Ardill Payne & PARTNERS

ENGINEERS PLANNERS SURVEYORS ENVIRONMENTAL PROJECT MANAGEMENT

PRELIMINARY CONTAMINATED SITE INVESTIGATION

Proposed Rezoning for Future Residential Subdivision and Development

Lot 100 DP 1201719
Hills Road, Rileys Hill

for:
Monal Pty Ltd (c/- Alan Cardy)

October 2020

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1. Executive Summary

Ardill Payne and Partners has been engaged by Monal Pty Ltd to undertake a Stage 1 Preliminary Contaminated Site Investigation in respect of Lot 100 DP 1201719, Hills Road, Rileys Hill.

The Department of Planning issued a conditional Gateway Determination (Dated 16th February 2018) in respect of the subject land as follows:

"Planning Proposal (Department Ref: PP_2018_RICHM_001_00): to rezone part of Lot 100 DP 1201719 at Hills Road, Rileys Hill from RU1 Primary Production to RU5 Village and change the minimum lot size from 40 hectares to 600m^2 to enable the land to be developed for low density residential purposes."

A Preliminary Contaminated Site Investigation was prepared to address part of Condition 1 (dated 13th August 2018), viz:

1. Prior to community consultation the following site investigations are to be undertaken and the planning proposal amended if necessary to reflect the outcomes of the site investigations. The site investigations are to be included in the material used for community consultation:
    a. an ecological assessment;
    b. a preliminary site contamination assessment including soil sampling as appropriate and to the satisfaction of Council;
    c. an Aboriginal cultural heritage assessment;
    d. an assessment of the potential impacts of the Rileys Hill Quarry operations, including a land use conflict risk assessment for potential blasting, noise, traffic and vibration impacts, should the operation of the quarry be resumed;
    e. a traffic impact assessment;
    f. a flood study;
    g. a bushfire hazard risk assessment;
    h. an infrastructure servicing plan; and
    i. an acid sulfate soils assessment.

2. Prior to community consultation the planning proposal is to be amended as follows:
    a. the content of the planning proposal is to be amended in accordance with the results of the site investigations require by Condition 1 of this Gateway determination;
    b. maps which show the current and proposed zone and minimum lot size for the land are to be included within the planning proposal; and
    c. a project time line is to be included in the planning proposal;

3. Once the site investigations required by Condition 1 have been undertaken and the planning proposal has been amended in accordance with Condition 2 the planning proposal is to be forwarded to the Department for approval of the form

Richmond Valley PP_2018_RICHM_001_00 (EF18/275)

of the proposal for community consultation in accordance with section 57(2) of the Act.

As per Condition 2 above, and as a consequence of on-going detailed communications with Council in complying with Condition 1 above, the Planning Proposal has been modified such that there has been:

- a significant reduction in the proposed footprint/area of the RU5 zone
- an increase in the mapped minimum lot size to 800m^2 for the RU5 zoned land
- the inclusion of an E2 – Environmental Conservation Zone over part of the land with a 2ha minimum lot size

As a consequence of the above, there has been a significant reduction in the potential lot yield as originally proposed, from 70 x residential lots down to 35 x residential lots (which will be zoned RU5) and 1 x single dwelling opportunity lot (which will be zoned part RU1 and part E2).

This amended Preliminary Contaminated Site Investigation has been prepared to support/inform the community consultation process for the Planning Proposal as per Condition 3 above.

2. Objective & Scope of Works

The objective of this report is to satisfy the requirements of Council (and the Department of Planning) with regards to a preliminary site contamination assessment.

This contaminated site investigation is a Stage 1 – Preliminary Investigation, in accordance with the *Managing Land Contamination Planning Guidelines* (DUAP & EPA, 1998).

The purpose of this investigation is to:

- identify all past and present potentially contaminating activities
- identify potential contamination types
- discuss the site conditions
- provide a preliminary assessment of site contamination
- assess the need for further investigations

This report has been written in accordance with the NSW EPA (2000, reprinted 2011) *Guidelines for Consultants Reporting on Contaminated Sites.*

3. Proposed Development & Site Identification

The proposal involves the rezoning of part of Lot 100 DP 1201719 from *RU1 – Primary Production* to part *RU5 – Village* and part *E2 – Environmental Conservation* and to change the minimum lot size of the proposed RU5 zoned land from 40 hectares to 800m^2 to enable the RU5 zoned land to be subdivided and developed for residential purposes.

It should be noted that as a consequence of on-going reporting and investigations and communications with Council which have been undertaken to comply with the terms and conditions of the original Gateway Determination (dated 16th February 2018), the proposed minimum lot size for the RU5 zoned land has now been increased 800m^2 from the originally proposed 600m^2 (as per the Gateway Determination).

Site identification details of the subject land are provided below in Table 1.

Table 1 – Current Site Identification Details

Site Address	Hills Road, Rileys Hill
Site Area	8.268ha
Title	Lot 100 DP 1201719
Local Government Area	Richmond Valley Council
Zoning	Zone RU1 – Primary Production Zone (RVLEP 2012)
Site Features	The site is vacant and generally cleared with vegetation along the western, southern and eastern lot boundaries. The site is fenced along the boundary lines.
Elevation	4.5m AHD – 15m AHD
Site Location Co-ordinates	Latitude: -29.017221 Longitude: 153.394937
Existing Land Use	Cattle grazing
Surrounding Environment	The Rileys Hill residential subdivision is located to the north-east and a number of residential properties are located to the south-west. The broader locality is predominated by farmland and rural residential properties. Located to the east is the Broadwater National Park.

A site locality plan is provided below in Figure 1. Further plans of the site are presented in Attachment 1.

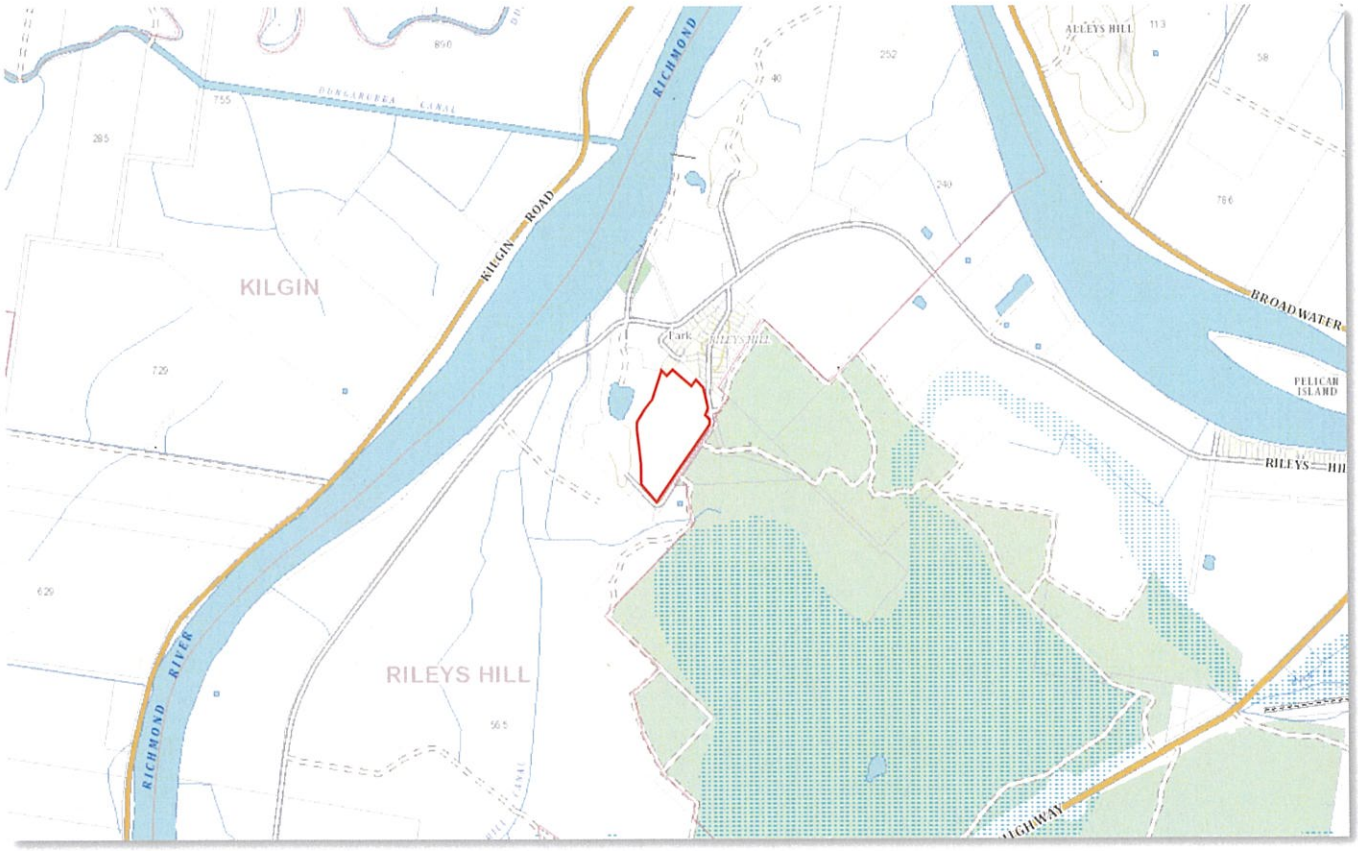


Figure 1: Site Locality (SIX Maps 2018)

4. Site Condition and Surrounding Environment

4.1. Geology & Hydrogeology

The site soil variants are mapped by Morand 2001[1] as developed terrain from the Olive Gap (olb) soil landscape grouping, viz:

- Olive Gap (olb)
  - Landscape – rolling rises and low hills on Gatton Sandstone (quartz-lithic and feldspathic sandstones), Ripley Road Sandstone (quartz sandstone and conglomerate). Slopes 10-15%; relief 70-100m; elevation 20-150m. Rock outcrop common. Two conspicuous faults are present. Partially cleared, tall open-forest, previously logged.
  - Soils – shallow to moderately deep (50-100cm), poorly/imperfectly drained Grey and Brown Kurosols (Gleyed Podzolic soils; Yellow Podzolic Soils) throughout slopes and crests, with localized, moderately deep (>100cm), moderately well drained Red Dermosols and Red Kandosols (Red Pedzolic Soils/Red Earths) on ferruginised sandstone.
  - Limitations – Steep slopes; rock outcrop; high foundation hazard. Highly erodible, strongly acidic, stoney and infertile soils with low permeability.

During large rainfall events, based on the topography of the site, surface water sheet-flows to the centre of the site and is ultimately directed east towards the Broadwater National Park.

[1] *Morand, D.T. (2001)*, "Soil Landscapes of the Woodburn1:100 000 Sheet Map", *Soil Conservation service of NSW, Sydney.*

5. Site History

A desk-top site history review was undertaken to determine the chronological history of site uses and any possible sources and locations of contamination.

5.1. Land Use Investigation Methods

Prior land uses have been determined from:

- On-line records search:
  - NSW Primary Industries Science and Research: Cattle dip site locator
  - NSW Office of Environment and Heritage Contaminated Land: POEO Public Register
  - NSW Office of Environment and Heritage Contaminated Land: Record of Notices
- Reviewing historical aerial photographs

5.2. Online Records Search Outcomes

5.2.1. Cattle Dip Sites

There are no dips recorded for 'Rileys Hill'. A search of 'Broadwater' identified six (6) dips with two of the dips being located in Rileys Hill. There are no dips located within a 1km radius of the subject site according to the locations provided in the *Dip Site Location* page of the *Cattle Dip Site Locator*.

5.2.2. POEO Register

The suburb of 'Rileys Hill' returned eight (8) results in the POEO Public Register. All of the results were for the Rileys Hill Sewage Treatment System (RHSTS) which is operated by Richmond Valley Council and is located to the north-west of the subject site. It should be noted that the sites are separated by a ridge that runs south-west. This ridge provides a barrier to any potential contamination pathways and therefore, it is highly unlikely that any potential pollution from the RHSTS would have been transported to the subject site.

5.2.3. Contaminated Land Register

A search of the NSW Office of Environment & Heritage Contaminated Land Records was undertaken for all notice types, which include:

- Declaration of Significant Contaminated Land
- Approved Voluntary Management Proposal

- Management Order
- On-going Maintenance Order
- Repeal, Revocation and Variation Notice
- Site Audit Statement

None of the abovementioned notice types are listed for the suburb of 'Rileys Hill' or 'Broadwater' (which was also searched due to its close proximity).

5.3. Aerial Photographs

Table 2 presents a summary of the review of historical aerial photographs relating to the focus area. Copies of aerial photographs are presented below.

Table 2 – Summary of Aerial Photograph Observations

Year	Description
1967	Vacant site with scattered trees. Swampy patch evident in eastern portion of site.
1977	Site heavily vegetated, assumed to be for forestry purposes, sparse in eastern portion. Power-line strip evident.
1988	Vegetation more developed. Swampy patch evident in eastern portion of site.
1998	Site completely covered in vegetation. Power-line strip evident. Swampy patch more evident in eastern portion of site.
2007	Site vacant with good vegetative cover and scattered large established trees.
2017	Site vacant with good vegetative cover and greater number of scattered large established trees.

Figure 2: Historical Aerial of Subject Site (1964)

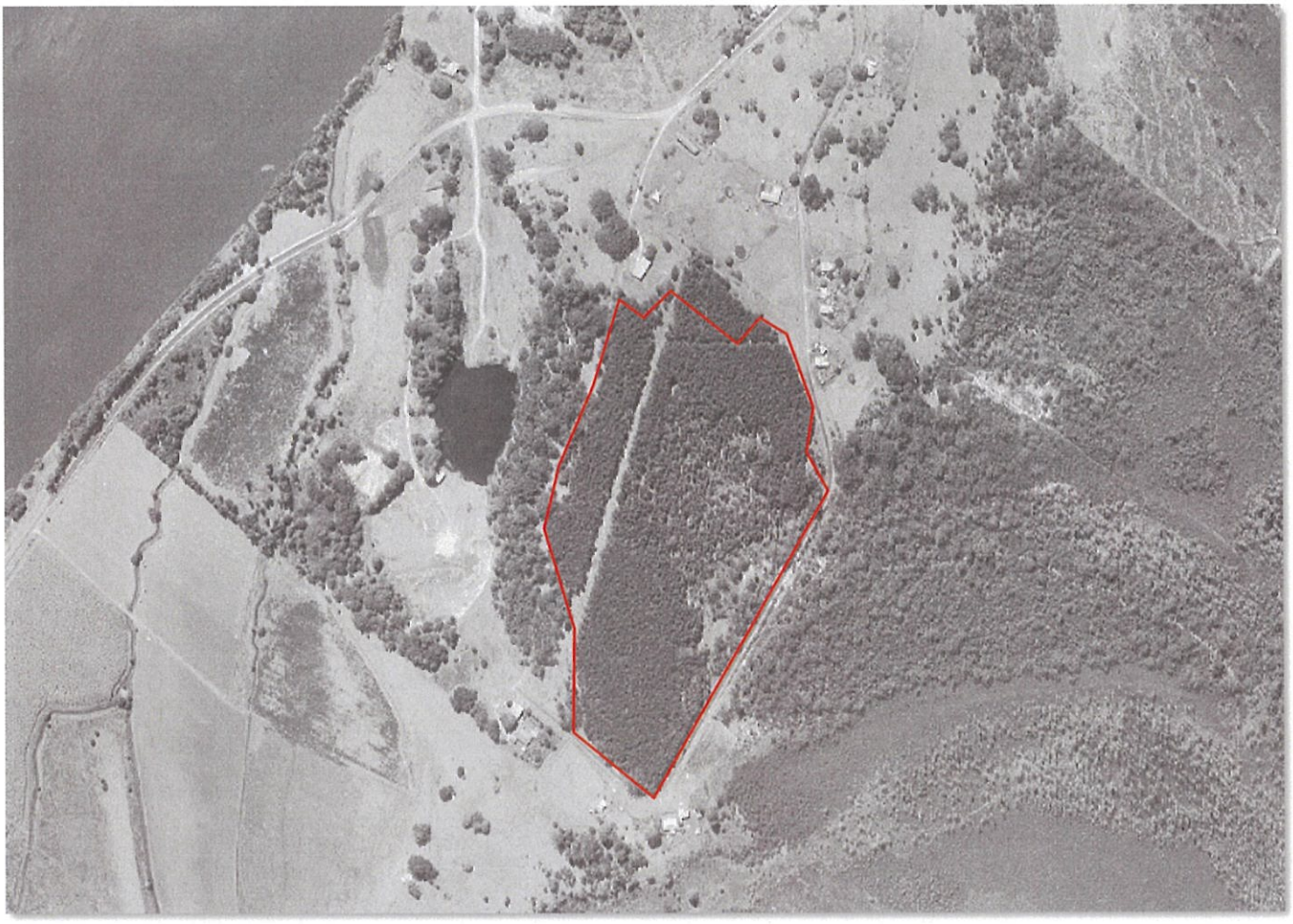


Figure 3: Historical Aerial of Subject Site (1977)

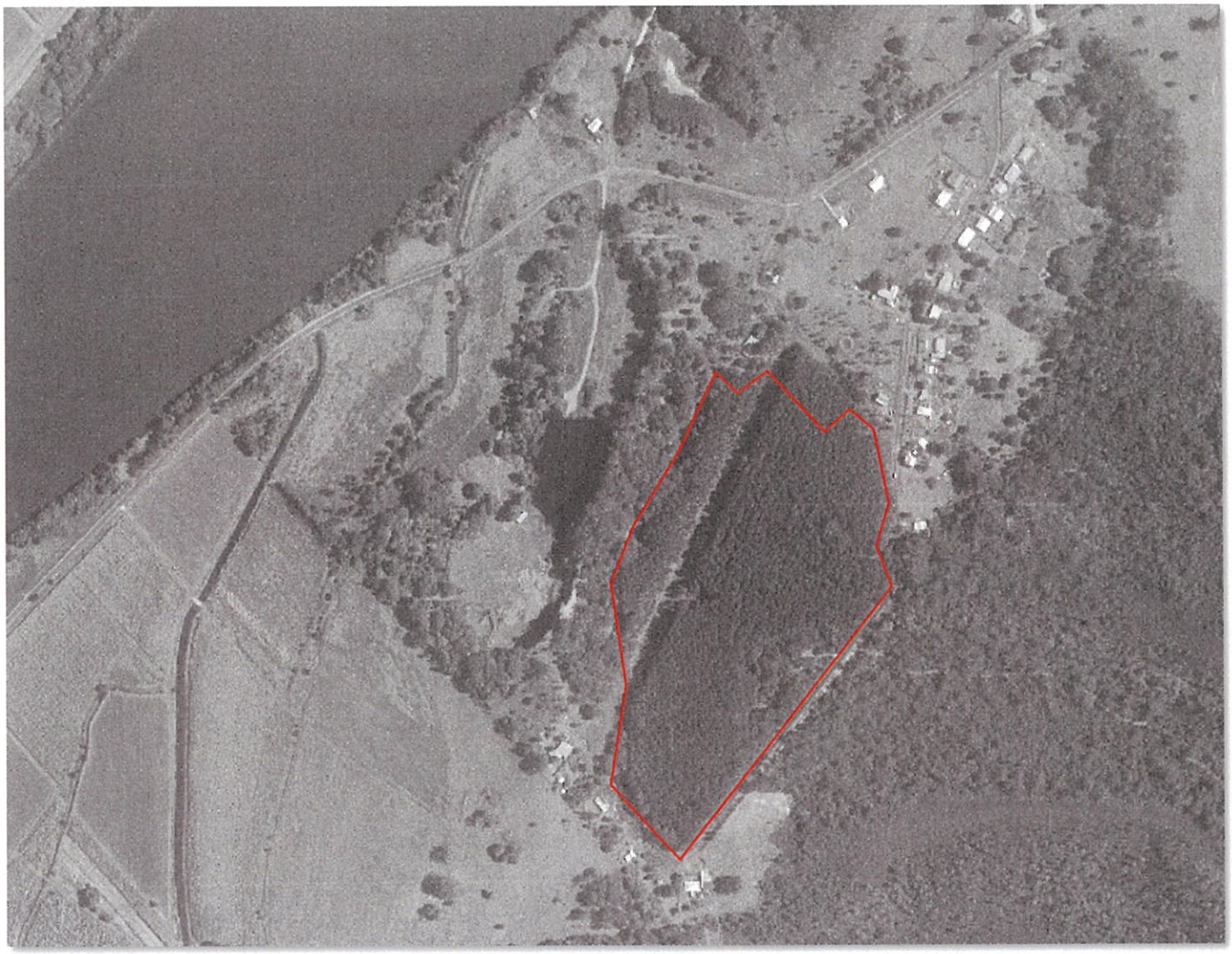


Figure 4: Historical Aerial of Subject Site (1988)

Figure 5: Historical Aerial of Subject Site (1998)

Figure 6: Historical Aerial of Subject Site (2007)

Figure 7: Historical Aerial of Subject Site (2017)

5.4. Parish and Historical Maps

Table 3 presents a summary of the review of Parish and historical maps relating to the focus area. Copies of historical maps are presented below.

Table 3 – Summary of Historical Map Observations

Year	Description
1914	Identified as Parish No. 173, Catalogue No. 2321 under the name of Lawrence with an area of 21 acres and 2 roods by 10 perches (equivalent to 8.74ha)

1938	Identified as Portion 173, Plan 2321 under the name of E.G Laurence with an area of 21 acres and 2 roods by 37.5 perches (equivalent to 8.79ha)
1963	Identified as Portion 173, Plan 2321 under the name of E.G Laurence with an area of 21 acres and 2 roods by 37.5 perches (equivalent to 8.79ha). 10.6ha of the adjacent site to the NW was noted on 19/04/1974 as being appropriated for quarrying.

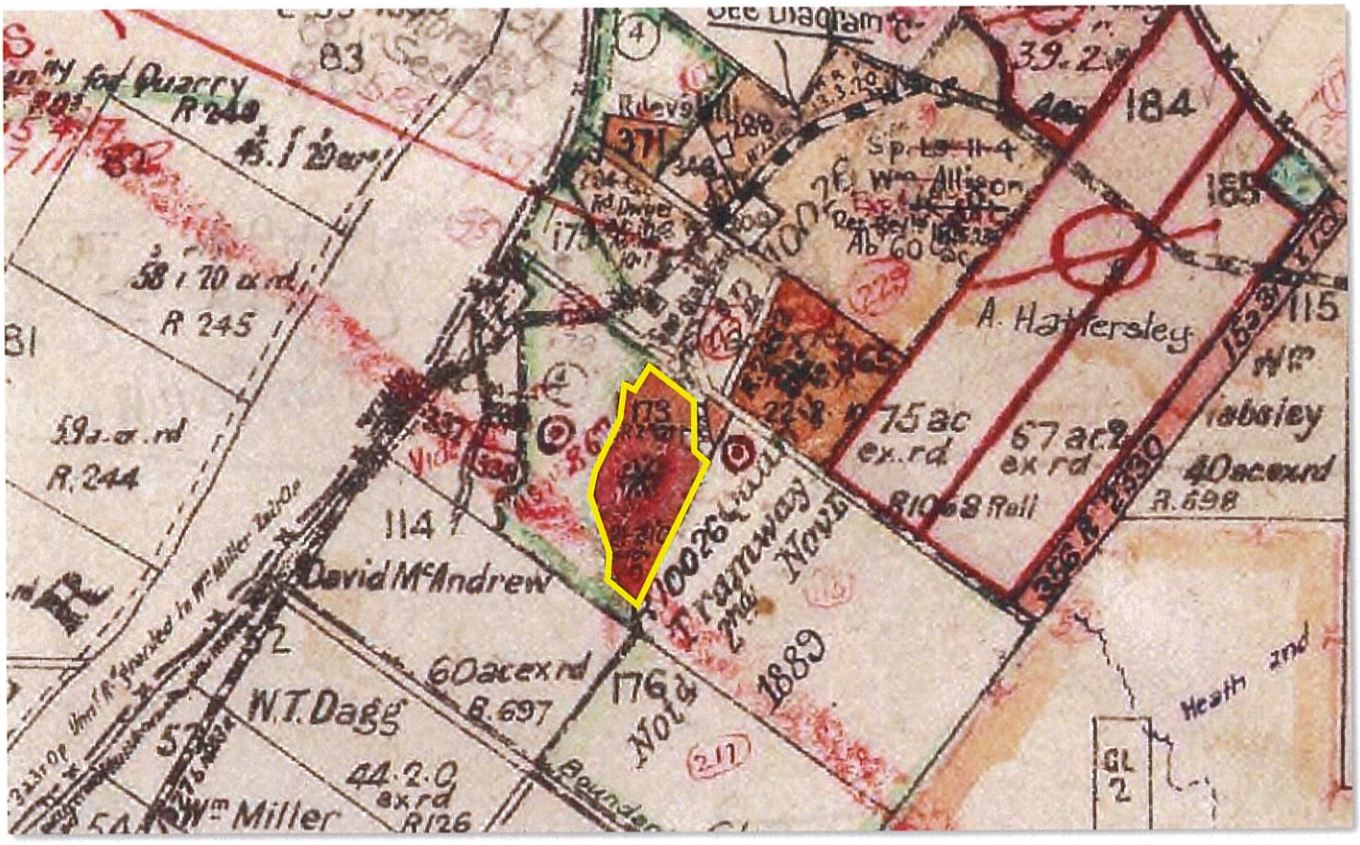


Figure 8: Historical Parish Map of Subject Site and Surrounds (1914)

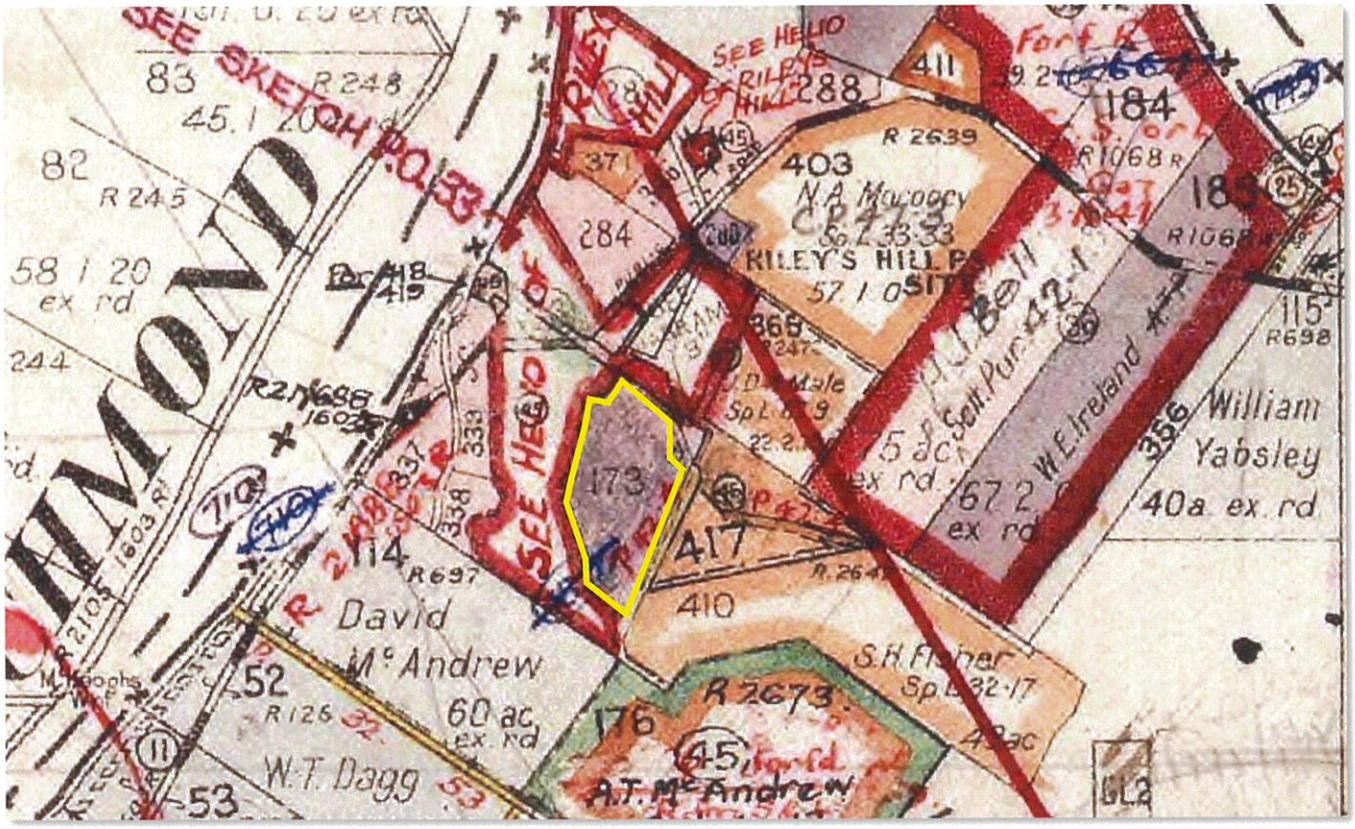


Figure 9: Historical Parish Map of Subject Site and Surrounds (1938)

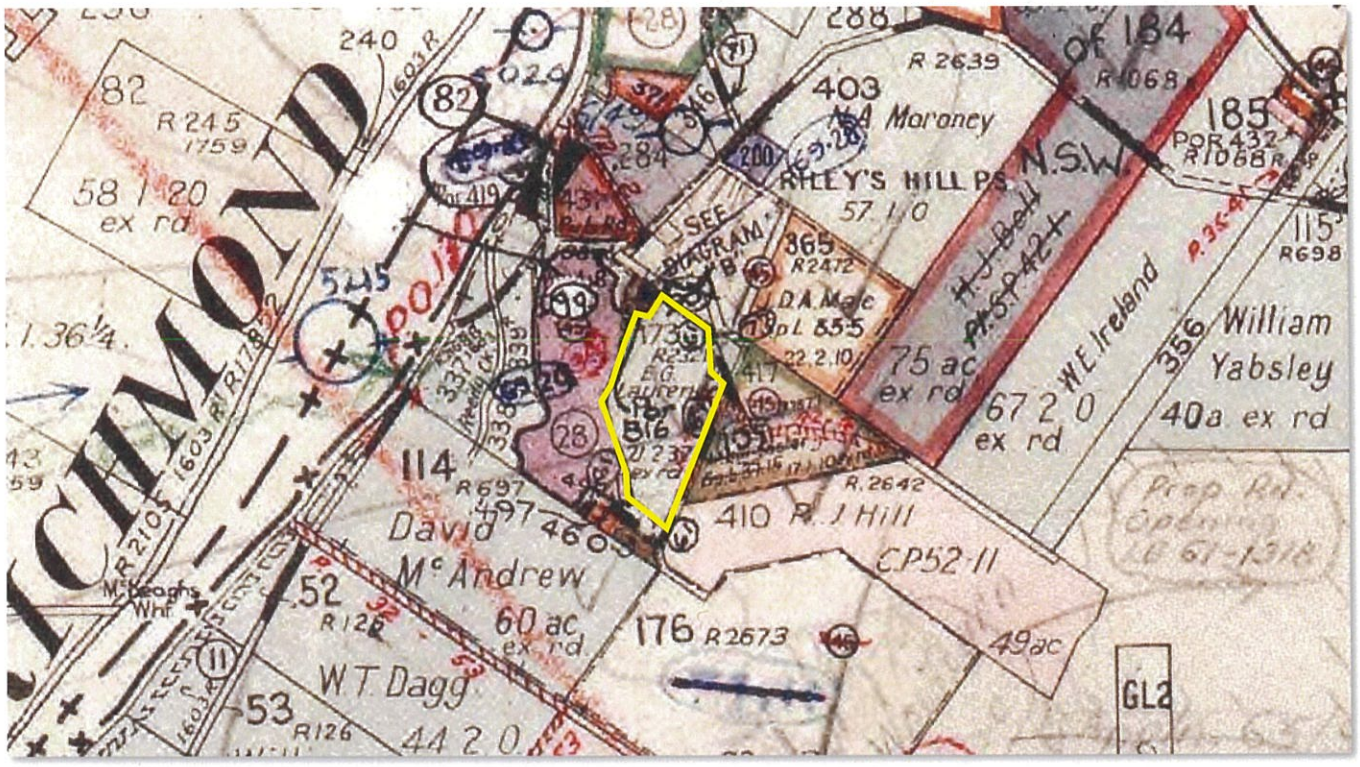


Figure 10: Historical Parish Map of Subject Site and Surrounds (1963)

5.5. Discussion of Site History

Below are the concluded findings of the site history search:

- no dip sites in the vicinity of the subject land or the focus area
- the POEO search returned no sites of concern
- the Contaminated Land Register returned no results for the subject site
- the aerial photographs of the subject site and surrounds show potentially contaminating activities in the form of horticultural activities circa 1977 – 1998
- the historical parish maps of the subject site and surrounds show no dramatic changes to the lot – it is believed that the lot was owned by the same person throughout the span of these parish maps ('Lawrence' was crossed out and amended to 'Laurence' on the 1938 map)
- quarrying was approved on the adjacent site however this parcel of land was not identified on the mining surveys register of the parish maps – the quarry supplied rock for the Ballina break-walls and was filled with water following heavy rains according to a 1936 Northern Star newspaper article

It should also be noted that based on the historical land uses of the broader locality, there is potential for the site to have been utilised for cattle grazing.

6. Areas of Environmental Concern

A number of potential contaminants could be located on the site as a result of the historical horticultural activities that were undertaken on the site circa 1977 – 1998 and potential agricultural activities in the form of cattle grazing. The potential contaminants of concern are discussed below.

6.1. Potential Contaminants of Concern

6.1.1. Heavy Metals

Due to the findings of the site history investigation, the site has the potential to be affected by heavy metal contamination.

6.1.2. Pesticides

The site also has the potential to be affected by organochlorine pesticides. Due to their relatively short half-life of organophosphate pesticides, they are not expected to be encountered on site.

7. Preliminary Sampling and Analysis Plan

7.1. Field Investigations

At the time of the inspection, the site was vacant, had good vegetative cover, with established trees generally lining the boundaries and scattered established trees throughout the property. The central northern and eastern portion of the site was swampy with standing water observed despite the fact that minimal rainfall was recorded in the previous month (closest rainfall observation station at Woodburn, some 7km to the south-west). Cow-pats as well as tracks and hoof-prints were observed on site, confirming that the site has in fact been utilised for cattle grazing.

7.2. Sampling Rationale

7.2.1. Soils

A soil sampling regime, based on the primary stage of the development process, has been employed to determine the presence of potential COCs, being:

- a screening based systematic soil sampling pattern[2] was employed – samples taken at surface (0-150mm)
- 14 soil samples were taken (equivalent to 1.7 points per hectare)
- the soil samples were sent to the NATA accredited Environmental Analysis Laboratory at Southern Cross University, Lismore
- the sample results will enable an assessment of background contamination to be reported and whether further, more specific testing is required

The pattern of sampling was determined using 'Environmental Protection Authority NSW: *Contaminated Sites – Sampling Design Guidelines*' 1995.

Extensive agricultural and horticultural activities are broad scale in nature and have a low potential for wide-spread contamination and therefore screening based sampling was considered appropriate for a site of this size. APP have undertaken screening based sampling on a number of larger sites proposed for residential development. In addition to screening based sampling, judgmental sampling was proposed to be undertaken if any source or sign of contamination was present on site. No judgmental sampling was undertaken.

[2] Section 2.3 Contaminated Sites – Sampling Design Guidelines (EPA, NSW) 1995

An indicative sampling map is included in Attachment 1.

7.3. Sampling Methodology

7.3.1. Soils

Sampling was carried out with a hand auger. Equipment was cleaned with potable water and phosphate free detergent (Decon 90), with demineralised water being used for a final rinse before each sample was taken. Samples were placed in new glass containers and were stored and transported on ice to the Environmental Analysis Laboratory Lismore (EAL) for analysis. Chain of Custody documentation is appended.

7.4. Quality Assurance and Quality Control

7.4.1. Field QA/QC

Samples were collected in the field by suitably qualified and experienced staff members. Cross-contamination was prevented by thoroughly washing the auger with phosphate free detergent and wearing fresh gloves between collecting each sample.

Due to the preliminary nature of this investigation and the small number of samples collected, no duplicate samples or rinsate blanks were collected during this sampling regime.

Samples were stored in an esky with ice bricks and then taken to the EAL once sampling had been completed. Chain of Custody (COC) documents were recorded for each sample and are included in Attachment 2. COC indicates the sample number, storage method and analytical requirements.

7.4.2. Laboratory QA/QC

The Environmental Analysis Laboratory (EAL) at Southern Cross University is a NATA accredited Laboratory. Details of analytical methods are described in the laboratory certificates included in Attachment 2.

Due to the preliminary nature of this investigation and the small number of samples analysed (<20), inter- and intra-laboratory duplicate testing was not conducted.

8. Investigation Levels

8.1. Soil Health Based Investigation Levels

Adopted Investigation Levels are in accordance with the *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)*, dated 11 April 2013.

The NEPM states that *"Investigation levels and screening levels are the concentrations of a contaminant above which further appropriate investigation and evaluation will be required."*

An exceedance of an investigation level does not indicate that there is a definite risk to human health, but rather that further site specific assessment may be required to quantify the potential risks to human health.

Health Investigation Levels (HILs) were considered for the site. HIL – Residential A (HIL-A) was used for the site as this reflected the proposed future use.

8.1.1. Investigation Levels Summary

Table 1A(1) Health investigation levels for soil contaminants

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
Metals and Inorganics				
Arsenic[2]	100	500	300	3 000
Beryllium	60	90	90	500
Boron	4500	40 000	20 000	300 000
Cadmium	20	150	90	900
Chromium (VI)	100	500	300	3600
Cobalt	100	600	300	4000
Copper	6000	30 000	17 000	240 000
Lead[3]	300	1200	600	1 500
Manganese	3800	14 000	19 000	60 000
Mercury (inorganic)[5]	40	120	80	730
Methyl mercury[4]	10	30	13	180
Nickel	400	1200	1200	6 000
Selenium	200	1400	700	10 000
Zinc	7400	60 000	30 000	400 000
Cyanide (free)	250	300	240	1 500
Polycyclic Aromatic Hydrocarbons (PAHs)				
Carcinogenic PAHs (as BaP TEQ)[6]	3	4	3	40
Total PAHs[7]	300	400	300	4000
Phenols				
Phenol	3000	45 000	40 000	240 000
Pentachlorophenol	100	130	120	660
Cresols	400	4 700	4 000	25 000
Organochlorine Pesticides				
DDT+DDE+DDD	240	600	400	3600
Aldrin and dieldrin	6	10	10	45
Chlordane	50	90	70	530
Endosulfan	270	400	340	2000
Endrin	10	20	20	100
Heptachlor	6	10	10	50
HCB	10	15	10	80
Methoxychlor	300	500	400	2500
Mirex	10	20	20	100
Toxaphene	20	30	30	160
Herbicides				
2,4,5-T	600	900	800	5000
2,4-D	900	1600	1300	9000
MCPA	600	900	800	5000

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
MCPB	600	900	800	5000
Mecoprop	600	900	800	5000
Picloram	4500	6600	5700	35000
Other Pesticides				
Atrazine	320	470	400	2500
Chlorpyrifos	160	340	250	2000
Bifenthrin	600	840	730	4500
Other Organics				
PCBs[8]	1	1	1	7
PBDE Flame Retardants (Br1–Br9)	1	2	2	10

Notes:

(1) Generic land uses are described in detail in Schedule B7 Section 3

HIL A – Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

HIL B – Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

HIL C – Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.

HIL D – Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.

(2) Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7).

(3) Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.

(4) Methyl mercury: assessment of methyl mercury should only occur where there is evidence of its potential source. It may be associated with inorganic mercury and anaerobic microorganism activity in aquatic environments. In addition the reliability and quality of sampling/analysis should be considered.

(5) Elemental mercury: HIL does not address elemental mercury. A site-specific assessment should be considered if elemental mercury is present, or suspected to be present,

(6) Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products.

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

Where the B(a)P occurs in bitumen fragments it is relatively immobile and does not represent a significant health risk.

(7) Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998). The application of the total PAH HIL should consider the presence of carcinogenic PAHs and naphthalene (the most volatile PAH). Carcinogenic PAHs reported in the total PAHs should meet the B(a)P TEQ HIL. Naphthalene reported in the total PAHs should meet the relevant HSL.

(8) PCBs: HIL relates to non-dioxin-like PCBs only. Where a PCB source is known, or suspected, to be present at a site, a site-specific assessment of exposure to all PCBs (including dioxin-like PCBs) should be undertaken.

Table 1A(2) Interim soil vapour health investigation levels for volatile organic chlorinated compounds

Chemical	Interim soil vapour HIL (mg/m^3)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial / Industrial[1] D
TCE	0.02	0.02	0.4	0.08
1,1,1-TCA	60	60	1200	230
PCE	2	2	40	8
cis-1,2-dichloroethene	0.08	0.08	2	0.3
Vinyl chloride	0.03	0.03	0.5	0.1

Notes:

1. Land use settings are equivalent to those described in Table 1A(1) Footnote 1 and Schedule B7, though secondary school buildings should be assessed using residential 'A/B' for vapour intrusion purposes.
2. Interim HILs for VOCCs are conservative soil vapour concentrations that can be adopted for the purpose of screening sites where further investigation is required on a site-specific basis. They are based on the potential for vapour intrusion using an indoor air-to-soil vapour attenuation factor of 0.1 and an outdoor air-to-soil vapour attenuation factor of 0.05.
3. Application of the interim HILs is based on a measurement of shallow (to 1 m depth) soil vapour (or deeper where the values are to be applied to a future building with a basement) or sub-slab soil vapour.
4. The applicability of the interim HILs needs to be further considered when used for other building types such as homes with a crawl-space and no slab, which may require site-specific assessment.
5. Use of the interim HILs requires comparison with data that has been collected using appropriate methods and meets appropriate data quality requirements.
6. Oral and dermal exposure should be considered on a site-specific basis where direct contact exposure is likely to occur.

Figure 11: National Environment Protection Amendment Measure 2013 – Schedule B1 HILs

8.1.2. Assumptions and Limitations of Criteria

The selected criteria have been sourced from guidelines which are currently endorsed by the NSW EPA. The investigation levels contained in these documents have been established through toxicity tests and field and laboratory experiments. In some cases, insufficient data exists to provide thresholds. In these cases, the data is simply used as an indicator of the presence and extent of contamination.

The adopted composite HIL thresholds are assumed to be a fraction of the single sample threshold to account for the possibility that a high concentration in one sample may be diluted by a low concentration in another sample within the composite. This is considered standard practice when using composite sampling.

9. Results

All samples analysed by the laboratory had concentrations of the tested metals and organochlorine/phosphate pesticides less than the adopted composite health investigation level (HIL-A). No organochlorine or organophosphate pesticides were present above the limit of detection.

Laboratory results are included in Attachment 2.

10. Discussion and Conclusion

This report comprises a Stage 1 Preliminary Contaminated Site Investigation for Lot 100 DP 1201719, Hills Road, Rileys Hill. This investigation consisted of a desk-top site history review and soil sampling and analysis.

The objective of this investigation is to determine if the site is appropriate for the proposed rezoning (that will enable possible future residential subdivision and development) and has not been contaminated from current or prior land uses.

The desk-top site history review found that contaminants may be present on the site due to a potentially contaminating activity on the site resulting from horticultural activities undertaken on the site (circa 1977 – 1998 aerial photographs).

All samples had results which were below the adopted health investigation level (HIL-A), which is the most stringent health investigation level and reflects the proposed future residential zoning. No organochlorine or organophosphate pesticides were present above the limit of detection.

The results of this investigation confirm that the site has not been contaminated from historical land uses and is suitable for the proposed rezoning.

11. General Notes

General

Geotechnical and environmental reports present the results of investigations carried out for a specific project and usually for a specific phase of the project (eg preliminary design). The report is based specific criteria, such as the nature of the project, underground utilities or scope of service limitations imposed by the Client. The report may not be relevant for other phases of the project (eg construction), after some time or where project details and clients change.

Soil and Rock Description

Soil and rock descriptions are based on AS1726-1993 using visual and tactile assessment except at discrete locations where field and/or laboratory tests have been carried out. Refer to the terms and symbols sheet for definitions.

Groundwater

The water levels indicated are taken at the time of measurement and depending on material permeability may not reflect the actual groundwater level at those specified locations. Also groundwater levels can vary with time due to seasonal or tidal fluctuation, construction activities and other external factors.

Interpretation of Results

The discussion and recommendations in the accompanying report are based on extrapolation/interpolation from data obtained at discrete locations and other external sources and guidelines. The actual interface between the materials may be far more gradual or abrupt than indicated. Also actual conditions in areas not sampled may differ from those predicted.

The report is based on significant background details that only the authors can be aware off, and therefore implementation of the recommendations by others may lead to misinterpretation and complications. Therefore, this company should be consulted to explain the reports implications to other involved parties.

Reporting relies on interpretation of often limited factual information based on judgement and opinion which has a level of uncertainty and ambiguity attached to it, and is far less exact than other design disciplines. This should be considered by users of the report when assessing the implications of the recommendations.

Change in Conditions

Subsurface conditions can change with time and can vary between test locations. Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations can also affect subsurface conditions.

12. Scope of Engagement

This report has been prepared by Ardill Payne & Partners (APP) at the request of Monal Pty Ltd (c/- Alan Cardy) for the purpose of a Preliminary Contaminated Site Investigation and is not to be used for any other purpose or by any other person or corporation.

This report has been prepared from the information provided to us and from other information obtained as a result of enquiries made by us. APP accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

APP declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately it is recommended that you consult with APP before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

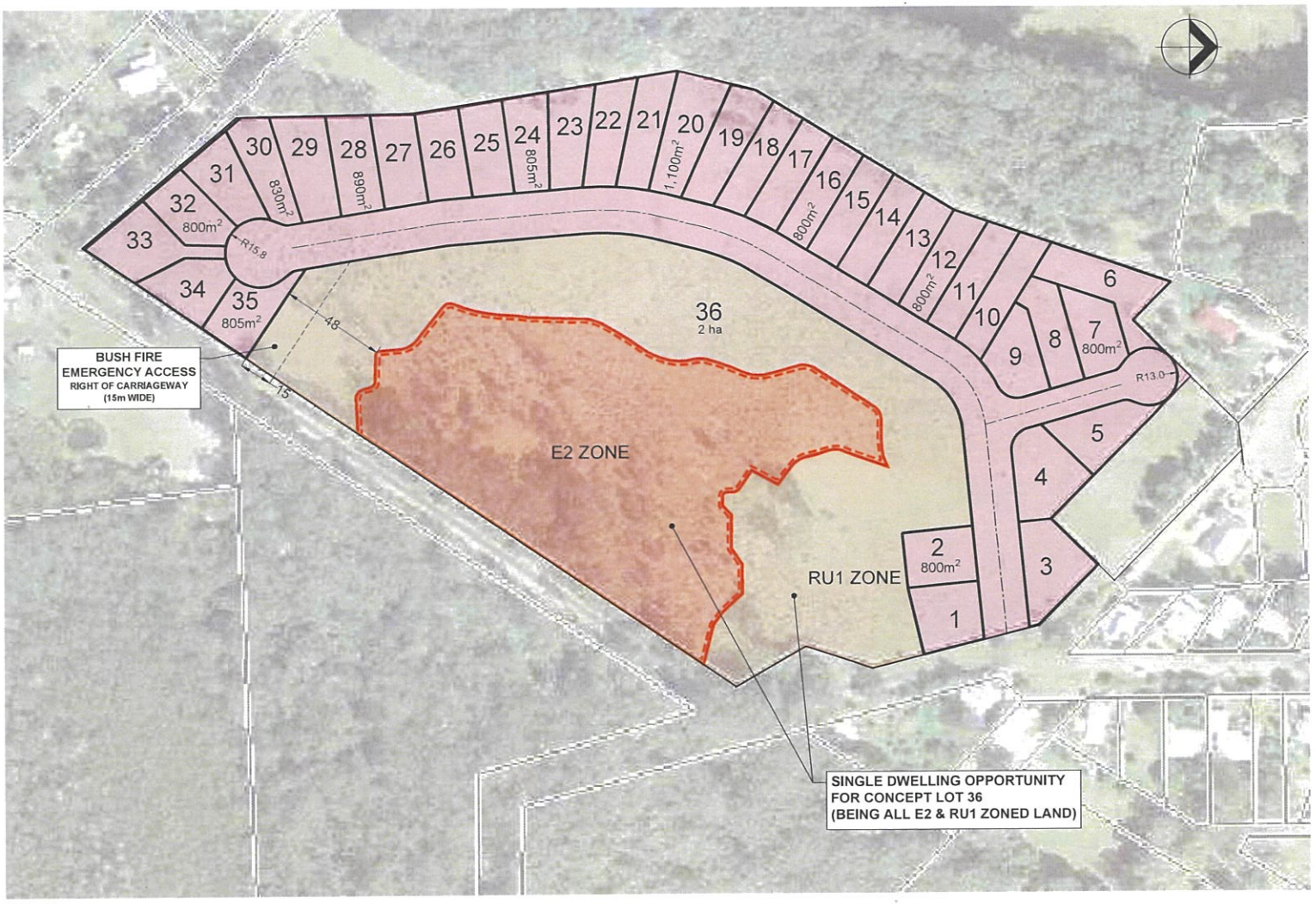
13. Attachments

Attachment 1	Figures
Attachment 2	Laboratory Certificates and Results

Ardill Payne & PARTNERS

ATTACHMENT 1

Attachment 1: Figures



TOTAL LOTS = 36

41,736 m²	RU5 ZONE MIN LOT SIZE 800m²
21,436 m²	RU1 ZONE MIN LOT SIZE 2 ha
19,456 m²	E2 ZONE MIN LOT SIZE 2 ha

This plan is NOT to be used for construction purposes unless it carries the approval stamp of the local authority.

Issue	Date	Description	App'd
P6	02/09/2020	Amended Lot Layout	
P5	15/04/20	Dimensions Amended	
P4	15/04/20	Dimensions Added	
P3	25/02/20	Council Review	
P2	11/02/20	Council Review	
P1	28/05/19	Council Review	

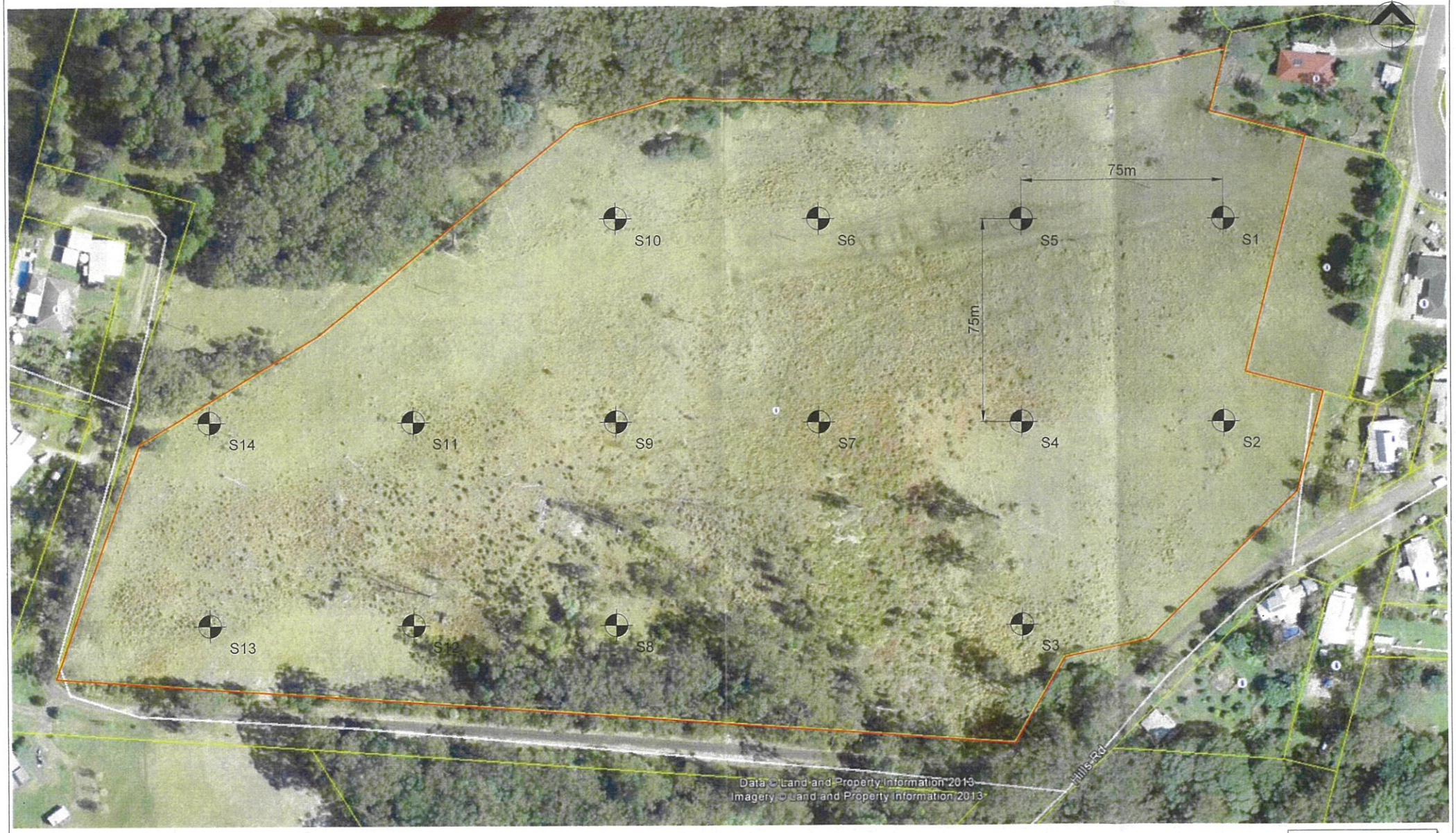
Client: Alan Cardy

Project: Proposed Rezoning
Lots 100 DP1201719
Hills Road, Rileys Hill

Title: Concept Subdivision Layout Plan

ARDILL PAYNE
& Partners
ENGINEERS PLANNERS SURVEYORS
ENVIRONMENTAL PROJECT MANAGEMENT
BALLINA 45 River Street Ph. 02 6686 3280
SOUTH BRISBANE 89 Grey Street Ph. 07 3123 6875
GUNNEDAH 285 Conadilly Street Ph. 02 6742 9955
A.B.N. 51 808 558 977 e-mail: info@ardillpayne.com.au

Designed	EMR
Drawn	EMR
Checked	PS
Approved	
Scale	1:1000 @ A1, 1:2000 @ A3 (0 10 20 30 40 50)
Date	APRIL 2019
Datum	AHD
File Name	8174 SP1-P6 Rev P6 (02-09-2020).dwg
Job No.	8174
Dwg No.	SP1
Issue	P6



This plan is NOT to be used for construction purposes unless it carries the approval stamp of the local authority.

Issue	Date	Description	App'd
A	08/08/2018	Original Issue	PS

Client: Alan Cardy

Project: Proposed Residential Subdivision
Lot 100 DP 1201719
Hills Road, Rileys Hill

Title: Preliminary Contaminated Site Investigation Sampling Plan

ARDILL PAYNE & PARTNERS
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Design	RMCG	Scale	Not to scale
Drawn	RMCG		
Checked	PS	Datum	
Approved	APP	Drafting File	8174 SEPP55.dwg
Date	08/08/2018	Design File	
Job No.	8174	Dwg No.	FIG.1
		Issue	A

Ardill Payne & PARTNERS

ATTACHMENT 2

Attachment 2: Laboratory Certificates and Results

EAL Environmental Analysis Laboratory

PO Box 157 (Military Road)
LISMORE NSW 2480
T: 02 6620 3678 E: eal@scu.edu.au W: www.scu.edu.au

Submitting Client Details

Quote Id:
Job Ref: 8174
Company: ARDILL PAYNE
Contact: ROWENA MCCEARY
Phone:
Mobile:
Email: rowenam@ardillpayne.com.au
Postal address:

Billing Client Details

☐ Tick if same as submitting details
ABN:
Company: ARDILL PAYNE
Contact: GAYLE EVTUSHENKO
Phone:
Mobile:
Email: gaylee@ardillpayne.com.au
Postal address:

Payment Method:
☐ Purchase Order
☐ Cheque
☐ Credit/Debit Card (EAL staff will phone for details)
☒ Invoice (prior approval)

Relinquished: R. MCCEARY Date: 19/7/18
Received: Date:

Preservation: none - ~~freezer bricks~~ - ice - acidified - filtered - other
Condition on receipt: ambient - cool - frozen - other

Comments:

Likelihood and nature of Hazardous material:

Lab ID	Sample ID	Sample Depth	Sampling Date	Sampler	Your Client	Crop ID	Sample Type (e.g. water, leaf, soil)	Total number of samples: 14 — Sample Analysis Request: Price list code (e.g. SW-PACK-06): SS-PACK-005
	S1	SURF	18/7/18	RMC	B174	—	SOIL	X
	↓	↓	↓	↓	↓	↓	↓	X
	↓	↓	↓	↓	↓	↓	↓	X
	S14	↓	↓	↓	↓	↓	↓	X

RESULTS OF SOIL ANALYSIS

14 soil samples supplied by Ardill Payne & Partners on 19th July, 2018 - Lab Job No. H2434
Analysis requested by Rowena McGeary. Your Job: 8174
PO Box 20 BALLINA NSW 2478

ANALYTE	METHOD REFERENCE	Sample 1 S1	Sample 2 S2	Sample 3 S3	Sample 4 - S4	Sample S S5	Sample 6 S6	Sample 7 S7	Sample 8 S8	Sample 9 S9	Sample 10 S10	Sample 11 S11	Sample 12 S12	Sample 13 S13	Sample 14 S14	RESIDENTIAL A Guideline Limit Composite - Column A	RESIDENTIAL A Guideline Limit Individual - Column A	Background Range
	Job No.	H2434/1	H2434/2	H2434/3	H2434/4	H2434/5	H2434/6	H2434/7	H2434/8	H2434/9	H2434/10	H2434/11	H2434/12	H2434/13	H2434/14	See note 1a	See note 1a	See note 2
TEXTURE (SAND, CLAY, SILT)	** inhouse	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	Silt	..	..	..
MOISTURE %	** c	21	24	22	20	30	43	43	29	31	17	18	20	22	17	..	..	..
SILVER (mg/kg DW)	a	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	na	na	na
ARSENIC (mg/kg DW)	a	1	2	1	<1	1	1	2	<1	<1	1	1	2	<1	1	25	100	0.2-30
LEAD (mg/kg DW)	a	7	23	9	5	15	11	7	2	9	7	6	3	3	11	75	300	<2-200
CADMIUM (mg/kg DW)	a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5	20	0.04-2.0
CHROMIUM (mg/kg DW)	a	1	4	1	1	4	3	1	1	2	2	2	1	1	3	(<25)	(<100)	0.5-110
COPPER (mg/kg DW)	a	1	6	1	<1	2	3	2	3	1	1	1	5	1	1	1,500	6,000	1-190
MANGANESE (mg/kg DW)	a	10	429	25	7	14	18	7	54	6	189	71	4	14	455	950	3,800	4 - 12,600
NICKEL (mg/kg DW)	a	0.6	1.8	0.5	0.5	2.2	1.7	1.5	0.5	1.2	1.0	0.7	1.2	0.5	1.7	100	400	2-400
SELENIUM (mg/kg DW)	a	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	50	200	na
ZINC (mg/kg DW)	a	5	42	17	2	18	13	11	20	3	6	4	1	5	13	1,850	7,400	2-180
MERCURY (mg/kg DW)	a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	40	0.001-0.1
IRON (% DW)	a	0.22	1.29	0.55	0.19	0.45	0.37	0.33	0.09	0.13	0.77	0.51	0.33	0.07	0.71	na	na	na
ALUMINIUM (% DW)	a	0.23	0.65	0.30	0.21	1.09	0.80	0.43	0.09	0.42	0.38	0.27	0.07	0.13	0.44	na	na	na
BERYLLIUM (mg/kg DW)	a	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	15	60	na
BORON (mg/kg DW)	a	1	1	1	1	1	4	5	1	2	<1	<1	1	1	<1	1,125	4,500	na
COBALT (mg/kg DW)	a	1	3	<1	<1	2	2	1	<1	1	4	2	1	<1	6	25	100	na
PESTICIDE ANALYSIS SCREEN																		
DDT+DDE+DDD (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	60	240	<0.1
Aldrin + Dieldrin (mg/kg)	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2	6	<0.1
Chlordane (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	13	50	<0.1
Endosulfan (mg/kg)	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	68	270	<0.1
Endrin (mg/kg)	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	3	10	<0.1
Heptachlor (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2	6	<0.1
HCB (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3	10	<0.1
Methoxychlor (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	75	300	<0.1
Other Organochlorine Pesticides (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	<0.1
Chlorpyrifos (mg/kg)	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	40	160	<0.1
Other Organophosphate Pesticides (mg/kg)	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	..	..	<0.1

METHODS REFERENCE

a. [1,3]Nitric/HCl digest - APHA 3125 ICPMS
b. [1,3]Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - SGS report no. SE 181875
** denotes these test procedure or calculation are as yet not NATA accredited but quality control data is available

NOTES

1a. HIL A ≙ Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.
1b. HIL B ≙ Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
1c. HIL C ≙ Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space.
1d. HIL D ≙ Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.
(REFERENCE: Health Investigation Guidelines from NEPM (National Environmental Protection, Assessment of Site Contamination, Measure), 2013; Schedule B1).
2. Environmental Soil Quality Guidelines, Page 40, ANZECC, 1992.

Additional NOTES

DW = Dry Weight, na = no guidelines available

Organochlorine pesticide (OC's) screen: (HCB, alpha-BHC, Heptachlor, delta-BHC, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, Lindane, trans-Nonachlor, Endrin Ketone, Isodrin, Mirex
Alpha Endosulfan, p,p'-DDE, Dieldrin, Endrin, p,p'-DDD, Beta Endosulfan, p,p'-DDT, Endrin Aldehyde, Endosulfan Sulphate, Methoxychlor)

Organophosphorus pesticide (OP's) screen: (Diazinon, Dimethoate, Chlorpyriphos-methyl, Chlorpyrphos, Fenitrothion, Bromophos-ethyl, Ethion,Dichlorvos, Malathion, Parathion-Ethyl (Parathion), Methidathion and Azinphos-methyl (Guthion))

checked.....

Environmental Analysis Laboratory, Southern Cross University.
Tel. 02 6620 3678. website: scu.edu.au/eal