ITEM 6b.19.021 PLANNING PROPOSAL JUNCTION HILL (REZ2019/0003)

Meeting	Environment, Planning & Community Committee	20 August 2019
Directorate	Environment, Planning & Community	
Reviewed by	A/Manager - Environment, Development & Strategic Planning (Kerry Harre)	
Attachment	To be tabled	

SUMMARY

Proponent	*Garrard Building Pty Ltd; Rob Donges, consultant as authorised representative*
Owner	*Kahuna No 1 Pty Ltd*
Subject land	*Part of Lot 102 DP1221192, Summerland Way, Koolkhan*
Site area	*8.91 ha (whole of Lot 2)* *2.21 ha (E2 zoned area subject to planning proposal)*
Current Zoning CVLEP 2011	*E2 Environmental Conservation (Part Lot 102, area subject to planning proposal)*
Proposal	*To rezone part of Lot 102 DP1221192 Summerland Way, Koolkhan (the land) from E2 Environmental Conservation to E3 Environmental Management with the ultimate aim of enabling a dwelling house to be erected on the land.*

Council has received a planning proposal that seeks to rezone part of Lot 102 DP1221192 Summerland Way, Koolkhan (the land) from E2 Environmental Conservation to E3 Environmental Management with the ultimate aim of enabling a dwelling house to be erected on the land.

This report recommends that Council provide its initial support to the planning proposal to the "Planning Gateway".

OFFICER RECOMMENDATION

That Council:

1. As the Planning Proposal Authority, endorse the planning proposal and seek a Gateway Determination to amend the Clarence Valley Local Environmental Plan 2011 over part Lot 102 DP1221192, Summerland Way, Koolkhan, to rezone the land from E2 Environmental Conservation to E3 Environmental Management and otherwise give effect to achieving the objectives and intended outcomes of the planning proposal.
2. Accept inconsistencies with Section 9.1 Directions 2.1 Environment Protection Zones and 4.1 Acid Sulfate Soils due to the inconsistencies being of a minor nature and advise the Department of Planning, Industry and Environment (the Department) accordingly.
3. Forward the planning proposal to the Department requesting a "Gateway" Determination, pursuant to Section 3.34 (1) of the Environmental Planning and Assessment Act.
4. Advise the Department that should the Gateway Determination allow the planning proposal to proceed, that it will accept any plan making delegations offered under Section 3.36 of the Environmental Planning and Assessment Act, 1979.
5. Require the proponent, prior to exhibition of the planning proposal, to undertake and provide a Stage 1 Preliminary Investigation to form part of the publicly exhibited planning proposal. In order to comply with the relevant provisions of State Environmental Planning Policy No. 55 - Remediation of Land, the Stage 1 Preliminary Investigation should be prepared in accordance with Managing Land Contamination: Planning Guidelines - SEPP 55 - Remediation of Land (Department of Urban Affairs and Planning and NSW EPA 1998).

COMMITTEE RECOMMENDATION

Baker/Simmons

That the Officer Recommendation be adopted.

Voting recorded as follows:
For: Baker, Clancy, Novak, Simmons
Against: Nil

Having declared an interest in this item, Cr Ellem left the Ordinary Council meeting at 2.51 pm and returned at 2.52 pm.

COUNCIL RESOLUTION – 6b.19.021

Williamson/Toms

That Council:

1. **As the Planning Proposal Authority, endorse the planning proposal and seek a Gateway Determination to amend the Clarence Valley Local Environmental Plan 2011 over part Lot 102 DP1221192, Summerland Way, Koolkhan, to rezone the land from E2 Environmental Conservation to E3 Environmental Management and otherwise give effect to achieving the objectives and intended outcomes of the planning proposal.**
2. **Accept inconsistencies with Section 9.1 Directions 2.1 Environment Protection Zones and 4.1 Acid Sulfate Soils due to the inconsistencies being of a minor nature and advise the Department of Planning, Industry and Environment (the Department) accordingly.**
3. **Forward the planning proposal to the Department requesting a "Gateway" Determination, pursuant to Section 3.34 (1) of the Environmental Planning and Assessment Act.**
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Voting recorded as follows:
For: Simmons, Kingsley, Baker, Clancy, Novak, Williamson, Lysaught, Toms
Against: Nil

LINKAGE TO OUR COMMUNITY PLAN

Theme 5 Leadership

Objective 5.1 We will have a strong, accountable and representative Government

Strategy 5.1.6 Ensure decisions reflect the long-term interest of the community and support financial and infrastructure sustainability

BACKGROUND

Lot 102 DP1221192 is currently zoned part R1 General Residential (R1), part E2 Environmental Conservation (E2) and part RU1 Primary Production under the Clarence Valley LEP 2011 (the LEP), as indicated in Figure 3 below. The location of the land is shown in Figure 1 below. An aerial image of Lot 102 is at Figure 2 below.

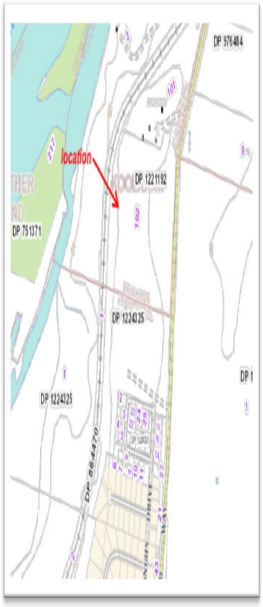

Figure 1 – Lot 102 - location plan

Figure 2 - Lot 102 - aerial image

Council has received a planning proposal that aims to rezone proposed Lot 2 in the proposed subdivision of Lot 102 DP1221192 Summerland Way, Koolkhan (the land) from E2 Environmental Conservation (E2) to E3 Environmental Management (E3). A copy of the lodged planning proposal is at Attachment 1.

According to the submitted planning proposal the intended outcome is "to permit the portion proposed to be rezoned E3 to be subdivided from the portion of R1 General Residential to which it is attached under

the approved plan of subdivision". That is the part of Lot 102 that is currently zoned E2 as shown in Figure 3 below is proposed to be zoned E3 Environmental Management.

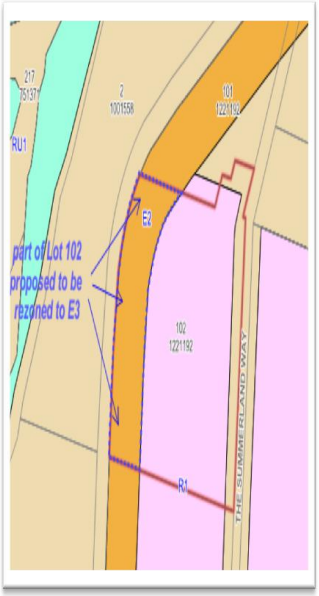

Figure 3 – current land zoning

This in turn would allow a development application (DA) to be submitted for the construction of a dwelling on the E3 zoned lot. The current E2 zoning does not permit this intended outcome for reasons outlined below.

The E2 zoned portion has an area of 2.213ha, while the Lot Size Map indicates a minimum lot size of 40ha. Accordingly, the E2 zoned portion cannot be separated by subdivision from the R1 General Residential zoned portion of the property under Clause 4.1 Minimum subdivision size of the LEP.

KEY ISSUES

The planning proposal does not appear to raise any major issues other than the Minister's section 9.1 Direction relating to Environment Protection Zones (Direction 2.1) and acid sulfate soils and its associated Minister's Direction 4.1.

Minister's section 9.1 Direction - 2.1 Environment Protection Zones (Direction 2.1)

As the land is currently zoned E2 and is proposed to be rezoned E3, Direction 2.1 is both applicable and relevant. The objective of Direction 2.1 is to protect and conserve environmentally sensitive areas.

In particular the direction requires that a planning proposal:

(i) "must include provisions that facilitate the protection and conservation of environmentally sensitive areas.

(ii) that applies to land within an environment protection zone or land otherwise identified for environment protection purposes in a LEP must not reduce the environmental protection standards that apply to the land (including by modifying development standards that apply to the land). This requirement does not apply to a change to a development standard for minimum lot size for a dwelling in accordance with clause (5) of Direction 1.5 "Rural Lands".

The planning proposal has provided an assessment of this specific direction by commenting that the proposal is "inconsistent but justified". The proposal further states that it *"is inconsistent if a rezoning from E2 to E3 is considered to reduce the level of environmental protection. If it is, then the*

inconsistency is justified by the current lack of an environmental value as assessed in the Preliminary Biodiversity Assessment and the proposed vegetating and on-going management of appropriate species as illustrated in the Landscape Plan and defined in the Vegetation Management Plan to be provided prior to public exhibition. These documents provide justification under 6 (b) of the Direction. If the rezoning from E2 to E3 is not considered to reduce the level of environmental protection in this instance, then the proposal is consistent".

The discussion addressing the direction and the proposal's inconsistency with it is generally supported, as is the discussion in the lodged planning proposal at 4.1 (pp 11-15) and section 4.6 (p.16).

The objectives of the E3 zone appear to be more suited to the attributes and values of the land than the E2 zone objectives. The attributes and values of the land are outlined in more detail below the following table. A comparison of the respective E zone objectives is provided in the table below.

E2 zone objectives (current)	E3 zone objectives (proposed)
• To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.	• To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
• To prevent development that could destroy, damage or otherwise have an adverse effect on those values.	• To provide for a limited range of development that does not have an adverse effect on those values.
• To protect coastal wetlands and littoral rainforests.	• To prevent inappropriate development in geologically hazardous areas so as to minimise erosion and other adverse impacts on escarpment areas.
• To protect land affected by coastal processes and environmentally sensitive coastal land.	• To ensure that development does not unreasonably increase the demand for public services or public facilities.
• To prevent development that would adversely affect, or be adversely affected by, coastal processes.	• To ensure development is not adversely impacted by environmental hazards.
	• To protect prominent hillsides, ridgelines, other major natural features, riparian areas and water catchment areas.

The land is not mapped as High Environmental Value under the North Coast Regional Plan 2036. The planning proposal incorporates a preliminary biodiversity assessment prepared by GeoLINK. It notes that the *"native vegetation within the E2 zone is very sparse and limited to four naturally occurring trees within exotic grassland"*. It summarise the vegetation within the E2 zone at the site as follows:

- Native vegetation: the E2 zone is highly disturbed and contains five native trees (one of which is planted). Vegetation is not characteristic of any Plant Community Type (PCT).
- Disturbance history: the E2 zone has been cleared and modified for agriculture. Native vegetation is limited to four remnant trees.
- Threatened flora species: no threatened flora species occur.
- Threatened ecological communities: two trees within the E2 zone form part of the TEC Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions, which occurs on adjacent land to the south.
- Threatened fauna habitat: due to the lack of woody vegetation, the site does not contain significant habitat for threatened fauna.

Acid Sulfate Soils

The land is Class 5 acid sulfate soils (ASS) and Minister's s.9.1 Direction in relation to Acid Sulfate Soils (Direction 4.1) is applicable and relevant. In its assessment against this Direction the planning proposal acknowledges that the Direction requires that where a planning proposal that proposes an intensification of land uses on land identified as having a probability of containing acid sulfate soils (ASS) the Council is to consider an ASS study assessing the appropriateness of the change of land use given the presence of ASS.

An ultimate outcome of the proposal is a future dwelling house on a lot that is proposed to be separated from the part of the current lot that is zoned R1. This constitutes an intensification of the land use, albeit only a slight intensification. The proposal is therefore strictly inconsistent with the Direction due to the above and also for the reason that it is not supported by an ASS study.

The proposal has acknowledged this inconsistency and puts a case for justifiable inconsistency as follows:

"An ASS study is not considered to be necessary in this case as the land where a future dwelling is proposed has an elevation of 30m above AHD which is well beyond all reasonable limits and likelihood of triggering the works thresholds in clause 7.1 Acid sulfate soils of the LEP and therefore there is little likelihood of significant adverse environmental impact resulting from the planning proposal.

Due to the above circumstances the inconsistency is considered to be of minor significance as per paragraph 8(b) of the Direction". This assessment is supported.

Other issues

Other issues include Aboriginal cultural heritage assessment, noise and land contamination.

Aboriginal cultural heritage assessment

The proposal in addressing Action 18.2 of the North Coast Regional Plan stated that:
"The previous Archaeological Assessments (Everick Heritage Consultants) involving Aboriginal community consultations and extensive targeted ground excavation found no issues on the subject land. Nevertheless, the assessments can be reviewed and updated prior to public exhibition if required".

It is possible that a further Aboriginal cultural heritage assessment (ACHA) may be required to be provided as a consequence of any "may proceed" Gateway Determination that may be issued.

Noise

The proposal refers to the *Junction Hill Residential Development Road Traffic & Rail Noise Impact Assessment Report* (Cardno December 2011) which forms Annexure F to the submitted planning proposal. It determined that any future dwellings within 40m - 80m of the North Coast Rail Line would be located with Zone B and would be required to be constructed in accordance with Road Noise Control Treatment Category 2 (p16, Annexure F).

The indicative dwelling site falls within the 40m - 80m zone. The Report recommends that should future stages include lots within the designated buffer, a detailed assessment of rail noise impacts would be required based on the criteria mentioned above (p.32). Accordingly, dwellings are not precluded from the subject land and any future DA for a dwelling would need to be accompanied by an assessment against the nominated criteria.

Land contamination

The proposal states that:
"The subdivision application for Lot 102 DP1221192 was accompanied by a Phase 1 Contamination Assessment (Regional Geotechnical Solutions, May 2016), an Addendum undertaking further sampling (RGS March 2017) and an Addendum dated July, 2017. All concluded the assessment met the requirements for a Residential A site as detailed in the National Environmental Protection (Assessment of Site Contamination) Measure (NEP 2013). The assessments were restricted to the R1 component of the property and did not include the adjoining subject land (E2). The proposal would create environmental management land rather than residential land, and although the E2 land has been utilised for the same grazing activities as the tested R1 land, a Stage 1 Preliminary investigation in accordance with the provisions of State Environmental Planning Policy 55, Remediation of Land may be required prior to public exhibition of the proposal".

It is agreed that due to the fact that the previous site investigation did not cover the E2 zoned land, further land contamination assessment ("Stage 1 - preliminary investigation") is likely to be required prior to public exhibition to comply with the provisions of SEPP 55.

COUNCIL IMPLICATIONS

Budget/Financial
The applicant has paid the rezoning application fee which is expected to cover the reasonable costs associated with dealing with this matter, excluding the cost of any additional studies or other documentary requests that may be specified in any Gateway Determination.

Asset Management
N/A

Policy or Regulation
Environmental Planning and Assessment Act 1979 - including relevant State Environmental Planning Policies and Minister's Section 9.1 Directions

Consultation
There has been no consultation undertaken to date. Consultation and public exhibition will occur after the Planning Gateway stage.

Legal and Risk Management
There are no legal appeal rights for third parties who may oppose the proposal. The applicant may request a review of the Gateway Determination if they are dissatisfied with the determination.

Climate Change
This proposal does not raise any foreseeable climate change implications.

Prepared by	Terry Dwyer, Strategic Planning Coordinator
Attachment	Planning Proposal - Part Lot 102 DP1221192, Summerland Way, Koolkhan – To be tabled

Planning Proposal

Amend Clarence Valley Local Environmental Plan 2011 Zoning Map

To Rezone Part Proposed Lot 2 in subdivision of
Lot 102 DP 1221192 Summerland Way, Koolkhan from
E2 Environmental Conservation to E3 Environmental Management

Document Control Sheet

Document Title:	To Rezone Part Proposed Lot 2 in subdivision of Lot 102 DP 1221192 Summerland Way, Koolkhan from E2 Environmental Conservation to E3 Environmental Management
Author:	Rob Donges, BA, MTCP
Date of Issue:	March 2019

Document Distribution				
Date	Status	Distribution – Number of Copies		
		Client	Council	Other
May 2019	Final	1	1	
June 2019	Updated	1	1	
July 2019	Updated	1	1	

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C. Copmanhurst LEP 1990 (Amendment 13)
D. Junction Hill Staged Subdivision Application – Landscape Masterplan (Jackie Amos Landscape Architect Dec 2011)
E. Preliminary Biodiversity Assessment Report (Geolink 2018)
F. Noise Impact Assessment Report (Cardno Dec 2011)
G. Site Contamination Assessment (RGS May 2016), Addendum (RGS July 2016) & further Addendum (March 2017)
H. North Coast Regional Plan 2036 Consistency Checklist
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J. State Environmental Planning Policy Consistency Checklist
K. Section 9.1 Directions Consistency Checklist
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1. Preliminary

1.1 Context

This planning proposal constitutes a document referred to in Section 3.33 of the Environmental Planning and Assessment Act 1979. It has been prepared in accordance with the Department of Planning and Environment's *"A guide to preparing planning proposals"* (August 2016). A gateway determination under Section 3.34 of the Act is requested.

1.2 Introduction

Kahuna No. 1 Pty Ltd, owner of Lot 102 DP 1221192 Summerland Way Koolkhan, are seeking approval to rezone part of the property from E2 Environmental Conservation to E3 Environmental Management under Clarence Valley Local Environmental Plan 2011. This would permit the E3 portion to be subdivided from a residential lot-sized portion of R1 General Residential land to which it is attached, and for dwelling houses to be applied for on both resulting lots.

1.3 Property Description

The site is located on the western side of Summerland Way at Koolkhan which forms a northern extension of Junction Hill Village, approximately 6 kms from Grafton.

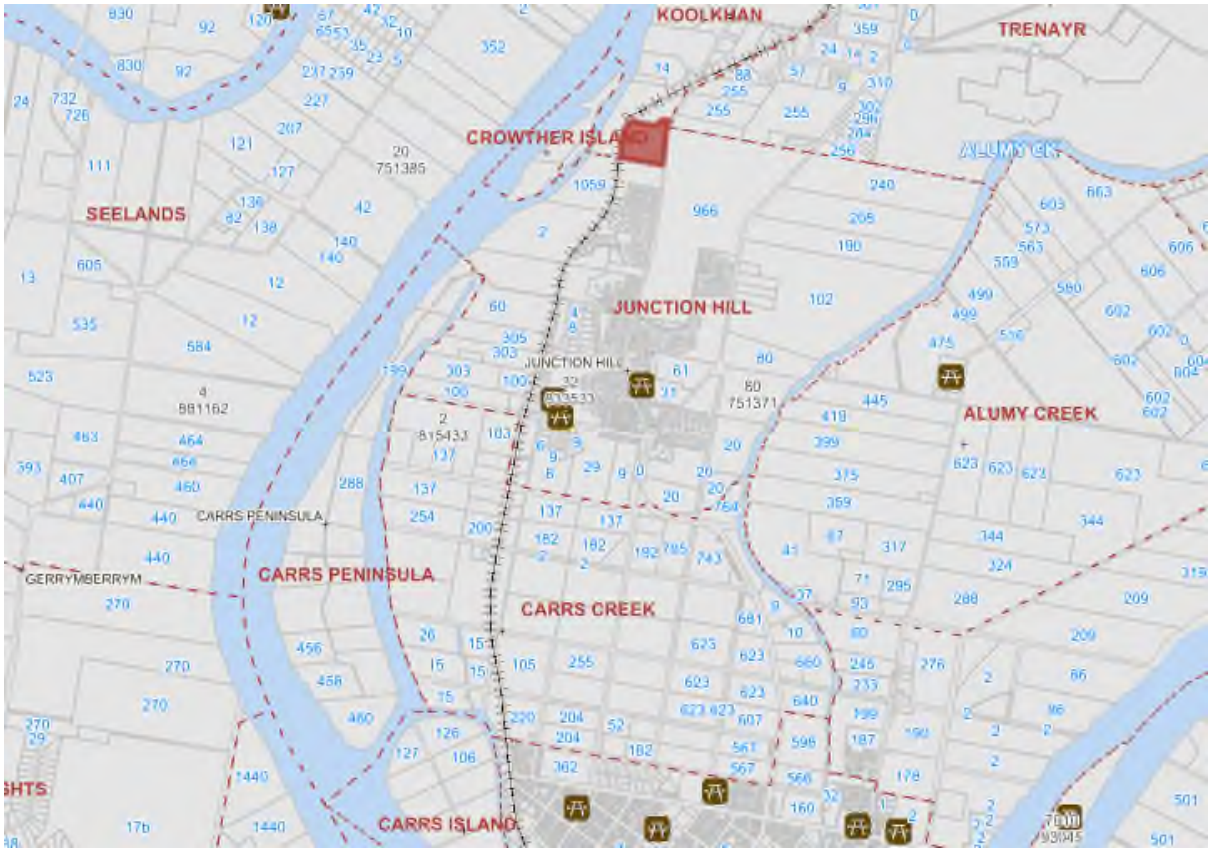


Figure 1 - Locality Map

The land specific to this proposal forms part of a 75m-103m wide strip of E2 Environmental Conservation land adjacent to the North Coast Railway which runs along the site's western boundary.

The E2 strip also extends to the south and north of the subject land (see Figure 2). To the south it is located on Lot 1 DP 1224325 which the Preliminary Biodiversity Assessment (see Annexure E) concludes does contain a small Threatened Environmental Community and so is worthy of a partial E2 zoning covering that vegetation.

To the north the E2 strip extends through Lot 101 DP 1221192, Lot 10 DP 976484 and Lot 1 DP 199583 until it reaches the boundary of the Koolkhan Industrial Estate. No Biodiversity Assessment has been undertaken over this land as part of this proposal but the section immediately to the north on Lot 101 again contains only pasture land.

If the proposal is successful it will physically sever the connectivity of the E2 land, but it is the contention of this proposal that there are no high ecological, scientific, cultural or aesthetic values on the subject E2 land and potentially some or all of the E2 land to the north and so connectivity is not required.

1.4 Subject Land

Figure 2 - Site Plan

This proposal specifically applies to part of Proposed Lot 2 in the approved subdivision of Lot 102 DP 1221192.
Proposed Lot 2 is zoned Part R1 General Residential/Part E2 Environmental Conservation under Clarence Valley LEP 2011.
Proposed Lot 2 forms part of the approved subdivision of Lot 102 DP 1221192 into:

- Proposed Lot 2 : Part R1/Part E2 – residential lot with attached E2 land
- Proposed Lots 1, 3-57: R1 -56 residential lots
- Proposed Lot 58 : R1 – Public Reserve
- Proposed Lot 59 : RU1 – Public Reserve

The approved subdivision is part of a larger northerly extension of the Junction Hill Village.

1.5 Development History of Subject Land

In October 2007 Clarence Valley Council received an application to rezone a tract of land immediately north of Junction Hill under Copmanhurst LEP 1990 from:-

- 5(c) (Arterial Roads Proposed)
- 1(b) (Agricultural Protection); and
- 1(a) Rural (General)

to:

- 2 (a) (Village); and
- 1(c) Rural (Small Holdings)

The land proposed to be rezoned included Lot 1 DP 812999 of which the subject site formed part.

The rezoning proposal was accompanied by a "master plan" indicating a total of 1004 residential lots among other uses, so the subject formed only a minor component of the land involved.

Council at its meeting on 11 December, 2007 resolved to support the rezoning as submitted.

Copmanhurst LEP 1990 (Amendment No.13) was gazetted on 17 December, 2010 (see Annexure C). The amendment rezoned the land subject of this Proposal to 1(a) Rural (General) and also classified it "Environmentally Sensitive Land (Clause 25E (7)). Clause 25 E(7) defined Environmentally Sensitive Land and Clause 25E (5) prohibited development on it except for environmental protection works and recreation areas.

This did not reflect the rezoning proposal endorsed by Council in December 2007.

On 23 December, 2011 Clarence Valley Council LEP 2011 was gazetted and the subject land was zoned E2 Environmental Conservation.

In 2012 a development application for a "Staged Subdivision" with a first stage of 75 new residential lots, 1 commercial lot, 1 open space lot, 1 drainage reserve lot, 1 hobby farm lot, roads and certain residue rural lots was submitted to Council. None of the lots applied for were located on the subject land, but it was included in the Overall Concept Plan which accompanied the application.

The staged subdivision application was accompanied by a number of consultant reports, including Landscape Masterplan & Report (Jackie Amos Landscape Architect December, 2011). The Report addresses the subject Lot 102 DP 1221199 and specifically, the subject land (the E2 portion of that lot) as follows:

- The Master Plan (see Annexure D) indicates that the subject E2 land is to be enhanced with *"proposed tree planting (random groups) to open space"* and *"proposed informal tree plantings to internal road."* It is also to be provided with a *"proposed 1.5m path linking to residential areas."*
  The Masterplan also indicates a park (referred to in the Report as Park 3), located on what is now part of the R1 land and linked to the E2 land.
  The Masterplan also indicates a perimeter road abutting the park and E2 land.

- Section 4.2.3 Vegetation & Rehabilitation (p 20)
  "The Masterplan identifies an area of environmentally sensitive land in the western development site. The Structure Plan describes this area as having remnant rainforest vegetation and as per that plan, the area to have weed control and revegetation planting. Revegetation strategies for this area are to be detailed by a flora and fauna consultant during detail design for this area. The landscape masterplan addresses broad proposal for this area as open space.
  This area represents the part of the site closest to the Clarence River. At this location there are attractive views to the river and the Gibraltar Range in the distance. The northern part of this area is to be open space and it is proposed it has a "natural" character that reflects its outlook and focus on revegetation. A path meanders through the open space and provides a link with the neighbourhood park. Seats could be located along the route to take in the river views. Interpretive signs could be included to describe revegetation strategies and particular plant species. It is proposed street tree planting to the edge of the reserve includes random groups of trees and that species selection is based on revegetation species used in the reserve."

- Section 4.2.4 Open Spaces (p28)
  "Park 3 is in the western portion of the site and overlooks the environmentally sensitive land that is to be revegetated. The park will have views to the Clarence River and Gibraltar Range. This park is most likely to be accessed by residents living in the western precinct of the village and is well linked by pathways to its surrounds. Given

it is the only park for this precinct, the masterplan proposes Park 3 provides a greater range of facilities for residents. It is suggested that it include a children playground, shade structures, BBQ and picnic facilities, seating and an open play space. The park character will be largely defined by its proximity to the river and the land to revegetate. In keeping with that, the park would have an informal layout with a focus on facilities taking in the river views and providing plenty of shade. Plan species for the park would reflect the rainforest species that are to be adopted for the revegetation areas nearby. The park could incorporate signage to describe the revegetation works underway and could also include historical information about wool routes and the use of the river as a transportation route."

The enhancement proposed for the E2 portion and its attachment to the park indicate that the subject land was intended to be open to the public, which could only be achieved if the land was held in public ownership.

On 18 August, 2017 Council issued consent to SUB2016/0020 over Lots 101 & 102 DP 1221192, subsequently modified on 21 December, 2017. This approved 59 lot subdivision, including Proposed Lot 2 which incorporates the subject land (see Annexure B). Following earlier discussions with Council staff, the subdivision plan incorporated, and was subsequently approved with, the following features:-

- the E2 land attached to a 1,311m^2 R1 portion to create Proposed Lot 2
- perimeter road providing public access to the E2 land not provided
- the park relocated away from the E2 land

Condition 6 states:

6. *The developer shall meet the full cost of the dedication of the two public reserves to Council.*

The two public reserves referred to are the park (Lot 58) and the public reserve along Summerland Way (Lot 59). There is no condition requiring the dedication of the E2 land and the approved subdivision layout does not allow public access to this land. The E2 land to both the north and south are also held in private ownership as the subdivision consents on each of these properties also did not require dedication of the E2 land. To the west is the railway line, so as a result there is no public access or ownership of this land.

Accordingly, the vision of public use of the E2 land which underpins the Landscape Masterplan prepared by Jackie Amos in 2011 cannot be achieved.

Condition 4 of the consent states:

A Landscape Plan, prepared by a person competent in the field, is to be submitted to Council for approval prior to the issue of a Civil Construction Certificate. The plan is to show all

proposed streetscape plantings, plantings in the two public reserves and plantings in the E2 zoned land.

The plan is to be generally in accordance with the Landscape Masterplan and Report, dated December, 2011, Issue C, prepared by Jackie Amos Landscape Architect, and the landscape elements reflective of the history of Junction Hill as discussed in that report. The plan shall indicate the mature height, location, quantity and species of all plantings and shall provide details of soil conditions, the planting method and maintenance program.

Landscaping is to be completed in accordance with the approved Landscape Plan prior to the release of the relevant Subdivision Certificate.

In an oversight by both the developer and Council staff, this plan was not prepared and submitted with the Civil Construction Certificate which has now been issued.

A Landscape Plan has now been prepared for the E2 land and plantings will be completed prior to the release of the relevant Subdivision Certificate as required.

The condition references the Landscape Masterplan and Report prepared by Jackie Amos, but as discussed above primary focus of creating a public space on the E2 land cannot be achieved as Council did not require it to be dedicated for this purpose.

The Landscape Plan adopts and adapts the approach taken on Lot 1 DP 1224325 immediately to the south and approved by Council in conjunction with the residential subdivision of part of that lot. The Plan locates the proposed plantings immediately adjacent the railway line at the southern end of the property where it connects to the remnant vegetation on the adjoining property creating an extended critical mass of special ecological value across both properties.

This will enable the fenced planting area to be protected and properly managed while retaining the historic low level grazing on the balance of the land which is critical to site maintenance particularly as it will be immediately adjoining residential properties.

A Vegetation Management Plan (VMP) will be prepared and submitted for Council's approval which will set out the obligations on the owner of this land (and binding on future owners) to maintain the planted areas in accordance with the maintenance schedule contained therein.

It is proposed to submit the VMP prior to this proposal being placed on public exhibition should it reach that stage. This VMP will have a strong emphasis on the restoration and maintenance of these pockets of high ecological value, beyond the level which would normally apply to remnant vegetation on private land. Should the proposal not proceed a VMP will not be submitted but rather a maintenance schedule as required by Condition 4 to ensure the plantings survive to the point where they become self-sufficient.

1.6 Proposed Subdivision

A plan showing the proposed subdivision which would result from the proposal is at Annexure B and is described in Part 1 of this proposal.

Part 1: Objective or Intended Outcome

The objective of this Planning Proposal is to rezone that portion of Lot 102 DP 1221192 Summerland Way, Koolkhan currently zoned E2 Environmental Conservation to E3 Environmental Management.

The intended outcome is to permit the portion proposed to be rezoned E3 to be subdivided from the portion of R1 General Residential to which it is attached under the approved plan of subdivision (see Annexure B for the approved plan of subdivision). This would allow a development application to be submitted for the construction of a dwelling on the E3 lot. The current E2 zoning does not permit this intended outcome as discussed below.

The E2 portion has an area of 2.213ha, while the Lot Size Map indicates a minimum lot size of 40ha. Accordingly, the E2 portion cannot be separated by subdivision from the R1 General Residential portion of the property under **Clause 4.1 Minimum subdivision size** of Clarence Valley LEP 2011.

Clause 4.1A Exceptions to minimum lot size for certain split zone lots states:

4.1A Exceptions to minimum lot size for certain split zone lots

(1) The objectives of this clause are as follows:

- *a) to provide for the subdivision of lots that are within more than one zone but cannot be subdivided under clause 4.1, 4.1AA or 4.2C,*
- *b) to ensure that the subdivision occurs in a manner that promotes suitable land use and development.*

(2) This clause applies to each lot (an original lot) that contains:

- *a) land in a residential, business or industrial zone, and*
- *b) land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone E2 Environmental Conservation or Zone E3 Environmental Management.*

(3) Despite clauses 4.1, 4.1AA and 4.2C, development consent may be granted to subdivide an original lot to create other lots (the resulting lots) if:

- *a) one of the resulting lots will contain:*
  - *i. land in a residential, business or industrial zone that has an area that is not less than the minimum size shown on the Lot Size Map in relation to that land, and*
  - *ii. all of the land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone E2 Environmental Conservation or Zone E3 Environmental Management that was in the original lot, and*
- *b) all other resulting lots will contain land that has an area that is not less than the minimum size shown on the Lot Size Map in relation to that land.*

(4) Despite subclause (3), development consent may only be granted to subdivide an original lot to create a lot referred to in subclause (3) (a) (ii) that is less than the minimum size shown on the Lot Size Map in relation to that land if the consent authority is satisfied that the lot is suitable for the erection of a dwelling house.

In this instance the **original lot** consists of approximately 6.34ha of R1 General Residential land and 2.213ha of E2 Environmental Conservation land and so complies with the requirements of **Clause 4.1A(2).**

If the E2 portion is rezoned to E3 as proposed, it will also comply with **Clause 4.1A (2).**

The approved plan of subdivision creates proposed Lot 2 with an area of 2.34ha consisting of 1,311m^2 of R1 land and 2.213ha of E2 land (proposed E3). When that lot is registered it will become the **original lot** and will also comply with **Clause 4.1A (2).**

If this Proposal is approved, the future subdivision of proposed Lot 2 would create the following **resulting lots.**

- Lot 2 zoned R1 General Residential with an area of 1,310.6m^2 including handle.
- Lot 60 zoned E3 Environmental Management with an area of 2.213ha (excluding access handle).

Accordingly, Clause 4.1 A(3) will be complied with.

Clause 4.1A (4) requires that Council be satisfied that proposed Lot 60 is suitable for the erection of a dwelling house. Physically, the potential dwelling site indicated on the proposed subdivision plan (Annexure B) is suitable and would not unduly impact on existing developments in the vicinity, but the current E2 zoning does not permit dwelling houses and so the intent of **Clause 4.1.A (4)** cannot be met under the current zoning. Dwelling houses are permitted under the E3 Environmental Management zone and it is for this reason the rezoning is required.

Part 2: Explanation of Provisions

The intended outcome of the Proposal will be achieved by the following amendment to the Clarence Valley LEP 2011.

- *"Amendment to Land Zoning Map – Sheet LZN 007 in accordance with the proposed zoning map shown in Annexure A"*

This will have the effect of rezoning the current E2 portion of Lot 102 DP 1221192 to RU1 Primary Production.

The Height of Buildings Map does not specify a height for E2 or RU1 land and so no amendment to that Map is required.

The Lot Size Map classifies the subject E2 portion as "AB4- 40 hectares" and does not require amendment as the provision of Clarence Valley LEP 2011 Clause 4.1A will permit the proposed subdivision should the rezoning occur.

Part 3: Justification

4.1 Is the Planning Proposal a result of any strategic study or report?

No.

There is no strategic study or report upon which the proposal is based, but the *"LEP Practice Note PN09-002 Environmental Protection Zones" (Dept of Planning 2009)* states in relation to the E2 zone:

> *"This zone is for areas with high ecological, scientific, cultural or aesthetic values outside national parks and nature reserves. The zone provides the highest level of protection, management and restoration for such lands whilst allowing uses compatible with those values.*
>
> *It is anticipated that many councils will generally have **limited areas** displaying the characteristics suitable for the application of the E2 zone. Areas where a broader range of uses is required (whilst retaining environmental protection) may be more appropriately zoned E3 Environmental Management."*

and

> *"Prior to applying the relevant zone, the environmental values of the land should be established, preferably on the basis of strategy or from an environmental study developed from robust data sources and analysis. This is particularly important where land is identified as exhibiting high ecological, scientific, cultural or aesthetic values outside national parks and nature reserves. For example, in most cases, Councils proposal to zone land E2 needs to be supported by a strategy or study that demonstrates the high status of these values. Under such a strategy or study, zoning would be to be appropriate and land uses would need to be capable of being sustained."*

In specifically addressing the E2 zone, the Practice Note includes the following examples of where the E2 zone should be applied.

- *"Lands with very high conservation values such as old growth forests, significant wildlife, wetlands or riparian corridors or land containing endangered ecological communities*
- *high conservation coastal foreshores and land acquired, or proposed for acquisition, under a Coastal Lands Protection Scheme*
- *some land with a registered Biobanking agreement*
- *land under the care, control and management of another catchment authority such as the Department of Water and Energy or a Council for critical town water supply, aquifer or catchment as appropriate*

- *land with significant Aboriginal heritage values, if appropriate*
- *coastal foreshores and land subject to coastal hazards, including climate change effects*
- *land currently zoned for environmental protection where strict controls on development apply, e.g. steeply sloping escarpment lands, land slip areas."*

The objectives of the E2 zone in Clarence Valley LEP 2011 are:

1. ***Objectives of zone***

- *To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.*
- *To prevent development that could destroy, damage or otherwise have an adverse effect on those values.*
- *To protect coastal wetlands and littoral rainforests.*
- *To protect land affected by coastal processes and environmentally sensitive coastal land.*
- *To prevent development that would adversely affect, or be adversely affected by, coastal processes.*

2. ***Permitted without consent***

Nil

3. ***Permitted with consent***

Emergency services facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Roads

4. ***Prohibited***

Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3.

As well as having no ecological value, the land also has no high scientific, cultural or aesthetic values to protect, manage or restore. The E2 portion falls 4.5 metres over its 80m width along its southern boundary and 2m along its northern boundary, giving an average slope of 5.6% in the south and 2.5% in the north, so it would not even qualify for protection on the grounds of steep or prominent land.

The preliminary Biodiversity Assessment prepared by Geolink (see Annexure E) states:-

- *Native vegetation: the E2 zone is highly disturbed and contains five native trees (one of which is planted). Vegetation is not characteristic of any PCT (Plant Community Type).*
- *Disturbance history: the E2 zone has been cleared and modified for agriculture. Native vegetation is limited to four remnant trees*

- *Threatened flora species: no threatened flora species occur*
- *Threatened ecological communities: two trees within the E2 zone form part of the TEC (Threatened Ecological Community) Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions, which occurs on adjacent land to the south*
- *Threatened fauna habitat: due to the lack of woody vegetation, the site does not contain significant habitat for threatened fauna*

The Preliminary Biodiversity Assessment also references the *"Northern Councils E Zone Review" (Dept of Planning & Environment 2015)* which includes criteria to qualify land as suitable for an E2 zone, none of which are relevant to the subject land. Although the Review does not apply to the Clarence Valley, the criteria are universal, leading the preliminary Biodiversity Assessment to conclude:

"It is evident that the E2 zone on Lot 102 meets none of these criteria and hence is a poor candidate for environmental zoning. Vegetation within the E2 zone on adjacent Lot 1 DP 1224325 is a candidate for an E2 zone as it comprises a TEC. Applying conservation values for the vegetation on neighbouring Lot 1 to Lot 102 is poor environmental practice and has no relevance to areas of improved pasture."

LEP Practice Note PN09-002 then refers to the E3 Environment Management Zone. This zone has a lower threshold of ecological, scientific, cultural and aesthetic values that that of the E2 zone. E2 provides the highest level of protection, management & restoration for suitable land, while E3 applies to land with special values that required careful consideration/management. The Note states:

"Areas where a broader range of uses is required (whilst retaining environmental protection) may be more appropriately zoned E3 Environmental Protection"

The Amos Masterplan envisaged a well-treed public space upon which there was an obligation on the owner (most likely Council) to protect and manage the whole area in accordance with the objectives of the E2 zone.

The Landscape Plan VMP which will accompany this proposal will specify the protection and management of the parcel of special ecological value with a scale achievable by a private owner, combined with the general maintenance of the balance of the land through low-level grazing or regular slashing to protect the amenity of future adjoining residential properties.

This approval would appear to be aligned with the objectives of the E3 zone rather than the current E2 zone.

The E3 Land Use Table is:

"Zone E3 Environmental Management

1. Objectives of zone

- *To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values*
- *To provide for a limited range of development that does not have an adverse effect on those values*
- *To prevent inappropriate development in geologically hazardous areas so as to minimise erosion and other adverse impacts on escarpment areas*
- *To ensure that development does not unreasonably increase the demand for public services or public facilities*
- *To ensure development is not adversely impacted by environmental hazards*
- *To protect prominent hillsides, ridgelines, other major facilities, riparian areas and water catchment areas*

2. Permitted without consent

Extensive agriculture; Home-based childcare; Home occupations; Home Occupations (sex services)

3. Permitted with consent

Animal boarding or training establishments; Ben and breakfast accommodation; Camping grounds; Caravan parks; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Emergency services facilities; Environmental facilities; Environmental protection works; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Home businesses; Home industries; Oyster aquaculture; Pond-based aquaculture; Recreation areas; Roads, Tank based aquaculture.

4. Prohibited

Industries; Multi dwelling housing; Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in Item 2 or 3."

The E3 zone permits **extensive agriculture** (which includes grazing) without consent and **dwelling houses** with consent. This reflects the current and potential future use of the land for grazing, which the E2 zone with its prohibition on extensive agriculture does not.

The permissibility of dwelling houses in the E3 zone allows compliance with **Clause 4.1A Exceptions to minimum lot size for certain split zones,** subclause (4).

"(4) Despite subclause (3), development consent may only be granted to subdivide an original lot to create a lot referred to in subclause (3) (a) (ii) that is less than the minimum size shown on the Lot Size Map in relation to that land if the consent authority is satisfied that the lot is suitable for the erection of a dwelling house."

Should the proposal be approved, the owner will be able to apply to subdivide the subject land off the residential component of proposed Lot 2 under this clause.

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

Yes.

The objective of restoring and managing special ecological values on the subject land while acknowledging that those values do not meet the 'high' criteria necessary to justify an E2 zoning, is best met by rezoning the land to E3.

The intended outcome of permitting the residential and environmental components of proposed Lot 2 to be separated with each having a dwelling entitlement is achieved through this proposal. This will create a clear delineation between the residential subdivision with all lots of regular low-density residential size and the rear environmental section which will contain managed vegetation plus the continuation of existing low-level grazing outside of those managed areas.

Relationship to Strategic Planning Framework

4.3 Applicable Regional Plan

The North Coast Regional Plan 2036 consistency checklist at Annexure H assesses the proposal to be consistent with the 3 actions identified as relevant.

4.4 Consistency with Council's Local Strategies and other Local Strategic Plans

The Clarence 2027 is Council's adopted community strategic plan. It is supported by Council's Delivery Program and Annual Operational Plan applicable at the time.

Other local strategies include:

- South Grafton Heights Precinct Strategy
- Clarence Valley Settlement Strategy
- Lower Clarence Retail Strategy (May 2007)
- Yamba Retail/Commercial Strategy (May 2002)
- Clarence Valley Economic Development Strategic Plan
- Clarence Valley Industrial Lands Strategy
- Clarence Valley Affordable Housing Strategy
- Clarence Valley Council Biodiversity Management Strategy 2010
- Clarence River Way Masterplan 2009
- Clarence Valley Open Spaces Strategic Plan 2012

An assessment of the planning proposal against the Clarence 2027 and associated Delivery and Operational Plans is at Annexure I.

The Clarence Valley Settlement Strategy (1999) specifically addresses the extension of Junction Hill Village which led to the initial rezoning of the subject land and adjoining lands. The proposal will result in one additional dwelling.

Although the Preliminary Biodiversity Assessment concludes the subject land has low biodiversity value, the proposed restoration and on-going management of appropriate vegetation is in keeping with the Biodiversity Management Strategy's support for conservation/revegetation/regeneration on private land.

4.5 Consistency with Applicable SEPP's (State Environmental Planning Policies)

The proposal is consistent with applicable state environmental planning policies (SEPPs).

Refer to the consistency checklist against these policies at Annexure J.

4.6 Consistency with applicable Ministerial Directions (Sec. 9.1)

The proposal is consistent with applicable Section 9.1 Directions with the exception of **2.1 Environmental Protection Zones** where the inconsistency is considered justified under 6(b) of the Direction on the grounds that the Preliminary Biodiversity Assessment concludes the land has no environmental values, but the proposal to restore and manage such values will justify the inconsistency or potentially remove the inconsistency.

Refer to the consistency checklist against these Directions at Annexure K.

Environmental, Social & Economic Impacts

4.7 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?

No.

The proposal will restore and protect an ecological community through the provisions of the associated Vegetation Management Plan.

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

4.8.1 Noise

The 2011 staged subdivision application included the Junction Hill Residential Development Road Traffic & Rail Noise Impact Assessment Report (Cardno December 2011 – see Annexure F). The Report assessed the impact of rail noise in accordance with the *"Development Near Rail Corridors & Busy Roads – Interim Guidelines (NSW Dept. of Planning 2008)"* and "*State Environmental Planning Policy (Infrastructure) 2007"* and determined that any future dwellings within 40m – 80m of the North Coast Rail Line would be located with Zone B and would be required to be constructed in accordance with Road Noise Control Treatment Category 2 (p16). The indicative dwelling site falls within the 40m-80m zone.

The Report recommends that should future stages include lots within the designated buffer, a detailed assessment of rail noise impacts would be required based on the criteria mentioned above (p.32).

Accordingly, dwellings are not precluded from the subject land and any future development application for a dwelling would need to be accompanied by an assessment against the nominated criteria.

4.8.2 Soil Contamination

The subdivision application for Lot 102 DP 1221192 was accompanied by a Phase 1 Contamination Assessment (Regional Geotechnical Solutions, May 2016), an Addendum undertaking further sampling (RGS March 2017) and an Addendum dated July, 2017. All concluded the assessment met the requirements for a Residential A site as detailed in the National Environmental Protection (Assessment of Site Contamination) Measure (NEP 2013).

The assessments were restricted to the R1 component of the property and did not include the adjoining subject land (E2). The proposal would create environmental management land rather than residential land, and although the E2 land has been utilised for the same grazing activities as the tested R1 land, a Stage 1 Preliminary

investigation in accordance with the provisions of **State Environmental Planning Policy 55, Remediation of Land** may be required prior to public exhibition of the proposal.

See Annexure G for the Assessment and Addendums.

4.8.3 Other Environmental Issues

The site is not affected by flood, bushfire hazards and is classified ASS Class 5. Any future dwelling would connect into the reticulated sewer system being provided in the adjoining residential subdivision.

4.9 Relevant Social & Economic Effects

4.9.1 Heritage Conservation

A series of Archaeological assessments were conducted by Everick Heritage Consultants Pty Ltd between May 2007 & May 2009 as part of the initial rezoning process, with a final report in May 2009 involving aboriginal community consultation and extensive targeted ground excavation.

The Report identified 2 scar trees located on now Lot 102 DP 1221199, which will be located within the Public Reserve adjacent to Summerland Way (Proposed Lot 59 in the approved subdivision).

The subdivision consent is conditioned to require work to stop and appropriate notification to be made if any artefacts are unearthed during the construction phase and a similar condition could be placed on any consent for a dwelling on the subject land, noting that disturbance from the construction would be minor.

Is there adequate public infrastructure for the planning proposal?

The services are available on the adjoining residential land and will be connected to the subject land.

4.10 What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

There has been no consultation with State & Commonwealth public authorities to date.

A gateway determination has not yet been issued.

5. PART 4 - MAPPING

Copies of current and proposed versions of the Minimum Lot Size map are attached at Annexure A.

6. PART 5 - COMMUNITY CONSULTATION

It is considered that the proposal is a 'low impact' for the purpose of community consultation under Section 5.5.2 of *"A guide to preparing local environmental plans, August 2016".*

On this basis, it is intended that the planning proposal be advertised for 14 days in accordance with Section 5.5.2 of "*Á guide to preparing local environmental plans*". It is also intended to provide written notification to land owners in the immediate vicinity of the subject land.

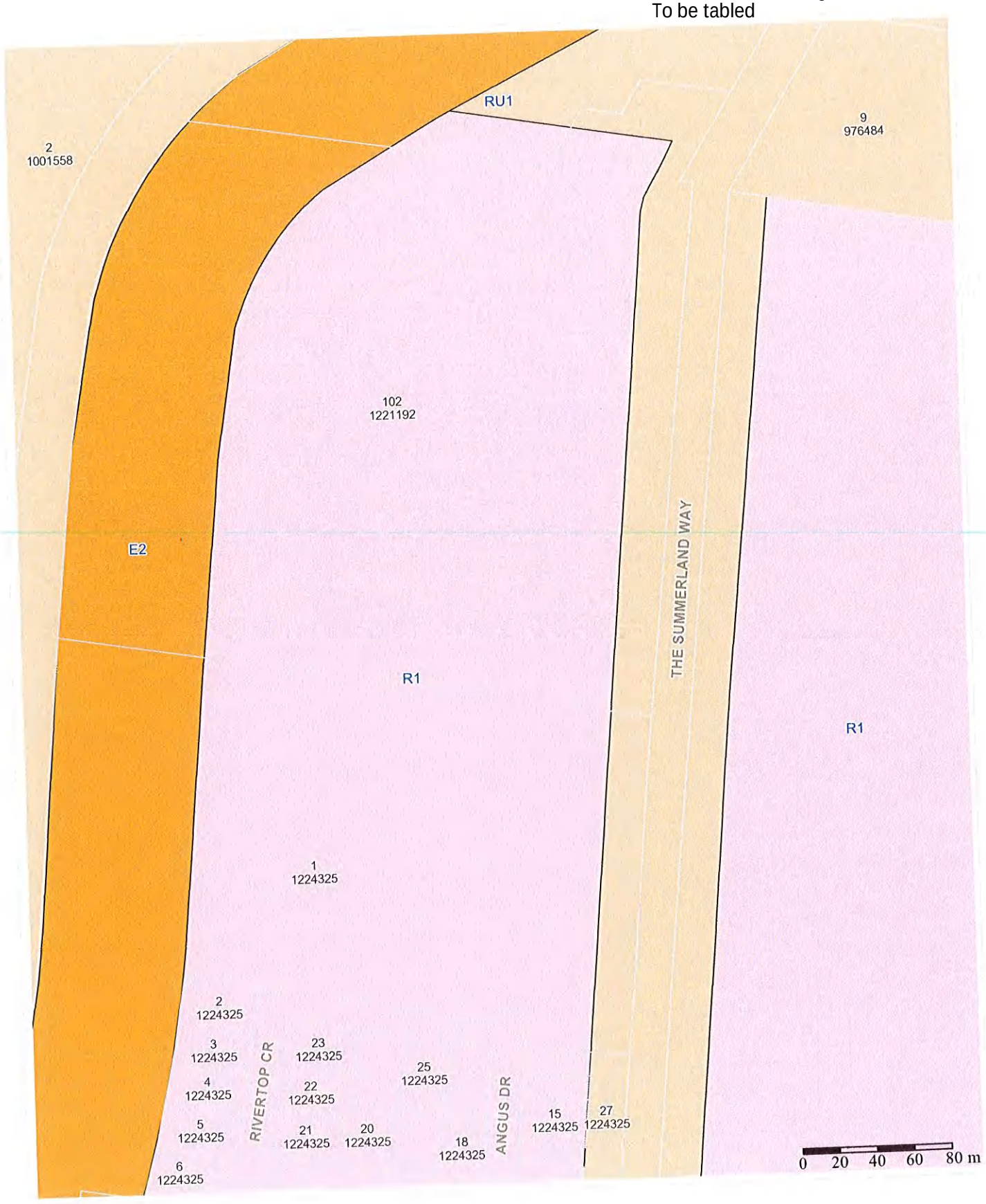
A public hearing is not considered necessary.

7. PART 6 - PROJECT TIMELINE

A preliminary timetable will be prepared once the Gateway Determination is issued.

ANNEXURE A

CURRENT & PROPOSED ZONING MAPS



Locked Bag 23 GRAFTON NSW 2640 t 02 6643 0200 w www.clarence.nsw.gov.au

clarence
VALLEY COUNCIL

IMPORTANT NOTICE

Drawn By:

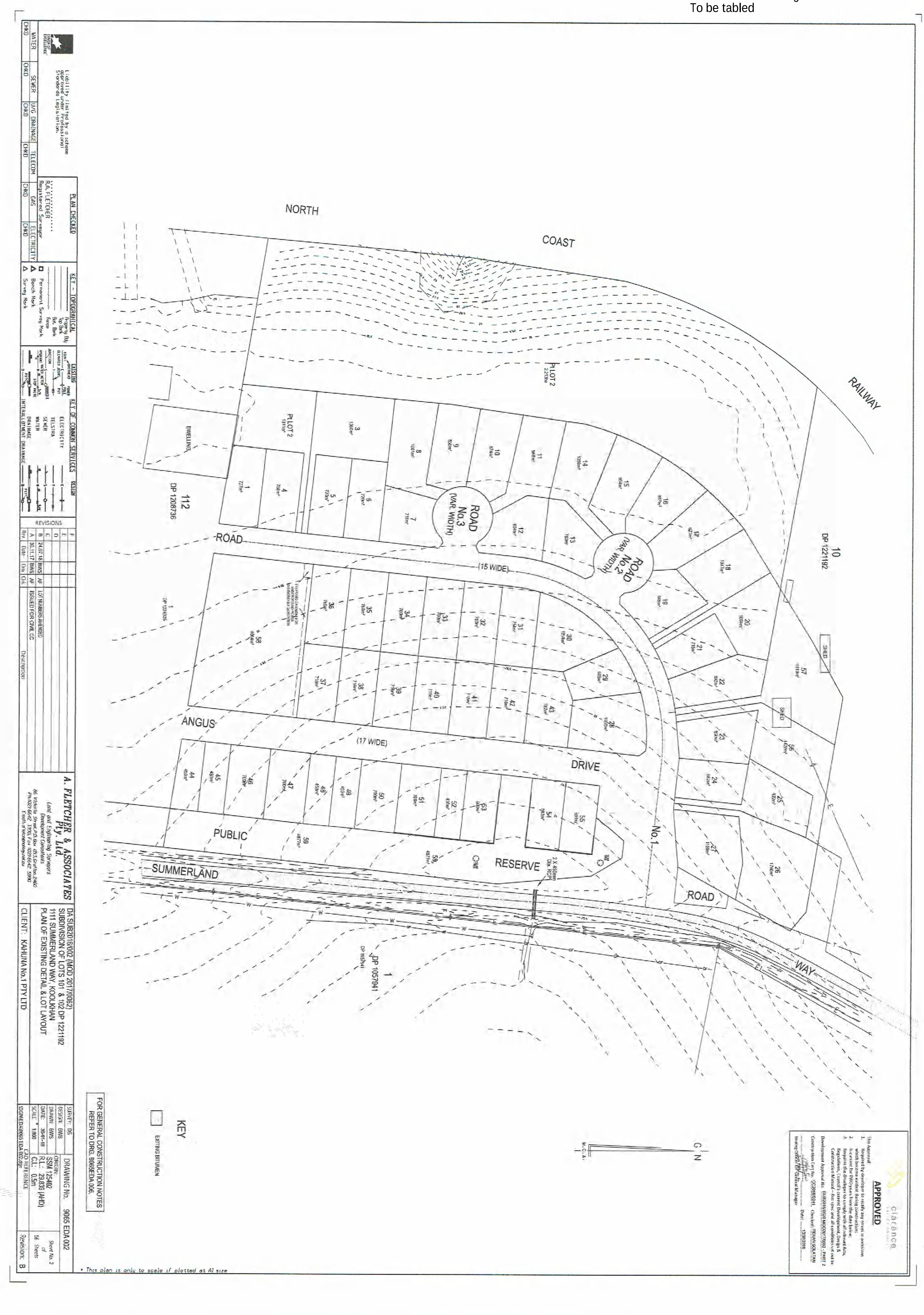
Projection: GDA94 / MGA zone 56

Date: 23/02/2019 2:10 PM

Map Scale: 1:2656 at A4

ANNEXURE B

CURRENT & PROPOSED SUBDIVISION PLANS


NORTH
COAST
RAILWAY
SUMMERLAND
WAY
ANGUS
DRIVE
PUBLIC
RESERVE
ROAD
No.1
ROAD No.2 (VAR WIDTH)
ROAD No.3 (VAR WIDTH)
(15 WIDE)
(17 WIDE)
10
DP 1221192
112
DP 1208736
1
DP 1057941
DWELLING
SHED
KEY
EXISTING BITUMEN
FOR GENERAL CONSTRUCTION NOTES REFER TO DRG. 9065EDA006.
A. FLETCHER & ASSOCIATES Pty. Ltd.
DA SUB2016/0002 (MOD 2017/0062)
SUBDIVISION OF LOTS 101 & 102 DP 1221192
1111 SUMMERLAND WAY, KOOLKHAN
PLAN OF EXISTING DETAIL & LOT LAYOUT
CLIENT: KAHUNA No.1 PTY LTD
DRAWING No. 9065 EDA 002
APPROVED
This plan is only to scale if plotted at A1 size

NOTES:

1. THIS PLAN WAS PREPARED FOR KAHUNA No. 1 PTY LTD AS A PROPOSED SUBDIVISION TO ACCOMPANY A DEVELOPMENT APPLICATION TO CLARENCE VALLEY COUNCIL & SHOULD NOT BE USED FOR ANY OTHER PURPOSES.
2. THE TITLE BOUNDARIES SHOWN HEREON WERE MARKED BY A FLETCHER & ASSOCIATES PTY LTD AT THE TIME OF THE SURVEY. NO RELIANCE SHOULD BE PLACED ON THE INFORMATION ON THIS PLAN FOR FINANCIAL DEALINGS ON THE LAND.
3. SERVICES HAVE NOT BEEN SHOWN ON THIS SKETCH PLAN BUT WATER, POWER & TELSTRA ARE AVAILABLE TO THIS PROPOSAL.
4. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.
5. SPOT HEIGHTS HAVE BEEN DETERMINED BY GNSS METHODS.
6. THE PROPOSED RECIPROCAL RIGHTS OF ACCESS 3 WIDE TO BE EXTENDED TO SERVICE PROPOSED LOT 60
7. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

(A) EASEMENT FOR DRAINAGE OF SEWAGE 5 WIDE
(B) EASEMENT FOR DRAINAGE OF SEWAGE 3 WIDE
(C) EASEMENT FOR DRAINAGE OF SEWAGE 3.75 WIDE
(D) EASEMENT FOR DRAINAGE OF WATER 1.5 WIDE
(E) EASEMENT FOR DRAINAGE OF SEWAGE VARIABLE WIDTH
(F) RECIPROCAL RIGHTS OF ACCESS & SERVICES 3.5 WIDE & VARIABLE
(G) 20m WIDE & VARIABLE NO DWELLING/BUILDING WITHIN THIS AREA. A RESTRICTION ON THE USE OF THE LAND WILL APPLY
(H) RECIPROCAL RIGHTS OF ACCESS & SERVICES 3 WIDE & VARIABLE
(I) EASEMENT FOR MULTI-PURPOSE ELECTRICAL INSTALLATION 4.2 WIDE
(J) EASEMENT FOR UNDERGROUND POWER 2 WIDE
(K) EASEMENT FOR DRAINAGE OF WATER 2.3 WIDE
(DE) DENOTES PROPOSED DWELLING ENVELOPE

112
DP 1208736
OWNERS: M & R DOUGHERTY

1
DP 1057941
OWNERS: FARLMAT PTY LTD

TABLE OF CURVED LINES

No.	ARC	RAD	CHORD
1	20.9	15	19.25
2	7.15	15	7.07
3	9.16	15	9.02
4	14.46	15	13.9
5	6.17	15	6.13
6	16.56	15	15.74
7	12.95	90	31.72
8	23.50	90	23.43
9	16.34	15	15.54
10	6.17	15	6.13
11	16.62	151.31	16.61
12	6.00	15	5.96
13	25.27	151.31	25.24
14	12.44	15	12.08
15	28.03	151.31	27.99
16	14.06	15	13.55
17	26.65	151.31	26.62
18	19.07	15	17.81
19	23.00	90	22.94
20	16.50	90	16.47
21	15.00	90	14.98
22	7.00	90	7.00
23	29.72	75	29.53
24	35.82	75	35.48
25	38.17	75	37.76
26	14.08	75	14.06
27	96.6	151.31	94.95
28	110.62	223.30	109.52

* This plan is only to scale if plotted at A2 size

REVISIONS				
Rev.	Date	Drn.	Chk.	Description

A. FLETCHER & ASSOCIATES Pty Ltd
Land and Engineering Surveyors
Development Consultants
86 Victoria Street, P.O. Box 1213, Grafton, 2460
Ph.(02) 6642 3300, Fax (02) 6642 5990
Email: afletch@hotkey.net.au

DASUB2016/0020 (MOD2017/0062)
PLAN OF PROPOSED LOT 60
SUBJECT OF PLANNING PROPOSAL
1111 SUMMERLAND WAY, JUNCTION HILL

CLIENT: KAHUNA No. 1 PTY LTD

SURVEY: DS	DRAWING No. 9065 REZ
DESIGN:	ORIGIN: SSM 125402 RL 29.839 (AHD) C.I. 0.5m
DRAWN: BF	Sheet No. 1 of 1 Sheets
DATE: 13.03.2019	
SCALE: x 1:1,000	CAD REFERENCE Z:\9065\DGN\9065SALESPLANREVB.dgn
	Revision:

ANNEXURE C

COPMANHURST LEP 1990 (AMENDMENT 13)

2010 No 707

New South Wales

Copmanhurst Local Environmental Plan 1990 (Amendment No 13)

under the

Environmental Planning and Assessment Act 1979

I, the Minister for Planning, make the following local environmental plan under the *Environmental Planning and Assessment Act 1979*. (09/01495-2)

TONY KELLY, MLC
Minister for Planning

2010 No 707

Copmanhurst Local Environmental Plan 1990 (Amendment No 13)

under the

Environmental Planning and Assessment Act 1979

1 Name of Plan

This Plan is *Copmanhurst Local Environmental Plan 1990 (Amendment No 13)*.

2 Commencement

This Plan commences on the day on which it is published on the NSW legislation website.

3 Land to which Plan applies

This Plan applies to the land shown edged heavy black on the map marked "Copmanhurst Local Environmental Plan 1990 (Amendment No 13)" deposited in the office of the Clarence Valley Council.

Schedule 1 Amendment of Copmanhurst Local Environmontal Plan 1990

[1] Clause 5 Definitions

Insert in appropriate order in the definition of ***the map*** in clause 5 (1):

Copmanhurst Local Environmental Plan 1990 (Amendment No 13)

[2] Clause 25E

Insert after clause 25D:

25E Junction Hill—restrictions on development

(1) This clause applies to the land shown edged heavy black on thc map marked "Copmanhurst Local Environmental Plan 1990 (Amendment No 13)".

(2) The aim of this clause is to protect, enhance and conserve the natural environment (including native vegetation habitats and threatened species) with respect to environmentally sensitive land.

(3) **Development control plan**

Development consent must not be granted for the subdivision of land to which this clause applies unless a development control plan that provides for the matters specified in subclause (4) has been prepared for the land.

(4) The development control plan must providc for all of the following:

(a) a staging plan for the timely and efficient release of urban land making provision for necessary infrastructure and sequencing,

(b) an overall transport movement hierarchy showing the major circulation routes and connections to acbieve a simple and safe movement system for private vehicles, public transport, pedestrians and cyclists,

(c) suitably located publie facilities and services, including provision for appropriate traffic management facilities and parking,

(d) measures to aeeommodate and control appropriate neighbourhood commercial and rctail uses,

(e) management of Aboriginal eultural heritage values,

(f) controls for the following:

(i) environmentally sensitive land and adjacent areas,

(ii) a buffer area between the land to which this clause applies and the Trenayr industrial area,

(iii) noise attenuation and landscape buffer areas along the rail corridor and road network,

(iv) any areas in the vicinity of high voltage electricity transmission lines,

(v) the area between the land to which this clause applies and agricultural land and potential agricultural effluent re-use areas,

(g) management of potentially contaminated lands and constrained sites identified by geotechnical assessment,

(h) controls for flood liable land,

(i) management of open space,

(j) residential density or minimum lot size controls,

(k) streetscape and lot layout principles,

(l) management of remnant vegetation and overall landscaping strategy, including rehabilitation of natural areas and requirements for both the public and private domain,

(m) location and function of community facilities,

(n) water cycle management, including the management of stormwater, water supply (potable and recycled) and recycled water,

(o) energy efficiency,

(p) waste management,

(q) augmentation of water and sewerage infrastructure to ensure adequate capacity,

(r) noise attenuation management measures,

(s) acid sulphate soil management measures.

(5) **Environmentally sensitive land**

Except as provided by subclause (6), development is prohibited on environmentally sensitive land.

(6) Development for the purposes of environmental protection works and reereation areas may be carried out with development consent on environmentally sensitive land.

(7) **Definitions**

In this clause:

environmental protection works means works associated with the rehabilitation of land towards its natural state or any work to protect land from environmental degradation, and includes bush regeneration works, wetland protection works, erosion protection works, dune restoration works and the like.

environmentally sensitive land means the land shown stippled on the map marked "Copmanhurst Local Enviroumental Plan 1990 (Amendment No 13)".

[3] Clause 32A

Insert after clause 32:

32A Public infrastructure in urban release areas

(1) **Objective**

The objective of this clause is to require satisfactory arrangements to be made for the provision of designated State public infrastructure and public utility infrastructure before the subdivision of land in urban release areas to satisfy needs that arise from development on the land, but only if the land is developed intensively for urban purposes.

(2) **Application**

This clause does not apply to any land in an urban release area if all or any part of the land is in a special contributions area (as defined by section 93C of the Act).

(3) This clause prevails over any other provision of this plan to the extent of any inconsistency.

(4) **Arrangements for designated State public infrastructure**

Development consent must not be granted for the subdivision of land in an urban release area if the subdivision would create a lot smaller than the minimum lot size permitted on the land immediately before the land became, or became part of, an urban release area, unless the Director-General has certified in writing to the consent authority that satisfactory arrangements have been made to contribute to the provision of designated State public infrastructure in relation to that lot.

(5) *State Environmental Planning Policy No 1—Development Standards* does not apply to the subdivision of land to which subclause (4) applies.

(6) Subclause (4) does not apply to:

(a) any lot identified in the certificate as a residue lot, or

(b) any lot that is proposed in the development application to be reserved or dedicated for public open space, public roads, public utility undertakings, edueational facilities, or any other public purpose, or

(c) a subdivision for the purpose only of rectifying an encroachment on any existing lot.

(7) **Public utility infrastructure**

Development consent must not be granted for development on land in an urban release area unless the consent authority is satisfied that any public utility infrastructure that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when required.

(8) Subclause (7) does not apply to development for the purpose of providing, extending, augmenting, maintaining or repairing any public utility infrastructure.

(9) **Definitions**

In this clause:

designated State public infrastructure means public facilities or services that are provided or financed by the State (or if provided or finaneed by the private seetor, to the extent of any finaneial or in-kind contribution by the State) of the following kinds:

(a) State and regional roads,

(b) bus interehanges, bus serviees and bus lanes,

(e) land required for regional open spaee,

(d) land required for social infrastrueture and facilities (sueh as land for schools, hospitals, emergency services and justice purposes).

public utility infrastructure means infrastrueture for any of the following purposes:

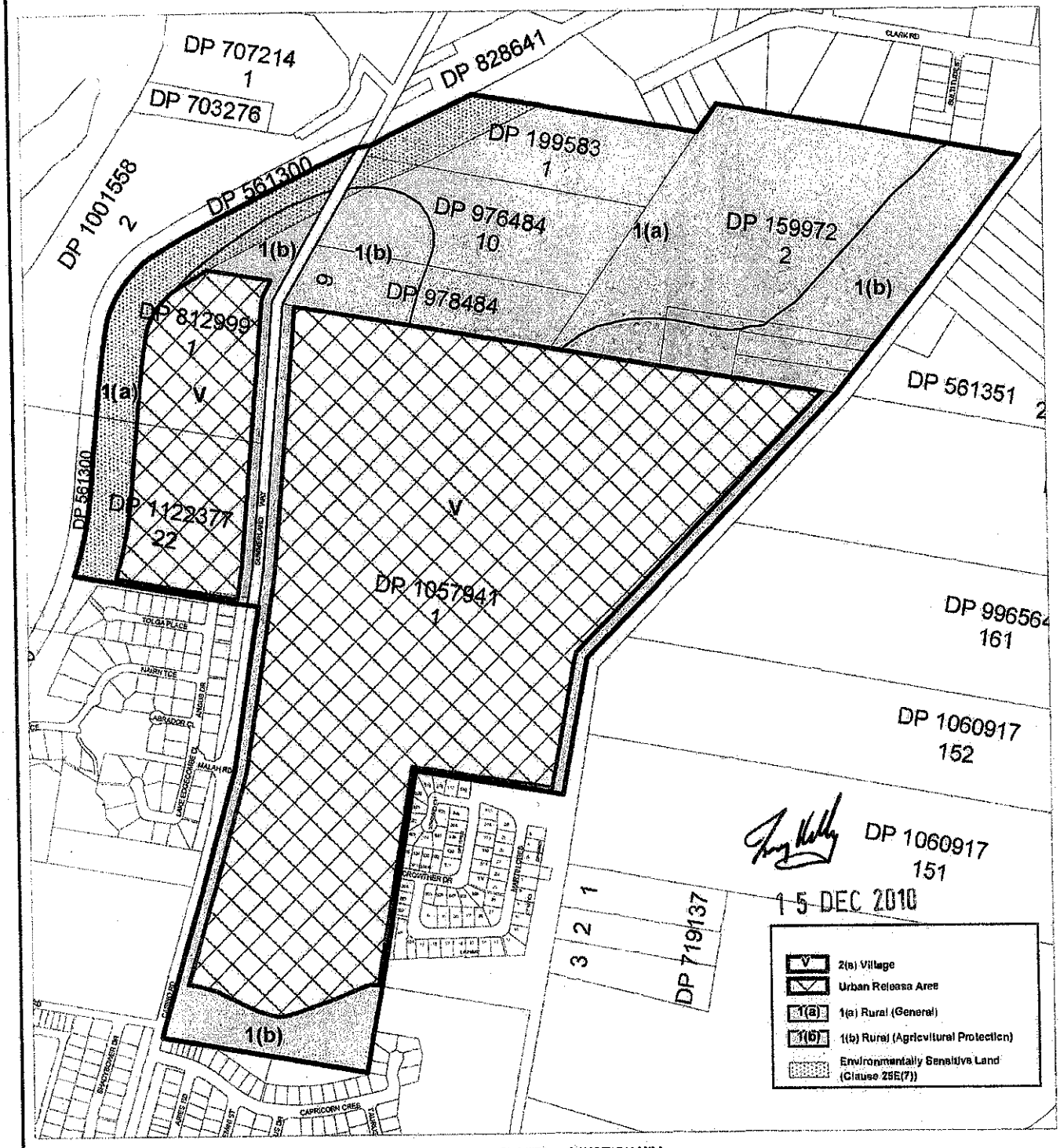
(a) thc supply of water,

(b) the supply of eleetrieity,

(c) the disposal and management of sewage.

urban release area means the land shown edged heavy red with black cross hatching on the following maps:

Copmanhurst Local Environmental Plan 1990 (Amendment No 13)



SCALE 1:7000 LOCALITY: JUNCTION HILL

ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979

Copmanhurst Local Environmental Plan 1990 (Amendment No 13)

DRAWN BY S.T DATE 25/10/10	STATEMENT OF RELATIONSHIP WITH OTHER PLANS
SUPERVISING DRAFTSMAN S.T	**Amends Copmanhurst Local Environmental Plan 1990**
PLANNING OFFICER D.MORRISON	
COUNCIL FILE NO.	
DEPT FILE NO. G97/09136	CERTIFIED IN ACCORDANCE WITH THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979, AND REGULATIONS
DATE PUBLISHED ON NSW LEGISLATION WEBSITE	for GENERAL MANAGER DATE 25/10/10

ANNEXURE D

JUNCTION HILL STAGED SUBDIVISION APPLICATION
LANDSCAPE MASTERPLAN
(JACKIE AMOS, LANDSCAPE ARCHITECT, DECEMBER 2011)


TRENAYR ROAD
LEGEND
property boundary
Stage 1 boundary
Stage 1 lots
future development
existing path & street trees to Summerland Way
vehicle & pedestrian link to river along Carrs Peninsula Road
existing tress
proposed 2m path
proposed 1.5m path
proposed avenue tree planting to Summerland Way & Trenayr Road
proposed avenue tree planting to internal road
proposed informal tree planting to internal road
proposed tree planting (random groups) to open space
proposed feature trees
proposed broad shade trees to park
proposed passive recreation node (picnic/seating/shade facilities)
proposed childrens play area
proposed park structure
proposed open play space
proposed landmark/distinct landscape
environmentally sensitive land to be protected & revegetated
park
stormwater detention
stormwater detention & treatment with bio-retention treatment
drainage reserve & access

ANNEXURE E

PRELIMINARY BIODIVERSITY ASSESSMENT REPORT (GEOLINK 2018)

GeoLINK environmental management and design

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20 November 2018
Ref No.: 3205-1003

Garrard Building Pty Limited
PO Box 538
YAMBA NSW 2464

Attn: Neil Garrard

Dear Neil

Lot 102 DP1221192 Summerland Way, Junction Hill – E Zone Assessment

This report presents the results of a preliminary Biodiversity Assessment, undertaken to assess the conservation values within the Environmental E2 zone at Lot 102 DP1221192 Summerland Way, Junction Hill ('the site'). A brief inspection was completed of the site and adjacent E2 zoned land to the south on 16 November 2018 and focused on determining the conservation values of the E2 zone (approximate width of 77 metres), such as habitat for threatened species or communities listed in the *Biodiversity Conservation Act 2016* (BC Act) or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Results of the field assessment are discussed below.

Flora

The site comprises improved pasture which has been historically cleared. Within the E2 zone, typical grassland species include Kikuyu (*Cenchrus clandestinum*), Couch (*Cynodon dactylon*) and Paspalum (*Paspalum mandiocanum, P. urvillei*). A range of agricultural weeds occur including Fireweed (*Senecio madagascariensis*), Fleabane (*Conyza bonariensis*) and Blackberry Nightshade (*Solanum nigrum*). Very few trees occur within the E2 zone (refer to **Attachment A**) and are limited to:

- 2 x isolated mature Silky Oak (*Grevillea robusta*), possibly remnant trees
- 1 x Camphor Laurel* (*Cinnamomum camphora*)
- 1 x Jacaranda* (*Jacaranda mimosifolia*) – planted tree
- 2 x Kaffir Plum* (*Harpephyllum caffrum*) – planted trees
- 1 x immature Silky Oak – planted tree
- 2 x Foam Bark Tree (*Jagera pseudorhus var. pseudorhus*)

*Introduced species

On this basis, native vegetation within the E2 zone is very sparse and limited to four naturally occurring trees within exotic grassland.

On adjacent Lot 1 DP1224325 (south of the site), a small patch of dry rainforest occurs. Emergent Hoop Pine (*Araucaria cunninghamii*) dominate, with other species including Foam Bark Tree, Shatterwood (*Backhousia sciadophora*), Small-leaved Tuckeroo (*Cupaniopsis parvifolia*), Hairy Alectryon (*Alectryon tomentosus*) and Native Holly (*Alchornea ilicifolia*). The two Foam Bark within the E2 zone on Lot 102 form part of this community.

Dry rainforest is characteristic of plant community type (PCT) 887 *Hoop Pine - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion* as per the BioNet vegetation classification. PCT 887 is analogous with the threatened ecological community (TEC) *Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*. This vegetation may also represent the federally listed TEC *Lowland Rainforest of Subtropical Australia* (further floristic assessment required).

A summary of vegetation within the E2 zone at the site is as follows:

- Native vegetation: the E2 zone is highly disturbed and contains five native trees (one of which is planted). Vegetation is not characteristic of any PCT.
- Disturbance history: the E2 zone has been cleared and modified for agriculture. Native vegetation is limited to four remnant trees.
- Threatened flora species: no threatened flora species occur.
- Threatened ecological communities: two trees within the E2 zone form part of the TEC Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions, which occurs on adjacent land to the south.
- Threatened fauna habitat: Due to the lack of woody vegetation, the site does not contain significant habitat for threatened fauna.

On this basis, the site has low biodiversity values. In contrast, the small patch of dry rainforest adjacent to the site has high biodiversity values.

Discussion

The *LEP Practice Note PN 09-002 Environmental Protection Zones* (Department of Planning 2009) states that E2 zones are for *"…areas with high ecological, scientific, cultural or aesthetic values outside national parks and nature reserves".* The Practice Note also states that:

"Prior to applying the relevant zone, the environmental values of the land should be established, preferably on the basis of a strategy or from an environmental study developed from robust data sources and analysis. This is particularly important where land is identified as exhibiting high ecological, scientific, cultural or aesthetic values outside national parks and nature reserves. For example, in most cases, council's proposal to zone land E2 needs to be supported by a strategy or study that demonstrates the high status of these values. Under such a strategy or study, zoning would need to be appropriate and land uses would need to be capable of being sustained".

The *Northern Councils E Zone Review* (Department of Planning and Environment 2015) further considered the following criteria qualified land as suitable for an E2 zone:

1. Littoral rainforests (formerly SEPP 26).
2. Coastal wetlands (formerly SEPP 14).
3. Endangered Ecological Communities (EECs) listed under the BC Act or EPBC Act.
4. Key Threatened Species Habitat.
5. Over-cleared vegetation communities.
6. Culturally significant lands.

It is evident that the E2 zone on Lot 102 meets none of these criteria and hence is a poor candidate for environmental zoning. Vegetation within the E2 zone on adjacent Lot 1 DP1224325 is a candidate for an E2 zone as it comprises a TEC. Applying conservation values for the vegetation on neighbouring Lot 1 to Lot 102 is poor environmental practice and has no relevance to areas of improved pasture.

Please contact me if you require further information.

Yours sincerely
GeoLINK

Ian Colvin
Senior Ecologist

Attachment A – Flora Features

Attachment A – Flora Features

Red polygon depicts approximate location of E2 zone

Imagery by Google Earth
Cadastre by Department Finance, Services and Innovation

ANNEXURE F

NOISE IMPACT ASSESSMENT REPORT (CARDNO DECEMBER, 2011)

Junction Hill Residential Development
Road Traffic and Rail Noise Impact Assessment Report

Project Number: A074/B1020

207

Prepared for Mike Dougherty

December 2011

Cardno (Qld) Pty Ltd
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Document Control: Junction Hill Subdivision Noise Impact Assessment					
Version		**Author**		**Reviewer**	
		Name	**Initials**	**Name**	**Initials**
1	Final	Paul Lonard	PL	Julie McDonagh	JM
2	Final	Paul Lonard	PL	Julie McDonagh	JM

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1 EXECUTIVE SUMMARY

This report assesses noise impacting the proposed subdivision location at Summerland Way, Junction Hill. The proposal is to develop the site in stages, with Stage 1A (51 residential lots) and 1B (23 residential lots) at the detailed subdivisional phase of development. The balance of the site is yet to be subdivided in detail.

The subject site is currently exposed to traffic noise from Summerland Way and Trenayr Road, rail noise from the North Coast Rail Line, and to a lesser extent, commercial activity noise.

Noise impacts were assessed against the relevant criteria contained within the following policies or guidelines:

- New South Wales EPA document *Environmental Criteria for Road Traffic Noise 1999 (ECRTN)*;
- NSW Department of Planning's document *Development Near Rail Corridors and Busy Roads – Interim Guideline2008 (DNRCBR-Interim Guideline);*
- New South Wales EPA document *Industrial Noise Policy 2000 (INP).*

Analysis of road traffic noise levels has showed that future (year 2032) road traffic noise levels are predicted to impact future dwellings at levels moderately above the criteria. To mitigate road traffic noise, future dwellings proximate to Summerland Way or Trenayr Road may require upgraded construction to achieve the internal noise criteria. Traffic noise predictions are based upon year 2032 traffic volumes as indicated in the traffic study conducted by Cardno (Traffic and Transport). A detailed analysis of traffic noise impacts is provided in Section 7, with recommendations to achieve compliance provided in Section 8. Provided the recommendations are implemented, road traffic noise impacts until the year 2032 are predicted to comply with the design benchmarks detailed in Section 6.2.

Proposed lots located within Stage 1B are located approximately 85m from the North Coast Rail Line. In accordance with the DNRCBR Interim Guideline, dwellings further than 80m from a rail line do not require acoustic treatment. In the event of future stages containing lots within 80m, a more detailed analysis of rail noise impacts can be undertaken.

Noise from the currently existing commercial premises located within the Koolkan-Trenayr industrial estate to the north of the site was observed to be inaudible during the course of a site visit. Additional traffic growth from Trenayr was factored into the traffic noise model; however the impact on lots within stages 1A and 1B is predicted to be negligible when compared to noise impacts from Summerland Way. Lots located within future stages on the north-eastern portion of the site will be the most exposed to additional traffic on Trenayr Road.

2 INTRODUCTION

This assessment was carried out to determine the predicted noise impacts affecting residential lots located within Stage 1A and 1B of the proposed subdivision at Summerland Way, Junction Hill. The assessment was conducted in accordance with the following policies or guidelines:

- New South Wales EPA document *Environmental Criteria for Road Traffic Noise 1999 (ECRTN)*;
- NSW Department of Planning's document *Development Near Rail Corridors and Busy Roads – Interim Guideline 2008 (DNRCBR-Interim Guideline);*
- New South Wales EPA document *Industrial Noise Policy 2000 (INP).*

Traffic noise impacts were determined using SoundPLAN 7.1 computer noise modelling software, which utilises Calculation of Road Traffic Noise (CoRTN) algorithms. The model was verified against noise data obtained from long term continuous noise monitoring carried out in the vicinity of the assessment area. The impacts were assessed against the noise limits contained within the *ECRTN*.

The subject site is proximate to the North Coast Rail line; therefore rail noise impacts are considered in this assessment. The assessment of rail noise is conducted in accordance with the DNRCBR-Interim Guideline.

The proposal may potentially be affected by offsite commercial activity noise, as well as noise generated by commercial uses within future stages. Noise impacts from commercial activity are to be assessed in accordance with the INP, which establishes the applicable noise limits and assessment methodology.

2.1 SITE ENVIRONS

The site is located to the north of the Junction Hill Township, on land described by the following real property description:

Lot 1 on DP1057941, part of Lot 22 on DP 1122377, and Lot 1 on DP 812999,
966, 1059, and 1111 Summerland Way, Junction Hill.

Summerland Way bounds the western boundary of No. 966 and the eastern boundaries of No. 1059 and 1111 Summerland Way. At the location of the subject site, it is currently an asphalt paved 2-lane carriageway, with a posted speed limit of 80km/h. Summerland Way is also known as Casino Road and the Bruxner Highway.

Trenayr Road bounds the eastern boundary of the site (No.966 Summerland Way). At the location of the subject site, it is currently an asphalt paved 2-lane carriageway, with a posted speed limit of 80km/h.

The North Coast Railway line bounds the north-western boundaries of the site (No.1059 and 1111 Summerland Way). The railway consists of a single line, which carries freight and long-haul diesel passenger routes. The speed zone drops from 80km/h to 60km/h at the subject site, as there is a level crossing to the north of No. 1111 Summerland Way.

Properties neighbouring the site are primarily rural or residential. The topography of the site undulates; however the majority of the site is relatively flat and consists of open grassland or paddocks.

2.2 DEVELOPMENT PROPOSAL

The proposal is to subdivide the existing parcel of land into a staged and predominately residential development. Other uses may likely include a retirement village, educational or childcare facilities, and commercial or retail development.

Access to the site will be from a new roundabout to be constructed at the existing T-Section of Summerland Way and Angus Drive.

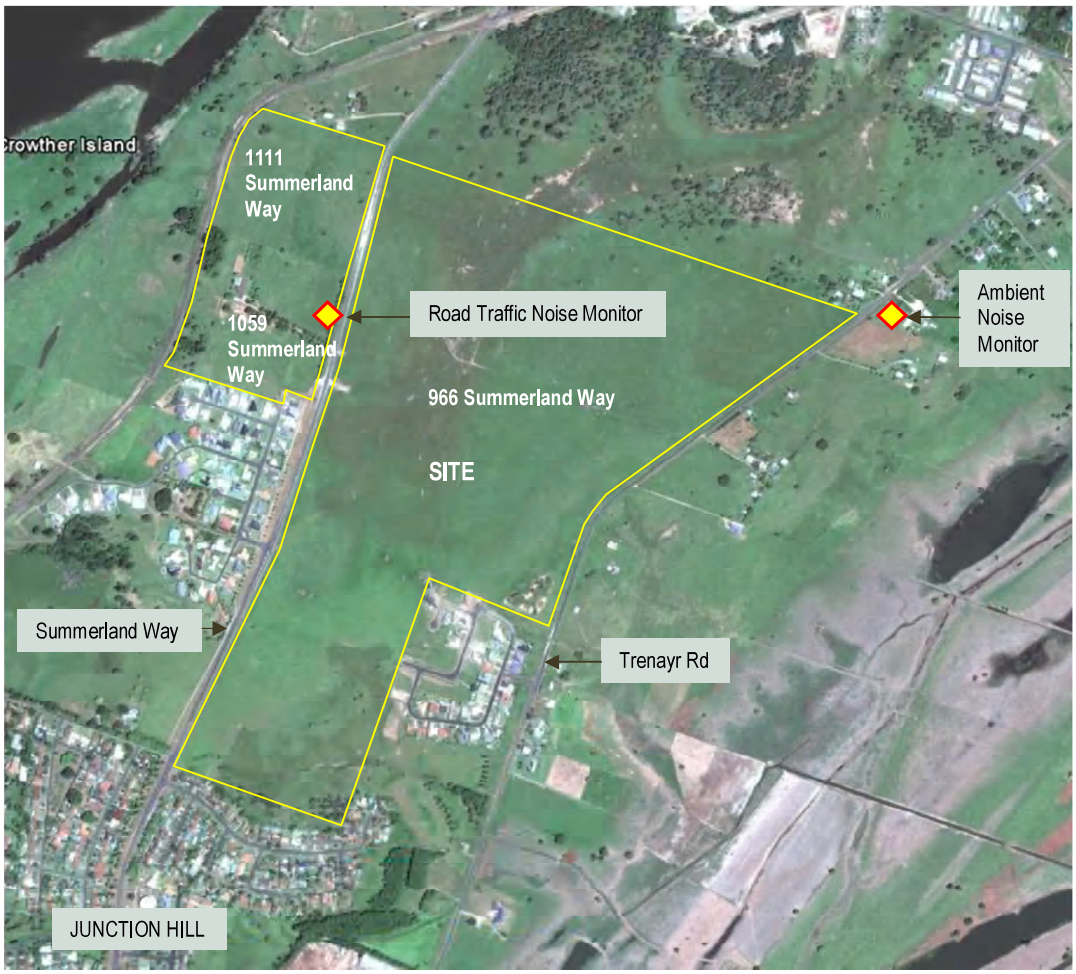
The proposal in its current form does not include dwelling designs; however it is envisaged future development may include two-storey dwellings consisting of light-weight and/or masonry construction.

Figure 1 below provides the proposed site layout.

Figure 1: Site Layout

Figure 2 below shows the site location and surrounding areas.

Figure 2: Site Location & Surrounding Areas



3 EXISTING NOISE ENVIRONMENT

3.1 ROAD TRAFFIC NOISE MONITORING METHODOLOGY

An unattended noise monitor was installed 8 metres within the eastern boundary of 1059 Summerland Way to measure traffic noise levels from Summerland Way for a period of 11 days. The logger was placed 17 metres from the edge of the carriageway, with the microphone situated approximately 2.5 metres above the road surface.

The noise monitoring was carried out using an ARL EL315 (SN# 15-299-045) noise logger configured to measure 15-minute statistics, between the 15th and 25th August 2011.

3.2 AMBIENT NOISE MONITORING METHODOLOGY

An unattended noise monitor was installed in the front yard of 256 Trenayr Road to measure ambient (i.e. background) noise levels for a period of 11 days. The logger was setback over 38 metres from Trenayr Road and was generally considered a location that would have background levels indicative of levels experienced on the subject site.

The noise monitoring was carried out using an ARL EL315 (SN# 15-299-418) noise logger configured to measure 15-minute statistics, between the 15th and 25thAugust 2011.

3.3 EQUIPMENT CALIBRATION

Calibration of the sound monitoring equipment was conducted before and after the measurement period, with a variance of less than + / - 0.4dB recorded.

3.4 METEOROLOGICAL MONITORING CONDITIONS

Weather data was sourced from the Bureau of Meteorology's Grafton Agricultural Research Centre weather station, approximately 2km east of the subject site. The environmental conditions noted during the measurement period were as follows:

Conditions:	Mostly fine with showers on the 23rd August 2011
Wind:	0-26 km/h from a predominately SW direction
Humidity:	32-91 %
Temperature:	7-22°C

3.5 MEASUREMENT PARAMETERS

As environmental noise varies with time, the use of statistical descriptors is necessary to understand and describe these variations. For road traffic noise these descriptors are further classified for day time (7am - 10pm) and night time (10pm - 7am). For environmental noise, the assessment period for day time is further split into day (7am – 6pm) and evening (6pm – 10pm). A-weighted statistical levels are used to describe ambient noise levels. The common descriptors used to describe environmental noise are described as follows:

$L_{Amax:}$ the A-weighted maximum noise level measured during the measurement period.

L_{A1}: the A-weighted noise level exceeded for 1% of the measurement period.

L_{A10}: the noise A-weighted level exceeded for 10% of the measurement period, generally referred to as the average maximum sound pressure level.

L_{A90} : the A-weighted noise level exceeded for 90% of the measurement period, generally referred to as the background noise level (refer AS 1055.1 – 1997).

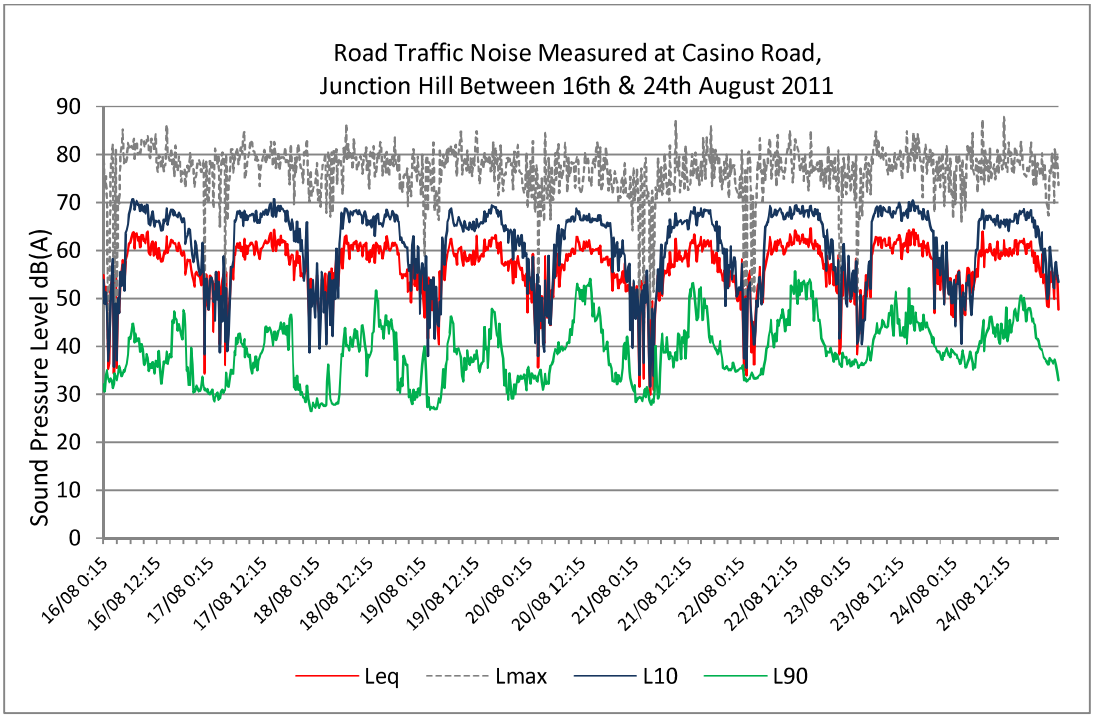
L_{Aeq} : the equivalent continuous noise level over the measurement period, generally referred to as the energy average sound pressure level over the measurement period.

4 MEASUREMENT RESULTS

4.1 MEASURED TRAFFIC NOISE LEVELS

Graphical representation of the measured traffic noise levels is presented in Figure 3 and Figure 4. Figure 3 shows noise levels measured throughout the monitoring period, with Figure 4 detailing noise levels averaged in 1 hour periods for the whole monitoring period.

Figure 3: 9 day Road Traffic Noise Levels Measured at Logger Location 1



Noise at the monitoring location predominately consisted of traffic noise from Summerland Way. Observations during site visits to install and collect the logger also identified the following noise sources that were audible at the monitoring location:

- Birds
- Insects

Figure 4: Typical 24 hour Road Traffic Noise Levels Logger Location 1

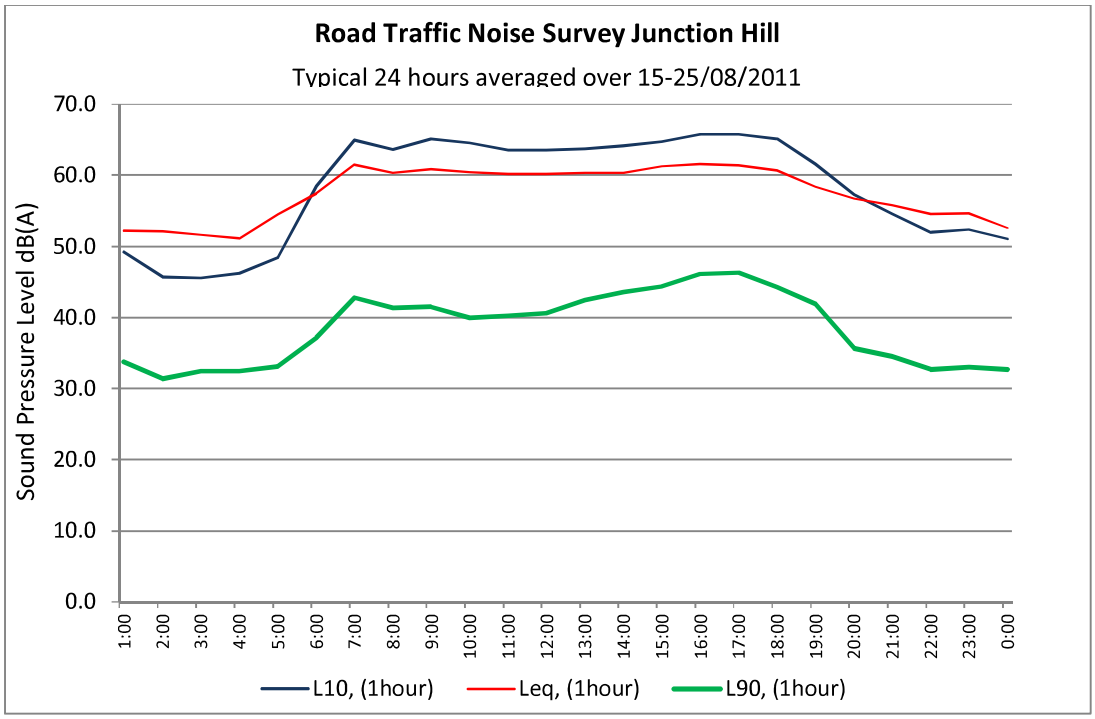


Table 1 presents the measured road traffic noise levels, with the measured $L_{eq\ 1hour}$ levels for a 24 hour period shown in Table 2.

Table 1: Summary of Averaged Noise Levels

Descriptor	*Time Period*	*Measured Noise Level, dB(A)*
$L_{A10,\ (18\ hour)}$	6am-midnight	61.4
Day $L_{Aeq,\ (15\ hour)}$	7am-10pm	60.1
Night $L_{Aeq,\ (9\ hour)}$	10pm-7am	55.8
Day $L_{Aeq,\ (1\ hour,\ max)}$	3pm-4pm	61.8
Night $L_{Aeq,\ (1\ hour,\ max)}$	6am-7am	61.6

Table 2: Measured $L_{eq\ 1hour}$ Noise Levels

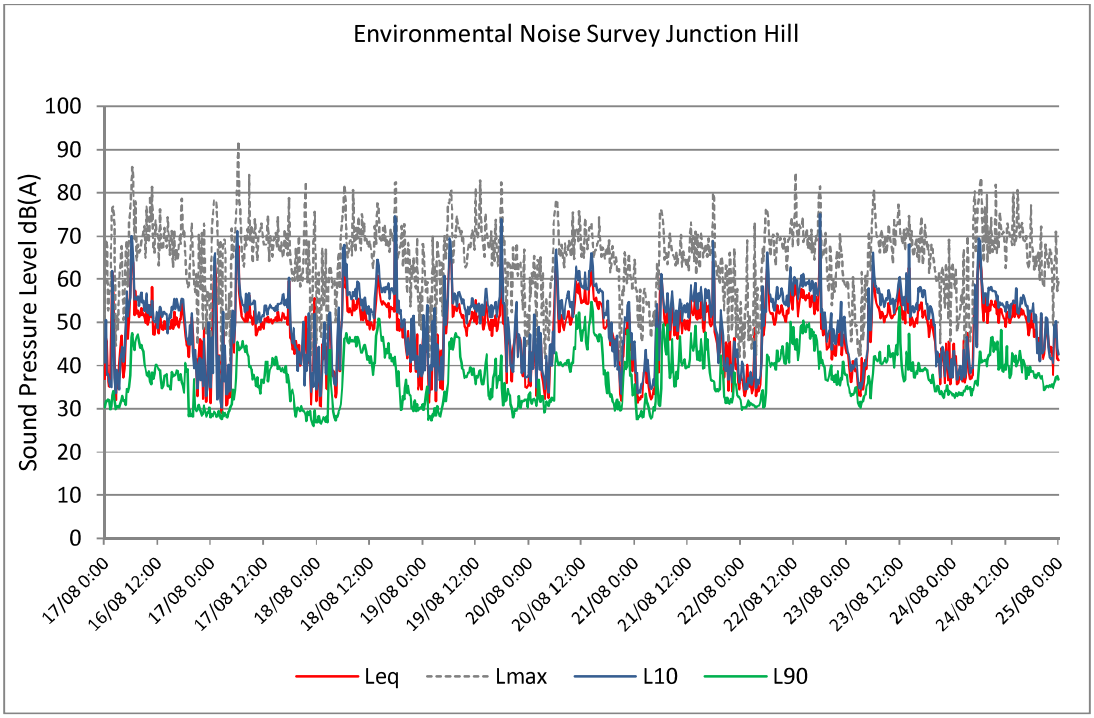
Time	*Measured Noise Level, dB(A) $L_{eq\ (1hour)}$*
12am-1am	52.4
1am-2am	52.2
2am-3am	51.8
3am-4am	50.8
4am-5am	54.3
5am-6am	57.5

Time	Measured Noise Level, dB(A) $L_{eq\ (1hour)}$
6am-7am	61.6
7am-8am	60.5
8am-9am	61.0
9am-10am	60.6
10am-11am	60.3
11am-12pm	60.5
12pm-1pm	60.4
1pm-2pm	60.6
2pm-3pm	61.5
3pm-4pm	61.8
4pm-5pm	61.5
5pm-6pm	60.7
6pm-7pm	58.6
7pm-8pm	56.8
8pm-9pm	55.9
9pm-10pm	54.6
10pm-11pm	54.8
11pm-12am	52.4

4.2 MEASURED BACKGROUND NOISE LEVELS

Graphical representation of the measured background noise levels is presented in Figure 5 and Figure 6. Figure 5 shows noise levels measured throughout the monitoring period, with Figure 6 detailing noise levels averaged in 1 hour periods for the whole monitoring period.

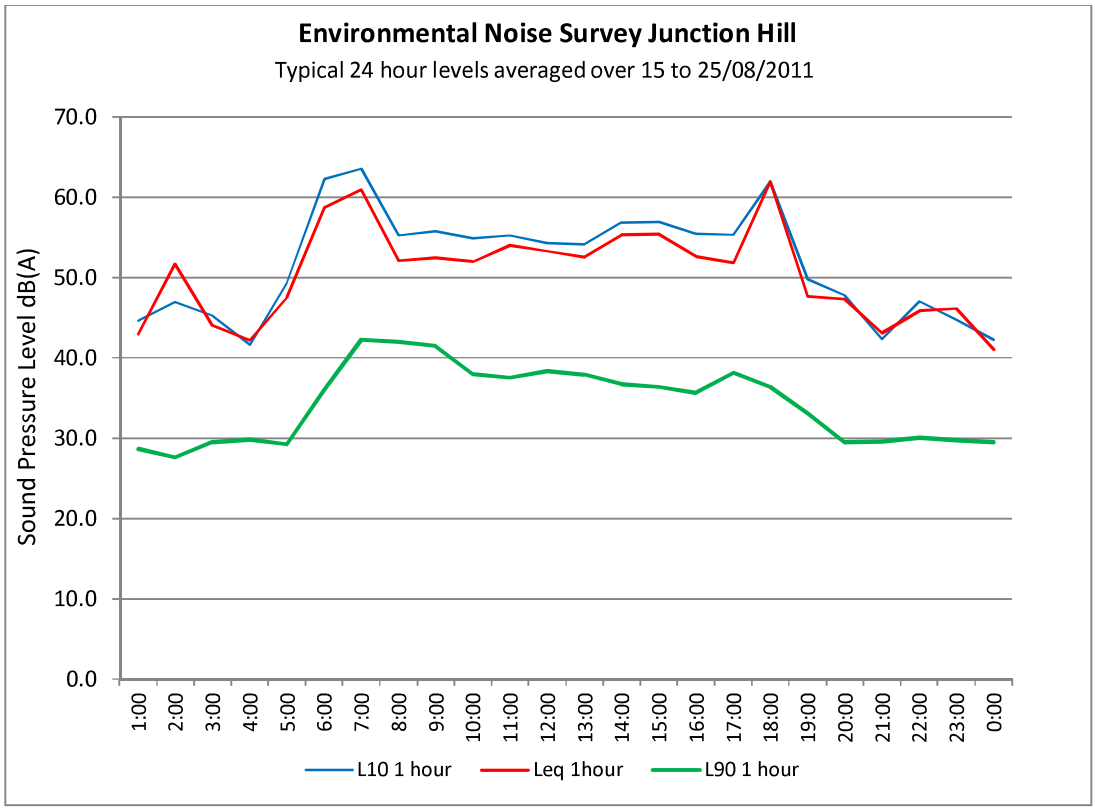
Figure 5: 9 day Ambient Noise Levels Measured at Logger Location 2



Noise at the monitoring location predominately consisted of traffic noise from Trenayr Road. Observations during site visits to install and collect the logger also identified the following noise sources that were audible at the monitoring location:

- Birds
- Insects

Figure 6: Typical 24 hour Ambient Noise Levels Logger Location 2



Elevated noise levels at 6-7am and 6pm are most likely due to birds and insects which are most active at dawn and dusk.

The measured Assessment Background Level (ABL) for each time period from each day are displayed in Table 3. The ABLs are used to determine the Rating Background Level (RBL), which forms the basis of the intrusive noise criteria (refer to Section 0).

Table 3: Measured Background Noise Levels

Date	ABL		
	Day	Evening	Night
16/08	35	28	29
17/08	35	28	27
18/08	41	30	27
19/08	35	29	28
20/08	39	30	31
21/08	37	31	28
22/08	40	36	30
23/08*	38*	33*	32*
24/08	38	35	33
RBL=	**38**	**30**	**29**

*Data excluded from the analysis due to adverse weather conditions.

5 NOISE ASSESSMENT CRITERIA

5.1 STATUTORY REQUIREMENTS

5.1.1 NSW EPA Environmental Criteria for Road Traffic Noise

Under the NSW EPA ECRTN, Summerland Way is designated as an Arterial Road, with Trenayr Road designated as a Collector Road. Justification for these assumptions is provided as follows:

- Summerland Way is the main thoroughfare between Grafton and Casino, and therefore caters for inter-regional traffic; and
- Trenayr Road collects traffics from the local area for distribution onto Summerland Way.

Given that the assessment is for a new residential development affected by collector traffic noise, the relevant criteria are detailed in Table 4.

Table 4: Environmental Criteria for Road Traffic Noise

Type of Development	*Criteria*		
	Day (7am-10pm) dB(A)	*Night (7am-10pm) dB(A)*	*Where criteria already exceeded*
2. New residential land use developments affected by freeway/arterial traffic noise	$L_{Aeq(15hr)}$55	$L_{Aeq(9hr)}$50	Where feasible and reasonable, existing noise levels should be reduced to meet the noise criteria via judicious design and construction of the development. Locations, internal layouts, building materials and construction should be chosen so as to minimise noise impacts.
5. New residential developments affected by collector traffic noise	$L_{Aeq(1hr)}$60	$L_{Aeq(1hr)}$55	Where feasible and reasonable, existing noise levels should be reduced to meet the noise criteria via judicious design and construction of the development. Locations, internal layouts, building materials and construction should be chosen so as to minimise noise impacts.

Notes to the ECRTN require acoustic assessments to take into consideration future traffic volumes, accounting for a ten year planning horizon.

The ECRTN recommends internal noise limits in the absence of formal local government development codes. An excerpt from Section 2.2 of the ECRTN is provided as follows:

> *Sleeping areas are usually the most sensitive to noise impact, so in the absence of any local codes internal levels of 35–40 dB(A) at night are recommended. As a guide for other living areas, internal noise levels 10 dB(A) below external levels are recommended on the basis of operable windows being opened sufficiently to provide adequate ventilation (refer to Building Code of Australia for additional information). For most residences this equates to a minimum of 20% of the window area left open.*

Based upon the above recommended internal noise objectives of the ECRTN, the noise limits for bedrooms and living areas applied in this assessment are detailed in Section 6.2.

5.1.2 NSW DP Development Near Rail Corridors and Busy Roads – Interim Guideline

The assessment of rail noise impacts was conducted in accordance with the NSW Department of Planning's document *Development Near Rail Corridors and Busy Roads – Interim Guideline*. The guideline specifies assessment methodology and refers to the *State Environmental Planning Policy (Infrastructure) 2007* (the 'Infrastructure SEPP') for the internal noise criteria. The internal rail noise limits from clause 87 of the Infrastructure SEPP are shown in Table 5.

Table 5: Rail Noise Limits for Habitable Spaces

Habitable space	Criteria	
	Day (7am-10pm) dB(A)	Night (10pm-7am) dB(A)
Living Area	40 L_{Aeq}	40 L_{Aeq}
Bedrooms	40 L_{Aeq}	35 L_{Aeq}

It should be noted that the infrastructure SEPP or the guideline do not define a measurement period for the assessment of rail noise impacts.

In addition to detailing internal noise limits, the guideline specifies Acoustic Assessment Zones, which are based upon the speed of rail line, the composition of rail traffic (i.e. passenger or freight) and the distance from the nearest operational track. Based upon a track speed of 80-85 km/h proximate to the site and given that freight and passenger services utilise the North Coast railway line, Zone A encompasses all lots within 40m, with Zone B encompassing lots within 40-80m of the line. Dwellings or apartments falling within Zone A shall require acoustic treatments prescribed with a full acoustic assessment once building plans are available. Zone B dwellings are required to be constructed in accordance with Road Noise Control Treatment Category 2. Category 2 requirements are specified in Appendix C of the guideline, and shown in Table 6 below.

Table 6: Road Noise Control Category 2 Requirements.

R_W of Building Elements (minimum assumed)				
Windows/ Sliding Doors	Frontage Facade	Roof	Entry Door	Floor
27	45	43	30	29

In addition to the above, the guideline advises dwellings falling within Zone B may undergo an acoustic assessment in lieu of applying the Category 2 requirements.

5.1.3 Australian Standards

The following Australian Standards provide criteria and methodology that has been adopted in this assessment.

- Australian Standard AS 2702 – 1984, Methods for the Measurement of Road Traffic Noise.
- Australian Standard AS3671:1989, Acoustics – Road Traffic Noise Intrusion – Building Siting & Construction.

AS3671:1989

AS 3671 provides methods to determine the required Traffic Noise Reduction and the types of construction required to achieve this reduction. The standard references the internal design sound levels listed in AS/NZS 2107.

In accordance with Clause 3.2 of AS3671, the worst case Traffic Noise Reduction (TNR) can be calculated and associated category construction adopted.

The required categories are defined as follows:

3.2.1 *Category 1. Standard construction; openings, including open windows and doors may comprise up to 10% of the exposed facade. TNR of approximately 10 dB(A) is expected.*

3.2.2 *Category 2. Standard construction, except for lightweight elements, such as fibrous cement, or metal cladding, or all glass facades. Windows, doors and other openings must be closed. TNR of approximately 25 dB(A) is expected.*

3.2.3 *Category 3. Special construction, chosen in accordance with Clause 3.4. Windows, doors and other openings must be closed. TNR between 25 and 35 is expected.*

3.2.4 *Category 4. TNR greater than 35 dB(A) is required; special acoustic advice should be sought.*

5.2 DEPARTMENT OF ENVIRONMENT CLIMATE CHANGE AND WATER (DECCW)

The noise criteria for industrial noise emission within NSW are set by the guidelines in the DECCW's Industrial Noise Policy (INP).

There are two objectives in the Industrial Noise Policy, these are to preserve the amenity of the environment and to also protect against noise intrusion. To protect amenity the existing noise from industrial sources is compared against acceptable levels for a particular land use. If the current levels are close to or approaching these acceptable levels then restrictions on the level of new noise emission may apply.

Noise intrusion is controlled by limiting the amount by which noise levels can increase above the existing noise levels for each new development or significant plant item introduced during an upgrade.

During an assessment it is identified whether the intrusive criterion or the amenity criterion is more stringent. The more stringent becomes the project specific criterion within each time period for the development or upgrade.

Separate criteria are defined for the daytime (7am to 6pm), evening (6pm to 10pm) and night-time assessment periods (10pm to 7am) to reflect the change in ambient noise levels within a 24 hour period.

5.2.1 Intrusive Noise Criteria

The intrusive criteria are established from the ambient L_{A90} background noise level (in the absence of the noise source to be assessed) at the nearest sensitive receivers. The statistical analysis of the background noise level is termed the Rating Background Level (RBL). The intrusive criterion used to assess the predicted noise level associated with the project is then determined by adding 5dBA to the RBL level.

The intrusive noise criteria for this site that are shown below in Table 7, are based upon the RBL's displayed in Table 3 of Section 4.2.

Table 7: Intrusive Criteria for Industrial Noise Emissions

Intrusive Noise Criteria ($L_{Aeq\ (15minute)}$) dBA		
Daytime (7am to 10pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
43	35	34

5.2.2 Amenity Noise Criteria

The amenity assessment is based upon the noise criteria specific to land use and associated activities, and is expressed in L_{Aeq} over specified time periods. The amenity criteria are set out in full in Table 2.1 of the NSW Industrial Noise Policy. Under the INP guidelines the site would be classified as "suburban", as the acoustic environment is generally dominated by local traffic with intermittent flows and some limited commerce or industry. In the evening it is dominated by the natural environment and infrequent human activity.

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Note that the land use classification may not relate to Council planning definitions of land use. These are separate definitions within the INP that relate to the acoustic environment. The applicable amenity noise goals during the day, evening and night-time periods for residential receivers near the site are reproduced in Table 8.

Table 8: INP Recommended Amenity Criteria

Type of Receiver	*Indicative Noise Amenity Area*	*Time of Day*	*Acceptable L_{Aeq} noise level*	*Recommended Maximum L_{Aeq}*
Residence	Rural	Day	50 dBA	55 dBA
		Evening	45 dBA	50 dBA
		Night	40 dBA	45 dBA
Residence	Suburban	Day	55dBA	60dBA
		Evening	45 dBA	50 dBA
		Night	40 dBA	45dBA
Commercial	All	When in use	65 dBA	70dBA

6 DESIGN BENCHMARKS

6.1 EXTERNAL ROAD TRAFFIC NOISE

Table 9 summarises the adopted external road traffic noise criteria for this development.

Table 9: Summary of Adopted Road Traffic Noise Criteria

Noise Source	*Assessment Descriptor*	*Measurement Location*	*Criteria Reference*	*Relevant External Noise Criteria*
Summerland Way	$L_{eq,\ 15hr}$(Between 7am and 10pm)	One metre in front of the most exposed part of a proposed noise sensitive place	ECRTN 1999	55 dB(A)
Summerland Way	$L_{eq,\ 9hr}$(Between 10pm and 7am)	One metre in front of the most exposed part of a proposed noise sensitive place	ECRTN 1999	50 dB(A)
Trenayr Road	$L_{eq,\ 1hr}$(Maximum1hour period between 7am and 10pm)	One metre in front of the most exposed part of a proposed noise sensitive place	ECRTN 1999	60 dB(A)
Trenayr Road	$L_{eq,\ 1hr}$(Maximum1hour period between 10pm and 7am)	One metre in front of the most exposed part of a proposed noise sensitive place	ECRTN 1999	55 dB(A)

Where the above criteria cannot be met, road traffic noise levels inside the dwellings are required to comply with the internal noise levels as defined in Section 6.2.

6.2 INTERNAL ROAD TRAFFIC NOISE

Table 10 summarises the adopted internal road traffic noise criteria for this development, which are applicable when the predicted 2032 external noise levels are above the noise limits detailed in Table 9.

Table 10: Adopted internal noise limits – Road Traffic Noise

Noise Source	*Habitable space*	*Criteria*	
		Day (7am-10pm) dB(A)	*Night (10pm-7am) dB(A)*
Summerland Way	Living Area	$L_{Aeq(15hr)}$45	$L_{Aeq(9hr)}$40
	Bedrooms	N/A	$L_{Aeq(9hr)}$40
Trenayr Road	Living Area	$L_{Aeq(1hr)}$50	$L_{Aeq(1hr)}$45
	Bedrooms	N/A	$L_{Aeq(1hr)}$40

6.3 INTERNAL RAIL NOISE

Table 10 summarises the adopted internal rail noise limits for this development, for allotments located within 80m of the North Coast railway line.

Table 11: Adopted internal noise limits – Rail Noise

Habitable space	Criteria	
	Day (7am-10pm) dB(A)	Night (10pm-7am) dB(A)
Living Area	$L_{Aeq(1hr)}$40	$L_{Aeq(1hr)}$40
Bedrooms	$L_{Aeq(1hr)}$40	$L_{Aeq(9hr)}$35

6.3.1 Project Specific Noise Criteria

The noise limits for industrial or commercial noise, as assessed inside the affected dwellings property boundary, are detailed in Table 12. The noise limits represent the more stringent of the intrusive criteria or the amenity criteria; however for all time periods the intrusive noise criteria was the determining factor.

Table 12: Adopted INP noise limits – Industrial and Commercial Noise

Time Period	Intrusive Noise Limit, $L_{eq\ (15min)}$ dB(A)	Amenity Noise Limit, $L_{eq\ (15min)}$ dB(A)	Most Stringent Noise Limit, $L_{eq\ (15min)}$ dB(A)
Day 7am – 6pm	43	55	**43**
Evening 6pm – 10pm	35	45	**35**
Night 10pm – 7am	34	40	**34**

7 NOISE ASSESSMENT METHODOLOGY

7.1 ROAD TRAFFIC NOISE

SoundPlan 7.1 computer modelling software was used to predict noise levels from Summerland Way and Trenayr Road impacting the proposed development site. Proposed site plans and future traffic volumes were used to generate modelling scenarios for the year 2032. Information included in the model is detailed as follows:

- Existing 3D topography of the site, surrounds and nearby road alignments supplied by Cardno.
- Road traffic flows for Summerland Way and Trenayr Road based upon year 2032 traffic volumes.
- Road traffic speeds, and heavy vehicles as detailed in Table 14.
- Dense Graded Asphalt (DGA) road surface on all modelled roads.

7.1.1 Noise Model Inputs & Assumptions

Table 13 details the traffic input data used for modelling the existing scenario.

Table 13: Noise modelling inputs

Input Parameter	*Input Date/Source Reference*
Ground Elevation Geometry	Provided by Cardno
Road Alignment	Provided by Cardno
Current Traffic Data	Provided by Austraffic refer to Section7.1.2
Future Traffic Data	Provided by Cardno refer to Section7.1.2
Road Traffic Speeds	50 and 80km/h, the posted speed limits for Summerland Way 80km/h, the posted speed limit for Trenayr Road
Road Surface Type	Modelling has assumed a pavement surface of Dense Grade Asphalt indicating a correction factor of 0 dB(A) to be applied to all modelling scenarios
Ground Absorption	Assumed 100% soft ground absorption surfaces between road and receivers (i.e. grass)
Correction to CoRTN for Australian Conditions	-0.7 dB(A) CoRTN correction for Australian conditions (free field) -1.7 dB(A) CoRTN correction for Australian conditions (facade corrected)
Receiver Height	Assumed to be 1.8 metre above ground level for ground level and 4.6 metres above ground level for 2nd storeys.

Buildings were not included in the modelling as the size, height, and locations of future dwellings are not known at this stage. Without the inclusion of shielding that would be provided by onsite dwellings, the model provides a conservative assessment of predicted road traffic noise impact.

7.1.2 Traffic Volumes

Current traffic data for inclusion in the model was obtained from surveys conducted by Austraffic (August 2011), with year 2032 traffic projections conducted by Cardno (Traffic and Transport division). Traffic surveys conducted in 2011 are summarised in Table 14with traffic projections for the year 2032 summarised in Table 15.

Table 14: Year 2011 Traffic modelling inputs

Road segment	*AADT*	*% Heavy Vehicles*	*Traffic Speed, km/h*
Summerland Way, north of Angus Drive	2,790	10.7	80
Summerland Way, south of Angus Drive	3,270	9.8	50-80
Trenayr Road, north of Martin Crescent	845	8.2	80

Table 15: Year 2032 Traffic modelling inputs

Road segment	*AADT*	*% Heavy Vehicles*	*Traffic Speed, km/h*
Summerland Way, north of Angus Drive	9,453	10.7	80
Summerland Way, south of Angus Drive	14,115	9.8	50-80
Trenayr Road, north of Martin Crescent	3,702	8.2	80

7.1.3 Modelled Scenarios

The SoundPLAN software was set to determine predicted traffic noise levels using the Calculation of Road Traffic Noise (CoRTN) algorithm. The following scenarios were included in the noise model:

1 Model Verification: Existing road traffic noise model based on the modelling inputs supplied for 2011, This model included a -0.7 dB(A) CoRTN correction factor for Australian Conditions added. The results of the model verification are discussed in Section 7.1.4.

2 Summerland Way - receiver points for current situation: Noise predictions for the year 2011 were conducted at ground level (1.8m) and first floor level (4.6m) receiver points. The receiver points were assessed with a 5 metre setback from the property boundary fronting Summerland Way. Measured levels (refer to Section 4.1) were used as the basis for determining the predicted $L_{eq\ 15\ hour}$ and $L_{eq\ 9\ hour}$ values from the predicted $L_{10\ 18\ hour}$ levels. The results of the receiver point predictions are shown in Section 7.1.5.

3 Summerland Way - receiver points year 2032: Noise predictions for the year 2032 were conducted at ground level (1.8m) and first floor level (4.6m) receiver points. The receiver points were assessed with a 5 metre setback from the property boundary fronting Summerland Way. Measured levels (refer to Section 4.1) were used as the basis for determining the predicted $L_{eq\ 15\ hour}$ and $L_{eq\ 9\ hour}$ values from the predicted $L_{10\ 18\ hour}$ levels. The results of the receiver point predictions are shown in Section 7.1.5.

4 Summerland Way - Day $L_{eq\ (15\ hour)}$ noise level contours: Predicted road traffic noise levels were based on the modelling inputs for the year 2032, with a receiver height of 1.8m and 4.6m above ground level to represent 1 and 2 storey dwellings respectively. Noise levels in this model were calculated as the day time $L_{eq\ (15\ hour)}$, with the results presented in Appendix B, Figure B1 (ground level) and Figure B2 (first floor level).

5 Summerland Way - Night $L_{eq\ (9\ hour)}$ noise level contours: Predicted road traffic noise levels were based on the modelling inputs for the year 2032, with a receiver height of 1.8m and 4.6m above ground level to represent 1 and 2 storey dwellings respectively. Noise levels in this model were calculated as the day time $L_{eq\ (9\ hour)}$, with the results presented in Appendix B, Figure B3 (ground level) and Figure B4 (first floor level).

6 Trenayr Road - Day $L_{eq\ (1hour,\ max)}$ noise level contours: Predicted road traffic noise levels were based on the modelling inputs for the year 2032, with a receiver height of 1.8m and 4.6m above ground level to represent 1 and 2 storey dwellings respectively. Noise levels in this model were calculated as the day time $L_{eq(1hour,\ max)}$, with the results presented in Appendix B, Figure B5 (ground level) and Figure B6 (first floor level).

7 Trenayr Road - Night $L_{eq\ (1hour,\ max)}$, noise level contours: Predicted road traffic noise levels were based on the modelling inputs for the year 2032, with a receiver height of 1.8m and 4.6m above ground level to represent 1 and 2 storey dwellings respectively. Noise levels in this model were calculated as the night time $L_{eq\ (1hour,\ max)}$, with the results presented in Appendix B, Figure B7 (ground level) and Figure B8 (first floor level).

All model scenarios (excluding the model verification) included a +2.5 dB(A) facade correction, and a further -1.7 dB(A) CoRTN correction factor for Australian conditions (i.e. resulting in a net correction factor of +0.8dB(A)).

7.1.4 Noise Model Verification

Verification of the modelling program, Sound Plan 7.1, was undertaken prior to the prediction of future traffic noise levels. An iteration of the model was developed using existing (2011) traffic data (refer to Table 16) and current site conditions to generate a predicted SPL ($L_{A10,\ 18hr}$) for comparison to the measured SPL ($L_{A10,\ 18hr}$).

Table 16 below shows the parameters applied in the verification:

Table 16: Modelling Parameters – Summerland Way – Existing Traffic (2011)

Parameter	*Value*
Traffic Volume (24 hours)	2,790 vehicles
Percentage heavy vehicles	10.9 %
Road Surface	Dense Graded Asphalt (DGA)
Traffic Speed	80km/hr
Number of Lanes	1 lane in each direction

To reflect the free-field measurement location, the model verification was determined as a free-field level, with the results shown in Table 17.

Table 17: Modelling Verification Results

Measurement Parameter	*Predicted, dB(A)*	*Measured, dB(A)*	*Difference, dB(A)*
$L_{A10,18hr}$	62.1	61.4	+0.7

As the NSW RTA allowable deviation is within +/-2.0 dB(A) tolerance, the model was considered to be verified.

7.1.5 Predicted Traffic Noise Levels

Predicted levels are provided for each lot within Stages 1A and 1B of the proposed subdivision. The receiver points include ground floor (1.8m above ground) and first floor (4.6m above ground) locations, to account for one or two storey dwellings. Future dwelling facades were assumed to incorporate a minimum setback distance of 5m from the property boundary that faces Summerland Way. The Sound PLAN 7.1 model predicts traffic noise levels for the year 2032 as presented in Table 18.

Table 18: Predicted year 2032 traffic noise levels

Stage.Lot	Floor	Predicted 2011 Noise Level, dB(A)		Predicted 2032 Noise Level, dB(A)		Construction Category	
		$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	Living	Bedrooms
1A.1	ground	50	46	57	52	2	2
	first	52	48	58	54	2	2
1A.2	ground	49	45	55	51	-	2
	first	51	46	57	53	2	2
1A.3	ground	48	44	54	50	-	-
	first	50	45	56	52	2	2
1A.4	ground	47	43	54	49	-	-
	first	49	45	55	51	-	2
1A.5	ground	46	42	53	49	-	-
	first	48	44	54	50	-	-
1A.6	ground	46	41	52	48	-	-
	first	47	43	54	49	-	-
1A.7	ground	45	41	52	47	-	-
	first	47	42	53	49	-	-
1A.8	ground	45	40	51	47	-	-
	first	46	42	53	48	-	-
1A.9	ground	50	46	57	52	2	2
	first	52	47	58	54	2	2
1A.10	ground	49	45	55	51	-	2
	first	51	46	57	53	2	2
1A.11	ground	48	44	54	50	-	-
	first	50	45	56	52	2	2
1A.12	ground	47	43	54	49	-	-
	first	49	44	55	51	-	2
Stage.Lot	Floor	Predicted 2011 Noise Level, dB(A)		Predicted 2032 Noise Level, dB(A)		Construction Category	

		$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	Living	Bedrooms
1A.13	ground	46	42	53	49	-	-
	first	48	44	54	50	-	-
1A.14	ground	46	41	52	48	-	-
	first	47	43	54	49	-	-
1A.15	ground	45	41	51	47	-	-
	first	46	42	53	49	-	-
1A.16	ground	44	40	51	47	-	-
	first	46	42	53	48	-	-
1A.17	ground	51	47	58	53	2	2
	first	53	49	59	55	2	2
1A.18	ground	50	45	56	52	2	2
	first	52	47	58	54	2	2
1A.19	ground	49	44	55	51	-	2
	first	50	46	57	53	2	2
1A.20	ground	48	43	54	50	-	-
	first	49	45	56	52	2	2
1A.21	ground	47	42	53	49	-	-
	first	49	44	55	51	-	2
1A.22	ground	46	42	52	48	-	-
	first	48	43	54	50	-	-
1A.23	ground	45	40	51	47	-	-
	first	47	42	53	49	-	-
1A.24	ground	44	40	51	46	-	-
	first	46	42	53	48	-	-

Stage.Lot	Floor	Predicted 2011 Noise Level, dB(A)		Predicted 2032 Noise Level, dB(A)		Construction Category	
		$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	Living	Bedrooms

1A.25	ground	43	39	50	46	-	-
	first	45	41	52	47	-	-
1A.26	ground	42	38	49	45	-	-
	first	43	39	50	46	-	-
1A.27	ground	41	37	48	44	-	-
	first	43	38	49	45	-	-
1A.28	ground	40	36	47	43	-	-
	first	41	37	48	44	-	-
1A.29	ground	41	36	47	43	-	-
	first	41	37	48	43	-	-
1A.30	ground	41	37	48	43	-	-
	first	42	38	49	45	-	-
1A.31	ground	43	39	50	45	-	-
	first	44	39	51	46	-	-
1A.32	ground	43	38	50	45	-	-
	first	44	40	51	47	-	-
1A.33	ground	43	39	50	46	-	-
	first	45	41	52	48	-	-
1A.34	ground	44	39	51	46	-	-
	first	45	41	52	48	-	-
1A.35	ground	44	39	51	46	-	-
	first	45	41	52	48	-	-
1A.36	ground	44	39	51	46	-	-
	first	45	41	52	48	-	-
1A.37	ground	44	40	51	46	-	-
	first	45	41	52	48	-	-
Stage.Lot	***Floor***	***Predicted 2011 Noise Level, dB(A)***		***Predicted 2032 Noise Level, dB(A)***		***Construction Category***	
		$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	***Living***	***Bedrooms***
1A.38	ground	45	41	52	47	-	-

	first	47	42	53	49	-	-
1A.39	ground	45	41	52	47	-	-
	first	47	42	53	49	-	-
1A.40	ground	46	42	53	48	-	-
	first	48	44	54	50	-	-
1A.41	ground	46	42	53	48	-	-
	first	48	44	54	50	-	-
1A.42	ground	46	42	53	48	-	-
	first	48	44	54	50	-	-
1A.43	ground	46	42	53	48	-	-
	first	48	44	54	50	-	-
1A.44	ground	46	42	53	48	-	-
	first	48	44	54	50	-	-
1A.45	ground	48	43	54	50	-	-
	first	49	45	56	51	2	2
1A.46	ground	49	44	54	50	-	-
	first	50	46	56	52	2	2
1A.47	ground	50	45	55	51	-	2
	first	51	47	57	53	2	2
1A.48	ground	51	46	57	52	2	2
	first	53	48	59	54	2	2
1A.49	ground	52	48	58	54	2	2
	first	54	50	60	56	2	2
1A.50	ground	59	54	64	60	2	2
	first	60	56	66	62	3	3
Stage.Lot	***Floor***	***Predicted 2011 Noise Level, dB(A)***		***Predicted 2032 Noise Level, dB(A)***		***Construction Category***	
		$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	***Living***	***Bedrooms***
1A.51	ground	59	54	64	60	2	2
	first	61	56	66	62	3	3

1A.200	ground	59	55	66	62	3	3
1A.300	ground	51	47	58	53	2	2
1B.2	ground	46	42	52	47	-	-
	first	48	44	53	49	-	-
1B.3	ground	46	42	52	47	-	-
	first	48	44	53	49	-	-
1B.4	ground	46	42	51	47	-	-
	first	48	44	53	49	-	-
1B.5	ground	46	42	51	47	-	-
	first	48	43	53	49	-	-
1B.6	ground	45	41	51	47	-	-
	first	47	43	53	48	-	-
1B.7	ground	46	42	52	47	-	-
	first	48	44	53	49	-	-
1B.8	ground	47	43	53	49	-	-
	first	49	45	54	50	-	-
1B.9	ground	48	44	54	50	-	-
	first	50	46	55	51	-	2
1B.10	ground	49	45	55	51	-	2
	first	51	47	57	52	2	2
1B.11	ground	51	46	56	52	2	2
	first	52	48	58	54	2	2
1B.12	ground	52	48	58	53	2	2
	first	54	50	59	55	2	2
Stage.Lot	***Floor***	***Predicted 2011 Noise Level, dB(A)***		***Predicted 2032 Noise Level, dB(A)***		***Construction Category***	
		$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	$L_{eq\ 15\ hour}$	$L_{eq\ 9hour}$	***Living***	***Bedrooms***
1B.13	ground	58	54	63	59	2	2
	first	60	55	65	61	2	3
1B.14	ground	58	54	63	59	2	2

	first	60	55	65	61	2	3
1B.15	ground	58	54	63	59	2	2
	first	60	55	65	61	2	3
1B.16	ground	58	54	63	59	2	2
	first	60	55	65	61	2	3
1B.17	ground	53	48	58	54	2	2
	first	54	50	60	55	2	2
1B.18	ground	51	46	56	52	2	2
	first	52	48	58	54	2	2
1B.19	ground	49	45	55	51	-	2
	first	51	47	57	52	2	2
1B.20	ground	48	44	54	49	-	-
	first	50	46	55	51	-	2
1B.21	ground	48	44	54	49	-	-
	first	50	46	55	51	-	2
1B.22	ground	48	44	54	50	-	-
	first	50	46	56	51	2	2
1B.23	ground	49	45	55	51	-	2
	first	51	47	57	52	2	2
1B.24	ground	51	46	56	52	2	2
	first	53	48	58	54	2	2
1B.25	ground	52	48	58	54	2	2
	first	54	50	60	55	2	2

Based on the predicted levels displayed in Table 18, Lots 1A.50, 1A.51 and 1B.13 to 1B.16 are the worst affected lots and will require AS3671 Category 2 construction, with Category 3 construction for bedrooms located on the first floor when 2-storey dwellings are proposed. The remainder of traffic noise affected lots will be required to be designed and built in accordance with AS3671 Category 2 construction requirements.

Constructing the dwellings in accordance with AS3671 Construction Category requirements is to ensure traffic noise levels within future dwellings comply with the internal noise benchmarks (refer to Section 6.2).

The use of acoustic barriers was considered in this assessment; however the following aspects would compromise their effectiveness:

- Long street frontage distances;
- A height in excess of 4.5m would be required to remove requirements for construction categories at ground floor level;
- Ineffectiveness at reducing noise levels (and the applicable construction category) at the 2nd level of 2-storey dwellings, where bedrooms are most likely to be situated;
- Leakage at site access points (i.e. a barrier cannot continue through the proposed roundabout at the intersection of Angus Drive and Summerland Way).

Where predicted noise levels trigger a requirement for a Construction Category of 2 or higher, recommendations for compliance with the internal design benchmarks (refer to Section 6.2) are provided in further detail in Section 8.

Traffic noise at receivers not prescribed with a construction category, were predicted to comply with the external noise objectives (refer to Section 6.1); therefore acoustic treatment of dwellings is not required on these lots.

7.2 RAIL NOISE

Proposed lots located within stages 1A and 1B are over 80 metres from the North Coast Rail Line and will not require any acoustic treatment to achieve compliance with the criteria detailed in Section 5.1.2.

7.3 OFFSITE COMMERCIAL/INDUSTRIALNOISE

A site survey conducted at 3pm on the 15th of August 2011 identified a number of commercial premises located within the KoolKan-Trenayr Industrial Estate, situated approximately 300m north of the subject site. The following land uses were identified:

- Storage Sheds;
- Junkyards;
- Farm equipment supplies;
- Joinery;
- Dent Timber;
- Boral timber;
- JJ Richards;
- Piggery equipment supplies; and
- Residential dwellings.

These land uses were observed to be inaudible at the northern boundary of the subject site, therefore further mitigation measures are not recommended. Sufficient buffer distance and building screening contribute to attenuating noise impacts between the Trenayr Industrial Estate and the subject site.

8 RECOMMENDATIONS

8.1 ROAD TRAFFIC NOISE

8.1.1 Stages 1A and 1B

Traffic noise levels at lots fronting Summerland Way are predicted to exceed the external design benchmarks detailed in Section 6.1, therefore traffic noise affected lots will require further acoustic treatments to achieve compliance with the internal design benchmarks detailed in Section 6.2. To ensure compliance, future noise affected dwellings as identified in Table 18 of this report should be constructed in accordance with AS3671:1989 Acoustics – Road traffic noise intrusion-Building siting and construction.

Future dwellings fronting Summerland Way will be required to achieve a traffic noise reduction (TNR) of up to 27dB(A) to achieve compliance with the internal noise objectives.

Dwellings requiring Category 2 construction (refer to Table 18), must meet the following requirement:

> ***3.2.2*** *Category 2. Standard construction, except for lightweight elements, such as fibrous cement, or metal cladding, or all glass facades. Windows, doors and other openings must be closed. TNR of approximately 25 dB(A) is expected.*

Dwellings requiring Category 3 construction (refer to Table 18), must meet the following requirement:

> ***3.2.3*** *Category 3. Special construction, chosen in accordance with Clause 3.4. Windows, doors and other openings must be closed. TNR between 25 and 35 is expected.*

Traffic noise affected lots predicted to require AS3671 Category 2 or 3 construction are graphically displayed in Appendix C, Figure C1.

If the above recommendations are adhered to, road traffic noise impacting future onsite development is predicted to comply with the adopted design benchmarks detailed in Section 6.2 of this report.

8.1.2 Future Stages

Noise contour maps presented in Appendix B show that noise levels at future stages of the subdivision are predicted to exceed the external noise criteria. Based on current requirements, a further traffic noise assessment should be conducted to ensure future development complies with the criteria detailed in Section 5.1.1. Assessments should be conducted once detailed plans of the subdivision layouts are available.

8.2 RAIL NOISE

Currently, proposed allotments are located approximately 85 metres from the North Coast rail line; therefore further acoustic treatments will not be necessary.

Should future stages include allotments within the designated buffer, a detailed assessment of rail noise impacts would be required. Based on current requirements, the assessment would be conducted to ensure compliance with the criteria detailed in Section 5.1.2.

8.3 COMMERCIAL ACTIVITY NOISE

The current proposal does not include detailed designs of commercial premises (e.g. retail, childcare centres, etc.). A detailed assessment of noise impacts can be conducted once plans for commercial premises eventuate. Based upon current requirements, assessments would be conducted to ensure compliance with the criteria detailed in Section 5.

9 CONCLUSIONS

A full acoustic assessment was conducted for Stage 1A & 1B of the proposed subdivision located at Summerland Way, Junction Hill. Recommendations are provided in Section 8 to allow predicted noise levels to comply with the criteria detailed in Section 5, based on the assumptions and predictions contained within this report.

If the above recommendations are adhered to, road traffic noise impacting future onsite development is predicted to comply with the adopted design benchmarks detailed in Section 6.2 of this report.

Noise contour maps presented in Appendix B show that noise levels at future stages of the subdivision are predicted to exceed the external noise criteria. To ensure future development complies with the criteria detailed in Section 5.1.1, future subdivision layouts should be verified against the traffic noise model once detailed plans are available.

Currently, proposed allotments are located approximately 85 metres from the North Coast rail line; therefore further acoustic treatments to control rail noise impact will not be necessary in accordance with Infrastructure SEPP.

The offsite commercial land uses located to the north of the development site were observed to be inaudible at the northern boundary of the site, therefore further mitigation measures are not recommended. Sufficient buffer distance and building screening contribute to attenuating noise impacts between the Trenayr Industrial Estate and the subject site.

Appendix A

Technical Terms

APPENDIX A – TECHNICAL TERMS

A-weighted Level:
As per dB(A) defined below.

Ambient Sound:
Of an environment: the all-encompassing sound associated with that environment, being a composite of sounds from many sources, near and far.

Background Sound Level:
The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted external ambient noise sources.

Decibel, dB:
Unit of acoustic measurement. Measurements of power, pressure and intensity may be expressed in dB relative to standard reference levels.

dB(A):
Unit of acoustic measurement electronically weighted to approximate the sensitivity of human hearing to sound frequency.

L_{90}, L_{10}etc:
A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, i.e. L_{90} is the level which is exceeded for 90 percent of an observation period. L_{90} is commonly referred to as a basis for measuring the background sound level.

$L_{Abg,}$:
The A-weighted background sound level measured over a time interval T.

$L_{Aeq,T}$:
Equivalent continuous A-weighted sound pressure level. This is the value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

Sound Pressure Level, Lp, dB, of a sound:
A measurementobtained directly obtained using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure of 20 microPascals.

Sound Power Level, Lw, dB of a source:
Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power level is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt.

Appendix B

Noise Contour Maps

Figure B1: Predicted Daytime Leq 15 hour, Ground Level (note the criterion is 55dB(A))

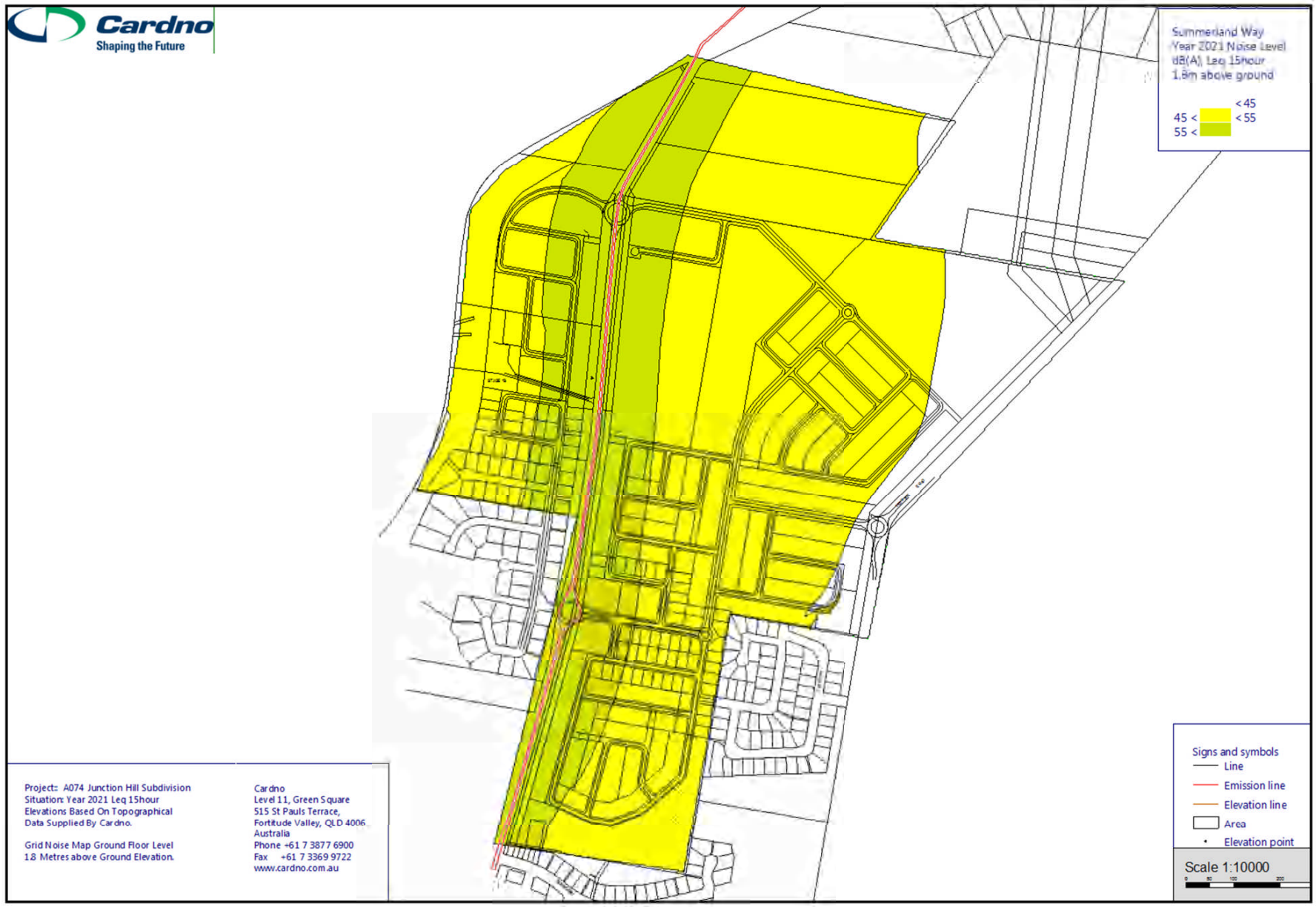


Figure B2: Predicted Day Time Leq 15 hour, First Floor Level (note the criterion is 55dB(A))

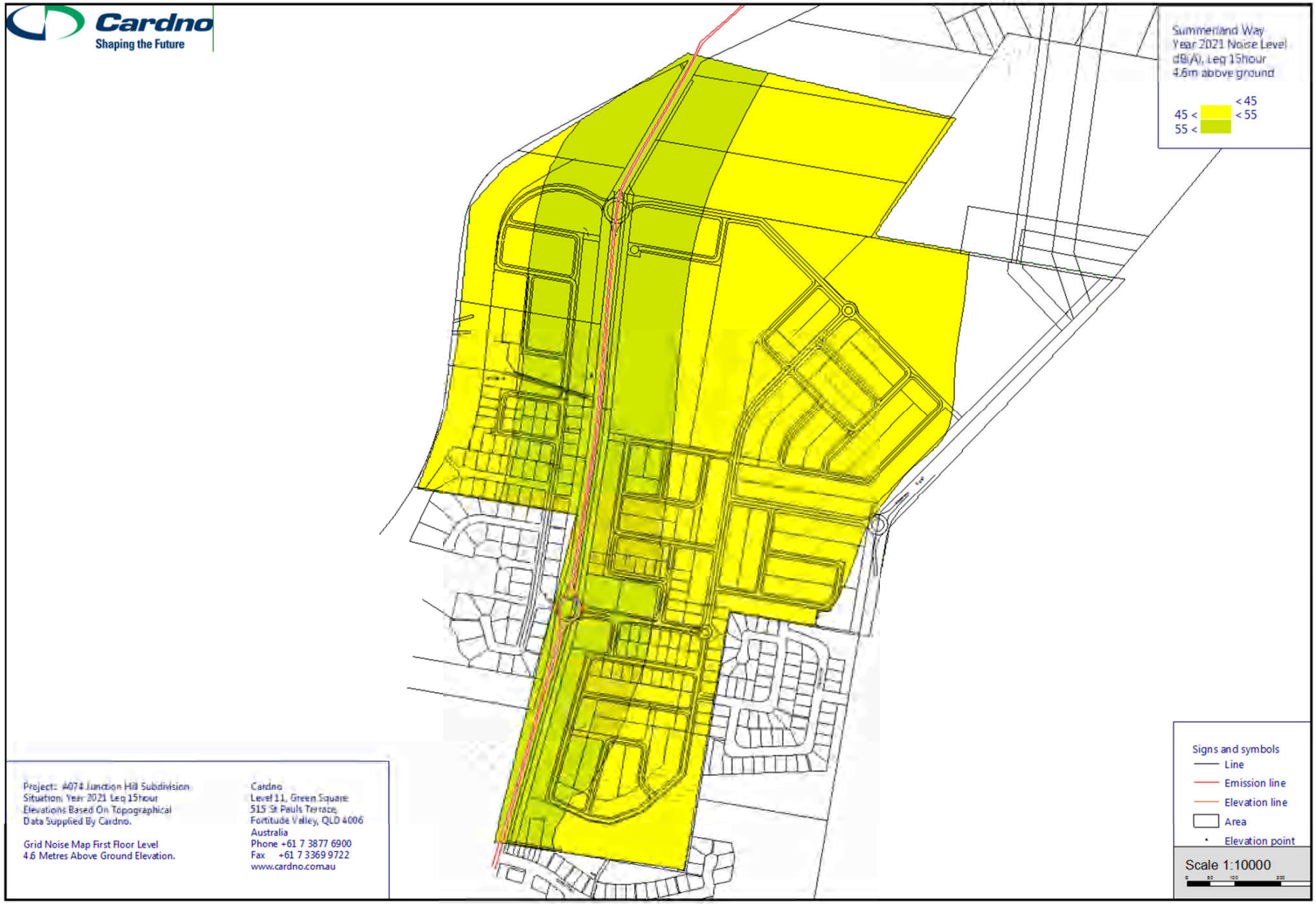


Figure B3: Predicted Night Time Leq 9hour, Ground Floor Level (note the criterion is 50dB(A))

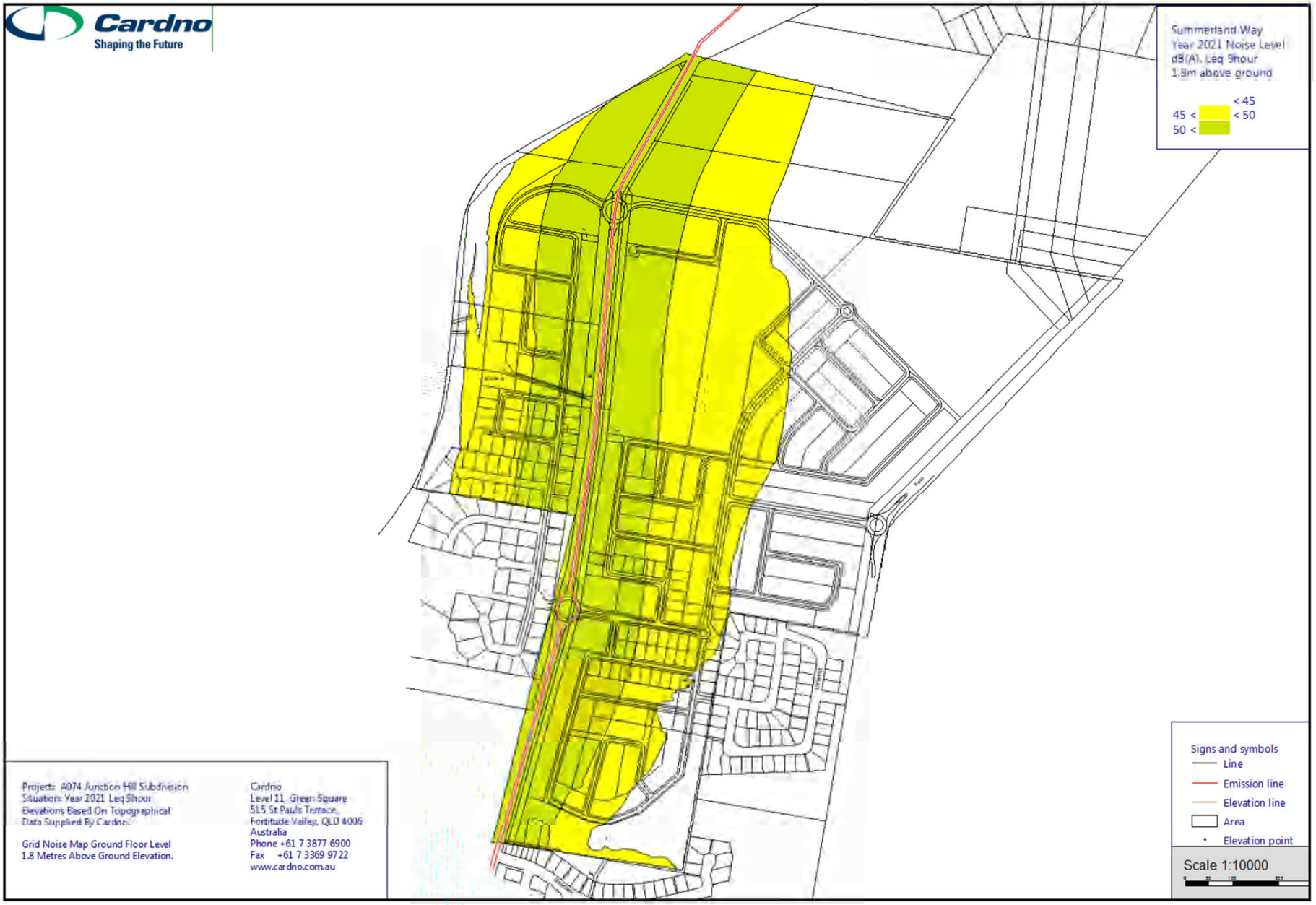


Figure B4: Predicted Night Time Leq 9hour, First Floor Level (note the criterion is 50dB(A))

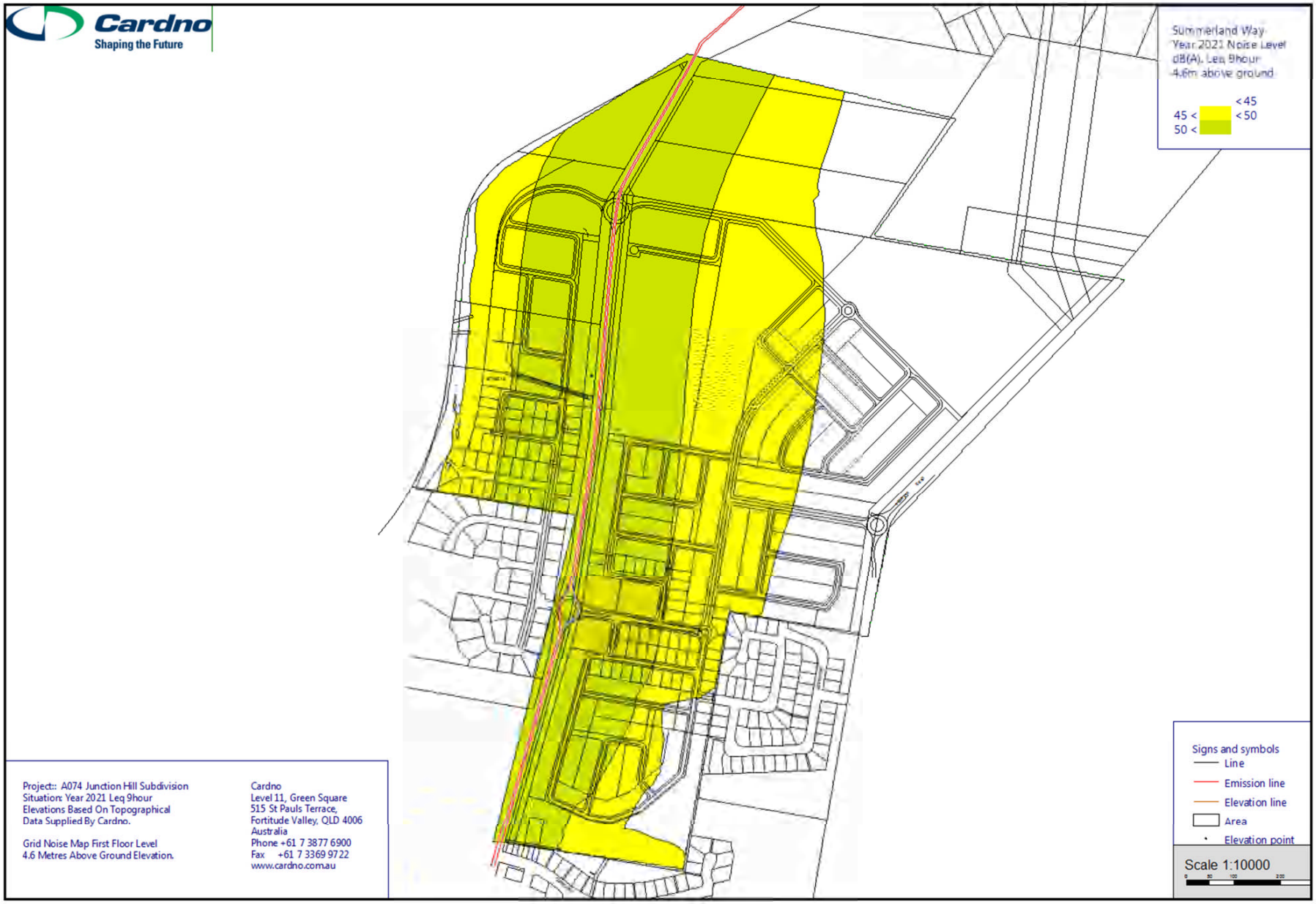


Figure B5: Predicted Day Time Leq 1hour, Ground Floor Level (note the criterion is 60dB(A))

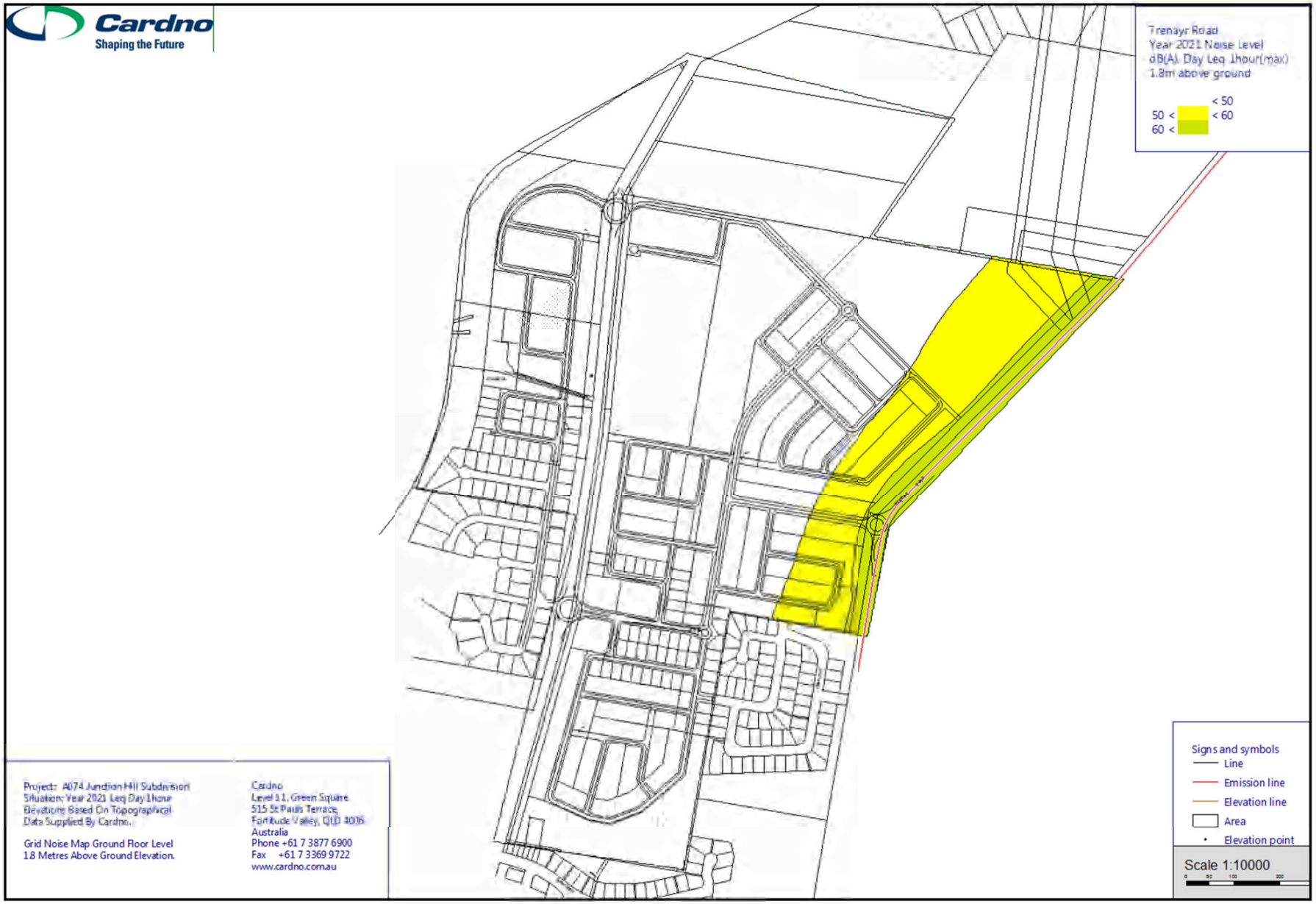


Figure B6: Predicted Day Time Leq 1hour, First Floor Level (note the criterion is 60dB(A))

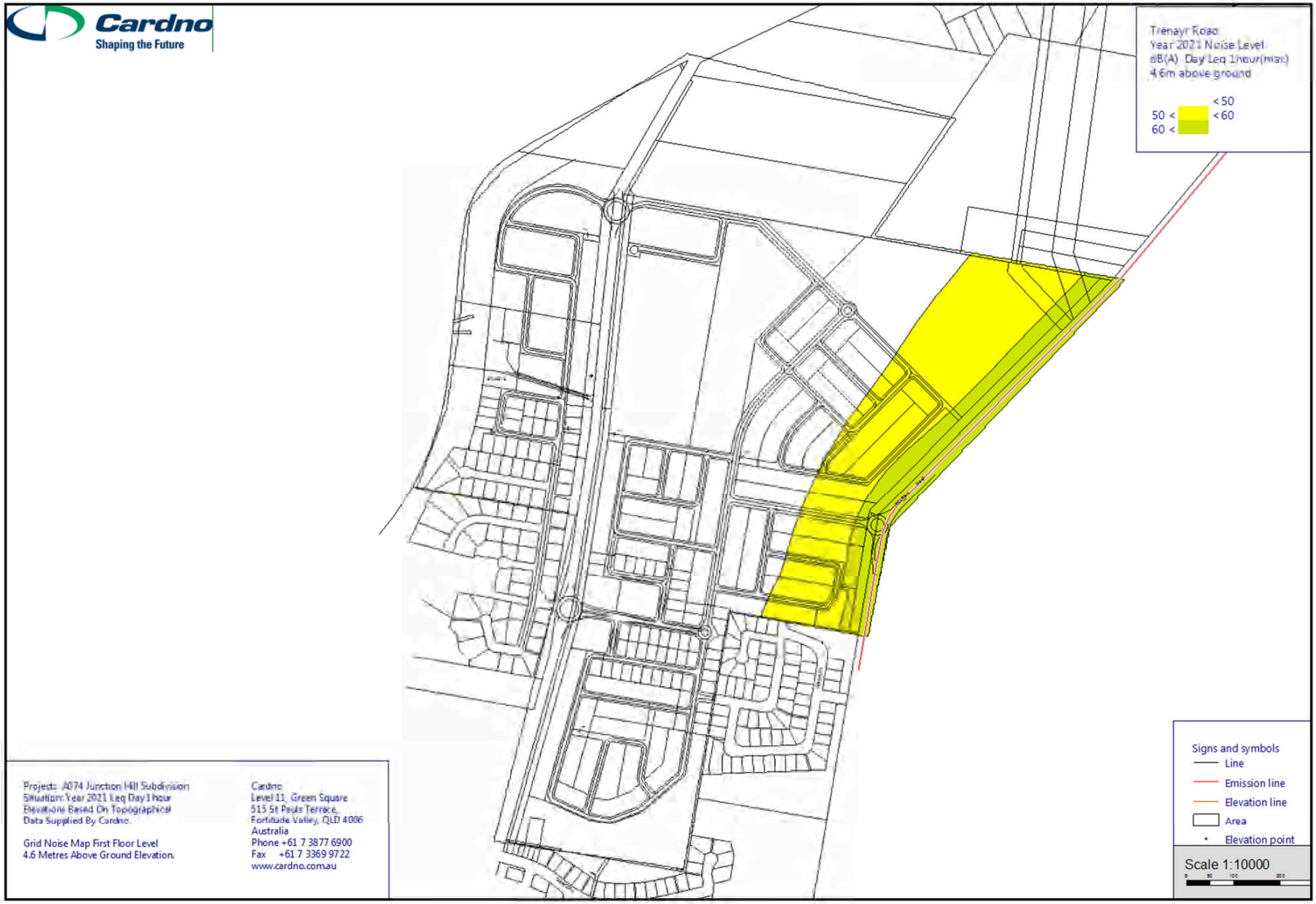


Figure B7: Predicted Night Time Leq 1hour, Ground Floor Level (note the criterion is 55dB(A))

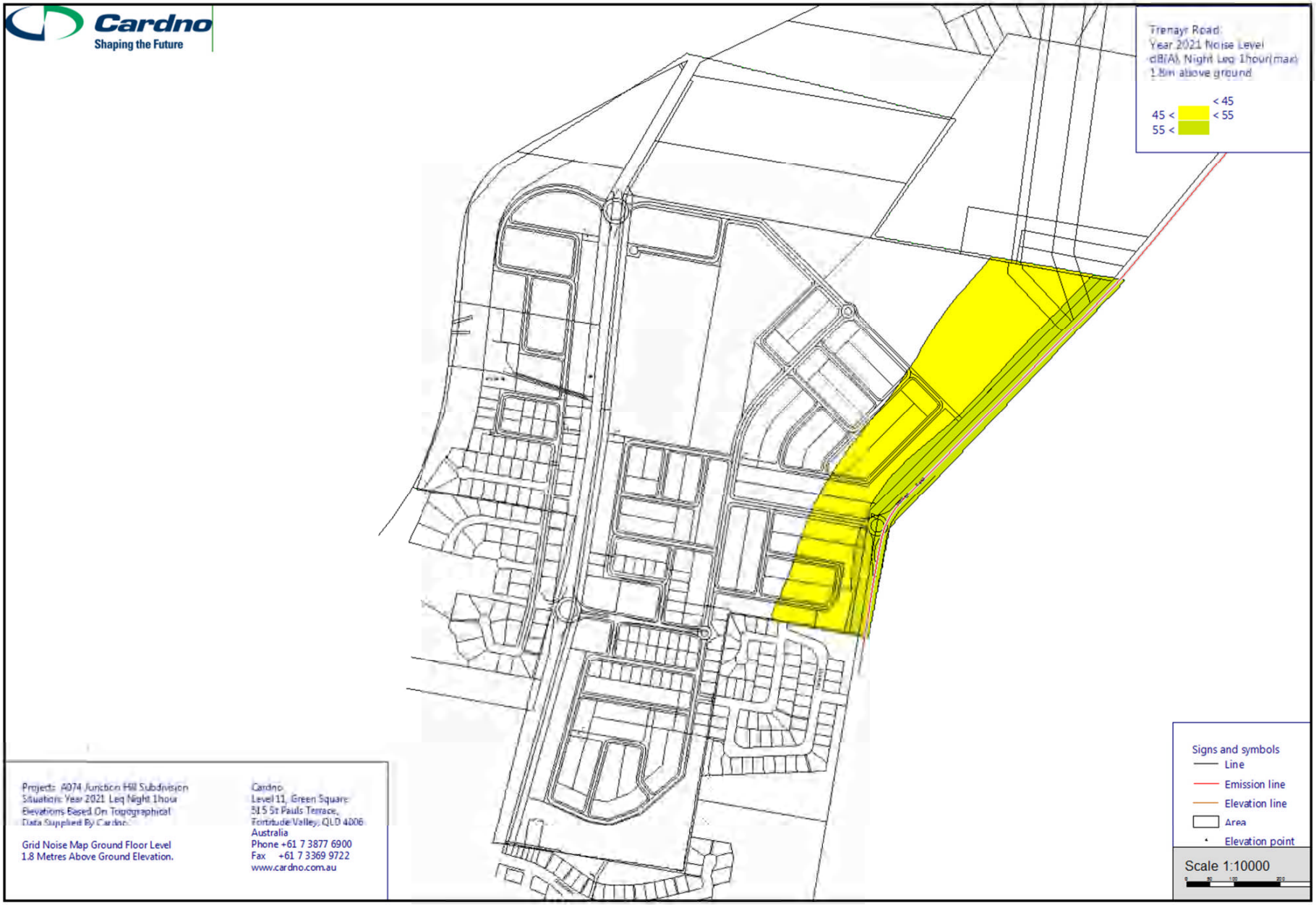
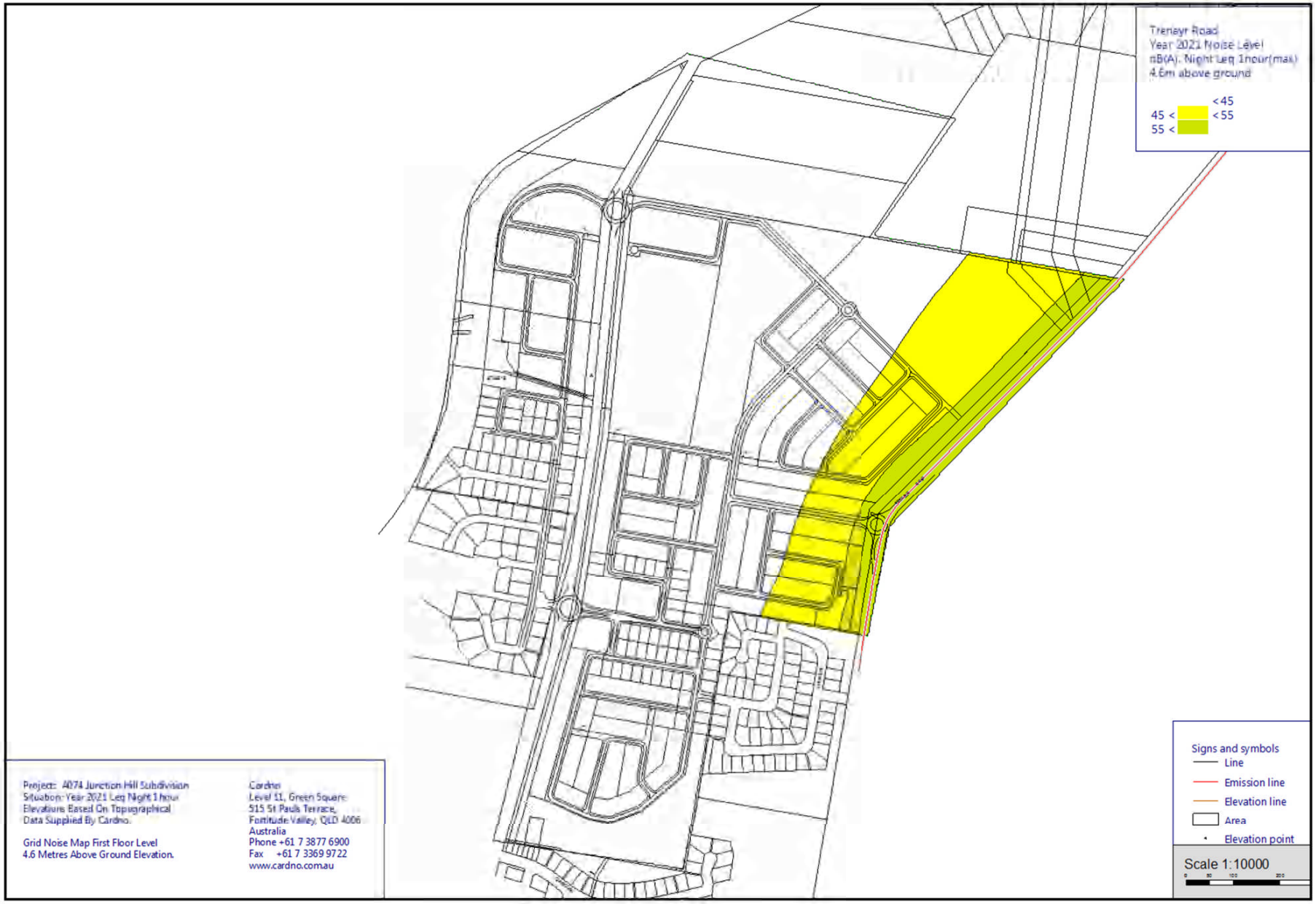


Figure B8: Predicted Night Time Leq 1hour, First Floor Level (note the criterion is 55dB(A))



Appendix C

Traffic Noise Affected Lots

Figure C1: Stage 1A Traffic Noise Affected Lots

LEGEND

- Dwellings requiring construction category 2 for ground level and category 3 for upper levels
- Dwellings requiring construction category 2 for ground and upper levels
- Dwellings requiring construction category 2 for upper levels only

Figure C2: Stage 1B Traffic Noise Affected Lots

LEGEND

- Dwellings requiring construction category 2 for ground level and category 3 for upper levels
- Dwellings requiring construction category 2 for ground and upper levels
- Dwellings requiring construction category 2 for upper levels only

ANNEXURE G

SITE CONTAMINATION ASSESSMENT (RGS MAY, 2016)
ADDENDUM (RGS JULY, 2016), & FUTHER ADDENDUM (MARCH, 2017)

Neil Garrard Building Contractors Pty Ltd

Proposed Subdivision

1111 Summerland Way, Koolkhan

Phase 1 Site Contamination Assessment

Report No. RGS30868.1-AB

26 May 2016

REGIONAL
GEOTECHNICAL SOLUTIONS

Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS30868.1-AB

26 May 2016

Neil Garrard Building Contractors Pty Ltd
PO Box 528
YAMBA NSW 2464

Attention: Neil Garrard

Dear Neil

RE: Proposed Subdivision – 1111 Summerland Way, Koolkhan
Phase 1 Site Contamination Assessment

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Phase 1 site contamination assessment for a site where it is proposed to construct a residential subdivision. The results of the investigation are presented herein.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Simon Keen

Geotechnical Engineer

Table of Contents

Figures

Appendices

1 INTRODUCTION

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Phase 1 site contamination assessment (SCA) at the site of a fifty six lot residential subdivision that is currently proposed for part of 1111 Summerland Way, Koolkhan (Lot 1 DP812999). This report presents the results of the assessment.

The site is currently a greenfield site used for grazing. The purpose of the preliminary Phase 1 SCA was to assess the type and extent of potential contamination that may be present and provide guidance on any further investigation work and site remediation that may be required if contamination is identified. The results of the soil analysis have been assessed against the criteria for Residential 'A' land use in accordance with the '*National Environmental Protection Measure (NEPM) 2013 – Volume 2: Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater*'.

2 BACKGROUND

A site contamination assessment encompassing this portion of the property and surrounding areas was undertaken by Black Earth Environmental Services a number of years ago, extracts of which have been reviewed in the preparation of this report. The executive summary of the report indicates the property has historically been used for diary and beef cattle grazing similar to its current usage. Apart from localised contamination being identified near a disused cattle dip - which is located over 1km to the south on the opposite side of Summerland Way, no contamination was identified and the site was identified as having "a very low risk through (of) soil contamination".

3 METHODOLOGY

Field work for the site contamination assessment was undertaken in April 2016 by a Senior Geotechnical Engineer from RGS who assessed site surface conditions, nominated the sampling locations and collected soil samples for analysis.

The assessment involved:

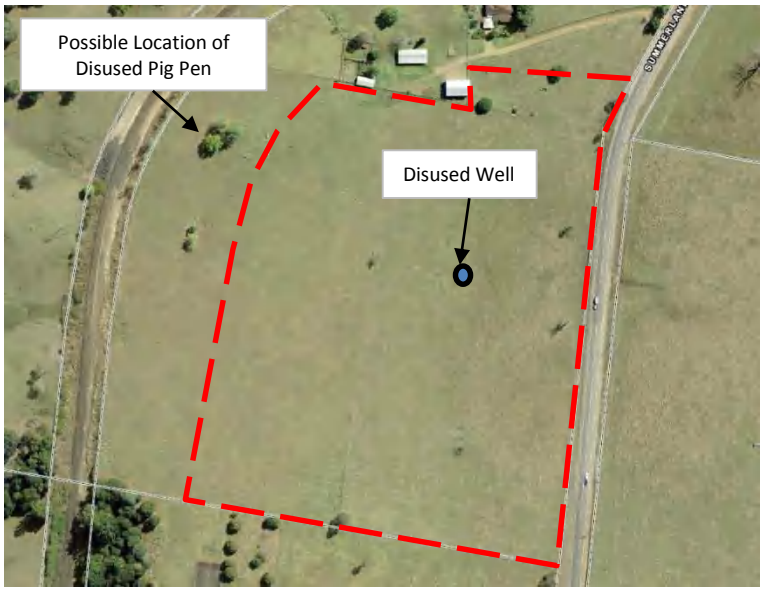
- Shallow surface sampling using hand tools at seventy locations; and
- Laboratory analysis of selected recovered samples.

Samples were collected using hand tools and disposable gloves. All sampling equipment was decontaminated between sampling points using Decon90 detergent and potable water. The samples were collected in laboratory supplied, pre-treated jars and sample bags as appropriate for the intended analysis.

4 SITE CONDITIONS

The site is located within a region characterised by gently undulating residual topography and is situated on the western side of Summerland Way. The site is currently used for cattle grazing. The North Coast Railway line forms the western boundary.

An aerial photograph showing the site setting and the extent of the site contamination assessment is shown below.



Extent of area assessed as part of the site contamination assessment (shown by red dashed line)

The site is vegetated with grasses. A disused well was encountered in the centre of the site and was covered in old concrete fence posts. No staining was observed around the well nor were any strong odours observed to be coming from the well. A disused pig pen is also located to the west beyond the area of the assessment.

Materials observed over the site include topsoil and the natural residual clay soils. No soil staining or odours that could signify potential soil contamination were observed and no significant potential contamination sources were identified – such as farm machinery sheds, chemical storage areas, dip sites etc.

Typical site photographs are presented below.

Looking north through the centre of the site

Looking northwest through the centre of the site

Disused well encountered on the centre of the site

Looking down the disused well

The 1:250,000 Grafton Geology Map indicates that the site is underlain by the Grafton Formation which comprises sandstone, siltstone and claystone. The soil sampling encountered clayey sandy silt topsoil overlying natural residual clays. Groundwater was not encountered during the investigation.

5 LABORATORY ANALYSIS

Forty four soil samples, including six duplicate and three triplicate samples, were transported under chain-of-custody to a NATA accredited specialist chemical testing laboratory. The samples were analysed for the following suite of contaminants:

- Asbestos – absence / presence
- Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc;
- Polychlorinated Biphenyls (PCB);

- Polycyclic Aromatic Hydrocarbons (PAH);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl-Benzene and Xylene (BTEX); and
- Organochlorine (OC) and Organophosphorous (OP) pesticides.

The laboratory test result sheets are attached to this report.

6 QUALITY CONTROL

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination.

Six duplicate sample was submitted to the laboratory and three triplicate samples were submitted to a separate laboratory for analysis. Comparison of the test results on the primary, duplicate and triplicate samples generally show good correlation. The primary and corresponding duplicate and triplicate samples are identified below.

Table 1: Summary of Duplicate & Triplicate Samples

Primary Sample	Duplicate Sample	Triplicate Sample
S10	D1	T1
S20	D2	--
S30	D3	--
S39	D4	--
S50	D5	T2
S70	D6	T3

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test result sheets.

All laboratory quality control data is within acceptable limits for the tests carried out. Therefore, on the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

7 SITE CONTAMINATION ASSESSMENT

7.1 Guidelines and Assessment Criteria - Soils

The assessment was carried out in general accordance with the '*National Environment Protection (Assessment of Site Contamination) Measure 2013*' (NEPM). The NEPM document provides a range of guidelines for assessment of contaminants for various land use scenarios. In accordance with the NEPM guideline the following criteria for a residential site were adopted for this assessment:

- Health Investigation Levels (HILs) for Residential A land use were used to assess the potential human health impact of heavy metals and PAH;
- Health Screening Levels (HSLs) for coarse textured (sand or gravel) or fine textured (silt or clay) soils on a Residential A site were adopted as appropriate for the soils encountered to assess the potential human health impact of petroleum hydrocarbons and BTEX compounds;
- Ecological Investigation Levels (EILs) for residential land use were used for evaluation of the potential ecological / environmental impact of heavy metals and PAH; and
- Ecological Screening Levels (ESLs) for coarse textured (sand) or fine textured (silt or clay) soils on a residential site were adopted as appropriate for the soils encountered, to assess the potential ecological / environmental impact of petroleum hydrocarbons and BTEX compounds.

In accordance with NEPM 2013, exceedance of the criteria does not necessarily deem that remediation or clean-up is required, but is a trigger for further assessment of the extent of contamination and associated risks.

The adopted criteria are presented on the results summary (Table A1) presented in Appendix A.

7.2 Test Results

An evaluation of the laboratory test results against the adopted soil assessment criteria is provided below:

- No asbestos was detected in any of the samples analysed;
- Results of heavy metal analysis revealed some slightly elevated levels, however, the concentrations were well below the adopted assessment criteria;
- Results of BTEX analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of TRH C6-C10 (F1) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of TRH C10-C16 (F2) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of TRH C16-C34 (F3) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of TRH C34-C40 (F4) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of PAH analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria; and
- Results of organochlorine and organophosphorus pesticide analysis recorded values below the level of recording for all samples tested.

8 CONCLUSIONS

Samples were collected from seventy locations across the site and forty four samples were selected on the basis of materials and sample location and analysed for a broad suite of commonly encountered contaminants. The soil analysis indicates that in all samples tested no analytes exceeded the adopted assessment criteria for residential land use.

A disused well was encountered in the centre of the site with the water level being about 3m below ground level on the day of the assessment. Water sampling was not included as part of the assessment and it is recommended that sampling and testing be undertaken to ensure that the water has not been contaminated as a result of past activities.

Based on assessment undertaken, results of the soil sampling and laboratory analysis and in consideration of the findings of the previous site contamination assessment undertaken by Black Earth Environmental Services, the site is considered suitable for residential development with regard to the presence of soil contamination providing sampling and testing of the water within the disused well are below the limits for a Residential A site.

9 LIMITATIONS

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

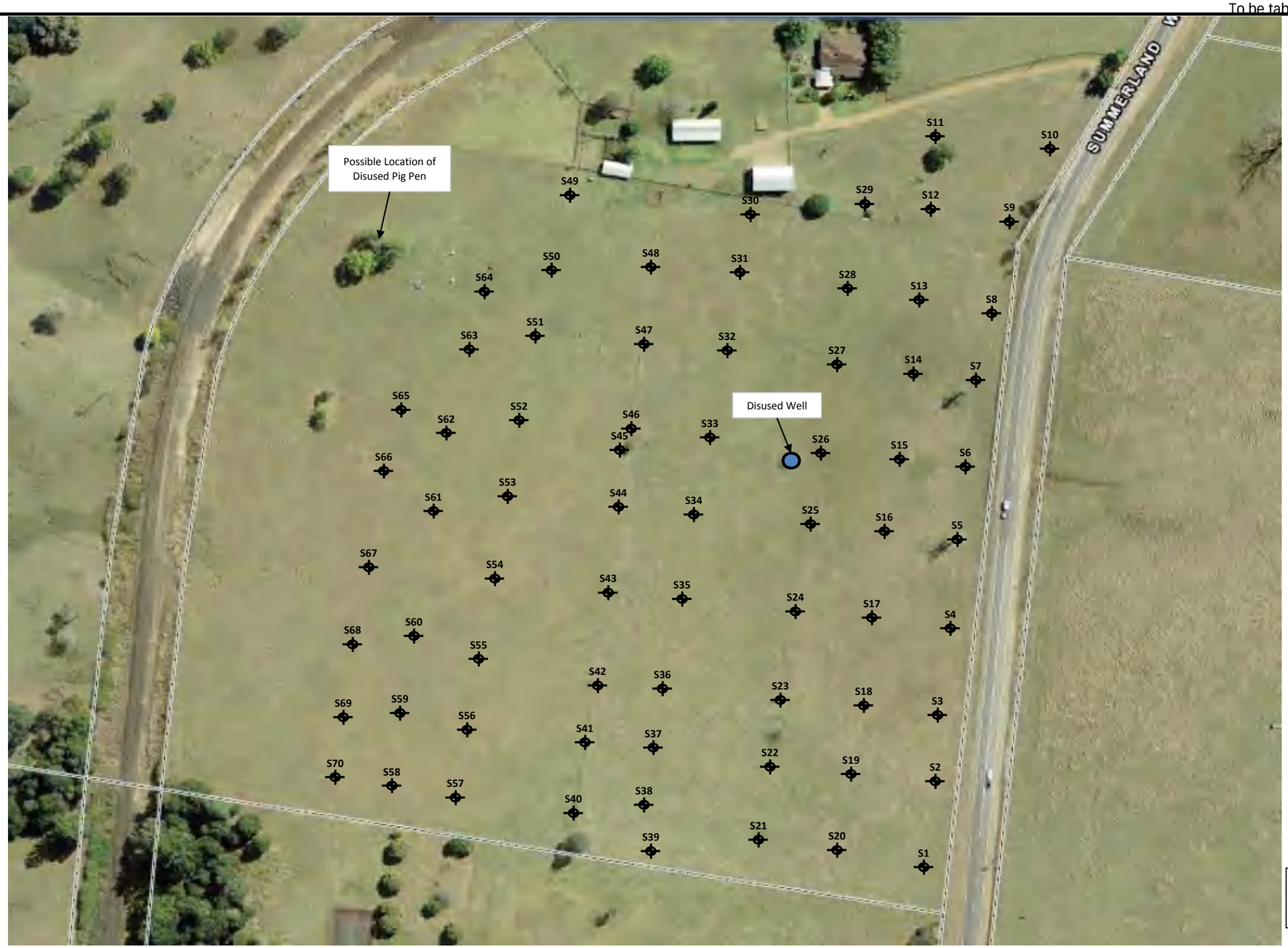
For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Simon Keen

Geotechnical Engineer

Figures



Legend
Sample Location

REGIONAL GEOTECHNICAL SOLUTIONS

Client:	Neil Garrard Building Contractors Pty Ltd	Job No.	RGS30868.1
Project:	Site Contamination Assessment Lot 1 DP812999 Summerland Way, Koolkhan	Drawn By:	SK
		Scale:	As Shown
		Date:	26-May-16
Title:	Sample Location Plan	Drawing No.	**Figure 1**

Appendix A

Laboratory Test Results

TABLE A1 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg) '**Residential A' Site**.

National Environmental Protection Measure (NEPM) 2013 – Volume 2: Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater

Report No. RGS30868.1-AB

Site Location: 1111 Summerland Way, Koolkhan

Location	Depth (m)	Asebestos	TOTAL RECOVERABLE HYDROCARBONS					PAH		OC-OP PESTICIDE	BTEX	PCB	HEAVY METALS							
			C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p				As	Cd	Cr*	Cu	Pb	Hg	Ni	Zn
Health Based Soil investigation Level								*300*	*3*	*6*	*NL*	*1*	*100*	*20*	*100*	*6000*	*300*	*40*	*400*	*7400*
Ecological Investigation Level (EIL):																				
Ecological Screening Level (ESL):			*180*	*120*	*300*	*2800*			*0.7*		*50*		***Coarse grained soil in mg/kg***							
			180	*120*	*1300*	*5600*			*0.7*		*65*		***Fine grained soil in mg/kg***							
S1	0.05 - 0.15												<5	<1	35	<5	11	----	3	9
S3	0.05 - 0.15												<5	<1	9	<5	7	----	<2	6
S4	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	22	<5	9	<0.1	<2	<5
S7	0.05 - 0.15												<5	<1	11	<5	7	----	<2	6
S10	0.05 - 0.15												<5	<1	39	<5	10	----	<2	6
D1 (S10 Dupl.)	0.05 - 0.15												<5	<1	12	<5	9	----	<2	6
T1 (S10 Tripl.)	0.05 - 0.15												5	<0.1	45	----	15	<0.05	5	----
S11	0.05 - 0.15												<5	<1	16	7	73	----	<2	16
S12	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	13	<5	8	<0.1	<2	16
S13	0.05 - 0.15												<5	<1	13	<5	8	----	<2	8
S17	0.05 - 0.15												<5	<1	12	5	7	----	<2	7
S19	0.05 - 0.15												<5	<1	13	<5	7	----	2	6
S20	0.05 - 0.15												<5	<1	61	<5	18	----	4	11
D2 (S20 Dupl.)	0.05 - 0.15												<5	<1	20	<5	11	----	3	9
S22	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	17	<5	11	<0.1	2	6
S23	0.05 - 0.15												<5	<1	15	<5	9	----	2	8
S26	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	13	<5	8	<0.1	<2	10
S27	0.05 - 0.15												<5	<1	11	<5	7	----	<2	7
S29	0.05 - 0.15												<5	<1	16	5	11	----	<2	29
S30	0.05 - 0.15												<5	<1	16	<5	11	----	<2	26
D3 (S30 Dupl.)	0.05 - 0.15												<5	<1	14	<5	10	----	<2	24
S32	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	16	<5	9	<0.1	<2	16
S33	0.05 - 0.15												<5	<1	23	<5	10	----	2	11
S37	0.05 - 0.15												<5	<1	25	6	15	----	4	10
S39	0.05 - 0.15												<5	<1	29	9	20	----	5	34
D4 (S39 Dupl.)	0.05 - 0.15												<5	<1	22	9	17	----	6	40
S41	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	23	8	18	<0.1	5	16
S44	0.05 - 0.15												<5	<1	23	6	15	----	4	9
S47	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	32	<5	12	<0.1	2	23
S48	0.05 - 0.15												<5	<1	17	5	9	----	2	18

BLUE - Denotes concentration exceeds health based guideline for Residential A
GREEN - Denotes concentration exceeds ecological guideline for Residential A
ORANGE - Denotes concentration exceeds health and ecological based guideline

TABLE A1 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg) '**Residential A' Site**.

National Environmental Protection Measure (NEPM) 2013 – Volume 2: Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater

Report No. RGS30868.1-AB

Site Location: 1111 Summerland Way, Koolkhan

Location	Depth (m)	Asebestos	TOTAL RECOVERABLE HYDROCARBONS					PAH		OC-OP PESTICIDE	BTEX	PCB	HEAVY METALS							
			C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p				As	Cd	Cr*	Cu	Pb	Hg	Ni	Zn
S49	0.05 - 0.15												<5	<1	33	8	15	----	2	35
S50	0.05 - 0.15												<5	<1	18	5	10	----	<2	14
D5 (S50 Dupl.)	0.05 - 0.15												<5	<1	19	7	15	----	3	22
T2 (S50 Tripl.)	0.05 - 0.15												6	0.1	42	----	16	<0.05	4	----
S52	0.05 - 0.15												<5	<1	31	6	14	----	2	9
S56	0.05 - 0.15												<5	<1	22	8	15	----	4	12
S60	0.05 - 0.15												<5	<1	31	6	14	----	2	11
S62	0.05 - 0.15												<5	<1	22	6	11	----	<2	12
S64	0.05 - 0.15												5	<1	22	15	155	----	3	97
S65	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<1	<0.1	<5	<1	14	<5	15	<0.1	<2	14
S68	0.05 - 0.15												<5	<1	18	6	11	----	2	17
S70	0.05 - 0.15												<5	<1	36	6	12	----	2	14
D6 (S70 Dupl.)	0.05 - 0.15												<5	<1	32	6	11	----	2	17
T3 (S70 Tripl.)	0.05 - 0.15												4	0.1	47	----	14	<0.05	4	----

BLUE - Denotes concentration exceeds health based guideline for Residential A
GREEN - Denotes concentration exceeds ecological guideline for Residential A
ORANGE - Denotes concentration exceeds health and ecological based guideline

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1607723**	Page	: 1 of 40
Client	: **REGIONAL GEOTECHNICAL SOLUTION**	Laboratory	: Environmental Division Sydney
Contact	: MR ADAM HOLZHAUSER	Contact	:
Address	: 44 BENT STREET WINGHAM NSW, AUSTRALIA 2429	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION	Date Samples Received	: 11-Apr-2016 09:55
Order number	: ----	Date Analysis Commenced	: 12-Apr-2016
C-O-C number	: ----	Issue Date	: 15-Apr-2016 18:59
Sampler	: ----		
Site	: JUCTION HILL		
Quote number	: ----		
No. of samples received	: 49		
No. of samples analysed	: 41		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly and NATA accreditation does not apply to analysis on these samples.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2

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Work Order	: ES1607723
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S3	S7	S10	S11
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-001	ES1607723-002	ES1607723-003	ES1607723-004	ES1607723-005
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		5.4	7.0	5.8	4.4	5.9
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	----	----	----
Asbestos Type	1332-21-4	-	--		----	----	----	----	----
Sample weight (dry)	----	0.01	g		----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		----	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		35	9	11	39	16
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	7
Lead	7439-92-1	5	mg/kg		11	7	7	10	73
Nickel	7440-02-0	2	mg/kg		3	<2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg		9	6	6	6	16
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		----	----	----	----	----

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Work Order : ES1607723
Client : REGIONAL GEOTECHNICAL SOLUTION
Project : RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S1	S3	S7	S10	S11
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-001	ES1607723-002	ES1607723-003	ES1607723-004	ES1607723-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S1	S3	S7	S10	S11
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-001	ES1607723-002	ES1607723-003	ES1607723-004	ES1607723-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S3	S7	S10	S11
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-001	ES1607723-002	ES1607723-003	ES1607723-004	ES1607723-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Benzene	71-43-2	0.2	mg/kg		----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		----	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S13	S17	S19	S20	S23
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-006	ES1607723-007	ES1607723-008	ES1607723-009	ES1607723-010
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		6.0	5.1	4.8	8.0	6.1
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	----	----	----
Asbestos Type	1332-21-4	-	--		----	----	----	----	----
Sample weight (dry)	----	0.01	g		----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		----	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		13	12	13	61	15
Copper	7440-50-8	5	mg/kg		<5	5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		8	7	7	18	9
Nickel	7440-02-0	2	mg/kg		<2	<2	2	4	2
Zinc	7440-66-6	5	mg/kg		8	7	6	11	8
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S13	S17	S19	S20	S23
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-006	ES1607723-007	ES1607723-008	ES1607723-009	ES1607723-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S13	S17	S19	S20	S23
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-006	ES1607723-007	ES1607723-008	ES1607723-009	ES1607723-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S13	S17	S19	S20	S23
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-006	ES1607723-007	ES1607723-008	ES1607723-009	ES1607723-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	----	----

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Work Order	: ES1607723
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S27	S29	S30	S33	S37
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-011	ES1607723-012	ES1607723-013	ES1607723-014	ES1607723-015
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	4.8	7.0	5.2	3.5	5.8
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	11	16	16	23	25
Copper	7440-50-8	5	mg/kg	<5	5	<5	<5	6
Lead	7439-92-1	5	mg/kg	7	11	11	10	15
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	2	4
Zinc	7440-66-6	5	mg/kg	7	29	26	11	10
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S27	S29	S30	S33	S37
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-011	ES1607723-012	ES1607723-013	ES1607723-014	ES1607723-015
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S27	S29	S30	S33	S37
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-011	ES1607723-012	ES1607723-013	ES1607723-014	ES1607723-015
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S27	S29	S30	S33	S37
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-011	ES1607723-012	ES1607723-013	ES1607723-014	ES1607723-015
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S39	S44	S48	S49	S50
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-016	ES1607723-017	ES1607723-018	ES1607723-019	ES1607723-020
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		6.9	6.0	6.7	7.0	5.8
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	----	----	----
Asbestos Type	1332-21-4	-	--		----	----	----	----	----
Sample weight (dry)	----	0.01	g		----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		----	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		29	23	17	33	18
Copper	7440-50-8	5	mg/kg		9	6	5	8	5
Lead	7439-92-1	5	mg/kg		20	15	9	15	10
Nickel	7440-02-0	2	mg/kg		5	4	2	2	<2
Zinc	7440-66-6	5	mg/kg		34	9	18	35	14
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S39	S44	S48	S49	S50
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-016	ES1607723-017	ES1607723-018	ES1607723-019	ES1607723-020
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S39	S44	S48	S49	S50
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-016	ES1607723-017	ES1607723-018	ES1607723-019	ES1607723-020
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S39	S44	S48	S49	S50
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-016	ES1607723-017	ES1607723-018	ES1607723-019	ES1607723-020
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S52	S56	S60	S62	S64
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-021	ES1607723-022	ES1607723-023	ES1607723-024	ES1607723-025
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	6.0	5.6	4.3	4.4	6.7
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	31	22	31	22	22
Copper	7440-50-8	5	mg/kg	6	8	6	6	15
Lead	7439-92-1	5	mg/kg	14	15	14	11	155
Nickel	7440-02-0	2	mg/kg	2	4	2	<2	3
Zinc	7440-66-6	5	mg/kg	9	12	11	12	97
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S52	S56	S60	S62	S64
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-021	ES1607723-022	ES1607723-023	ES1607723-024	ES1607723-025
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S52	S56	S60	S62	S64
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-021	ES1607723-022	ES1607723-023	ES1607723-024	ES1607723-025
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S52	S56	S60	S62	S64
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-021	ES1607723-022	ES1607723-023	ES1607723-024	ES1607723-025
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S68	S70	D1	D2	D3
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-026	ES1607723-027	ES1607723-028	ES1607723-029	ES1607723-030
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	5.4	4.9	7.4	4.9	3.9
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	18	36	12	20	14
Copper	7440-50-8	5	mg/kg	6	6	<5	<5	<5
Lead	7439-92-1	5	mg/kg	11	12	9	11	10
Nickel	7440-02-0	2	mg/kg	2	2	<2	3	<2
Zinc	7440-66-6	5	mg/kg	17	14	6	9	24
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S68	S70	D1	D2	D3
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-026	ES1607723-027	ES1607723-028	ES1607723-029	ES1607723-030
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S68	S70	D1	D2	D3
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-026	ES1607723-027	ES1607723-028	ES1607723-029	ES1607723-030
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S68	S70	D1	D2	D3
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-026	ES1607723-027	ES1607723-028	ES1607723-029	ES1607723-030
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	D4	D5	D6	S4	S12
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-031	ES1607723-032	ES1607723-033	ES1607723-034	ES1607723-035
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	6.4	5.8	4.6	4.3	4.5
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	No	No
Asbestos Type	1332-21-4	-	--	----	----	----	-	-
Sample weight (dry)	----	0.01	g	----	----	----	24.4	22.1
APPROVED IDENTIFIER:	----	-	--	----	----	----	S.SPOONER	S.SPOONER
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	22	19	32	22	13
Copper	7440-50-8	5	mg/kg	9	7	6	<5	<5
Lead	7439-92-1	5	mg/kg	17	15	11	9	8
Nickel	7440-02-0	2	mg/kg	6	3	2	<2	<2
Zinc	7440-66-6	5	mg/kg	40	22	17	<5	16
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	----	----	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	----	----	----	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D4	D5	D6	S4	S12
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-031	ES1607723-032	ES1607723-033	ES1607723-034	ES1607723-035
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		----	----	----	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		----	----	----	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		----	----	----	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		----	----	----	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		----	----	----	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		----	----	----	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		----	----	----	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		----	----	----	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		----	----	----	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		----	----	----	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		----	----	----	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		----	----	----	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		----	----	----	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		----	----	----	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		----	----	----	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		----	----	----	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		----	----	----	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		----	----	----	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		----	----	----	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		----	----	----	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		----	----	----	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		----	----	----	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		----	----	----	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		----	----	----	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		----	----	----	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		----	----	----	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		----	----	----	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		----	----	----	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		----	----	----	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D4	D5	D6	S4	S12
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-031	ES1607723-032	ES1607723-033	ES1607723-034	ES1607723-035
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		----	----	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	----	<0.5	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		----	----	----	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		----	----	----	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		----	----	----	**0.6**	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		----	----	----	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg		----	----	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg		----	----	----	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		----	----	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	----	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		----	----	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		----	----	----	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		----	----	----	<50	<50
EP080: BTEXN									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D4	D5	D6	S4	S12
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-031	ES1607723-032	ES1607723-033	ES1607723-034	ES1607723-035
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Benzene	71-43-2	0.2	mg/kg		----	----	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		----	----	----	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	**70.5**	**75.0**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	**73.4**	**87.6**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	**69.5**	**85.0**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	**72.2**	**79.2**
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	**74.7**	**74.6**
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	**43.5**	**42.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	**74.5**	**72.0**
Anthracene-d10	1719-06-8	0.5	%		----	----	----	**76.6**	**79.7**
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	**77.0**	**76.6**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	**116**	**106**
Toluene-D8	2037-26-5	0.2	%		----	----	----	**101**	**102**
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	**107**	**109**

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Work Order : ES1607723
Client : REGIONAL GEOTECHNICAL SOLUTION
Project : RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S22	S26	S32	S41	S47
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-036	ES1607723-037	ES1607723-038	ES1607723-039	ES1607723-040
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		5.3	5.2	5.6	6.7	6.3
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	No	No	No
Asbestos Type	1332-21-4	-	--		-	-	-	-	-
Sample weight (dry)	----	0.01	g		17.5	13.0	16.1	19.1	17.2
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		17	13	16	23	32
Copper	7440-50-8	5	mg/kg		<5	<5	<5	8	<5
Lead	7439-92-1	5	mg/kg		11	8	9	18	12
Nickel	7440-02-0	2	mg/kg		2	<2	<2	5	2
Zinc	7440-66-6	5	mg/kg		6	10	16	16	23
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S22	S26	S32	S41	S47
			Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit	ES1607723-036	ES1607723-037	ES1607723-038	ES1607723-039	ES1607723-040
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S22	S26	S32	S41	S47
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-036	ES1607723-037	ES1607723-038	ES1607723-039	ES1607723-040
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S22	S26	S32	S41	S47
				Client sampling date / time	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]	[11-Apr-2016]
Compound	CAS Number	LOR	Unit		ES1607723-036	ES1607723-037	ES1607723-038	ES1607723-039	ES1607723-040
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**74.6**	**73.1**	**75.4**	**74.9**	**74.1**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**86.5**	**81.8**	**89.6**	**67.7**	**86.7**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**86.1**	**78.4**	**85.1**	**63.9**	**81.0**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**73.4**	**72.8**	**82.9**	**76.3**	**83.8**
2-Chlorophenol-D4	93951-73-6	0.5	%		**73.5**	**73.6**	**74.8**	**74.6**	**72.0**
2.4.6-Tribromophenol	118-79-6	0.5	%		**44.8**	**45.3**	**48.0**	**38.2**	**45.0**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**77.4**	**72.4**	**76.8**	**73.0**	**74.5**
Anthracene-d10	1719-06-8	0.5	%		**74.6**	**75.2**	**73.8**	**71.8**	**72.5**
4-Terphenyl-d14	1718-51-0	0.5	%		**83.0**	**76.6**	**82.2**	**78.5**	**79.7**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**107**	**110**	**111**	**126**	**111**
Toluene-D8	2037-26-5	0.2	%		**101**	**99.9**	**101**	**114**	**106**
4-Bromofluorobenzene	460-00-4	0.2	%		**96.7**	**95.0**	**109**	**115**	**108**

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Work Order	:	ES1607723
Client	:	REGIONAL GEOTECHNICAL SOLUTION
Project	:	RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S65	----	----	----	----
				Client sampling date / time	[11-Apr-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1607723-041	--------	--------	--------	--------
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		5.6	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	----	----	----	----
Asbestos Type	1332-21-4	-	--		-	----	----	----	----
Sample weight (dry)	----	0.01	g		20.7	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		14	----	----	----	----
Copper	7440-50-8	5	mg/kg		<5	----	----	----	----
Lead	7439-92-1	5	mg/kg		15	----	----	----	----
Nickel	7440-02-0	2	mg/kg		<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg		14	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S65	----	----	----	----
			Client sampling date / time	[11-Apr-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1607723-041	--------	--------	--------	--------
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S65	----	----	----	----
			Client sampling date / time	[11-Apr-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1607723-041	--------	--------	--------	--------
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S65	----	----	----	----
			Client sampling date / time	[11-Apr-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1607723-041	--------	--------	--------	--------
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	----	----	----	----
^ **Total Xylenes**	1330-20-7	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**75.6**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**89.9**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**81.6**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**81.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**77.2**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**46.3**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**74.6**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**72.9**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**80.3**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**118**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	**99.0**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**93.5**	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	S4 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S12 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S22 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S26 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S32 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S41 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S47 - [11-Apr-2016]	Mid brown clay soil with grey rocks.
EA200: Description	S65 - [11-Apr-2016]	Mid brown clay soil with grey rocks.

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

RESULTS OF SOIL ANALYSIS

3 samples supplied by Regional Geotechnical Solutions Pty Ltd on 11th April, 2016 - Lab Job No. E9382
Analysis requested by Tim Morris. **Your Project: RGS30868.1**
(44 Bent Street WINGHAM NSW 2429).

	Method	Sample 1 T1	Sample 2 T2	Sample 3 T3
	Job No.	*E9382/1*	*E9382/2*	*E9382/3*
METALS				
Silver (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	<0.1	<0.1	<0.1
Arsenic (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	5	6	4
Lead (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	15	16	14
Cadmium (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	<0.1	0.1	0.1
Chromium (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	45	42	47
Nickel (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	5	3	4
Selenium (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	0.6	0.7	0.7
Mercury (mg/Kg)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	<0.05	<0.05	<0.05
Aluminium (%)	1:3 Nitric/HCl digest - APHA 3125 ICPMS	1.37	0.87	0.83

Notes:

1: ECEC = Effective Cation Exchange Capacity = sum of the exchangeable Mg, Ca, Na, K, H and Al
2: Exchangeable bases determined using standard Ammonium Acetate extract (Method 15D3) with no pretreatment for soluble salts. When Conductivity ≥0.25 dS/m soluble salts are removed (Method 15E2).
3. ppm = mg/Kg dried sample
4. Exchangeable sodium percentage (ESP) is calculated as sodium ($cmol^+$/Kg) divided by ECEC
5. All results as dry weight DW - samples were dried at 40°C for 24-48hrs prior to crushing and analysis.
6. Aluminium detection limit is 0.05 $cmol^+$/Kg; Hydrogen detection limit is 0.1 $cmol^+$/Kg. However for calculation purposes a value of 0 is used.
7. For conductivity 1 dS/m = 1 mS/cm = 1000 μS/cm
8. 1 $cmol^+$/Kg = 1 meq/100g
9. Methods from Rayment and Lyons, Soil Chemical Methods - Australasia
10. Conversion of cmol+/Kg to mg/Kg multiply cmol+/Kg by:
    230 for Sodium; 391 for Potassium; 200 for Calcium; 122 for Magnesium; 90 for Aluminium
11. Metals analysed by ICP-MS (Inductively Coupled Plasma - Mass Spectrometry) or ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry)

NATA
WORLD RECOGNISED ACCREDITATION
Accreditation No. 14960.
Accredited for compliance with ISO/IEC 17025.

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

checked: .....
Graham Lancaster
Laboratory Manager

Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS30962.1 - AB

27 July 2016

Neil Garrard Building Contractors Pty Ltd
PO Box 528
YAMBA NSW 2464

Attention: Neil Garrard

Dear Neil

RE: Proposed Subdivision – 1111 Summerland Way, Koolkahn

Site Contamination Assessment – Addendum Report

Regional Geotechnical Solutions Pty Ltd (RGS) has previously completed a site contamination assessment at the site of a fifty-six lot residential subdivision that is currently proposed for part of 1111 Summerland Way, Koolkhan (Lot 1 DP812999). During the site assessment an open brick lined water well was identified on the site. This addendum report has been prepared following the completion of sampling and laboratory testing on a water sample recovered from the well which has been undertaken in addition to the initial site contamination assessment (presented in report RGS30868.1-AC, dated 26 May 2016). This addendum report should be read in conjunction with the site contamination report.

One groundwater sample was collected by a Geotechnical Engineer on 21 June 2016. The samples were collected with disposable sampling tools and transferred into a laboratory supplied pre-treated glass bottle and vials, prior to being placed in a chilled esky and transported to a NATA accredited laboratory.

The sample was analysed for the following suite of contaminants:

- Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc;
- Polychlorinated Biphenyls (PCB);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl-Benzene and Xylene (BTEX); and
- Organochlorine (OC) and Organophosphorous (OP) pesticides.

The laboratory test result sheet is attached to this report.

The assessment was carried out in general accordance with the '*National Environment Protection (Assessment of Site Contamination) Measure 2013*' (NEPM). The NEPM 2013 provides a series of Groundwater Investigation Levels for the protection of drinking water or aquatic ecosystems, as appropriate based on down-gradient recipients of groundwater emanating from the site. For assessing groundwater quality therefore, it is first necessary to assess the beneficial uses or sensitive receptors of groundwater down-gradient of the site being assessed.

Potential beneficial users include groundwater bores used for extraction for domestic, rural, or irrigation purposes. A search of NSW Government records was undertaken to check for the presence of registered bores in the vicinity of the site. The results indicate that the closest well is about 300m to the southwest of the site.

The soil profiles encountered, being predominantly residual in nature, indicate that groundwater flow gradients are likely to approximately follow surface slope gradients, at least on a regional scale and therefore it is reasonable to assume groundwater would flow towards the east.

Based on this information, the most sensitive receptor in the likely direction of groundwater flow is an intermittent drainage gully to the east of Summerland Way that flows into the Clarence River freshwater ecosystem. It is therefore reasonable to adopt groundwater investigation levels (GIL's) aimed at protecting the fresh water ecosystem.

An evaluation of the laboratory test results against the adopted soil assessment criteria is provided below:

- Results of heavy metal analysis revealed a slightly elevated zinc level, however, the concentration was well below the adopted assessment criteria. All other metals were below the level of reporting and therefore below the adopted assessment criteria;
- Results of BTEX analysis revealed concentrations below the level of reporting and therefore below the adopted assessment criteria;
- Results of TRH C6-C10 (F1), C10-C16 (F2), C16-C34 (F3) and C34-C40 (F4) analysis revealed concentrations below the level of reporting and therefore below the adopted assessment criteria;
- Results of PAH analysis revealed concentrations below the level of reporting and therefore below the adopted assessment criteria; and
- Results of organochlorine and organophosphorus pesticide analysis recorded values below the level of recording and therefore below the adopted assessment criteria.

Based on assessment undertaken and the results of the water sampling and laboratory analysis, the water within the existing open brick lined well meets the requirements for a freshwater aquatic ecosystem as defined within the NEPM 2013 guidelines. Based on this assessment the presence of the open well is not considered to be a constraint to the proposed residential subdivision from an environmental site contamination perspective.

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of

the site at all points. If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Simon Keen

Geotechnical Engineer

Attachments: Laboratory Test Results Sheets

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1613353**	Page	: 1 of 7
Client	: **REGIONAL GEOTECHNICAL SOLUTION**	Laboratory	: Environmental Division Sydney
Contact	: MR ADAM HOLZHAUSER	Contact	:
Address	: 44 BENT STREET WINGHAM NSW, AUSTRALIA 2429	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION	Date Samples Received	: 21-Jun-2016 10:15
Order number	: ----	Date Analysis Commenced	: 24-Jun-2016
C-O-C number	: ----	Issue Date	: 28-Jun-2016 17:32
Sampler	: ----		
Site	: JUCTION HILL		
Quote number	: ----		
No. of samples received	: 1		
No. of samples analysed	: 1		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Page	: 3 of 7
Work Order	: ES1613353
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WS1	----	----	----	----
				Client sampling date / time	[21-Jun-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1613353-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.057**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2	µg/L		<2.0	----	----	----	----
^ **Total Chlordane (sum)**	----	0.5	µg/L		<0.5	----	----	----	----

Page : 4 of 7
Work Order : ES1613353
Client : REGIONAL GEOTECHNICAL SOLUTION
Project : RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WS1	----	----	----	----
				Client sampling date / time	[21-Jun-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1613353-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1	µg/L		<1.0	----	----	----	----

Page	: 5 of 7
Work Order	: ES1613353
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WS1	----	----	----	----
				Client sampling date / time	[21-Jun-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1613353-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
Pentachlorophenol	87-86-5	2	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----

Page	: 6 of 7
Work Order	: ES1613353
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WS1	----	----	----	----
				Client sampling date / time	[21-Jun-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1613353-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**70.6**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**109**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**75.0**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**21.7**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		**60.3**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%		**36.6**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**67.1**	----	----	----	----
Anthracene-d10	1719-06-8	1	%		**93.4**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		**66.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**116**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**109**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**105**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	30	120
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	129
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS30868.1-AD

7 March 2017

Neil Garrard Building Contractors Pty Ltd
C/o: Andrew Fletcher & Associates Pty Ltd
PO Box 1213
GRAFTON NSW 2460

Attention: Andrew Fletcher

Dear Andrew

RE: Proposed Residential Subdivision – 1111 Summerland Way, Koolkahn
Site Contamination Assessment – Addendum Report

1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) have previously undertaken a site contamination assessment at the above site where it is proposed to construct a residential subdivision, the results of which are presented in report nos. RGS30686.1-AB and RGS30686.1-AC.

Clarence Valley Council (CVC) has since undertaken a review of the reports and requested that additional sampling and analysis be undertaken from three locations at the site. The three locations were nominated by CVC and are reproduced on Figure 1.

This addendum report presents the results of the additional sampling and compares it to the adopted guidelines (Residential A land use as detailed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013).

2 ADDITIONAL SAMPLING AND TESTING

2.1 Sample Locations & Rationale

In accordance with a request from CVC, three surface samples were collected from the three additional sampling areas identified by CVC for subsequent laboratory testing. Sampling locations are shown on the attached Figure 1.

2.2 Laboratory Testing

The three soil samples were transported under chain-of-custody to ALS Laboratory Group, a NATA accredited specialist chemical testing laboratory. The samples were analysed for the following suite of contaminants;

samples were analysed for the following suite of contaminants:

- Heavy metals;
- Total Recoverable Hydrocarbons (TRH)
- Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene (BETXN);
- Phenols;
- Pesticides and PCBs; and
- Asbestos

Laboratory test result sheets are attached.

2.3 Quality Control

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the attached laboratory test results.

All laboratory quality control data is within acceptable limits for the tests carried out. Therefore, on the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

2.4 Guidelines & Assessment Criteria

The assessment was carried out in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013). The NEPM document provides a range of guidelines for assessment of contaminants for various land uses. It is proposed to construct a residential subdivision, therefore the investigation levels for "Residential A" land use have been adopted as the primary investigation criteria. A summary of the criteria adopted for the assessment is presented in our previous site contamination assessment (report no. RGS30868.1-AB).

2.5 Results

An evaluation of the additional laboratory test results against the adopted soil assessment criteria as presented in RGS' previous site contamination assessment is provided below:

- Results of heavy metal analysis revealed some elevated levels, however, the concentrations encountered were below the adopted soil investigation criteria;
- Results of BTEX analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria for BTEX compounds;

- Results of TRH (C6-C10, C10-C16, C16-C34 and C34-C40) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of PAH analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria;
- Results of organochlorine and organophosphorus pesticide analysis recorded values below level of recording for all samples tested and therefore below the adopted assessment criteria;
- Results of Polychlorinated Biphenyls analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria; and
- Asbestos was not detected in any of the samples tested.

2.6 Conclusions

For all samples tested the analysis found that heavy metals, TPH, BTEX, PAH, PCB and OC/OP pesticides were either at concentrations below the laboratory detection limits or at concentrations below the adopted assessment criteria for Residential A land use

On the basis of the assessment undertaken the material meets the requirements for a Residential A site as detailed in the NEPM 2013 guidelines. Further assessment regarding site contamination is not required.

3 LIMITATIONS

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Simon Keen

Geotechnical Engineer

Attachments: Figure 1
Laboratory Test Result Sheets

REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	Neil Garrard Building Contractors Pty Ltd	Job No. RGS30868.1
	Project:	Site Contamination Assessment Lot 1 DP812999 Summerland Way, Koolkhan	Drawn By: SK Scale: As Shown Date: 7-Mar-17
	Title:	Sample Location Plan	Drawing No. **Figure 1**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1703584**	Page	: 1 of 8
Client	: **REGIONAL GEOTECHNICAL SOLUTION**	Laboratory	: Environmental Division Sydney
Contact	: MR ADAM HOLZHAUSER	Contact	: Customer Services ES
Address	: 44 BENT STREET WINGHAM NSW, AUSTRALIA 2429	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION	Date Samples Received	: 16-Feb-2017 09:37
Order number	: ----	Date Analysis Commenced	: 17-Feb-2017
C-O-C number	: ----	Issue Date	: 22-Feb-2017 15:08
Sampler	: ----		
Site	: JUNCTION HILL		
Quote number	: SYBQ/303/15		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- **EA200: As only one sample container was submitted for multiple tests, at the client's request, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Page	: 3 of 8
Work Order	: ES1703584
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S1A	S2A	S3A	----	----
			Client sampling date / time	13-Feb-2017 00:00	13-Feb-2017 00:00	13-Feb-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1703584-001	ES1703584-002	ES1703584-003	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	4.2	5.3	5.7	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	----	----
Asbestos Type	1332-21-4	-	--	-	-	-	----	----
Sample weight (dry)	----	0.01	g	36.9	39.7	32.4	----	----
APPROVED IDENTIFIER:	----	-	--	C.OWLER	C.OWLER	C.OWLER	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	24	34	29	----	----
Copper	7440-50-8	5	mg/kg	7	7	8	----	----
Lead	7439-92-1	5	mg/kg	14	14	18	----	----
Nickel	7440-02-0	2	mg/kg	4	3	4	----	----
Zinc	7440-66-6	5	mg/kg	17	21	14	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----

Page	: 4 of 8
Work Order	: ES1703584
Client	: REGIONAL GEOTECHNICAL SOLUTION
Project	: RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1A	S2A	S3A	----	----
				Client sampling date / time	13-Feb-2017 00:00	13-Feb-2017 00:00	13-Feb-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1703584-001	ES1703584-002	ES1703584-003	--------	--------
					Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----

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Work Order : ES1703584
Client : REGIONAL GEOTECHNICAL SOLUTION
Project : RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1A	S2A	S3A	----	----
				Client sampling date / time	13-Feb-2017 00:00	13-Feb-2017 00:00	13-Feb-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1703584-001	ES1703584-002	ES1703584-003	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	<50	----	----
EP080: BTEXN									

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Client : REGIONAL GEOTECHNICAL SOLUTION
Project : RGS3868.1 PROPOSED RESIDENTIAL SUBDIVISION

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S1A	S2A	S3A	----	----
			Client sampling date / time	13-Feb-2017 00:00	13-Feb-2017 00:00	13-Feb-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1703584-001	ES1703584-002	ES1703584-003	--------	--------
				Result	Result	Result	----	----
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**96.0**	**105**	**89.8**	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**115**	**115**	**102**	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**102**	**95.5**	**83.1**	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**96.3**	**104**	**96.8**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**101**	**106**	**98.8**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**89.2**	**97.1**	**78.6**	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**116**	**123**	**120**	----	----
Anthracene-d10	1719-06-8	0.5	%	**114**	**123**	**118**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**102**	**105**	**102**	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**95.9**	**102**	**117**	----	----
Toluene-D8	2037-26-5	0.2	%	**97.8**	**98.6**	**104**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**100**	**102**	**105**	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	S1A - 13-Feb-2017 00:00	Mid brown sandy soil
EA200: Description	S2A - 13-Feb-2017 00:00	Mid brown sandy soil
EA200: Description	S3A - 13-Feb-2017 00:00	Mid brown sandy soil

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

TABLE A1 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg) '**Residential A' Site**.

National Environmental Protection Measure (NEPM) 2013 – Volume 2: Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater

Report No. RGS30868.1-AD

Site Location: 1111 Summerland Way, Koolkhan

Location	Depth (m)	Asebestos	TOTAL RECOVERABLE HYDROCARBONS					PAH		OC-OP PESTICIDE	BTEX	PCB	HEAVY METALS							
			C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p				As	Cd	Cr*	Cu	Pb	Hg	Ni	Zn
Health Based Soil investigation Level								*300*	*3*	*6*	*NL*	*1*	*100*	*20*	*100*	*6000*	*300*	*40*	*400*	*7400*
Ecological Investigation Level (EIL):																				
Ecological Screening Level (ESL):			*180*	*120*	*300*	*2800*			*0.7*		*50*		***Coarse grained soil in mg/kg***							
			180	*120*	*1300*	*5600*			*0.7*		*65*		***Fine grained soil in mg/kg***							
S1A	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<0.2	<0.1	<5	<1	24	7	14	<0.1	4	17
S2A	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<0.2	<0.1	<5	<1	34	7	14	<0.1	3	21
S3A	0.05 - 0.15	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<0.2	<0.1	<5	<1	29	8	18	<0.1	4	14

BLUE - Denotes concentration exceeds health based guideline for Residential A
GREEN - Denotes concentration exceeds ecological guideline for Residential A
ORANGE - Denotes concentration exceeds health and ecological based guideline

ANNEXURE H

NORTH COAST REGIONAL PLAN 2036 CONSISTENCY CHECKLIST

NORTH COAST REGIONAL PLAN 2036 CONSISTENCY CHECKLIST

(Note - refer to section 4.3 of this template document)

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
Goal 1 - The most stunning environment in NSW **Direction 1 - Deliver environmentally sustainable growth**		
Action 1.1 - Focus future urban development to mapped urban growth areas.	Yes	Consistent although this action is not directly relevant to the planning proposal.
Action 1.2 - Review areas identified as 'under investigation' within urban growth areas to identify and map sites of potentially high environmental value.	Yes	Consistent although this action is not directly relevant to the planning proposal
Action 1.3 - Identify residential, commercial or industrial uses in urban growth areas by developing local growth management strategies endorsed by the Department of Planning and Environment.	Yes	Consistent although this action is not directly relevant to the planning proposal
Action 1.4 - Prepare land release criteria to assess appropriate locations for future residential, commercial and industrial uses.	Yes	Consistent although this action is not directly relevant to the planning proposal
Goal 1 - The most stunning environment in NSW **Direction 2 - Enhance biodiversity, coastal and aquatic habitats, and water catchments**		
Action 2.1 - Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value.	Yes	The Preliminary Biodiversity Assessment states that the subject land has low biodiversity value and so is focused on an area of least biodiversity sensitivity. The restoration of vegetation on site adds 'revegetate' to the hierarchy.
Action 2.2 - Ensure local plans manage marine environments, water catchment areas and groundwater sources to avoid potential development impacts.	Yes	Consistent although this action is not directly relevant to the planning proposal
Goal 1 - The most stunning environment in NSW **Direction 3 - Manage natural hazards and climate change**		
Action 3.1 - Reduce the risk from natural hazards, including the projected effects of climate change, by identifying, avoiding and managing vulnerable areas and hazards.	Yes	Consistent although this action is not directly relevant to the planning proposal
Action 3.2 - Review and update floodplain risk, bushfire and coastal management mapping to manage risk, particularly where urban growth is being investigated.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 3.3 - Incorporate new knowledge on regional climate projections	*Yes*	Consistent although this action is not

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
and related cumulative impacts in local plans for new urban development.		directly relevant to the planning proposal
Goal 1 - The most stunning environment in NSW **Direction 4 - Promote renewable energy opportunities**		
Action 4.1 - Diversify the energy sector by identifying renewable energy resource precincts and infrastructure corridors with access to the electricity network.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 4.2 - Enable appropriate smaller-scale renewable energy projects using bio-waste, solar, wind, small-scale hydro, geothermal or other innovative storage technologies.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 4.3 - Promote appropriate smaller and community-scale renewable energy projects.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 5 - Strengthen communities of interest and cross-regional relationships**		
Action 5.1 - Collaborate on regional and intra-regional housing and employment land delivery, and industry development.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 5.2 - Integrate cross-border land use planning between NSW and South East Queensland, and remove barriers to economic, housing and jobs growth.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 5.3 - Encourage ongoing cooperation and land use planning between the City of Gold Coast and Tweed Shire Council.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 5.4 - Prepare a regional economic development strategy that drives economic growth opportunities by identifying key enabling infrastructure and other policy interventions to unlock growth.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 6 - Develop successful centres of employment**		
Action 6.1 - Facilitate economic activity around industry anchors such as health, education and airport facilities by considering new infrastructure needs and introducing planning controls that encourage clusters of related activity.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 6.3 - Promote knowledge industries by applying flexible planning controls, providing business park development opportunities and identifying opportunities for start-up industries.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 6.3 - Reinforce centres through local growth management strategies and local environmental plans as primary mixed-use locations for commerce, housing, tourism, social activity and regional services.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 6.4 - Focus retail and commercial activities in existing centres and develop place–making focused planning strategies for centres.	*Yes*	Consistent although this action is not directly relevant to the planning proposal

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
Action 6.5 - Promote and enable an appropriate mix of land uses and prevent the encroachment of sensitive uses on employment land through local planning controls.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 6.6 - Deliver an adequate supply of employment land through local growth management strategies and local environmental plans to support jobs growth.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 6.7 - Ensure employment land delivery is maintained through an annual North Coast Housing and Land Monitor.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 7 - Coordinate the growth of regional cities**		
Action 7.1 - Prepare action plans for regional cities that: ▪ ensure planning provisions promote employment growth and greater housing diversity; ▪ promote new job opportunities that complement existing employment nodes around existing education, health and airport precincts; ▪ identify infrastructure constraints and public domain improvements that can make areas more attractive for investment; and ▪ deliver infrastructure and coordinate the most appropriate staging and sequencing of development.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 8 - Promote the growth of tourism**		
Action 8.1 - Facilitate appropriate large-scale tourism developments in prime tourism development areas such as Tweed Heads, Tweed Coast, Ballina, Byron Bay, Coffs Harbour and Port Macquarie.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 8.2 - Facilitate tourism and visitor accommodation and supporting land uses in coastal and rural hinterland locations through local growth management strategies and local environmental plans.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 8.3 - Prepare destination management plans or other tourism focused strategies that: ▪ identify culturally appropriate Aboriginal tourism opportunities; ▪ encourage tourism development in natural areas that support conservation outcomes; and ▪ strategically plan for a growing international tourism market.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 8.4 - Promote opportunities to expand visitation to regionally significant nature-based tourism places, such as Ellenborough Falls, Dorrigo National Park, Wollumbin–Mount Warning National Park, Iluka Nature Reserve and Yuraygir Coastal Walk.	*Yes*	Consistent although this action is not directly relevant to the planning proposal

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
Action 8.5 - Preserve the region's existing tourist and visitor accommodation by directing permanent residential accommodation away from tourism developments, except where it is ancillary to existing tourism developments or part of an area otherwise identified for urban expansion in an endorsed local growth management strategy.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 9: Strengthen regionally significant transport corridors**		
Action 9.1 - Enhance the competitive value of the region by encouraging business and employment activities that leverage major inter-regional transport connections, such as the Pacific Highway, to South East Queensland and the Hunter.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 9.2 - Identify buffer and mitigation measures to minimise the impact of development on regionally significant transport infrastructure including regional and state road network and rail corridors.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 9.3 - Ensure the effective management of the State and regional road network by: ▪ preventing development directly adjoining the Pacific Highway; ▪ preventing additional direct 'at grade' access to motorway-class sections of the Pacific Highway; ▪ locating highway service centres on the Pacific Highway at Chinderah, Ballina, Maclean, Woolgoolga, Nambucca Heads, Kempsey and Port Macquarie, approved by the Department of Planning and Environment and Roads and Maritime Services; and ▪ identifying strategic sites for major road freight transport facilities.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 10 - Facilitate air, rail and public transport infrastructure**		
Action 10.1 - Deliver airport precinct plans for Ballina–Byron, Lismore, Coffs Harbour and Port Macquarie that capitalise on opportunities to diversify and maximise the potential of value-adding industries close to airports.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 10.2 - Consider airport-related employment opportunities and precincts that can capitalise on the expansion proposed around Gold Coast Airport.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 10.3 - Protect the North Coast Rail Line and high-speed rail corridor to ensure network opportunities are not sterilised by incompatible land uses or land fragmentation.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 10.4 - Provide public transport where the size of the urban area has	*Yes*	Consistent although this action is not

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
the potential to generate sufficient demand.		directly relevant to the planning proposal
Action 10.5 - Deliver a safe and efficient transport network to serve future release areas.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 11: Protect and enhance productive agricultural lands**		
Action 11.1 - Enable the growth of the agricultural sector by directing urban and rural residential development away from important farmland and identifying locations to support existing and small-lot primary production, such as horticulture in Coffs Harbour.	*Yes*	Consistent as the proposal will retain agricultural land in an appropriate zoning.
Action 11.2 - Deliver a consistent management approach to important farmland across the region by updating the Northern Rivers Farmland Protection Project (2005) and Mid North Coast Farmland Mapping Project (2008).	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 11.3 - Identify and protect intensive agriculture clusters in local plans to avoid land use conflicts, particularly with residential and rural residential expansion.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 11.4 - Encourage niche commercial, tourist and recreation activities that complement and promote a stronger agricultural sector, and build the sector's capacity to adapt to changing circumstances.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 11.5 - Address sector-specific considerations for agricultural industries through local plans.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 12 - Grow agribusiness across the region**		
Action 12.1 - Promote the expansion of food and fibre production, agrichemicals, farm machinery, wholesale and distribution, freight and logistics, and processing through flexible planning provisions in local growth management strategies and local environmental plans.	*Yes*	The proposal will allow the subject land to be utilised for on-going low level grazing or other agricultural activities
Action 12.2 - Encourage the co-location of intensive primary industries, such as feedlots and compatible processing activities.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 12.3 - Examine options for agribusiness to leverage proximity from the Gold Coast and Brisbane West Wellcamp airports.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 12.4 - Facilitate investment in the agricultural supply chain by protecting assets, including freight and logistics facilities, from land use conflicts arising from the encroachment of incompatible land uses.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 2 - A thriving, interconnected economy **Direction 13 - Sustainably manage natural resources**		
Action 13.1 - Enable the development of the region's natural, mineral and	*Yes*	Consistent although this action is not

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
forestry resources by directing to suitable locations land uses such as residential development that are sensitive to impacts from noise, dust and light interference.		directly relevant to the planning proposal
Action 13.2 - Plan for the ongoing productive use of lands with regionally significant construction material resources in locations with established infrastructure and resource accessibility.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 14 - Provide great places to live and work**		
Action 14.1 - Prepare precinct plans in growth areas, such as Kingscliff, or centres bypassed by the Pacific Highway, such as Woodburn and Grafton, to guide development and establish appropriate land use zoning, development standards and developer contributions.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 14.2 - Deliver precinct plans that are consistent with the Precinct Plan Guidelines (Appendix C).	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 15 - Develop healthy, safe, socially engaged and well-connected communities**		
Action 15.1 - Deliver best-practice guidelines for planning, designing and developing healthy built environments that respond to the ageing demographic and subtropical climate.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 15.2 - Facilitate more recreational walking and cycling paths and expand inter-regional and intra-regional walking and cycling links, including the NSW Coastline Cycleway.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 15.3 - Implement actions and invest in boating infrastructure priorities identified in regional boating plans to improve boating safety, boat storage and waterway access.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 15.4 - Create socially inclusive communities by establishing social infrastructure benchmarks, minimum standards and social impact assessment frameworks within local planning.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 15.5 - Deliver crime prevention through environmental design outcomes through urban design processes.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 16 - Collaborate and partner with Aboriginal communities**		
Action 16.1 - Develop partnerships with Aboriginal communities to facilitate engagement during the planning process, including the development of engagement protocols.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 16.2 - Ensure Aboriginal communities are engaged throughout the preparation of local growth management strategies and local	*Yes*	Consistent although this action is not directly relevant to the planning proposal

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
environmental plans.		
Goal 3 - Vibrant and engaged communities **Direction 17: Increase the economic self-determination of Aboriginal communities**		
Action 17.1 - Deliver opportunities to increase the economic independence of Aboriginal communities through training, employment and tourism.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 17.2 - Foster closer cooperation with Local Aboriginal Land Councils to identify the unique potential and assets of the North Coast communities.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 17.3 - Identify priority sites with economic development potential that Local Aboriginal Land Councils may wish to consider for further investigation.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 18 - Respect and protect the North Coast's Aboriginal heritage**		
Action 18.1 - Ensure Aboriginal objects and places are protected, managed and respected in accordance with legislative requirements and the wishes of local Aboriginal communities.	*Yes*	Previous archaeological reports located two scar trees, neither of which are on the subject land.
Action 18.2 - Undertake Aboriginal cultural heritage assessments to inform the design of planning and development proposals so that impacts to Aboriginal cultural heritage are minimised and appropriate heritage management mechanisms are identified.	*Yes*	The previous Archaeological Assessments (Everick Heritage Consultants) involving aboriginal community consultations and extensive targeted ground excavation found no issues on the subject land. Nevertheless, the assessments can be reviewed and updated prior to public exhibition if required
Action 18.3 - Develop local heritage studies in consultation with the local Aboriginal community, and adopt appropriate measures in planning strategies and local plans to protect Aboriginal heritage.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 18.4 - Prepare maps to identify sites of Aboriginal heritage in 'investigation' areas, where culturally appropriate, to inform planning strategies and local plans to protect Aboriginal heritage.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 19 - Protect historic heritage**		
Action 19.1 - Ensure best-practice guidelines are considered such as the Australia International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance and the NSW Heritage Manual when assessing heritage significance.	*Yes*	Consistent although this action is not directly relevant to the planning proposal

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
Action 19.2 - Prepare, review and update heritage studies in consultation with the wider community to identify and protect historic heritage items, and include appropriate local planning controls.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 19.3 - Deliver the adaptive or sympathetic use of heritage items and assets.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 20 - Maintain the region's distinctive built character**		
Action 20.1 - Deliver new high-quality development that protects the distinct character of the North Coast, consistent with the North Coast Urban Design Guidelines (2009)	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 20.2 - Review the North Coast Urban Design Guidelines (2009).	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 3 - Vibrant and engaged communities **Direction 21 - Coordinate local infrastructure delivery**		
Action 21.1 - Undertake detailed infrastructure service planning to support proposals for new major release areas.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 21.2 - Maximise the cost-effective and efficient use of infrastructure by directing development towards existing infrastructure or promoting the co-location of new infrastructure.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 4 - Great housing choice and lifestyle options **Direction 22 - Deliver greater housing supply**		
Action 22.1 - Deliver an appropriate supply of residential land within local growth management strategies and local plans to meet the region's projected housing needs.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 22.2 - Facilitate housing and accommodation options for temporary residents by: ▪ preparing planning guidelines for seasonal and itinerant workers accommodation to inform the location and design of future facilities; and ▪ working with councils to consider opportunities to permit such facilities through local environmental plans.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 22.3 - Monitor the supply of residential land and housing through the North Coast Housing and Land Monitor.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 4 - Great housing choice and lifestyle options **Direction 23 - Increase housing diversity and choice**		
Action 23.1 - Encourage housing diversity by delivering 40 per cent of new housing in the form of dual occupancies, apartments, townhouses, villas or	*Yes*	Consistent although this action is not directly relevant to the planning proposal

NORTH COAST REGIONAL PLAN 2036 GOALS, DIRECTIONS & ACTIONS	CONSISTENCY	COMMENTS
dwellings on lots less than 400 square metres, by 2036.		
Action 23.1 - Develop local growth management strategies to respond to changing housing needs, including household and demographic changes, and support initiatives to increase ageing in place.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 4 - Great housing choice and lifestyle options **Direction 24: Deliver well-planned rural residential housing areas**		
Action 24.1 - Facilitate the delivery of well-planned rural residential housing areas by: ▪ identifying new rural residential areas in a local growth management strategy or rural residential land release strategy endorsed by the Department of Planning and Environment; and ▪ ensure that such proposals are consistent with the Settlement Planning Guidelines: Mid and Far North Coast Regional Strategies (2007) or land release criteria (once finalised).	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 24.2 - Enable sustainable use of the region's sensitive coastal strip by ensuring new rural residential areas are located outside the coastal strip, unless already identified in a local growth management strategy or rural residential land release strategy endorsed by the Department of Planning and Environment.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Goal 4 - Great housing choice and lifestyle options **Direction 25 - Deliver more opportunities for affordable housing**		
Action 25.1 - Deliver more opportunities for affordable housing by incorporating policies and tools into local growth management strategies and local planning controls that will enable a greater variety of housing types and incentivize private investment in affordable housing.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
Action 25.2 - Prepare guidelines for local housing strategies that will provide guidance on planning for local affordable housing needs.	*Yes*	Consistent although this action is not directly relevant to the planning proposal
	Yes	Consistent although this action is not directly relevant to the planning proposal

ANNEXURE I

CLARENCE VALLEY COUNCIL'S LOCAL STRATEGY
& STRATEGIC PLANS CONSISTENCY CHECKLIST

clarence
VALLEY COUNCIL

COUNCILS LOCAL STRATEGY AND STRATEGIC PLAN/S CONSISTENCY CHECKLIST

Strategy/Strategic Plan	Relevant component/statement of consistency
The Clarence 2027	There are no themes or objectives that which are relevant to this proposal.
Council's Delivery Program and Operational Plan	There are no objectives, strategies or activities which are relevant to this proposal.
Maclean Urban Catchment Local Growth Management Strategy 2011	N/A
South Grafton Heights Precinct Strategy	N/A
Clarence Valley Settlement Strategy	The 2007 rezoning to extend Junction Hill Village, which included the subject land, was based on this Strategy which specifically identified the area as suitable for this use. The proposal will add one additional dwelling to the expanded village, which is insignificant but still in keeping with the Strategy's intent.
Lower Clarence Retail Strategy (May 2007)	N/A
Yamba Retail/Commercial Strategy (May 2002)	N/A
Clarence Valley Economic Development Strategic Plan	N/A
Clarence Valley Industrial Lands Strategy	N/A
Clarence Valley Affordable Housing Strategy	N/A
Clarence Valley Council Biodiversity Management Strategy 2010	The Strategy sets out how and why Council will preserve biodiversity in the Clarence Valley. The Preliminary Biodiversity Assessment concludes there is low biodiversity values present on the subject land, though ecological values will be re-established through the proposed re-vegetation and on-going maintenance specified in the proposed Vegetation Management Plan.
Clarence River Way Masterplan 2009	N/A
Clarence Valley Open Spaces Strategic Plan 2012	N/A

ANNEXURE J

STATE ENVIRONMENTAL PLANNING POLICY
CONSISTENCY CHECKLIST

Name of SEPP	Relevant/applicable?	Comment/statement of consistency
The following State Environmental Planning Policies (SEPPs) are current and whilst not all may be applicable to the Clarence Valley LGA they are all being acknowledged and some are considered in more detail where relevant.		
State Environmental Planning Policy No 1 - Development Standards	No	Not applicable to the CVLEP 2011 or to the planning proposal.
State Environmental Planning Policy No 19 - Bushland in Urban Areas	No	N/A
State Environmental Planning Policy No 21 - Caravan Parks	No	N/A
State Environmental Planning Policy No 33 - Hazardous and Offensive Development	No	N/A
State Environmental Planning Policy No 36 - Manufactured Home Estates	No	N/A
State Environmental Planning Policy No 44 - Koala Habitat Protection	No	N/A
State Environmental Planning Policy No 47 - Moore Park Showground	No	N/A
State Environmental Planning Policy No 50 - Canal Estate Development		
State Environmental Planning Policy No 55 - Remediation of Land	Yes	See Section 4.8.2 of this proposal. Previous Contaminated Soil Reports (Annexure G) concluded that the requirements for a Residential A site were met but did not test the subject land. It is proposed to provide a Stage 1 assessment for the subject site prior to public exhibition.
State Environmental Planning Policy No 64 - Advertising and Signage	No	N/A
State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development	No	N/A
State Environmental Planning Policy No 70 - Affordable Housing (Revised Schemes)	No	N/A
State Environmental Planning Policy (Affordable Rental Housing) 2009	No	N/A
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004	No	N/A
State Environmental Planning Policy (Coastal Management) 2018	No	N/A
State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017	No	N/A
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008	No	N/A
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004	No	N/A
State Environmental Planning Policy (Infrastructure) 2007	No	N/A
State Environmental Planning Policy (Kosciuszko National Park - Alpine Resorts) 2007	No	N/A
State Environmental Planning Policy	No	N/A

Name of SEPP	Relevant/applicable?	Comment/statement of consistency
(Kurnell Peninsula) 1989		
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007	No	N/A
State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007	No	N/A
State Environmental Planning Policy (Penrith Lakes Scheme) 1989	No	N/A
	No	N/A
State Environmental Planning Policy (State and Regional Development) 2011	No	N/A
State Environmental Planning Policy (State Significant Precincts) 2005	No	N/A
State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011	No	N/A
State Environmental Planning Policy (Sydney Region Growth Centres) 2006	No	N/A
State Environmental Planning Policy (Three Ports) 2013	No	N/A
State Environmental Planning Policy (Urban Renewal) 2010	No	N/A
State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017		
State Environmental Planning Policy (Western Sydney Employment Area) 2009	No	N/A
State Environmental Planning Policy (Western Sydney Parklands) 2009	No	N/A
State Environmental Planning Policy (Concurrences) 2018	No	N/A
State Environmental Planning Policy (Aboriginal Land) 2019	No	N/A
State Environmental Planning Policy (Primary Production and Rural Development) 2019	No	N/A

ANNEXURE K

SECTION 9.1 DIRECTION CONSISTENCY CHECKLIST

SECTION 9.1 DIRECTION	CONSISTENCY	COMMENTS
1. EMPLOYMENT AND RESOURCES		
1.1 Business and Industrial Zones	Not Applicable	The proposal does not involve business or industrial zones
1.2 Rural Zones	Not Applicable	Although no applicable, the proposal does met the Directions objective of protecting the agricultural value of rural land.
1.3 Mining, Petroleum Production and Extractive industries	Not Applicable	The proposal does not affect any land identified as having extractive resources of regional significance or their haulage routes.
1.4 Oyster Aquaculture	Not Applicable	The proposal does not affect land within the vicinity of any oyster aquaculture leases.
1.5 Rural Lands	Not Applicable	The proposal does not involve rural lands.
2. ENVIRONMENT AND HERITAGE		
2.1 Environmental protection Zones	Inconsistent but justified	The proposal is inconsistent if a rezoning from E2 to E3 is considered to reduce the level of environmental protection. If it is, then the inconsistency is justified by the current lack of an environmental value as assessed in the Preliminary Biodiversity Assessment and the proposed vegetating and on-going management of appropriate species as illustrated in the Landscape Plan and defined in the Vegetation Management Plan to be provided prior to public exhibition. These documents provide justification under 6 (b) of the Direction. If the rezoning from E2 to E3 is not considered to reduce the level of environmental protection in this instance, then the proposal is consistent.
2.2 Coastal management	Not Applicable	The proposal does not affect land located in the coastal zone
2.3 Heritage Conservation	Not Applicable	The proposal does not affect any objects or areas of heritage significance
2.4 Recreation Vehicle Areas	Not Applicable	The proposal does not involve the development of land for use as a recreation vehicle area
2.5 Application of E2 and E3 Zones and Environmental Overlays in Far North Coast LEPs	Not applicable	This direction does not apply to the Clarence Valley Council area.
3. HOUSING, INFRASTRUCTURE AND URBAN DEVELOPMENT		
3.1 Residential Zones	Consistent	The proposal will affect the residential component of proposed Lot 2 as it will no longer have a large area of non-residential land attached should subdivision occur. The overall result is one additional dwelling which will utilise infrastructure being provided in the adjoining residential subdivision.
3.2 Caravan Parks and Manufactured Home Estates	Not Applicable	The proposal does not involve the development or a caravan park or manufactured home estate
3.3 Home Occupations	Not Applicable	The proposal does not intend to alter the current legislative controls of home occupations in dwellings
3.4 Integrated Land Use and Transport	Not Applicable	The proposal does not involve land zoned residential, business, industrial, village or tourist purposes
3.5 Development Near Regulated Airports and	Not Applicable	The proposal does not affect land area licensed for aerodromes

SECTION 9.1 DIRECTION	CONSISTENCY	COMMENTS
Defence Airfields		
3.6 Shooting Ranges	Not Applicable	The proposal does not affect, create, alter or remove a zone or a provision relating to land adjacent to and/or adjoining an existing shooting range.
3.7 Reduction in non-hosted short term rental accommodation period	Not applicable	The Direction applies to the Byron Shire Council only.
4. HAZARD AND RISK		
4.1 Acid Sulfate Soils	Inconsistent	The land is Class 5 acid sulfate soils (ASS). It is acknowledged that the Direction requires that where a planning proposal that proposes an intensification of land uses on land identified as having a probability of containing acid sulfate soils (ASS) the Council is to consider an ASS study assessing the appropriateness of the change of land use given the presence of ASS. An ultimate outcome of the proposal is a future dwelling house on a lot to be separated from the part of the current lot that is zoned R1. This constitutes an intensification of the land use albeit only a slight intensification. The proposal is therefore strictly inconsistent with the Direction due to the above and also for the reason that it is not supported by an ASS study. An ASS study is not considered to be necessary in this case as the land where a future dwelling is proposed has an elevation of 30m above AHD which is well beyond all reasonable limits and likelihood of triggering the works thresholds in clause 7.1 Acid sulfate soils of the LEP and therefore there is little likelihood of significant adverse environmental impact resulting from the planning proposal. Due to the above circumstances the inconsistency is considered to be of minor significance as per paragraph 8(b) of the Direction.
4.2 Mine Subsidence and Unstable land	Not Applicable	The proposal does not affect any Mine Subsidence Districts
4.3 Flood Prone Land	Not Applicable	The proposal does not involve flood prone land.
4.4 Planning for Bushfire Protection	Not Applicable	The proposal does not involve any land affected by bushfire hazard
5. REGIONAL PLANNING		
5.1 Implementation of Regional Strategies	Not applicable.	No longer applicable as the Mid North Coast Regional Strategy has now been replaced by the North Coast Regional Plan 2036. Refer to Direction 5.10 below.
5.2 Sydney Drinking Water Catchments	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
5.3 Farmland of State and Regional Significance on the NSW Far North Coast	Not applicable.	This Direction does not apply to the Clarence Valley Council area.

SECTION 9.1 DIRECTION	CONSISTENCY	COMMENTS
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	Not Applicable	The proposal does not involve land covered by this Direction
5.5 Development in the Vicinity of Ellalong, Paxton and Millfield (Cessnock LGA)	Not applicable.	*Revoked 18 June 2010*
5.6 Sydney to Canberra Corridor	Not applicable.	*Revoked 10 July 2008 - See amended Direction 5.1*
5.7 Central Coast	Not applicable.	*Revoked 10 July 2008 - See amended Direction 5.1*
5.8 Second Sydney Airport: Badgerys Creek	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
5.9 North West Rail Link Corridor Strategy	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
5.10 Implementation of Regional Plans	Consistent	The proposal involves land covered by North Coast Regional Plan 2036 and is not inconsistent with any provisions of that Plan (see 4.3 of this report)
5.11 Development of Aboriginal Land Council land	Not applicable	No ALCL involved
6. LOCAL PLAN MAKING		
6.1 Approval and Referral Requirements	Consistent	The proposal does not include provisions which require concurrence, consultation or referral of a Minister or public authority
6.2 Reserving Land for Public Purposes	Not Applicable	This proposal does not involve the reserving of land for public purposes
6.3 Site Specific Provisions	Consistent	The proposal does not apply additional development standards or requirements
7. METROLPOLITAN PLANNING		
7.1 Implementation of a Plan for Growing Sydney	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.2 Implementation of Greater Macarthur Land Release Investigation	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.3 Parramatta Road Corridor Urban Transformation Strategy	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.4 Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.5 Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.6 Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.7 Implementation of Glenfield to Macarthur Urban Renewal Corridor	Not applicable.	This Direction does not apply to the Clarence Valley Council area.

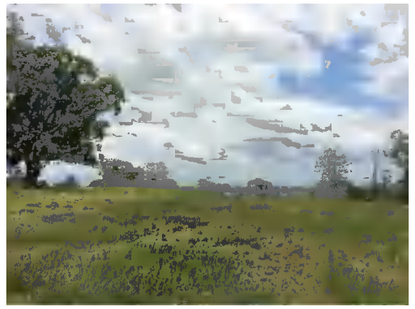
SECTION 9.1 DIRECTION	CONSISTENCY	COMMENTS
7.8 Implementation of Western Sydney Aerotropolis Interim Land Use and Infrastructure Implementation Plan	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.9 Implementation of Bayside West Precincts 2036 Plan	Not applicable.	This Direction does not apply to the Clarence Valley Council area.
7.10 Implementation of Planning Principles for the Cooks Cove Precinct	Not applicable.	This Direction does not apply to the Clarence Valley Council area.

ANNEXURE L

LANDSCAPE PLAN

VIEWS

View 1



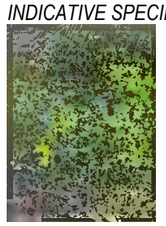
View 2

View 3

SPECIES LIST

Scientific Name	Common Name	Species Type	Mature Height (m)
Acacia disparrima subsp. disparrima	Brush Ironbark Wattle	Tree	9
Acmena smithii	Lilly Pilly	Tree	15
Alchornea ilicifolia	Native Holly	Shrub	6
Alectryon tomentosus	Hairy Alectryon	Tree	15
Alyxia ruscifolia	Chain Fruit	Shrub	3
Aphananthe philippinensis	Rough-leaved Elm	Tree	15
Araucaria cunninghamii	Hoop Pine	Emergent	30
Brachychiton acerifolius	Flame Tree	Tree	20
Bridelia exaltata	Brush Ironbark	Tree	20
Capparis arborea	Capparis	Tree	8
Cryptocarya triplinervis	Three-veined Laurel	Tree	20
Cupaniopsis parvifolia	Small-leaved Tuckeroo	Tree	15
Diospyros pentamera	Myrtle Ebony	Tree	25
Drypetes deplanchei	Yellow Tulipwood	Tree	20
Elaeocarpus obovatus	Hard Quandong	Tree	25
Elaeodendron australe	Red Olive-plum	Tree	8
Grevillea robusta	Silky Oak	Emergent	20
Jagera pseudorhus var. pseudorhus	Foam Bark Tree	Tree	15
Mallotus philippensis	Red Kamala	Tree	15
Notelaea longifolia	Mock Olive	Tree	9
Pittosporum multiflorum	Orange Thorn	Shrub	3
Scolopia braunii	Flintwood	Tree	20
Streblus brunonianus	Whalebone Tree	Tree	15
Wilkiea huegeliana	Veiny Wilkiea	Shrub	8

INDICATIVE SPECIES IMAGES



Alyxia ruscifolia
Chain Fruit

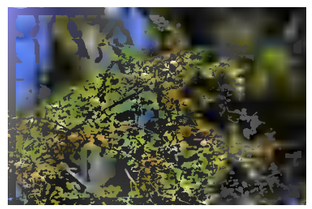
Araucaria cunninghamii
Hoop Pine

Brachychiton acerifolius
Flame Tree

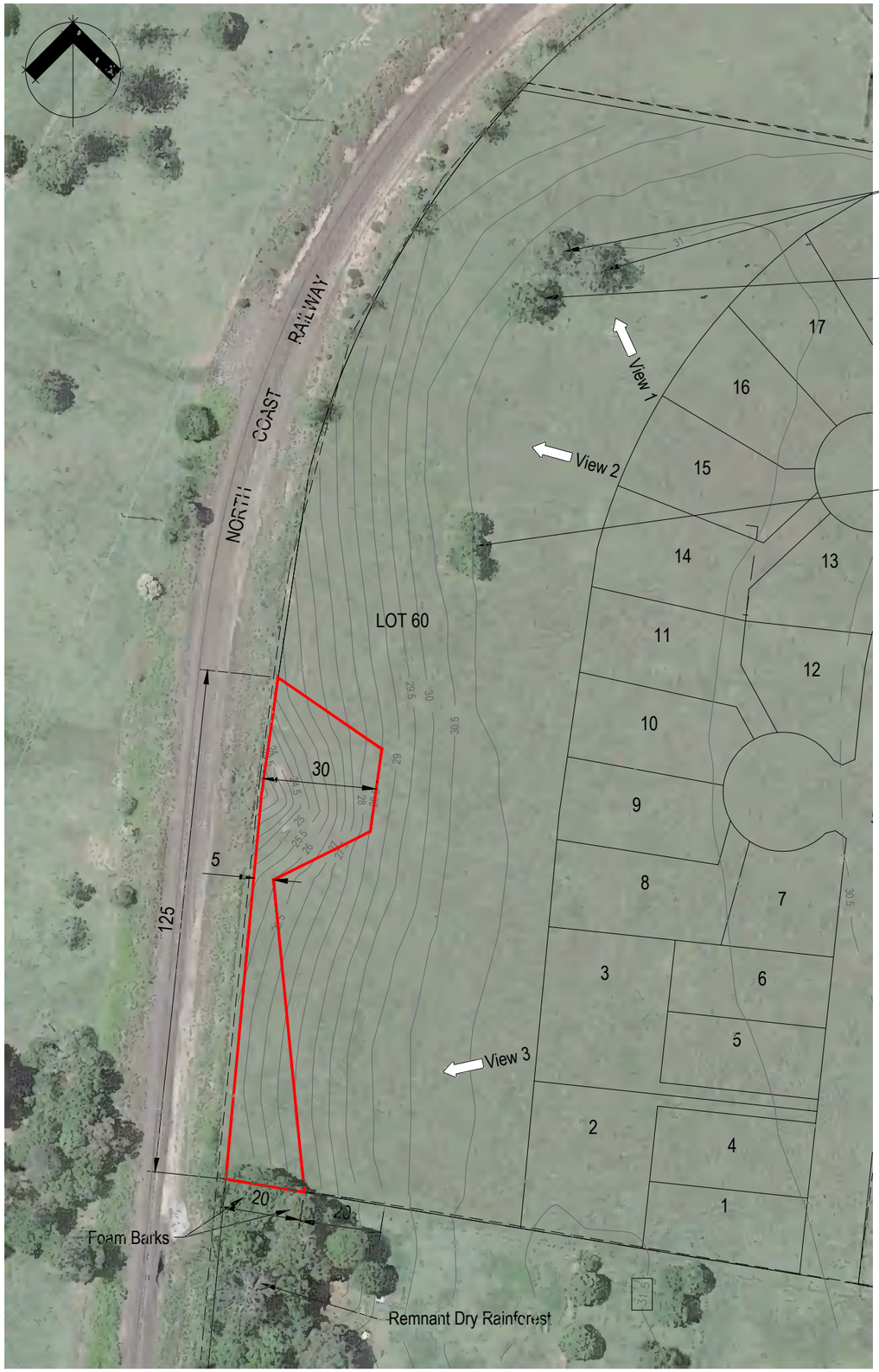
Drypetes deplanchei
Yellow Tulipwood

Elaeodendron australe
Red Olive-plum

Mallotus Philippensis
Red Kamala



Streblus brunonianus
Whalebone Tree



Revegetation Area 2000 m²

Rev.	Description	Date	Des.	App.	Chk.

Amendments

GeoLINK environmental management and design
www.geolink.net.au

Level 1, 64 Ballina Street
PO Box 119
LENNOX HEAD NSW 2478
T 02 6687 7666
F 02 6687 7782
info@geolink.net.au

23 Gordon Street
PO Box 1446
COFFS HARBOUR NSW 2450
T 02 6651 7666
F 02 6651 7733

quality solutions **sustainable** future

Project Title
111 Summerland Way

Client
Kahuna No1. PTY LTD

Designed	RE	Drawn	RE	Checked	RE
Approved	ILC	Date	5/07/2019		
XREFs					
Scale					
A	metres	Not To Scale			

Drawing Title
Revegetation Plan

3205-1004
Drawing Number *Revision*
1