

APPENDIX I

Traffic Impact Study

ARDILL PAYNE & PARTNERS

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



TRAFFIC IMPACT STUDY

Submission to Ballina Shire Council

New Extractive Industry
Lot 32 DP 1151612
Newrybar Swamp Road, Lennox Head

for:
Ballina Sands Pty Ltd

January 2013

Document Control Sheet

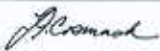
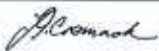

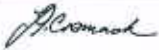
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1 Introduction

Ardill Payne and Partners (APP) has been engaged by Ballina Sands Pty Ltd to carry out a traffic impact study to accompany the lodgement of a development application and statement of environmental effects with Ballina Shire Council.

Development consent is sought for a new extractive industry on lot 32 DP1151612, Newrybar Swamp Road, Lennox Head.

This report provides details regarding the current traffic generation and the level of service provided by Newrybar Swamp Road, Ross Lane, Coast Road and Pacific Highway and the impact the proposed development will have on these roads.

1.1 The Proposal

The proposed development involves the extraction of sand resource up to a maximum 610,000m³ (solid volume) at a maximum extraction rate of 80,000m³ (approx. 160,000 tonnes) per annum. The average extraction rate is approximately 41,000m³ (solid volume) per annum.

Mining operations will include stripping of topsoil (for use in minor site filling and earthen acoustic and visual mounds where and if required), extraction using excavators, stockpiling and loading into haulage trucks for dispatch to market.

The quarry will have an extracted footprint of approximately 10.6 Ha located in the south eastern corner of the allotment. Removal of the sand material will be obtained through a staged process. A layout of the development proposal is included in **Attachment 2**.

1.2 Expected Quarry Life

At the proposed maximum extraction rates, the quarry would be expected to have a minimum life of 7.6 years, however to accommodate demand variations a maximum life of 15 years is envisaged.

1.3 Post Quarry Activities

After the completion of quarrying activities, the site will be rehabilitated in accordance with the specifications outlined in the Plan of

Management prepared by APP. At the conclusion of the quarry's life, the perimeters of the formed lake will be vegetated.

2 Existing Conditions

The subject site is located on Newrybar Swamp Road, Lennox Head. The site and surrounds are described in the subsections below:

2.1 Location and Cadastral Description

The land is described in real property terms as Lots 32 DP 1151612, within the Parish of Ballina, County of Rous. The total property area is 48.6ha and project site area of 10.6ha. A locality plan is included in **Attachment 1**.

2.2 Zoning

The subject site is zoned 1(a2) – Rural (Coastal Lands Agriculture) Zone under the provisions of the Ballina Local Environmental Plan 1987.

2.3 Existing Land Use

The site is currently used for cane farming.

2.4 Adjoining Land Use

Land uses adjoining and surrounding the subject site as determined by aerial photography and 1:25,000 topographic map review and site inspections are listed below:

North – Existing extractive industry (sand quarry). Additionally there are two other approved extractive operations (sand quarries) located about 1km to the north-east of the site

South – 1 rural dwelling house and sugar cane

West – sugar cane

East – 3 rural dwelling houses, aquatic centre, rural industry (scaffold depot), electricity substation and sugar cane.

2.5 Existing Road Conditions

The current haulage routes for the adjoining extractive industry (sand quarry) are south along Newrybar Swamp Road and then either east or west along Ross Lane to the Coast Road or the Pacific Highway respectively. This route will be the same for the proposed extractive industry on Lot 32 DP 1151612. Current descriptions and conditions for

Newrybar Swamp Road, Ross Lane, Coast Road and Pacific Highway are provided below.

2.5.1 Newrybar Swamp Road

Newrybar Swamp Road is a rural road that begins at Ross Lane, extends north for approximately 9km, generally following the Newrybar Drain north of the site. The road has a bitumen seal varying in width from 7-8m and is in good condition for a length of 1.7km north from its intersection with Ross Lane.

Sight distances at the Ross Lane intersection are considered adequate.

2.5.2 Ross Lane

Ross Lane is a classified regional road (MR 7735) that is funded by the RMS and maintained by Ballina Council. Ross Lane is the main road linkage between the Coast Road and the Pacific Highway. It is the most direct route for local and visitor traffic from the Pacific Highway intersection at Tintenbar through to Lennox Head. The road is a 2-lane sealed road that has a pavement width ranging from 6-8m. The intersection at Newrybar Swamp Road provides channelised deceleration and turn lanes for vehicles approaching from both the east and west.

Sight distances at both the Pacific Highway and Coast Road intersections are considered adequate.

Pavement condition to the west of Newrybar Swamp Road is good due to recent road improvements. The pavement condition to the east is good to fair with some rough sections due to surface patching and repairs.

Grades on Ross Lane are steepest to the west of Newrybar Swamp Road where the road climbs from the coastal plain to the Pacific Highway. The road to the east of Newrybar Swamp Road is relatively level.

Heavy vehicles associated with the existing quarry operations, sugar cane production and harvesting and pet food factory represent a significant component of both local and through traffic.

2.5.3 Coast Road

The Coast Road by-passes the township of Lennox Head and extends between Ballina and Byron Bay as a 2-lane bitumen sealed road. The Coast Road is situated approximately 3km to the east of the subject site. The pavement width averages approximately 10m with an average of 7m sealed width between the edge line markings. The pavement is in generally good condition.

Sight distances along the Coast Road at its intersection with Ross Lane are approximately 350m north and 700m south.

2.5.4 Pacific Highway

The Pacific Highway is located approximately 2.5km west of the site. The highway is generally 4-lane 2-way divided carriageway to the south and 2-lane 2-way to the north with regular overtaking lanes.

Highway interchanges have been provided at Ross Lane for vehicles to access the highway.

2.6 Existing Traffic Flows

Existing traffic volume data is shown in **Table 1 & 2** below.

Table 1 – Existing Traffic Counts - RTA

Station	Road	Location	1998 AADT	2001 AADT	2004 AADT
04.660	MR 545 Coast Road	Lennox Head – 1.5km South of Ross Lane	6891	9366	8126
04.674	MR 545 Coast Road	At Ballina Shire Boundary	4736	5690	5049
04.060*	Pacific Highway	Knockrow – South of Martins Lane	8550	9862	13516

Source: Traffic Volume Data for Hunter and Northern Regions 2004, RTA

*-indicates a permanent Survey station counting axle pair passes

Table 2 – Existing Traffic Counts - Ballina Shire Council

Station	Road	Location	1998 AADT	2001 AADT	2004 AADT	Adjusted (2% p.a.)
12935	Newrybar Swamp Road	160m North of Ross Lane	463* (Peak 65)	-	-	611 (86)
12088	MR 7735 Ross Lane	70m East of Newrybar Swamp Road	-	3413 (Peak 375)	-	4244 (466)
10717	MR 545 Coast Road	300m North of Byron Street	-	-	9637** (Peak 858)	11291 (1005)
10755	MR 545 Coast Road	150m North of Ross Lane	-	-	6213** (Peak 542)	7280 (635)

Source: Ballina Shire Council

*-Average of three day count only (Fri-Sun)

** -Counts taken during Christmas holiday period Dec 2007 – Jan 2008

The traffic counts for Newrybar Swamp Road were taken during the peak cane harvesting period (June to December). As it was only a three day count, the impact of cane trucks and other quarrying operations on the recorded volumes is unknown. However compared to traffic volumes recorded in 2000 (daily average 65 vehicle movements on Newrybar Swamp Road – Table 4.1, Environmental Impact Statement, GeoLINK, November 2000) it appears that a significant count of haulage vehicles is included in the current figures. A previous study (J & D Pick, EIS for the Extraction of Filling Sand near Newrybar, R.W. Corkery & Co Pty Ltd, 1995) estimated traffic volumes from cane trucks alone at approximately 100 vehicle movements per day.

2.7 Accident History

Serious accidents, some with fatalities, have occurred along Ross Lane and at its intersection with the Pacific Highway (prior to completion of interchange associated with Ballina Bypass highway upgrade works). The steep section of Ross Lane west of Newrybar Swamp Road has been re-aligned and re-surfaced, including improvements to drainage with the speed limit being reduced to 80km/hr.

2.8 Public Transport

School bus services currently operate in the area. There are no scheduled services other than the school bus services.

Blanchs Bus Company operates a school day service into Newrybar Swamp Road, turning around approximately 100m from the intersection with Ross Lane. Two services operate from Lennox Head and one from the Pacific Highway, both morning and evening. Blanchs also have an additional school day service that travels along Ross Lane both morning and evening.

Brunswick Valley Coaches and Emanuel Anglican College both operate one morning and one evening school day bus service along Ross Lane.

All school day services operate between 8:00am – 9:15am in the morning and 3:15pm – 4:30pm in the afternoon.

2.9 Pedestrians

School students walk along Newrybar Swamp Road to access bus services on school days. There is little other pedestrian activity in the area.

3 Proposed Development

The proposed extractive industry (sand quarry) will extract high quality sand fill material which is used in residential, industrial and infrastructure developments in the local area.

The extraction of the material will be via conventional means utilising excavators and front end loaders.

Descriptions of proposed site layout, plant equipment, personnel, transportation, parking, site access, circulation and traffic generation are described in the subsections below.

3.1 Site Layout

The site shall be laid out such that all activities involved in the extraction and loading of materials are completed onsite. Only haulage vehicles entering and leaving the site shall impact on the surrounding road network.

Earthen sound mounds and positioning of stockpiles shall help reduce noise pollution from the site as well as provide visual buffers to the extraction and loading areas.

A layout of the development proposal is included in **Attachment 2**.

3.2 Plant and Equipment

The equipment used for the extraction and loading of haulage vehicles is expected to be:

- 1-2 Excavators (up to 25 tonne)
- Front end loader (up to 5m³ capacity)
- Haulage Trucks up to 20m³ capacity (truck and dog)

Additional plant and equipment may be utilised during peak extraction periods.

3.3 Personnel

One to two on-site plant operators and a site foreman will be employed at the site in conjunction with day-to-day operations. Additional personnel may be needed on a limited basis, and during peak extraction periods.

Hours of operation will be:

- 7am – 5pm Monday to Friday
- 7am – 2pm Saturday

Quarrying operations are not permitted on Sundays and public holidays, except for the delivery of materials as requested by police or other authorities for safety reasons, and/or emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

3.4 Transportation

Sand extracted from the site will be loaded onto maximum 20m³ capacity trucks for haulage to a number of locations throughout the region including Lennox Head, Byron Bay, Ballina, Newrybar, Bangalow, and Tintenbar.

The haulage route will be consistent with current routes utilised by the extractive industry (sand quarry). These routes are south along Newrybar Swamp Road, then either east or west along Ross Lane. Transport to Lennox Head/Ballina/Byron Bay areas will be east along Ross Lane then either north or south along the Coast Road. Transport to Newrybar/Bangalow/Tintenbar areas will be west along Ross Lane then either north or south along the Pacific Highway.

On the adjoining sand quarry, a commitment to speed management, ensuring compliance with truck load limits, and a “covered load” policy is currently in place. These practices will be implemented at the proposed site to ameliorate the impact of the development on other road users and the road network.

3.5 Access and site Distance

Site access and egress will be via a constructed access onto Newrybar Swamp Road.

For a design speed of 80 km/h (Newrybar Swamp Road), a minimum safe intersection sight distance of 170m is required in each direction from the site access point. For a design speed of 100 km/h (Ross Lane), a minimum safe intersection sight distance of at least 240m is required in each direction from the intersection (Austroads GTEP – Part 5: Intersections at Grade, 2005). The available sight distances are in excess of the Austroads requirements.

3.6 Circulation

A network of internal access roads will provide access around the site. These access roads will be marked with temporary marker posts as required and adjusted to suit the extraction operations.

3.7 Parking

The assessment of parking requirements has been based on:

- AS/NZS2890.1-2004 “Parking Facilities – Part 1: Off-street Car Parking”
- AS2890.2-2002 “Parking Facilities – Part 2: Off-street commercial vehicle facilities”
- RTA Guide to Traffic Generating Developments, 1993.

These requirements are summarised in **Table 3** below.

Table 3 – Parking Requirements for Proposed Development

Parking Generation Unit	Number	Parking Requirement	Parking Spaces Required
Employees	3	1 per 2 employees	2

Deliveries will be relatively infrequent, and will be limited to fuel for extraction plant, and plant service vehicles. These will occur mainly in

off-peak times. Due to the small amount of supplies and materials required the provision of additional parking is not warranted.

4 Impacts of the Proposed Development

The greatest impact on the surrounding road network will be felt on Newrybar Swamp Road and Ross Lane. Traffic generation, impacts on traffic efficiency, road pavements and public transport are described in the subsections below.

4.1 Traffic Generation

The project proponent indicates that target extraction rates will vary however consent is being sought for a maximum of 80,000m³ (solid volume) per annum. The sand has a bulking factor of approximately 1.5 which will result in a maximum of approx. 120,000m³ (loose volume) being hauled from the site each year. It is envisaged that extraction rates would more typically be in the order of 20,000 – 40,000m³ (solid) per annum.

Actual daily extraction rates will vary in accordance with a number of factors including:

- weather (particularly during rain events)
- resource supply
- fluctuations in demand

Notwithstanding the above, the total number of truck movements per year generated by the operations will be limited by the proposed yearly cap on extraction and the recommendations of the acoustic report.

It is proposed to conduct work at the site six days per week, 52 weeks per year; however the above-referenced variations will likely reduce this to a maximum of 260 days per year, which equates to five working days per week.

Based on an average annual extraction rate of 41,000m³ and 260 working days per year, the average daily extraction rate is approximately 160m³ (solid). This equates to approximately 240m³ (loose). Therefore approx. 12 truck loads per day would be transported from the site.

Maximum daily extraction rates will be limited to 9 truck loads per hour (18 vehicle movements per hour). Therefore peak days may produce maximums of up to 2,000m³/day, equating to 100 truck loads/200

vehicle movements per day. It should be noted that if these peak rates were sustained the site would be generating approximately 520,000m³ p.a.

Traffic generation has been estimated assuming the use of haulage trucks with a maximum capacity of 20m³. This equates to a maximum of 5,980 truck loads per year, or 11,960 truck trips per year, based on the maximum extraction rate of 120,000m³ of loose sand per annum (a return trip counts as two trips). It is noted that truck loads are trimmed at the weighbridge to ensure each load is of maximum capacity.

Table 4 is indicative of the average traffic rates that will be generated by the operations if the average daily extraction rate (160m³/day) is achieved.

Table 4 – Average Traffic Generation Rates

Truck Capacity	Loads/day	Vehicle Movements/day	Vehicle movements/hr
20m ³	12	24	<3

Typically, peak hourly traffic rates are 9% of daily movements

Table 5 is indicative of the peak traffic rates that will be generated by the operations if the maximum daily extraction rate of 2,000m³/day (as limited by the acoustic report) is achieved.

Table 5 – Peak Traffic Generation Rates

Truck Capacity	Loads/day	Vehicle Movements/day	Vehicle Movements/hr
20m ³	100	200	18

Typically, peak hourly traffic rates are 9% of daily movements

The site will typically be operated by one to two on-site plant operators and a site foreman, who will generate on average an additional two vehicle movements per day

The proposal is not expected to increase heavy vehicle movements on Newrybar Swamp Road and Ross Lane as the extractive industry (sand quarry) to the north of the site is expected to be exhausted prior to the start of the proposed site.

4.2 Impact on Traffic Safety

Peak generated traffic movements of a maximum of 18 vehicles per hour are unlikely to raise any adverse safety issues for local transport and users of the local and regional road network. Currently the

extractive industry (sand quarry) to the north operates at this traffic generation rate without adverse impacts.

The existing roads and intersections have the capacity to cater for the additional heavy vehicle movements. Deceleration lanes are provided in Ross Lane to allow for turning movements into Newrybar Swamp Road. Signs have been erected on Ross Lane and Newrybar Swamp Road to advise motorists of truck movements in the area.

During peak demand some queuing of heavy vehicles may occur on site during loading operations, but this will not impact on traffic flows on Newrybar Swamp Road.

4.3 Impact on Traffic Efficiency

This traffic study indicates that the traffic flows generated by the development will not change the level of service currently experienced in the adjacent roads.

To aid interpretation on the impacts on traffic flows, the RTA's "Guide to Traffic Generating Developments" provides acceptable ranges of peak vehicle flows for various "levels of service" experienced on rural roads. The intention is to at least maintain the existing "level of service" for the roads adjacent to the site. Road capacity "levels of service" are defined by the RTA for rural roads as shown in **Table 6**, with the highest level of service being Level A (free flow), with service deteriorating to Level F (forced flow).

Table 6 – Two-Way Peak Hour Flows on Two Lane Rural Roads

Terrain	Level of Service	15% Heavy Vehicles (veh/hr) – 80km/h	15% Heavy Vehicles (veh/hr) – 100km/h
Level	B	477	530
	C	783	870
	D	1269	1410
	E	2061	2290

The following performance standards are recommended:

Weekday Peak Hour Flows

Major Roads: Level of service C

Minor Roads: Level of service C (desirable)

Recreational Peak Hours (weekends)

Major Roads: Level of service D

Minor Roads: Level of service D (desirable)

The “level of service” on Newrybar Swamp Road is currently Level B or better (86 veh/hr from Table 2). The “level of service” on Ross Lane is currently Level B (466 veh/hr from Table 2). The anticipated additional traffic movements generated by the proposed quarrying operations will not alter the “level of service” currently experienced on Newrybar Swamp Road or Ross Lane, nor impose any major social or physical detriment upon the local residents and road users.

The traffic generated by the proposal will represent approximately 2.8% of the traffic on Newrybar Swamp Road during an average year, and 20.9% during a peak year. Further, the traffic levels are still well within the prescribed RTA service guides.

The level of impact on the Coast Road and the Pacific Highway will be minimal due to the trip distribution.

4.4 Impacts on Road Pavements

The theoretical impact on the road pavement is measured by the Equivalent Standard Axle (ESA) load applied by the additional traffic to the life cycle ESA of the existing road pavement.

The additional traffic on Newrybar Swamp Road is unlikely to significantly impact upon the existing road pavement. The proposed development will generate approximately 2.8×10^5 ESA's (assuming 100% commercial vehicles) in a total design life of the existing pavement of approximately 5×10^6 ESA's (assuming 300mm pavement depth and subgrade CBR of 10 – Figure 8.4, Austroads 'Guide to Pavement Technology: Part 2 – Pavement Structural Design', 2012), or approximately 5.6% of the total design traffic for the road. The level of impact on the road pavements of other roads decreases as the traffic is distributed throughout the local road network. The pavement life of the local roads is therefore not compromised by the traffic generated by this development.

4.5 Impact on Public Transport

Where using main roads, the haulage trucks will share these roads with public transport. This is the case with current extraction haulage activities in the area, with no known problems. It is recommended that

truck drivers be made aware of existing school bus routes, bus stop locations and timetables along the proposed haulage routes.

The proposal raises no demand for the provision of public transport as only one to three employees are engaged at the site. Private transport will be adopted for personal access.

5 Conclusion

An assessment of a variety of traffic issues associated with the proposed development was undertaken by Ardill Payne & Partners. This assessment was to examine the impact that the proposed development will have on the local traffic flows and road network.

The issues addressed in this report and the associated conclusions are summarised below:

- **Access** – the proposed site access location is suitable for the proposed heavy vehicle movements, and intersection sight distance is adequate.
- **Parking** – adequate space will be provided onsite for employee and visitors parking.
- **Traffic Generation** – will not alter the level of service currently experienced on adjacent roads, nor impose any major social or physical detriment upon the local residents and road users.
- **Traffic Safety** – traffic movements generated by the development are unlikely to raise any adverse safety issues for local transport and users of the local and regional road network.

In view of the above it is assessed that the safety and efficiency of the local road network will not be unduly affected by the increase in the number of truck movements that will be generated by the proposal.

6 Scope of Engagement

This report has been prepared by Ardill Payne & Partners (APP) at the request of Ballina Sands Pty Ltd for the purpose of a traffic impact study for the proposed extractive industry (sand quarry), and is not to be used for any other purpose or by any other person or corporation.

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

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

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

7 Attachments

Attachment 1 Locality Plan

Attachment 2 Development Proposal

ATTACHMENT 1



Project	Lot 32 DP 1151612 Newrybar Swamp Road Lennox Head		Client	Ballina Sands		Scale at A3	As shown		
	Site Locality Plan			Title	Design		RMcG	Drawn	RMcG
					Date		16.01.2013	Filename	6542 SLP
					Checked			Approved	
				Job No.	6542	Dwg. No.	6542	Issue	
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ATTACHMENT 2



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Design	JF	Scale at A3	1:2500
Drawn	RMCG	Drawn	A.H.D.
Date	14.01.2013	Finalised	6542 Rehab Plans
Checked		Approved	
Job No.	6542	Dwg. No.	STAGE1
Issue			

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Client:	Ballina Sands
Title:	Staging Plan Stage 1: Site Establishment & Setup

Project:	Lot 32 DP 1151612 Newrybar Swamp Road Lennox Head
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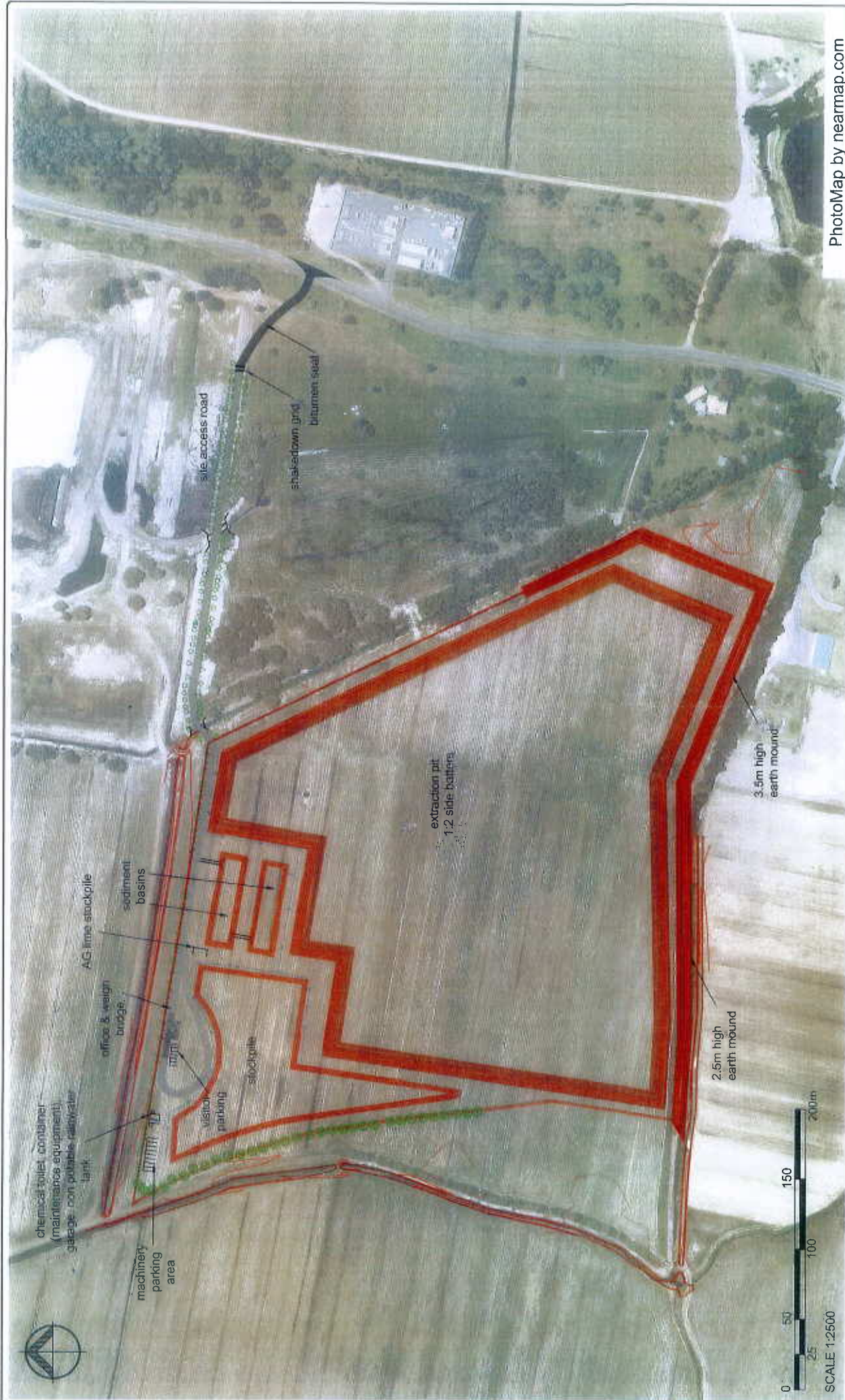
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Design	JF	Scale at A3	1:2500
Drawn	RMCG	Datum	A.H.D
Date	14.01.2013	Filename	6542 Rehab Plans
Checked		Approved	
Job No.	6542	Dwg. No.	STAGE2
House			

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Client:	Ballina Sands
Title:	Staging Plan Stage 2: Commence Extraction

Project:	Lot 32 DP 1151612 Newrybar Swamp Road Lennox Head
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Project	Lot 32 DP 1151612 Newrybar Swamp Road Lennox Head	
	Ballina Sands	
Client	Title:	
	Stage 3: Conclusion of Extraction	
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<p>ARDILL PAYNE & PARTNERS Consulting Civil & Structural Engineers Project Managers Town Planners & Surveyors 79 Tamar Street PO Box 100 BALLINA NSW 2478 Telephone: 02 6686 3280 Facsimile: 02 6686 7920 Email: info@ardillpayne.com.au Website: www.ardillpayne.com.au</p>		
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Job No.	6542	Dwg. No.	STAGE4
		Issue	A

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Client:	Ballina Sands
Title:	Staging Plan Stage 4: Final Rehabilitation & Revegetation of Site

Project:	Lot 32 DP 1151612 Newrybar Swamp Road Lennox Head
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