A Boondah Road	8,869	Sydney Water	Environmental constraints/ other factors	Sewage Treatment Plant	SP2 Infrastructure (Sewerage System)	Least-less	<ul style="list-style-type: none"> Proposed future use which is consistent with the adjoining lands use 	Council has been advised by the land owner the site will be required for uses associated with the Warriewood Sewerage Treatment Plant in the future.
174	9 Boondah Road	7,899	Sydney Water	Environmental constraints/ other factors	Sewage Treatment Plant	SP2 Infrastructure (Sewerage System)	Least-less	<ul style="list-style-type: none"> Proposed future use which is consistent with the adjoining lands use 	Council has been advised by the land owner the site will be required for uses associated with the Warriewood Sewerage Treatment Plant in the future.
Properties within Southern Buffer	4A Boondah Road	231	Sydney Water	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Least	<p><i>Note: These comments apply to all properties within the Southern Buffer</i></p> <ul style="list-style-type: none"> Flat, low lying Flooding constraints - flood depths exceeding 1m across most of the Southern Buffer in a 1% AEP event and flood events more prolonged. Identified as Category F under the Warriewood Valley Strategic Review Hydrology Study 2011. <p><i>Continued below.</i></p>	4A Boondah Road is owned by Sydney Water and currently contains a pumping station operated in connection with the Warriewood Sewerage Treatment Plant. Sydney Water advised that they required the land for ongoing operational use and that the current zoning of RU2 Rural Landscape appropriately accommodates this use.
	1 Boondah Road	7,475	Pittwater Council	Environmental constraints/ other factors	Employment Generating Land	SP2 Infrastructure (Public Administration Building)	Less - Moderate		Currently contains Council's Operations Centre, which is not likely to be relocated in the near future.

⁴⁰ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

⁴¹ Warriewood Valley Strategic Review Hydrology Study 2011 prepared by Cardno.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴²	Composite Capability map classification Least to Most Capable	Constraints and Opportunities	Comments
Properties within Southern Buffer Continued	6 Jacksons Road	15,161	Private	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Least	<p><i>Note: These comments apply to all properties within the Southern Buffer</i></p> <ul style="list-style-type: none"> Biodiversity constraints - species include: <ul style="list-style-type: none"> Swamp Oak Floodplain Forest (EEC), Swamp Oak, Swamp Sclerophyll Forest (EEC), Bangalay/Apple Open Forest (characteristic of Sydney Coastal Sand Bangalay Forest EEC), Freshwater Wetlands (EEC) Bushfire hazards Privately owned lands in Southern Buffer adjoin existing recreational precinct and Warriewood Wetlands In addition some properties within the Southern Buffer have site specific opportunities/ constraints: <ul style="list-style-type: none"> 1 Boondah Road currently utilised as Council's Operations Centre 4A Boondah Road required for uses ancillary to the Warriewood Sewerage Treatment Plant 2 and 4 Jacksons Road have frontage to Pittwater Road 1 Boondah Road is classified as Category F under the Warriewood Valley Strategic Review Hydrology Report 2011. <p>In December 2013 a Planning Proposal was lodged for the privately owned land within the sector (6 Jacksons Road and 3, 6, 8, 10 and 12 Boondah Road). The Planning Proposal proposed to rezone the land to B4 Mixed Use, proposing a commercial, industrial and residential development with heights up to 24 metres.</p> <p>The application was refused by Council on 17 March 2014. It was considered that the proposal was not consistent with the 2012 Strategic Review. Whilst no forward path was given for the Southern Buffer under the 2012 Strategic Review, Don Fox Planning (consultants engaged to assess the application) recommended any future planning proposals should incorporate all land within the Southern Buffer and also the Warriewood Square Shopping Centre site.</p> <p>Don Fox Planning's assessment of the Planning Proposal concluded the proposal is inconsistent with the 2012 Strategic Review, the Planning Proposal was unable to achieve a clear and direct link to Warriewood Square shopping centre, and was inconsistent with recommendations of the specialist consultant reports relating to flooding, building height, dwelling density, land use, traffic generation and the format of retail floor space. Additionally, it was inconsistent with Council and NSW government policies relating to flood prone land and would result in unacceptable adverse outcomes for existing open space and recreation areas.</p> <p>This portion of the sector also has evacuation issues which are likely to restrict future uses of the sector.</p>	<p>In December 2013 a Planning Proposal was lodged for the privately owned land within the sector (6 Jacksons Road and 3, 6, 8, 10 and 12 Boondah Road). The Planning Proposal proposed to rezone the land to B4 Mixed Use, proposing a commercial, industrial and residential development with heights up to 24 metres.</p> <p>The application was refused by Council on 17 March 2014. It was considered that the proposal was not consistent with the 2012 Strategic Review. Whilst no forward path was given for the Southern Buffer under the 2012 Strategic Review, Don Fox Planning (consultants engaged to assess the application) recommended any future planning proposals should incorporate all land within the Southern Buffer and also the Warriewood Square Shopping Centre site.</p> <p>Don Fox Planning's assessment of the Planning Proposal concluded the proposal is inconsistent with the 2012 Strategic Review, the Planning Proposal was unable to achieve a clear and direct link to Warriewood Square shopping centre, and was inconsistent with recommendations of the specialist consultant reports relating to flooding, building height, dwelling density, land use, traffic generation and the format of retail floor space. Additionally, it was inconsistent with Council and NSW government policies relating to flood prone land and would result in unacceptable adverse outcomes for existing open space and recreation areas.</p> <p>This portion of the sector also has evacuation issues which are likely to restrict future uses of the sector.</p>
	3 Boondah Road	6,152	Private	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Less		
	6 Boondah Road	10,218	Private	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Least-Moderate		
	8 Boondah Road	10,317	Private	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Least-Less		
	10 Boondah Road	10,256	Private	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Least-Less		
	12 Boondah Road	10,165	Private	Environmental constraints/ other factors	Employment Generating Land	RU2 Rural Landscape	Least-More		

⁴² Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴³	Composite map classification Least to Most Capable	Constraints and Opportunities	Comments
Properties within Southern Buffer Continued	2 Jacksons Road	2,850	Pittwater Council	Environmental constraints/ other factors	Conservation/ Open Space	RE1 Public Recreation/ Infrastructure (Community Facility)	Moderate-More	<ul style="list-style-type: none"> See comments above 	<p>2 and 4 Jacksons Road and 2 Boondah Road contain community centres, which have a special use zoning under the PLEP 2014. It is unlikely that these facilities will be redeveloped in the near future, except for embellishment of the existing facilities.</p> <p>2A Boondah Road and 4 Jacksons Road contain sports fields, which have a public recreation zoning under PLEP 2014.</p>
	4 Jacksons Road	57,801	Pittwater Council	Environmental constraints/ other factors	Conservation/ Open Space	RE1 Public Recreation	Least-Moderate		
	2 Boondah Road	3,750	Crown Lands	Environmental constraints/ other factors	Conservation/ Open Space	SP2 Infrastructure (Community Facility)	Less		
	2A Boondah Road	18,203	Crown Lands	Environmental constraints/ other factors	Conservation/ Open Space	RE1 Public Recreation	Least-Less		
201	4 Walana Crescent	1,302	NSW Dep't of Lands	Not considered undeveloped as part of Sector 20	Traditional Residential	SP2 Infrastructure (Cemetery)	More	<ul style="list-style-type: none"> Existing use of site ancillary to the Mona Vale Cemetery Shape Size 	<p>The sector adjoins Mona Vale Cemetery to the east.</p> <p>The land currently forms part of Sector 20. The land was donated by the developer for the expansion of the Mona Vale Cemetery when the remainder of the sector was rezoned in 2005. The transfer to the Crown occurred in 2009.</p>
202	14 Walana Crescent	4,155	Private	Not considered undeveloped as part of Sector 20	Traditional Residential	Portion of the site included in the Release Area is zoned R3 Medium Density Residential	More	<ul style="list-style-type: none"> Bushfire Flooding – Overland Flow Geotechnical Hazard Biodiversity Existing development on site Access issues if additional lots are created 	<p>The site is the undeveloped portion of Sector 20. The master plan approved for Sector 20 showed 72 lots in total. The majority of Sector 20 has been developed with 8 lots yet to be created. The master plan indicates 4 lots on this site.</p> <p>The existing dwelling and ancillary development on the site may also preclude further residential development.</p>

⁴³ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴⁴	Composite Capability map classification <i>Least to Most Capable</i>	Constraints and Opportunities	Comments
203	3 Harrier Place	14,679	Private	Not considered undeveloped as part of Sector 20	Traditional Residential	Portion of the site included in the Release Area is zoned R3 Medium Density Residential	Moderate-More	<ul style="list-style-type: none"> • Bushfire • Flooding – Overland Flow • Geotechnical Hazard • Biodiversity • Access issues if additional lots are created 	<p>The site is the undeveloped portion of Sector 20. The master plan approved for Sector 20 showed 72 lots in total. The majority of Sector 20 has been developed with 8 lots yet to be created. The master plan indicates 4 lots on this site.</p> <p>Redevelopment of the site is limited due to the site's topography and geotechnical hazards. The site is also bushfire prone.</p> <p>Access is currently gained across a right of carriageway across two privately owned adjoining sites. Access to any new lots created is likely to be over this right of carriageway in the future which may be problematic. Access for emergency vehicles is also likely to be an issue.</p>
204	79 Cabbage Tree Road	38,643	Private	Not considered undeveloped as part of Sector 20	Traditional Residential	RU2 Rural Landscape	Less-More	<ul style="list-style-type: none"> • Bushfire • Flooding – Overland Flow • Geotechnical Hazard • Biodiversity 	<p>Currently contains the Aveo Peninsular Gardens Retirement Village. The sector, a residue of Sector 20, was not rezoned as part of Sector 20 as development already existed on the site. There has been no indication that the retirement village will re-develop in the future.</p>
802	5 Forest Road (Mater Maria Catholic College)	37,472	Trustees of the Roman Catholic Church	Not considered undeveloped as part of Sector 8	Medium Density Residential	RU2 Rural Landscape	Less-More	<ul style="list-style-type: none"> • Bushfire • Flooding • Geotechnical Hazard • Biodiversity • Existing development on the site 	<p>This sector is a residue of Sector 8, which was not zoned with Sector 8. It however is not zoned for residential development, nor was it attributed a yield under the master plan for Sector 8.</p> <p>It is currently developed as a school. Given the site was developed recently and scale of the development it is unlikely to be redeveloped in the future.</p>

⁴⁴ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴⁵	Composite Capability map classification Least to Most Capable	Constraints and Opportunities	Comments
901D and 901E	1 Fern Creek Road and adjoining Orchard Street road reserve (901D) and portion of 12 Orchard Street (battle-axe handle) and adjoining Orchard Street road reserve (901E)	13,240 (901D) 1,914 (901E)	Private (2)	Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Mixed Residential	R3 Medium Density Residential	Moderate - Less	<p>901D</p> <ul style="list-style-type: none"> Slope Visual amenity High voltage power lines Biodiversity <p>901E</p> <ul style="list-style-type: none"> Thin width as it is an access corridor which would require the cooperation of the adjoining land owners to develop 	<p>Following the completion of the 2012 Strategic Review, Council staff undertook a review of the environmental constraints affecting these sites, as well as Sector 901G and 901C.</p> <p>It was recognised that the sites had similar characteristics to Sector 20 where 6 - 10 dwellings per hectare had been achieved. There was potential for Sectors 901D and 901E and the adjoining Orchard Street road reserve (north-east portion) to amalgamate, to enable more appropriate setbacks to constraints, maximising development potential across the two sites.</p> <p>The sectors were rezoned in December 2013 with a maximum dwelling yield of 12 dwellings across Sectors 901D, 901E and the adjoining Orchard Street road reserve.</p>
901G	11 Fern Creek Road	6,470	Private	Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Mixed Residential	R3 Medium Density Residential	More	<ul style="list-style-type: none"> Land locked site with no access to Fern Creek Road Contains a large proportion of creek line corridor Visual Amenity Biodiversity 	<p>Following the completion of the 2012 Strategic Review, Council staff undertook a review of the environmental constraints affecting this site, 901C, as well as Sector 901D and 901E.</p> <p>It was recognised that the site had potential for 6 lots, subject to development occurring in conjunction with the adjoining land parcel (Sector 901C) as both sectors were owned by same landholder.</p> <p>The sector was rezoned in December 2013 with a maximum dwelling yield of 6 dwellings. However the sector is to be developed with 901C.</p> <p>This sector is the subject of a Planning Proposal (PP0002/16), effecting a different development outcome. See Section 5.2.8 of this report or PP0002/16 on 'Application Search' on Council's website for more details.</p>

⁴⁵ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴⁶	Composite Capability map classification <i>Least to Most Capable</i>	Constraints and Opportunities	Comments
901C	12 Fern Creek Road	6,879	Private	Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Mixed Residential	R3 Medium Density Residential	More	<ul style="list-style-type: none"> Contains a large proportion of creek line corridor Visual Amenity Biodiversity 	<p>Following the completion of the 2012 Strategic Review, Council staff undertook a review of the environmental constraints affecting this site, 901G, as well as Sector 901D and 901E.</p> <p>It was recognised that the site had potential for 22 lots, subject to development occurring in conjunction with the adjoining land parcel (Sector 901G) as both sectors were owned by same landholder.</p> <p>The sector was rezoned in December 2013 with a maximum dwelling yield of 22 dwellings. However the sector is to be developed with 901G.</p> <p>This sector is the subject of a Planning Proposal (PP0002/16), effecting a different development outcome. See Section 5.2.8 of this report or PP0002/16 on 'Application Search' on Council's website for more details.</p>
901H	Portion of 4 and 5 Fern Creek Road	1,138	Private (2)	Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Mixed Residential	RU2 Rural Landscape	More	<ul style="list-style-type: none"> Slope Visual amenity Bushfire Biodiversity 	<p>Only a portion of 4 and 5 Fern Creek Road were originally included in Sector 9. These two sites formed 901H under the 2012 Strategic Review and were identified as not suitable for development due to significant environmental constraints, particularly bushfire and biodiversity.</p> <p>The 2012 Strategic Review recommended this sector be removed from the Release Area. Land owners were given the opportunity to come forward with additional information demonstrating their sites capacity for residential development. To date, no substantive information justifying a review has been received.</p> <p>It is confirmed that the majority of the sector is not capable of being developed due to environmental constraints. However, the battle axe portion has potential to amalgamate with neighbouring development sites (either Sectors 901B, or 901C and 901G) to facilitate better development outcomes.</p> <p>Any use of the battle axe handles by the adjoining neighbours would need to ensure that access to 4 and 5 Fern Creek Road is not impeded in accordance with the "Isolation of Sites" Planning Principle.</p>

⁴⁶ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴⁷	Composite Capability map classification <i>Least to Most Capable</i>	Constraints and Opportunities	Comments
10A.1 & 10A.2	Portion of 115 and 111, 111A and 113 Orchard Street	5,566 (10A.1) 3,768 (10A.2)	Private (2)	Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Mixed Residential	RU2 Rural Landscape	More-Less	<ul style="list-style-type: none"> • Slope • Visual amenity • Bushfire • Biodiversity 	<p>These sectors are a residue of Sector 10 however they were not rezoned as part of the masterplan for Sector 10.</p> <p>The 2012 Strategic Review recommended these sectors be removed from the Release Area. Land owners were given the opportunity to come forward with additional information demonstrating their sites capacity for residential development. To date, no substantive information justifying a review has been received.</p>
10C	194 Garden Street	11,677	Private (1 owner, 52 strata titled units)	Not considered undeveloped as existing development on site	Mixed Residential	R3 Medium Density Residential	More	<ul style="list-style-type: none"> • Bushfire • Flooding • Flat, regular shape • Adjoins Irrawong Reserve to the south 	<p>This sector was a residue of Sector 10 however it was not rezoned or allocated a yield as the Seaside Residential Aged Care Facility existed on site.</p> <p>In recognition of the owners of the strata scheme investigating opportunities to redevelop the site, the sector should be allocated a yield that is consistent with the adjoining sectors and reflective of its position on the edge of Irrawong Reserve and the Release Area.</p>

⁴⁷ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁴⁸	Composite Capability map classification <i>Least to Most Capable</i>	Constraints and Opportunities	Comments
120 Mona Vale Road (identified as Clause 6.2 on Urban Release Area Map)				Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Not defined in 2010 Planning Framework. ⁴⁹	Part E4 Environmental Living Part R2 Low Density Residential Part E2 Environment Conservation	Least - Moderate	<ul style="list-style-type: none"> • Slope • Visual amenity • Bushfire • Biodiversity • Geotechnical • Creek line corridor • Access 	<p>Property immediately adjoins Ingleside Chase Reserve to the south and Katandra Bushland Sanctuary to the north. It also contains the upper reach of Narrabeen Creek which abuts the southern boundary.</p> <p>Access is currently facilitated by a right of carriageway via 10 Jubilee Avenue. A single driveway off Mona Vale Road currently facilitates access to the single dwelling on 120 Mona Vale Road.</p> <p>120 Mona Vale Road is substantially cleared but contains some significant vegetation on the southern fringes. This sector is also subject to bushfire and geotechnical hazards.</p> <p>This property has recently been zoned⁵⁰ for residential development with 122 Mona Vale Road rezoned for environmental conservation. It also rezoned the creekline corridor (25 metres from the centre of the creekline) as E2 Environment Conservation.</p> <p>At this stage the yield for 120 Mona Vale Road is uncertain, as a masterplan is yet to be submitted which is consistent with the Clause 6.2 of the PLEP 2014 and the lot size map.</p> <p>It is uncertain if 4 Boundary Street and 10 Jubilee Avenue are proposed to provide access to 120 Mona Vale Road as part of the redevelopment of the site.</p> <p>The creekline corridors within 120 and 122 Mona Vale Road contain part of the upper reach of the Narrabeen Creek catchment. A missing portion of the upper reach, south of 120 Mona Vale Road is contained on 3 Boundary Street; however 3 Boundary Street is not part of the Release Area.</p>

⁴⁸ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

⁴⁹ Council resolution of 18 September 2006 to include 120 Mona Vale Road in the Warriewood Valley Release Area.

⁵⁰ PLEP 2014 Amendment 1 (came into effect on 27 June 2014). The JRPP was the Relevant Planning Authority, being the authority that progressed the rezoning of the property.

Sector	Address	Area (m ²)	Land owner	Reason for exclusion from 2012 Strategic Review	Land use designation under 2010 Planning Framework	Current zoning under PLEP 2014 ⁵¹	Composite Capability map classification <i>Least to Most Capable</i>	Constraints and Opportunities	Comments
122 Mona Vale Road	122 Mona Vale Road	5,516	Private	Investigated but no density recommended as environmentally constrained and unlikely to achieve density greater than 25 dwellings per hectare	Not defined in 2010 Planning Framework. ⁵²	E2 Environment Conservation	Least - Moderate	<ul style="list-style-type: none"> Slope Visual amenity Bushfire Biodiversity Geotechnical Creek line corridor Access 	<p>The property immediately adjoins Ingleside Chase Reserve to the south and Katandra Bushland Sanctuary to the north. Contains the upper reach of Narrabeen Creek which abuts the southern boundary.</p> <p>This property has recently been rezoned⁵³ for environmental conservation. It also rezoned the creekline corridor (25 metres from the centre of the creekline) as E2 Environment Conservation.</p> <p>The property has been identified for acquisition on the Urban Release Area Map.</p>
Creek Line Corridor within Buffer Area 1 sub-sectors	-	-	Multiple private	-	Creek line corridor subject to environmental constraints including a Threatened Species Community	R3 Medium Density Residential	Least	<ul style="list-style-type: none"> Biodiversity Flooding 	<p>Environmentally sensitive lands within the Buffer Area 1 subsectors were identified to be purchased under the Section 94 Plan.</p> <p>The review of the Section 94 Plan has rationalised expenditure, identifying only the inner 25m creek line corridor component for purchase.</p> <p>The land is identified on the Biodiversity map in the PLEP 2014. Future development will need to consider the potential impact of the development on the vegetation.</p>

⁵¹ Since exhibition of the addendum report, the Pittwater Local Environmental Plan (PLEP) 2014 has come into effect.

⁵² Council resolution of 18 September 2006 to include 120 Mona Vale Road in the Warriewood Valley Release Area.

⁵³ PLEP 2014 Amendment 1 (came into effect on 27 June 2014). The JRPP was the Relevant Planning Authority, being the authority that progressed the rezoning of the property.

Appendix 3: Recommendations for Residential Sectors as at 17 November 2014

Sector	Property Address	Recommended Land Use Designation	Recommended Forward Path	Additional Dwellings	Comments
201	4 Walana Crescent	-	Remove from PLEP 2014 Urban Release Area Map. No change to zoning in PLEP 2014 (SP2 Infrastructure (Cemetery)).	0	Sector now part of Mona Vale Cemetery site and already zoned for this use (SP2 Infrastructure (Cemetery)).
202	14 Walana Crescent	Residential – Low density	Amend PLEP 2014 Urban Release Area Map – identify as individual sector. Amend PLEP 2014 Part 6.1 Clause 3 – attribute a maximum yield of 1 dwelling	-3	Landowner has no intention to develop the site further. Original master plan for Sector 20 showed site accommodating 4 dwellings.
203	3 Harrier Place	Residential – Low density	Amend PLEP 2014 Urban Release Area Map – identify as individual sector. Amend PLEP 2014 Part 6.1 Clause 3 – attribute a maximum yield of 4 dwellings.	0	Recommended yield consistent with original master plan for Sector 20.
204	79 Cabbage Tree Road (Aveo Peninsular Gardens Retirement Village)	-	Remove from PLEP 2014 Urban Release Area Map. No change to zoning (RU2 Rural Landscape).	0	Developed as a seniors living development prior to land being identified for release. Unlikely to be redeveloped.
Buffer Area 2 and Sector 3	6-14 Macpherson Street (Anglican Retirement Village)	Residential – Medium density	Amend PLEP 2014 Urban Release Area Map – consolidated sector labelled "Buffer Area 2". Amend PLEP 2014 Part 6.1 Clause 3 – remove Sector 3 and attribute a maximum yield of 147 dwellings to Buffer Area 2.	0	Anglican Retirement Village development straddles Buffer Area 2 and Sector 3.

Sector	Property Address	Recommended Land Use Designation	Recommended Forward Path	Additional Dwellings	Comments
801	23B Macpherson Street	Residential - Medium Density and Focal Neighbourhood Centre	No change to PLEP 2014.	0	Already zoned R3 Medium Density Residential with a dwelling yield of 38 dwellings. Already listed in Schedule 1 of the PLEP 2014 which allows the additional permitted use of development for the purpose of restaurants, cafes and neighbourhood shops.
802	Portion of 5 Forest Road (Mater Maria Catholic College)	Infrastructure	Amend PLEP 2014 Urban Release Area Map – identify as individual sector. Amend zoning under PLEP 2014 - Rezone entire school site to SP2 Infrastructure (Educational Establishment)	0	Developed as school, unlikely to be redeveloped for residential development. Recommended to be zoned SP2 Infrastructure (Educational Establishment), consistent with the zoning of schools in LGA.
9 Fern Creek Road ⁵⁴	9 Fern Creek Road	Recreation	No change to PLEP 2014.	0	Already rezoned R3 Medium Density Residential but was not allocated a dwelling yield as Council recognised 9 Fern Creek Road being integral to facilitating better design outcomes for the surrounding sectors and 9 Fern Creek Road.
901 D	1 Fern Creek Road and Orchard Street Road Reserve	Residential – Low Density	No change to PLEP 2014.	0	Already zoned R3 Medium Density Residential and attributed a dwelling yield of 16 dwellings
901E	Portion of 12 Orchard Street				
901G ⁵⁵	11 Fern Creek Road	Residential – Low Density	Amend PLEP 2014 Part 6.1 Clause 3 to identify Sectors 901G and 901C together and attribute a maximum yield of 28 dwellings and a minimum of 17 dwellings.	0	Already zoned R3 Medium Density Residential with a dwelling yield of 6 dwellings
Sector	Property Address	Recommended Land Use Designation	Recommended Forward Path	Additional Dwellings	Comments

⁵⁴ Updated 2017, see Appendix 3A for more details

⁵⁵ Updated 2017, see Appendix 3A for more details

901C ⁵⁶	12 Fern Creek Road	Residential – Medium Density	Amend PLEP 2014 Part 6.1 Clause 3 to identify Sectors 901G and 901C together and attribute a maximum yield of 28 dwellings and a minimum of 17 dwellings.	0	Already zoned R3 Medium Density Residential with a dwelling yield of 22 dwellings
901H	Portion of 4 & 5 Fern Creek Road	Residential - Medium Density (Battle-axe handles only)	Amend PLEP 2014 Urban Release Area Map – identify revised 901H (battle-axe handles only) as Sector 901H. Amend zoning under PLEP 2014 – Rezone battle-axe handles to R3 Medium Density Residential. Amend PLEP 2014 Part 6.1 Clause 3 – allocate a maximum of 3 dwellings Amend PLEP 2014 Minimum Lot Size Map and Height of Buildings Map.	3	Original 901H is unlikely to be developed. Battle-axe portion has capacity to be incorporated into either adjoining sector and to incentivise development occurring. Yield for battle axe portion is based on a density of 32 dwellings per hectare developing with Sectors 901B or 901C.
10A.1 & 10A.2	Portion of 115 Orchard Street Portion of 111, 111A and 113 Orchard Street	-	No change to PLEP 2014.	0	Unlikely to be developed residentially because of significant environmental constraints. Sectors already removed from PLEP 2014 Urban Release Area Map and is zoned RU2 Rural Landscape.
10C	194 Garden Street (Seaside Residential Aged Care Facility)	Residential – Low Density	Amend PLEP 2014 Urban Release Area Map – identify as individual sector. Amend PLEP 2014 Part 6.1 Clause 3 – allocate a maximum yield 17 dwellings	17	Already zoned R3 Medium Density Residential under PLEP 2014. Yield based on a density of 15 dwellings per hectare, consistent with density of adjoining Sector 10.
120 & 122	120 & 122 Mona Vale Road	Conservation (122) and Residential – Low Density (120)	Amend PLEP 2014 Urban Release Area Map – identify sites as individual sectors – Sector 120 & 122. No change to zoning.	No yield determined as Clause 6.2 of PLEP 2014 requires a DCP to be prepared for the site to determine the yield.	No change to current zoning in PLEP 2014 (Part E4 Environmental Living, R2 Low Density Residential and E2 Environment Conservation) in recognition of current Planning Proposal progressed by the JRPP.

⁵⁶ Updated 2017, see Appendix 3A for more details

Sector	Property Address	Recommended Land Use Designation	Recommended Forward Path	Additional Dwellings	Comments
Creek Line Corridor	Creek line corridor within Buffer Area 1 sub-sectors	Creek Line Corridor (25 metres either side of the creek line)	Amend PLEP 2014 Urban Release Area Map - reduce the creek line corridor width to 25 metres either side of the creek line.	0	The creekline corridor land on Buffer Areas 1F, 1G, 1H, 1i, 1J and 1K identified for purchase has been reduced to 25 metres as measured from the centre line of the creek. Identifying 25 metres either side of the creekline for purchase is a practice that has consistently been applied elsewhere in Warriewood Valley.
			Net Additional Dwellings	17	<p>The net additional dwelling are based on:</p> <ul style="list-style-type: none"> - The Additional yield recommended to be attributed to Sectors 10C (17 dwellings) and 901H (3 dwellings). - Yield currently attributed to Sector 202 recommended to be reduced (minus 3 dwellings).

Appendix 3A: Revised recommendations for Sectors 901A(part), 901C, 901G & 9 Fern Creek Rd as a result of Planning Proposal (PP0002/16)

Property Description (Sector)	Addendum Report recommended land use designation (as at 17 Nov 2014)	Updated land use designation (result of PP0002/16)	Min and Max Dwelling Yield* (as at 17 Nov 2014)	Revised Min and Max Dwelling Yield** (result of PP0002/16)	Comments / Recommended Forward Paths (i.e. identified changes to PLEP 2014)	
					Northern Portion	Southern Portion
9 Fern Creek Rd	Recreation	Northern portion for Recreation Southern portion for Medium Density Residential	0	13 to 17	Rezoned to RE1 - Public Recreation Height of Building remains 8.5m	Remains as R3 - Medium Density Residential Amend Height of Building map to 10.5m
12 Fern Creek Rd (901C)	Residential Medium Density			10 to 13	Rezoned to RE1 - Public Recreation Amend Height of Building map to 8.5m	Remains as R3 - Medium Density Residential Height of Building map remains 10.5m
11 Fern Creek Rd (901G)	Residential Low Density	Northern portion for Recreation Southern portion for Low Density Residential	23 to 28	3 to 3		
13 Fern Creek Rd (Part of 901A)	Mixed residential (as part of 901A)	Removed from Sector 901A Designated for Recreation	2 to 2	0	Rezoned to RE1 - Public Recreation Amend Height of Building map to 8.5m	Rezoned to RE1 - Public Recreation Amend Height of Building map to 8.5m
Total Dwelling Yields			25 (min) to 30 (max)	26 (min) to 33 (max)	Amend Cl. 6.1(3) under PLEP 2014 to remove 2 dwellings from 901A, to specifically state: "Sector 901A - Not more than 492 dwellings or less than 456 dwellings"	

* Pre-Planning Proposal (PP0002/16) – Warriewood Valley Strategic Review Addendum Report 2014 recommended dwelling yields as at 17 Nov 2014

** Post-Planning Proposal (PP0002/16) - Warriewood Valley Strategic Review Addendum Report resulting dwelling yields as an outcome of Planning Proposal (PP0002/16)

Appendix 4: Recommendations for Employment Generating Sectors & Southern Buffer

Sector	Property Address	Recommended Land Use Designation	Recommended Forward Path	Comments
102	185 Warriewood Road	Employment Generating Land	No change to PLEP 2014.	Sector already identified on PLEP 2014 Urban Release Area Map and zoned IN2 Light Industrial. Land owners encouraged to investigate opportunities for amalgamation to facilitate development.
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	Employment Generating Land	No change to PLEP 2014.	Sector already identified on PLEP 2014 Urban Release Area Map and zoned IN2 Light Industrial. Land owners encouraged to investigate opportunities for amalgamation to facilitate development.
104	3 Harris Street	Employment Generating Land	No change to PLEP 2014.	Sector already identified on PLEP 2014 Urban Release Area Map and zoned IN2 Light Industrial. Land owner encouraged to explore options for employment generating on site.
105	15 Jubilee Avenue	Employment Generating Land	No change to PLEP 2014.	Sector already identified on PLEP 2014 Urban Release Area Map and zoned IN2 Light Industrial. Land owners encouraged to investigate opportunities for amalgamation to facilitate development.
172	1A Boondah Road	Recreation	No change to PLEP 2014. Amend PLEP 2014 Urban Release Area Map – include sector in Southern Buffer Sector.	Not suitable for employment generating development.
173	9A Boondah Road	-	No change to PLEP 2014.	Sector not in PLEP 2014 Urban Release Area Map. Zoned SP2 Infrastructure (Sewerage System). Sydney Water has indicated land is required for Sewerage Treatment Plant operations.
174	9 Boondah Road	-	No change to PLEP 2014.	Sector not in PLEP 2014 Urban Release Area Map. Zoned SP2 Infrastructure (Sewerage System). Sydney Water has indicated land is required for Sewerage Treatment Plant operations.

Sector	Property Address	Recommended Land Use Designation	Recommended Forward Path	Comments
Southern Buffer	2 and 4 Jacksons Road and 2, 2A, 3, 4A, 6, 8, 10, 12 Boondah Road	Recreation	No change to PLEP 2014.	No longer considered appropriate for employment generating development. Majority of sector best utilized for recreation. 2 and 4 Jacksons Road zoned part RE1 Public Recreation and SP2 Infrastructure (Community Facility). 2 Boondah Road zoned SP2 Infrastructure (Community Facility). 2A Boondah Road zoned RE1 Public Recreation. 3, 4A, 6, 8, 10, 12 Boondah Road zoned RU2 Rural Landscape. All sectors already identified on PLEP 2014 Urban Release Area Map.
	1 Boondah Road	Infrastructure	No change to PLEP 2014.	No longer considered appropriate for employment generating development. To be retained as Councils operation facility. Zoned SP2 Infrastructure (Public Administration Building). Sector already identified on PLEP 2014 Urban Release Area Map.
	6 Jacksons Road	No development potential	No change to PLEP 2014.	No longer considered appropriate for employment generating development. Zoned RU2 Rural Landscape. Sector already identified on PLEP 2014 Urban Release Area Map.
702	10 Jubilee Avenue	-	No change to PLEP 2014.	Site currently utilised for Pittwater Uniting Church, unlikely to be developed for industrial use. Sector not in PLEP 2014 Urban Release Area Map. Zoned RU2 Rural Landscape.

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Planning Proposal (PP0002/16) – 9, 11, 12 & 13 Fern Creek Road, Warriewood - To create the southern portion of the planned Central Local Park, Warriewood Valley