



HEGGIES

REPORT 30-1202-R3

Revision 0

**Proposed Minor Modification to Holcim
Regional Distribution Centre, Rooty Hill
Noise Impact Assessment**

PREPARED FOR

**Umwelt (Australia) Pty Limited
PO Box 838
Toronto NSW 2283**

26 AUGUST 2010

HEGGIES PTY LTD
ABN 29 001 584 612



Proposed Minor Modification to Holcim Regional Distribution Centre, Rooty Hill Noise Impact Assessment

PREPARED BY:

Heggies Pty Ltd
Level 1, 14 Watt Street Newcastle NSW 2300 Australia
(PO Box 1768 Newcastle NSW 2300 Australia)
Telephone 61 2 4908 4500 Facsimile 61 2 4908 4501
Email newcastle@heggies.com Web www.heggies.com

DISCLAIMER

Reports produced by Heggies Pty Ltd are prepared for a particular Client's objective and are based on a specific scope, conditions and limitations, as agreed between Heggies and the Client. Information and/or report(s) prepared by Heggies may not be suitable for uses other than the original intended objective. No parties other than the Client should use any information and/or report(s) without first conferring with Heggies.

The information and/or report(s) prepared by Heggies should not be reproduced, presented or reviewed except in full. Before passing on to a third party any information and/or report(s) prepared by Heggies, the Client is to fully inform the third party of the objective and scope and any limitations and conditions, including any other relevant information which applies to the material prepared by Heggies. It is the responsibility of any third party to confirm whether information and/or report(s) prepared for others by Heggies are suitable for their specific objectives.



Heggies Pty Ltd is a Member Firm of the Association of Consulting Engineers Australia.



Heggies Pty Ltd operates under a Quality System which has been certified by SAI Global Pty Limited to comply with all the requirements of ISO 9001:2008 "Quality management systems - Requirements" (Licence No 3236).

This document has been prepared in accordance with the requirements of that System.

DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
30-1202-R3	Revision 0	26 August 2010	John Cotterill	Nathan Archer	John Cotterill



EXECUTIVE SUMMARY

Heggies Pty Ltd (Heggies) has been commissioned by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Holcim (Australia) Pty Ltd (Holcim) to prepare a noise impact assessment (NIA) for proposed minor modifications to the approved Regional Distribution Centre (RDC) to be located at Rooty Hill, NSW.

Broadly, the objective of this noise assessment was to identify the potential impacts of noise from the proposed modifications, including construction and operation stages and associated on-site rail and vehicle movements, and to provide advice with regard to effective mitigation strategies where necessary. As there are no changes proposed to road and rail movements to or from the RDC as a result of the modification these will not form part of this NIA.

OPERATIONAL NOISE PREDICTIONS

A computer model was used to predict noise emissions from the proposed RDC. The Environmental Noise Model (ENM) used has been produced in conjunction with the Department of Environment, Climate Change and Water (DECCW). Noise levels were predicted for the general operational scenario summarised in **Section 7.1.1** with the inclusion of the noise mitigation and management procedures detailed in **Section 7.1.2**. While the mitigation options specified in this report will allow the RDC to achieve the predicted noise levels, Holcim reserve the right to alter or refine these methods if superior mitigation techniques or improvements in technology become available.

Operational noise levels are predicted to meet the project specific noise criteria and relevant consent conditions at all residential locations under calm and prevailing weather conditions. In addition, noise levels at the Colebee function centre and the Blacktown Olympic Centre are predicted to meet the acceptable project specific noise criteria.

Some small areas of the Nurranginy Reserve, adjacent to the Holcim site boundary, may experience noise levels higher than the acceptable amenity level for a passive recreation area (50 dBA) with all equipment on site operating simultaneously. It should be noted that ambient noise levels within the Reserve are already relatively high, particularly in close proximity to the rail line.

The noise barrier adjacent to the rail line at Nurranginy Reserve will have the effect of minimising noise and visual impacts as a result of construction and operation of the RDC. This barrier will also have the additional benefit of reducing existing rail traffic noise.

The predicted noise impacts for the modification to the RDC are less than the noise impacts for the approved RDC at all residential locations surrounding the site. The predicted noise impacts for the modification are generally below or similar to the impacts predicted for the approved RDC at the Nurranginy Reserve, Colbee Centre and Blacktown Olympic Centre.

SLEEP DISTURBANCE ASSESSMENT

In the interests of minimising sleep disturbance impacts the following mitigation measures will be implemented during the morning shoulder (6:00 am to 7:00 am) and night-time periods (10:00 pm to 6:00 am):

- Front end loader reversing alarms will not be used; reversing warnings will be visual only.
- All conveyor start-up warnings will be visual, not audible.
- All those provided in **Section 7.1.2**.



EXECUTIVE SUMMARY

The highest L_{Amax} noise level at any residential area is predicted to occur when trains are manoeuvring at the extremities of the rail siding in the presence of a temperature inversion. Maximum noise emissions from the Project site are predicted to meet the recommended sleep disturbance noise goals at all residential locations.

CONSTRUCTION NOISE ASSESSMENT

Construction noise levels are predicted to be below the relevant noise goals at each of the residential areas considered once the relevant noise barriers are in place. There may be short periods of time, while noise barriers are being constructed or when multiple pieces of construction equipment are in use, where construction noise levels exceed the relevant noise goals at residential areas.

Sections of the Nurragingy Reserve close to the RDC are likely to experience noise levels that are marginally above (approximately 1 dBA) the relevant noise goal when heavy construction equipment is operating on the eastern boundary of the RDC site. The noise impact in the Reserve will decrease as works move away from the boundary. Notwithstanding this, recommendations have been presented in **Section 7.3.2** with the aim of minimising construction noise impact at the Nurragingy Reserve and at the nearest residential locations.



TABLE OF CONTENTS

1	INTRODUCTION	6
2	PROJECT DESCRIPTION	6
	2.1 Acoustically Significant Plant and Equipment	8
3	SITE DETAILS	9
4	NOISE ASSESSMENT CRITERIA	10
	4.1 Operational Noise	10
	4.2 Construction Noise Goals	13
5	ASSESSMENT OF NOISE IMPACTS	15
	5.1 Operational Noise Modelling	15
	5.1.1 Operational Noise Modelling Parameters	15
	5.1.2 Noise Management and Mitigation	16
	5.1.3 Operational Scenario - Noise Model Summary	18
	5.1.4 Operational Noise Modelling Results and Discussion	19
	5.1.5 Cumulative Noise Assessment	21
	5.2 Sleep Disturbance Analysis	21
	5.3 Construction Noise Assessment	22
	5.3.1 Construction Noise Modelling Parameters	22
	5.3.2 Construction Noise Modelling Results and Discussion	23
	5.3.3 Construction Vibration	24

Appendix A Location Map

Appendix B Noise Contours



1 INTRODUCTION

Heggies Pty Ltd (Heggies) has been commissioned by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Holcim (Australia) Pty Ltd (Holcim) to prepare a noise impact assessment (NIA) for minor modifications to the approved Regional Distribution Centre (RDC) located at Rooty Hill, NSW.

Project Approval was granted under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in April 2006 (Approval No. 05_0051) to construct and operate the RDC. Since the approval was granted and building on the recent change in ownership Holcim conducted a review of the approved RDC project for which construction has not yet commenced. During the review process Holcim identified some potential design improvements and efficiencies and is now seeking to modify the 2006 Project Approval to allow these minor design modifications.

The objective of this noise assessment was to identify the potential impacts of noise from the proposed modifications, including construction and operation stages and associated on-site rail and vehicle movements, and to provide advice with regard to effective mitigation strategies where necessary. As there are no changes to road and rail movements to or from the RDC as a result of the modification these do not require further consideration as part of this NIA.

The noise assessment has been prepared in accordance with Australian Standard AS 1055-1997 “*Description and Measurement of Environmental Noise*” Part 1, 2 and 3 and with reference to the NSW Industrial Noise Policy (INP), Environmental Noise Control Manual (ENCM) and the Interim Construction Noise Guideline.

Heggies also prepared the noise impact assessment for the original development application (refer Heggies Report 30-1202-R2 Revision 3 *Proposed Regional Distribution Centre Rooty Hill Noise Impact Assessment* dated 3 November 2005).

2 OVERVIEW OF THE APPROVED RDC

Holcim currently supplies the Sydney market with quarry products from the company’s Penrith Lakes Development Corporation (PLDC) operations. However, this resource is nearly depleted and the facility is approaching closure. Consequently Holcim has had to locate alternative sources of quarry products to meet the needs of its Sydney market. These quarry materials will come from quarries outside the Sydney basin, including the new Lynwood Quarry near Marulan in the Southern Tablelands region of NSW. The approved RDC will allow Holcim to receive, store and distribute construction materials to meet customer requirements in the Sydney region.

The RDC is approved to handle up to 4 Mtpa of quarry product. Construction materials such as sand and aggregate will be transported by rail to the RDC from quarries. These materials will be blended by equipment at the RDC as required and distributed by road to the Sydney market.

The approved RDC includes the following:

- A regional office building and materials testing laboratory.
- A rail siding and rail unloading facility.
- Elevated steel storage bins and truck load out facilities.
- Ground storage and reclaim facilities.
- Blending Plant/Pug Mill.
- A conveyor system linking the unloading station to the storage and truck load out facilities.
- Workshop, stores, site offices and amenities facilities, truck washdown facilities, truck refuelling, weighbridges, truck and car parking.



- Concrete Batching Plant (CBP).
- Bridges at two locations over Angus Creek.
- Realignment of the existing North Parade and creation of New North Parade.

The approved RDC will operate 24 hours per day, seven days a week. The RDC will take approximately two years to build and will employ approximately 220 people during construction. During operation of the approved RDC, approximately 250 people will be employed on-site. At 4 Mtpa the approved RDC will dispatch approximately 400 heavy vehicles from the site on an average day. All traffic to the RDC will access the site via Kellogg Road, with the exception of some minor laboratory traffic. Those vehicles accessing Kellogg road to/from the south will do so via Woodstock Avenue direct from the M7. Heavy vehicles accessing Kellogg Road to/from the north would do so via Glendenning Road and Power Street direct from the M7

3 DESCRIPTION OF THE PROPOSED MODIFICATIONS

The RDC site is located at Kellogg Road and Woodstock Avenue, Rooty Hill within the Blacktown Local Government Area (LGA). The site is located to the north of the Main Western Railway Line, Nurragingy Reserve is located to the east, and an industrial area is located to the west and to the north of the Project Area.

Construction of the RDC is planned to begin in 2011 and the RDC is expected to commence operations in 2013. Since the 2006 granting of approval for the RDC, Holcim has been undertaking further detailed design studies and has identified operational, capital and environmental benefits in modifying the approved layout of the RDC. Accordingly Holcim is seeking a modification to the 2006 Project Approval to allow these minor modifications to the approved RDC (The Project).

The Project will involve minor changes to the approved, but yet to be constructed RDC. The facility would initially commence handling of 2 to 2.5 Mtpa of quarry product, increasing to a projected full capacity of about 4 Mtpa as dictated by the construction materials market.

The proposed minor modifications include:

- Changing from elevated steel storage bins to on-ground concrete storage bays, this will reduce the height of the storage facility by about 10 metres.
- Changing the configuration and location of the rail unloader and rail sidings to accommodate shorter trains, for the initial phase of the development.
- Reducing the payload capacity of trains, for the initial phase of the development.
- The removal of the ground storage bins that were originally sited west of the steel storage bins.
- Closure of North Parade by Blacktown City Council rather than relocation of the road.
- An increased ground storage area at the radial stacker.
- Minor changes to the locations of the office, workshop and other internal facilities are proposed to improve operating efficiencies and in response to the layout changes outlined above.

The proposed minor changes to the RDC will not result in changes to overall RDC components or to the approved RDC capacity of 4 Mtpa. The RDC will operate in much the same way as is currently approved. There will be no change to the number, size or tonnages of heavy vehicles accessing the facility during construction or operation of the RDC. Traffic arrangements and volumes will not change from the currently approved RDC design.



4 ACOUSTICALLY SIGNIFICANT PLANT AND EQUIPMENT

Acoustically significant plant and equipment to be used on site, and the associated sound power levels, are provided in **Table 1**. These levels were obtained from a Heggies database of similar equipment.

Table 1 Rooty Hill Modified RDC Plant and Equipment Sound Power Levels

Plant and Equipment	LAeq(15minute) Sound Power Level*
Trucks being loaded with product	100 dBA
Trucks driving off	91 dBA
Blending plant	106 dBA
Base bin with feeder	100 dBA
RDC front end loader	110 dBA
Truck unloading into reclaim hopper	95 dBA
Radial stacker	104 dBA
Conveyor drive (100kW-250kW, unenclosed)	98 dBA
Conveyor drive (45kW-75kW, unenclosed)	95 dBA
Conveyors	97 dBA/100m
Skid steer loader	104 dBA
Street sweeper/Water cart	105 dBA
Forklift	98 dBA
Dust control units (enclosed)	93 dBA
Maintenance activities (eg grinding, welding, etc)	Up to 104 dBA
Air compressor	90 dBA
Rail noise: unloading from train	109 dBA
locomotives (2)	100 dBA
wagon bunching	95 dBA
Agitator loading	110 dBA
Agitator slumping	110 dBA
Cement tanker	111 dBA
Raw materials delivery truck	102 dBA
CBP front end loader	107 dBA

Note: In addition CV-04, CV-07, CV-11, CV-13 and CV-15 will be designed to achieve a sound power level of 92 dBA/100m



5 SITE DETAILS

The RDC site is located off Kellogg Road, Rooty Hill. It lies within the City of Blacktown, Parish of Rooty Hill and the County of Cumberland. The site is situated within a developed industrial area in Western Sydney approximately 35 km west of the Sydney Central Business District (CBD).

Existing industrial developments are located adjacent to the western and northern boundary of the RDC. The nearest residential area is located to the west on Station Street, Rooty Hill, approximately 590 metres from the RDC. There are also residences located to the South and east of the RDC on Mavis Street, Rooty Hill and Knox Road, Doonside approximately 720 and 770 metres from the RDC respectively.

The Nurragingy Reserve is also a potentially affected area since it is located immediately east of the RDC. The Colebee Centre, a function centre, located in the Nurragingy Reserve east of the RDC and the Blacktown Olympic Centre, located to the south across the Main Western Railway line, have also been considered as potentially noise-sensitive areas.



6 NOISE ASSESSMENT CRITERIA

6.1 Operational Noise

Project specific noise criteria were determined as part of Heggies previous noise assessment (refer Heggies Report 30-1202-R2 Revision 3 *Proposed Regional Distribution Centre Rooty Hill Noise Impact Assessment* dated 3 November 2005). These noise criteria are reproduced in **Table 2** and **Table 3**.

Table 2 Proposed RDC Project Specific Noise Criteria

Location	Period	Intrusiveness Criteria LAeq(15minute)	Amenity Criteria LAeq(Period)	Project Specific Noise Criteria
Location 1 (Station Street)	Morning Shoulder	47 dBA	52 dBA	47 dBA
	Day	52 dBA	60 dBA	52 dBA
	Evening	48 dBA	46 dBA	46 dBA
	Night	43 dBA	45 dBA*	43 dBA
Location 2 (Crawford Road)	Morning Shoulder	44 dBA	52 dBA	44 dBA
	Day	45 dBA	60 dBA	45 dBA
	Evening	45 dBA	50 dBA	45 dBA
	Night	43 dBA	45 dBA	43 dBA
Nurragingy Reserve	When in use - day and evening periods only	N/A	Acceptable 50 dBA Recommend Max. 55 dBA	50 dBA 55 dBA max.
Colebee Centre	When in use	N/A	Acceptable 50 dBA Recommend Max. 55 dBA	50 dBA 55 dBA max.
Blacktown Olympic Venue	When in use	N/A	Acceptable 55 dBA Recommend Max. 60 dBA	55 dBA 60 dBA max.

*This criterion has been determined as per the INP for assessment in areas of high traffic noise.
Day 7.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night 10.00 pm - 7.00 am; Morning Shoulder 6.00 am - 7.00 am
On Sundays and Public Holidays, Day 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night 10.00 pm - 8.00 am

Table 3 Sleep Disturbance Noise Goals

Location	Period	Measured Background Noise Level (LA90)	Sleep Disturbance Noise Goal
Station Street*	Morning Shoulder	40 dBA**	55 dBA
	Night	38 dBA	53 dBA
Crawford Road	Morning Shoulder	43 dBA **	58 dBA
	Night	38 dBA	53 dBA

*Sleep disturbance noise goals for Station Street have been adopted at Mavis Street residences.

** These background noise levels are the *lowest* LA90 recorded during the noise monitoring survey and thus provide a conservative assessment of the likelihood of sleep disturbance.

These criteria were determined in accordance with methodology provided in the NSW Industrial Noise Policy and Environmental Noise Control Manual (ENCM).

Notwithstanding the preceding, the following criteria are provided in the Project Approval for the subject development (PA 05_0051).



Noise

The Proponent shall minimise noise emissions from plant and equipment operated on the site in relation to the project by installing and maintaining, wherever reasonable and practicable, efficient silencers, low-noise mufflers (residential standard) and replacement of reversing alarms with alternative measures, such as flashing lights.

Construction

2.2 The Proponent shall only undertake construction activities associated with the project, that are audible at any residential receptor, between the following hours:

- a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;
- b) 8:00 am to 1:00 pm on Saturdays; and
- c) at no time on Sundays or public holidays.

Operation

2.3 The Proponent shall design, construct, operate and maintain the project to ensure that the noise contributions from the project to the background acoustic environment do not exceed the maximum allowable noise contributions specified in Table 1, at those locations and during those periods indicated.

Table 1: Noise Criteria

Location	Morning Shoulder 6am -7am Monday to Saturday and 6 am – 8am Sundays and Public Holidays	Day 7am-6pm Monday to Saturday and 8 am – 6pm Sundays and Public Holidays	Evening 6 pm- 10pm Monday to Sunday	Night 10pm -7am Monday to Saturday and 10pm – 8am Sunday	
	LAeq(15minute) dBA	LAeq(15minute) dBA	LAeq(15minute) dBA	LAeq(15minute) dBA	LA1(1minute) dBA
Any residences in Station Street	39	44	44	39	53
Any residences in Crawford Road	40	40	39	39	53
Any residences in Mavis Street	35	35	35	35	53
Nurragingy Reserve	When the reserve is in use – LAeq 50 dBA				
Colebee Centre	When the centre is in use – LAeq 50 dBA				
Blacktown Olympic Centre (Active recreation area)	When active recreation areas of the centre are in use – LAeq 55 dBA				



2.4 For the purpose of assessment of noise contributions specified under condition 2.3 of this approval, noise from the project shall be

- a) measured at the most affected point on or within the residential boundary, or at the most affected point within 30 metres of the dwelling (where the dwelling is more than 30 metres from the boundary) to determine compliance with $L_{Aeq}(15 \text{ minute})$ noise limits; or
- b) measured at 1 metre from the dwelling façade to determine compliance with $L_{A1}(1 \text{ minute})$ noise limits.

2.5 Notwithstanding condition 2.4 of this approval, should direct measurement of noise from the project be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the EPA (refer to Section 11 of the EPA's Industrial Noise Policy). Details of such an alternative noise assessment method accepted by the EPA shall be submitted to the Director-General prior to the implementation of the assessment method. Section 4 of the Industrial Noise Policy shall also apply to the measured noise levels, where applicable.

2.6 Noise emission limits specified under condition 2.3 apply under the following meteorological conditions:

- a) wind speed up to 2ms^{-1} at 10 metres above ground level; or
- b) temperature inversion conditions of up to $3^{\circ}\text{C}/100\text{m}$ and wind speed up to 2ms^{-1} at 10 metres above the ground.



6.2 Construction Noise Goals

The Department of Environment Climate Change and Water (DECCW) released the Interim Construction Noise Guideline in July 2009.

The guideline sets out noise management levels, in relation to construction type activities, for residential receivers and how they are to be applied. The guideline suggests restriction to the hours of construction that apply to activities that generate noise at residences above the 'highly affected' noise management level. A summary of the noise management levels from the Guideline is contained in **Table 4** and **Table 5**.

Table 4 Interim Construction Noise Guideline Noise at residences

Time of day	Management level LAeq(15minute)	How to apply
Recommended standard hours Monday to Friday 7am to 6pm Saturday 8am to 1pm No work Sundays or public holidays	Noise Affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. <ul style="list-style-type: none"> Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. <ul style="list-style-type: none"> Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ol style="list-style-type: none"> times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise Affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. <ul style="list-style-type: none"> The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.



Table 5 Noise at Sensitive Land Uses (other than residences)

Land Use	Management level LAeq(15minute) (applies when properties are being used)
Classrooms at schools and other educational institutions	Internal noise level 45 dBA
Hospital wards and operating theatres	Internal noise level 45 dBA
Places of worship	Internal noise level 45 dBA
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dBA
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dBA
Community centres	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

It is anticipated that construction of the RDC would take approximately two years to complete.

The daytime background noise level (LA90) was determined at two potentially affected residential locations in 2005. A daytime LA90 of 47 dBA was measured at Location 1 (Station Street) and 40 dBA at Location 2 (Crawford Road). This monitoring was undertaken before the M7 Motorway came into operation and is therefore considered to be conservation as the traffic on the M7 is expected to have increased the background noise levels in areas surrounding the motorway. The project specific construction noise goals are presented in **Table 6** for the nearest potentially affected residential locations.

Table 6 Construction Noise Goals - Residential Areas

Construction Period	Construction Noise Goal (LAeq(15minute))¹	
	Location 1 (Station Street)*	Location 2 (Crawford Road)
Noise affected	57 dBA	50 dBA
Highly noise affected	75 dBA	75 dBA

1. Applicable between the hours of 7.00 am and 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturdays.

* These criteria have also been adopted at Mavis Street residences.

The relevant construction noise goal for the Nurragingy Reserve is LAeq(15minute) 60 dBA and for Blacktown Olympic Centre is 65 dBA.



7 ASSESSMENT OF NOISE IMPACTS

7.1 Operational Noise Modelling

7.1.1 Operational Noise Modelling Parameters

A computer model was used to predict noise emissions from the proposed modified RDC. The Environmental Noise Model (ENM) used has been produced in conjunction with the DECCW and has been endorsed by DECCW for environmental noise assessment. A three-dimensional digital terrain map giving all relevant topographic information was used in the modelling process. The model used this map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers.

Topographic contours and drawings of the RDC were supplied by Umwelt and utilised for the purpose of modelling noise from the proposed development.

Due to the large size of the Nurragingy Reserve the potential noise impact has been assessed at the point most likely to be utilised as a passive recreation area nearest to the RDC. This location, and others where noise was assessed, is shown on the Location Map in **Appendix A**.

Prediction of noise under calm and prevailing atmospheric conditions (temperature inversion and prevailing winds) was conducted. Atmospheric parameters under which noise predictions were made are given in **Table 7**. These prevailing weather conditions were determined from a detailed assessment of meteorological data for Heggies previous noise assessment. Refer to Heggies previous report for details.

Table 7 Meteorological Parameters for Noise Predictions

	Temperature	Humidity	Wind Speed	Wind Direction (degrees from north)	Temperature Gradient
Calm (All periods)	20°C	65%	N/A	N/A	N/A
Temperature Inversion (Night)	10°C	90%	N/A	N/A	3°C/100 m
Easterly Wind (Evening)	20°C	65%	2 m/s	90°	N/A
SSW Wind (Evening and Night)	20°C	65%	2 m/s	202.5°	N/A

Other assumptions made in modelling the proposed development include the following:

- All acoustically significant plant and equipment operates simultaneously.
- Mobile noise sources, such as delivery and product despatch trucks, were modelled at typical locations and assumed to operate in repetitive cycles.
- All mitigation measures described in **Section 7.1.2** are implemented.
- The radial stacker will only be used in the situation of an unforeseen malfunction with the main storage bins (approximately 10% of the time). Single point noise predictions have been made with and without the radial stacker. It has been assumed that the main storage bins will not be loaded when the stacker is in operation.



7.1.2 Noise Management and Mitigation

Noise mitigation and management procedures that have been incorporated into the model with the aim of achieving project specific noise criteria include the construction of noise barriers, enclosures, other specific equipment treatment and management of equipment use during certain periods. While the mitigation options specified in this report will allow the RDC to achieve the predicted noise levels, Holcim reserve the right to alter or refine these methods if superior mitigation techniques or improvements in technology become available. A complete list of mitigation and noise management measures is as follows:

Noise Barriers and Enclosures

- All conveyor drives and transfer points will be enclosed.
- Conveyors CV-04, CV-07, CV-11, CV-13 and CV-15 will be designed to achieve a sound power level of 92 dBA/100m.

Note: Reduction in the sound power level of conveyors can be readily achieved by enclosing (or partially enclosing) the conveyor, utilising specialised low-noise components or some combination of these two methods.

- The most eastern sides of the truck load-out facility will be enclosed.
- A continuous noise wall, minimum of 4 m in height, along the northern side of the subject site; from immediately north of the weighbridge, following the proposed truck route east and continuing to as near as possible to the eastern side of the truck load-out facility.
- A continuous noise wall as near as possible to the northern side of the eastern end of the rail siding. This will follow the Nurragingy Reserve boundary (to the south-west corner of the reserve) at a minimum height of 3 m above the rail level. The wall will then continue north following the access road adjacent to CV-04 at a minimum height of 3 m above ground level.
- The noise walls adjacent to the rail siding should be constructed from timber, an aerated concrete product, or similar sound absorbing materials. Sheet steel fencing product is not recommended for this location due to its highly reflective properties.
- Where noise walls are specified, the same level of noise attenuation can be provided by an earth bund or the combination of a noise wall and earth bund provided the overall height remains at the recommended level. A schematic diagram is provided as **Figure 1** showing indicative locations of the noise walls.



Figure 1 Noise Wall Locations



Equipment Treatments

- The rail unloading bins will be lined to reduce impact noise. Only rail unloading bins that receive aggregate will require to be lined, it is not necessary to line those receiving sand.
- The street sweeper shall have a maximum sound power level of 105 dBA.

Plant Management

- The southern openings of the loading and slumping enclosures of the concrete plant will be required to be closed during operation.



7.1.3 Operational Scenario - Noise Model Summary

The operational scenarios modelled are summarised in **Table 8**. A tick (✓) indicates that the equipment is in operation, a cross (×) indicates that the equipment is not in operation. Where there is a number in brackets following a tick, this represents the number of items of the equipment that has been considered in the noise model. It should be noted that the operational scenario modelled is likely to represent an acoustically worst-case scenario.

Table 8 Operational Scenarios Considered for Noise Modelling

Plant and Equipment	With Radial Stacker	Without Radial Stacker
Trucks being loaded with product (x3) (2 in load-out bays and 1 at stockpile)	✓ (3)	✓ (3)
Trucks driving off (x3 at RDC, x2 at CBP)	✓ (5)	✓ (5)
Pugmill	✓	✓
Product being loaded into storage bins	✓	✓
RDC front end loader (operating near stockpile)	✓	✓
Radial stacker ¹	✓	×
Conveyor drives (enclosed)	✓ (all except CV-07 and CV-15)	✓
Conveyors	✓ (all except CV-07 and CV-15)	✓
Skid steer loader	✓	✓
Street sweeper (or water cart)	✓	✓
Forklift	✓	✓
Dust control units ²	✓	✓
Maintenance activities (eg grinding, welding, etc)	✓	✓
Rail noise (one train arriving while one is unloading):		
Unloading from train (in rail unloading enclosure)	✓	✓
Locomotives	✓	✓
Wagon bunching	✓	✓
Agitator loading (in loading enclosure, doors on south side of enclosure assumed closed)	✓ (2)	✓ (2)
Agitator slumping (in slump enclosure, doors on south side of enclosure assumed closed)	✓ (2)	✓ (2)
Cement tanker (Adjacent to blending plant)	✓	✓
Base bin with feeder	✓	✓
Cement tanker (CBP)	✓	✓
Raw materials delivery truck (CBP)	✓	✓
CBP front end loader	✓	✓

1. Refer to **Section 7.1.1**

2. Refer to **Section 7.1.2**



7.1.4 Operational Noise Modelling Results and Discussion

Noise emission levels were predicted from the proposed development based on the operational scenarios described in **Table 8** and the noise mitigation and management procedures described in **Section 7.1.2**. Noise from all sources that contribute to the total noise from the site have been examined to identify characteristics that may cause greater annoyance (for example tonality, impulsiveness etc). The modifying factors, as outlined in the INP, have been applied where these characteristics are considered to be present. Noise levels predicted at the specific receiver locations are provided in **Table 9** and **Table 10** for operation without and with the radial stacker, respectively. For comparison purposes predicted noise levels from the original noise assessment have been provided in brackets ().

Noise contour maps, provided as **Appendix B**, show predicted noise levels from operation of the proposed RDC (without the use of the radial stacker) at the project site and surrounding areas. It should be noted that noise contours are indicative of the noise emissions surrounding the RDC and that single point calculations provided in the report should be used for accurately interpreting noise levels at sensitive receiver locations.

Table 9 Predicted RDC Noise Levels - Without Radial Stacker

Location	Period	Predicted Noise Level LAeq(15minute) (dBA)				Project Specific Noise Criteria (LAeq)	Consent Conditions - PA 05_0051 (LAeq)
		Calm	Temp. Inversion	Easterly Wind	SSW Wind		
Location 1 (Station St)	Morn. Shoulder	32 (35)	36 (39)	n/a	31 (34)	52 dBA	39 dBA
	Day	32 (35)	n/a	n/a	n/a	52 dBA	44 dBA
	Evening	32 (35)	n/a	43 (44)	31 (34)	46 dBA	44 dBA
	Night	32 (35)	36 (39)	n/a	31 (34)	43 dBA	39 dBA
Location 2 (Crawford Rd)	Morn. Shoulder	31 (34)	36 (38)	n/a	37 (39)	52 dBA	40 dBA
	Day	31 (34)	n/a	n/a	n/a	45 dBA	40 dBA
	Evening	31 (33)	n/a	<30 (<30)	37 (38)	45 dBA	39 dBA
	Night	31 (33)	36 (37)	n/a	37 (38)	43 dBA	39 dBA
Mavis Street	Morn. Shoulder	<30 (30)	33 (34)	n/a	<30 (<30)	52 dBA	35 dBA
	Day	<30 (30)	n/a	n/a	n/a	52 dBA	35 dBA
	Evening	<30 (<30)	n/a	35 (35)	<30 (<30)	46 dBA	35 dBA
	Night	<30 (<30)	33 (33)	n/a	<30 (<30)	43 dBA	35 dBA
Nurragingy Reserve	When in use:						
	Day	49 (49)	n/a	n/a	n/a	50 dBA	50 dBA
Colebee Centre	When in use:						
	Evening/Night	42 (41)	46 (47)	37 (36)	47 (49)	50 dBA	50 dBA
Blacktown Olympic Centre	When in use:						
	Morn. Shoulder	49 (51)	51 (52)	n/a	46 (48)	55 dBA	55 dBA
	Day	49 (51)	n/a	n/a	n/a		
	Evening/Night	49 (50)	51 (52)	49 (49)	46 (47)		

n/a: the meteorological condition is not relevant during this period



Table 10 Predicted RDC Noise Levels - With Radial Stacker

Location	Period	Predicted Noise Level LAeq(15minute) (dBA)				Project Specific Noise Criteria (LAeq)	Consent Conditions - PA 05_0051 (LAeq)
		Calm	Temp. Inversion	Easterly Wind	SSW Wind		
Location 1 (Station St)	Morn. Shoulder	32 (35)	36 (39)	n/a	31(34)	52 dBA	39 dBA
	Day	32 (35)	n/a	n/a	n/a	52 dBA	44 dBA
	Evening	32 (35)	n/a	43 (44)	31 (34)	46 dBA	44 dBA
	Night	32 (35)	36 (39)	n/a	31 (34)	43 dBA	39 dBA
Location 2 (Crawford Rd)	Morn. Shoulder	31 (34)	36 (38)	n/a	37 (39)	52 dBA	40 dBA
	Day	31 (34)	n/a	n/a	n/a	45 dBA	40 dBA
	Evening	31 (33)	n/a	<30 (<30)	37 (38)	45 dBA	39 dBA
	Night	31 (33)	36 (37)	n/a	37 (38)	43 dBA	39 dBA
Mavis Street	Morn. Shoulder	<30 (30)	33 (34)	n/a	<30 (<30)	52 dBA	35 dBA
	Day	<30 (30)	n/a	n/a	n/a	52 dBA	35 dBA
	Evening	<30 (<30)	n/a	35 (35)	<30 (<30)	46 dBA	35 dBA
	Night	<30 (<30)	33 (33)	n/a	<30 (<30)	43 dBA	35 dBA
Nurragingy Reserve	When in use:						
	Day	49 (49)	n/a	n/a	n/a	50 dBA	50 dBA
Colebee Centre	Evening	49 (49)	n/a	47 (45)	49 (49)		
	When in use:						
	Day	42 (42)	n/a	n/a	n/a	50 dBA	50 dBA
Blacktown Olympic Centre	Evening/Night	42 (41)	46 (47)	37 (36)	47 (49)		
	When in use:						
	Morn. Shoulder	49 (51)	51 (52)	n/a	46 (48)	55 dBA	55 dBA
Blacktown Olympic Centre	Day	49 (51)	n/a	n/a	n/a		
	Evening/Night	49 (50)	51 (52)	49 (49)	46 (47)		

n/a: the meteorological condition is not relevant during this period

Operational noise levels are predicted to meet the project specific noise criteria and relevant consent conditions at all residential locations under calm and prevailing weather conditions. In addition, noise levels at the Colebee function centre and the Blacktown Olympic Centre are predicted to meet the acceptable project specific noise criteria.

As can be seen from the noise contour diagrams there are some small areas of the Reserve, adjacent to the Holcim site boundary, which may experience noise levels higher than the acceptable amenity level for a passive recreation area (50 dBA) when all equipment on site operating simultaneously.

It should be noted that ambient noise levels within the Reserve are already relatively high, particularly in close proximity to the Main Western rail line. A short-term LAeq(15minute) of 57 dBA was measured during an operator attended survey at a distance of 100 m from the rail line. This measured existing noise level is higher than the recommended maximum amenity level of 55 dBA, as described in the INP, for a passive recreation area.

The noise barrier adjacent to the rail line at Nurragingy Reserve will have the effect of minimising noise and visual impacts due to the construction and operation of the RDC. This barrier will also have the additional benefit of reducing existing rail traffic noise. For example, during the operator attended noise measurement conducted in the Reserve, noise levels up to 76 dBA were recorded during a coal train pass-by. This noise level will be significantly reduced (by up to 13 dBA) with the inclusion of the proposed noise barrier.



As outlined in **Table 10** the predicted noise impacts for the modification to the RDC are less than or equal to the noise impacts for the approved RDC at all residential locations surrounding the site. The predicted noise impacts for the modification are generally below or similar to the impacts predicted for the approved RDC at the Nurranginy Reserve, Colbee Centre and Blacktown Olympic Centre.

7.1.5 Cumulative Noise Assessment

The proposed development site is situated within a developed industrial area in Western Sydney. Existing industrial properties are located to the west and north of the RDC.

Potential cumulative noise impacts from existing and successive developments are embraced by the INP procedures by ensuring that the appropriate noise emission criteria (and consent limits) are established with a view to maintaining acceptable noise *amenity* levels for residences. Therefore, the cumulative impact of the RDC with existing industrial noise sources has been assessed in the determination of the amenity levels at surrounding potentially noise sensitive areas.

Cumulative noise from the RDC and existing industrial developments is predicted to meet the amenity criteria set in accordance with the INP.

7.2 Sleep Disturbance Analysis

In the interests of minimising sleep disturbance impacts the following mitigation measures will be implemented during the morning shoulder and night-time periods:

- Front end loader reversing alarms will not be used; reversing warnings will be visual only.
- All conveyor start-up warnings will be visual, not audible.
- All those provided **Section 7.1.2**.

In assessing sleep disturbance, typical L_{Amax} noise levels of acoustically significant plant and equipment to be used at the RDC (refer to **Table 11**) were used as input to the ENM acoustic model and predictions were made at the nearest residential areas in Station Street, Mavis Street¹ and Crawford Road under adverse weather conditions at night. Noise events considered include loading into an empty truck, truck reversing alarms, a front end loader scraping concrete and those associated with rail shunting. The use of the L_{Amax} noise level provides a worst-case prediction since the $LA_{1(1minute)}$ noise level of a noise event is likely to be less than the L_{Amax} .

Table 11 L_{Amax} Sound Power Levels

Source	Maximum Sound Power Level
Loading into an empty truck	113 dBA
Truck reversing alarms	104 dBA
Front end loader scraping concrete	117 dBA
Rail shunting	114 dBA

The highest L_{Amax} noise level at any residential area is predicted to occur when trains are manoeuvring at the extremities of the rail siding in the presence of a temperature inversion. External noise levels up to L_{Amax} 47 dBA may occur at some Station Street residences in this situation, up to 52 dBA at residences in Mavis Street and up to L_{Amax} 50 dBA at Crawford Road residences. Hence, predicted noise levels meet the recommended sleep disturbance noise goal of 53 dBA.

¹ Sleep disturbance criteria determined for Station Street residences has been adopted at Mavis Street.



The ECRTN provides further guidance with regard to sleep disturbance and calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The DECCW policy document acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance.

However, the ECRTN provides that maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions and one or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA (inside dwellings) are not likely to significantly affect health and wellbeing. Maximum noise predictions have shown that external noise levels up to 52 dBA may occur at some residences during the night-time period as a result of RDC operation. This correlates to noise levels significantly below 50 dBA inside dwellings. Therefore the maximum noise levels produced by operation of the RDC are not likely to cause sleep disturbance at the surrounding residential areas.

7.3 Construction Noise Assessment

7.3.1 Construction Noise Modelling Parameters

Plant and equipment considered in assessing noise from construction of the proposed development are provided, with the associated sound power levels, in **Table 12**. Sound power levels of construction equipment were obtained from a Heggies database.

Proposed construction equipment was modelled at potential worst case locations on the RDC; the eastern, western and southern boundaries of the site and at either extremity of the rail siding.

Construction noise levels have been predicted assuming all barriers adjacent to the rail siding and along the northern boundary of the site are in place.

Table 12 Construction Plant and Equipment

Plant and Equipment	Sound Power Level (LAeq15minute)
Scraper	111 dBA
Dozer	110 dBA
30 tonne Excavator	111 dBA
Articulated Dump Truck	111 dBA
Vibrating Roller	111 dBA
Mobile Cranes (up to 150t)	105 dBA
Grader	111 dBA
Water Cart	112 dBA
Asphalt Paving and Spray Seal Machines	112 dBA
Pile Boring Machine	107 dBA
Power Cable Feeding and Tensioning Truck	107 dBA
Concrete Boom Pump	107 dBA
Concrete Truck	103 dBA
Front End Loader	113 dBA
'Ditch Witch'	104 dBA
Rail Mounted Ballast Regulator	117 dBA
Rail Mounted Tamping Machine	117 dBA



7.3.2 Construction Noise Modelling Results and Discussion

The results of construction noise predictions are provided in **Table 13** for the nearest residential areas. These noise levels were predicted assuming all barriers adjacent to the rail siding and along the northern boundary of the site are in place.

Table 13 Construction Noise Predictions - Residential Areas

Construction Plant and Equipment Location	Highest LAeq Noise Level Expected at Nearest Residential Area	Construction Noise Goal (LAeq(15minute))	
		Noise Affected	Highly Noise Affected
Eastern boundary RDC	40 dBA at Crawford Road	50 dBA	75 dBA
Western boundary RDC	30 dBA at Station Street	57 dBA	75 dBA
Southern boundary RDC	39 dBA at Station Street	57 dBA	75 dBA
Eastern end of rail siding	40 dBA at Crawford Road	50 dBA	75 dBA
Western end of rail siding	51 dBA at Mavis Street	57 dBA	75 dBA

Construction noise levels are predicted to be below the Noise Affected goals at each of the residential areas considered once the relevant noise barriers are in place. There may be short periods of time, while noise barriers are being constructed where construction noise levels exceed the Noise Affected goals at residential receivers, however, the predicted construction noise levels will be below the Highly Noise Affected goals at all times.

Sections of the Nurragingy Reserve are likely to experience noise levels that are marginally above the relevant noise goal when heavy construction equipment is operating on the eastern boundary of the RDC. Under this scenario, noise levels of approximately 61 dBA LAeq may be experienced in the Reserve adjacent to this boundary, even with the noise wall along this boundary in place, when, for example, a front-end loader is operating in this location. This exceedance is considered minor and a change in noise level of 1 dBA is highly unlikely to be detectable by the human ear. Similar noise levels can be expected in sections of the Reserve adjacent to the proposed siding during construction of the siding. It should also be noted that noise levels adjacent to the proposed siding are already high due to rail traffic on the existing rail line. The noise impact in the Reserve will obviously decrease as works move away from the RDC/Nurragingy boundary or the eastern end of the proposed rail siding.

For approximately the first six months of the construction period trucks will utilise the road network within part of the Reserve to gain access to North Parade from Knox Road. It is estimated that a *maximum* of 10 trucks each way (20 truck movements) will utilise the Reserve road network during the morning peak hour. The Environmental Criteria for Road Traffic Noise (ECRTN) provides a criteria for road traffic noise levels in a passive recreation area of 55 dBA LAeq(1hour). Based on this maximum volume, the predicted LAeq(1hour) due to construction traffic in the Reserve is 54 dBA. Hence, construction traffic noise levels are predicted to be below the relevant criteria.

Notwithstanding the above, the following recommendations are made with the aim of minimising construction noise impact at the Nurragingy Reserve and at the nearest residential locations:

- The recommended noise walls should be constructed as early as possible in the construction period.
- Site noisy equipment behind structures that act as barriers or at the greatest distance from the noise-sensitive area or orient the equipment so that noise emissions are directed away from any sensitive areas, where possible.
- Keep equipment well maintained.



- Employ “quiet” practices when operating equipment (eg positioning and unloading of trucks in appropriate areas).
- A Construction Noise Management Plan will be prepared in accordance with consent condition 5.3 of the 2006 Project Approval and will form part of the Construction Environmental Management Plan for the project. The Construction Noise Management Plan will be implemented prior to commencement of construction works at the site. The plan will include the following:
 - Construction noise and vibration goals.
 - Recommendations regarding specific physical and managerial measures for controlling noise, noise and vibration monitoring programs and reporting procedures.
 - Measures for dealing with exceedances and mechanisms to provide ongoing community liaison.

With regard to potentially offensive noise events associated with construction activities AS 2436-1981 “*Guide to noise control on construction, maintenance and demolition sites*” provides the following:

If noisy operations must be carried out, then a responsible person should maintain liaison between the neighbouring community and the contractor. This person should inform the public at what time to expect noisy operations and also inform the contractor of any special needs of the public.

Consultation and cooperation between the contractor and his neighbours and the removal of uncertainty and rumour can help to reduce the adverse reaction to noise.

Holcim will liaise with Blacktown City Council and the Western Sydney Parklands Trust regarding the management of construction noise impacts on Nurragingy Reserve.

7.3.3 Construction Vibration

The major vibration generating activities will occur during the earthworks in preparing the site; activities such as excavation and the use of vibratory rollers. The nearest residential premises to such construction activity is approximately 470 m (proximity of Mavis Street residence to rail siding). Due to the large separation distance to this and other residences, the level of vibration caused by construction activities at the Rooty Hill site is extremely unlikely to be perceptible at any of the nearest residential premises.

The nearest industrial building to potential vibration generating activities is the Blacktown Olympic Centre. This building is situated approximately 70 m from such potential construction activities. This magnitude of separation is expected to ensure that construction activities at the Rooty Hill site will have no impact on neighbouring industrial buildings.



8 CONCLUSION

8.1 Operational Noise Assessment

Noise levels were predicted for the operation of the RDC with and without the use of the radial stacker (refer to **Section 7.1.1**) with the noise mitigation and management procedures detailed in **Section 7.1.2** in place.

Operational noise levels are predicted to meet the project specific noise criteria and relevant consent conditions at all residential locations under calm and prevailing weather conditions. In addition, noise levels at the Colebee function centre and the Blacktown Olympic Centre are predicted to meet the acceptable project specific noise criteria.

Some small areas of the Nurranginy Reserve, adjacent to the Holcim site boundary, which may experience noise levels higher than the acceptable amenity level for a passive recreation area (50 dBA) with all equipment on site operating simultaneously. It should be noted that ambient noise levels within the Reserve already exceed ambient noise goals, particularly in close proximity to the rail line.

The predicted noise impacts for the modification to the RDC are less than or equal to the noise impacts for the approved RDC at all residential locations surrounding the site. The predicted noise impacts for the modification are generally below or similar to the impacts predicted for the approved RDC at the Nurranginy Reserve, Colbee Centre and Blacktown Olympic Centre.

The noise barrier adjacent to the rail line at Nurranginy Reserve will have the effect of minimising noise and visual impacts due to the construction and operation of the RDC. This barrier will also have the additional benefit of reducing existing rail traffic noise within the Nurranginy Reserve.

8.2 Sleep Disturbance Assessment

In the interests of minimising sleep disturbance impacts the following mitigation measures will be implemented during the morning shoulder and night-time periods:

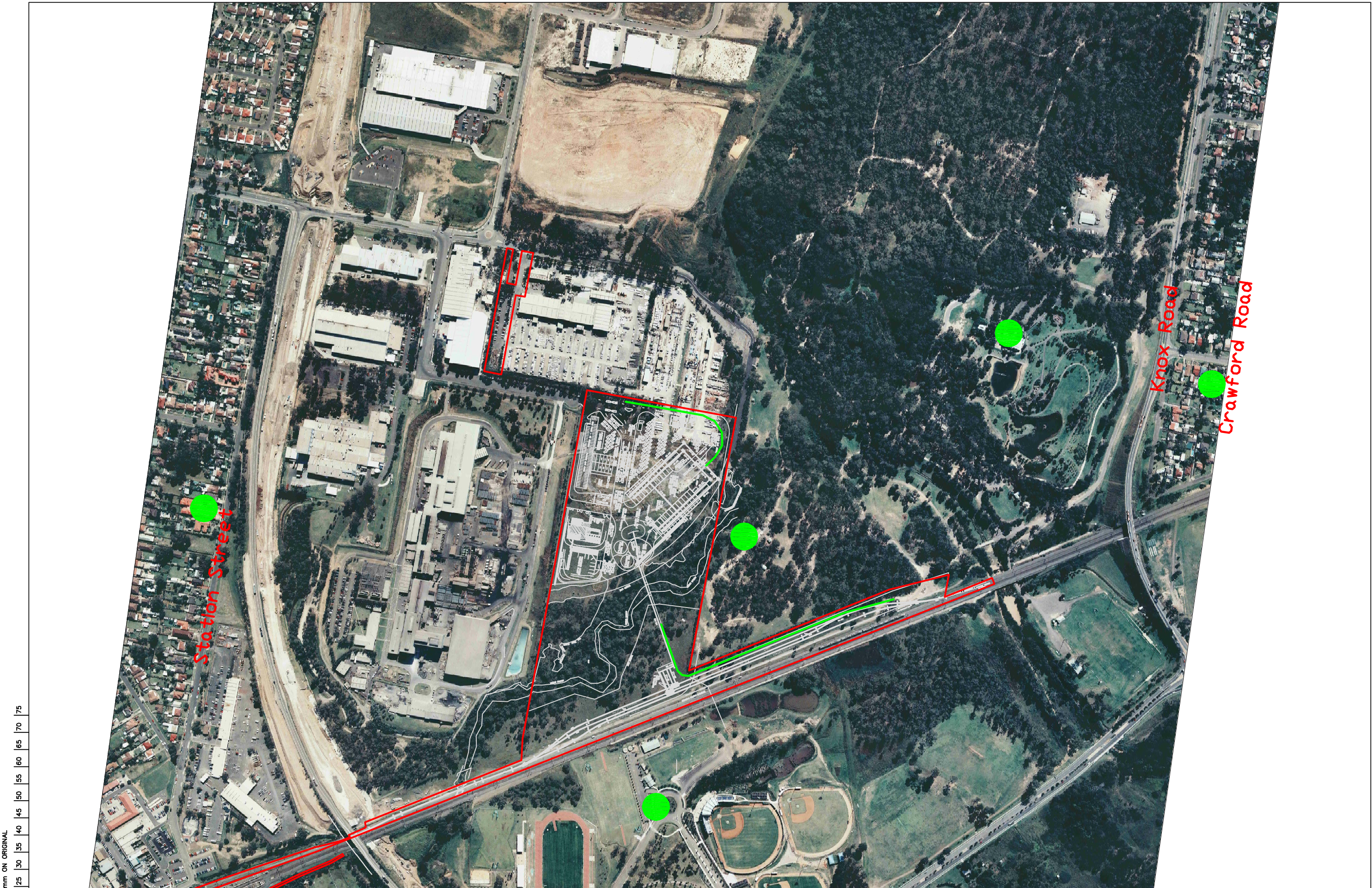
- Front end loader reversing alarms will not be used; reversing warnings will be visual only.
- All conveyor start-up warnings will be visual, not audible.
- All those provided in **Section 7.1.2**

The highest L_{Amax} noise level at any residential area is predicted to occur when trains are manoeuvring at the extremities of the rail siding in the presence of a temperature inversion. Maximum noise emissions from the RDC are predicted to meet the recommended sleep disturbance noise goal at all residential locations.

8.3 Construction Noise Assessment

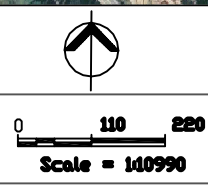
Construction noise levels are predicted to be below the Noise Affected goals at each of the residential areas considered once the relevant noise barriers are in place. There may be short periods of time, while noise barriers are being constructed when construction noise levels exceed the Noise Affected goals, however, construction noise levels will be maintained below the Highly Noise Affected goals at all residential areas.

Sections of the Nurranginy Reserve are likely to experience noise levels that are marginally above the relevant noise goal when heavy construction equipment is operating on the eastern boundary of the RDC. The noise impact in the Reserve will decrease as works move away from these respective boundaries. Notwithstanding this, recommendations have been presented in **Section 7.3.2** with the aim of minimising construction noise impact at the Nurranginy Reserve.



75 mm ON ORIGINAL

0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
REV.	DATE	AMENDMENT / ISSUE DESCRIPTION										PREPARED	CHECKED		



● Receiver Location

Heggies Pty Ltd
 Level 1, 14 Watt Street
 PO Box 1768
 Newcastle NSW 2300
 Email address newcastle@heggies.com.au
 Telephone 02 4908 4500 Facsimile 02 4908 4501

FILE NAME
 30-1202 RDC 2010 Noise Contours 20100812 v3.dwg

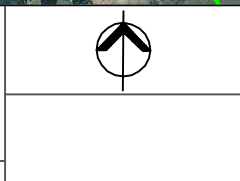
30-1202 RDC Appendix A
 Location Map
 Receiver Locations in the Operational Noise Model

DRAWING No.
001

REVISION



REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	20/08/20	Original	BT	EC



- LAeq(15minute) 35dBA
- LAeq(15minute) 39dBA
- LAeq(15minute) 40dBA
- LAeq(15minute) 44dBA
- LAeq(15minute) 50dBA
- LAeq(15minute) 55dBA
- Receiver Location

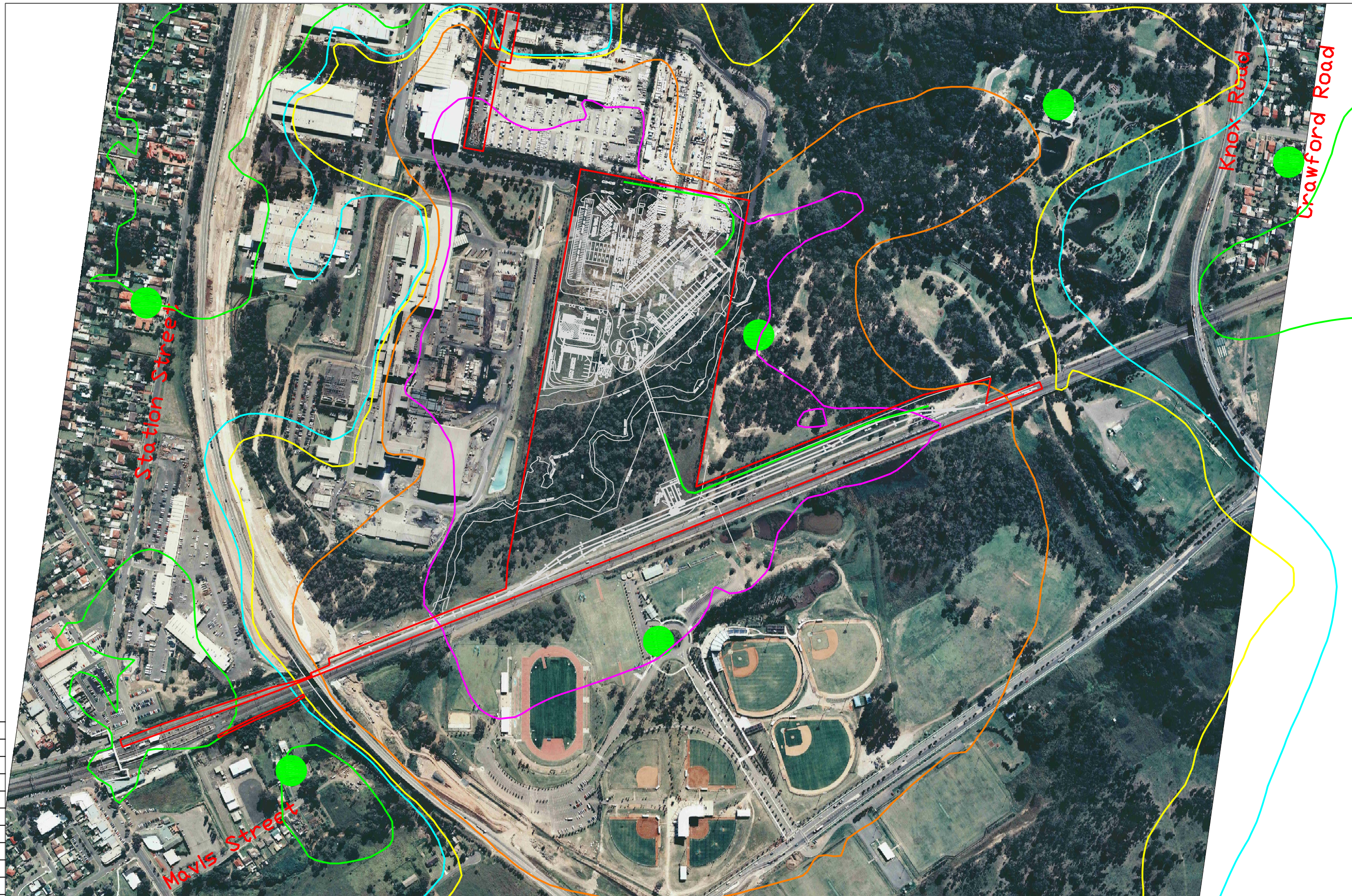

Heggies Pty Ltd
 Level 1, 14 Watt Street
 PO Box 1768
 Newcastle NSW 2300
 Email address newcastle@heggies.com.au
 Telephone 02 4908 4500 Facsimile 02 4908 4501

FILE NAME
 30-1202 RDC 2010 Noise Contours 20100812 v3.dwg

30-1202 RDC Appendix B1
 Predicted Operational Noise Levels (Without Stacker)
 Calm Meteorological Conditions

DRAWING No. **001**

REVISION



REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	20/08/20	Original	BT	AC



- LAeq(15minute) 35dBA
- LAeq(15minute) 39dBA
- LAeq(15minute) 40dBA
- LAeq(15minute) 44dBA
- LAeq(15minute) 50dBA
- LAeq(15minute) 55dBA
- Receiver Location


Heggies Pty Ltd
 Level 1, 14 Watt Street
 PO Box 1768
 Newcastle NSW 2300
 Email address newcastle@heggies.com.au
 Telephone 02 4908 4500 Facsimile 02 4908 4501

FILE NAME
 30-1202 RDC 2010 Noise Contours 20100812 v3.dwg

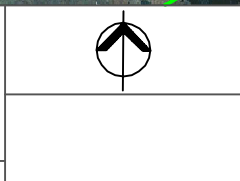
30-1202 RDC Appendix B2
 Predicted Operational Noise Levels (Without Stacker)
 Temperature Inversion

DRAWING No.
001

REVISION



REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	20/06/20	Original	BT	EC



- LAeq(15minute) 35dBA
- LAeq(15minute) 39dBA
- LAeq(15minute) 40dBA
- LAeq(15minute) 44dBA
- LAeq(15minute) 50dBA
- LAeq(15minute) 55dBA
- Receiver Location

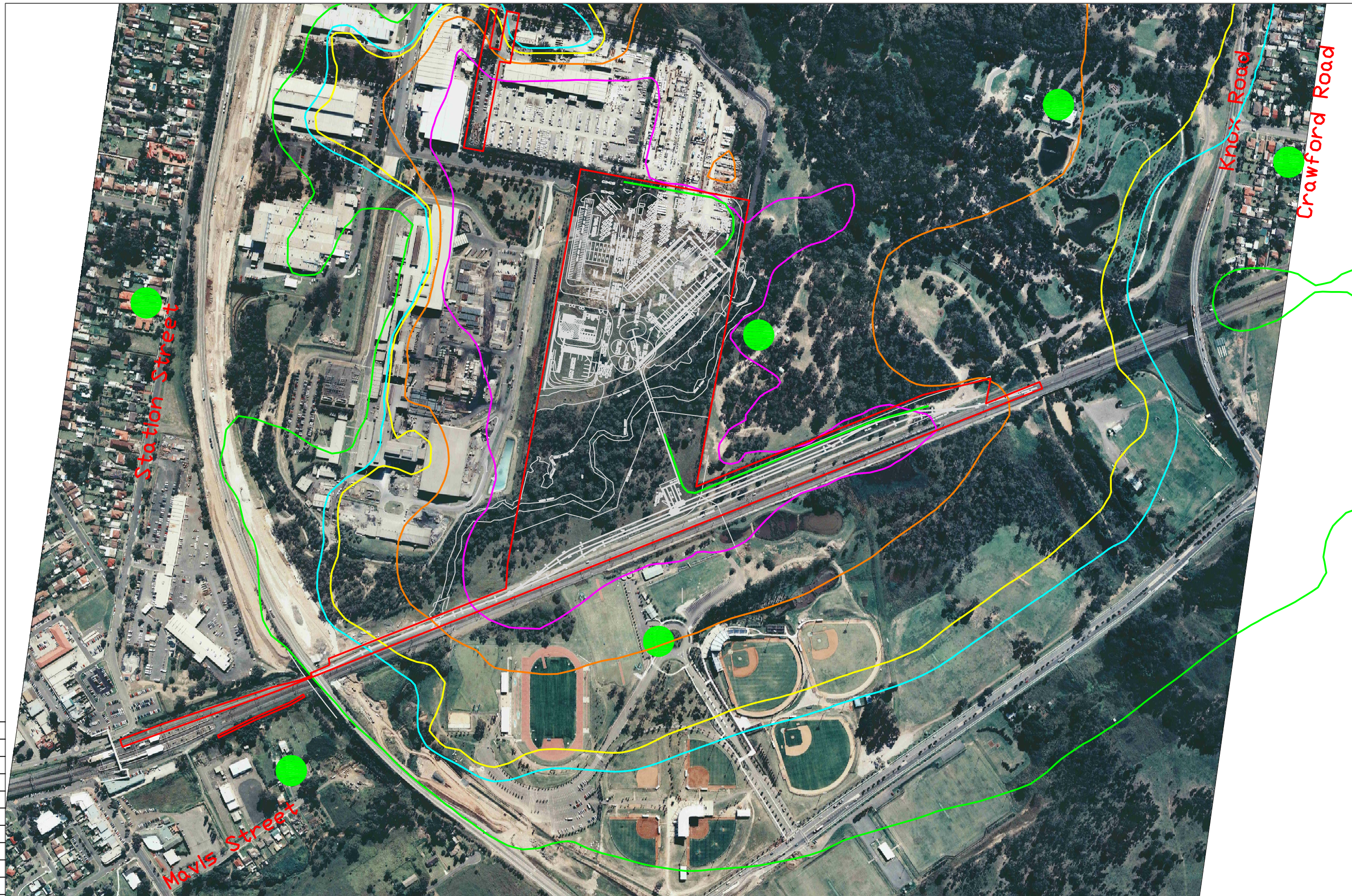

Heggies Pty Ltd
 Level 1, 14 Watt Street
 PO Box 1768
 Newcastle NSW 2300
 Email address newcastle@heggies.com.au
 Telephone 02 4908 4500 Facsimile 02 4908 4501

FILE NAME
 30-1202 RDC 2010 Noise Contours 20100812 v3.dwg

30-1202 RDC Appendix B3
 Predicted Operational Noise Levels (Without Stacker)
 Easterly Wind 2m/s

DRAWING No.
001

REVISION



REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	20/08/20	Original	BT	EC



- LAeq(15minute) 35dBA
- LAeq(15minute) 39dBA
- LAeq(15minute) 40dBA
- LAeq(15minute) 44dBA
- LAeq(15minute) 50dBA
- LAeq(15minute) 55dBA
- Receiver Location

Heggies Pty Ltd
 Level 1, 14 Watt Street
 PO Box 1768
 Newcastle NSW 2300
 Email address newcastle@heggies.com.au
 Telephone 02 4908 4500 Facsimile 02 4908 4501

30-1202 RDC Appendix B4
 Predicted Operational Noise Levels (Without Stacker)
 SSW Wind 2m/s

FILE NAME
 30-1202 RDC 2010 Noise Contours 20100812 v3.dwg

DRAWING No. **001**
 REVISION