7213-05_21_09_07 Basement CMP_Rev2.docx

7th September 2021

General Manager
Byron Shire Council
PO Box 219
MULLUMBIMBY NSW 2482

ATTN: Emma Holt

Dear Emma,

RE: CONSTRUCTION MANAGEMENT PLAN FOR BASEMENT SHORING
PROPOSED STAGE 5
HABITAT DEVELOPMENT, BYRON BAY

Ardill Payne and Partners (APP) being consulting civil and structural engineers have prepared this letter to address the proposed construction methodology and proposed treatment of excavated material.

Ardill Payne & Partners has over 37 years of local experience in both civil and structural engineering. During this time APP has been involved in a number of commercial scale projects with basement carparking within the Byron and Ballina Shires. Recent examples of projects within the Byron Bay CBD include the following:

Main Beach Backpackers Hostel –Corner of Lawson and Fletcher Street, Bryon Bay

YHA Byron Bay –7 Carlyle Street, Byron Bay

Byron Bay Hotel and Apartments – Corner Byron and Fletcher Street, Byron Bay

Proposed Boutique Hotel – 4 Marvell Street, Byron Bay (currently under construction)

The following information seeks to further clarify the proposed construction process for Stage 5 of Habitat Byron Bay including detailing proposed methodology, construction sequence, techniques, expected timing and treatment of excavated materials. In summary the proposed basement construction at Stage 5 Habitat is proposed to be constructed combining common construction methodologies.

Construction Methodology:

It is proposed to provide a secant piled wall (installed system) utilising Continuous Flight Auger piling (method) for the full perimeter of the basement with a post-tensioned infill slab and footings.

> Secant Piling – A secant piling wall is a type of retaining wall constructed for ground retention prior to excavation and is particularly suited for basement style excavation. Secant pile walls can be installed as cast in situ bored or CFA piles. Habitat Stage 5 will utilise CFA piling (refer below).

A secant piling wall is made up of alternating primary (also known as soft) and secondary (also known as hard) piles. The primary and secondary piles are installed in two steps. The first step will involve the installation of primary (soft) piles around the entire perimeter of the area to be excavated. The second step is the installation of the secondary (hard) piles. The pile spacings are set such that the secondary piles partially cut into either side of the primary piles. The resultant overlap provides a continuous impervious structure. Figure 1 shows the general arrangement for secant pile installations.

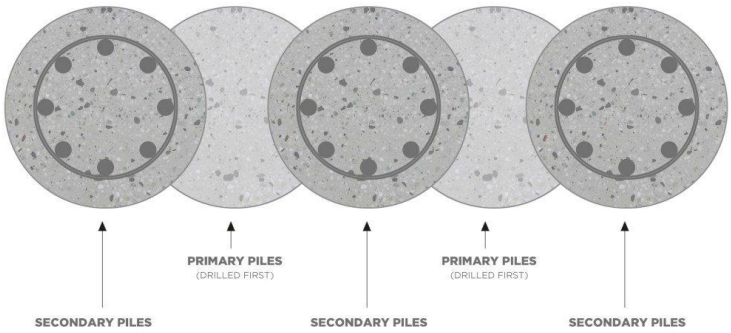


Figure 1 - Secant Piling Arrangement

Continuous Flight Auger (CFA) Piling - CFA piles are cast in place piles formed by drilling with a machine called a Continuous Flight Auger. The auger is drilled into the soil and/or rock to the design depth in a single pass. Once the design depth/criteria has been achieved, the auger containing the drilled material is then slowly removed as cement-sand grout or concrete is pumped through the hollow stem. This process pressurises the hole to prevent wall collapse and continues until the auger is completely removed and the hole filled. A reinforcing cage may then be lowered centrally into the liquid grout or concrete pile as required.

CFA piling is considered the most suitable method of piling for this project due to their non-displacement, minimal vibration and ability to be installed in saturated soils (below groundwater level) without collapse or requirements for shoring. CFA piling can be utilised for different types of shoring and retention solutions including secant piling.

Figure 2 - CFA Piling Installation

Post Tensioned Slabs - Post Tensioned Slabs are more commonly used for commercial scale structural concrete slabs which provides considerable benefits provided by prestressed concrete while retaining the flexibility afforded by the cast-in-place method of building concrete structures. The use of post-tensioned reinforcement to construct floor slabs can result in thinner concrete sections and/or longer spans between supports. Designers commonly take advantage of this method to produce buildings and structures with clear open spaces allowing more architectural freedom. Habitat Stage 5 seeks to adopt this method of construction so as to assist in limiting the depth of excavation required.

Expected Timing:

The construction of the CFA secant piled wall is expected to take approximately 12-15 weeks (weather dependant). During this period no dewatering will be required. No excavation will be undertaken until perimeter piling is complete. CFA piling will result in a small amount of spoil being created with each pile drilled (refer below).

Expected Pile Soil:

The estimated volume of spoil resultant of installation of CFA secant piled wall considers the following assumptions:

- Architectural plans identify a basement perimeter of 321 lineal metres. 329 lineal meters of piling conservatively estimated allowing an additional 1m larger in each direction;
- Similar depth basement projects indicate piles would be in the order of 350mm – 450mm diameter. 450mm basement conservatively estimated;
- Douglas and Partners Report on Groundwater Impact Assessment (dated 10 June 2021) suggest 9m depth of cut-off wall;

Resultant volume is estimated at 329m x 0.45m x 9m = 1,332m^3 of spoil. This equates to an estimated volume of 1,600 m^3 when adopting a bulking factor of 20%. This spoil is proposed to be placed in a bunded area within the centre of the proposed basement footprint for treatment be required prior to removal from site.

Treatment of Excavated Materials:

Treatment of the excavated materials will generally occur in two stages/methods as outlined below:

Stage 1 – Piling works

CFA piling will result in a small amount of spoil being created with each pile drilled. It is proposed to construct a bunded area within the centre of the proposed basement to stockpile this spoil. This bunded area would be within the site fill material which was placed during the bulk filling works 2014. The existing filling material is proposed to be removed from the site to create the bunded area.

The piling spoil will be then stockpiled, treated (as required) and contained within the bunded area until such time as basement piling is complete. Once the piled basement walls are completed the spoil material can be removed from site. The size of the bunded area would be nominally 60m x 30m allowing for a 1m deep stockpile.

Douglas and Partners Report on Geotechnical Investigations and Acid Sulfate Soil Assessment (dated 12 August 2021) confirms testing extends to 5.5m below ground level and has not identified PASS or ASS to this level. This equates to approximately 800m³ of the 1332m³ spoil being within the tested range.

This proposed bunded area would sit within the 1.5m layer of fill imported to the site in 2014/2015 under Development Application 10.2005.705.1. This would enable spoil to remain stockpiled without any risk to areas external to the Stage 5 site.

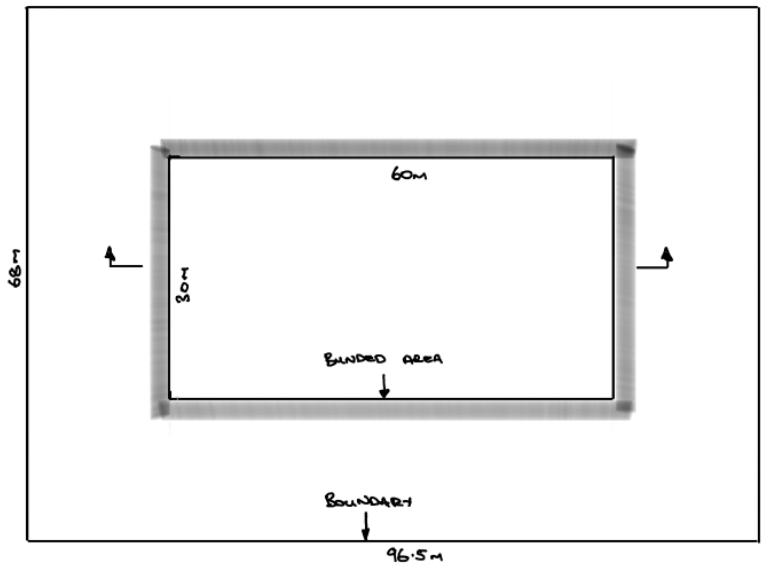


Figure 3 – Diagrammatic Plan View of Bunded Area

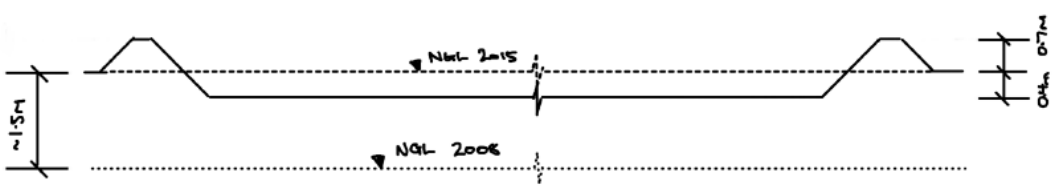


Figure 4 – Diagrammatic Section of Bunded Area

Stage 2 - Bulk Excavation

Excavation of the basement will be wholly within the footprint of the completed secant piled wall. The basement walls ensure no horizontal flow into or out of the excavated area. Their embedment in the low permeability high density indurated sand layer effectively provides a bund which will contain runoff from the excavated material leaving the site. Any runoff during rainfall events or leachates would be collected by the internal dewatering wells and treated via the groundwater treatment train. Excavated material will be treated progressively (as required) prior to removal from site once the basement walls are completed.

All treatment of soil will be in accordance with the Douglas and Partners Report on Geotechnical Investigations and Acid Sulfate Soil Assessment (dated 12 August 2021) and any subsequent management plans.

Construction Sequence:

Construction contractors will adopt and adhere to the following sequencing:

1. Site establishment and implementation of approved management plans;
2. Construction of bunded treatment area for piling of minor spoil;
3. Further acid sulphate soils sampling and analysis
4. Installation of secant piled basement cut-off wall to permitter of site;
5. Installation of internal basement sump wells;
6. Basement excavation and dewatering;
7. Construction of footings and post tensioned basement slab;

The above noted stages of construction will be completed sequentially with each stage commencing only upon completion of the stage prior. Stage 4 must consider and adopt the outcome of further acid sulphate soils analysis.

Additional information

To assist in assessment, enclosed within this letter is previous correspondence with Council in relation to the filling material, natural ground survey levels prior to filling works, Architectural plans and sections showing current ground levels, and natural ground levels.

Conclusion

The construction methodology and techniques outlined within this letter are considered to reflect a traditional basement construction methodology for Byron Bay.

It is considered that council would be able to condition the basement construction methodology similar to below to ensure that this methodology is adopted during detailed design and construction stages of the project.

Basement Construction works shall be carried out in the following sequence:

1. Site establishment and implementation of approved management plans;
2. *Construction of bunded treatment area for piling spoil;*
3. *Further acid sulphate soils sampling and analysis*
4. *Installation of secant piled basement cut-off wall to permitter of site;*
5. *Installation of internal basement sump wells;*

6. *Basement excavation and dewatering; and*
7. *Construction of footings and post tensioned basement slab.*

Basement construction and shoring is to be completed utilising Continuous Flight Auger (CFA) secant piles for the full perimeter of the basement wall. CFA Piles to extend 3m into indurated sand (nominally 9m below ground level). Piling spoil shall be stockpiled and treated within a bunded area located within the basement footprint.

Existing site fill may be removed from site to construct the bunded area for pile spoil. No removal of pile spoil or excavated natural material may be carried out prior to the completion of the basement piling and prior to treatment in accordance with any subsequent management plans. Additional management plans will be prepared and implemented should the further ASS analysis indicate PASS or ASS soils are present.

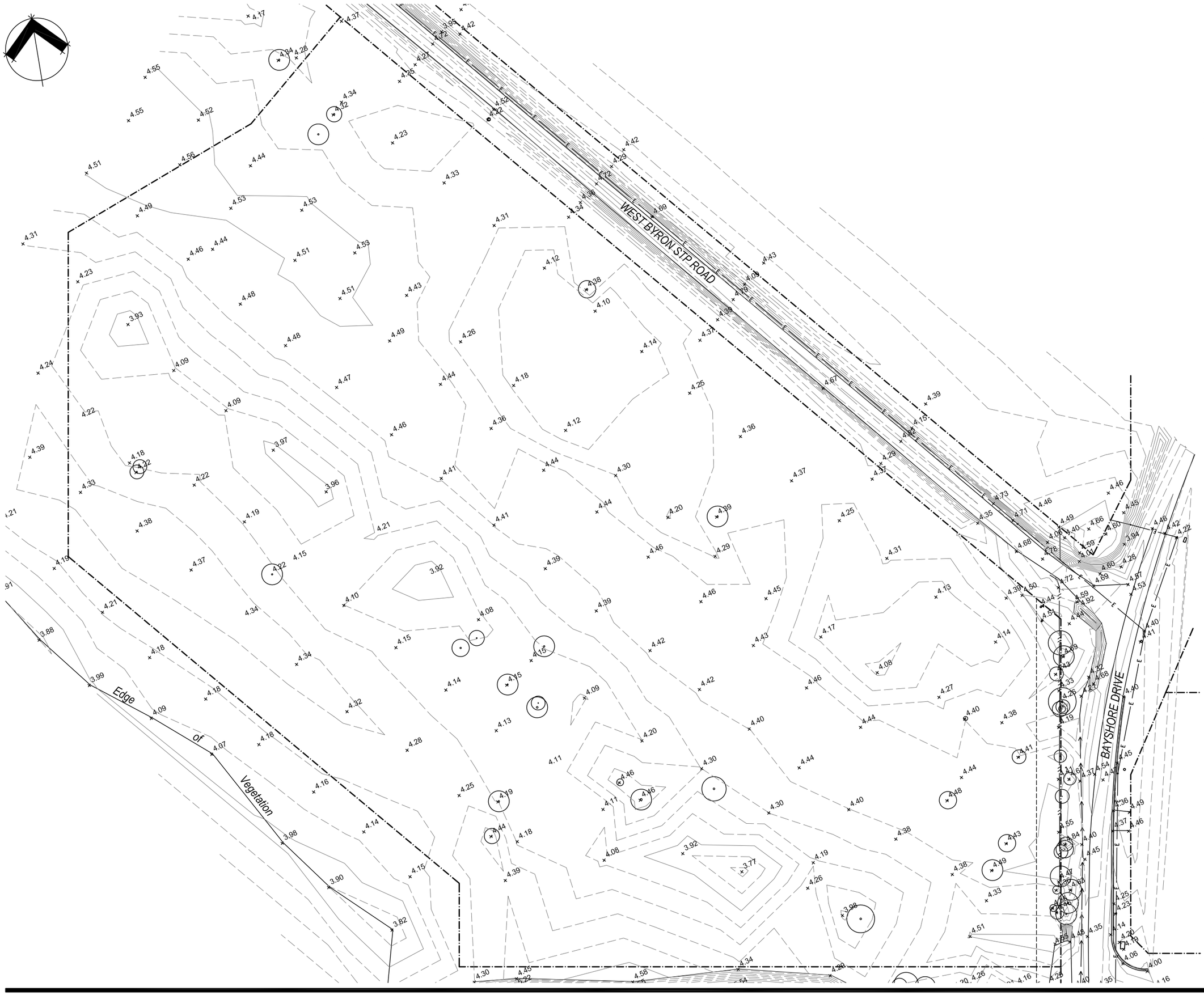
Should you have any queries in relation to the above please feel free to contact our office on 02 6686 3280.

Yours faithfully,

Ryan Beavis
Principal Engineer
ARDILL PAYNE & PARTNERS

Encl. Predevelopment site levels
Architectural drawings of proposed building and existing ground levels
Architectural Sections showing predevelopment, existing and proposed levels
Email Correspondence with council in relation to filling material

s:\01 jobs\7200-7299\7213 bayshore village byron bay\03 town planning\da stage 5 responses\2021_08 basement\7213-05_21_09_07 basement cmp_rev2.docx



LEGEND

- Existing site contour @ 0.1m Intervals
- 4.39 Existing surface level
- Existing fence
- E Electricity line
- Property boundary
- Services easement
- Existing tree

No.	Description	Date	Initial

Amendments

Prepared by **GeoLINK** and **Simpson + Wilson Architects**

Project Title

Bayshore Village

Client

Bayshore Property Trust

Designed	MVE	Drawn	MVE	Checked	CJ
Approved	CJ	Date	15/05/08		
XREFs					

Scale

metres 0 5 10 15 20 25

Drawing Title

Existing Site

0291605

Drawing Number *Revision*

0291 EN 01

Height Reference Points

Ref. Point	Description	Ground RL	Roof RL	Roof Height above GL
A	Existing Surveyed Ground Line	5.350	15.600	10.250
B	Existing Surveyed Ground Line	5.325	15.600	10.275
C	Existing Surveyed Ground Line	5.380	15.600	10.220
D	Existing Surveyed Ground Line	5.345	15.210	9.865
E	Existing Surveyed Ground Line	5.649	15.600	9.951
F	Existing Surveyed Ground Line	5.771	16.070	10.299
G	Existing Surveyed Ground Line	6.030	16.070	10.040
H	Existing Surveyed Ground Line	6.220	16.070	9.850
I	Existing Surveyed Ground Line	6.360	15.934	9.574
J	Existing Surveyed Ground Line	6.320	16.070	9.834

LEGEND:

5.4 EXISTING SURVEYED SPOT LEVELS (APPROVED SURVEY PLAN 17/10/18 - DWG No S08)

S5 A
BUILDING A

S5 B
BUILDING B

S5 C
BUILDING C

S5 D
BUILDING D

S5 E
BUILDING E

S5 F
BUILDING F

PLANT PLATFORM S5 A & B
A: 32.00 m²
F: CN.2

PLANT PLATFORM S5 C & D
A: 32.00 m²
F: CN.2

PLANT PLATFORM S5 E
A: 39.11 m²
F: CN.2

1 SOUTH WEST ELEVATION
2 NORTH EAST ELEVATION
3 NORTH WEST ELEVATION
4 SOUTH EAST ELEVATION
5 NORTH EAST BACK ELEVATION
6 SOUTH WEST BACK ELEVATION
7 NORTH WEST BACK ELEVATION
8 SOUTH EAST BACK ELEVATION
9 NORTH WEST BACK ELEVATION
10 NORTH WEST BACK ELEVATION

DFJ ARCHITECTS PTY LTD
45/1 Porter St, Byron Bay
NSW 2481
(+ 61 2) 6687 1425
admin@dfj.com.au

CONSULTANTS
REFER CONSULTANT DRAWINGS WHERE DIRECTED

- PROJECT MANAGER - **ABEL EAST**
- BUILDER - **TBC**
- LANDSCAPE - **MALIK PAINTER**
- PLANNING CONSULTANT - **STEVE CONNELLY**
- STRUCTURAL ENGINEER - **RYAN BEAVIS**
- MECHANICAL ENGINEER - **JAMES MORGAN**
- HYDRAULIC ENGINEER - **IAN DENOVARO**
- ELECTRICAL ENGINEER - **VAUGHAN OXENFORD**
- BCA CONSULTANTS - **PETER & HALEY THORNTON**

RevID	Transmittal Set Name
01	DRAFT ISSUE 01
02	DRAFT ISSUE 02
03	DA ISSUE 07 (COUNCIL RFI)

Change ID	Change Name

Transmittal Set Date
22/11/19
20/12/19
11/6/21

PROJECT :
HABITAT

CLIENT :
BAYSHORE DEVELOPMENT PTY LTD

PROJECT ADDRESS :
The 2 Community Title blocks bounded by Wallum Place, Gallagher Street, Easy Street and the walkway at the rear of 2-20 Porter Street and Penny Lane BYRON BAY NSW 2481 AUSTRALIA

JOB NO :
DFJ102

SCALE AT A1 : 1:200
DRAWN : LG
CHECKED : FWM

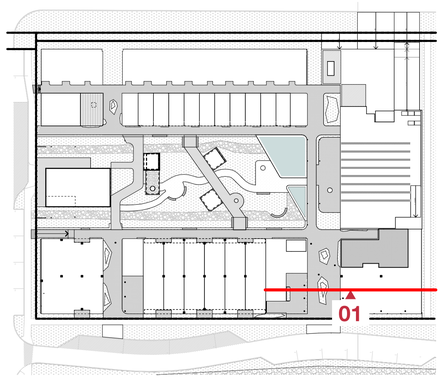
NOMINATED ARCHITECT : DOMINIC FINLAY JONES NSW REG. 7674

DRAWING TITLE : 210 BUILDING HEIGHT
BUILDING HEIGHT RELATIVE TO EXISTING GROUND LEVEL

PROJECT STATUS :
DEVELOPMENT APPLICATION

REVISION NO.
03

DRAWING NO.
DA 210



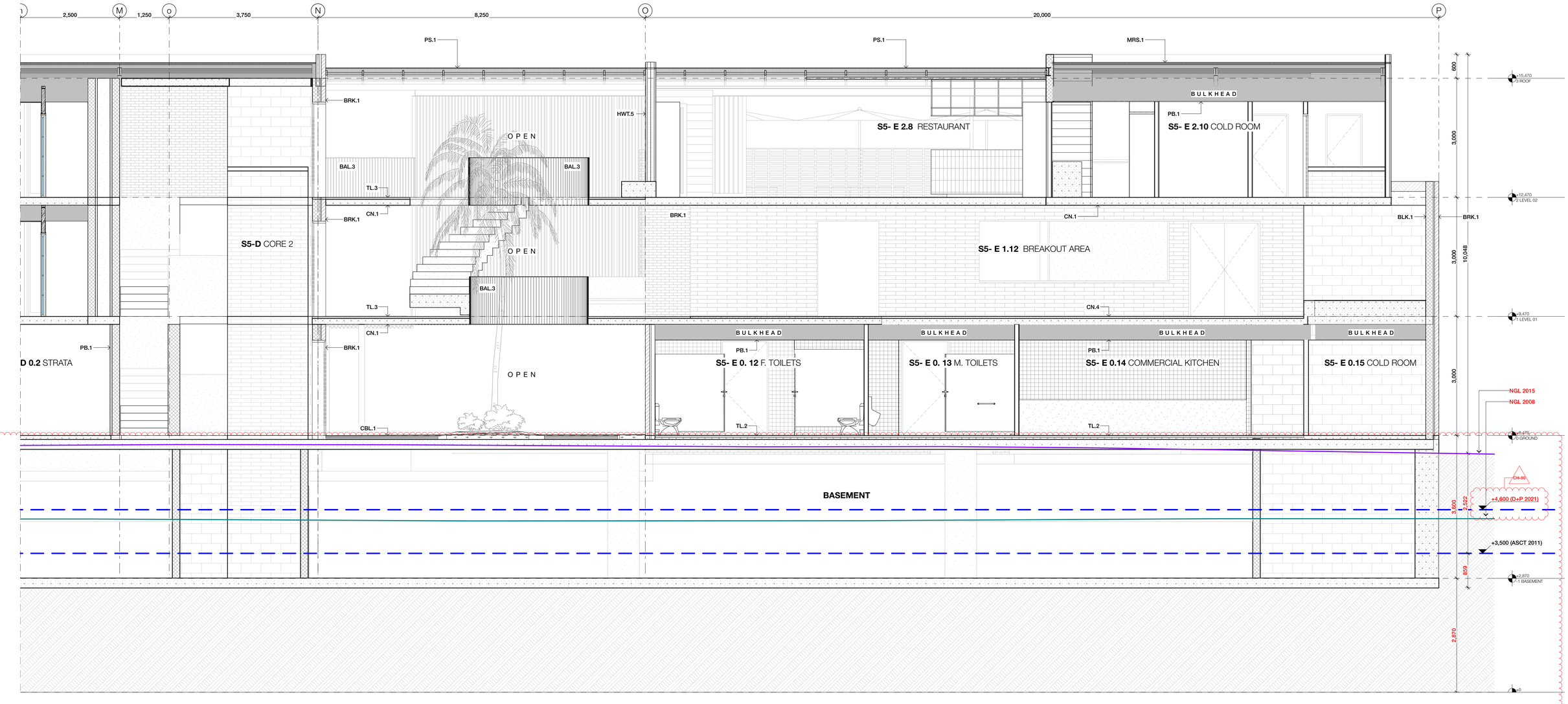
LEGEND

- NGL 2015 (REFERENCE SURVEY DETAILS)
- NGL 2008 (REFERENCE SURVEY DETAILS)
- RL 3.500 — WATER TABLE (GEOTECHNICAL REPORT ASCT 2011/2013)
- RL 4.600 — WATER TABLE (DOUGLAS + PARTNERS MAY 2021) INVESTIGATION DONE AFTER SIGNIFICANT RAIN EVENT
- CH-76

*NOTE - STRUCTURAL MEMBERS SIZED AS PER STRUCTURAL ENG. ADVICE.

***NOTE - REFER DA 860 TO DA 871 FOR DETAILED CROSS SECTIONS AND PLANS OF PROPOSED EXCAVATION DEPTHS**

CONTINUED DA 401



01 **400 SECTIONS - A1 BUILDING SECTION**

1:50

DFJ ARCHITECTS PTY LTD
45/1 Porter St, Byron Bay
NSW 2481
(+ 61 2) 6687 1425
admin@dfj.com.au

CONSULTANTS

REFER CONSULTANT DRAWINGS WHERE DIRECTED

- PROJECT MANAGER - **ABEL EAST**
- BUILDER - **TBC**
- CERTIFIER - **MARK PAINTER**
- PLANNING CONSULTANT - **STEVE CONNELLY**
- STRUCTURAL ENGINEER - **RYAN BEAVIS**
- MECHANICAL ENGINEER - **JAMES MORGAN**
- HYDRAULIC ENGINEER - **IAN DENOARO**
- ELECTRICAL ENGINEER - **VAUGHAN OXENFORD**
- BCA CONSULTANTS - **PETER & HALEY THORNTON**

RevID	Transmittal Set Name	Change ID	Change Name	Transmittal Set Date
01	DRAFT ISSUE 02			20/12/19
02	DRAFT ISSUE 03			24/1/20
03	DA ISSUE 07 (COUNCIL RFI)			11/6/21

CH-75

PROJECT :
HABITAT

CLIENT :
BAYSHORE DEVELOPMENT PTY LTD

PROJECT ADDRESS :
The 2 Community Title blocks bounded by Wallum Place, Gallagher Street, Easy Street and the walkway at the rear of 2-20 Porter Street and Penny Lane BYRON BAY NSW 2481 AUSTRALIA

JOB NO :
DFJ102

SCALE AT A1 : **1:50**
DRAWN : **LG**
CHECKED : **FWM**

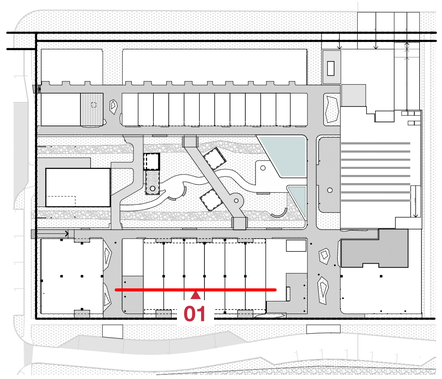
NOMINATED ARCHITECT : DOMINIC PALAY JONES NSW REG. 7674

DRAWING TITLE :
400 SECTIONS
SECTIONS

PROJECT STATUS :
DEVELOPMENT APPLICATION

REVISION NO.
03

DRAWING NO.
DA 400



LEGEND

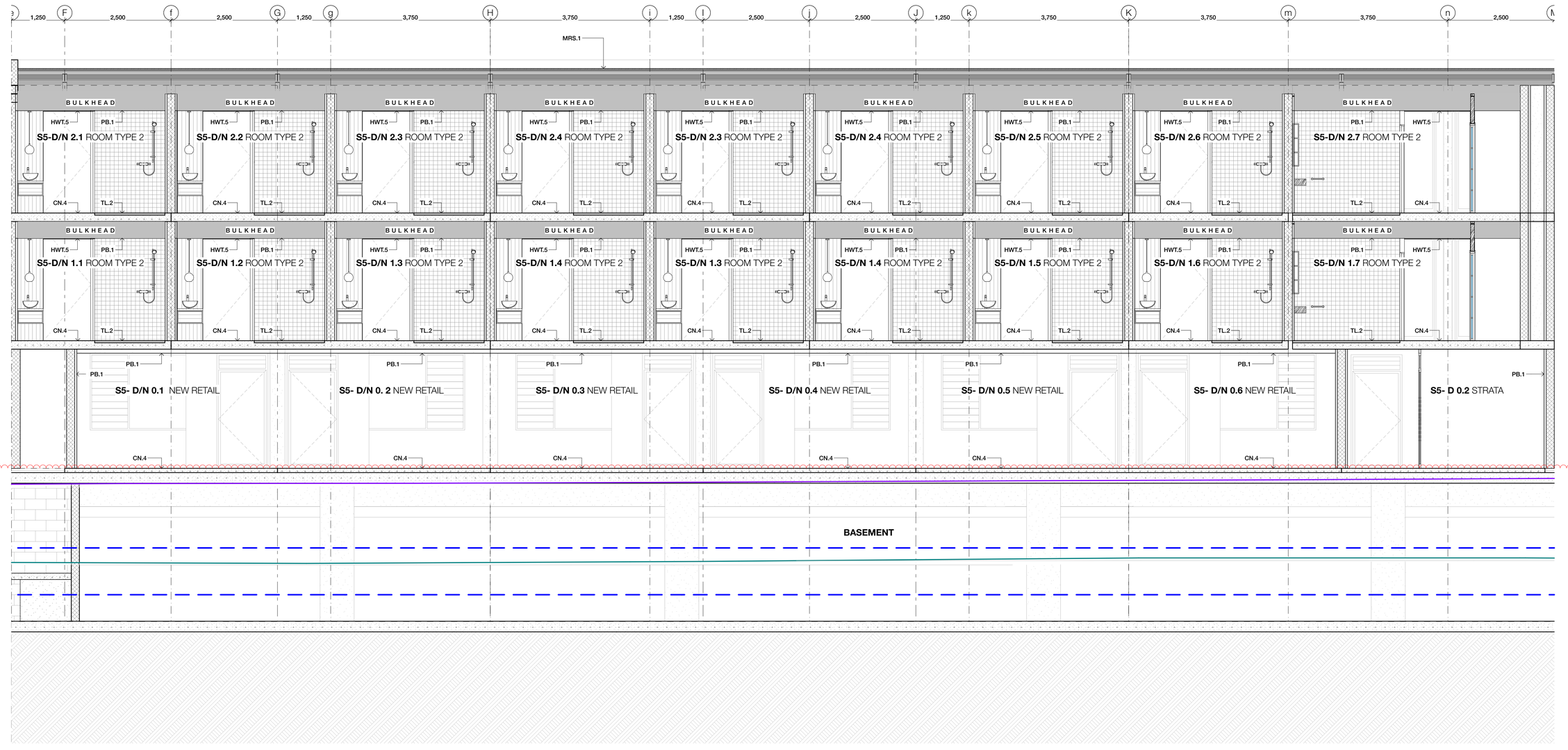
- NGL 2015 (REFERENCE SURVEY DETAILS)
- NGL 2008 (REFERENCE SURVEY DETAILS)
- RL 3.500 — WATER TABLE (GEOTECHNICAL REPORT ASCT 2011/2013)
- RL 4.600 — WATER TABLE (DOUGLAS + PARTNERS MAY 2021) INVESTIGATION DONE AFTER SIGNIFICANT RAIN EVENT

CH-76

*NOTE - STRUCTURAL MEMBERS SIZED AS PER STRUCTURAL ENG. ADVICE.

***NOTE - REFER DA 860 TO DA 871 FOR DETAILED CROSS SECTIONS AND PLANS OF PROPOSED EXCAVATION DEPTHS**

CONTINUED DA 402



CONTINUED DA 400

01 **400 SECTIONS - A1 BUILDING SECTION (1)**

1:50

DFJ ARCHITECTS PTY LTD
45/1 Porter St, Byron Bay
NSW 2481
(+ 61 2) 6687 1425
admin@dfj.com.au

CONSULTANTS
REFER CONSULTANT DRAWINGS WHERE DIRECTED

- PROJECT MANAGER - **ABIEL EAST**
- BUILDER - **TBC**
- CERTIFIER - **MARK PAINTER**
- PLANNING CONSULTANT - **STEVE CONNELLY**
- STRUCTURAL ENGINEER - **RYAN BEAVIS**
- MECHANICAL ENGINEER - **JAMES MORGAN**
- HYDRAULIC ENGINEER - **IAN DENOVARO**
- ELECTRICAL ENGINEER - **VAUGHAN OXENFORD**
- BCA CONSULTANTS - **PETER & HALEY THORNTON**

RevID	Transmittal Set Name	Change ID	Change Name	Transmittal Set Date
01	DRAFT ISSUE 02			20/12/19
02	DRAFT ISSUE 03			24/1/20
03	DA ISSUE 07 (COUNCIL RFI)			11/6/21

CH-75

PROJECT :
HABITAT

CLIENT :
BAYSHORE DEVELOPMENT PTY LTD

PROJECT ADDRESS :
The 2 Community Title blocks bounded by Wallum Place, Gallagher Street, Easy Street and the walkway at the rear of 2-20 Porter Street and Penny Lane BYRON BAY NSW 2481 AUSTRALIA

JOB NO :
DFJ102

SCALE AT A1 : **1:50**
DRAWN : **LG**
CHECKED : **FWM**

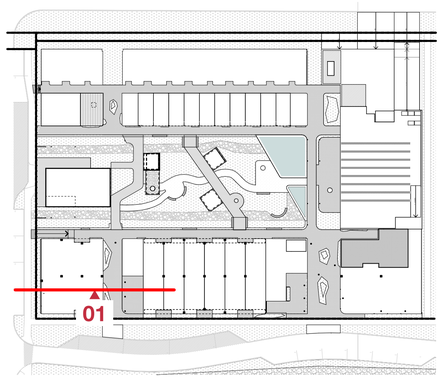
NOMINATED ARCHITECT : DOMINIC FINLAY JONES NSW REG. 7674

DRAWING TITLE :
400 SECTIONS
SECTIONS

PROJECT STATUS :
DEVELOPMENT APPLICATION

REVISION NO.
03

DRAWING NO.
DA 401

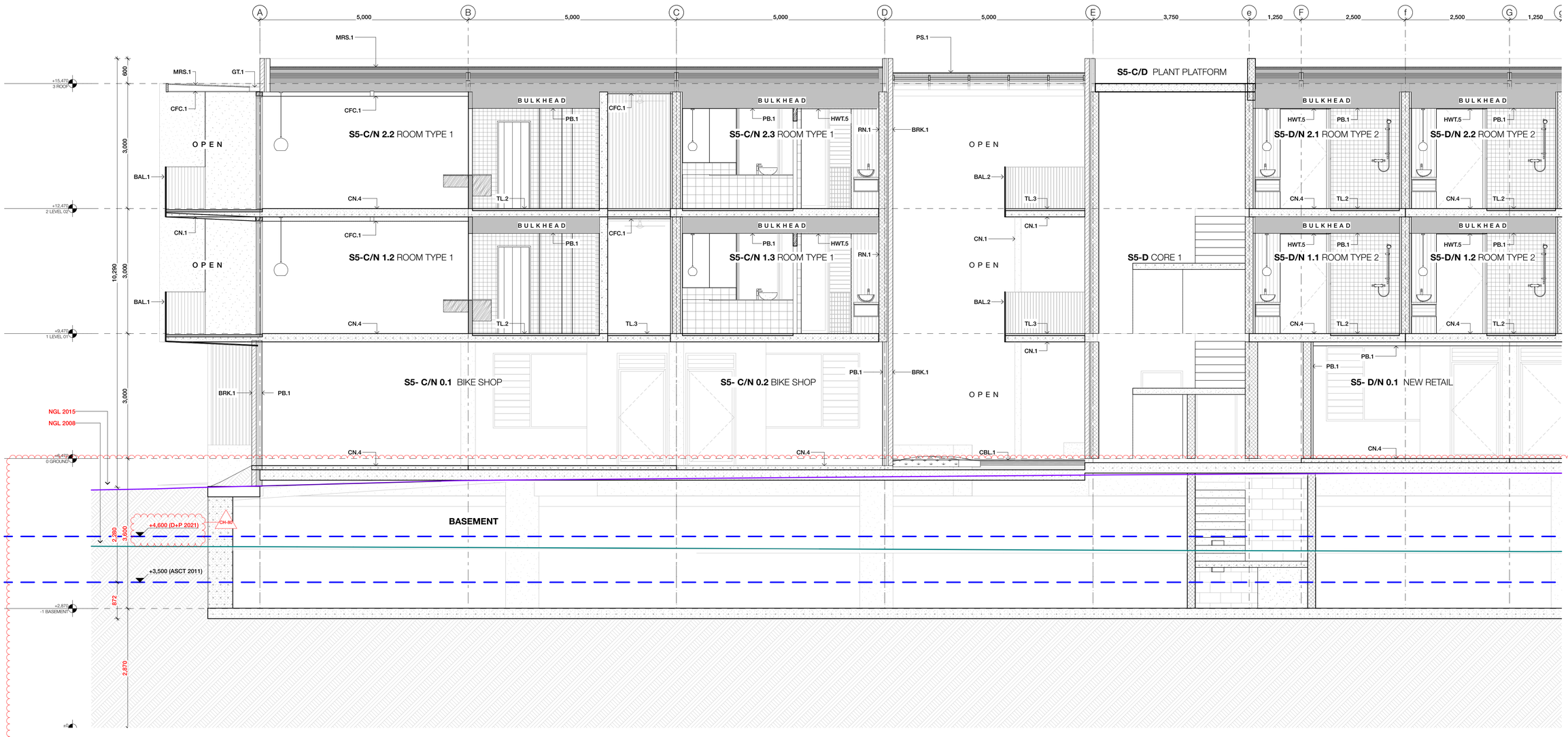


LEGEND

- NGL 2015 (REFERENCE SURVEY DETAILS)
- NGL 2008 (REFERENCE SURVEY DETAILS)
- RL 3.500 — WATER TABLE (GEOTECHNICAL REPORT ASCT 2011/2013)
- RL 4.600 — WATER TABLE (DOUGLAS + PARTNERS MAY 2021) INVESTIGATION DONE AFTER SIGNIFICANT RAIN EVENT
- CH-76

*NOTE - STRUCTURAL MEMBERS SIZED AS PER STRUCTURAL ENG. ADVICE.

***NOTE - REFER DA 860 TO DA 871 FOR DETAILED CROSS SECTIONS AND PLANS OF PROPOSED EXCAVATION DEPTHS**



CONTINUED DA 401

01 **400 SECTIONS - A1 BUILDING SECTION**

1:50

DFJ ARCHITECTS PTY LTD
45/1 Porter St, Byron Bay
NSW 2481
(+ 61 2) 6687 1425
admin@dfj.com.au

CONSULTANTS
REFER CONSULTANT DRAWINGS WHERE DIRECTED

- PROJECT MANAGER - **ABIEL EAST**
- BUILDER - **TBC**
- CERTIFIER - **MARK PAINTER**
- PLANNING CONSULTANT - **STEVE CONNELLY**
- STRUCTURAL ENGINEER - **RYAN BEAVIS**
- MECHANICAL ENGINEER - **JAMES MORGAN**
- HYDRAULIC ENGINEER - **IAN DENOVARO**
- ELECTRICAL ENGINEER - **VAUGHAN OXENFORD**
- BCA CONSULTANTS - **PETER & HALEY THORNTON**

RevID	Transmittal Set Name	Change ID	Change Name	Transmittal Set Date
01	DRAFT ISSUE 02			20/12/19
02	DRAFT ISSUE 03			24/1/20
03	DA ISSUE 07 (COUNCIL RFI)			11/6/21

CH-75

PROJECT :
HABITAT

CLIENT :
BAYSHORE DEVELOPMENT PTY LTD

PROJECT ADDRESS :
The 2 Community Title blocks bounded by Wallum Place, Gallagher Street, Easy Street and the walkway at the rear of 2-20 Porter Street and Penny Lane BYRON BAY NSW 2481 AUSTRALIA

JOB NO : **DFJ102**

SCALE AT A1 : **1:50**
DRAWN : **LG**
CHECKED : **FWM**

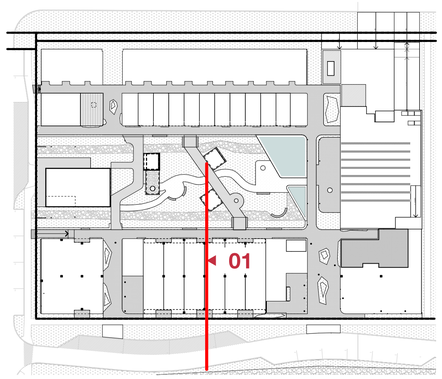
NOMINATED ARCHITECT : DOMINIC FINLAY JONES NSW REG. 7674

DRAWING TITLE : 400 SECTIONS
SECTIONS

PROJECT STATUS :
DEVELOPMENT APPLICATION

REVISION NO. **03**

DRAWING NO. **DA 402**



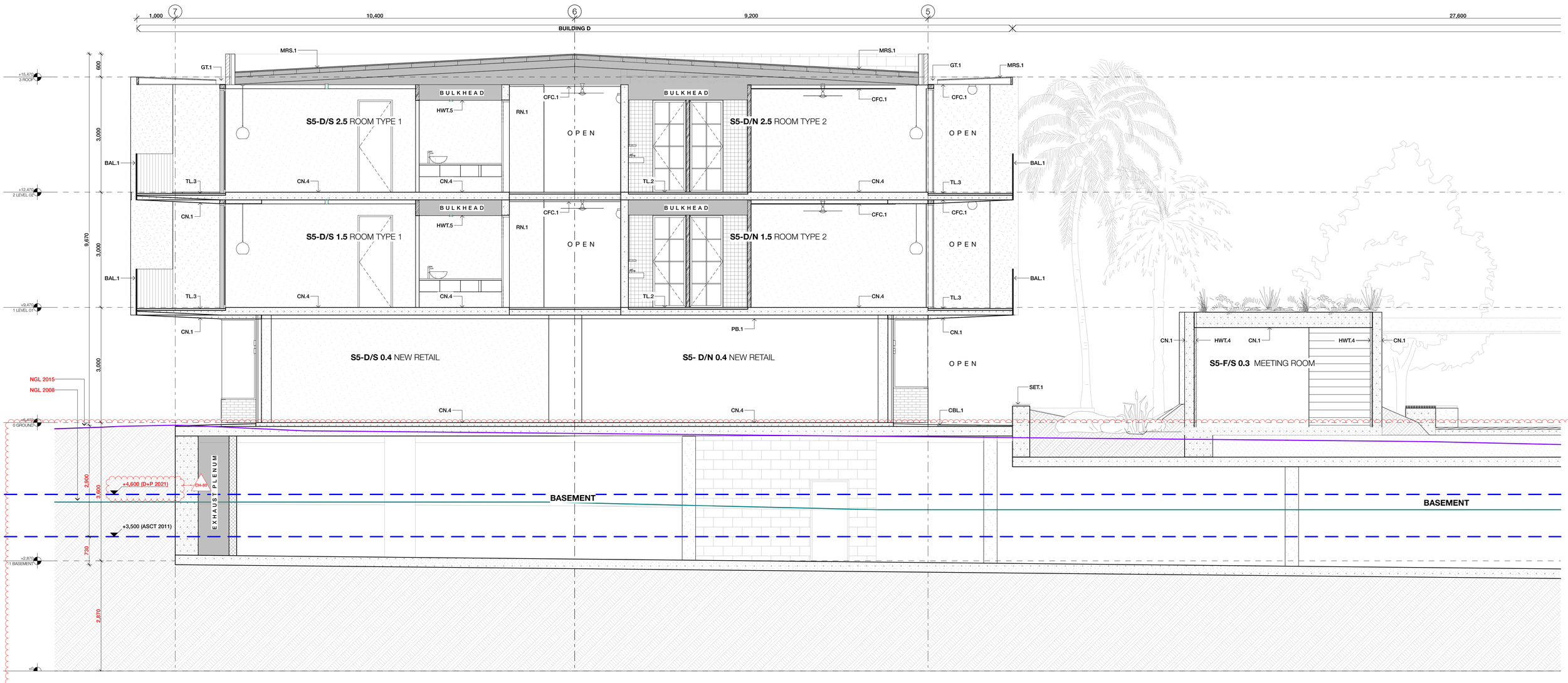
LEGEND

- NGL 2015 (REFERENCE SURVEY DETAILS)
- NGL 2008 (REFERENCE SURVEY DETAILS)
- RL 3.500 — WATER TABLE (GEOTECHNICAL REPORT ASCT 2011/2013)
- RL 4.600 — WATER TABLE (DOUGLAS + PARTNERS MAY 2021) INVESTIGATION DONE AFTER SIGNIFICANT RAIN EVENT

CH-76

*NOTE - STRUCTURAL MEMBERS SIZED AS PER STRUCTURAL ENG. ADVICE.

***NOTE - REFER DA 860 TO DA 871 FOR DETAILED CROSS SECTIONS AND PLANS OF PROPOSED EXCAVATION DEPTHS**



CONTINUED DA 404

01 **400 SECTIONS - A2 BUILDING SECTION**

1:50

DFJ ARCHITECTS PTY LTD
45/1 Porter St, Byron Bay
NSW 2481
(+ 61 2) 6687 1425
admin@dfj.com.au

CONSULTANTS

REFER CONSULTANT DRAWINGS WHERE DIRECTED

- PROJECT MANAGER - **ABIEL EAST**
- BUILDER - **TBC**
- CERTIFIER - **MARK PAINTER**
- PLANNING CONSULTANT - **STEVE CONNELLY**
- STRUCTURAL ENGINEER - **RYAN BEAVIS**
- MECHANICAL ENGINEER - **JAMES MORGAN**
- HYDRAULIC ENGINEER - **IAN DENOVARO**
- ELECTRICAL ENGINEER - **VAUGHAN OXENFORD**
- BCA CONSULTANTS - **PETER & HALEY THORNTON**

RevID	Transmittal Set Name	Change ID	Change Name	Transmittal Set Date
01	DRAFT ISSUE 02			20/12/19
02	DRAFT ISSUE 03			24/1/20
03	DA ISSUE 07 (COUNCIL RFI)			11/6/21

CH-75

PROJECT :
HABITAT

CLIENT :
BAYSHORE DEVELOPMENT PTY LTD

PROJECT ADDRESS :
The 2 Community Title blocks bounded by Wallum Place, Gallagher Street, Easy Street and the walkway at the rear of 2-20 Porter Street and Penny Lane BYRON BAY NSW 2481 AUSTRALIA

JOB NO : **DFJ102**

SCALE AT A1 : **1:50**
DRAWN : **LG**
CHECKED : **FWM**

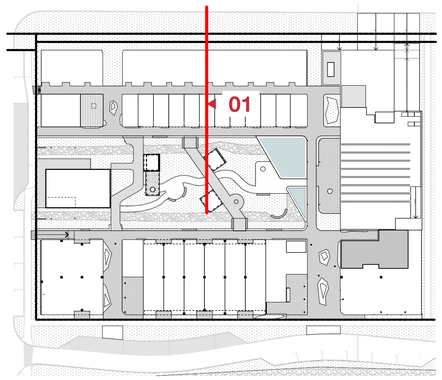
NOMINATED ARCHITECT : DOMINIC FINLAY JONES NSW REG. 7674

DRAWING TITLE : 400 SECTIONS
SECTIONS

PROJECT STATUS :
DEVELOPMENT APPLICATION

REVISION NO. **03**

DRAWING NO. **DA 403**



LEGEND

NGL 2015
(REFERENCE SURVEY DETAILS)

NGL 2008
(REFERENCE SURVEY DETAILS)

WATER TABLE
(GEOTECHNICAL REPORT ASCT 2011/2013)

*NOTE - STRUCTURAL MEMBERS SIZED AS PER STRUCTURAL ENG. ADVICE.

CH-76

***NOTE - REFER DA 860 TO DA 871 FOR DETAILED CROSS SECTIONS AND PLANS OF PROPOSED EXCAVATION DEPTHS**

CONTINUED DA 403

27,600 | 8,000 | 2,000 | 8,800 | 1,800
46,000

4 | 3 | 2 | 1

MRS.1 | GT.1 | CFC.1 | OPEN | BAL.1 | TL.3 | CN.4 | CN.1 | PB.1 | CBL.1 | RN.1 | HWT.5 | BULKHEAD | BLK.3

S5-B/S 2.5 ROOM TYPE 2
S5-B/N 2.5 ROOM TYPE 1
S5-B/S 1.5 ROOM TYPE 2
S5-B/N 1.5 ROOM TYPE 1
S5-F/S 0.4 MEETING ROOM
S5-B/S 0.5 WELLNESS
S5-B/N 0.5 SERVICED APARTMENT

HWT.2

BASEMENT | BASEMENT

EXHAUST PLENUM

CH-80

+4,600 (D+P 2021)

+3,500 (ASCT 2011)

NGL 2015
NGL 2008

130 | 3,000 | 10,222 | 3,000 | 3,000 | 1,878 | 730 | 2,870

+15,470
P3 ROOF

+12,470
P2 LEVEL 02

+9,470
P1 LEVEL 01

+6,470
P0 GROUND

+2,870
P-1 BASEMENT

+0

01 400 SECTIONS - A2 BUILDING SECTION
1:50

DFJ ARCHITECTS PTY LTD
45/1 Porter St, Byron Bay
NSW 2481
(+ 61 2) 6687 1425
admin@dfj.com.au

CONSULTANTS
REFER CONSULTANT DRAWINGS WHERE DIRECTED

- PROJECT MANAGER - **ABEL EAST**
- BUILDER - **TBC**
- CERTIFIER - **MARK PAINTER**
- PLANNING CONSULTANT - **STEVE CONNELLY**
- STRUCTURAL ENGINEER - **RYAN BEAVIS**
- MECHANICAL ENGINEER - **MARK VAUGHAN**
- HYDRAULIC ENGINEER - **IAN DESMOND**
- ELECTRICAL ENGINEER - **VAUGHAN OXENFORD**
- BCA CONSULTANTS - **PETER & HALEY THORNTON**

RevID	Transmittal Set Name	Change ID	Change Name	Transmittal Set Date
01	DRAFT ISSUE 02			20/12/19
02	DRAFT ISSUE 03			24/1/20
03	DA ISSUE 07 (COUNCIL RFI)			11/6/21

CH-75

PROJECT :
HABITAT

CLIENT :
BAYSHORE DEVELOPMENT PTY LTD

PROJECT ADDRESS :
The 2 Community Title blocks bounded by Wallum Place, Gallagher Street, Easy Street and the walkway at the rear of 2-20 Porter Street and Penny Lane BYRON BAY NSW 2481 AUSTRALIA

JOB NO : **DFJ102**

SCALE AT A1 : **1:50**
DRAWN : **LG**
CHECKED : **FWM**

NOMINATED ARCHITECT : DOMINIC FINLAY JONES NSW REG. 7674

DRAWING TITLE : 400 SECTIONS
SECTIONS

PROJECT STATUS :
DEVELOPMENT APPLICATION

REVISION NO. **03**

DRAWING NO. **DA 404**

Sam Watson

From: Rowena McGeary
Sent: Tuesday, 22 March 2016 10:41 AM
To: Emma.Holt@byron.nsw.gov.au
Cc: Scott Roberts; Sam Watson; nat.andrews@byron.nsw.gov.au
Subject: 7213 Habitat at Bayshore - Condition 14 DA 10.2015.353
Attachments: 7213 2013_08_22 Memo DA condition 13.pdf; Ballina Sands Pty Ltd Information.zip

Hi Emma,

Following Bill's email on the 15th of March, this issue hasn't been addressed further. Please find below our justification to conclude this issue.

I refer to the referral you received from Nat Andrews on 22 February 2016 with regards to Condition 14 of DA No. 10.2015.353. You were asked to review the documents that were attached and confirm if they satisfied condition 14 of DA No. 10.2015.353.

Condition 14 is the Classification and Suitability of Fill and states:

> The fill material must be classified as suitable for the site. Such classification must conclude to the satisfaction of Council's Environmental Health Officers that the fill material is not contaminated and/or contain acid sulfate material. Classification must be in accordance with the NSW DECC '*Waste Classification Guidelines (2008)*' and '*Acid Sulfate Soil Guidelines (ASSMAC, 1998)*'.

You concluded that the information supplied did not satisfy consent condition 14 of DA10.2015.353.1. And noted that in particular, the information submitted had not been prepared in accordance with NSW DECC '*Waste Classification Guidelines (2008)*' and '*Acid Sulfate Soil Guidelines (ASSMAC, 1998)*'. It was recommended that further information be provided to meet requirements set out in the condition.

However, all site filling was undertaken under DA 10.2008.360.1 in accordance with Condition 11 – Earthworks and retaining walls. This DA was to do with bulk earthworks of the site. No approval for site filling was requested or is proposed under DA 10.2011.162 (civil works) or DA 10.2015.353 (built form elements).

Fill was historically sourced from the Northern Hotel development in Byron Bay under DA 10.2005.705 and more recently sourced from the Ballina Sands Pty Ltd quarry located at Tintenbar. Filling works commenced in 2011/2012 and were completed mid-2015.

Notwithstanding, please find attached the following:

- The original memo that was supplied to council titled *Bayshore Village DA Condition 13, Fill Material*
- A preliminary Contaminated Site Investigation for the source of the Ballina Sands Pty Ltd fill; and
- Laboratory certificates of representative stockpiled material from Ballina Sands Pty Ltd at the time of filling (note that this was not a requirement for filling but was done as part of the quarries quality assurance)

The last two are included in a zipped folder titled Ballina Sands Pty Ltd Information.

Please also find below the previous approvals that are relevant to the Habitat proposal. The four DAs that I referred to above are indicated in bold text. These include the Historic Fill (from the Northern Hotel development) Stage, Bulk Earthworks Stage, Civil Works Stage and the Built form Elements Stage.

10.2004.394.1	5 November 2004	Stockpiling of fill material	
10.2005.705.1	**25 September 2006**	**Stockpiling 1.5m of fill over 12,500m^2**	**Historic Fill Stage**
10.2007.177.1	19 December 2007	Environmental Enhancement Works	

10.2008.360.1	**18 December 2008**	**Mixed use development comprising 82 dwellings, retail, commercial and creative industrial units**	**Bulk Earthworks Stage**
10.2009.12.1	11 November 2009	Community title subdivision of mixed use development	
10.2011.162.1	**24 February 2012**	**Mixed use development comprising 67 residential dwellings, commercial, retail, live/work and creative industry units, with the provision of road works, car parking, landscaping, water, sewer, drainage and communication services, plus the subdivision of the site under a Community Scheme**	**Civil Works Stage**
10.2015.353.1	**4 February 2016**	**Current Conditions of Consent**	**Built form Elements Stage**

I trust that the information provided is sufficient to close off this issue. If you have any questions or wish to discuss the above please do not hesitate to contact me directly. I think that it would be appropriate to organise a meeting with both yourself and Nat if you wish to discuss this issue further.

Kind Regards,

Rowena McGeary
02 6686 3280

Ardill Payne & Partners
Engineers | Planners | Surveyors | Environmental | Project Management

BALLINA
45 River Street
PO Box 20
BALLINA NSW 2478
Ph: 02-6686 3280

BRISBANE
Level 1, The Designbank
89 Grey Street
SOUTH BRISBANE QLD 4101
Ph: 07-3123 6675

GUNNEDAH
Germane House,
285 Conadilly Street,
GUNNEDAH NSW 2380
Ph: 02-6742 9955

www.ardillpayne.com.au

ABN: 51 808 558 977

Engineering Consultancy Services

Local Government PROCUREMENT APPROVED CONTRACTOR

Members of:
Engineers Australia
Board of Professional Engineers of Qld
Urban Land Institute
Australian Steel Institute
Institute of Public Works Engineering Australia
Stormwater Industry Association
Surveyors Board of Qld
Planning Institute of Australia
Board of Surveying & Spatial Information
Institution of Surveyors NSW

MEMO

Subject: **Bayshore Village DA Condition 13, Fill Material**

Date: **22 August 2013** Job No: **7213**

Condition 13

Documentation must be provided to verify the soil characteristics of the material to be used for filling. This should be assessed by Council to ensure that the material used will not result in alteration to the pH and nutrient levels in the adjacent wetlands via runoff both during construction and post development.

APP Response:

The soil landscape of the site[1] (Figure 1) is straddled between an Aeolian, Aeolian/Estuarine landscape called Black Rock (br) / Tyagarah (ty). These landscapes comprises of:

Br: *Extremely low level to gently undulating beach ridge plains on Pleistocene beaches and dune sand. Elevation and relief are 1-2m, slopes <5%. The topography is characterised by dune/swale systems aligned parallel to the coast. Dunes are very low (<3m) and narrow to moderately broad (20-500m), swales narrow to moderately broad (100-500m). Dry and wet heathland occurs in dunes and swales respectively.* *Limitations – non-cohesive, highly permeable, highly acidic soils of very low fertility. Organic Soils in swales with permanently high water tables. High wind erosion hazard.*
Ty: *Sediment basins of mixed estuarine and Aeolian origin forming level to gently undulating plains. Relief is <3m, elevation is <5m and slopes l<1%.* *Limitations - very strongly acid, permeable, often waterlogged soils of low fertility and low water holding capacity with localised salinity. Permanently high water tables and moderate wind erosion hazard.*

[1] Soil Landscapes of the Lismore – Ballina 1:100000 Sheet (DOCLM - Morand,1994)

The existing filling for the subject site has been completed under the approvals DA10.2008.360.1 and CC 11.2008.360.1. This work commenced in 2011 - 2012 and is approximately 30% complete. Historic Fill for the site was sourced from local developments (such as the Beach Hotel) with the balance from local sand quarries. It is believed that to date, the fill has been sourced primarily from the Tyagrah landscape.

Measured chemical analysis interpretation for the Both Br and Ty soil landscapes are presented in Figure 2. These soil types are typified as low pH, low nutrient sands and silty/ clayey sands. The border between aeolian and aeolian/estuarine sourced soil landscapes are not easily defined.

It is proposed that the balance of the fill material for the Bayshore development be sourced from matching local soil landscapes. This will ensure that the chemical properties, nutrient levels, permeability and other physical properties match the existing site and therefore the runoff shall be very similar in nature.

There are a number of local sources of fill sand which meet these requirements.

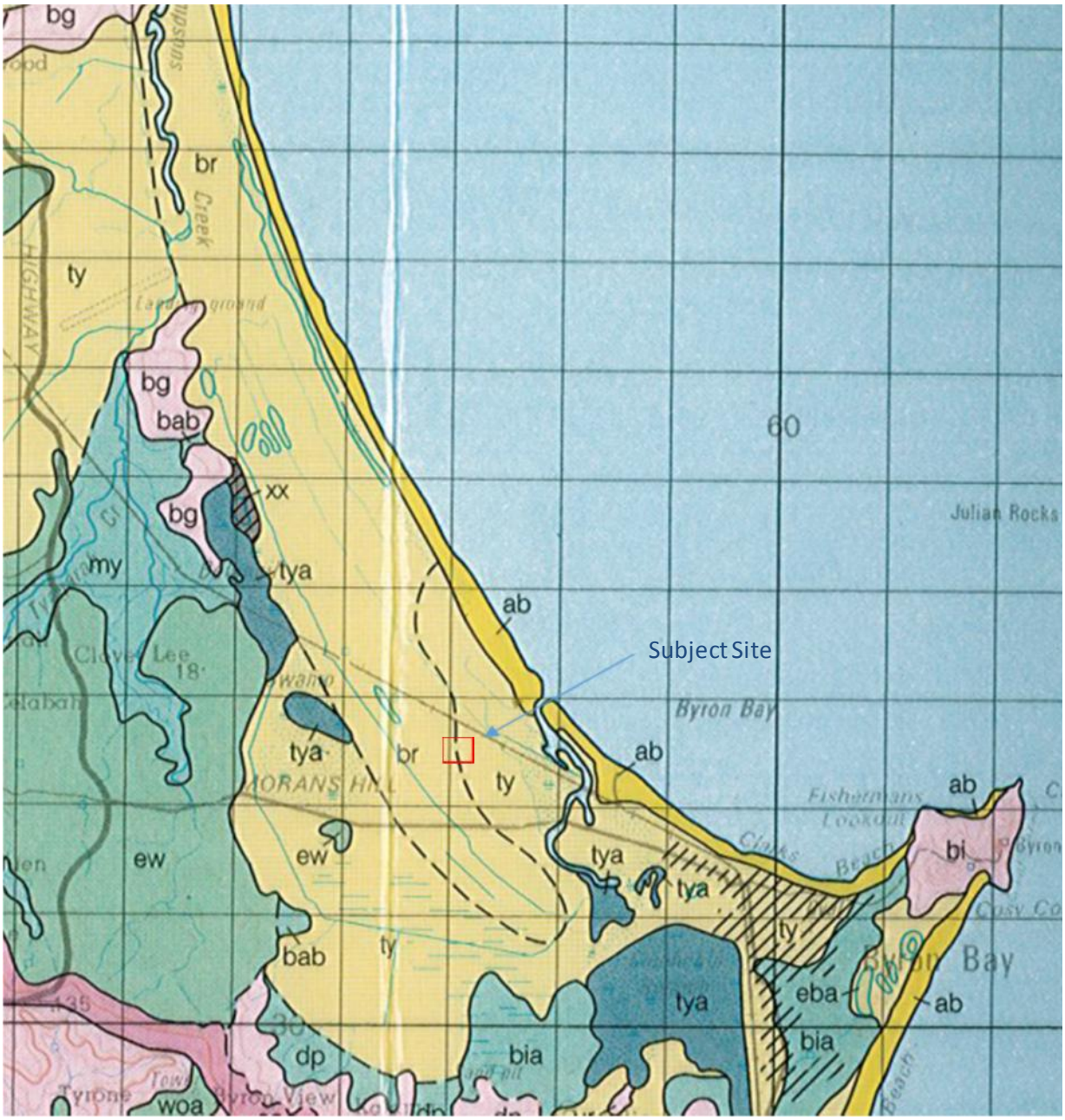


Figure 1– Soil Landscape Lismore - Ballina (DOCLM - Morand,1994)

CHEMICAL ANALYSIS: Lismore–Ballina

CHEMICAL INTERPRETATION: Lismore–Ballina

Soil mat	Data card		SSS Lab 93/051	Aust Grid Ref East	Aust Grid Ref North	Depth Range cm	Hor-izon	pH H_2O	pH $CaCl_2$	pH Buf Cap	Max Lime t/ha	OC %	OM %	Bray P ppm	(RA)	P Sorpt ppm	(RA)	EC	ECe	Acid	Alk	pH Buf Cap	OM	Avail P	P Sorpt RA		P Sorpt RA		ECe	Rust	Cncrt Corr
ab1	388	1	141	555700	6804050	0-20	A	9.20	8.40	4		0.20	0.40	3		nd		0.51	11.58		VSt	VL	EL	VL		L		H	Hazd	
ab2	30	2	142	555600	6804200	0-50	B	9.10	8.20	4		0.30	0.50	3		nd		0.18	4.09		VSt	VL	EL	VL		L		M	Hazd	
ab3	345	2	144	555300	6804150	40-100	A2	6.30	5.70	4		0.60	0.10	2		nd		0.60	1.36	Sl		VL	EL	VL		L		VL	Hazd	
ba1	49	1	191	591000	6824700	0-50	A1	4.90	3.80	33	1.98	2.86	5.00	2	1.0	nd		0.70	1.59	VSt		M	H	VL	VL	L	L	VL	Hazd	
ba2	267	2	80	540450	6800100	10-30	A2	5.10	4.20	67	0.34	1.44	2.52	3		112		0.70	0.67	St		M	M	VL		L		VL		
ba3	267	1	79	540450	6800100	0-10	A1	5.30	4.50	70		3.82	6.68	27		93		0.15	3.40	St		M	VH	VH		L		L	Hazd	
ba4	267	3	81	540450	6800100	30-60	B1	4.60	3.90	95	5.52	0.66	1.16	1		696		0.10	0.86	VSt		H	L	VL		VH		VL	Hazd	
bg1	92	1	206	553200	6826800	0-30	A	4.90	4.55	125		3.15	5.51	3		803		0.16	1.38	VSt		VH	VH	VL		VH		VL	Hazd	
bg2	92	2	208	505200	6793000	30-100	B11	5.18	5.07	127		1.22	2.13	1		814		0.80	0.60	St		VH	M	VL		VH		VL	Hazd	
bi1	61	1	22	549900	6814600	0-15	A1	5.20	4.78	107		4.24	7.42	7	6.2	476	425	0.13	1.12	St		H	VH	L	L	H	H	VL	Hazd	
bi2	67	1	3	559100	6828100	0-20	A	4.24	3.49	75	3.25	3.40	5.95	4	3.6	500	446	0.13	1.12	Ext		M	VH	VL	VL	H	H	VL	Hazd	Hazd
bi3	67	3	4	559100	6828100	20-40	B2	4.54	3.59	77	5.24	0.36	0.63	2	1.5	550	412	0.70	0.41	VSt		H	VL	VL	VL	H	H	VL	Hazd	
bi4	67	4	5	559100	6828100	40+	BC	4.35	3.40	80	9.96	0.22	0.39	2		599		0.50	0.29	Ext		H	EL	VL		H		VL	Hazd	
bp1	7	1	152	555800	6804900	0-70	A	7.20	6.50	5		0.70	0.12	6		nd		0.33	7.49	N	N	VL	EL	L		L		M	Hazd	
bp2	15	1	192	552400	6805550	0-30	A	5.60	5.40	141		11.00	19.25	60		496		2.41	20.73	M		VH	VH	VH		H		VH	Hazd	Hazd
bp3	341	1	153	553800	6805150	0-100	A	3.60	3.50	53		2.28	3.99	14		294		6.77	153.68	Ext		M	H	M		MH		VH	Hazd	Hazd
bp4	385	2	193	551500	6805300	10-100	B	7.30	7.00	116		1.60	2.80	8		696		2.05	11.89	N	N	VH	M	L		VH		H	Hazd	
br1	11	1	137	557000	6818850	0-30	A1	4.30	3.50	18	1.29	2.41	4.22	2		nd		0.60	1.36	Ext		VL	H	VL		L		VL	Hazd	Hazd
br2	11	2	138	557000	6818850	30-150	A2	5.10	4.20	5		0.19	0.33	1		nd		0.20	0.45	St		VL	EL	VL		L		VL		
br3	389	1	140	555750	6835400	0-40	P	5.50	5.30	356		46.83	81.95	7		798		1.90	16.34	St		VH	VH	L		VH		VH	Hazd	Hazd
bu1	84	1	26	552800	6843700	0-15	A	5.03	4.51	56		3.20	5.60	4		375		0.14	1.33	VSt		M	VH	VL		MH		VL	Hazd	
bu2	67	1	204	559100	6828100	0-20	A	4.24	3.49	75	3.25	3.40	5.95	4	3.6	500	446	0.13	1.12	Ext		M	VH	VL	VL	H	H	VL	Hazd	Hazd
bu3	84	3	27	552800	6843700	15-40	B	4.90	3.97	72	5.42	0.61	1.07	1	0.6	515	309	0.70	0.53	VSt		M	VL	VL	VL	H	MH	VL		
cc1	213	1	66	509350	6821550	0-20	A1	5.30	4.30	36	0.41	1.59	2.78	4		nd		0.70	1.59	St		M	M	VL		L		VL	Hazd	
cc2	184	1	154	519400	6820950	0-30	A	5.50	4.70	45		1.54	2.69	36		214		0.80	1.82	St		M	M	VH		M		VL	Hazd	
cc3	184	2	155	519400	6820950	30-100	B1	5.00	4.40	72	4.32	0.32	0.56	4	2.2	449	248	0.60	1.36	VSt		M	VL	VL	VL	H	M	VL	Hazd	
cc4	213	3	68	509350	6821550	30-70	B1	4.50	3.60	107	21.15	0.40	0.70	nd		679		0.60	0.57	VSt		H	VL			VH		VL	Hazd	
ck1	344	1	177	520650	6789750	0-60	A	4.80	4.40	21	0.61	0.46	0.81	3		151		0.60	1.36	VSt		L	VL	VL		M		VL	Hazd	
ck2	344	2	178	520650	6789750	60-100	B	5.00	4.40	44	0.69	0.23	0.40	3		356		0.40	0.38	VSt		M	EL	VL		MH		VL		
ck3	383	2	200	521550	6794500	30-100	B1	5.00	3.70	126	19.05	0.33	0.57	1		781		0.30	0.17	VSt		VH	VL	VL		VH		VL	Hazd	
cl1	232	1	161	521600	6837500	0-20	A1	4.90	4.30	93		4.25	7.44	16		542		0.80	0.76	VSt		H	VH	M		H		VL		
cl2	232	2	162	521600	6837500	20-100	A2	4.50	3.90	109	16.53	0.73	1.28	1		777		0.12	1.14	VSt		H	L	VL		VH		VL	Hazd	
cl3	218	1	158	519800	6835250	0-50	A1	5.30	4.30	55	3.97	0.66	1.16	2		387		0.40	0.38	St		M	L	VL		MH		VL		
cl4	218	2	159	519800	6835250	50-100	B1	5.00	3.90	116	17.93	0.28	0.49	<1		770		0.40	0.38	VSt		VH	EL			VH		VL	Hazd	
cl5	228	1	73	524100	6829500	0-10	A	4.90	4.80	106		4.42	7.74	4		551		0.60	0.57	VSt		H	VH	VL		H		VL	Hazd	
cl6	228	3	75	524100	6829500	30-55	B11	4.60	4.10	153	4.34	0.96	1.68	nd		797		0.70	0.60	VSt		VH	L			VH		VL	Hazd	
co1	92	1	205	553200	6826800	0-30	A	4.90	4.55	125		3.15	5.51	3		803		0.16	1.38	VSt		VH	VH	VL		VH		VL	Hazd	
co2	92	2	207	505200	6793000	30-100	B11	5.18	5.07	127		1.22	2.13	1		814		0.80	0.60	St		VH	M	VL		VH		VL	Hazd	
dp1	182	1	57	523590	6820700	0-30	A	5.10	4.40	183		2.25	3.94	3		826		0.29	2.49	St		VH	H	VL		VH		L	Hazd	
dp2	182	2	58	523590	6820700	30-100	A	5.10	4.20	185		1.19	2.08	4		863		0.37	2.77	St		VH	L	VL		VH		L	Hazd	

APPENDIX 7.2.7 CHEMICAL ANALYSIS INTERPRETATION TEST RESULTS

Soil mat	Data card		SSS Lab 93/051	Aust Grid Ref East	Aust Grid Ref North	Depth Range cm	Hor-izon	pH H_2O	pH $CaCl_2$	pH Buf Cap	Max Lime t/ha	OC %	OM %	Bray P ppm	(RA)	P Sorpt ppm	(RA)	EC	ECe	Acid	Alk	pH Buf Cap	OM	Avail P	(RA)	P Sorpt	(RA)	ECe	Rust	Cncrt Corr
na4	122	3	169	510400	6813800	120-500	B1	8.40	8.00	85		0.10	0.17	7		23		4.44	42.18		M	H	EL	L		L		VH	Hazd	Hazd
nc1	370	2	173	501055	6817055	5-50	B	6.70	6.00	197		2.56	4.48	1		547		0.22	1.28	N	N	VH	H	VL		H		VL	Hazd	
ni1	324	1	125	532550	6839200	0-30	A	4.20	4.00	86	3.47	2.14	3.75	2		608		0.80	0.69	Ext		H	H	VL		VH		VL		
ni2	340	2	157	528250	6842350	10-100	A12	4.50	4.20	127	9.25	2.02	3.54	nd		878		0.50	0.43	VSt		VH	H			VH		VL	Hazd	
ni3	333	3	203	540500	6841200	45-100	B2	4.20	3.80	101	5.66	0.14	0.25	1		576		0.30	0.17	Ext		H	EL	VL		H		VL	Hazd	
ro1	92	1	34	553200	6826800	0-30	A	4.90	4.55	125		3.15	5.51	3		803		0.16	1.38	VSt		VH	VH	VL		VH		VL	Hazd	
ro2	92	2	35	553200	6826800	30-100	B11	5.18	5.07	127		1.22	2.13	1		814		0.80	0.60	St		VH	M	VL		VH		VL	Hazd	
sc1	96	1	36	505200	6793000	0-30	A	5.20	4.10	20	1.16	0.51	0.89	5		nd		0.14	3.18	St		VL	VL	VL		L		L	Hazd	
sc2	96	2	37	505200	6793000	30-65	A2	5.20	3.80	78	2.86	0.30	0.53	2		315		0.17	3.86	St		H	VL	VL		MH		L	Hazd	
sc3	300	1	98	518350	6795500	0-20	A	4.70	4.20	82	0.79	3.75	6.56	6		810		0.44	9.99	VSt		H	VH	L		VH		H	Hazd	
sc4	96	3	38	505200	6793000	65-100	B1	4.80	3.90	57	1.07	0.11	0.19	2		164		0.48	4.56	VSt		M	EL	VL		M		M	Hazd	
sc5	300	4	101	518350	6795500	70-100	B22	4.00	3.60	117	11.82	0.37	0.65	1		688		0.73	6.28	Ext		VH	VL	VL		VH		M	Hazd	
ta1	106	1	39	505200	6802000	0-10	A	5.40	4.80	140		10.40	18.20	63		401		0.28	2.41	St		VH	VH	VH		H		L	Hazd	
ta2	106	2	40	505200	6802000	10-50	B1	5.40	4.30	153		0.94	1.65	3		786		0.11	0.64	St		VH	L	VL		VH		VL	Hazd	
ta3	305	2	103	516300	6802600	0-80	B1	6.70	5.70	154		1.11	1.94	4		559		0.12	1.03	N	N	VH	L	VL		H		VL	Hazd	
ta4	101	2	166	503200	6800400	40-100	A2	6.40	5.80	51		1.01	1.77	9		187		0.80	0.46	Sl		M	L	L		M		VL		
te1	178	1	54	521400	6829700	0-25	A	5.90	5.10	54		1.65	2.89	7		347		0.17	1.46	M		M	M	L		MH		VL	Hazd	
te2	178	2	55	521400	6829700	25-60	B1	6.10	5.30	56		1.04	1.82	8	4.4	391	216	0.12	1.03	Sl		M	L	L	VL	MH	M	VL	Hazd	
tu1	47	1	149	558700	6830650	0-20	A1	4.20	3.60	83	0.78	9.66	16.91	22		335		0.14	3.18	Ext		H	VH	H		MH		L	Hazd	Hazd
tu2	314	1	110	536000	6799500	0-10	A	4.40	4.00	163		18.31	32.04	17		843		0.40	5.52	Ext		VH	VH	M		VH		M	Hazd	Hazd
tu3	314	2	111	536000	6799500	10-70	B	4.70	4.10	93		2.33	4.08	32		736		0.20	1.90	VSt		H	H	VH		VH		VL	Hazd	
ty1	315	1	112	535600	6797700	0-20	A11	4.80	4.20	67	5.24	4.74	8.29	18		653		0.11	2.50	VSt		M	VH	M		VH		L	Hazd	
ty2	315	2	113	535600	6797700	20-40	A12	4.80	4.20	36	4.31	1.69	2.96	5		687		0.10	2.27	VSt		M	M	VL		VH		L	Hazd	
ty3	374	2	179	552340	6843400	20-50	B	4.70	4.20	65		1.28	2.24	6		364		2.50	56.75	VSt		M	M	L		MH		VH	Hazd	Hazd
wo1	286	1	91	542400	6814200	0-20	A	4.60	4.10	147	1.64	3.74	6.54	2		819		0.15	1.29	VSt		VH	VH	VL		VH		VL	Hazd	
wo2	286	3	93	542400	6814200	45-100	B2	4.20	3.90	170	10.42	0.55	0.96	1		841		0.12	0.90	Ext		VH	VL	VL		VH		VL	Hazd	
yo1	109	1	201	500850	6808000	0-30	A	5.30	4.40	31		0.63	1.11	5		94		0.40	0.55	St		M	L	VL		L		VL		
yo2	94	2	164	505600	6796900	30-50	B1	5.30	3.80	92		0.50	0.88	2		456		0.90	0.77	St		H	VL	VL		H		VL	Hazd	
yo3	342	2	168	505550	6796350	30-100	B2	5.00	3.80	133		0.67	1.17	1		818		0.80	0.69	VSt		VH	L	VL		VH		VL	Hazd	
yo4	112	3	43	516700	6799300	65-110	B2	6.30	5.80	106		0.26	0.46	3	2.2	480	360	0.90	0.68	Sl		H	EL	VL	VL	H	MH	VL	Hazd	

Figure 2 - Chemical Analysis interpretations of Black Roack / Tyagrah Soil Type (highlighted) (DOCLM Morand, 1994)

P

James Foster
Associate Chemical/Environmental Engineer
BE (Hons) MIEAust
0421519354

Ardill Payne
Engineers | Planners | Surveyors | Environmental | Project Management

ARDILL PAYNE & PARTNERS

Civil & Structural Engineers – Project Managers – Town Planners – Surveyors

LAND CONTAMINATION ASSESSMENT

STAGE 1 PRELIMINARY INVESTIGATION

Submission to Ballina Shire Council

PROPOSED SAND EXTRACTION INDUSTRY
at
Lot 32 DP 1151612
Newrybar Swamp Road, Lennox Head

for:
Bob Watson

May 2012

79 Tamar Street
(PO Box 20)
BALLINA NSW 2478

Ph: (02) 6686 3280
Fax: (02) 6686 7920
Email: info@ardillpayne.com.au

Document Control Sheet

Filename:	6542w - Stage 1 Land Contamination Assessment
Job No.:	6542W
Job Captain:	Evan Elford
Authors:	Lucy Bennett and James Foster
Client:	Bob Watson
File/Pathname:	S:\01 Jobs\6500-6599\6542w Watson Sand Pit 2010\01 Administration\02 Reports\01 Current\6542w - Stage 1 Land Contamination Assessment.docx

Revision No:	Date:	Checked By		Issued By	
		Name	Signed	Name	Signed
0		J Foster		P Snellgrove	
1					
2					

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1 Executive Summary

Ardill Payne and Partners (APP) has been engaged by Ballina Sands Pty Ltd to undertake a Preliminary Contaminated Site Investigation to support a development application and Environmental Impact Assessment for a proposed change of use for Lot 32 DP 1151612.

A desk-top site history assessment of the site and adjacent areas was undertaken. Information to assist in the site history was collected and collated. A site inspection was undertaken to identify potential areas of contamination around the 11ha proposed sand extraction area.

Based on the desk-top site history assessment and the site inspection, it was considered that one AEC required further investigation:

- agricultural use including sugar cane and cattle grazing.

Two potential contaminants of concern were identified for the site:

- organo-chlorine pesticides/herbicides; and,
- metals.

Systematic soil sampling was undertaken on the site, 9 samples were collected and 3 composite samples analysed for the potential contaminants of concern. None of the samples submitted resulted in levels reaching or exceeding the relevant assessment criteria (HIL A and HIL F) and were consistent with natural background levels (NEPM, 1999).

Based on the findings of this assessment, it is submitted that further investigation is **not required** and that the **site is suitable** for the proposed change of use.

1 Introduction

Ardill Payne and Partners (APP) has been engaged by Ballina Sands Pty Ltd to undertake a Preliminary Contaminated Site Investigation to inform and support a development application and statement of environmental effects for a new sand extraction industry on Lot 32 DP 1151612, Newrybar Swamp Road, Lennox Head.

An existing sand extraction quarry has been operating on the adjacent site for the last 10 years. Upon conclusion of extraction of sand at this site, it is proposed to move extraction activities onto the adjacent site which is the subject of this report.

The location of the property is shown in **Figure 1**: - Location of subject land (Google, 2012) below:

Figure 1: - Location of subject land (Google, 2012)

A plan of the subject property is provided in **Attachment 1**.

It is proposed that there will be a change of use for the property from agricultural use (cattle grazing) to extractive industrial industry.

2 Scope of Works

Clause 7(1) of State Environment Planning Policy No 55 – Remediation of Land (SEPP 55) states that:

"(1) A consent authority must not consent to the carrying out of any development on land unless:

(a) it has considered whether the land is contaminated, and

(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

(2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.

(3) The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority…"

This Land Contamination Assessment has been prepared to address these SEPP 55 requirements. The proposed partial change of use is from existing agriculture (cattle grazing), to industrial (extractive industry).

The Land Contamination Assessment takes the form of a Stage 1 – Preliminary Investigation which has been prepared in accordance with the *Managing Land Contamination Planning Guidelines* (Department of Urban

Affairs [DUAP] and Environment Protection Authority [EPA] 1998) and the *Guidelines for Consultants Reporting on Contaminated Sites* (EPA, 2000).

This Stage 1 preliminary investigation has:

- Described the site conditions and surrounding environment;
- Provided a summary of the site history;
- Identified past and present potentially contaminating activities and potential contaminant types;
- Provided a preliminary assessment of the site contamination;
- Assessed the need for further investigations;
- Assessed soil sample analysis results against relevant criteria; and
- Assessed the suitability of the site for the proposed use

Relevant guidelines and references used in the preparation of this investigation are presented in **Section 13** of this report.

3 Methodology

This Stage 1 – Preliminary Investigation has been undertaken to identify the potential for contamination within the site. A desk-top site history assessment and a site inspection have been conducted as part of this investigation.

The desk-top site history assessment encompassed the site and adjacent areas. Information used to assist in the assessment was collected and collated from the following sources:

- Review of available site history details;
- NSW Land and Property Information (LPI) – Historic Title Search;
- Historical aerial photographs;
- NSW Office of Environment and Heritage's (OEH) *Protection of Environment Operations Act 1997* (POEO Act) Public Register; and
- OEH's Contaminated Land – Record of Notices.
- NSW Primary Industries: Cattle dip site locator

The site inspection included:

- Identification of potential sources and areas of contamination; and
- Preliminary soil sampling at areas identified as potentially contaminated during the site inspection.

4 Site Identification

Table 1 below provides details of the subject land which are of relevance to the proposed contamination investigation.

Table 1: Current Site Identification Details

Site Address	Newrybar Swamp Road, Lennox Head
Site Area	Total site – approximately 48.69 ha
Real Property Description	Lot 32 DP 1151612
Local Government Area	Ballina Shire Council
Zoning	1 (a2) Rural (Coastal Lands Agriculture Zone) BLEP RU1 – Primary Production - Ballina DLEP
Site Features	Flat sugar cane land
Elevation	Between 3.00-5.00m AHD.
Existing Land Use	Agricultural
Surrounding Environment	The subject land is situated within a rural/rural residential area. The broader locality is predominated by a mix of agricultural pursuits including cattle grazing and horticulture (predominately macadamias and sugar cane). The locality is also characterised by scattered rural dwellings and associated farm buildings and cleared grazing land and stands of bushland. Directly to the north east an existing sand quarry provides filling sand for developments within the local area.

4.1 Subject Land

A copy of the proposed layout plan is provided in **Attachment 2**,

5 Site Condition and Surrounding Environment

A desk-top study of the site was undertaken to establish the constraints to the project.

5.1 Surrounding Environment

The subject land is situated within a rural/rural residential area. The broader locality is predominated by a mix of agricultural pursuits including cattle grazing and horticulture (predominately macadamia and sugar cane). The locality is also characterised by scattered rural dwellings and associated farm buildings and cleared grazing land and stands of bushland. To the north, the existing sand quarry provides filling sand for developments within the local area. This extractive industry will be completed within the next few years, and hence the requirement for further extractive industries in the area.

5.2 Topography

The subject and adjoining land is situated on the eastern slope of the Knockrow plateau. The property has elevations ranging from 3 - 5 m AHD. To the east the Newrybar Drain flows into the North Creek, which meets the Richmond River at Ballina.

5.3 Soils

Soils maps for the area were obtained from *Soil Landscapes of the Lismore-Ballina* (Morand, 1994) maps the land proposed to be used for the sand extraction quarry is:

The site is mapped as:

"Ty – Tyagrah" landscape

- Landscape – Quaternary estuarine alluvium overlain by and/or mixed with Quaternary (Pleistocene) sands. Sands are generally aeolian, originating from the adjacent beach ridge systems. Slopes 0-1%, watertables within 100-200cm, elevation 2-5m.
- Soils dark course sand. Soil pH 4.5-5.0, occasionally 7.0-7.5.

A small portion of the site is mapped as:

"waa – Wardell" landscape

- Landscape – Quaternary (Pleistocene) sand sheets and barrier dunes consisting of aeolian and marine quartz sands. Slope 1-3%, elevation 5-6m. Areas shown as waa are very low isolated transgressive sand dunes that are now stabilised. These dunes have formed inland of the inner barrier. Historic sandmining has occurred in places and these areas are marked on the below map as Disturbed Terrain **(xx)**.

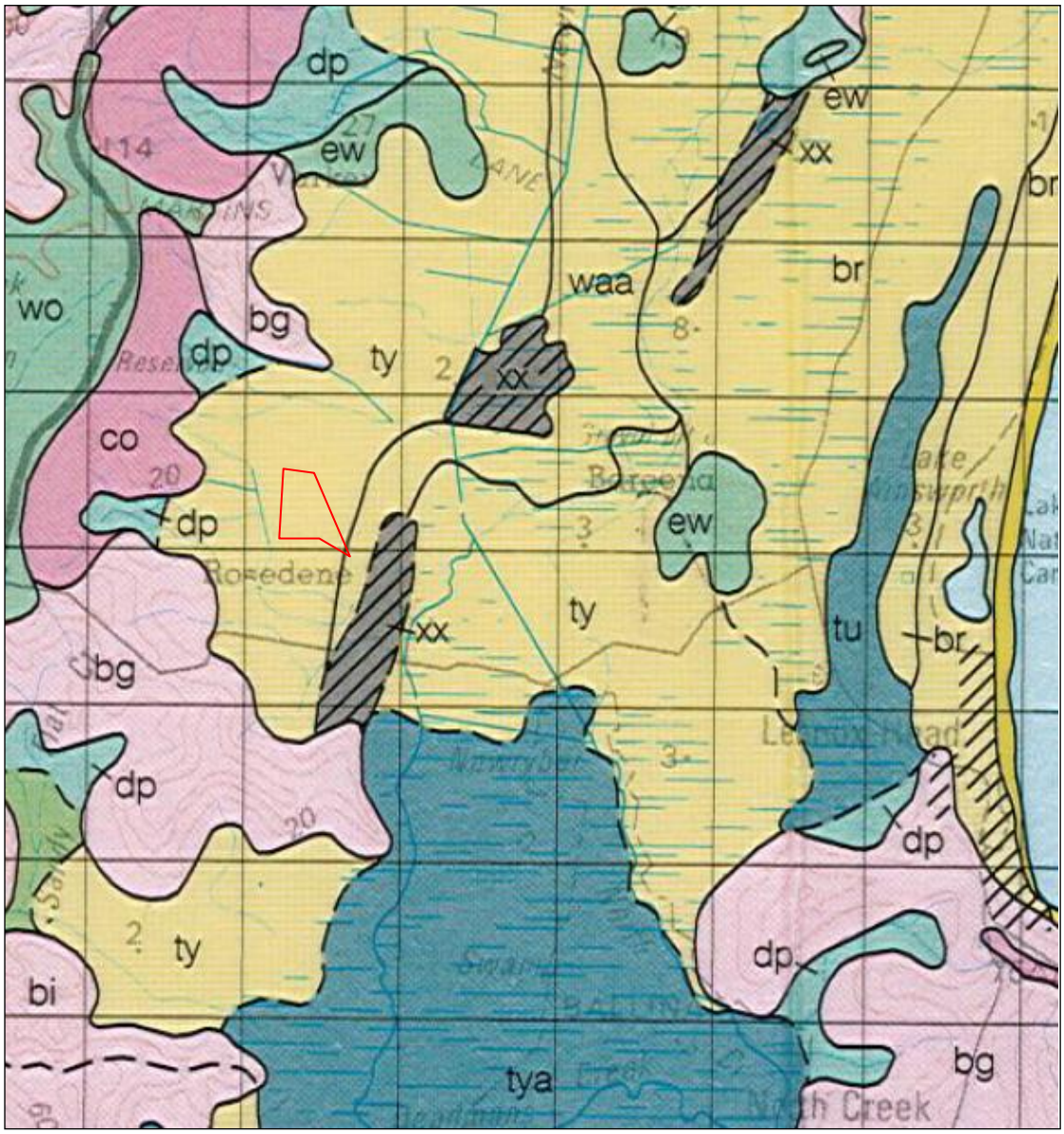


Figure 2 - Soils Map – (Morand, 1994)

5.4 Flooding

Ballina LEP 2011 shows the regional flood level at the site is 2.6m AHD. As the minimum levels on site are 3.0m AHD, the site should not be affected by regional scale flooding.

The site is also surrounded by drains which have been used to reduce groundwater levels to improve agricultural productivity. These drains require routine maintenance to ensure continued conveyance of flash flooding from the catchment to the west. With continued maintenance, localised flooding should not impact the site.

5.5 Acid Sulphate Soils

The elevated areas of the site are mapped as being Class 3 Acid Sulfate Soils (ASS) as indicated in **Figure 3** below. Therefore works more than 1m below the natural ground surface are likely to have an ASS impact. As proposed works will involve excavation to 6m below ground level (mbgl), an Acid Sulfate Soils Management Plan has been prepared as part of this submission (APP, 2012).

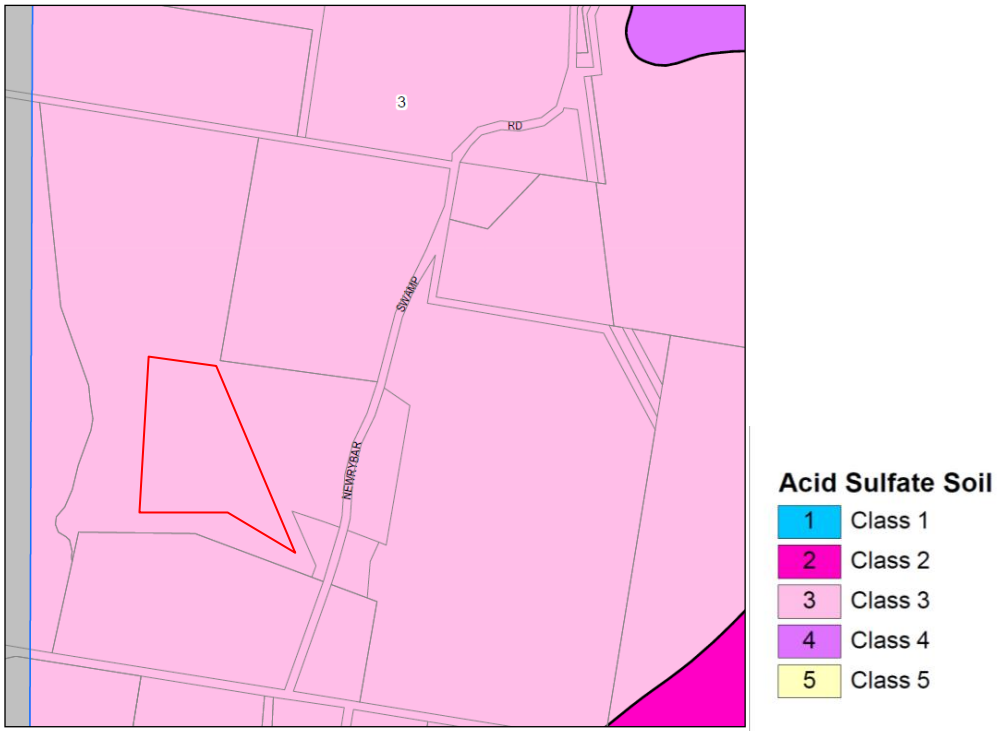


Figure 3: ASS Map (Source BSC LEP 2011)

5.6 Groundwater Resources

A search of existing licensed groundwater bores was undertaken on 16th May 2012 using the NSW Natural Resources Atlas (NRA) website (DNR). The search indicates that no groundwater bores are located within 250m of the proposed building envelopes. The closest bores are located approximately 2000m to the west and south west. A map showing the groundwater resources is presented in **Figure 4.**.

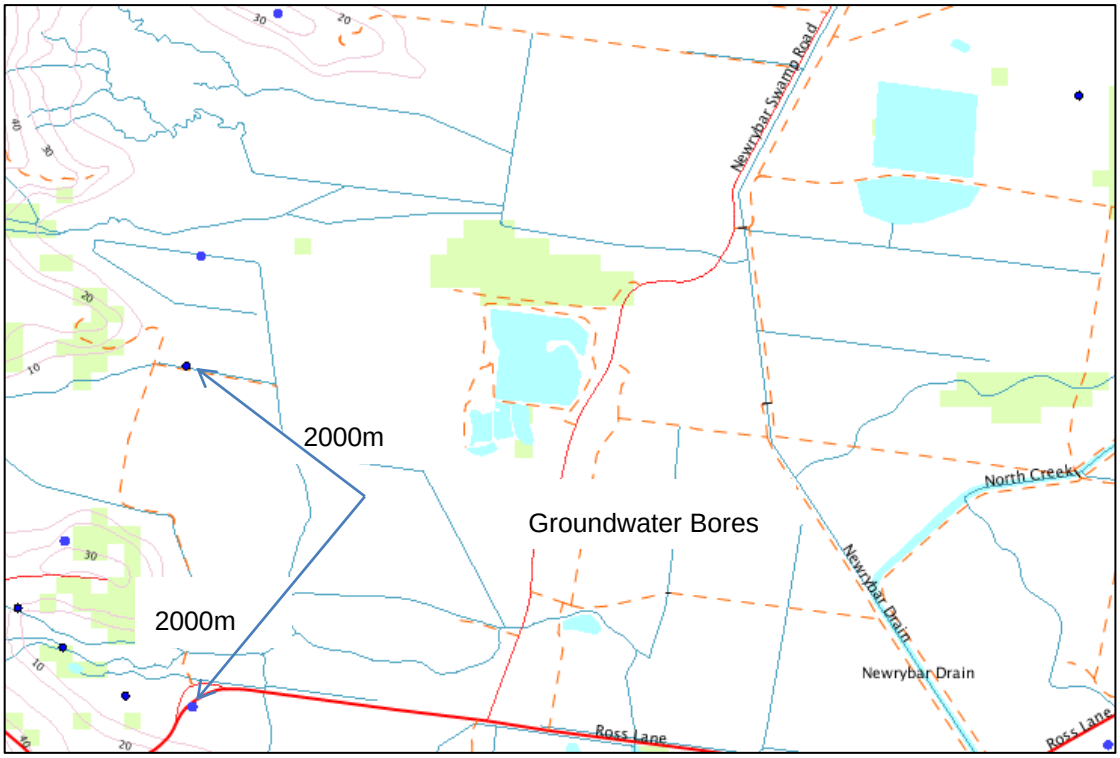


Figure 4: Groundwater resources

(Accessed 16/05/12 www.nratlas.nsw.gov.au © 2012)

6 Site History

A desk-top site history assessment was undertaken to determine the chronological history of the site and possible sources and locations of contamination. Information used to assist in the desk-top site history assessment was collected and collated from the following sources:

- Review of available site history details;
- A Site History Statement from the current owner;
- LPI – Historic Title Search;
- Historical aerial photographs;
- OEH's POEO Act Public Register; and
- OEH's Contaminated Land – Record of Notices.
- NSW Primary Industries: Cattle dip site locator

The findings of the desk-top site history assessment are summarised below.

6.1 Site History Overview

A Site History Assessment Questionnaire was completed by Robert Watson dated 9 May 2012. A copy of the signed site history statement is included in **Attachment 3**.

Length of association of knowledge of the property

- The Watson family has owned the property since January 1989.
- Land had recently been cleared when Watson purchased land.
- Cattle grazed until 1997.
- Sugar cane planted 1997 until 2006
- Returned to pasture 2006.

Historical Use of Adjacent Land

- Fallow, grazing cattle and sugar cane.

Chemicals

General: Weed control –, Roundup, Paraquat, Diuron

No storage on site. Used according to recommendations.

Tanks

- ***Provide details, uses and locations of any current and former tanks – underground/above ground.***

  Nil

Manufacturing/Industry

- ***Description of any manufacturing/industry processes on the site including locations and dates.***

  Nil

Asbestos

- ***Provide details of any asbestos used in past or present buildings.***

  Nil

Water Use

- ***Describe any usage of ground/surface water and bore/pump locations.***

  Nil.

Sewage Disposal

- ***Describe any sewage disposal areas.***

  Nil.

Indicators of Contamination

- ***Describe any areas of soil discolouration, bare soil patches, poor plant growth or stress, odours, complaints from neighbours etc.***

  Nil

6.2 Historical Aerial Photographs

Copies of the historical aerial photographs are provided in Error! Reference source not found.. A summary of the aerial photography is presented in Error! Reference source not found. below:

Table 2: Aerial Photo Chronology

Historical Aerial Photographs Observations	
1947	Vegetation visible on approximately one third of property in south eastern corner Less vegetation to the west Ross Lane visable to the south Drainage has not be formalised over the site Cleared area to the east of the site – possible sand mining
1967	Vegetation visible on majority of site Scrubby regrowth over the western side of the property Some improvements to drainage to the north of the subject area.
1979	Sugar cane / crop on western portion of property, drainage line visible/ thickly vegetated on eastern half of property formalised drainage over site as part of sugar cane use pond has appeared to the east – probable sand mining activity
1987	Property totally cleared of vegetation planted with sugar cane all drainage lines have been improved and straightened paddocks have been contoured to facilitated drainage
1997	Sugar cane visible on whole property except small portion in south eastern corner of property 'pond' area visible on lot 33. No mining activity seen House has been built between the site and Newrybar swamp road Scattered vegetation regrowth visible
2012	Sugar cane visible on whole property with possible grazing areas Electrical substation has been built to the east of Newrybar swamp road Sand extraction from Lot 33 well underway House / shed built to the south Drainage lines maintained, contour drains on paddocks evident Vegetation regrowth evident to east of proposed extraction area

Figure 5: Aerial photo subject land 1947

Figure 6: Aerial photo subject land 1967

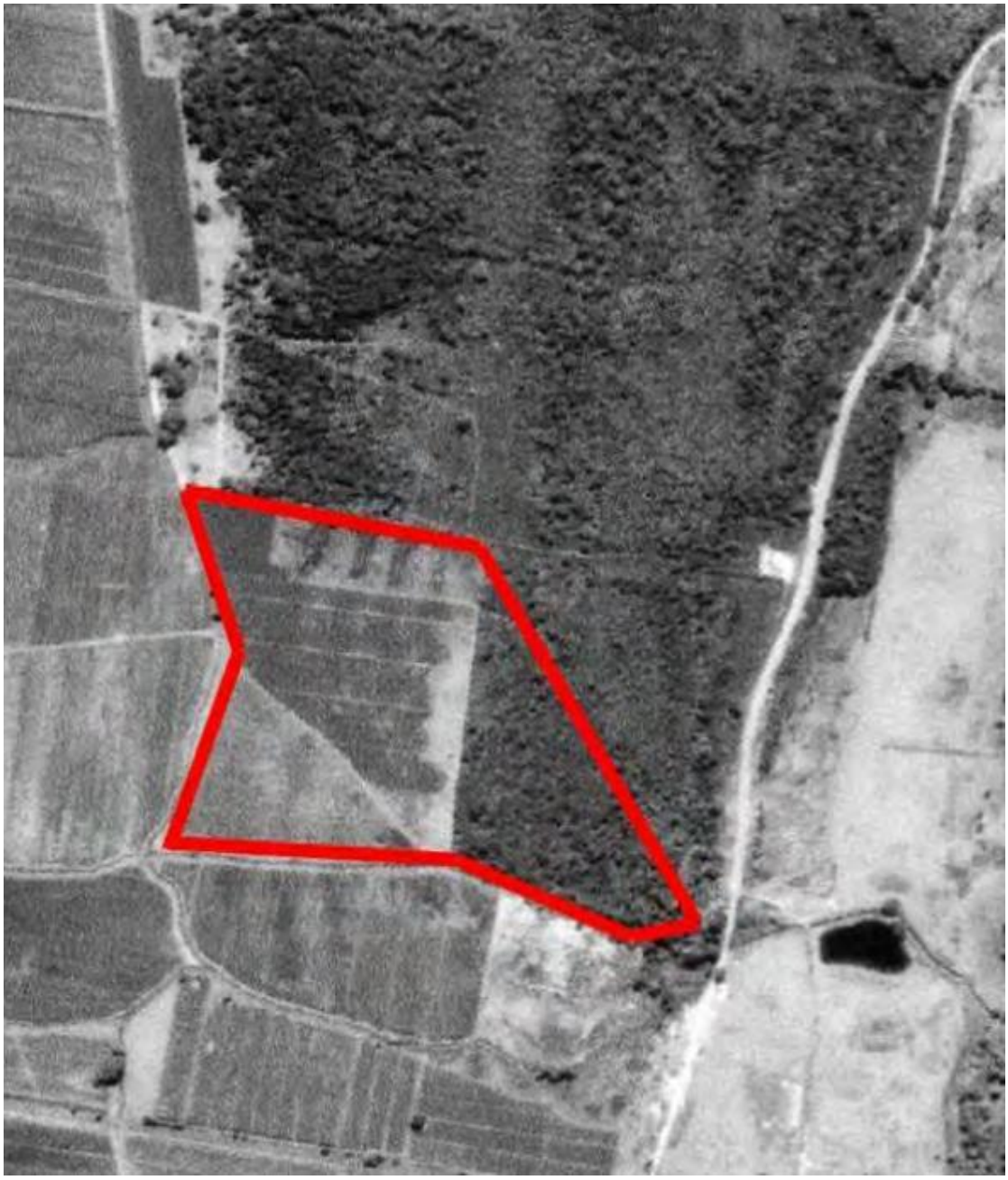


Figure 7: Aerial photo subject land 1979

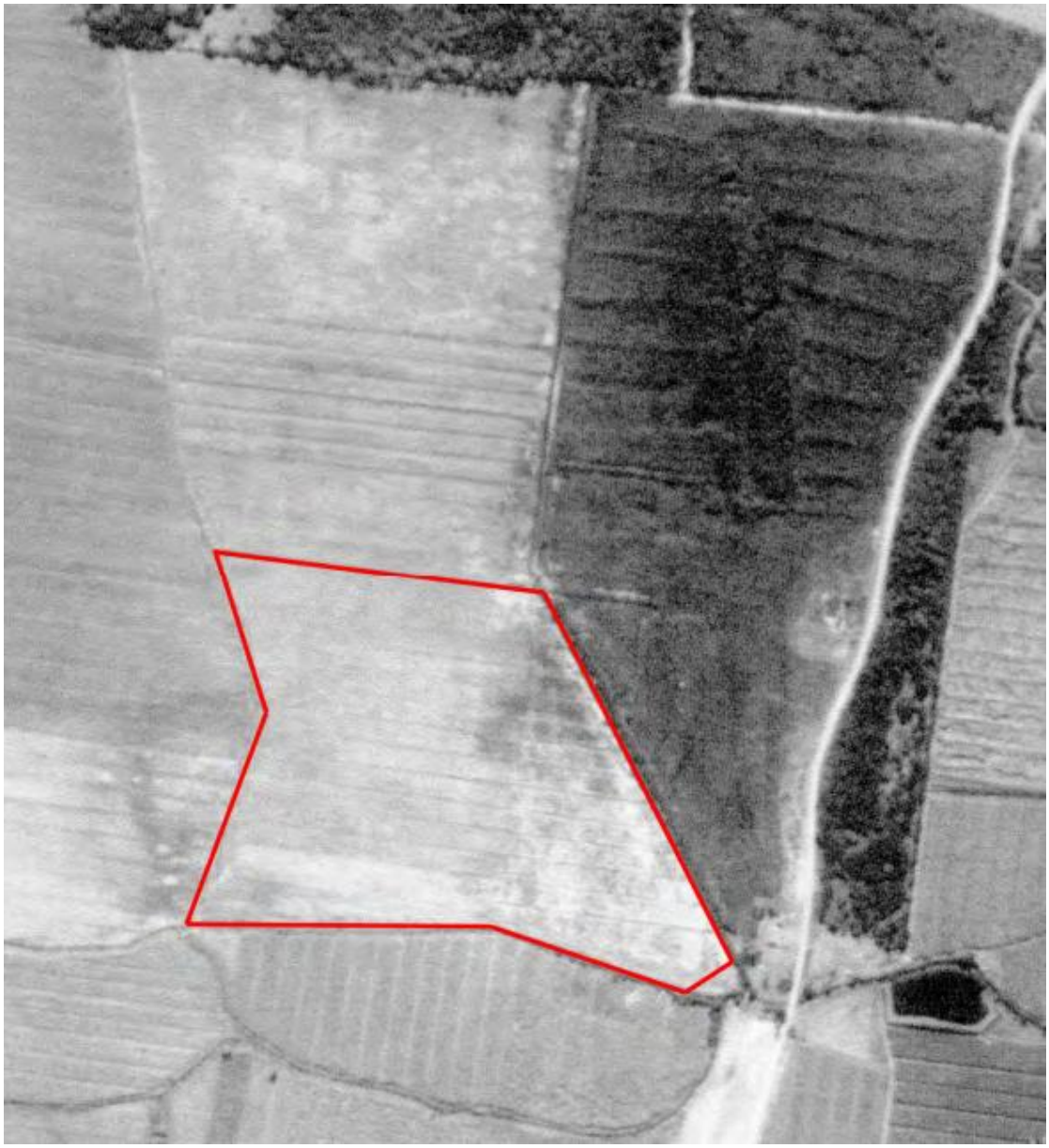


Figure 8: Aerial photo subject land 1987

Figure 9: Aerial photo subject land 1997

Figure 10: Aerial photo subject land 2012

6.3 Historical Title Search

The Parish Map for Newrybar was obtained from the LPI. This map is presented in **Figure 11**. This map shows the location of the Newrybar Drain. The original owners of the property were TG Jackson & WH Shepherd.

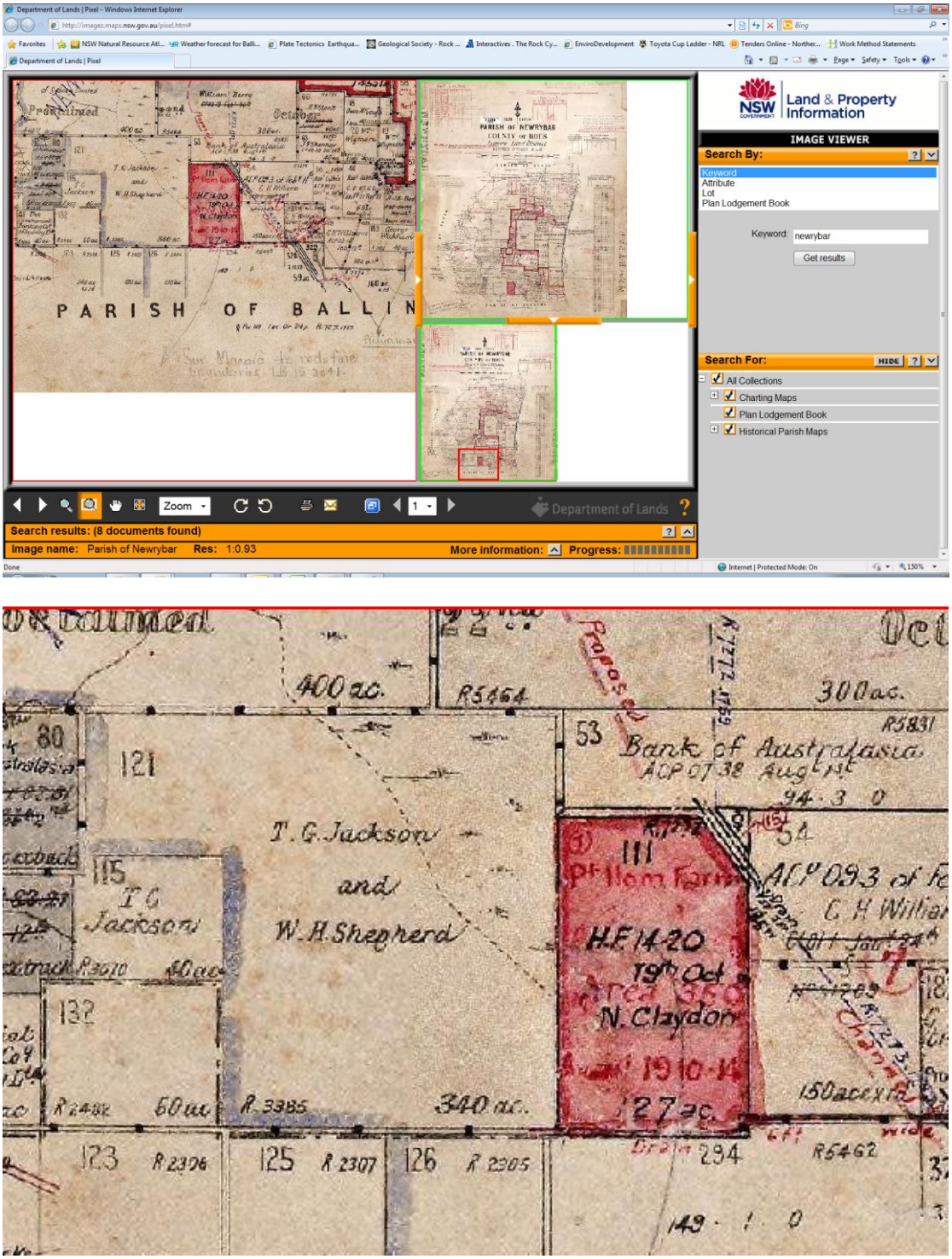


Figure 11: Historic Parish Map Newrybar 1908

(LPI, accessed 16th May 2012)

Newrybar Parish map from 1937 shows a gazettal of a Public Road on the subject land **(Figure 12).** The dotted line through the property is the drainage line which still exists today.

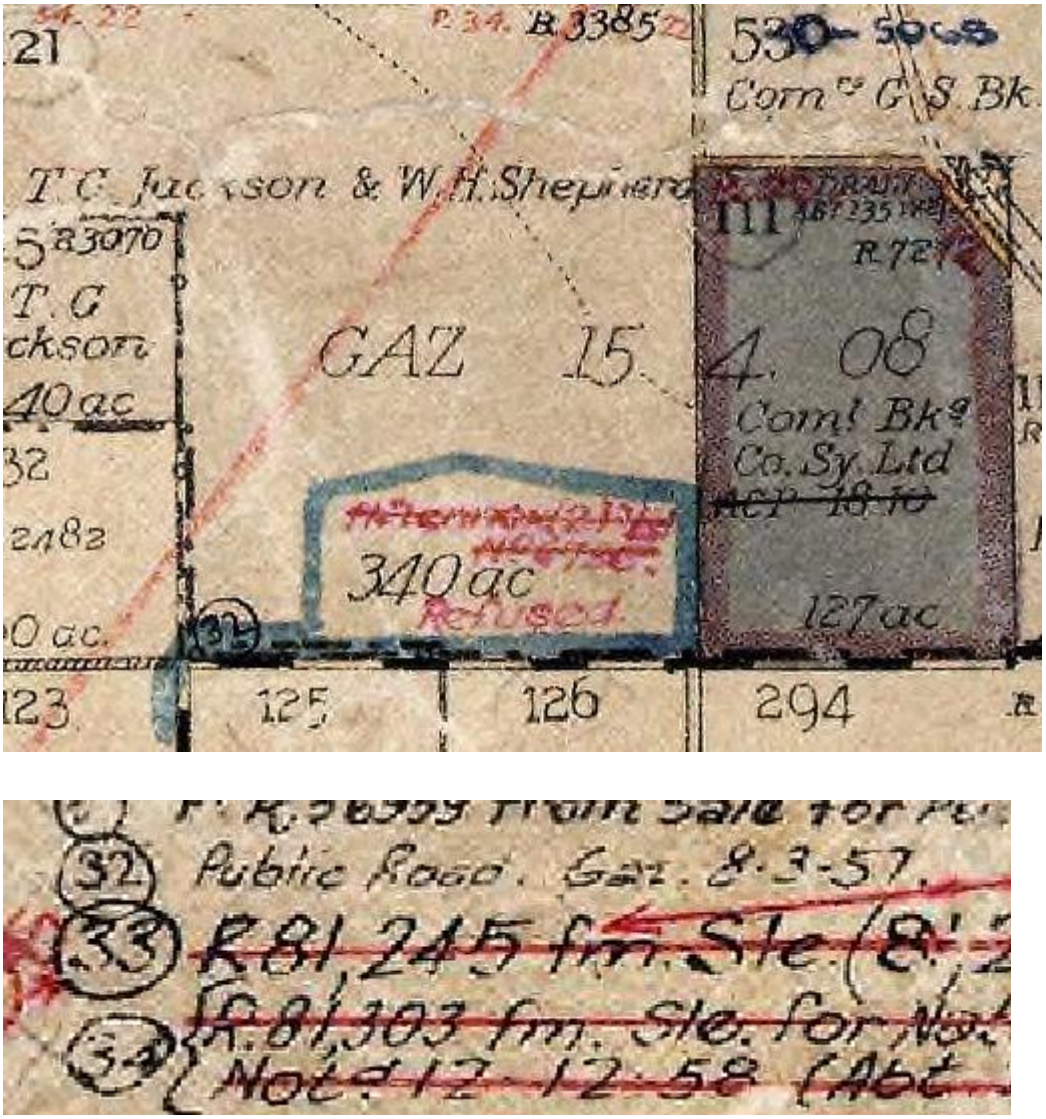
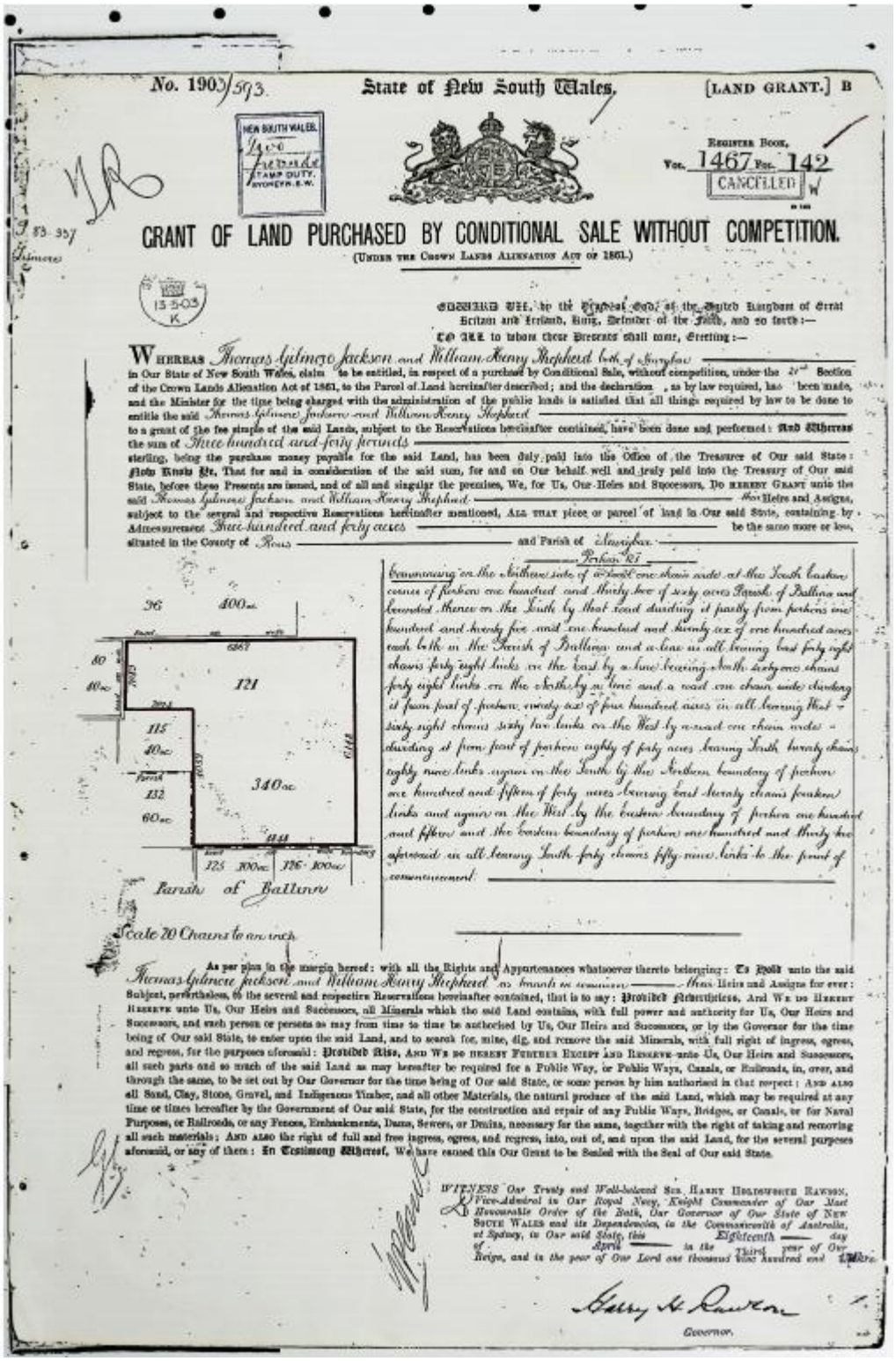


Figure 12: Newrybar Parish Map 1937

The historic Torrens Title search reveals the history since 1903, a copy of which is provided at **Figure 13,** reveals a part residue of the land was transferred from Thomas Gilmore Jackson & William Henry Shepherd to Samuel Gibson in 1903.



No. 1903/593. State of New South Wales. [LAND GRANT.] B

NEW SOUTH WALES. 1d. STAMP DUTY. SYDNEY, N.W.

REGISTER BOOK, VOL. 1467 FOL. 142 CANCELLED

GRANT OF LAND PURCHASED BY CONDITIONAL SALE WITHOUT COMPETITION.

(UNDER THE CROWN LANDS ALIENATION ACT OF 1861.)

GEORGIUS REX, by the Grace of God, of the United Kingdom of Great Britain and Ireland, King, Defender of the Faith, and so forth:—

TO ALL to whom these Presents shall come, Greeting:—

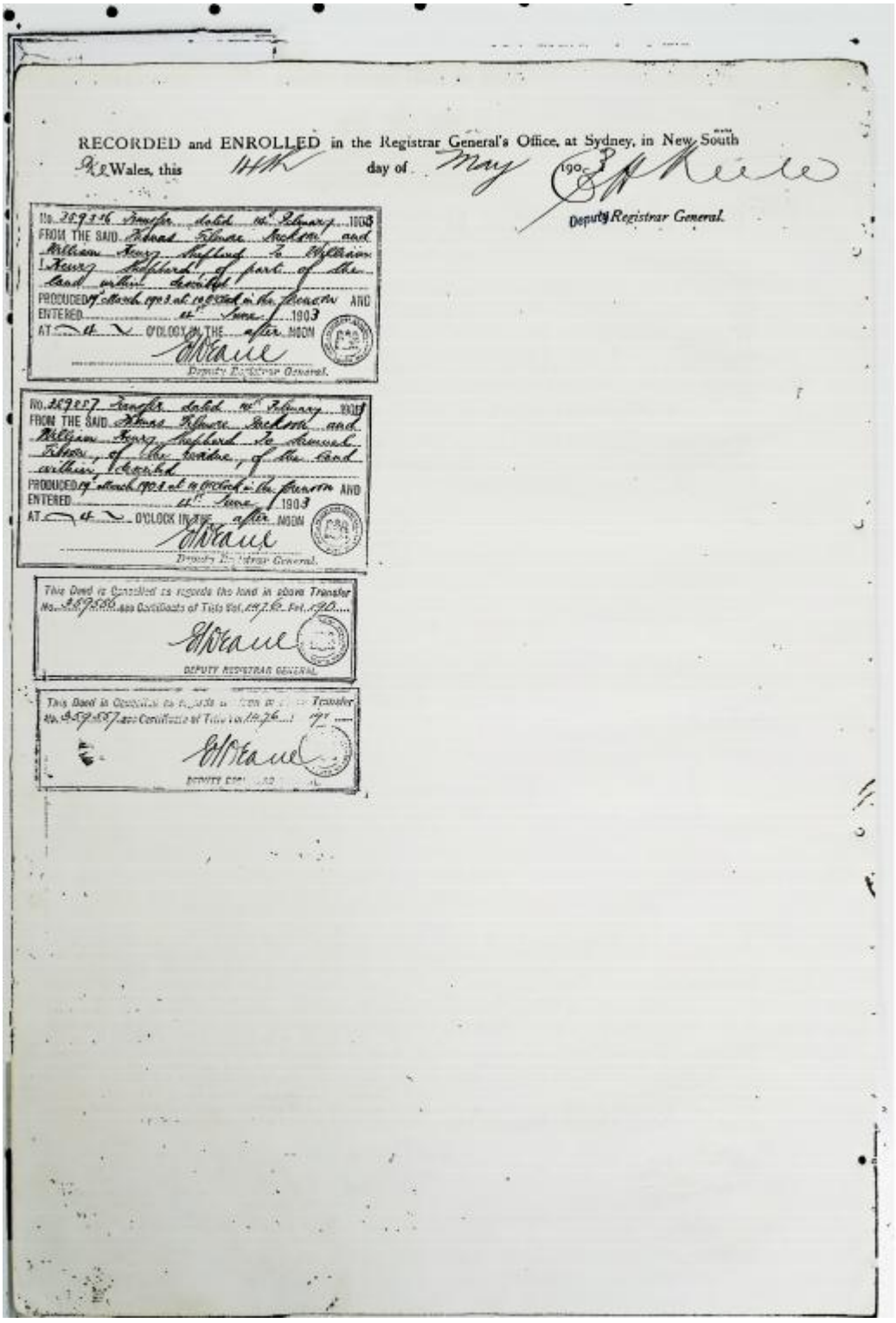
WHEREAS Thomas Gilmore Jackson and William Henry Shepherd both of Sunday in Our State of New South Wales, claim to be entitled, in respect of a purchase by Conditional Sale, without competition, under the 21st Section of the Crown Lands Alienation Act of 1861, to the Parcel of Land hereinafter described; and the declaration as by law required, has been made, and the Minister for the time being charged with the administration of the public lands is satisfied that all things required by law to be done to entitle the said Thomas Gilmore Jackson and William Henry Shepherd to a grant of the fee simple of the said Lands, subject to the Reservations hereinafter contained, have been done and performed: AND WHEREAS the sum of Three hundred and forty pounds sterling, being the purchase money payable for the said Land, has been duly paid into the Office of the Treasurer of Our said State: NOW KNOW YE, That for and in consideration of the said sum, for and on Our behalf well and truly paid into the Treasury of Our said State, before these Presents are issued, and of all and singular the premises, We, for Us, Our Heirs and Successors, DO HEREBY GRANT unto the said Thomas Gilmore Jackson and William Henry Shepherd their Heirs and Assigns, subject to the several and respective Reservations hereinafter mentioned, ALL THAT piece or parcel of land in Our said State, containing by Admeasurement Three hundred and forty acres be the same more or less, situated in the County of Rous and Parish of Newrybar Portion 81

Commencing on the Northern side of a road one chain wide at the South Eastern corner of Portion one hundred and thirty two of sixty acres Parish of Ballina and bounded thence on the South by that road dividing it partly from Portions one hundred and twenty five and one hundred and twenty six of one hundred acres each both in the Parish of Ballina and a line in all bearing East forty eight chains forty eight links on the East by a line bearing South sixty one chains forty eight links on the North by a line and a road one chain wide dividing it from part of Portion ninety six of four hundred acres in all bearing West sixty eight chains sixty two links on the West by a road one chain wide dividing it from part of Portion eighty of forty acres bearing South twenty chains eighty nine links again on the South by the Northern boundary of Portion one hundred and fifteen of forty acres bearing East twenty chains Portion links and again on the West by the Eastern boundary of Portion one hundred and fifteen and the Eastern boundary of Portion one hundred and thirty two aforesaid in all bearing South forty chains fifty nine links to the point of commencement

As per plan in the margin hereof: with all the Rights and Appurtenances whatsoever thereto belonging: TO HOLD unto the said Thomas Gilmore Jackson and William Henry Shepherd as tenants in common their Heirs and Assigns for ever: Subject, nevertheless, to the several and respective Reservations hereinafter contained, that is to say: PROVIDED NEVERTHELESS, And WE DO HEREBY RESERVE unto Us, Our Heirs and Successors, all Minerals which the said Land contains, with full power and authority for Us, Our Heirs and Successors, and such person or persons as may from time to time be authorised by Us, Our Heirs and Successors, or by the Governor for the time being of Our said State, to enter upon the said Land, and to search for, mine, dig, and remove the said Minerals, with full right of ingress, egress, and regress, for the purposes aforesaid: PROVIDED ALSO, AND WE DO HEREBY FURTHER EXCEPT AND RESERVE unto Us, Our Heirs and Successors, all such parts and so much of the said Land as may hereafter be required for a Public Way, or Public Ways, Canals, or Railroads, in, over, and through the same, to be set out by Our Governor for the time being of Our said State, or some person by him authorised in that respect: AND ALSO all Sand, Clay, Stone, Gravel, and Indigenous Timber, and all other Materials, the natural produce of the said Land, which may be required at any time or times hereafter by the Government of Our said State, for the construction and repair of any Public Ways, Bridges, or Canals, or for Naval Purposes, or Railroads, or any Fences, Embankments, Dams, Sewers, or Drains, necessary for the same, together with the right of taking and removing all such materials: AND ALSO the right of full and free ingress, egress, and regress, into, out of, and upon the said Land, for the several purposes aforesaid, or any of them: IN TESTIMONY WHEREOF, We have caused this Our Grant to be Sealed with the Seal of Our said State.

WITNESS Our Trusty and Well-beloved SIR HARRY HOLDSWORTH RAWSON, Vice-Admiral in Our Royal Navy, Knight Commander of Our Most Honourable Order of the Bath, Our Governor of Our State of NEW SOUTH WALES and its Dependencies, in the Commonwealth of Australia, at Sydney, in Our said State, this Eighteenth day of April in the Third year of Our Reign, and in the year of Our Lord one thousand nine hundred and three.

Harry A Rawson
Governor.



RECORDED and ENROLLED in the Registrar General's Office, at Sydney, in New South Wales, this 11th day of May 1903

Deputy Registrar General.

No. 289216 Transfer dated 4th February 1903
FROM THE SAID Edward Thomas Jackson and William Henry Hufford TO William Henry Hufford of part of the land within described
PRODUCED 4th March 1903 at 10 O'Clock in the forenoon AND ENTERED 11th June 1903
AT 4 O'CLOCK IN THE after NOON

Deputy Registrar General.

No. 289217 Transfer dated 4th February 1903
FROM THE SAID Edward Thomas Jackson and William Henry Hufford TO Ernest Edwin of Clerk Grafton, of the land within described
PRODUCED 4th March 1903 at 10 O'Clock in the forenoon AND ENTERED 11th June 1903
AT 4 O'CLOCK IN THE after NOON

Deputy Registrar General.

This Deed is Cancelled as regards the land in above Transfer No. 289216 see Certificate of Title Vol. 1247 Fol. 190

DEPUTY REGISTRAR GENERAL

This Deed is Cancelled as to ... in above Transfer No. 289217 see Certificate of Title Vol. 1247 Fol. 191

DEPUTY REGISTRAR GENERAL

Figure 13: Historic Title Deed

6.4 POEO Act Public Register Search

The OEH's POEO Act Public Register was searched for the area surrounding the site and only one licence was identified which relates to the subject site. Three surrendered licences were identified in the near vicinity.

Table 3: POEO Act Public Register Search

Number	Name	Location	Type	Issued Date
12710	Ballina Sands Pty Ltd	Newrybar Swamp Road, Lennox Head	POEO Licence	S56 Licence Variation 11 April 2012
13332	McGeary Brothers (AMA Quarry)	Newrybar Swamp Road, Newrybar	POEO licence	S80 Surrender Licence 14 Feb 2012
13331	McGeary Brothers (Pick's Quarry)	Newrybar Swamp Road, Newrybar	POEO Licence	S80 Surrender Licence 14 Feb 2012
11897	Gradex Civil Contractors Pty Ltd	Newrybar Swamp Road, Lennox Head	POEO Licence	S80 Surrender Licence 11 May 2005

Source: POEO Act Public Register (Date Accessed: 18/05/2012)

6.5 Contaminated Land – Record of Notices Search

The OEH's Contaminated Land – Record of Notices was searched (accessed on the 22nd May 2012) for the area surrounding the site and the only record identified for the site or surrounding area is a dip site in Figtree Hill Drive Lennox Head as per **Figure 14.** It is believed that this dip has subsequently been remediated.

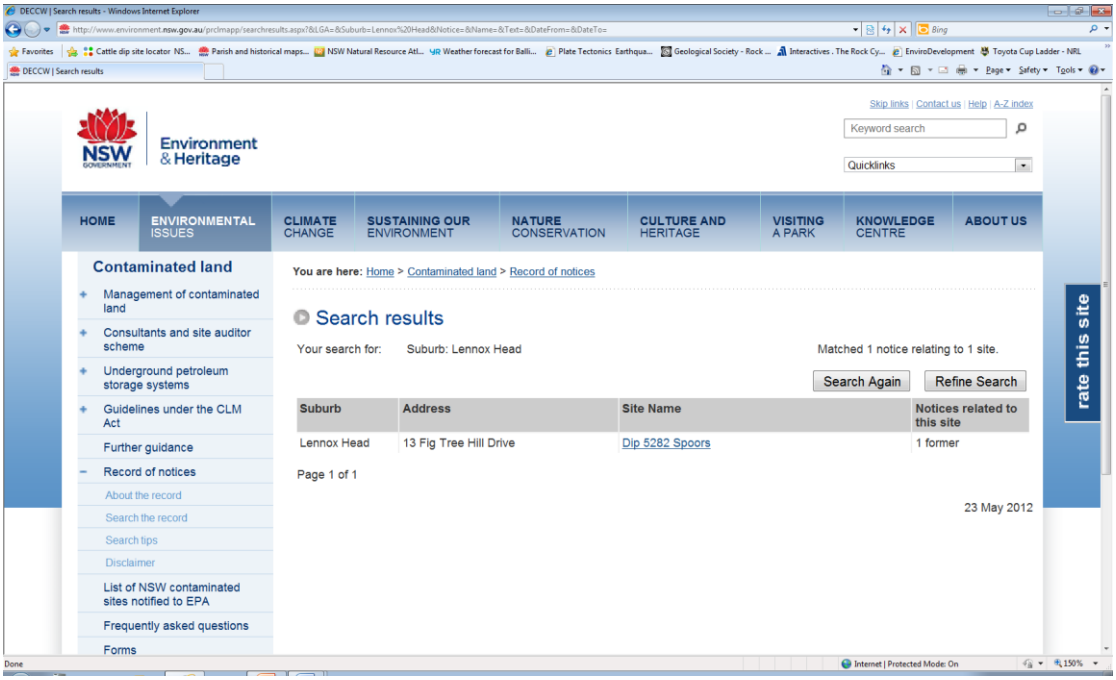


Figure 14: OEH Contaminated Land Register

6.6 NSW Primary Industries: Cattle dip site locator

The NSW Primary Industries Science and Research: Cattle Tick Dip Site locator indicates that two cattle dips are located in the vicinity, one of which is adjacent to the site. The location of the dip sites is shown in **Figure 15**.

Dip site location

Dipname	NEWRYBAR	*Note: Map references are for 25,000 series topographic and co-ordinates are in AGD66 AMG zone 56.*	
Road	PACIFIC HIGHWAY	**Mapsheet**	9640-III-N
Town/Locality	NEWRYBAR	**Easting**	55192
Shire Council	BALLINA	**Northing**	82110
Parish	NEWRYBAR	**County**	ROUS

Chemical Details

IMPORTANT NOTE: *Chemical history has been retrieved from a copied laboratory log. In some cases it may be confirmed by entries in the hard copy lease folder but generally the chemical record is based on this single lab document. It is possible that there are inaccuracies as well as errors made.*

Chemicals used in dip bath	Date first used
ARSENIC	3/51
DDT	11/60
COUMAPHOS	10/62

Current Details

Current Chemical	NONE
Dip bath status/contents	COVER

Dip site location

Dipname	SPOORS	*Note: Map references are for 25,000 series topographic and co-ordinates are in AGD66 AMG zone 56.*	
Road	FIG TREE HILL DRIVE	**Mapsheet**	9640-III-N
Town/Locality	NEWRYBAR	**Easting**	55604
Shire Council	BALLINA	**Northing**	81577
Parish	NEWRYBAR	**County**	ROUS

Dip site status

IMPORTANT NOTE: *Cattle dip site information provided by NSW DPI is based on our own hard copy files representing currently known data. NSW DPI is not a public consent authority for the development of land containing cattle dip sites. It is possible that the physical conditions of a cattle dip site - including soil, structures, access and usage - may have been changed due to extreme natural events or landowner and developer actions that NSW DPI cannot be aware of. For more specific and accurate status information a physical inspection should be made and enquiries should always be directed to the appropriate Shire Council.*

Dip Status	DECOMMISSION	**Licence/Lease Status**	LAPSED
Land type	LEASE	**Licence/Lease Expiry Date**	07/11/1988

Explanation of status terms

Chemical Details

IMPORTANT NOTE: *Chemical history has been retrieved from a copied laboratory log. In some cases it may be confirmed by entries in the hard copy lease folder but generally the chemical record is based on this single lab document. It is possible that there are inaccuracies as well as errors made.*

Chemicals used in dip bath	Date first used
ARSENIC	3/52
DDT	1/61
DIOXATHION	10/62
ETHION	11/65
ETHION CHLORDIMEFORM	10/73
AMITRAZ	1/85

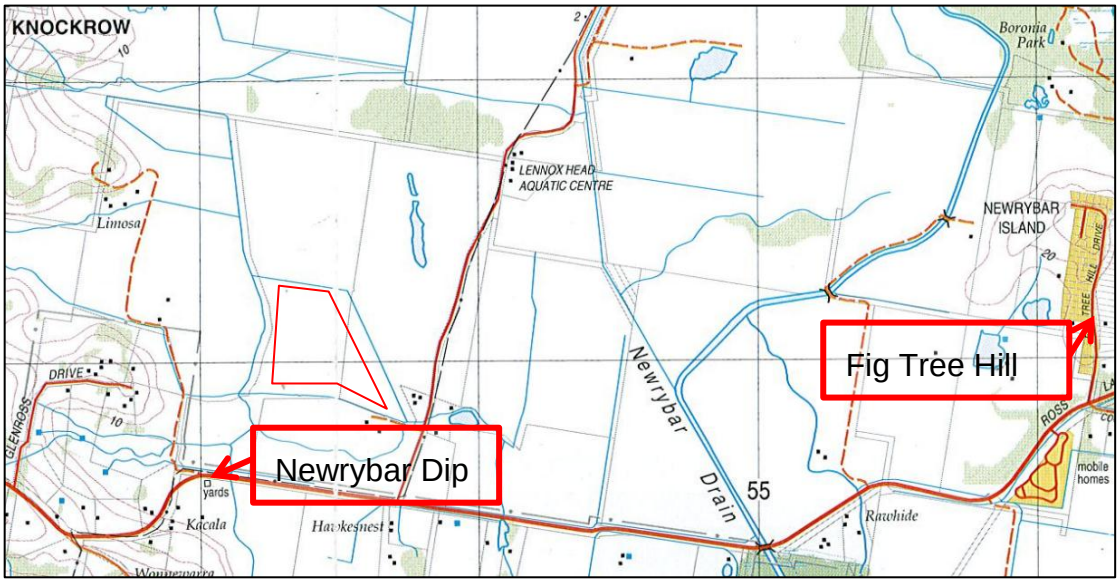


Figure 15: Location of Dip Sites

A 200m radius investigation zone is recommended around cattle tick dip sites (DIPMAC 1995). As the property is approximately 350m from the Newrybar dip site no further investigation is warranted.

6.7 Areas of Environmental Concern

Based on the desk-top site history assessment, one Area of Environmental Concern (AEC), considered to be a source of potential contaminants of concern may have occurred in or within the vicinity of the site, being:

- agricultural use including sugar cane farming and cattle;

Section 3.3.2 of the *Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land* (DUAP & EPA, 1998) states that *"further information is required when a subject site is in the vicinity of or associated with an activity listed in Table 1 but it is unknown whether contamination exists"*. The following activities (or related activities) from Table 1 were conducted on the site or in the vicinity of the site:

- Agricultural/horticultural activities;

Given the above, an inspection of the site was conducted to obtain further information about the AECs.

7 Site Inspection

7.1 Site Inspection Overview

James Foster (Environmental Engineer) undertook a site inspection on the 16th May 2012. The purpose of the site inspection was to obtain further information about the AECs identified during the desk-top site history assessment and to identify any additional AECs on the site. A summary of the site inspection is provided below.

7.2 Agricultural/Horticultural Activities

Based on the site history and the aerial imagery, the site has been primarily used for producing sugar cane. Cattle and horses have also been grazed.

Figure 16 – Photo showing site area being slashed with hills behind.

7.2.1 NSW Department of Primary Industries (DPI)

Kevin Quinlan of the DPI Wollongbar Institute was contacted regarding historical sugar cane cultivation. He advised the following with respect to sugar cane:

- Prior to the 1960's each State maintained a register of chemicals used as pesticides on agricultural crops;
- The Australian Pesticides and Veterinary Medicine Authority (APVMA) keep a record of currently approved (not historically used) pesticides;
- Typically four persistent organochlorine pesticides (OCPs) were applied to cane crops since the 1960's, which the laboratory regularly detected in samples. Those pesticides include dieldrin, heptachlor, chlordane and aldrin was used to a lesser extent. Dieldrin was preferred over aldrin as it was considered more effective.

7.2.2 NSW Sugar Milling Co-operative (SMC)

Peter McGuire, the Sugar Industry Officer for the Ballina branch of the SMC, was contacted regarding historical pesticide application to sugar cane crops from the 1970's onwards. Mr McGuire advised that sugar cane growers did not use much organchlorine pesticides (OCPs), but those that were used were aldrin, dieldrin, Lindane (BHC) and hexochlorobenzene (HCB).

Cane cuttings were often dipped in small quantities of Shirtan (methoxy ethyl mercuric chloride – a mercurial fungicide) before replanting, once every 6 years. Established cane crops were sprayed or dosed with diluted pesticide mixtures or powders and wire worm infested crops were treated with fertilisers mixed with aldrin.

7.2.3 Site History Since 1989

Based on the site history given by Mr Robert Watson, since 1989 the following herbicides have been used on the property:

Table 4: Herbicide Data

Herbicide	Active Ingredient	½ Life
Round-up	Glyphosphate	2-174 Days
Paraquat	1,1' dimethyl – 4,4' bipyridinium dichloride (Quaternary)	~1000 Days
Diuron	DCMU (3-(3,4-dichlorophenyl)-1,1-dimethylurea) (Anilides/Anilines)	~90 Days

Given the reasonably short half-life of glyphosphate pesticides, and the fact the site has not been used for growing cane since 2006, it is highly unlikely that they will be found in any ground contamination. Therefore, the more persistent organo-chlorines were targeted in our investigation.

The use of Diruon was suspended from use in Australia from November 2011.

7.3 Summary of Site Inspection

Based on the site inspection, it is considered that one AEC requires further investigation:

- Agricultural use including sugar cane and grazing (horses and cattle).

Agricultural activities have been conducted in the majority of the site.

From the information provided, the persistent Potential Contaminants of Concern (PCOC's) from sugar cane production and grazing are a range of organochlorine pesticides and heavy metals.

The proposed change of use will affect an area of less than 11 ha within the lot. The balance of the site will remain in its current land use.

8 Sampling and Analysis Plan

Section 2.1 of the *Sampling Design Guidelines* (EPA, 1995) states that a preliminary sampling and analysis program may be required where investigations indicate possible sources of contamination. Given the above, sampling and analysis have been undertaken at the site.

8.1 Sampling Objective

In accordance with *Sampling Design Guidelines* (EPA, 1995), the rationale behind sampling is to gather information concerning the location, nature, level and extent of contamination found within the proposed extraction area. As the type of contamination sought is not circular (hot-spot) but widespread (equal distribution over a paddock), 9 samples were collected from within the development. The laboratory composited these samples into 3 samples to reduce the analysis cost.

8.2 Field Investigations

The field sampling investigation was conducted on the 11th May 2012. This involved the collection of 9 samples. The location of the sampling is shown in Error! Reference source not found.. The samples were collected from below the root zone to 150mm below ground level in accordance with the *Sampling Design Guidelines* (EPA, 1995). Soil borehole logs are provided in **Figure 18** below. Compositing details are shown in Error! Reference source not found..

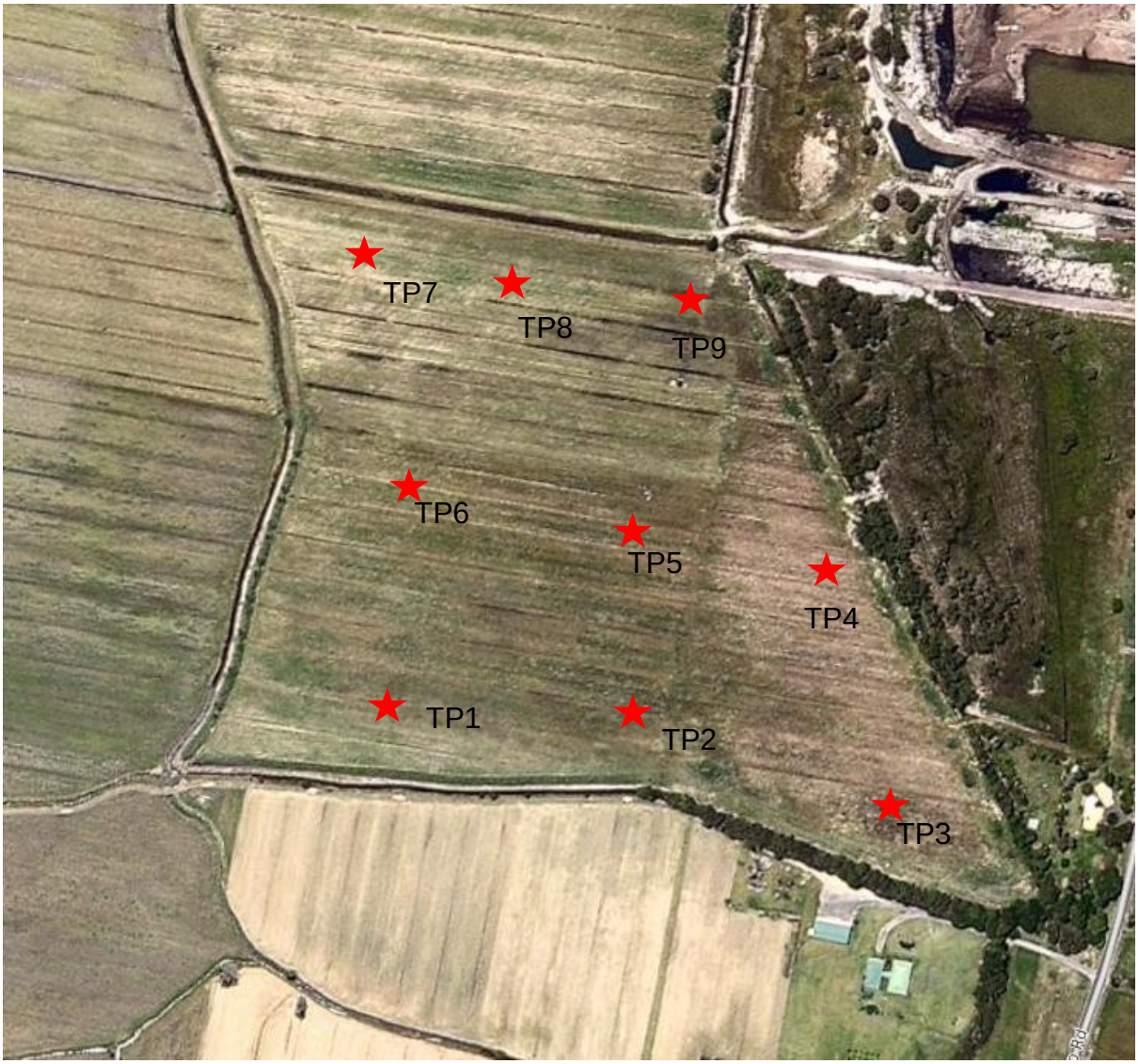


Figure 17: Soil Sample Locations

Table 5: Sampling Details

Sample No.	Depth (mm)	Composite
TP1	0-150	CS1
TP2	0-150	
TP3	0-150	
TP4	0-150	CS2
TP5	0-150	
TP6	0-150	
TP7	0-150	CS3
TP8	0-150	
TP9	0-150	

8.3 Sampling Methodology

Soil samples were collected in the field by suitably qualified and experienced staff members from APP. Soil samples were collected using a fresh glove hand from the shovel as soon as they were removed from the ground. Samples were sealed in plastic bags and chilled prior to dispatch to the Lab.

8.4 Field Quality Assurance/Quality Control (QA/QC)

Sampling equipment was cleaned thoroughly between each sample location by washing in a mixture of water and phosphate-free detergent prior to a thorough rinsing in freshwater and drying with a paper towel.

All samples were placed into their relevant containers and stored in an iced esky and transported to the SCU Environmental Analysis Laboratory for testing.

Chain of Custody (COC) documents and Lab Results were recorded for each sample and are provided at **Attachment 4**. The COC indicates the sample number, time sampled, sampler and analytical requirements.

8.5 Potential Contaminants of Concern

Based on the outcomes of the desk-top site history assessment and the site

inspection, two potential contaminants of concern have been identified for the site, being:

- Pesticides/herbicides; and
- Metals.

Pesticides/Herbicides

Herbicides and pesticides are used during agricultural and horticultural activities to kill organisms that are deemed to be harmful.

Some pesticides contain heavy metals and organocholorines. Pesticides may cause acute and delayed health effects in those who are exposed to such. Pesticide exposure can cause a variety of adverse health effects. These effects can range from simple irritation of the skin and eyes to more severe effects such as affecting the nervous system, mimicking hormones causing reproductive problems, or causing cancer.

Metals

Metals occur naturally in the ecosystem with large variations in concentration. Anthropogenic sources of metals, from pollution, fertilisers, pesticides/herbicides and combustion products of fossil fuels can be introduced to an ecosystem.

Table 6: Analytes Requested for Laboratory Analysis

Analytes Tested	Potential Contamination Source
Metals	Agricultural chemicals, pesticides, herbicides and fertilisers.
Organo-chlorine Pesticides	Agricultural pesticide/herbicides.

9 Assessment Criteria

The *Contaminated Land Management Act 1997* (CLM Act) allows the OEH to approve guidelines for purposes associated with the CLM Act, such as contaminated land assessments.

For the purpose of assessing site contamination of soil at the site, investigation levels from OEH's approved guidelines have been selected for the protection of human health and ecological impacts via exposure to contaminants.

9.1 Soils Assessment Criteria

OEH recommends using the National Environment Protection Measure (NEPM) for assessing soil contamination, which includes a range of investigation levels for various land uses that are designed to be used for guidance purposes to determine if further investigation is needed (NEPM, 1999). For the purpose of this investigation the following soil assessment criteria from *Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater* (NEPM, 1999) has been adopted:

- NEPM Health Investigation Levels exposure setting A (HIL F) for Commercial/Industrial land use. And;
- NEPM Health Investigation Levels exposure setting A (HIL A) for Residential land use.

The function of the NEPM HILs is to be an indicator for contamination, and they are not to be used as maximum permissible levels that would preclude the intended land use. The NEPM guidelines recommend further investigation and health risk assessments are undertaken where soil exceeds the HILs.

9.2 Assumptions and Limitations of Criteria

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

The NEPM HILs have been derived considering all exposure routes including ingestion, dermal exposure and inhalation, however most HILs have been derived and are based on oral ingestion exposure pathways. These investigation levels are used as a guide for further investigation if investigation levels are exceeded.

Table 7: Health Investigation Levels for Metals and Organochlorine Pesticides

Analyte	Health Investigation Level (HIL) - A (Residential)	Health Investigation Level (HIL) - F (Industrial)
Silver (mg/kg DW)	*Na*	*Na*
Arsenic (mg/kg DW)	*<100*[1]	*<500*[1]
Lead (mg/kg DW)	*<300*[1]	*<1500*[1]
Cadmium (mg/kg DW)	*<20*[1]	*<100*[1]
Chromium (mg/kg DW)	*<100*[1]	*<500*[1]
Copper (mg/kg DW)	*<1,000*[1]	*<5,000*[1]
Manganese (mg/kg DW)	*<1,500*[1]	*<7,500*[1]
Nickel (mg/kg DW)	*<600*[1]	*<3000*[1]
Selenium (mg/kg DW)	*100*[2]	*Na*
Zinc (mg/kg DW)	*<7,000*[1]	*<35,000*[1]
Mercury (mg/kg DW)	*<15*[1]	*<75*[1]
Iron (% DW)	*na*	*na*
Aluminium (% DW)	*na*	*na*
PESTICIDE ANALYSIS SCREEN		
4, 4 DDT (mg/kg)	*<2.5*[1]	*<1000*[1]
Methoxychlor (mg/kg)	*<2.5*[1]	*<50*[1]
Other Organochlorine Pesticides (mg/kg)	*<2.5*[1]	*<50*[1]

10 Laboratory Analysis Results

The soil sample laboratory analysis results for the site and relevant assessment criteria are presented in **Error! Reference source not found.**.

The assessment criteria presented in Table 7 have been divided by 3 due to the composting of samples.

Table 8: Soil Sample Laboratory Analysis Results

Analyte	Composite Health Investigation Level (HIL) – A (Residential)	Composite Health Investigation Level (HIL) – F (Industrial)	CS1 TP 1, 2 and 3	CS2 TP 4, 5 and 6	CS3 TP 7, 8 and 9
Silver (mg/kg DW)	*na*	*na*	<0.5	<0.5	<0.5
Arsenic (mg/kg DW)	*33.3*[1]	*166.7*[1]	<1	<1	<1
Lead (mg/kg DW)	*100*[1]	*500*[1]	1	1	2
Cadmium (mg/kg DW)	*6.7*[1]	*33.3*[1]	<0.5	<0.5	<0.5
Chromium (mg/kg DW)	*33.3*[1]	*166.7*[1]	1	1	3
Copper (mg/kg DW)	*333.3*[1]	*1666.7*[1]	2	3	5
Manganese (mg/kg DW)	*500*[1]	*2500*[1]	4	2	13
Nickel (mg/kg DW)	*200*[1]	*1000*[1]	1	1	4
Selenium (mg/kg DW)	*33.3*[2]	*na*	<1	<1	<1
Zinc (mg/kg DW)	*2333.3*[1]	*11666.7*[1]	3	1	4
Mercury (mg/kg DW)	*5.0*[1]	*25.0*[1]	<0.05	<0.05	<0.05
Iron (% DW)	*na*	*na*	0.05	0.04	0.10
Aluminium (% DW)	*na*	*na*	0.15	0.09	0.55
PESTICIDE ANALYSIS SCREEN					
4, 4 DDT (mg/kg)	*0.8*[1]	*333.3*[1]	<0.1	<0.1	<0.1
Methoxychlor (mg/kg)	*0.8*[1]	*16.7*[1]	<0.1	<0.1	<0.1
Other Organochlorine Pesticides (mg/kg)	*0.8*[1]	*16.7*[1]	<0.1	<0.1	<0.1

1 NEPM (1999) HIL-A. Note: mg/kg = milligrams per kilogram mg/kg DW = milligrams per kilogram dry weight % DW = percentage dry weight.

2 Risk-based Assessment of Soil and Groundwater Quality in the Netherlands: Standards and Remediation Urgency (Swartjes,1999).

10.1 Results

None of the samples submitted resulted in levels reaching or exceeding the relevant assessment criteria and were consistent with natural background levels (NEPM, 1999).

11 Conclusions

APP has undertaken a Stage 1 – Preliminary Investigation for the Project in accordance with the *Managing Land Contamination Planning Guidelines* (DUAP and EPA, 1998).

This investigation is to inform and support a development application and statement of environmental effects for a proposed subdivision into 4 lots each of which will have a dwelling entitlement.

This Stage 1 – Preliminary Investigation has:

- Described the site condition and surrounding environment;
- Provided a summary of the site history;
- Identified past and present potentially contaminating activities and potential contaminant types;
- Provided a preliminary assessment of the site contamination;
- Assessed the need for further investigations;
- Assessed soil sample analysis results against relevant criteria; and
- Assessed the suitability of the site for the proposed use.

A desk-top site history assessment and a site inspection have been conducted as part of the Stage 1 – Preliminary Investigation. The desk-top site history assessment encompassed the site and adjacent areas. Information used to assist in the site history was also collected and collated from the following sources:

- Review of available site history details including a site history statement;
- LPI – Historic Title Search;
- Historical aerial photographs;

- OEH's POEO Act Public Register;
- OEH's Contaminated Land – Record of Notices; and,
- NSW Primary Industries Cattle Dip Site Locator.

The site inspection included:

- An inspection of the site to identify potential areas of contamination; and
- Preliminary soil sampling at areas identified as potentially contaminated during the site inspection.

Based on the desk-top site history assessment and the site inspection, it was considered that one AEC required further investigation:

- Agricultural use including sugar cane and cattle grazing.

Two potential contaminants of concern were identified for the site:

- Pesticides/herbicides; and,
- Metals.

Given the above, a Preliminary sampling and analysis plan was undertaken. A total of 9 samples were analysed for the potential contaminants of concern from within the proposed development area.

None of the samples submitted resulted in levels reaching or exceeding the relevant assessment criteria and were consistent with natural background levels (ANZECC, 1992).

Based on the above assessment it is assessed that further investigation is **not required** and that the **site is suitable** for the proposed extractive industry.

12 General Notes

General

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

Soil and Rock Description

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

Groundwater

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

Interpretation of Results

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

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

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

Change in Conditions

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

13 References

1. *Australian and New Zealand Environment Conservation Council ANZECC, 1992. Environmental Soil Quality Guidelines.*
2. *Department of Urban Affairs and Planning and the Environment Protection Authority (1998). Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land.*
3. *Environment Protection Authority (1995) Sampling Design Guidelines.*
4. *Environment Protection Authority (2000) Guidelines for Consultants Reporting on Contaminated Sites*
5. *Office of Environment and Heritage Contaminated Land: POEO Public Register -* <http://www.environment.nsw.gov.au/prpoeoapp/searchregister.aspx>
6. *Office of Environment and Heritage Contaminated Land: Record of Notices - <http://www.environment.nsw.gov.au/prclmapp/searchregister.aspx>*
7. *Swartjes, F.A. (1999) Risk-based Assessment of Soil and Groundwater Quality in the Netherlands: Standards and Remediation Urgency. Risk Analysis 19(6): 1235-1249*
8. *National Environment Protection Council (1999) National Environment Protection (Assessment of Site Contamination) Measure.*
9. *Agency for Toxic Substances and Disease Registry (2005) Division of Toxicology ToxFAQs*
10. *National Environment Protection Council (1999) National Environment Protection (Assessment of Site Contamination) Measure Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater*

14 Glossary

Below is a list of commonly used abbreviations in the report:

AEC – Areas of Environmental Concern

APP – Ardill Payne and Partners

COC – Chain of Custody

DPI – Department of Primary Industries

EPA – Environment Protection Authority (now known as Office of Environment Heritage)

HILs – Health Investigation Levels (for soil)

NEPM – National Environment Protection Measure

OEH – Office of Environment & Heritage

QA/QC – Quality Assurance and Quality Control

15 Attachments

Attachment 1 Plan of subject property

Attachment 2 Proposed layout

Attachment 3 Signed site history statement

Attachment 4 Chain of custody documents and laboratory results

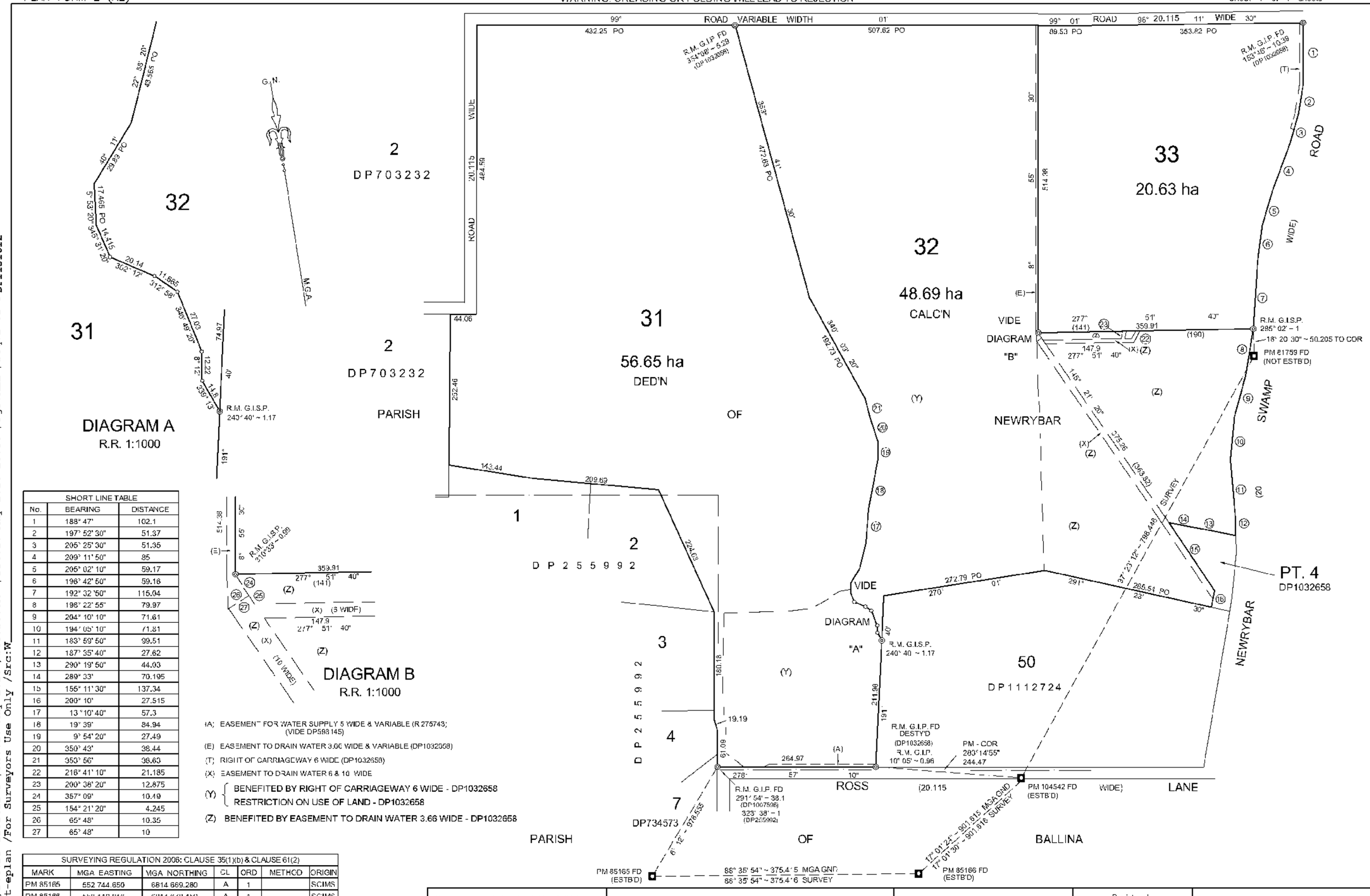
ATTACHMENT 1

Attachment 1
Plan of subject property

PLAN FORM 2 (A2)

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

ePlan Sheet 1 of 1 sheets



SHORT LINE TABLE		
No.	BEARING	DISTANCE
1	188° 47'	102.1
2	197° 52' 30"	51.37
3	205° 25' 30"	51.35
4	209° 11' 50"	85
5	205° 02' 10"	59.17
6	196° 42' 50"	59.18
7	192° 32' 50"	115.04
8	198° 22' 55"	79.97
9	204° 10' 10"	71.61
10	194° 05' 10"	71.81
11	183° 59' 50"	99.51
12	187° 35' 40"	27.82
13	290° 19' 50"	44.03
14	289° 33'	70.195
15	155° 11' 30"	137.34
16	200° 10'	27.515
17	13° 10' 40"	57.3
18	19° 39'	84.94
19	9° 54' 20"	27.49
20	350° 43'	38.44
21	353° 56'	38.63
22	216° 41' 10"	21.185
23	200° 38' 20"	12.875
24	357° 09'	10.49
25	154° 21' 20"	4.245
26	65° 48'	10.35
27	65° 48'	10

(A) EASEMENT FOR WATER SUPPLY 5 WIDE & VARIABLE (R 275743; (VIDE DP598145)

(E) EASEMENT TO DRAIN WATER 3.66 WIDE & VARIABLE (DP1032658)

(T) RIGHT OF CARRIAGEWAY 6 WIDE (DP1032658)

(X) EASEMENT TO DRAIN WATER 6 & 10 WIDE

(Y) { BENEFITED BY RIGHT OF CARRIAGEWAY 6 WIDE - DP1032658
RESTRICTION ON USE OF LAND - DP1032658

(Z) BENEFITED BY EASEMENT TO DRAIN WATER 3.66 WIDE - DP1032658

SURVEYING REGULATION 2006: CLAUSE 35(1)(b) & CLAUSE 61(2)						
MARK	MGA EASTING	MGA NORTHING	CL	ORD	METHOD	ORIGIN
PM 85165	552 744.650	6814 669.280	A	1		SCIMS
PM 85166	553 119.816	6814 678.459	A	1		SCIMS
PM 104542	553 383.666	6815 540.258	C	3		SCIMS
COMBINED SEA LEVEL AND SCALE FACTOR 0.999636 ZONE 56						
SOURCE: MGA COORDINATES ADOPTED FROM SCIMS ON 05-11-2004						

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

Surveyor :	GRAEME GEOFFREY CALNAN ARDILL PAYNE & PARTNERS P.O. BOX 20, BALLINA 2478
Date of Survey :	15 SEPTEMBER 2008
Surveyors Ref :	8710DP

PLAN OF SUBDIVISION OF
LOTS 1 & 2 IN DP1032658 & LOT 30 IN DP1102964

LGA:	BALLINA
Locality:	TINTENBAR
Subdivision No :	016/2009
Lengths are in metres.	Reduction Ratio 1:4000

Registered
14-5-2010

DP1151612

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 2 sheet(s)

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

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 AS AMENDED

IT IS INTENDED TO CREATE

1. EASEMENT TO DRAIN WATER 6 & 10 WIDE

Use PLAN FORM 6A
for additional certificates, signatures, seals and statements

Crown Lands NSW/Western Lands Office Approval

I.....(Authorised Officer) ..... in approving this plan certify 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: ..... **BALLINA SHIRE COUNCIL** .....
Date of Endorsement: ...19 AUGUST 2009.....
Accreditation no: .....
Subdivision Certificate no: .....016/2009.....
File no: .....2008/677.....

*Delete whichever is inapplicable.

*

DP1151612

*

Registered: 14-5-2010
Title System: TORRENS
Purpose: SUBDIVISION

* OFFICE USE ONLY

PLAN OF SUBDIVISION OF LOTS 1 & 2 IN DP1032658 & LOT 30 IN DP1102964

LGA: **BALLINA**
Locality: **TINTENBAR**
Parish: **NEWRYBAR & BALLINA**
County: **ROUS**

Surveying Regulation, 2006

I, **GRAEME GEOFFREY CALNAN**
of **ARDILL PAYNE & PARTNERS**
P.O. BOX 20 BALLINA, NSW 2478
a surveyor registered under the *Surveying Act, 2002*, certify that the survey represented in this plan is accurate, has been made in accordance with the *Surveying Regulation, 2006* and was completed on:..... **15 SEPTEMBER 2008** .....

The survey relates to ..... **PARTS 31, 32 & 33** .....

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

Signature..... *Dated:* **15/9/2008**
Surveyor registered under the Surveying Act, 2002

Datum Line:..... **PM85165 – PM85166** .....
Type: **Rural**

Plans used in the preparation of survey/compilation

DP255992 **DP1032658** **DP1102964**
DP1117294

(if insufficient space use Plan Form 6A annexure sheet)

SURVEYOR'S REFERENCE: **6710DP**

DEPOSITED PLAN ADMINISTRATION SHEET

PLAN OF SUBDIVISION OF LOTS 1 & 2 IN DP1032658 & LOT 30 IN DP1102964

DP1151612

Registered: 14-5-2010

* OFFICE USE ONLY

Subdivision Certificate No: **016/2009**

Date of Endorsement: **19 AUGUST 2009**

Certified correct for the purposes of the Real Property Act 1900 by the Mortgagee
SIGNED by Raymond Timms as attorney for Westpac Banking Corporation under power of attorney Book 4299 no. 332

(Signature) Tier Three Attorney

By executing this instrument the attorney states that the attorney has received no notice of the revocation of the power of attorney.

I certify that the attorney for the Mortgagee with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:

Name of witness: DWI MURDOCK

Address of witness: 1 King Street
Concord West NSW

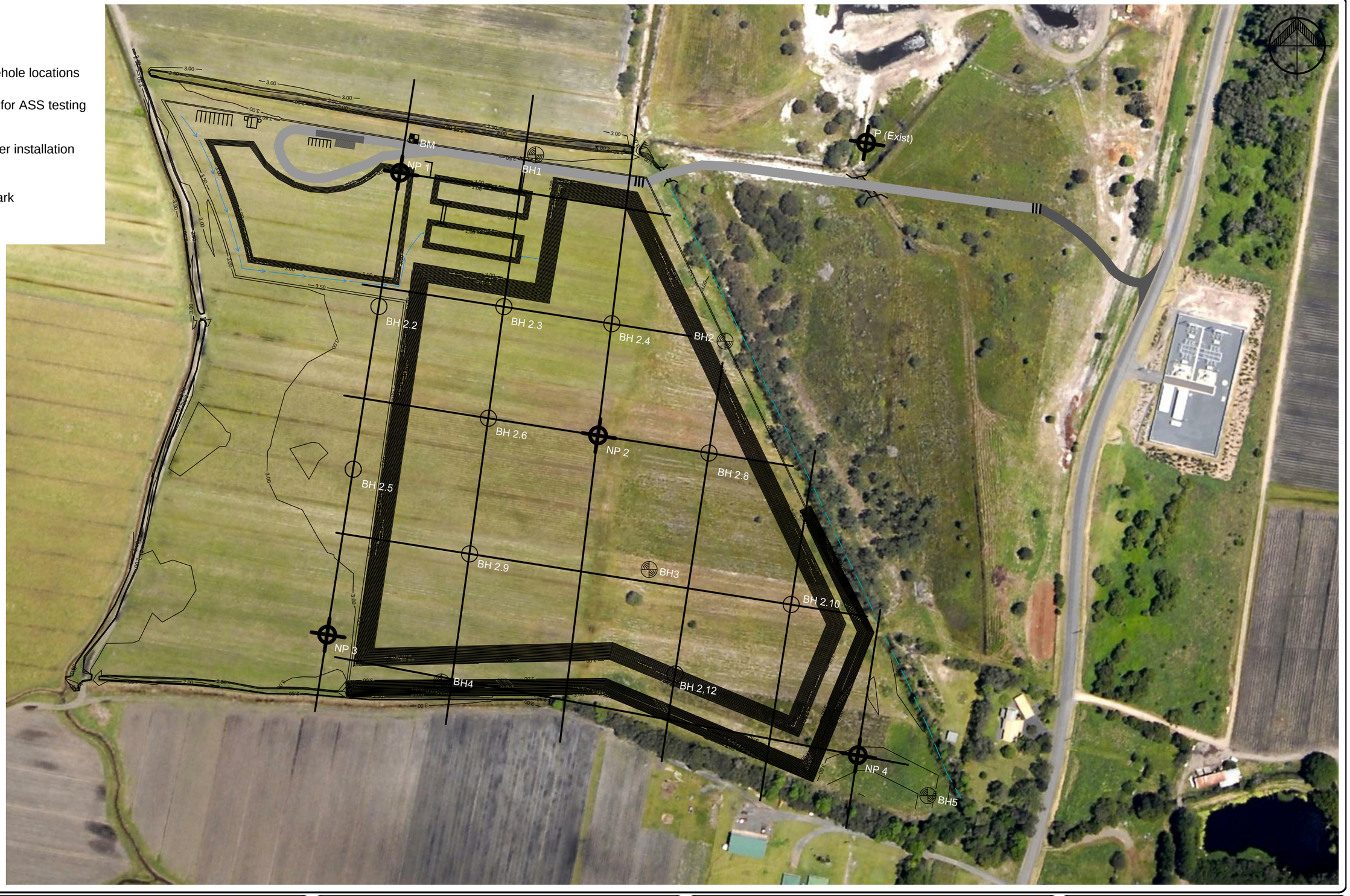
SURVEYOR'S REFERENCE: **6710DP**

ATTACHMENT 2

Attachment 2
Plan of proposed subdivision

Legend

- Existing Test borehole locations
- Borehole for ASS testing
- Peizometer installation
- Bench Mark (BM)



Project:	Lot 32 DP 1151612 Newrybar Swamp rd Lennox Head
Client:	Ballina Sands
Title:	Borehole Locations

Do not scale drawing. Use written dimensions only
This plan is copyright © All rights reserved.

ARDILL PAYNE & PARTNERS
Consulting Civil & Structural Engineers Project Managers
Town Planners & Surveyors
79 Tamar Street
P.O. Box 20
BALLINA NSW 2478
Telephone: 02 6686 3280
Facsimile: 02 6686 7920
Email: info@ardillpayne.com.au
Website: www.ardillpayne.com.au

Design	JF	Scale at A3	1:2500
Drawn	RMcG	Datum	AHD
Date	18.05.12	Filename	6542w-Borehole Locations
Checked		Approved	
Job No.	6542w	Dwg. No.	ASS.1
		Issue	

Attachment 3

Signed site history statement

Recd 14/5

ARDILL PAYNE AND PARTNERS

SITE HISTORY ASSESSMENT

Name: R & C WATSON
Site Address: Lot 32 DP 1151612

Land Use

- Chronological list of past and present land uses with associated time periods. For agricultural land uses please include crop types.
- Location of any cattle dip sites on or off-site.
- Attach additional sheets as necessary and any supporting documents, photographs, etc.

LAND PURCHASED JAN. 1989. PREVIOUS OWNER HAD RECENTLY CLEARED THE LAND. WE FENCED THE BLOCK AND GRAZED CATTLE UNTIL 1997. IT WAS THEN PLANTED TO CANE. BECAUSE OF POOR QUALITY CANE AND POOR PRICES THE LAND WAS PUT BACK TO PASTURE FROM 2006.
No CATTLE ON SITE. NEAREST OLD SITE > 1km away.
DIP DIP

Permits/Licences

- Provide details of any permits, licences, approvals etc for past site uses.

NIL

Historical Use of Adjacent Land

- Brief overview of historical use of adjacent land, if known.

FALLOW, GRAZING CATTLE, CANE

Chemicals

- Provide list of any chemicals (herbicides, insecticides, fuels, oils etc) used on site. State the purpose of chemical use, application (e.g. directly on crop or dipped inside sheds) and the time periods used.
- List storage, waste disposal areas, spills, and possible contaminant sources – on and off site.

ROUND UP, PANAGRAM DIURON – all used according to recommendations.

NIL STORAGE ON SITE

Tanks

- Provide details and locations of any former or existing underground/above ground tanks.

NIL

ARDILL PAYNE AND PARTNERS

Manufacturing/Industrial

- Description of any manufacturing/industrial processes on the site, including locations and dates.

NIL

Asbestos

- Provide details of any asbestos used in past or present buildings.

NIL

Water Use

- Describe any usage of ground/surface waters and bore/pump locations.

Sewerage Disposal

- Describe any sewerage disposal areas.

NIL

Indicators of Contamination

- Describe any areas of soil discolouration, bare soil patches, poor plant growth or stress, odours, complaints from neighbours etc.

NIL

Any other pertinent information

NIL

Name Robert WATSON

Date 9/5/12

Signature

ATTACHMENT 4

Attachment 4
Chain of Custody &
Lab Results

9 x soil

CHAIN OF CUSTODY

B9915

Environmental Analysis Laboratory	Client Details	EAL Quote No:	Project Ref:6542w–Contamination
Despatch Samples To:	Company Name: Ardill Payne & Partners		
EAL - Southern Cross University P O Box 157 / Military Road LISMORE NSW 2480	Contact Person: James Foster		Phone: 6686 3280
	Mobile:		Fax:
Phone: 02 6620 3678 Fax: 02 6620 3957 Mobile: 0419 984 088 Email: eal@scu.edu.au	Email Address: jamesf@ardillpayne.com.au		
	Postal Address:	79 Tamar Street Ballina	

Payment Method: (please tick ☐) (circle type of c/card)	☐ Credit Card	☐ Cheque	★ **Invoice (prior approval required)**	☐ Purchase Order
	Bankcard / Mastercard / Visa	No: _ _ _ _ _ _ / _ _ _ _ _ _ / _ _ _ _ _ _ / _ _ _ _ _ _		Exp. Date:
	Name on Card:		Signature:	
Billing Address: (if different from above)				

Relinquished By: J Foster	Date: 11/5/12	Time: 13:29	Signed:
Sample Preservation: None / Warm / Cool / **On Ice** / Frozen / Acidified / Filtered / Other:			
Received By: M. Hamilton-Tate	Date: 11/5/12	Time: 4pm	Signed:
Sample Condition on receipt:			

Sample No.	Sample ID	Sample Depth	Sampling Date	Your Client	Crop ID	Container (size and type)	Sample Type (e.g. water, leaf, soil)	Sample Analysis Request – Price List Code (e.g. SW-PACK-06): Composite	SS-PACK-08								
1	TP1	0-150	11/05/12	WATSON		Snap Lock	SOIL										
2	TP2	0-150	11/05/12	WATSON		Snap Lock	SOIL	x	x								
3	TP3	0-150	11/05/12	WATSON		Snap Lock	SOIL										
4	TP4	0-150	11/05/12	WATSON		Snap Lock	SOIL										
5	TP5	0-150	11/05/12	WATSON		Snap Lock	SOIL	x	x								
6	TP6	0-150	11/05/12	WATSON		Snap Lock	SOIL										

CHAIN OF CUSTODY

7	TP7	0-150	11/05/12	WATSON		Snap Lock	SOIL	x	x								
8	TP8	0-150	11/05/12	WATSON		Snap Lock	SOIL										
9	TP9	0-150	11/05/12	WATSON		Snap Lock	SOIL										

Report Date/Time: 14 May 2012 8:44:32AM

Sample Receipt Notification (SRN)

Project:	EAL/B9915
Customer:	**Ardill Payne & Partners**
Contact:	James Foster
Client Job ID:	6542w-Contamination > Soil
No. of Samples:	9 samples; 3 composites
Date Received:	11/05/2012 3:51:14PM
Comments:	Standard Request
Biller:	**Ardill Payne & Partners** - James Foster - 02 6686 3280

Environmental Analysis Laboratory
PO Box 157
Lismore NSW 2480
ABN: 41 995 651 524
Tel: (02) 6620 3678 Fax (02) 6620 3957
Email: eal@scu.edu.au

Test Request

Sample Text ID	Client Sample ID	Contaminated Site Assessment 3	Soil Compositing
		SS-PACK-08	SS-PREP-04
EAL/B9915/(C)001	Samples(1,2,3)	1	0
EAL/B9915/(C)002	Samples(4,5,6)	1	0
EAL/B9915/(C)003	Samples(7,8,9)	1	0
EAL/B9915/001	TP1	0	1
EAL/B9915/002	TP2	0	1
EAL/B9915/003	TP3	0	1
EAL/B9915/004	TP4	0	1
EAL/B9915/005	TP5	0	1
EAL/B9915/006	TP6	0	1
EAL/B9915/007	TP7	0	1
EAL/B9915/008	TP8	0	1
EAL/B9915/009	TP9	0	1
Total		**3**	**9**

RESULTS OF SOIL ANALYSIS

9 soil samples supplied by Ardill Payne & Partners on the 11th May, 2012 - Lab Job No. B9915
Soil samples supplied were composited by EAL into 3 composite samples for analysis
Analysis requested by James Foster. Your Job: 6542w
(PO Box 20, BALLINA NSW 2478).

ANALYTE	METHOD REFERENCE	Composite Sample 1 TP1, 2 & 3	Composite Sample 2 TP4, 5 & 6	Composite Sample 3 TP7, 8 & 9	RESIDENTIAL Guideline Limit Composite - Column 1	RESIDENTIAL Guideline Limit Individual - Column 1	COMMERCIAL Guideline Limit Composite - Column 4	COMMERCIAL Guideline Limit Individual - Column 4	Background Range
	Job No.	*B9915/C1*	*B9915/C2*	*B9915/C3*	*See note 1a,b*	*See note 1a,b*	*See note 1a,b*	*See note 1a,b*	*See note 2*
MOISTURE %	c	19	20	19	..	..	..	..	..
SILVER (mg/Kg DW)	*a*	<0.5	<0.5	<0.5	***na***	*na*	***na***	*na*	***na***
ARSENIC (mg/Kg DW)	*a*	<1	<1	<1	***<25***	*<100*	***<125***	*<500*	***<2-30***
LEAD (mg/Kg DW)	*a*	1	1	2	***<75***	*<300*	***<375***	*<1500*	***<2-200***
CADMIUM (mg/Kg DW)	*a*	<0.5	<0.5	<0.5	***<5***	*<20*	***<25***	*<100*	***0.04-2.0***
CHROMIUM (mg/Kg DW)	*a*	1	1	3	***<25***	*<100*	***<125***	*<500*	***0.5-110***
COPPER (mg/Kg DW)	*a*	2	3	5	***<250***	*<1000*	***<1250***	*<5000*	***1-190***
MANGANESE (mg/Kg DW)	*a*	4	2	13	***<375***	*<1500*	***<1875***	*<7500*	***4 - 12,600***
NICKEL (mg/Kg DW)	*a*	1	1	4	***<150***	*<600*	***<750***	*<3000*	***2-400***
SELENIUM (mg/Kg DW)	*a*	<1	<1	<1	***na***	*na*	***na***	*na*	***na***
ZINC (mg/Kg DW)	*a*	3	1	4	***<1750***	*<7000*	***<8750***	*<35000*	***2-180***
MERCURY (mg/Kg DW)	*a*	<0.05	<0.05	<0.05	***<3.75***	*<15*	***<18.75***	*<75*	***0.001-0.1***
IRON (% DW)	*a*	0.05	0.04	0.10	***na***	*na*	***na***	*na*	***na***
ALUMINIUM (% DW)	*a*	0.15	0.09	0.55	***na***	*na*	***na***	*na*	***na***
PESTICIDE ANALYSIS SCREEN									
4.4' - DDT (mg/Kg)	*c*	<0.1	<0.1	<0.1	***<2.5***	*<10*	***<250***	*<1000*	..
Methoxychlor (mg/Kg)	*c*	<0.1	<0.1	<0.1	***<2.5***	*<10*	***<12.5***	*<50*	..
Other Organochlorine Pesticides (mg/Kg)	*c*	<0.1	<0.1	<0.1	***<2.5***	*<10*	***<12.5***	*<50*	***<0.05***

METHODS REFERENCE

a. 1:3 Nitric/HCl digest - APHA 3125 ICPMS
b. 1:3 Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab report no. 73348

NOTES

1a. Column 1 ' Residential with gardens and accessible soil including childrens daycare centres, preschools, primary schools, town houses or villas' (NSW EPA 1998)
1b. Column 4 ' Commercial and Industrial' (NSW EPA 1998)
2. Environmental Soil Quality Guidelines, Page 40, ANZECC, 1992.

NATA
Lab Accred No.: 14960
This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IES 17025

Additional NOTES

DW = Dry Weight. na = no guidelines available

Organochlorine pesticide (OC's) screen: (HCB, alpha-BHC, gamma-BHC, Heptachlor, delta-BHC, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, Endosulfan 1, pp-DDE, Dieldrin, Endrin, pp-DDD, Endosulfan 2, pp-DDT, Endrin Aldehyde, Endosulfan Sulphate, Methoxychlor)

Organophosphorus pesticide (OP's) screen: (Diazinon, Dimethoate, Chlorpyriphos-methyl, Ronnel, Chlorpyriphos, Fenitrathion, Bromophos-ethyl, Ethion)

checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF ACID SULFATE SOIL ANALYSIS

2 samples supplied by Env Solutions Pty Ltd on the 23rd September, 2014 - Lab. Job No. D6443

Analysis requested by James Foster. **Your Project: 14010**

(1/17 Grandview Street, EAST BALLINA NSW 2478)

Sample Site	EAL lab code	TEXTURE (note 7)	MOISTURE CONTENT (% moisture of total wet weight)	MOISTURE CONTENT (g moisture / g of oven dry soil)	TITRATABLE ACTUAL ACIDITY (TAA) pH_{KCl}	TITRATABLE ACTUAL ACIDITY (TAA) (To pH 6.5) (mole H^+/tonne)	REDUCED INORGANIC SULFUR (% chromium reducible S) (%Scr)	REDUCED INORGANIC SULFUR (% chromium reducible S) (mole H^+/tonne)	NET ACIDITY Chromium Suite mole H^+/tonne (based on %Scrs)	LIME CALCULATION Chromium Suite kg $CaCO_3$/tonne DW (includes 1.5 safety Factor when liming rate is $^+$ve)
Method Info.					*(ACTUAL ACIDITY-Method 23)*		*(POTENTIAL ACIDITY-Method 22B)*		*note 5*	*note 4 and 6*
AS07	*D6443/1*	Coarse	7.5	0.1	6.87	0	0.017	11	11	0.8
AS08	*D6443/2*	Coarse	8.9	0.1	6.12	9	0.022	14	23	1.7

NOTE:

1 - All analysis is Dry Weight (DW) - samples dried and ground immediately upon arrival (unless supplied dried and ground)

2 - Samples analysed by SPOCAS method 23 (ie Suspension Peroxide Oxidation Combined Acidity & sulfate) and 'Chromium Reducible Sulfur' technique (Scr - Method 22B)

3 - Methods from Ahern, CR, McElnea AE , Sullivan LA (2004). ***Acid Sulfate Soils Laboratory Methods Guidelines.*** QLD DNRME.

4 - Bulk Density is required for liming rate calculations per soil volume. Lab. Bulk Density is no longer applicable - field bulk density rings can be used and dried/ weighed in the laboratory.

5 - **ABA Equation: Net Acidity = Potential Sulfidic Acidity (ie. Scrs or Sox) + Actual Acidity + Retained Acidity - measured ANC/FF (with FF currently defaulted to 1.5)**

6 - The neutralising requirement, lime calculation, includes a 1.5 safety margin for acid neutralisation (an increased safety factor may be required in some cases)

7 - For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays

8 - .. denotes not requested or required. '0' is used for ANC and Snag calcs if TAA pH <6.5 or >4.5

9 - SCREENING, CRS, TAA and ANC are NATA accredited but other SPOCAS segments are currently not NATA accredited

10- Results at or below detection limits are replaced with '0' for calculation purposes.

11 - Projects that disturb >1000 tonnes of soil, the ≥0.03% S classification guideline would apply (refer to acid sulfate management guidelines).

12 - Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.

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

(Classification of potential acid sulfate material if: coarse Scr≥0.03%S or 19mole H^+/t; medium Scr≥0.06%S or 37mole H^+/t; fine Scr≥0.1%S or 62mole H^+/t) - as per QUASSIT Guidelines

checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF ACID SULFATE SOIL ANALYSIS

2 samples supplied by Env Solutions Pty Ltd on the 29th October, 2014 - Lab. Job No. D7333

Analysis requested by James Foster. **Your Project: 14010 - Ballina Sands**

(1/17 Grandview Street, EAST BALLINA NSW 2478)

required if pH_{KCl} > 6.5

Sample Site	EAL lab code	TEXTURE (note 7)	MOISTURE CONTENT (% moisture of total wet weight)	MOISTURE CONTENT (g moisture / g of oven dry soil)	TITRATABLE ACTUAL ACIDITY (TAA) pH_{KCl}	TITRATABLE ACTUAL ACIDITY (TAA) (To pH 6.5) (mole H^+/tonne)	REDUCED INORGANIC SULFUR (% chromium reducible S) (%Scr)	REDUCED INORGANIC SULFUR (% chromium reducible S) (mole H^+/tonne)	ACID NEUTRALISING CAPACITY (ANC_{BT}) (% $CaCO_3$)	ACID NEUTRALISING CAPACITY (ANC_{BT}) (mole H^+/tonne)	NET ACIDITY Chromium Suite mole H^+/tonne (based on %Scrs)	LIME CALCULATION Chromium Suite kg $CaCO_3$/tonne DW (includes 1.5 safety Factor when liming rate is $^+$ve)
Method Info.					*(ACTUAL ACIDITY-Method 23)*		*(POTENTIAL ACIDITY-Method 22B)*		*(NEUTRALISING CAPACITY)*		*note 5*	*note 4 and 6*
AS 11	*D7333/1*	Coarse	4.9	0.1	5.24	38	0.129	80	..	0	119	8.9
AS 12	*D7333/2*	Coarse	1.6	0.0	7.81	0	0.146	91	3.23	645	-339	-17.0

NOTE:

1 - All analysis is Dry Weight (DW) - samples dried and ground immediately upon arrival (unless supplied dried and ground)

2 - Samples analysed by SPOCAS method 23 (ie Suspension Peroxide Oxidation Combined Acidity & sulfate) and 'Chromium Reducible Sulfur' technique (Scr - Method 22B)

3 - Methods from Ahern, CR, McElnea AE , Sullivan LA (2004). ***Acid Sulfate Soils Laboratory Methods Guidelines.*** QLD DNRME.

4 - Bulk Density is required for liming rate calculations per soil volume. Lab. Bulk Density is no longer applicable - field bulk density rings can be used and dried/ weighed in the laboratory.

5 - **ABA Equation: Net Acidity = Potential Sulfidic Acidity (ie. Scrs or Sox) + Actual Acidity + Retained Acidity - measured ANC/FF (with FF currently defaulted to 1.5)**

6 - The neutralising requirement, lime calculation, includes a 1.5 safety margin for acid neutralisation (an increased safety factor may be required in some cases)

7 - For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays

8 - .. denotes not requested or required. '0' is used for ANC and Snag calcs if TAA pH <6.5 or >4.5

9 - SCREENING, CRS, TAA and ANC are NATA accredited but other SPOCAS segments are currently not NATA accredited

10- Results at or below detection limits are replaced with '0' for calculation purposes.

11 - Projects that disturb >1000 tonnes of soil, the ≥0.03% S classification guideline would apply (refer to acid sulfate management guidelines).

12 - Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.

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

(Classification of potential acid sulfate material if: coarse Scr≥0.03%S or 19mole H^+/t; medium Scr≥0.06%S or 37mole H^+/t; fine Scr≥0.1%S or 62mole H^+/t) - as per QUASSIT Guidelines

checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF ACID SULFATE SOIL ANALYSIS

1 sample supplied by Env Solutions Pty Ltd on 28th April, 2015 - Lab. Job No. E1370

Analysis requested by James Foster. **Your Project: Sand Quarry**

(PO Box 248 BALLINA NSW 2478)

Sample Site	EAL lab code	TEXTURE (note 7)	MOISTURE CONTENT (% moisture of total wet weight)	MOISTURE CONTENT (g moisture / g of oven dry soil)	TITRATABLE ACTUAL ACIDITY (TAA) pH_{KCl}	TITRATABLE ACTUAL ACIDITY (TAA) (To pH 6.5) (mole H^+/tonne)	REDUCED INORGANIC SULFUR (%Scr)	REDUCED INORGANIC SULFUR (mole H^+/tonne)	NET ACIDITY Chromium Suite mole H^+/tonne (based on %Scrs)	LIME CALCULATION Chromium Suite kg $CaCO_3$/tonne DW (includes 1.5 safety Factor when liming rate is $^+$ve)
Method Info.					*(ACTUAL ACIDITY-Method 23)*		*(POTENTIAL ACIDITY-Method 22B)*		*note 5*	*note 4 and 6*
BS01	*E1370/1*	Coarse	9.0	0.1	4.62	39	0.005	3	42	3.2

NOTE:

1 - All analysis is Dry Weight (DW) - samples dried and ground immediately upon arrival (unless supplied dried and ground)

2 - Samples analysed by SPOCAS method 23 (ie Suspension Peroxide Oxidation Combined Acidity & sulfate) and 'Chromium Reducible Sulfur' technique (Scr - Method 22B)

3 - Methods from Ahern, CR, McElnea AE , Sullivan LA (2004). ***Acid Sulfate Soils Laboratory Methods Guidelines.*** QLD DNRME.

4 - Bulk Density is required for liming rate calculations per soil volume. Lab. Bulk Density is no longer applicable - field bulk density rings can be used and dried/ weighed in the laboratory.

5 - **ABA Equation: Net Acidity = Potential Sulfidic Acidity (ie. Scrs or Sox) + Actual Acidity + Retained Acidity - measured ANC/FF (with FF currently defaulted to 1.5)**

6 - The neutralising requirement, lime calculation, includes a 1.5 safety margin for acid neutralisation (an increased safety factor may be required in some cases)

7 - For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays

8 - .. denotes not requested or required. '0' is used for ANC and Snag calcs if TAA pH <6.5 or >4.5

9 - SCREENING, CRS, TAA and ANC are NATA accredited but other SPOCAS segments are currently not NATA accredited

10- Results at or below detection limits are replaced with '0' for calculation purposes.

11 - Projects that disturb >1000 tonnes of soil, the ≥0.03% S classification guideline would apply (refer to acid sulfate management guidelines).

12 - Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.

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

(Classification of potential acid sulfate material if: coarse Scr≥0.03%S or 19mole H^+/t; medium Scr≥0.06%S or 37mole H^+/t; fine Scr≥0.1%S or 62mole H^+/t) - as per QUASSIT Guidelines

checked: .....
Graham Lancaster
Laboratory Manager

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