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Report

Westport Quarry

Environmental Noise Impact Assessment

SMK Consultants

10 December, 2014
Rev 0 (Final)

Report Details

Westport Quarry - Environmental Noise Impact Assessment

Filename: 13633 Westport Quarry - Noise Impact Assessment Rev0.docx

Job #: J140317-00 Folder #: F134633

Revision: 0 (Final), Date: 10 December, 2014

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History

Date	Revision	Comments
10/12/2014	0	Final

Endorsements

Function	Signature	Name and Title	Date
Prepared By		Ian Guy Senior Acoustic Consultant (M.A.A.S)	10 December, 2014
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Authorised for Release By		Dr Rod Bennison Lead Environmental Scientist	10 December, 2014

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APPENDICES

1. INTRODUCTION

Advitech Pty Limited (trading as Advitech Environmental) was engaged by SMK Consultants on behalf of Narrabri Shire Council (NSC) to prepare an Environmental Noise Impact Assessment (ENIA) for Westport Quarry owned and operated by NSC. The ENIA forms part of the development application DA 41/2015 – Westport Quarry, Part Lot 21 DP757083, Westport Road, Narrabri to be submitted to the NSW Environmental Protection Authority (EPA).

The purpose of this assessment was to conduct an environmental noise assessment of the Westport Quarry operations and determine the acoustic impact on the local community in accordance with the EPA's letter (Reference DOC14/210637-02) to NSC and to comply with the requirements of the NSW Industrial Noise Policy (INP).

It should be noted that this report was prepared by Advitech Environmental for SMK Consultants ("the customer") in accordance with the scope of work and specific requirements agreed between Advitech and the customer. This report was prepared with background information, terms of reference and assumptions agreed with the customer. The report is not intended for use by any other individual or organisation and as such, Advitech will not accept liability for use of the information contained in this report, other than that which was intended at the time of writing.

1.1 Site Location and Surrounding Land Use

The Westport Quarry site is owned by the NSW Crown and utilised by Council under an agreement with Forestry Corporation. The quarry is located in the north eastern sector of the Jacks Creek State Forest. The quarry has been utilised by Council for several decades to repair and maintain various Shire roads, mainly located in the southern and south western part of the Shire. **Figure 1** shows the location of the Westport Quarry on the map of the local area.

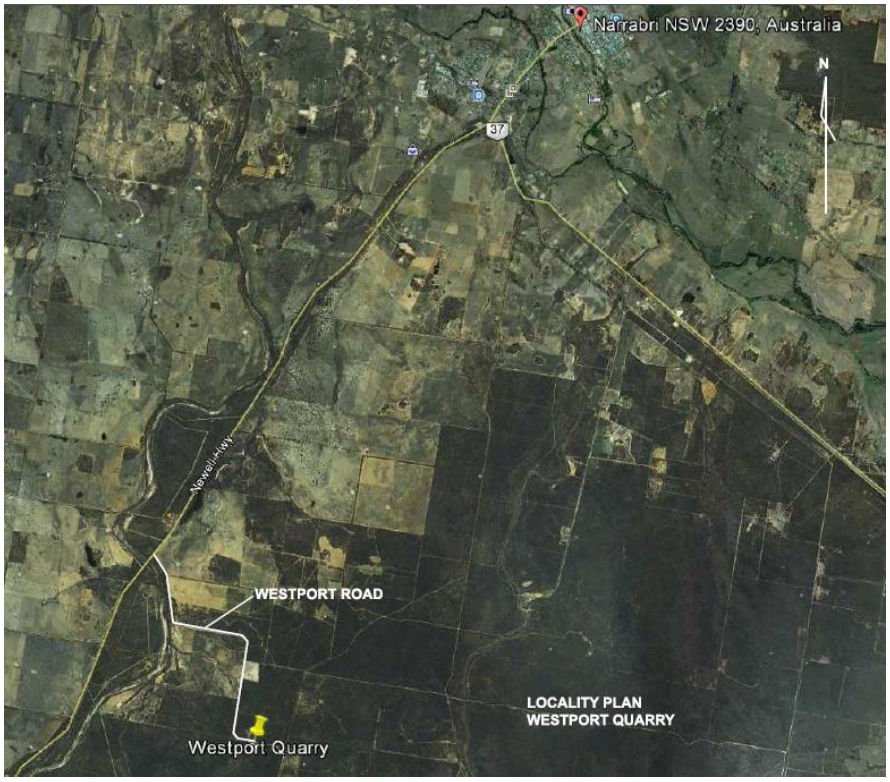


Figure 1: Locality Map (Source: SMK Consultants)

1.2 Proposed Development

Council proposes to extend the quarry by a distance of approximately 100 metres to the south into Jacks Creek State Forest and squaring off the eastern boundary. The extension will cover an area of approximately 4.75 hectares. Due to demand for road building and construction materials, Council wishes to secure long term access to this quarry.

Vehicular access to the site would remain via Westport road. Transport vehicles associated with the quarry are to remain as a truck and dog vehicle arrangement to haul product from the quarry. As a result daily truck traffic movements would remain similar to current levels.

The plan of the current and proposed Westport Quarry operations is provided in **Figure 2.**

Figure 2: Westport Quarry Operations

1.3 Sensitive Noise Receivers

Figure 3 presents an aerial photograph of noise sensitive receivers in the surrounding rural district from the quarry. The nearest residence (Residence 1) not associated with the proposal is located approximately 350 metres north of the centre of the quarry site. Whereas, residences 5 and 6, being located a considerable distance from the quarry operations, are more likely to be impacted by vehicular transportation.

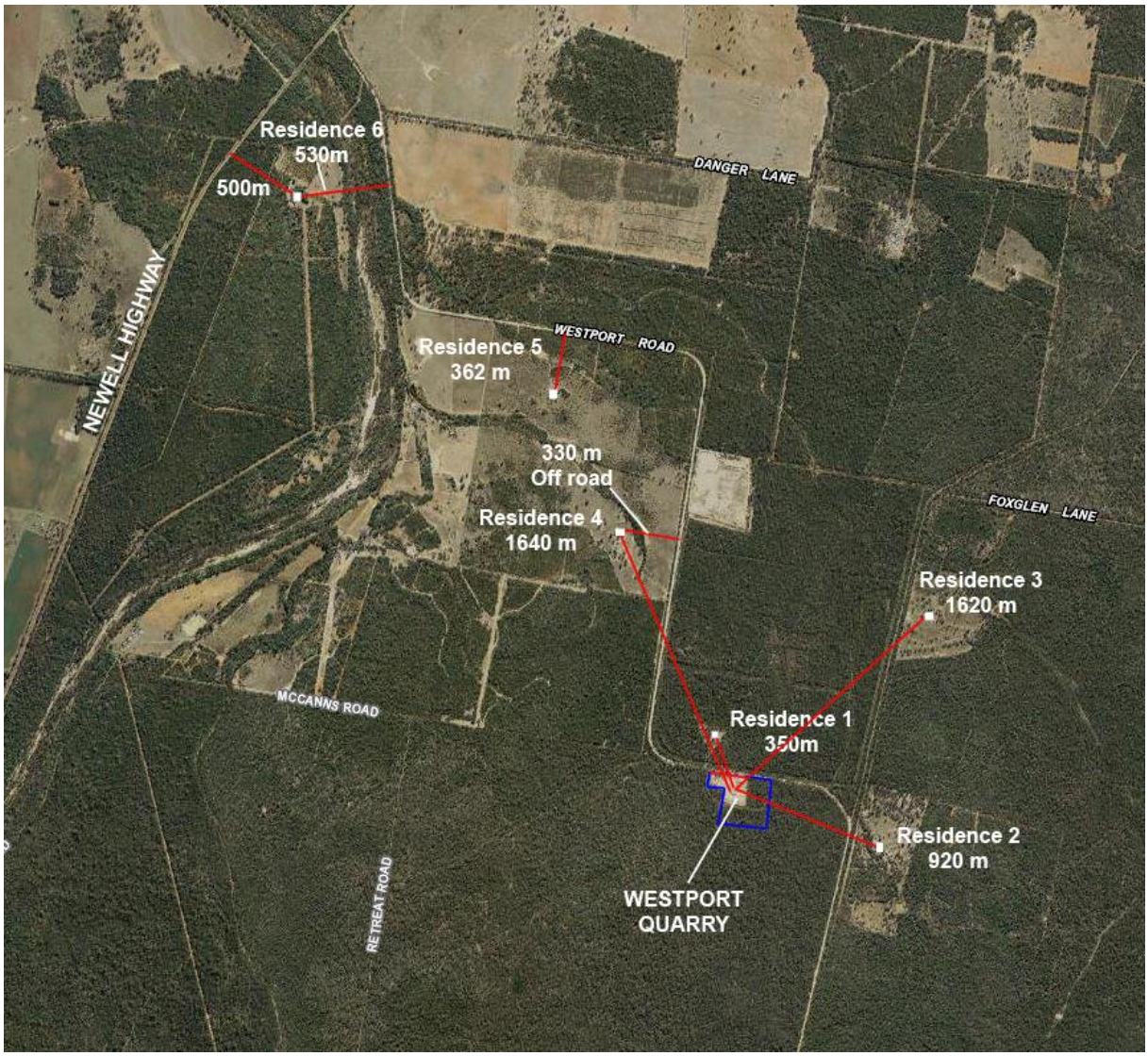


Figure 3: Sensitive Noise Receivers

2. REFERENCES

The following information was used in the preparation of this report:

1. Narrabri Shire Council (EIS) Notice of Development Application 41/2015 – Designated Development dated 22 September 2014;
2. NSW Environment Protection Agency (EPA). Letter of response to Council (Reference DOC14/210637-02 dated 10 October 2014;
3. NSW Environment Protection Agency (2000). *NSW Industrial Noise Policy*, NSW Environment Protection Agency, Sydney; and
4. NSW Department of Environment, Climate Change and Water (2011). *NSW Road Noise Policy*, NSW Department of Environment, Climate Change and Water, Sydney.

3. NOISE ASSESSMENT CRITERIA

3.1 Assessing Industrial Noise Sources

3.1.1 Project Specific Noise Levels

The NSW Industrial Noise Policy (INP) presents a methodology for determining Project Specific Noise Levels (PSNL) for industrial development. On 8 December 2014 during a telephone conversation, the NSW Environment Protection Authority (EPA) provided direction to the assessment of the existing noise environment adjacent to the development site, and determined the PSNL relevant to the proposed development. It was considered and agreed that the noise criteria be set at 35dBA$_{Leq}$ for the assessment of impacts associated with the proposed development.

3.1.2 Assessment Periods

Current approvals and management plans state that noise generated by the project is to be measured and evaluated in accordance with the relevant requirements and exemptions of the NSW Industrial Noise Policy (INP). The INP states:

- Day is defined as the period from 7am to 6pm Monday to Saturday, and 8am to 6pm Sundays and public holidays;
- Evening is defined as the period from 6pm to 10pm; and
- Night is defined as the period from 10pm to 7am Monday to Saturday, and 10pm to 8am Sundays and public holidays.

3.1.3 Predicting Noise Levels

The INP presents the following procedure to accurately predict the noise impact from an industrial noise source:

- Identify all possible source, site and receiver parameters so that noise can be adequately predicted;
- Predict noise levels from the source at receiver locations, taking into account all important parameters including the source noise levels and locations, operating times, receiver locations, weather conditions applicable to the site, site features and topography, as well as the project-specific noise levels; and
- Compare the predicted noise level with the project-specific noise levels to determine the noise impact.

The INP requires noise impacts to be quantified at all potentially affected receivers. Specifically, the noise levels predicted should correspond to the noise descriptor of the project specific noise levels applicable to the project. Any assumptions made when determining descriptors should be clearly validated and reported in the noise assessment.

4. OPERATIONAL NOISE IMPACTS

4.1 Project Specific Noise Levels

As stated in **Section 3.1.1,** the PSNL adopted was 35dBA$_{Leq}$ for the assessment of impacts associated with the proposed development over all three (3) assessment periods.

4.2 Modelling Methodology

Prediction of the cumulative $L_{Aeq,15\text{-}minute}$ noise level resulting from the proposed development was undertaken by modelling noise sources using the Predictor (Type7810) software. The Predictor software package calculates the noise level at specified receiver locations (Single Point Calculation) and generates noise level contours over a defined area (Contour Calculation).

The predicted noise levels are then compared against the project specific noise levels. If the project specific noise levels are exceeded, feasible and reasonable noise mitigation strategies will need to be assessed for the proposed development, to ensure compatibility with the existing noise environment.

If the proposed development can achieve the project specific noise levels during the night time period it will also achieve the less stringent day and evening criteria.

4.3 Noise Sources

The modelled impact of the proposed operation was based on the Sound Power Level (SWL) and location of noise sources within the project, consistent with the site arrangement provided in **Figure 2**.

The purpose of this assessment is to provide detailed analysis of potential noise impacts and identify conflicts with the existing noise environment. The mechanical plant octave band SWLs applied to the model were calculated from field measurements of current fixed plant infrastructure and of the mobile plant, including transportation vehicles, utilised at typical quarry operations.

The noise sources used in the model are presented in **Table 1**.

Table 1: Representative source noise levels

Description	SWL, dB(A)
Track Dozer (Komatsu D275)	108
Rock Crusher (Terex Finlay)	115
Front End Loader (Caterpillar 980H)	108
Truck and Dog Combination	107

The model presents a worst case noise impact for proposed operations, comprising:

- Dozer ripping and stockpiling rock material;
- Mobile crusher operating with associated loader operations, adjacent to processed material;
- Trucks hauling road base product within the quarry; and
- Haul trucks transporting product on Westport Road.

It should be noted that impact predictions are made on the basis of the $L_{Aeq,15minute}$ criteria, and that all sources are active within any single 15 minute period.

4.4 Assumptions of the Model

The following assumptions are implicit in the noise model:

- Noise emissions were modelled as a worst case noise level from the proposed Westport Quarry site. The model assumes noise is emitted as a point source from each of the specified fixed plant noise sources and as line sources for mobile plant and transportation vehicles;
- The plant layout was based on the Westport Quarry site arrangement provided in **Figure 2** and from Advitech staff observation during the quarry site inspection.
- Sound Power Level (SWL) and location of noise sources within the project, consistent with the site arrangement and representative source noise levels provided in **Table 1.**
- Worst case meteorological propagation scenario was applied to the model in accordance with Section 5.1 of the INP. Propagation was assessed under the following meteorological scenarios:
  - Neutral (calm) conditions;
  - Worst case gradient wind (source to receiver wind at 3m/s); and
  - Night period temperature inversion (G-class stability, source to receiver wind at 0.5m/s).
- the following operational scenarios are considered and include the following noise sources:
  - preliminary site preparation via dozer ripping (1 x Komatsu D275);
  - quarrying operations – crushing, stockpiling, loading of material into transport trucks and transport offsite via Westport Road (1 x Crusher, 1 x Loader and 1 x truck and dog); and
  - modified quarrying operations. Preliminary review of 'Quarrying Operations' model indicates potential for significant impacts associated with operation of crushing plant. A subsequent model was developed to evaluate potential impacts under a scenario whereby judicious location of stockpiles is used to provide screening of emissions from crushing plant.

4.5 Results

Table 2 presents the results of noise modelling focused on the nominated noise sensitive receivers to the Westport Quarry operations.

Table 2: Predicted worst case noise level, dB(A)

Noise Receiver	Dozer Ripping	Quarry Operations	Modified Quarry Operations
Receiver 1	**42**	**50**	**47**
Receiver 2	31	**37**	**37**
Receiver 3	26	32	32
Receiver 4	<25	34	34
Receiver 5	<25	32	32
Receiver 6	<25	28	28

4.5.1 Assessment of Industrial Noise Impacts

Results of this assessment indicate that $L_{Aeq,15minute}$ impacts associated with the proposed operations would exceed the PSNL at adjacent to the Westport Quarry, under worst case meteorological conditions and Receivers R1 and R2:

- Dozer ripping activities may exceed the 35dB(A) PSNL at R1 by up to 7dB(A);
- Crushing of quarried material may exceed the 35dB(A) PSNL at R1 by up to 15dB(A);
  - it is noted that through the judicious use of stockpiles as screening barriers, a 3dB(A) reduction on this SPL may be expected; and
- A minor (2dB(A)) exceedence of the 35dB(A) PSNL may be expected at R2 during crushing of quarried material under worst case (source to receiver wind) conditions;
  - it is noted that impact predictions for this activity are less than the 35dB(A) PSNL under neutral meteorological conditions.

Worst case impact predictions at all other receivers (R3 to R6) are less than the 35dB(A) PSNL under all meteorological conditions.

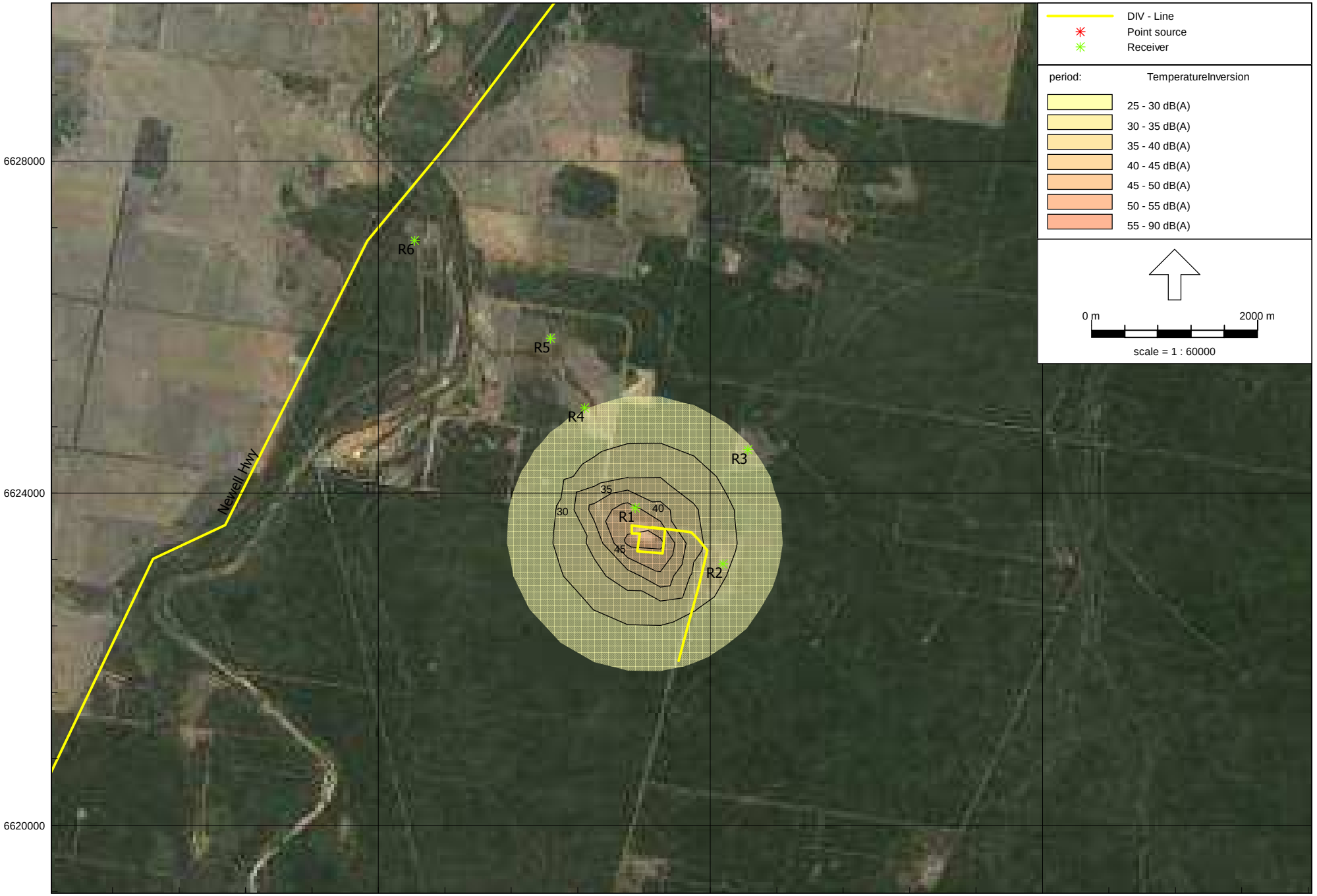
5. DISCUSSION AND CONCLUSION

The acoustic impact of the proposed expansion of Westport Quarry operations is predicted to exceed the adopted PSNL of $35dBA_{Leq}$ at the nearest noise sensitive receiver (R1) during typical quarry operations. Minimal to negligible acoustic impact is predicted at all other sensitive receivers surrounding the quarry operations and transportation route.

Advitech Environmental understands that rather than permanent operation, the quarry would operate on a campaign basis to win material only in order to meet specific needs of NSC. On the basis of these potentially short term operational scenarios (on the order of weeks or months), it is considered that potential impacts at receivers R1 and R2 may be managed via effective consultation with affected residents, and with reference to noise management practices for short term or temporary works established in the Interim Construction Noise Guideline (ICNG).

Appendix I

Noise Impact Contours



Industrial noise - ISO 9613.1/2 (1/3 Octave), [Narrabri - Westport Quarry Model (Dozer Rip)] , Predictor V8.11

Published: 10 December, 2014

Westport Quarry Noise Model
G-stability, 0.5m/s from South, Dozer Ripping

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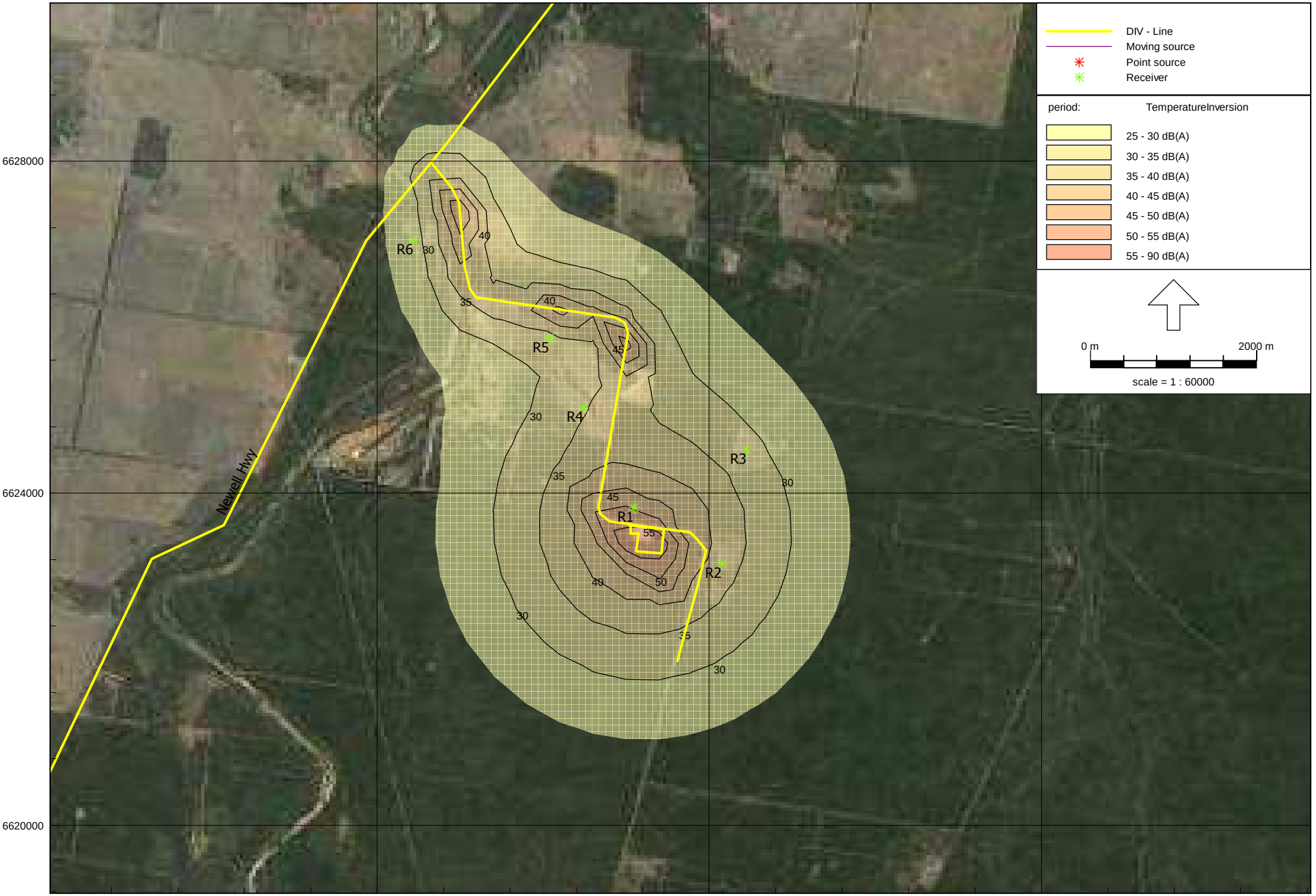
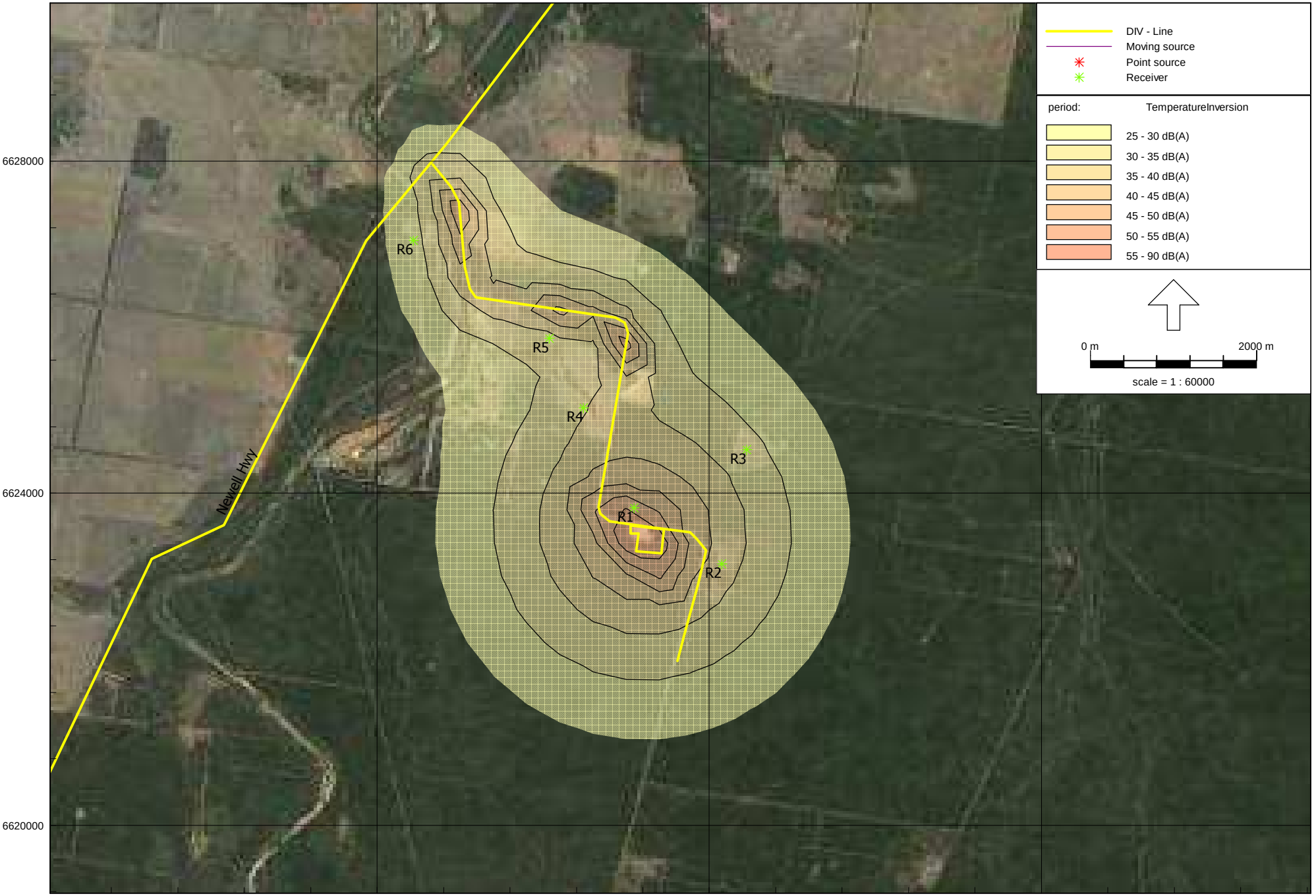


Industrial noise - ISO 9613.1/2 (1/3 Octave), [Narrabri - Westport Quarry Model (Processing with Stockpiles)] , Predictor V8.11

Published: 10 December, 2014

Westport Quarry Noise Model
G-stability, 0.5m/s from South, Processing with Stockpiles

Advitech Environmental Pty Ltd



Industrial noise - ISO 9613.1/2 (1/3 Octave), [Narrabri - Westport Quarry Model (Processing without Stockpiles)] , Predictor V8.11

Published: 10 December, 2014

Westport Quarry Noise Model
G-stability, 0.5m/s from South, Processing without Stockpiles

Advitech Environmental Pty Ltd

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SOUTH QLD SOILS PTY LTD
ATF F&B UNIT TRUST ABN 35 229 054 612

NARRABRI LABORATORY
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California Bearing Ratio Test Report

Report No: CBR:S149-8996
Issue No: 1

Client:
Narrabri Shire Council
PO Box 261.
Narrabri. NSW 2390

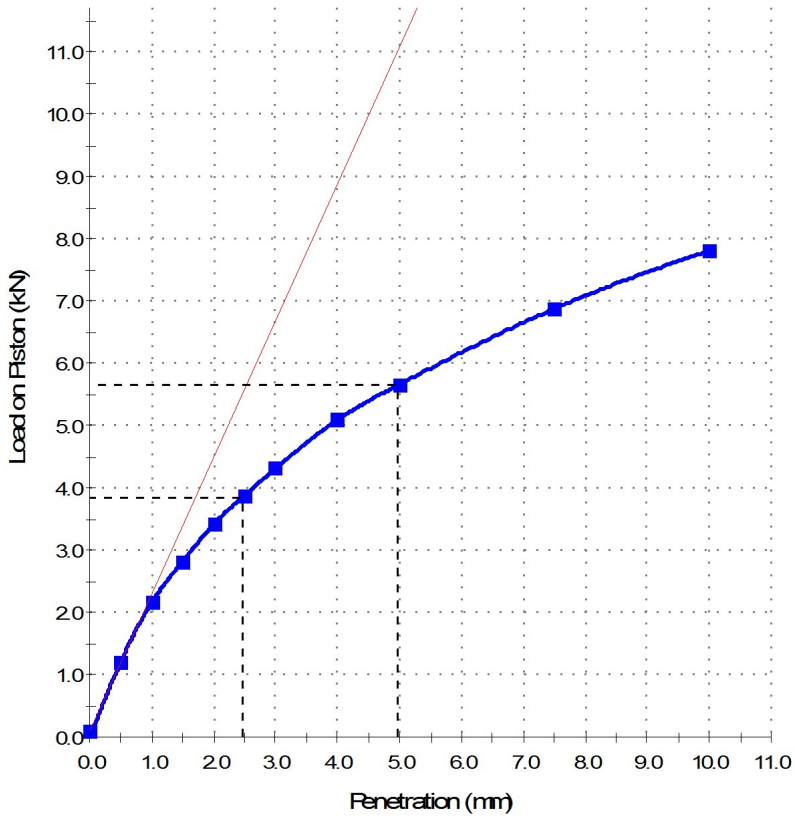
Project: Quality Assurance

NATA
Accreditation No. 2911
Accredited for compliance with ISO/IEC 17025.
Approved Signatory: Leigh Boyd
Date of Issue: 19/11/2014

Sample Details

Sample ID:	S149-8996	Date Sampled:	11/11/2014
Sampled By:	Client		
Sampling Method:	Unknown		
Source:	West Port Stockpile	Material:	Clayey Gravel
Specification:	N/A	Location:	West Port Stockpile, Sample 1
Tested By:	Aaron O'Donoghue	Date Tested:	18/11/2014
Lot No:	N/A		
TRN:	N/A		

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 2.5mm (%):	30
Maximum Dry Density (t/m³):	1.91
Optimum Moisture Content (%):	10.9
Dry Density before Soaking (t/m³):	1.91
Density Ratio before Soaking (%):	100
Moisture Content before Soaking (%):	10.8
Moisture Ratio before Soaking (%):	98
Dry Density after Soaking (t/m³):	1.91
Density Ratio after Soaking (%):	100
Swell (%):	0.0
Moisture Content of Top 30mm (%):	14.9
Moisture Content of Remaining Depth (%):	12.6
Compactive Effort:	Standard
Surcharge Mass (kg):	4.50
Period of Soaking (Days):	4
Oversize Material:	Excluded
Oversize Material (%):	23.7

Moisture Content

Field Moisture Content (%):	4.5

Comments

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28 Dangar Street Narrabri NSW 2390
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Material Test Report

Report No: MAT:S149-8996
Issue No: 1

Client:
Narrabri Shire Council
PO Box 261.
Narrabri. NSW 2390

Project: Quality Assurance

NATA
Accredited for compliance with ISO/IEC 17025.
Accreditation No. 2911
Approved Signatory: Leigh Boyd
Date of Issue: 19/11/2014

Sample Details

Sample ID:	S149-8996
Field Sample:	302531
Test Request No:	N/A
Sampled By:	Client
Sampling Method:	Unknown
Date Sampled:	11/11/2014
Lot No:	N/A
Source:	West Port Stockpile
Material:	Clayey Gravel
Specification:	N/A
Location:	West Port Stockpile, Sample 1

Other Test Results

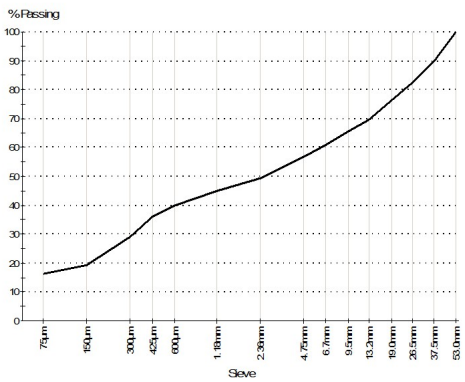
Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	5.0	
Mould Length (mm)		250	
Crumbling		No	
Curling		No	
Cracking		No	
Liquid Limit (%)	AS 1289.3.1.2	27	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	15	
Plasticity Index (%)	AS 1289.3.3.1	12	
Date Tested		14/11/2014	

Particle Size Distribution

Method:	AS 1289.3.6.1
Drying by:	Oven
Date Tested:	14/11/2014
Note:	Sample Washed

Sieve Size	% Passing	Limits
53.0mm	100	
37.5mm	90	
26.5mm	82	
19.0mm	76	
13.2mm	70	
9.5mm	66	
6.7mm	61	
4.75mm	57	
2.36mm	49	
1.18mm	45	
600µm	40	
425µm	36	
300µm	29	
150µm	19	
75µm	16	

Chart



Comments

N/A