PROJECT

PRELIMINARY CONTAMINATION ASSESSMENT, LOT 332 IN DP1158142, (RIVA VUE STAGE 4), MURWILLUMBAH NEW SOUTH WALES

PREPARED FOR

NEWLAND DEVELOPERS PTY LTD

DATE

JUNE 2011

GILBERT SUTHERLAND

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TITLE Preliminary Contamination Assessment, Lot 332 in DP1158142, (Riva Vue Stage 4), Murwillumbah New South Wales

PROJECT MANAGER N. Zurig

AUTHOR(S) N. Gifford

CLIENT Newland Developers Pty Ltd

CLIENT CONTACT Dale Scotcher

CLIENT REFERENCE – Preliminary Contamination Assessment

SYNOPSIS This report constitutes a Preliminary contamination assessment undertaken across a portion of the Riva Vue development footprint (Stage 4), specifically on Lot 332 in DP1158142. Having established the historical use of the site for sugar cane cropping, this assessment aimed to investigate and establish whether any contamination exists within soils across the site due to that use or subsequent site changes.

REVISION HISTORY

REVISION #	DATE	EDITION BY	APPROVED BY
1	06/05/11	N. Gifford	N. Zurig & L. Varcoe
2	14/06/11	N. Gifford	N. Zurig & L. Varcoe

DISTRIBUTION

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Distribution	1	2	3	4	5	6	7	8	9	10
Newlands Developers Pty Ltd	1	3								
G&S file	1	1								

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SUMMARY

Newland Developers Pty Ltd (Newland) commissioned Gilbert & Sutherland Pty Ltd (G&S) to undertake a preliminary contamination assessment across a portion (Stage 4) of the Riva Vue residential development located at Murwillumbah, New South Wales. The site is formally described as Lot 332 in DP1158142.

This report provides historical site information along with the results of a broadscale shallow and deep soil sampling event designed to identify any potentially contaminating activities associated with the identified historical use of the site. This report was prepared in general accordance with the State Environmental Planning Policy (SEPP) 55. Data Quality Objectives (DQOs) were developed to ensure all project objectives and requirements were fully articulated, documented and consistent with applicable regulatory guidance. The objectives of this report were:

- To present an accurate and up-to-date review of relevant historical site information relating to potentially contaminating activities occurring on-site.
- To present planned and documented Data Quality Objectives to support the scope of works.
- To identify and discuss any potentially contaminating activity that may have occurred on site.

To achieve these objectives, the following tasks were undertaken:

- A review of historical aerial photographs, dangerous goods records (if any) and any contaminated lands registry information recorded for the site (if any).
- A review of regulatory guidance documents to aid in the development of DQOs and sampling and analysis plans for the assessment of the site.

Based on the historical site information obtained as part of this report G&S conclude that no potentially contaminating activities resulting from the previous use of the site as an agricultural property, involving lowland cropping of sugar cane, have occurred.

A total of 11 boreholes were drilled across the site ranging in depth from shallow (0.3m below Near Surface Level (NSL)) to deep 6.5m below NSL. Samples were extracted from the surface 0-0.1m below NSL and from 0.2-0.3m below NSL from the seven (7) shallow boreholes (designated HA1-HA7). All surface samples (0-0.1m below NSL) from the shallow boreholes were analysed for a suite of eight (8) metals and organochlorine and oraganophosphorus pesticides, whilst samples extracted from 0.2-0.3m below NSL were placed on hold with the laboratory pending the initial results. The deeper boreholes (designated SB1-SB4) were drilled within areas already filled and compacted in preparation for residential development. Samples were extracted from the fill material and then from the natural material. Natural soil material was intercepted between 1.5m and 5.0m below NSL.

No shallow soil contamination was identified at concentrations above the applicable residential heath-based investigation levels (HIL's) and development guideline limits. Furthermore no pesticides were recorded above the laboratory's limit of reporting (LOR).

On the basis of our historical desktop review and subsequent site investigations, no contamination has been identified within the investigation area. The historical land use and recent site activity associated with residential development do not render the site unsuitable for the intended residential use or otherwise prevent the proposed development from continuing.

CONTENTS

1 Introduction

Gilbert & Sutherland Pty Ltd (G&S) was commissioned by Newland Developers Pty Ltd (Newland) to assess the potential contamination status of Lot 332 in DP1158142 located adjacent to the currently approved Riva Vue residential development site. The location of the investigation area, at Murwillumbah, New South Wales (hereafter referred to as the 'site'), is shown on Drawing No 10593.1.

Newland propose to develop the site for residential purposes. A requirement of the development process is the assessment of the site's contamination status based on its historical agricultural use for sugar cane cropping. This report is intended to inform the client and Tweed Shire Council (TSC) of the contamination status of the site.

1.1 The site

The site is approximately 10.5 hectares (ha) and encompasses Lot 332 in DP1158142. The site is to be subdivided into residential allotments, which would form Stage 4 of the Riva Vue development.

The site is currently zoned 'agricultural protection' under the Tweed Local Environment Plan 2000 and as such requires rezoning prior to subdivision. A portion of Lot 332 in DP1158142, bordering the Rous River to the north of the site, is dedicated for public open space and public reserve. Copies of the formal property description can be found in Appendix D.

1.2 Previous environmental investigations

One (1) previous environmental assessment has been conducted on the Riva Vue site, which directly relates to the contamination status. That report was prepared by G&S and is entitled:

- Acid Sulfate Soil Assessment and Management Plan, Erosion and Sedimentation Control Plan, Agricultural Suitability Assessment and Preliminary Site Contamination Assessment, Gilbert & Sutherland Pty Ltd, dated May 2004.

This report was reviewed as part of this assessment.

1.3 Scope of works

The scope of work undertaken for this Preliminary soil contamination assessment included:

- A review of the available site history relating to the potential contamination of the site from historical land uses.
- A desktop review of any previous contamination assessments completed for the development.
- A site inspection.
- A soil assessment to assess the likelihood that historical or recent activities have resulted in contamination of the site.
- Drilling on site of a total of 7 shallow boreholes to 0.3m below NSL and 4 deeper boreholes to a maximum depth of 6.0m below NSL.
- Quantitative laboratory analysis of soil samples for the presence of contaminants.
- Preparation of this Preliminary contamination assessment report.

1.4 Aims and objectives

The purpose of this Preliminary contamination assessment was to:

- summarise the historical use of the site in relation to any potentially contaminating activities that may have occurred within its bounds.
- assess whether the changes to the site in preparation for residential development are likely to have contaminated the site, and
- gain an understanding of the contamination (if any) of the shallow soil material occurring within the development footprint within the site.

1.5 Standards and guidelines

This baseline soil contamination assessment was undertaken with reference to the following standards and guidelines:

- Australian Standard 4482.1 – 2005 Guide to the sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds.
- National Environment Protection Measure (NEPM) (1999) Investigation Levels for Soil and Groundwater - Schedule B(1).
- NSW EPA Contaminated Sites: Draft Guidelines for the NSW Site Auditor Scheme.
- New South Wales Department of Planning - Managing Land Contamination - Planning Guidelines SEPP 55 - Remediation of land.

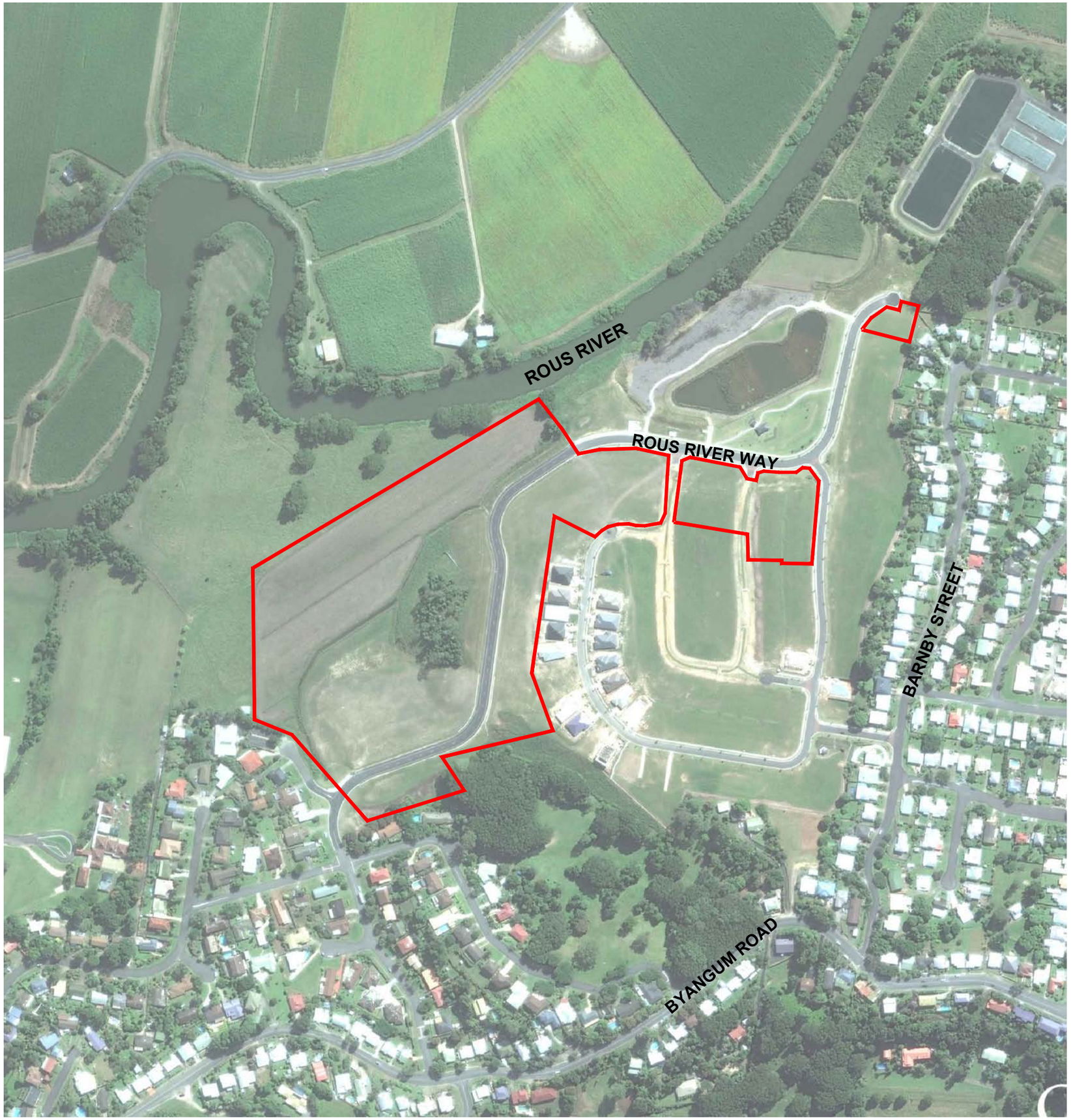
40 80 120 160 200
metres

SCALE
1:4 000

ORIENTATION
NORTH

LEGEND
Site Boundary (Lot 237 in DP1158142)

SOURCES
Image Source: Google Earth Pro 2011



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PROJECT
PRELIMINARY CONTAMINATION ASSESSMENT
RIVA VUE ESTATE

CLIENT
NEWLAND DEVELOPERS PTY LTD

DRAWING
SITE LOCATION PLAN

DATE 14/06/2011		**DRAWN** BMW
SCALE 1:4 000		**CHECKED** NJG
PROJECT NO 10593	**DRAWING NO** 10593.1	**REVISION** ORIGIN

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2 Site History

2.1 Site description

A summary of the site description including its location within the Tweed Shire of New South Wales is presented in Table 2.1.

2.2 Historical aerial photographs

In March 2011, G&S obtained from TSC copies of aerial photographs of the site for the following years:

- **1962 August (no scale given):** This photo shows residential development adjacent to the eastern and south-eastern site boundary (Barnby Street). The site was heavily vegetated with some clearing evident on the northern site boundary and along the Rous River.
- **1987, July 30 Run 2 (Scale: 1:8,000):** This photo shows the majority of the site cleared of vegetation. The photo shows a residence located within the already approved development area, adjacent to the eastern boundary of the assessment area. The south-western area of the assessed portion of the site was being used for cropping activities (possibly sugar cane). Residential development had occurred adjacent to the southern site boundary (now known as Byangum Road).
- **1993 (no scale given):** This photo shows that no further development of the site had occurred since the previous aerial photo nor were any additional cropping areas established.
- **2000 (No scale: TSC GIS image):** This photo shows that additional cropping areas had been established along the western site boundary adjacent to the Rous River. The remainder of the site was unchanged.
- **2004 (TSC GIS image)**: The photo shows

Table 2.1: Site Description

Site Address:	Rous River Way, Murwillumbah, NSW
Title Identification Details:	Lot 332 in DP1158142
Site Ownership	Metricon Pty Ltd (parent company of Newland Developers Pty Ltd)
Current Zoning:	Agricultural protection under Tweed Local Environment Plan, 2000
Future Zoning:	Residential
Current Site Use:	Vacant property
Proposed Site Use:	Residential
Total Site Area	Approximately 10.5 hectares (ha)
Site Buildings:	None within assessed area. (Residential premises removed from site)
Assessment Area:	Approximately 10.5 ha
Surface:	Sparse vegetation, imported fill material, bitumen road surface
Surface Condition:	Good
Adjacent Properties	• Residential premises are located adjacent to the eastern site boundary and are part of the Riva Vue stages 1-3 development. • The Rous River borders the western and north western boundary of the site, beyond which are agricultural/pastoral lands. • Residential properties border the site's southern boundary. • The Murwillumbah wastewater treatment plant is located adjacent to the northern boundary of the site.
Nearest Surface Water Body:	Rous River is the nearest water receptor to the site. The river meanders along the western and north western boundary of the site approximately 100m from the site at its closest bend.

that cropping was still occurring along the western boundary of the site. The residence located in the middle of the site had been removed, however no further development was evident on the remainder of the site.

- **2009 (TSC GIS Image)**: The clearing and earthworks for the residential development (Riva View) is evident across the assessment area and the greater development area. The new road configuration has been established which includes new roads, Rous River Way (constructed through the assessment area) Coral Fern Circuit, Silkpod Avenue and Fig Court (all located within the approved development footprint).

Copies of historical aerial photographs are included in Appendix C. The site boundary of the assessment area has also been overlain on the historical aerial photographs as shown on drawings numbered 10593.3 – 10593.6.

2.3 Contaminated lands database searches

2.3.1 Tweed shire council

Based on discussions with TSC relating to the existing development, the assessment area, and furthermore, after review of the G&S 2004 contamination report, no search of the TSC database was conducted. This approach was adopted as previous searches for the area currently approved for development revealed no records for historical contaminating activities.

2.3.2 NSW DECCW database searches

In April 2011 G&S conducted online searches of the public databases of recorded contaminated lands information. The searches were conducted to identify any documents recorded under the Contaminated Lands Act and/or the POEO Act. No records were discovered relating to the site.

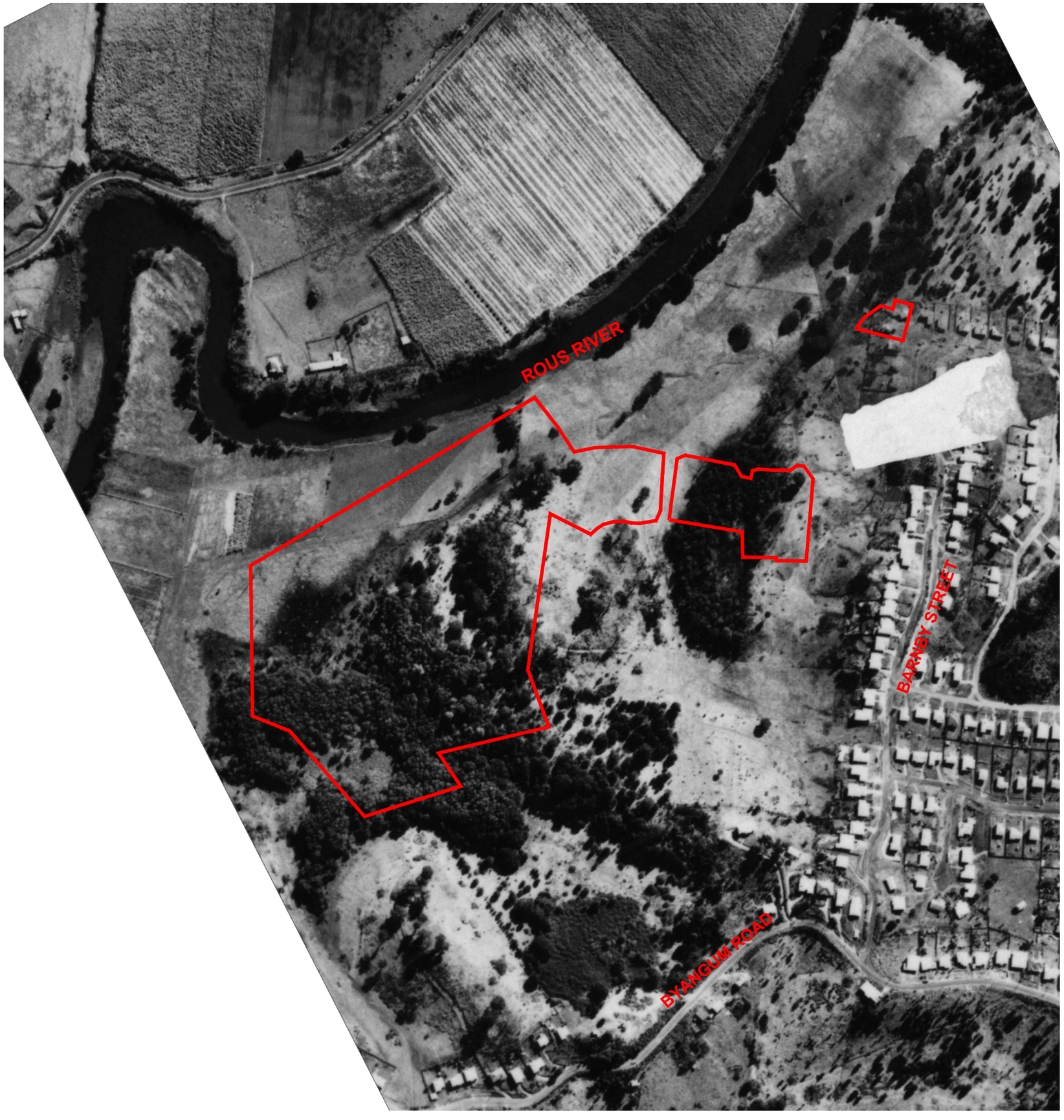
40 80 120 160 200
metres

SCALE
1:4 000

ORIENTATION
NORTH

LEGEND
Site Boundary

SOURCES
Image Source: Tweed Shire Council



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PROJECT
PRELIMINARY CONTAMINATION ASSESSMENT
RIVA VUE ESTATE

CLIENT
NEWLAND DEVELOPERS PTY LTD

DRAWING
HISTORICAL AERIAL IMAGERY 1962

DATE 14/06/2011		**DRAWN** BMW
SCALE 1:4 000		**CHECKED** NJG
PROJECT NO 10593	**DRAWING NO** 10593.3	**REVISION** ORIGIN

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AGRICULTURE WATER ENVIRONMENT

40 80 120 160 200
metres

SCALE
1:4 000

ORIENTATION
NORTH

LEGEND
Site Boundary

SOURCES
Image Source: Tweed Shire Council

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RIVA VUE ESTATE

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DRAWING
HISTORICAL AERIAL IMAGERY 1987

DATE 14/06/2011		**DRAWN** BMW
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PROJECT NO 10593	**DRAWING NO** 10593.4	**REVISION** ORIGIN

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AGRICULTURE WATER ENVIRONMENT

40 80 120 160 200
metres

SCALE
1:4 000

ORIENTATION
NORTH

LEGEND
Site Boundary

SOURCES
Image Source: Tweed Shire Council

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RIVA VUE ESTATE

CLIENT
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DRAWING
HISTORICAL AERIAL IMAGERY 1993

DATE 14/06/2011		**DRAWN** BMW
SCALE 1:4 000		**CHECKED** NJG
PROJECT NO 10593	**DRAWING NO** 10593.5	**REVISION** ORIGIN

40 80 120 160 200
metres

SCALE
1:4 000

ORIENTATION
NORTH

LEGEND
Site Boundary

SOURCES
Image Source: Tweed Shire Council

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PRELIMINARY CONTAMINATION ASSESSMENT
RIVA VUE ESTATE

CLIENT
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DRAWING
HISTORICAL AERIAL IMAGERY 2000

DATE 14/06/2011		**DRAWN** BMW
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PROJECT NO 10593	**DRAWING NO** 10593.6	**REVISION** ORIGIN

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AGRICULTURE WATER ENVIRONMENT

3 Methodology - subsurface investigations

3.1 Soil investigation

G&S drilled seven shallow soil boreholes and four deep boreholes across the site on 28 March 2011. Soil samples were recovered from each borehole to determine the presence, distribution and concentration of potential contaminants in the soil. The borehole locations are shown on Drawing No. 10593.2.

Shallow sampling was undertaken using a Jarrett head soil auger-extending boreholes to a maximum depth of 0.3m below Near Surface Level (NSL) with soil samples being extracted from depths ranging between 0-0.1m below NSL and 0.2-0.3m below NSL.

The Jarrett head auger was decontaminated between sampling in accordance with standard procedures. This involved the removal of soil followed by cleaning of the implements with a phosphate-free detergent and rinsing with clean water.

The four deeper boreholes were drilled utilising a truck-mounted drill rig using solid flight augers and operated by a qualified driller from BorderTech Pty Ltd.

Samples were extracted from the surface and from each 0.5m depth interval until borehole termination. The natural material was encountered between depths of 1.5mNSL and 5.0mNSL.

Samples were recovered both from within the fill material (imported as part of the road building and cut and fill works of Stage 4 Riva Vue development) and from within the natural material beneath the fill, and submitted for laboratory analyses.

This sampling regime was adopted to enable an assessment to be made of the contamination status of the imported fill material and to inform the client of any contamination that may be present in the natural material below as a result of historical potentially contaminating activities (if any).

3.2 Scope of laboratory analysis

Representative soil samples were recovered from the 11 boreholes. Laboratory analysis of recovered soils samples was undertaken for;

- 8 heavy metals
- Organochlorine (OC) and organophosphorus (OP) pesticides.

The sampling strategy adopted for the site was identified from the site history review.

Laboratory analysis was conducted by Australian Laboratory Services (ALS) Environmental, Brisbane which is NATA accredited for the relevant methods.

Soil samples from the seven shallow (HA1-HA7) boreholes extracted from depths between 0.2m and 0.3m below NSL were placed on hold with the ALS Laboratory in Brisbane. This measure provided that if shallow soils displayed concentrations above the applicable guideline limits, the deeper (0.2-0.3m) samples could be re-batched and analysed to delineate contamination.

3.3 Site inspection

G&S conducted a site inspection in conjunction with the soil investigation on 28 March 2011. The intent of the site inspection was to establish whether any visible evidence was present, of potentially contaminating activities occurring or having occurred within the investigation area. The inspection also noted site features including topography, slope and drainage features.

3.4 Site history

A review of historical site information was undertaken to determine if any additional contaminating activities had previously occurred on-site. The historical review made use of the following documents and information:

- Review of TSC-supplied historical aerial photographs dated August 1962, July 1987, 1993, 2000, 2004 and 2009 (to assist with profiling of the site's development history).
- A search of the relevant Department of Climate Change and Water (DECCW) databases regarding contaminated land (CLM Act, POEO Act).

- A review of the previous contamination assessments undertaken by G&S in May 2004.

3.5 Data Quality Objectives

Data Quality Objectives (DQO) were developed utilising technical information provided by the NSW Site Auditor Guidelines and in general accordance with the following guidelines:

- Australian Standard, 2005 Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds. AS 4482.1-2005.
- Department of Environment and Conservation NSW, 200y. Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition.
- NSW EPA, 1995, Contaminated Sites: Sampling Design Guidelines.
- US EPA, 2000. Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW.
- US EPA, 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4.

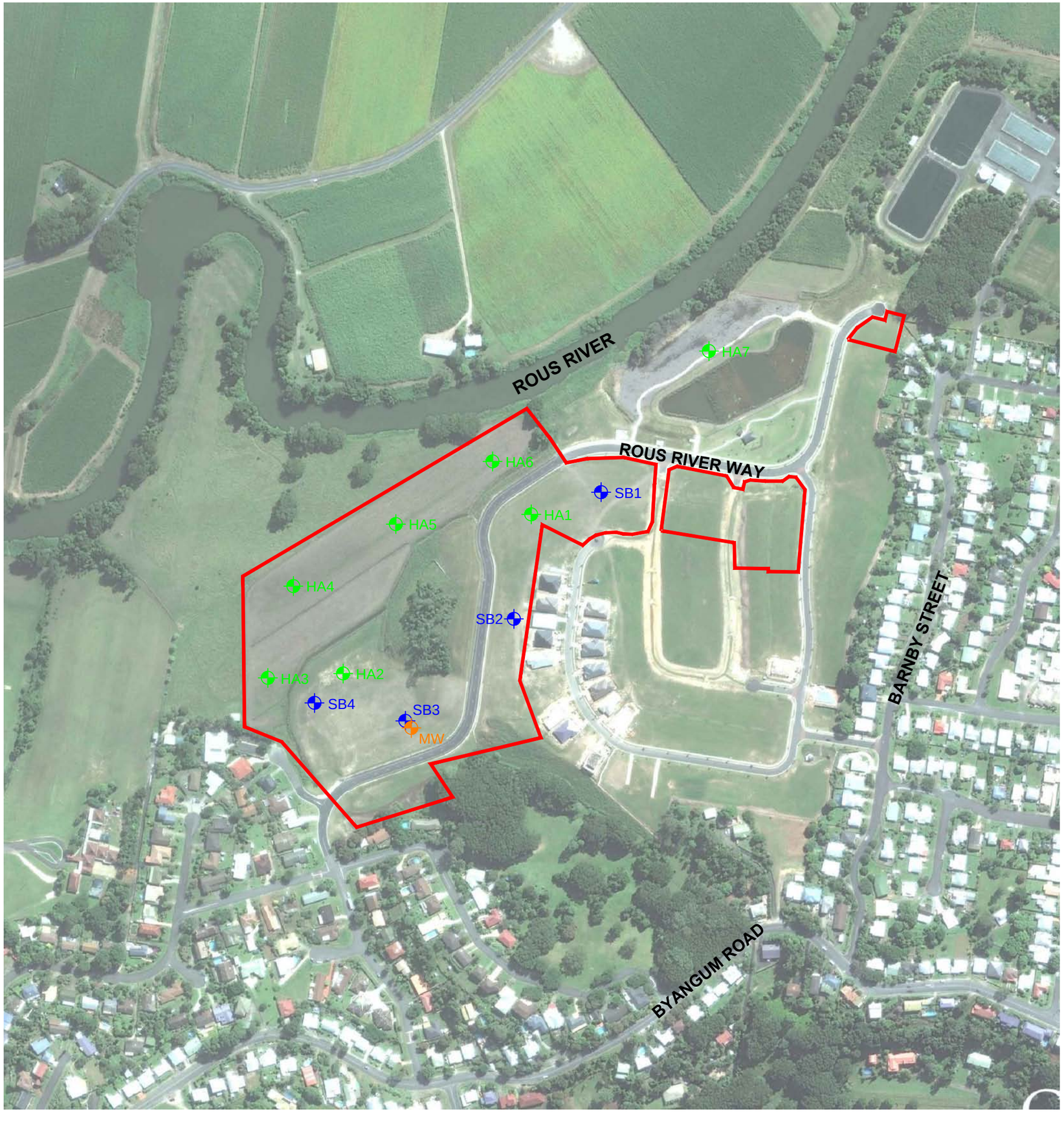
40 80 120 160 200
metres

SCALE
1:4 000

ORIENTATION
NORTH

LEGEND
- Site Boundary
- SB# Soil Bore (GS 28/03/2011)
- HA# Hand Auger (GS 28/03/2011)
- MW Existing Monitoring Well

SOURCES
Image Source: Google Earth Pro 2011



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PROJECT
PRELIMINARY CONTAMINATION ASSESSMENT
RIVA VUE ESTATE

CLIENT
NEWLAND DEVELOPERS PTY LTD

DRAWING
BOREHOLE LOCATION PLAN

DATE 14/06/2011		**DRAWN** BMW
SCALE 1:4 000		**CHECKED** NJG
PROJECT NO 10593	**DRAWING NO** 10593.2	**REVISION** ORIGIN

4 Conceptual site model and data quality objectives

To meet the assessment objectives and to assist with the identification of potential contamination, G&S developed a Conceptual Site Model (CSM) and performed a DQO analysis for the site. These measures helped to confirm the scope of works and the sampling regime designed for the site.

4.1 Topography and drainage

The site slopes are predominantly gently inclined, falling in a north-to-north westerly direction towards a drainage channel and ultimately the Rous River.

Drainage from the road and from the highest portion of the site (being the south eastern boundary) would follow the natural north-to-north westerly slope ranging in gradient from 10-20% at the entrance to the development from Barnby Street to 5% in the far north-western corner where a wetland has been constructed and established.

4.2 Geology and soils

A review of the Geological Survey of Queensland 1:100,000 Geology Series Map No 9541 (Murwillumbah) indicates that the elevated and sloping portions of the site (generally above 5-6m AHD) is underlain by rocks of the Cainozoic era generally comprising undifferentiated Neranleigh-Fernvale Beds of Greywacke, argillite, quartzite, chert, shale, sandstone and greenstone. The alluvial plains below 5m AHD are described as Quarternary alluvium, generally comprising of clay, silt, sand and gravel.

Based on soil results from G&S soil contamination assessment, March 2011, three soil orders were identified within the study area and these were ultimately derived from the underlying Neranleigh-Fernvale metasediments and the Cainozoic alluvial deposits. These soil orders included Dermosols, Hydrosols and Anthroposols.

4.3 Hydrogeology

Considering the site setting, local topography and the nearest surface water receptors, groundwater flow would be expected to follow the site's topographical contours and flow in a north-westerly direction.

4.4 Contaminants of potential concern

Contaminants of potential concern (COPC) identified from the historical site use of sugar cane cropping would include pesticides and heavy metals associated with general agricultural activities. These COPC's include:

- Arsenic (contained in pesticides)
- DDT (and its constituents)
- Lead
- Aldrin and Dieldrin.

4.5 Potential on-site sources

No potential primary sources of COPCs currently exist on-site, particularly as no storage facilities for pesticides was identified within the historical information and pesticides are not currently used on-site.

Potential secondary sources of COPCs may be present in underlying and surrounding soils potentially affected by the application of pesticides (if any) during the historical cropping activities of the site.

4.6 Potential off-site sources

No potential off-site sources of contamination were identified within a 400-metre radius of the site.

4.7 Nearby receptors

Potential receptors of COPC material include the Rous River (located approximately 200m) to the north/north-west of the site.

4.8 Data Quality Objectives

The DQOs for the assessment of the site were developed in conjunction with the NSW DECCW 2006 '*Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*[1] and the Australian

[1] Department of Environment, Climate Change and Water NSW. *Contaminated Sites: Guidelines for the NSW Site Auditor* Scheme (2nd Edition) 2006.

Table 4.8.1: Data Quality Objectives

Project:	To undertake a contamination assessment of shallow and deep soils from Lot 332 in DP1158142 known as Riva Vue development Stage 4, Murwillumbah, NSW.
Procedures:	Conduct soil sampling across the defined study area in accordance with the sample and analysis plan and in general accordance with relevant standards and guidelines.
Contaminants of Concern:	Arsenic, DDT, Aldrin & Dieldrin.
Sampling:	Sampling of surface soils by means of hand auger and by mechanical use of a solid flight auger truck mounted drill rig. All field procedures in general accordance with relevant guidelines and Australian Standards (AS4482.1-2005)
Laboratory:	Use laboratories that employ NATA certified methods for the analytes to be determined, appropriate detection limits and checks intra-laboratory QA.
Reporting:	Preliminary contamination assessment report presenting an account of quantitative and historical desktop works, conclusions and recommendations. Report to generally comply with NSW EPA *Guidelines for Consultants Reporting on Contaminated Sites,* 1997.

Standard AS 4482.1.[2]

The aim of the DQO process is to:

- Clearly define the project scope, procedures, COPCs targeted, sampling plans and reporting outputs.

The Data Quality Objectives defined for the soil assessment are summarised in Table 4.8.1 above.

The site validation results will be assessed against the NSW DECCW 2006 '*Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*, Appendix II-Column 1-Health Based Investigation levels for residential premises.

4.9 Site suitability statement

On completion of the Preliminary contamination assessment G&S will supply the client a statement of suitability based on the assessment's sample analytical results. The site validation results will be compared against the proposed intended use for the site as '*Residential with gardens and accessible soil'* as stipulated in the NSW HILs – Column 1 acceptance levels.

[2] Australian Standard, AS 4482.1. Guide to the investigation and sampling of sites with potentially contaminated soil: Part 1: Non- volatile and semi-volatile compounds, 2005.

5 Results – subsurface investigations

Soils were logged in accordance with the *Australian Soil and Land Survey, Field Handbook.* The borehole logs are attached as Appendix 2.

5.1 Soil investigation threshold levels

The Health Investigation Levels from Column 1 (residential development), Appendix II of the NSW Guidelines for the NSW Site Auditor Scheme prepared by the Department of Environment and Conservation (DEC), 2006 and mirrored in the *National Environment Protection Measure Schedule B(1),* were adopted for comparison.

The Health Investigation Level exposure setting A (HIL-A) was adopted on the basis that the proposed redevelopment of the site is for standard residential purposes. The investigation also considered the NEPM Environmental Investigation Levels (EILs) as a trigger for further investigation into potential environmental impact and phytotoxicity issues.

A summary of the Soil Investigation Levels is provided in Table 5.1.1.

5.2 Soil analytical results

The analytical results of recovered soil samples are shown in results tables numbered 5.1 to 5.2 (included at the end of this section). Results exceeding the HIL-A and EILs are highlighted. The certificates of analysis, quality control report and chain of custody documentation are attached as Appendix A and borelogs are attached as Appendix B.

No staining, odours or visible evidence of contamination were identified across the site including around the constructed wetland along the northern boundary.

The analytical results for soils indicate that there is no contamination in any of the shallow soil samples analysed from boreholes HA1-HA7. In addition no samples extracted from within the fill material encountered within boreholes SB1-SB4

Table 5.1.1 Health Based Soil Investigation levels for land use exposure setting A (Residential) and the Environmental Investigation Levels

Analyte	Health-based Investigation levels(A) (mg/kg)	Environmental Investigation Levels (mg/kg)
Metals/Metalloids		
Arsenic	100	20
Cadmium	20	3
Chromium (VI)	100	-
Copper	1000	60
Lead	300	600
Nickel	600	60
Zinc	7000	200
Mercury (Inorganic)	15	1
Organics (Organo-chlorine and organo-phosphorus pesticides)		
Aldrin + Dieldrin	10	0.2
Chlordane	50	-
DDT+DDD+DDE	200	0.2
Heptachlor	10	-

exhibited concentrations exceeding the nominated EIL's and HIL's.

Natural soil material samples extracted from boreholes SB1-SB4 at depth intervals ranging from 1.5m below NSL to 5.0m below NSL did not exhibit concentrations of anlaytes exceeding the nominated investigation levels.

5.3 Organochlorine and Organophosphorus pesticides (OC & OP)

No OC/OP pesticides exceeded laboratory limits of reporting (LOR) or documented HIL thresholds in any of the soil samples tested (Table 4.2).

5.4 Quality assurance and control

5.4.1 Field quality assurance (QA)

All sampling was undertaken by appropriately qualified and trained environmental scientists in general accordance with AS4482.1-2005.

The sampling tools (Jarrett head hand auger) were decontaminated between sampling events in accordance with standard procedures. This involved the removal of soil followed by cleaning of the implements with a phosphate-free detergent and rinsing with clean water.

All samples were stored in laboratory supplied glass jars or bottles, sealed with Teflon-lined lids and stored in a chilled esky. Samples were submitted to ALS Laboratories with appropriate chain-of-custody documentation. Chain-of-custody and laboratory quality control documentation is supplied with the analytical results in Appendix A.

5.4.2 Laboratory quality control

Laboratory quality control (QC) included duplicate analysis of 10% of the samples and analysis of

Laboratory Control Samples (LCS), Method Blanks and Matrix Spikes at a rate of 5% for each batch. Laboratory QC data is also presented in the certified laboratory reports and is included in Appendix A. Laboratory QC analytical results are summarised below.

- For all matrices, no Method Blank value outliers occurred.
- For all matrices, no Duplicate outliers occurred.
- For all matrices, no Matrix Spike outliers occurred.
- For all regular sample matrices, no surrogate recovery outliers occurred.
- No Analysis Holding Time Outliers existed.
- No Quality Control Sample Frequency Outliers exist.

In summary G&S considers that the laboratory QC results are acceptable and that the data can be relied upon for the purposes of this investigation.

Table 5.1
METALS RESULTS

Newland Developers Pty Ltd. Riva Vue Estate, Murwillumbah, NSW. Contamination Investigation

Lab	Lab batch #	Sample date:	Sample# / Depth (m)		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury
			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			Limit of reporting (ALS)		5	1	2	5	5	2	5	0.1
			HIL(F)		100	20	100	1000	300	600	7000	15
			EIL		20	3	-	60	300	60	200	1
ALS	EB1101559	28/03/11	SB1/0.3m		14	<1	13	51	25	22	91	<0.1
ALS	EB1101559	28/03/11	SB1/1.5m		15	<1	8	26	27	8	84	<0.1
ALS	EB1101559	28/03/11	SB1/3.0m		7	<1	31	11	15	7	26	<0.1
ALS	EB1101559	28/03/11	SB2/0.3m		16	<1	35	33	23	21	82	<0.1
ALS	EB1101559	28/03/11	SB2/3.0m		12	<1	5	23	29	10	46	0.1
ALS	EB1101559	28/03/11	SB2/5.0m		18	<1	11	53	68	28	76	<0.1
ALS	EB1101559	28/03/11	SB3/0.3m		18	<1	12	30	43	7	26	0.3
ALS	EB1101559	28/03/11	SB3/1.5m		15	<1	17	35	28	15	51	<0.1
ALS	EB1101559	28/03/11	SB3/3.5m		18	<1	10	26	22	10	41	<0.1
ALS	EB1101559	28/03/11	SB4/0.3m		17	<1	15	35	30	16	86	<0.1
ALS	EB1101559	28/03/11	SB4/2.0m		12	<1	9	23	17	6	27	<0.1
ALS	EB1101559	28/03/11	HA1/0-0.1m		7	<1	26	26	22	18	54	<0.1
ALS	EB1101559	28/03/11	HA2/0-0.1m		8	<1	20	27	31	14	60	<0.1
ALS	EB1101559	28/03/11	HA3/0-0.1m		<5	<1	26	20	19	15	62	<0.1
ALS	EB1101559	28/03/11	HA4/0-0.1m		<5	<1	26	17	14	16	58	<0.1
ALS	EB1101559	28/03/11	HA5/0-0.1m		<5	<1	26	17	14	17	76	<0.1
ALS	EB1101559	28/03/11	HA6/0-0.1m		11	<1	26	20	19	9	32	<0.1
ALS	EB1101559	28/03/11	HA7/0-0.1m		<5	<1	22	13	11	13	58	<0.1

Notes:

-- Not analysed
(QC) Interlab split
(QCA) Blind intralab duplicate
N/A No guideline available

Exceeds the NSW EPA (1998) Contaminated Sites: Draft Guidelines for the NSW Site Auditor Scheme — Table 1: Soil investigation levels for urban redevelopment sites in NSW Column 1-Residential setting (HIL-A)

Exceeds environmental investigation level (EIL) of the *National Environmental Prtotection and Management, 2004 (NEPM).*

Table 5.2
OC/OP PESTICIDE RESULTS

Newland Developers Pty Ltd. Riva Vue Estate, Murwillumbah, NSW. Contamination Investigation

Lab	Lab batch #	Sample date:	Sample# / Depth (m)		alpha-BHC	Hexachlorobenzene (HCB)	beta-BHC	gamma-BHC	delta-BHC	Heptachlor	Aldrin	Heptachlor epoxide	trans-Chlordane	alpha-Endosulfan	cis-Chlordane	Dieldrin	4,4`-DDE	Endrin	beta-Endosulfan	4,4`-DDD	Endrin aldehyde	Endosulfan sulfate	4,4`-DDT	Endrin ketone	Methoxychlor
			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			Limit of reporting (ALS)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.2
			HIL(F)		50	250	50	50	1000	1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			EIL		N/A	N/A	0.2	0.2	0.2	0.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ALS	EB1101559	28/03/11	SB1/0.3m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB1/1.5m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB1/3.0m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB2/0.3m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB2/3.0m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB2/5.0m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB3/0.3m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB3/1.5m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB3/3.5m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB4/0.3m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	SB4/2.0m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA1/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA2/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA3/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA4/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA5/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA6/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2
ALS	EB1101559	28/03/11	HA7/0-0.1m		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.2

Notes:

-- Not analysed
(S) Interlab split
(D) Blind intralab duplicate
N/A No guideline available

Exceeds the NSW EPA (1998) Contaminated Sites: Draft Guidelines for the NSW Site Auditor Scheme — Table 1: Soil investigation levels for urban redevelopment sites in NSW Column 1-Residential setting (HIL-A)

Exceeds environmental investigation level (EIL) of the National Environmental Prtotection and Management, 2004 (NEPM).

6 Conclusions

This Preliminary contamination assessment, including a desktop site history assessment, examined the occurrence of contaminants of potential concern (COPC) associated with potentially contaminating historical or current site activities. Samples recovered from across the site were analysed for the occurrence and concentration of arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury, organochlorine and organophosphorus pesticides.

The results of this assessment demonstrate that in respect of the samples recovered within the bounds of the investigation area (the site), no COPCs were detected at concentrations greater than:

- the NEPM Health-Based Investigation Levels (HIL)
- the Environmental Investigation Levels (EIL) or
- the NSW EPA Contaminated Sites: Draft Guidelines for the NSW Site Auditor Scheme.

The reconnaissance phase of this Preliminary contamination assessment, constituting the historical desktop assessment, identified no potentially contaminating activities.

No other potential sources of contamination or potentially contaminating activities were identified at the site during the period of this study.

At the time of preparing this report, based on the result of this Preliminary contamination assessment, no further site-specific investigations into potential contamination are considered necessary.

On the basis of the information available from this and previous site investigations in terms of possible site contamination, G&S considers that the site is suitable for its proposed residential use.

7 Appendix A – NATA certified laboratory certificates

CHAIN OF CUSTODY DOCUMENTATION

ALS Laboratory Group

CLIENT: ~~Gilbert &~~ Sutherland P/L	SAMPLER: Nick Gifford
ADDRESS / OFFICE: 5/232 Robina Town Centre Drive, Robina, Q 4230	MOBILE: 0408 391738
PROJECT MANAGER (PM): Nick Gifford	PHONE: 557 89 944
PROJECT ID: 10593	EMAIL REPORT TO: gifford.nj@access.gs
SITE: **Riva Vue** P.O. NO.:	EMAIL INVOICE TO: (if different to report) endres.dj@access.gs
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		S-2 (8 Metals)	OCP									
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles											
1	SB1/0.3m	S	28/03/11				*	*									
2	SB1/1.5m	S	28/03/11				*	*									
3	SB1/3.0m	S	28/03/11				*	*									
4	SB2/0.3m	S	28/03/11				*	*									
5	SB2/3.0m	S	28/03/11				*	*									
6	SB2/5.0m	S	28/03/11				*	*									
7	SB3/0.3m	S	28/03/11				*	*									
8	SB3/1.5m	S	28/03/11				*	*									
9	SB3/3.5m	S	28/03/11				*	*									
10	SB4/0.3m	S	28/03/11				*	*									
11	SB4/2.0m	S	28/03/11				*	*									
12	HA1/0-0.1m	S	28/03/11				*	*									

Environmental Division
Brisbane
Work Order JD.
EB1106203

Telephone : +61-7-3243 7222

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name:Nick Gifford	Date: 29/03/11	Name: VENCO	Date: 29/3/2011	Con' Note No:
Of: Gilbert & Sutherlnad	Time:10:00am	Of: ALS	Time: 15:45	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS LABORATORY GROUP

ENFM (204/5)

STODY DOCUMENTATION

Sutherland P/L

OFFICE: 5/232 Robina Town Centre Drive, Robina, Q 4230

ECT MANAGER (PM): Nick Gifford

PROJECT ID: 10593

SITE: **Riva Vue** P.O. NO.:

RESULTS REQUIRED (Date): QUOTE NO.:

SAMPLER: Nick Gifford

MOBILE: 0408 391738

PHONE: 557 89 944

EMAIL REPORT TO: gifford.nj@access.gs

EMAIL INVOICE TO: (if different to report) endres.dj@access.gs

ALS Laboratory Group

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		S-2 (8 Metals)	OCP										
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
13	HA1/0.2-0.3m	S	28/03/11															
14	HA2/0-0.1m	S	28/03/11				*	*										
15	HA2/0.2-0.3m	S	28/03/11															
16	HA3/0-0.1m	S	28/03/11				*	*										
17	HA3/0.2-0.3m	S	28/03/11															
18	HA4/0-0.1m	S	28/03/11				*	*										
19	HA4/0.2-0.3m	S	28/03/11															
20	HA5/0-0.1m	S	28/03/11				*	*										
21	HA5/0.2-0.3m	S	28/03/11															
22	HA6/0-0.1m	S	28/03/11				*	*										
23	HA6/0.2-0.3m	S	28/03/11															
24	HA7/0-0.1m	S	28/03/11				*	*										

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name:Nick Gifford	Date: 29/03/11	Name: Venko	Date: 29/3/2011	Con' Note No:
Of: Gilbert & Sutherlnad	Time:10:00am	Of: ALS	Time: 15:45	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS LABORATORY GROUP

ENFM (204/5)

STODY DOCUMENTATION

Sutherland P/L	SAMPLER: Nick Gifford
OFFICE: 5/232 Robina Town Centre Drive, Robina, Q 4230	MOBILE: 0408 391738
ECT MANAGER (PM): Nick Gifford	PHONE: 557 89 944
PROJECT ID: 10593	EMAIL REPORT TO: gifford.nj@access.gs
SITE: **Riva Vue** P.O. NO.:	EMAIL INVOICE TO: (if different to report) endres.dj@access.gs
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

ALS Laboratory Group

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		S-2 (8 Metals)	OCP									
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles											
25	HA7/0.2-0.3m	S	28/03/11														

RELINQUISHED BY:		RECEIVED BY			METHOD OF SHIPMENT
Name:Nick Gifford	Date: 29/03/11	Name: VENKO	Date:	29/3/2011	Con' Note No:
Of: Gilbert & Sutherlnad	Time:10:00am	Of: ALS	Time:	15:45	
Name:	Date:	Name:	Date:		Transport Co:
Of:	Time:	Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS LABORATORY GROUP

ENFM (204/5)

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order : **EB1106203**

Client	: **GILBERT & SUTHERLAND PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR NICK GIFFORD	Contact	: Milan Pavasovic
Address	: P O BOX 4115 ROBINA QLD, AUSTRALIA 4230	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: gifford.nj@access.gs	E-mail	: milan.pavasovic@alsglobal.com
Telephone	: +61 07 55789944	Telephone	: +61 7 3243 7129
Facsimile	: +61 07 55789945	Facsimile	: +61 7 3243 7218
Project	: 10593	Page	: 1 of 2
Order number	: ----		
C-O-C number	: ----	Quote number	: EB2010GILSUT0312 (BN/220/10)
Site	: Riva Vue		
Sampler	: Nick Gifford	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 29-MAR-2011	Issue Date	: 31-MAR-2011 14:39
Client Requested Due Date	: 08-APR-2011	Scheduled Reporting Date	: **08-APR-2011**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 11.4°C, 10.8°C - Ice bricks present
No. of coolers/boxes	: 2 MEDIUM	No. of samples received	: 25
Security Seal	: Intact.	No. of samples analysed	: 18

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Matt Goodwin.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
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.

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	(On Hold) SOIL No analysis requested	SOIL - EP068A (solids) Organochlorine Pesticides by GCMS	SOIL - S-02 8 Metals (incl. Digestion)
EB1106203-001	28-MAR-2011 15:00	SB1/0.3m		✓	✓
EB1106203-002	28-MAR-2011 15:00	SB1/1.5m		✓	✓
EB1106203-003	28-MAR-2011 15:00	SB1/3.0m		✓	✓
EB1106203-004	28-MAR-2011 15:00	SB2/0.3m		✓	✓
EB1106203-005	28-MAR-2011 15:00	SB2/3.0m		✓	✓
EB1106203-006	28-MAR-2011 15:00	SB2/5.0m		✓	✓
EB1106203-007	28-MAR-2011 15:00	SB3/0.3m		✓	✓
EB1106203-008	28-MAR-2011 15:00	SB3/1.5m		✓	✓
EB1106203-009	28-MAR-2011 15:00	SB3/3.5m		✓	✓
EB1106203-010	28-MAR-2011 15:00	SB4/0.3m		✓	✓
EB1106203-011	28-MAR-2011 15:00	SB4/2.0m		✓	✓
EB1106203-012	28-MAR-2011 15:00	HA1/0-0.1m		✓	✓
EB1106203-013	28-MAR-2011 15:00	HA1/0.2-0.3m	✓		
EB1106203-014	28-MAR-2011 15:00	HA2/0-0.1m		✓	✓
EB1106203-015	28-MAR-2011 15:00	HA2/0.2-0.3m	✓		
EB1106203-016	28-MAR-2011 15:00	HA3/0-0.1m		✓	✓
EB1106203-017	28-MAR-2011 15:00	HA3/0.2-0.3m	✓		
EB1106203-018	28-MAR-2011 15:00	HA4/0-0.1m		✓	✓
EB1106203-019	28-MAR-2011 15:00	HA4/0.2-0.3m	✓		
EB1106203-020	28-MAR-2011 15:00	HA5/0-0.1m		✓	✓
EB1106203-021	28-MAR-2011 15:00	HA5/0.2-0.3m	✓		
EB1106203-022	28-MAR-2011 15:00	HA6/0-0.1m		✓	✓
EB1106203-023	28-MAR-2011 15:00	HA6/0.2-0.3m	✓		
EB1106203-024	28-MAR-2011 15:00	HA7/0-0.1m		✓	✓
EB1106203-025	28-MAR-2011 15:00	HA7/0.2-0.3m	✓		

Requested Deliverables

MR NICK GIFFORD

- *AU Certificate of Analysis - NATA (COA)	Email	gifford.nj@access.gs
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	gifford.nj@access.gs
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	gifford.nj@access.gs
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	gifford.nj@access.gs
- Chain of Custody (CoC) (COC)	Email	gifford.nj@access.gs
- EDI Format - ENMRG (ENMRG)	Email	gifford.nj@access.gs
- EDI Format - XTab (XTAB)	Email	gifford.nj@access.gs

MS DEBBIE ENDRES

- A4 - AU Tax Invoice (INV)	Email	endres.dj@access.gs

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB1106203**	Page	: 1 of 7
Client	: **GILBERT & SUTHERLAND PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR NICK GIFFORD	Contact	: Milan Pavasovic
Address	: P O BOX 4115 ROBINA QLD, AUSTRALIA 4230	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: gifford.nj@access.gs	E-mail	: milan.pavasovic@alsglobal.com
Telephone	: +61 07 55789944	Telephone	: +61 7 3243 7129
Facsimile	: +61 07 55789945	Facsimile	: +61 7 3243 7218
Project	: 10593	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 29-MAR-2011
Sampler	: Nick Gifford	Issue Date	: 06-APR-2011
Site	: Riva Vue		
		No. of samples received	: 25
Quote number	: BN/220/10	No. of samples analysed	: 18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Matt Frost	Senior Organic Chemist	Brisbane Inorganics
Matt Frost	Senior Organic Chemist	Brisbane Organics

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 insuffient 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

Analytical Results

Sub-Matrix: SOIL				Client sample ID	SB1/0.3m	SB1/1.5m	SB1/3.0m	SB2/0.3m	SB2/3.0m
				Client sampling date / time	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00
Compound	CAS Number	LOR	Unit		EB1106203-001	EB1106203-002	EB1106203-003	EB1106203-004	EB1106203-005
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		11.0	13.8	25.8	13.3	12.9
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		14	15	7	16	12
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		13	8	31	35	5
Copper	7440-50-8	5	mg/kg		51	26	11	33	23
Lead	7439-92-1	5	mg/kg		25	27	15	23	29
Nickel	7440-02-0	2	mg/kg		22	8	7	21	10
Zinc	7440-66-6	5	mg/kg		91	84	26	82	46
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	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
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
beta-Endosulfan	33213-65-9	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
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.1	%		59.0	54.3	57.2	51.6	53.2
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.1	%		69.8	65.6	64.1	56.0	54.7

Analytical Results

Sub-Matrix: SOIL				Client sample ID	SB2/5.0m	SB3/0.3m	SB3/1.5m	SB3/3.5m	SB4/0.3m
				Client sampling date / time	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00
Compound	CAS Number	LOR	Unit		EB1106203-006	EB1106203-007	EB1106203-008	EB1106203-009	EB1106203-010
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		9.4	13.1	13.1	20.3	13.3
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		18	18	15	18	17
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		11	12	17	10	15
Copper	7440-50-8	5	mg/kg		53	30	35	26	35
Lead	7439-92-1	5	mg/kg		68	43	28	22	30
Nickel	7440-02-0	2	mg/kg		28	7	15	10	16
Zinc	7440-66-6	5	mg/kg		76	26	51	41	86
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	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
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
beta-Endosulfan	33213-65-9	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
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.1	%		66.2	52.3	46.5	57.4	55.5
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.1	%		67.2	57.0	54.4	61.1	61.0

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: SB4/2.0m Client sampling date / time: 28-MAR-2011 15:00 EB1106203-011	HA1/0-0.1m 28-MAR-2011 15:00 EB1106203-012	HA2/0-0.1m 28-MAR-2011 15:00 EB1106203-014	HA3/0-0.1m 28-MAR-2011 15:00 EB1106203-016	HA4/0-0.1m 28-MAR-2011 15:00 EB1106203-018
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**17.6**	**25.6**	**23.4**	**28.0**	**26.0**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**12**	**7**	**8**	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**9**	**26**	**20**	**26**	**26**
Copper	7440-50-8	5	mg/kg	**23**	**26**	**27**	**20**	**17**
Lead	7439-92-1	5	mg/kg	**17**	**22**	**31**	**19**	**14**
Nickel	7440-02-0	2	mg/kg	**6**	**18**	**14**	**15**	**16**
Zinc	7440-66-6	5	mg/kg	**27**	**54**	**60**	**62**	**58**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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
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
beta-Endosulfan	33213-65-9	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
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**55.4**	**64.8**	**56.3**	**67.0**	**54.8**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**61.1**	**74.4**	**64.9**	**83.9**	**65.5**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	HA5/0-0.1m	HA6/0-0.1m	HA7/0-0.1m	----	----
			Client sampling date / time	28-MAR-2011 15:00	28-MAR-2011 15:00	28-MAR-2011 15:00	----	----
Compound	CAS Number	LOR	Unit	EB1106203-020	EB1106203-022	EB1106203-024	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**26.4**	**23.0**	**6.4**	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**11**	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	**26**	**26**	**22**	----	----
Copper	7440-50-8	5	mg/kg	**17**	**20**	**13**	----	----
Lead	7439-92-1	5	mg/kg	**14**	**19**	**11**	----	----
Nickel	7440-02-0	2	mg/kg	**17**	**9**	**13**	----	----
Zinc	7440-66-6	5	mg/kg	**76**	**32**	**58**	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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	----	----
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	----	----
beta-Endosulfan	33213-65-9	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	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**116**	**100**	**115**	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**128**	**118**	**95.2**	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	138
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	22.8	134.5

QUALITY CONTROL REPORT

Work Order	: **EB1106203**	Page	: 1 of 6
Client	: **GILBERT & SUTHERLAND PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR NICK GIFFORD	Contact	: Milan Pavasovic
Address	: P O BOX 4115 ROBINA QLD, AUSTRALIA 4230	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: gifford.nj@access.gs	E-mail	: milan.pavasovic@alsglobal.com
Telephone	: +61 07 55789944	Telephone	: +61 7 3243 7129
Facsimile	: +61 07 55789945	Facsimile	: +61 7 3243 7218
Project	: 10593	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Riva Vue		
C-O-C number	: ----	Date Samples Received	: 29-MAR-2011
Sampler	: Nick Gifford	Issue Date	: 06-APR-2011
Order number	: ----		
		No. of samples received	: 25
Quote number	: BN/220/10	No. of samples analysed	: 18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Matt Frost	Senior Organic Chemist	Brisbane Inorganics
Matt Frost	Senior Organic Chemist	Brisbane Organics

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 insuffient 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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 1731779)									
EB1106196-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	13.2	12.6	4.5	0% - 50%
EB1106196-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	9.7	10.1	3.8	0% - 50%
EA055: Moisture Content (QC Lot: 1731780)									
EB1106244-016	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	87.0	88.1	1.3	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1732338)									
EB1106203-001	SB1/0.3m	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	13	18	26.8	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	22	23	4.7	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	14	13	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	51	50	2.6	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	25	23	9.5	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	91	92	1.8	0% - 50%
EB1106203-011	SB4/2.0m	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	9	9	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	7	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	12	13	11.2	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	23	24	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	17	15	11.4	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	27	28	3.8	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1732339)									
EB1106203-001	SB1/0.3m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB1106203-011	SB4/2.0m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1732201)									
EB1106203-001	SB1/0.3m	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1732201) - continued									
EB1106203-001	SB1/0.3m	EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EB1106203-011	SB4/2.0m	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1732338)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.11 mg/kg	127	90	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.76 mg/kg	108	82	124
EG005T: Chromium	7440-47-3	2	mg/kg	<2	60.93 mg/kg	119	89	129
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.68 mg/kg	119	89	125
EG005T: Lead	7439-92-1	5	mg/kg	<5	54.76 mg/kg	118	83	123
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.23 mg/kg	119	86	124
EG005T: Zinc	7440-66-6	5	mg/kg	<5	103.88 mg/kg	119	86	124
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1732339)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	77.8	73	127
EP068A: Organochlorine Pesticides (OC) (QCLot: 1732201)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	66.1	58.4	116
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	73.8	57.7	107
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	# 59.1	59.3	116
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	# 58.9	59.1	118
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	55.4	51	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	54	119
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	77.8	53	113
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	71.5	55	113
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	75.2	55	114
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	67.8	53	120
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	76.4	52	113
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	71.1	58.8	115
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	68.2	61.2	116
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	61.9	47	133
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	58.8	58.5	117
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	# 56.4	58.4	118
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	61.2	41	119
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	59.3	50	120
EP068: 4.4`-DDT	50-29-3	0.05	mg/kg	----	0.5 mg/kg	57.6	52.6	129
		0.2	mg/kg	<0.2	----	----	----	----
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	# 53.3	60	124
EP068: Methoxychlor	72-43-5	0.05	mg/kg	----	0.5 mg/kg	75.6	52.4	131
		0.2	mg/kg	<0.2	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1732338)							
EB1106203-002	SB1/1.5m	EG005T: Arsenic	7440-38-2	50 mg/kg	99.5	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	103	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.8	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	104	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	104	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	100	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	105	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1732339)							
EB1106203-002	SB1/1.5m	EG035T: Mercury	7439-97-6	5.0 mg/kg	76.0	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1732201)							
EB1106203-002	SB1/1.5m	EP068: gamma-BHC	58-89-9	0.25 mg/kg	82.5	70	130
		EP068: Heptachlor	76-44-8	0.25 mg/kg	95.4	70	130
		EP068: Aldrin	309-00-2	0.25 mg/kg	79.9	70	130
		EP068: Dieldrin	60-57-1	0.25 mg/kg	94.5	70	130
		EP068: Endrin	72-20-8	2 mg/kg	108	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	99.2	70	130

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB1106203**	Page	: 1 of 6
Client	: GILBERT & SUTHERLAND PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR NICK GIFFORD	Contact	: Milan Pavasovic
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Project	: 10593	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Riva Vue		
C-O-C number	: ----	Date Samples Received	: 29-MAR-2011
Sampler	: Nick Gifford	Issue Date	: 06-APR-2011
Order number	: ----		
		No. of samples received	: 25
Quote number	: BN/220/10	No. of samples analysed	: 18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
SB1/0.3m, SB1/1.5m, SB1/3.0m, SB2/0.3m, SB2/3.0m, SB2/5.0m, SB3/0.3m, SB3/1.5m, SB3/3.5m, SB4/0.3m, SB4/2.0m, HA1/0-0.1m, HA2/0-0.1m, HA3/0-0.1m, HA4/0-0.1m, HA5/0-0.1m, HA6/0-0.1m, HA7/0-0.1m	**28-MAR-2011**	**----**	----	----	**01-APR-2011**	11-APR-2011	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved							
SB1/0.3m, SB1/1.5m, SB1/3.0m, SB2/0.3m, SB2/3.0m, SB2/5.0m, SB3/0.3m, SB3/1.5m, SB3/3.5m, SB4/0.3m, SB4/2.0m, HA1/0-0.1m, HA2/0-0.1m, HA3/0-0.1m, HA4/0-0.1m, HA5/0-0.1m, HA6/0-0.1m, HA7/0-0.1m	**28-MAR-2011**	**01-APR-2011**	24-SEP-2011	✓	**05-APR-2011**	24-SEP-2011	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved							
SB1/0.3m, SB1/1.5m, SB1/3.0m, SB2/0.3m, SB2/3.0m, SB2/5.0m, SB3/0.3m, SB3/1.5m, SB3/3.5m, SB4/0.3m, SB4/2.0m, HA1/0-0.1m, HA2/0-0.1m, HA3/0-0.1m, HA4/0-0.1m, HA5/0-0.1m, HA6/0-0.1m, HA7/0-0.1m	**28-MAR-2011**	**01-APR-2011**	25-APR-2011	✓	**05-APR-2011**	25-APR-2011	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved								
SB1/0.3m,	SB1/1.5m,	**28-MAR-2011**	**01-APR-2011**	11-APR-2011	✓	**04-APR-2011**	11-MAY-2011	✓
SB1/3.0m,	SB2/0.3m,							
SB2/3.0m,	SB2/5.0m,							
SB3/0.3m,	SB3/1.5m,							
SB3/3.5m,	SB4/0.3m,							
SB4/2.0m,	HA1/0-0.1m,							
HA2/0-0.1m,	HA3/0-0.1m,							
HA4/0-0.1m,	HA5/0-0.1m,							
HA6/0-0.1m,	HA7/0-0.1m							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	3	27	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	2	18	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	18	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	18	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	18	**5.6**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	18	**5.6**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (1999) Schedule B(3) (Method 504,505)

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP068A: Organochlorine Pesticides (OC)	2037179-002	----	**beta-BHC**	319-85-7	59.1 %	59.3-116%	**Recovery less than lower control limit**
EP068A: Organochlorine Pesticides (OC)	2037179-002	----	**gamma-BHC**	58-89-9	58.9 %	59.1-118%	**Recovery less than lower control limit**
EP068A: Organochlorine Pesticides (OC)	2037179-002	----	**4.4`-DDD**	72-54-8	56.4 %	58.4-118%	**Recovery less than lower control limit**
EP068A: Organochlorine Pesticides (OC)	2037179-002	----	**Endrin ketone**	53494-70-5	53.3 %	60-124%	**Recovery less than lower control limit**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

8 Appendix B – Borelogs

Borehole: **SB1**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 3.00
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
0			SILTY CLAY , Fill, grey, sandy silts present, small gravels (3-10mm), dry	
1			SILTY CLAY , Fill, light brown, fine grain, minor gravels at 0.2-0.5m, dry	
2				
3			HEAVY CLAY , Natural at 2.1m, orange with brown mottles, high plasticity, borehole terminated at 3.0m.	
4				
5				
6				

Borehole: **HA1**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 0.30
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
0			SILTY CLAY LOAM , Fill, dark brown with black mottles, minor gravels, common roots and organic matter, moist	
			SILTY CLAY LOAM , Fill, light brown with white mottles, low plasticity, few medium pebbles, dry, borehole terminated at 0.3m.	
1				
2				
3				
4				
5				
6				

Borehole: **SB2**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 6.00
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
0			SILTY CLAY , Fill, light orange, fine grained, few small pebbles, dry	
1			SILTY CLAY , Fill, light orange, fine grained, dry, gradual change to;	
2				
3			SILTY CLAY , Fill, light brown, fine grained, dry	
4			SILTY CLAY , Fill, brown, fine grained, dry	
5			SILTY CLAY , Fill, brown, fine grained, dry, clay seam 4.8-5.1m, dry	
6			SILTY CLAY , Natural at 5.3m, brown, fine grained, low plasticity, dry, borehole terminated at 6.0m.	

Borehole: **SB3**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 2.00
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
1			SILTY CLAY LOAM , Light brown with 5% orange mottles, low plasticity, few medium pebbles,	
2			SILTY CLAY LOAM , Light brown with 10% orange mottles, low plasticity, few medium pebbles, clear change to;	
3			LIGHT MEDIUM CLAY , Natural at 1.5m, orange with light brown mottles, fine grain, medium plasticity, dry, borehole terminated at 2.0m.	
4				
5				
6				

Borehole: **SB4**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 2.00
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
1			SILTY CLAY LOAM , Light brown with 5% orange mottles, low plasticity, few medium pebbles,	
2			SILTY CLAY LOAM , Light brown with 10% orange mottles, low plasticity, few medium pebbles, clear change to;	
3			LIGHT MEDIUM CLAY , Natural at 1.5m, orange with light brown mottles, fine grain, medium plasticity, dry, borehole terminated at 2.0m.	
4				
5				
6				

Borehole: **HA2**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 0.3
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
0			SILTY CLAY LOAM , Fill, black, fine grained, medium plasticity, few small pebbles, few roots and organic matter,	
			SILTY CLAY LOAM , Fill, brown with orange white mottles, medium plasticity, moist, gradual change to medium clay, borehole terminated at 3.0m	
1				
2				
3				
4				
5				
6				

Borehole: **HA3**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 0.5
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
1			SILTY CLAY LOAM , Black, (10-20mm) polyhedral medium clay peds, moist HEAVY CLAY , Black, medium plasticity, massive structure, moist, borehole terminated at 0.5m.	
2				
3				
4				
5				
6				

Borehole: **HA4**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 0.5
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
1			SILTY CLAY LOAM , Black, (10-20mm) polyhedral medium clay peds, moist HEAVY CLAY , Black, medium plasticity, massive structure, moist, borehole terminated at 0.5m.	
2				
3				
4				
5				
6				

Borehole: **HA5**
Project: 10593
Client: Newland Developers Pty Ltd
Depth (m): 0.5
Logged by: NG
Drilled by: Bordertech
Drill date: 28/03/2011

Depth NSL(m)	Drilling: Depth NSL (m)	Drilling: Graphic log	Soil Description (As per McDonald et.al 1990)	Sample ID/Depth
1			SILTY CLAY LOAM , Black, (10-20mm) polyhedral medium clay peds, moist HEAVY CLAY , Black, medium plasticity, massive structure, moist, borehole terminated at 0.5m.	
2				
3				
4				
5				
6				

9 Appendix C – Aerial photographs

W
583
27

MURWILLUMBAH
1:8000 COLOUR
NSW 3583 (M1785)

RUN 2
30-7-87

1265m AS
153·10 m


Rous River

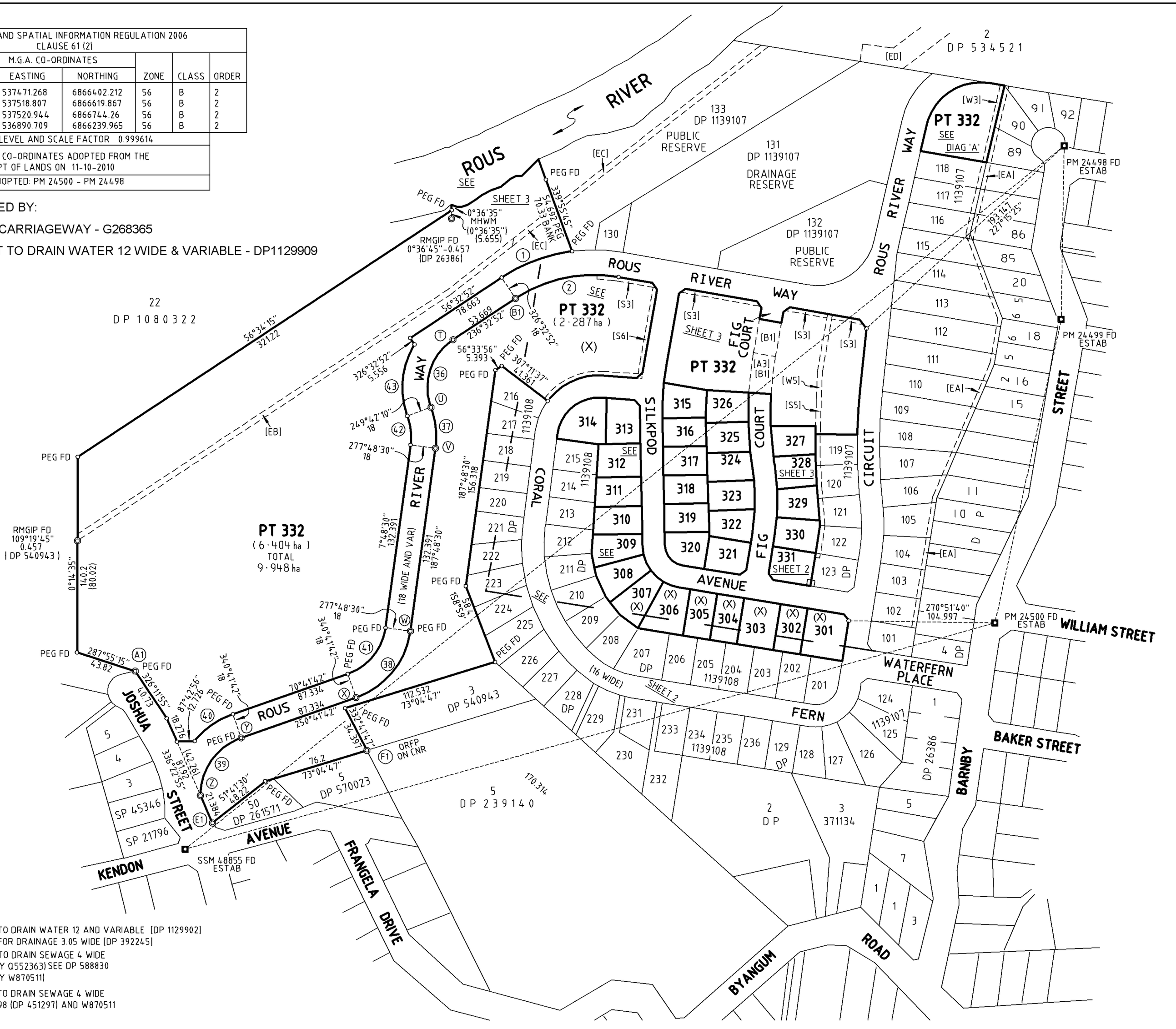

Rous River

10 Appendix D – Copies of real property description

SURVEYING AND SPATIAL INFORMATION REGULATION 2006 CLAUSE 61 (2)					
	M.G.A. CO-ORDINATES				
MARK	EASTING	NORTHING	ZONE	CLASS	ORDER
PM 24500	537471.268	6866402.212	56	B	2
PM 24499	537518.807	6866619.867	56	B	2
PM 24498	537520.944	6866744.26	56	B	2
SSM 48855	536890.709	6866239.965	56	B	2
COMBINED SEA LEVEL AND SCALE FACTOR 0.999614					
SOURCE : M.G.A. CO-ORDINATES ADOPTED FROM THE DEPT OF LANDS ON 11-10-2010					
ORIENTATION ADOPTED: PM 24500 - PM 24498					

(X)BENEFITED BY:

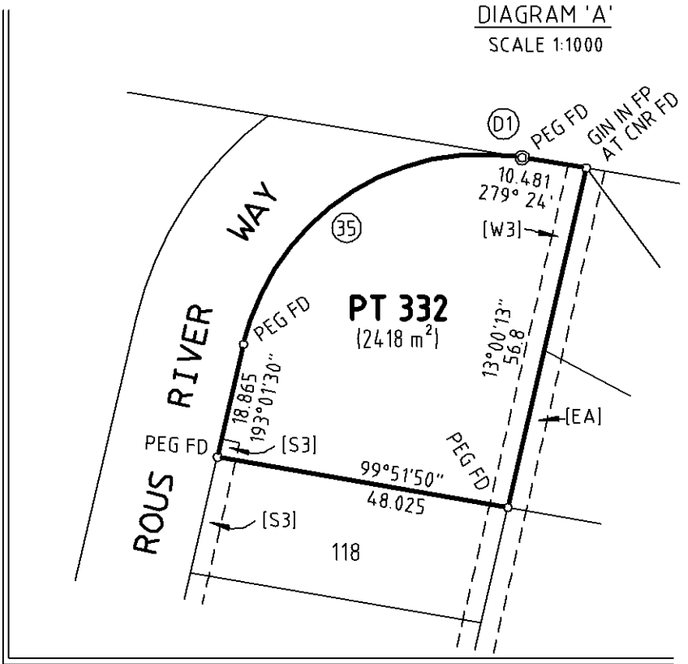
- RIGHT OF CARRIAGEWAY - G268365
- EASEMENT TO DRAIN WATER 12 WIDE & VARIABLE - DP1129909



[ED] - EASEMENT TO DRAIN WATER 12 AND VARIABLE (DP 1129902)
[EA] - EASEMENT FOR DRAINAGE 3.05 WIDE (DP 392245)
[EB] - EASEMENT TO DRAIN SEWAGE 4 WIDE (CREATED BY Q552363) SEE DP 588830 (CREATED BY W870511)
[EC] - EASEMENT TO DRAIN SEWAGE 4 WIDE VIDE Q803098 (DP 451297) AND W870511

[W3] - EASEMENT TO DRAIN WATER 3 WIDE (DP 1139107)
[W5] - EASEMENT TO DRAIN WATER 3.5 WIDE (DP 1139107)
[S3] - EASEMENT TO DRAIN SEWAGE 3 WIDE (DP 1139107)
[S5] - EASEMENT TO DRAIN SEWAGE 3.5 WIDE (DP 1139107)
[S6] - EASEMENT TO DRAIN SEWAGE 3 WIDE (DP 1139108)
[A3] - RIGHT OF CARRIAGEWAY 16 WIDE
[B1] - EASEMENT FOR SERVICES 16 WIDE

DIAGRAM 'A'
SCALE 1:1000



GN

MGA

MGA CONNECTIONS

PM 24498 - PM 24500
188°15'49" - 345.761 MGA GROUND
188°15'49" - 345.769 SURV

PM 24498 - 24499
180°59'03" - 124.459 MGA GROUND
180°59'41" - 124.461 SURV

PM 24499 - PM 24500
192°19'15" - 222.872 MGA GROUND
192°18'57" - 222.857 SURV

PM 24500 - SSM 48855
254°23'10" - 603.037 MGA GROUND
254°23'19" - 603.04 SURV

SSM 48855 - PM 24498
51°20'03" - 807.473 MGA GROUND
51°20'12" - 807.461 SURV

CURVED BOUNDARIES				
LINE	BEARING	DISTANCE	ARC	RADIUS
1	69°31'50"	53.919	54.384	120
2	78°16'23"	75.511	77.351	102
35	236°12'44"	54.751	60.301	40
36	198°07'32"	50.959	54.989	41
37	353°45'20"	29.623	29.922	61
38	219°15'06"	61.555	64.757	59
39	215°04'06"	50.677	54.097	43.5
40	54°54'25"	33.466	33.893	61.5
41	39°15'06"	42.776	45	41
42	353°45'20"	20.882	21.093	43
43	5°35'38"	51.525	53.322	59
46	186°41'30"	26.996	27.011	234

REFERENCE MARKS				
COR.	TYPE	BEARING	DISTANCE	
T	RMGIP FD	146°32'50"	1.0	(DP 1139107)
U	RMGIP FD	69°42'10"	1.0	(DP 1139107)
V	RMGIP FD	97°48'30"	1.0	(DP 1139107)
W	RMGIP FD	97°48'30"	1.0	(DP 1139107)
X	RMGIP FD	160°41'42"	1.0	(DP 1139107)
Y	RMGIP FD	160°41'42"	1.0	(DP 1139107)
Z	RMGIP FD	156°22'55"	1.0	(DP 1139107)
A1	RMDH&W FD	27°17'50"	6.794	(DP 1139107)
B1	RMDH&W FD	225°06'50"	15.587	(DP 1139107)
B1	RMDH&W FD	210°30'10"	25.616	(DP 1139107)
D1	RMDH&W	89°04'25"	19.374	(DP 1139107)
E1	RMDH&W FD	68°39'15"	7.887	(DP 1139107)
F1	RM SPIKE FD	68°02'40"	0.83	(DP 1139107)

Surveyor : BARRIE RICHARD GREEN of BROWN AND HAAN MURWILLUMBAH, NSW	PLAN OF SUBDIVISION OF LOT 237 IN DP 1139108	LGA: TWEED	Registered:	DP1158142
Date of Survey : 13.09.2010		Locality: MURWILLUMBAH	27.1.2011	
Surveyor's Ref : 20399-STG3		Subdivision No: SC10/0027		
		Lengths are in metres. Reduction Ratio 1 : 2000		

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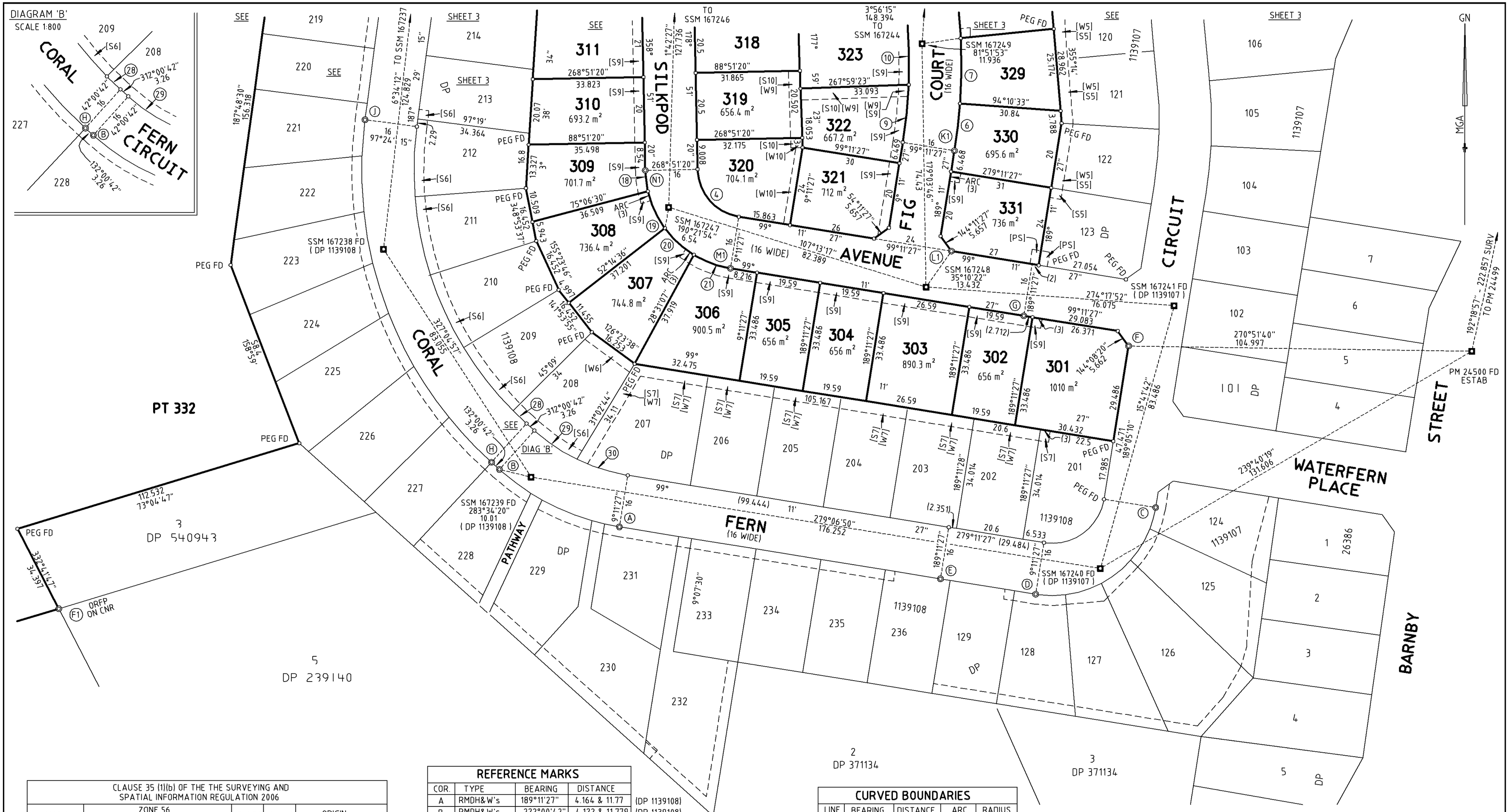

CLAUSE 35 (1)(b) OF THE THE SURVEYING AND SPATIAL INFORMATION REGULATION 2006					
MARK	ZONE 56		CLASS	ORDER	ORIGIN PM 24500
	MGA EASTING	MGA NORTHING			
SSM 167237	537152.793	6866557.405	U	N/A	GROUND CALC ONLY
SSM 167238	537138.511	6866433.395	U	N/A	GROUND CALC ONLY
SSM 167239	537183.645	6866363.675	U	N/A	GROUND CALC ONLY
SSM 167240	537357.672	6866335.757	U	N/A	GROUND CALC ONLY
SSM 167241	537380.257	6866416.13	U	N/A	GROUND CALC ONLY
SSM 167242	537383.401	6866633.314	U	N/A	GROUND CALC ONLY
SSM 167244	537313.368	6866644.295	U	N/A	GROUND CALC ONLY
SSM 167245	537239.728	6866657.258	U	N/A	GROUND CALC ONLY
SSM 167246	537229.506	6866573.903	U	N/A	GROUND CALC ONLY
SSM 167247	537225.7	6866446.224	U	N/A	GROUND CALC ONLY
SSM 167248	537304.395	6866421.832	U	N/A	GROUND CALC ONLY
SSM 167249	537303.178	6866496.251	U	N/A	GROUND CALC ONLY

REFERENCE MARKS				
COR.	TYPE	BEARING	DISTANCE	
A	RMDH&W's	189°11'27"	4.164 & 11.77	(DP 1139108)
B	RMDH&W's	222°00'42"	4.122 & 11.779	(DP 1139108)
C	RMDH&W's FD	99°05'10"	4.586 & 11.789	(DP 1139107)
D	RMDH&W's FD	189°11'27"	4.207 & 11.812	(DP 1139107)
E	RMDH&W's FD	189°11'27"	4.142 & 11.81	(DP 1139107)
F	RMDH&W's FD	189°05'10"	6.342 & 17.57	(DP 1139107)
G	RMGIP FD	184°13'50"	0.487	(DP 1139107)
H	RMDH&W's	222°00'42"	4.137 & 11.793	(DP 1139108)
J	RMDH&W's	277°29'15"	4.14 & 11.807	(DP 1139108)
F1	RM SPIKE FD	68°02'40"	0.83	(DP 1139107)
K1	RMDH&W's	99°11'27"	4.215 & 11.855	
L1	RMDH&W's	99°11'27"	6.378 & 17.831	
M1	RMDH&W's	189°11'27"	4.184 & 11.815	
N1	RMDH&W's	268°51'20"	4.109 & 11.772	

CURVED BOUNDARIES				
LINE	BEARING	DISTANCE	ARC	RADIUS
4	139°01'23"	19.216	20.856	15
6	6°41'	14.525	14.53	166
7	0°43'27"	19.988	20	166
9	5°48'31"	17.699	17.71	150
10	358°26'05"	20.883	20.9	150
18	172°53'	6.45	6.462	31
19	155°18'42"	12.467	12.552	31
20	132°32'51"	12.005	12.081	31
21	110°17'13"	11.932	12.007	31
28	133°34'51"	5.695	5.696	104
29	123°56'21"	15.727	15.78	56
30	107°31'44"	16.241	16.299	56

[PS] - EASEMENT FOR PADMOUNT SUBSTATION 4.5 WIDE (DP 1139107)
[W5] - EASEMENT TO DRAIN WATER 3.5 WIDE (DP 1139107)
[S5] - EASEMENT TO DRAIN SEWAGE 3.5 WIDE (DP 1139107)
[W7] - EASEMENT TO DRAIN WATER 3.5 WIDE (DP 1139108)
[S6] - EASEMENT TO DRAIN SEWAGE 3 WIDE (DP 1139108)
[S7] - EASEMENT TO DRAIN SEWAGE 3.5 WIDE (DP 1139108)
[W6] - EASEMENT TO DRAIN WATER 3 WIDE (DP 1139108)
[W9] - EASEMENT TO DRAIN WATER 3.5 WIDE
[W10] - EASEMENT TO DRAIN WATER 2 WIDE
[S9] - EASEMENT TO DRAIN SEWAGE 3 WIDE
[S10] - EASEMENT TO DRAIN SEWAGE 3.5 WIDE

Surveyor : BARRIE RICHARD GREEN of BROWN AND HAAN MURWILLUMBAH, NSW Date of Survey : 13.09.2010 Surveyor's Ref : 20399-STG3	PLAN OF SUBDIVISION OF LOT 237 IN DP 1139108	LGA: TWEED Locality: MURWILLUMBAH Subdivision No: SC10/0027 Lengths are in metres. Reduction Ratio 1 : 800	Registered: 27.1.2011	DP1158142

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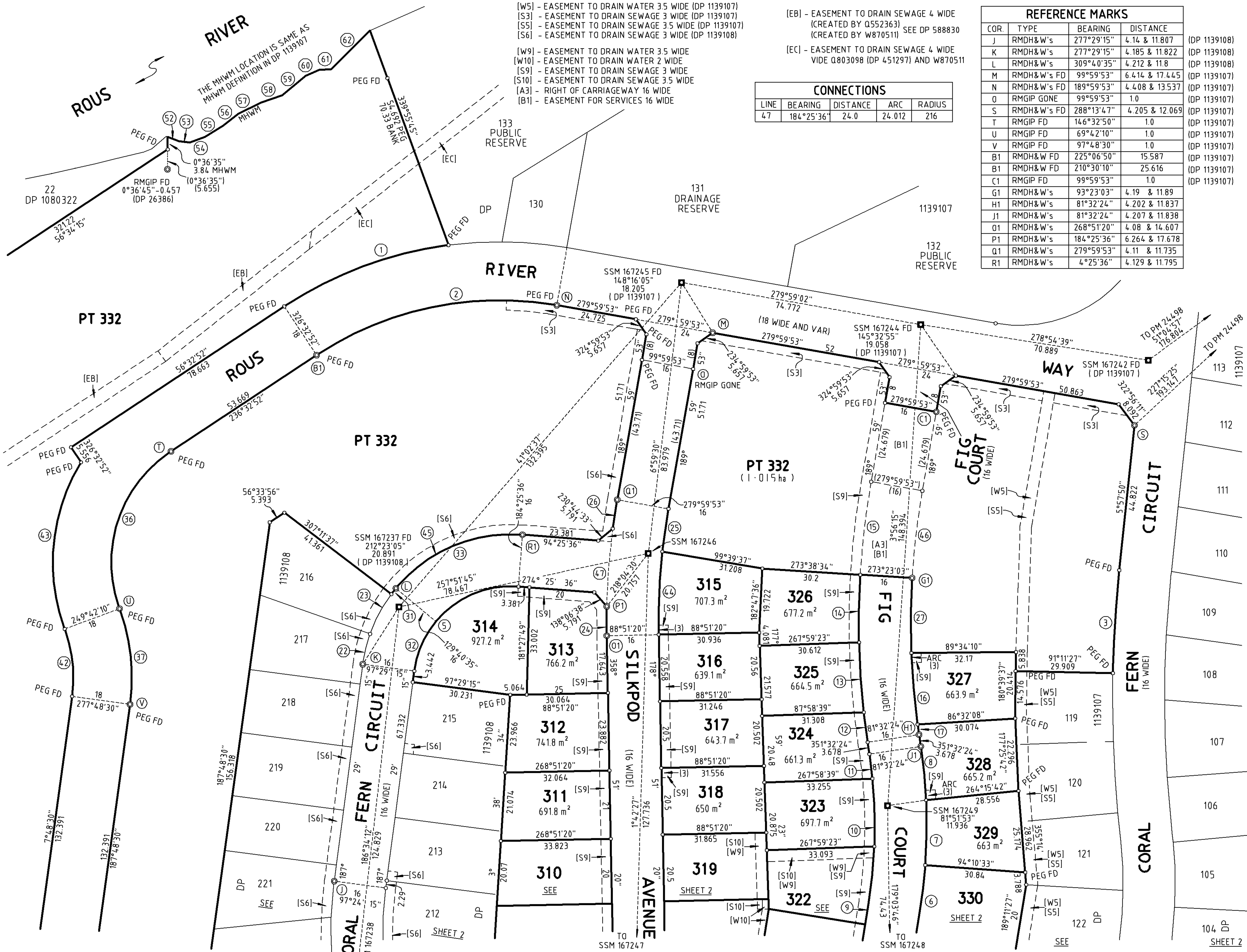

[W5] - EASEMENT TO DRAIN WATER 3.5 WIDE (DP 1139107)
[S3] - EASEMENT TO DRAIN SEWAGE 3 WIDE (DP 1139107)
[S5] - EASEMENT TO DRAIN SEWAGE 3.5 WIDE (DP 1139107)
[S6] - EASEMENT TO DRAIN SEWAGE 3 WIDE (DP 1139108)

[W9] - EASEMENT TO DRAIN WATER 3.5 WIDE
[W10] - EASEMENT TO DRAIN WATER 2 WIDE
[S9] - EASEMENT TO DRAIN SEWAGE 3 WIDE
[S10] - EASEMENT TO DRAIN SEWAGE 3.5 WIDE
[A3] - RIGHT OF CARRIAGEWAY 16 WIDE
[B1] - EASEMENT FOR SERVICES 16 WIDE

[EB] - EASEMENT TO DRAIN SEWAGE 4 WIDE (CREATED BY Q552363) (CREATED BY W870511) SEE DP 588830

[EC] - EASEMENT TO DRAIN SEWAGE 4 WIDE VIDE Q803098 (DP 451297) AND W870511

CONNECTIONS

LINE	BEARING	DISTANCE	ARC	RADIUS
47	184°25'36"	24.0	24.012	216

REFERENCE MARKS

COR.	TYPE	BEARING	DISTANCE	
J	RMDH&W's	277°29'15"	4.14 & 11.807	(DP 1139108)
K	RMDH&W's	277°29'15"	4.185 & 11.822	(DP 1139108)
L	RMDH&W's	309°40'35"	4.212 & 11.8	(DP 1139108)
M	RMDH&W's FD	99°59'53"	6.414 & 17.445	(DP 1139107)
N	RMDH&W's FD	189°59'53"	4.408 & 13.537	(DP 1139107)
O	RMGIP GONE	99°59'53"	1.0	(DP 1139107)
S	RMDH&W's FD	288°13'47"	4.205 & 12.069	(DP 1139107)
T	RMGIP FD	146°32'50"	1.0	(DP 1139107)
U	RMGIP FD	69°42'10"	1.0	(DP 1139107)
V	RMGIP FD	97°48'30"	1.0	(DP 1139107)
B1	RMDH&W FD	225°06'50"	15.587	(DP 1139107)
B1	RMDH&W FD	210°30'10"	25.616	(DP 1139107)
C1	RMGIP FD	99°59'53"	1.0	(DP 1139107)
G1	RMDH&W's	93°23'03"	4.19 & 11.89	
H1	RMDH&W's	81°32'24"	4.202 & 11.837	
J1	RMDH&W's	81°32'24"	4.207 & 11.838	
O1	RMDH&W's	268°51'20"	4.08 & 14.607	
P1	RMDH&W's	184°25'36"	6.264 & 17.678	
Q1	RMDH&W's	279°59'53"	4.11 & 11.735	
R1	RMDH&W's	4°25'36"	4.129 & 11.795	

CURVED BOUNDARIES

LINE	BEARING	DISTANCE	ARC	RADIUS
1	69°31'50"	53.919	54.384	120
2	78°16'23"	75.511	77.351	102
3	183°34'47"	31.752	31.761	381.63
5	230°57'25"	41.278	45.521	30
6	6°41'	14.525	14.53	166
7	0°43'27"	19.988	20	166
8	354°24'23"	16.602	16.609	166
9	5°48'31"	17.699	17.71	150
10	358°26'05"	20.883	20.9	150
11	352°59'30"	7.599	7.6	150
12	172°36'19"	9.295	9.296	250
13	176°08'40"	21.582	21.588	250
14	181°00'04"	20.789	20.795	250
16	175°01'21"	22.071	22.08	234
17	171°55'47"	3.182	3.182	234
22	193°28'40"	9.601	9.619	46
23	208°11'13"	13.946	14	46
24	180°02'55"	8.997	8.998	216
25	188°05'35"	13.297	13.3	200
26	188°48'17"	8.997	8.998	216
27	180°33'17"	23.101	23.11	234
31	38°17'28"	2.224	2.224	46
32	23°34'54"	16.633	16.854	30
33	67°03'05"	42.303	43.955	46
36	198°07'32"	50.959	54.989	41
37	353°45'20"	29.623	29.922	61
42	353°45'20"	20.882	21.093	43
43	5°35'38"	51.525	53.322	59
44	182°31'18"	25.579	25.596	200
45	245°40'	44.265	46.18	46

EASEMENTS

LINE	BEARING	DISTANCE	ARC	RADIUS
15	186°41'28"	28.842	28.858	250
46	186°41'28"	26.996	27.011	234

MEAN HIGH WATER MARK

LINE	BEARING	DISTANCE
52	111°37'04"	3.665
53	95°34'16"	3.333
54	70°39'55"	5.035
55	57°41'06"	6.6
56	52°27'40"	5.868
57	243°34'	7.772
58	70°32'14"	6.936
59	50°44'13"	9.322
60	65°47'24"	4.521
61	87°11'33"	3.656
62	45°08'30"	16.986

Surveyor : BARRIE RICHARD GREEN
of BROWN AND HAAN MURWILLUMBAH, NSW
Date of Survey : 13.09.2010
Surveyor's Ref : 20399-STG3

PLAN OF SUBDIVISION OF LOT 237 IN DP 1139108

LGA: TWEED
Locality: MURWILLUMBAH
Subdivision No: SC10/0027
Lengths are in metres. Reduction Ratio 1 : 800

Registered: 27.1.2011

DP1158142

Table of mm 10 20 30 40 50 90 100 110 120 130 140

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 3 sheet(s)

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

IT IS INTENDED TO DEDICATE THE EXTENSION OF SILKPOD AVENUE AND FIG COURT AS PUBLIC ROAD.

IT IS INTENDED TO DEDICATE THE EXTENSION OF CORAL FERN CIRCUIT AS PUBLIC ROAD SUBJECT TO EASEMENT TO DRAIN SEWAGE 3 WIDE (DP 1139108)

PURSUANT TO SECTION 88B ON THE CONVEYANCING ACT 1919 IT IS INTENDED:

(A) TO CREATE:
1. EASEMENT TO DRAIN WATER 3.5 WIDE
2. EASEMENT TO DRAIN SEWAGE 3 WIDE
3. EASEMENT TO DRAIN SEWAGE 3.5 WIDE
4. RESTRICTIONS ON USE OF LAND
5. RESTRICTION ON USE OF LAND
6. RESTRICTION ON USE OF LAND
7. RESTRICTIONS ON USE OF LAND
8. RESTRICTIONS ON USE OF LAND
9. RESTRICTION ON USE OF LAND
10. RESTRICTION ON USE OF LAND
11. RIGHT OF CARRIAGEWAY 16 WIDE
12. EASEMENT FOR SERVICES 16 WIDE
13. EASEMENT TO DRAIN WATER 2 WIDE

(B) TO RELEASE
1. RIGHT OF ACCESS 16 WIDE (DP 1139107)
2. RIGHT OF ACCESS 16 WIDE DP 1139108)
3. EASEMENT TO DRAIN WATER 3 WIDE SHOWN [W8] IN DP 1139108
4. EASEMENT TO DRAIN WATER 3 WIDE SHOWN [WC] IN DP 1139107

If space is insufficient use PLAN FORM 6A annexure sheet

Crown Lands NSW/Western Lands Office Approval

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

Signature: .....

Date: .....

File Number: .....

Office: .....

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to:

the proposed SUBDIVISION set out herein
(insert 'subdivision' or 'new road')

.....
* Authorised Person/*~~General Manager~~/*~~Accredited Certifier~~

Consent Authority: TWEED SHIRE COUNCIL
Date of Endorsement: 6 DECEMBER 2010
Accreditation no: .....
Subdivision Certificate no: SC10/0027
File no: DA05/0308

* Strike through inapplicable parts.

Office Use Only

DP1158142

Office Use Only

Registered: 27.1.2011
Title System: TORRENS
Purpose: SUBDIVISION

PLAN OF SUBDIVISION OF LOT 237 IN DP 1139108

LGA: **TWEED**
Locality: **MURWILLUMBAH**
Parish: **MURWILLUMBAH**
County: **ROUS**

Survey Certificate

I, BARRIE RICHARD GREEN

Of BROWN & HAAN, PO BOX 161 MURWILLUMBAH. NSW. 2484.

a surveyor registered under the Surveying and Spatial Information Act 2002, certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying and Spatial Information Regulation 2006 and was completed on: 13/09/2010

The survey relates to: LOTS 301-332 AND ASSOCIATED EASEMENTS AND CONNECTIONS

(specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey)

Signature .....Dated: 29.11.10
Surveyor registered under the Surveying and Spatial Information Act 2002

Datum Line: PM 24500 – PM24498
Type: Urban/~~Rural~~

Plans used in the preparation of survey / ~~compilation~~

DP368706	DP392245	DP793985	DP570023
DP261571	DP55987	DP239140	DP1080322
DP25665	DP26386	DP26085	DP371134
DP540943	DP1129902	DP588830	DP1139107
DP1139108			

If space is insufficient use PLAN FORM 6A annexure sheet

Surveyor's Reference: **20399-STG3**

PLAN FORM 6A WARNING: Creasing or folding will lead to rejection

DEPOSITED PLAN ADMINISTRATION SHEET

PLAN OF SUBDIVISION OF LOT 237 IN DP 1139108

Office Use Only

DP1158142

Office Use Only

Registered: 27.1.2011

Subdivision Certificate No.: SC10/0027 Date of Endorsement: 6 DECEMBER 2010

BARNBY DEVELOPMENTS PTY LTD - ACN 106 494 268 The Common Seal of

BARNBY DEVELOPMENTS PTY LTD
ABN: 94 244 765 421

MARIO VITTORIO BIASIN
DIRECTOR

YEN LAGURA
SECRETARY

ASHLEY SEREBRO
DIRECTOR

Surveyor's Reference: **20399-STG3**

PLAN FORM 6A WARNING: Creasing or folding will lead to rejection

DEPOSITED PLAN ADMINISTRATION SHEET Sheet 3 of 3 sheet(s)

PLAN OF SUBDIVISION OF LOT 237 IN DP 1139108	Office Use Only DP1158142
	Office Use Only **Registered:** 27.1.2011

Subdivision Certificate No.: SC10/0027 Date of Endorsement: 6 DECEMBER

Mortgagees Consent

Permanent Custodians Limited A.C.N. 001 426 384 as registered proprietor of Mortgage Number AE853242N **hereby consents** to the within Plan of Subdivision of Lot 237 in DP 1139108.

SIGNED for ~~Statewide Secured Investments Limited~~ PERMANENT CUSTODIANS LIMITED
A.C.N. ~~084 682 517~~ 001 426 384 by:

~~and~~ **Robert John Arnold**

Its Attorneys pursuant to Power of Attorney dated ~~14 October, 2000~~ 31/10/2001
~~14 October, 2000~~ a certified copy of which is filed in Permanent Order Book ~~4591~~ 4479 at No ~~575~~ 447 in the presence of:

Heather Argus

Heather Susanne Argus
Full Name: .....
Usual Address: 157 Fenaughty Street, Kyabram, 3620

Surveyor's Reference: **20399 - STG3**