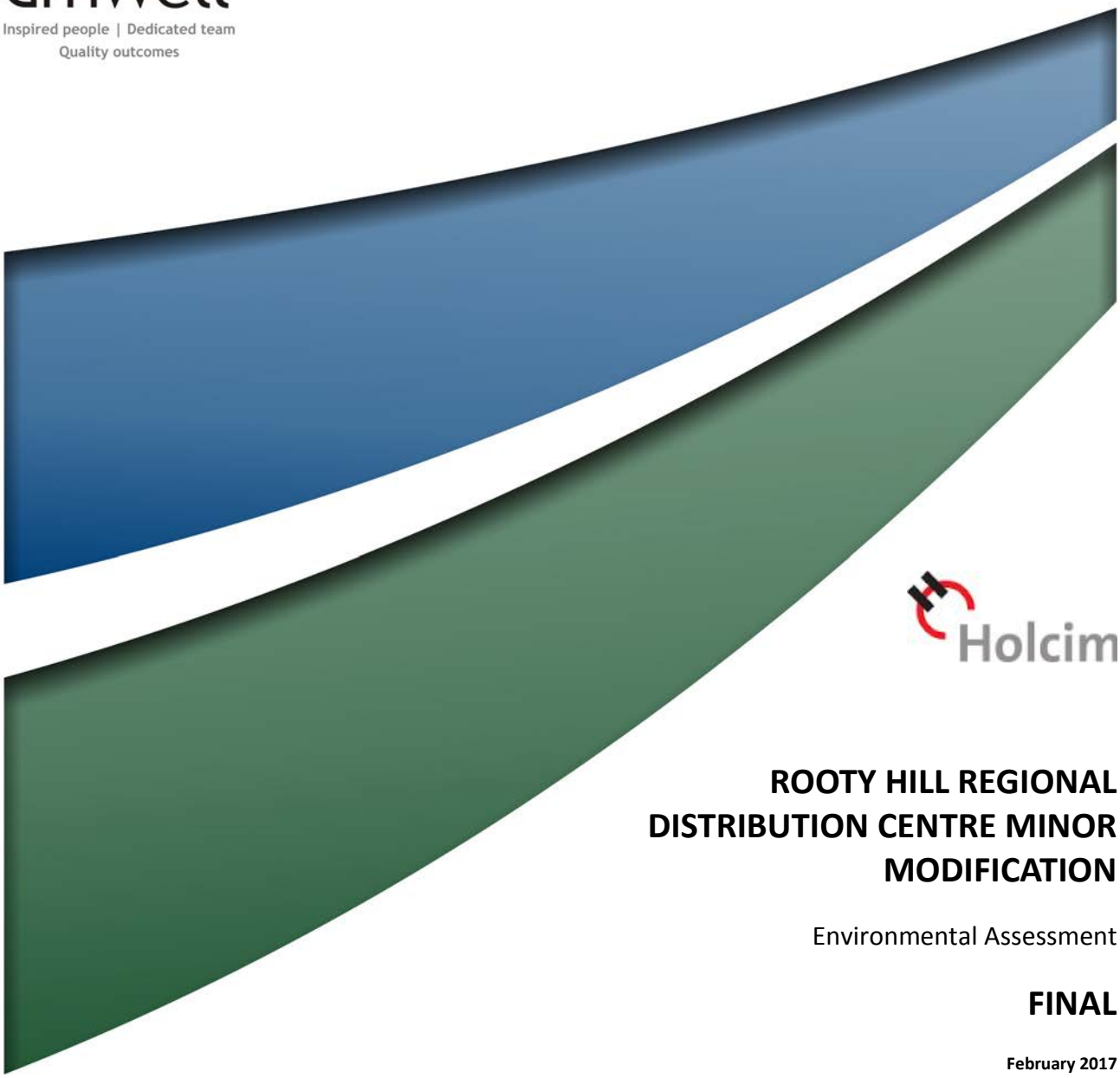
umwelt

Inspired people | Dedicated team
Quality outcomes



Holcim

ROOTY HILL REGIONAL DISTRIBUTION CENTRE MINOR MODIFICATION

Environmental Assessment

FINAL

February 2017

ROOTY HILL REGIONAL DISTRIBUTION CENTRE MINOR MODIFICATION

Environmental Assessment

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Holcim Australia

Project Director:	John Merrell
Project Manager:	Lachlan Sweeney
Report No.	3902/R01/Final
Date:	February 2017

Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

www.umwelt.com.au

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	**Date**	**Name**	**Date**
1	J. Merrell	21/02/2017		
2.	J. Merrell	27/02/2017	J. Merrell	27/02/2017

Table of Contents

Figures

Tables

Appendices

1.0 Introduction

Holcim (Australia) Pty Ltd (Holcim Australia) is one of the leading producers of aggregates, concrete, concrete pipe and other products in Australia and supplies concrete and quarry products to the building and construction industry. Holcim is a global company employing about 83,000 people in over 70 countries. From a network of over 200 concrete plants and 88 quarries in Australia, Holcim Australia provides high-quality products for a diverse range of customers and applications. Quarry products include rail ballast, aggregates, gravels, road pavement materials, manufactured and natural sands. These basic materials are an essential part of making concrete, which helps to build schools, hospitals, roads, bridges, airports and other infrastructure as well as commercial buildings.

Holcim Australia has been supplying construction materials in Australia since 1901 under well-known Readymix and later CEMEX and Humes brands. In October 2009, Holcim Australia acquired CEMEX, including the approved Regional Distribution Centre (RDC) for quarry materials located at Rooty Hill in New South Wales (NSW) (refer to **Figure 1.1**).

The RDC was approved in 2006 and commissioned in 2015. The RDC is the primary location for the distribution of construction materials (aggregate, sand and concrete) from Holcim Australia's Lynwood Quarry located in the Southern Highlands region of NSW into the Greater Sydney basin.

The RDC is supplying construction materials to a number of major construction projects throughout Sydney, including for various road projects under the management of the NSW Roads and Maritime Service (RMS). Current RMS requirements include material to be supplied from certified stockpiles. This necessitates testing and separation of materials traceable to a lot size, in most cases approximately 400 tonnes. In 2006 at the time of the original Project Approval, Holcim Australia's technical requirements for certification of construction materials to RMS projects did not include these current requirements. The existing RDC stockpile areas do not have sufficient space to accommodate the number of small stockpiles required to allow the RDC to meet the minimum technical specifications for certified stockpiles for RMS projects. Holcim Australia therefore proposes to modify the stockpiling arrangements at the site to provide additional stockpiling space thereby allowing RMS's certification requirements to be satisfied at the RDC. As outlined in **Section 1.1**, the proposed modifications are minor in nature with the majority of the approved operations, including the approved materials handling limits and total traffic movements remaining unchanged.

The purpose of this Environmental Assessment (EA) is to provide details of the proposed minor modification and to undertake an environmental assessment of the proposed changes.

1.1 Overview of the Proposed Modification

Holcim Australia proposes to convert a currently unused portion of the RDC that is located within the existing, approved disturbance footprint into an additional stockpile area (the modification). The proposed additional stockpile area is adjacent to the existing truck parking area and to the north west of the existing stockpile area, separated by an internal road (refer to **Figure 1.2**). The proposed stockpile area currently consists of a grassed/wood chipped area that would be paved as part of the modification.

The modification does not involve any changes to:

- the project disturbance footprint
- the volume or type of material distributed from the site

- truck numbers or traffic routes
- material handling processes
- employment numbers.

The Planning and Approval Process

The RDC operates under Project Approval 05_0051, granted 24 November 2006 by the Land and Environment Court of NSW. One subsequent modification to Project Approval 05_0051 was approved on 22 March 2011 under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Holcim Australia proposes to seek approval for the proposed modification under the provisions of Section 75W of the EP&A Act, in accordance with Schedule 6A Clause 3(1) of the EP&A Act. This EA will accompany the modification application.

1.2 Overview of the Existing Environment

The RDC site is located at Kellogg Road and Woodstock Avenue, in the suburb of Rooty Hill, NSW (refer to **Figure 1.1**). The site is situated in the Blacktown Local Government Area (LGA) approximately 35 kilometres to the west of the Sydney Central Business District (CBD).

Land use directly adjacent to the RDC site includes general industry such as the OneSteel Mini Mill and the Humes Concrete Products Facility located immediately to the west and north of the RDC site respectively (refer **Figure 1.1**). A passive recreation area called Nurragingy Reserve adjoins the eastern boundary of the RDC site. The Main Western Railway Line forms the southern boundary of the RDC site and the M7 Motorway is located 500 metres to the west.

Other land use types in the surrounding area include the Rooty Hill residential area located west of the M7 Motorway, and the Doonside residential area located to the east of Nurragingy Reserve (refer **Figure 1.1**). South of the main western railway line is the Blacktown Olympic Centre (in Aquilina Reserve). The RDC site is located approximately 600 metres from the nearest residents on Station Street to the west, with existing industrial facilities and the M7 Motorway located in the intervening distance. To the east, the RDC is approximately 800 metres from the nearest residents on Knox Road, with Nurragingy Reserve located between the RDC and this urban area.

The RDC site is located within the Angus Creek catchment, adjacent to the confluence of Angus Creek and Eastern Creek. Angus Creek flows in a west-east direction through the southern half of the RDC site. The riparian zone surrounding Angus Creek is heavily vegetated with a native mid and upper storey. The northern developed portion of the RDC site is flat consisting predominantly of the stockpile areas, internal roads, office buildings and parking areas.

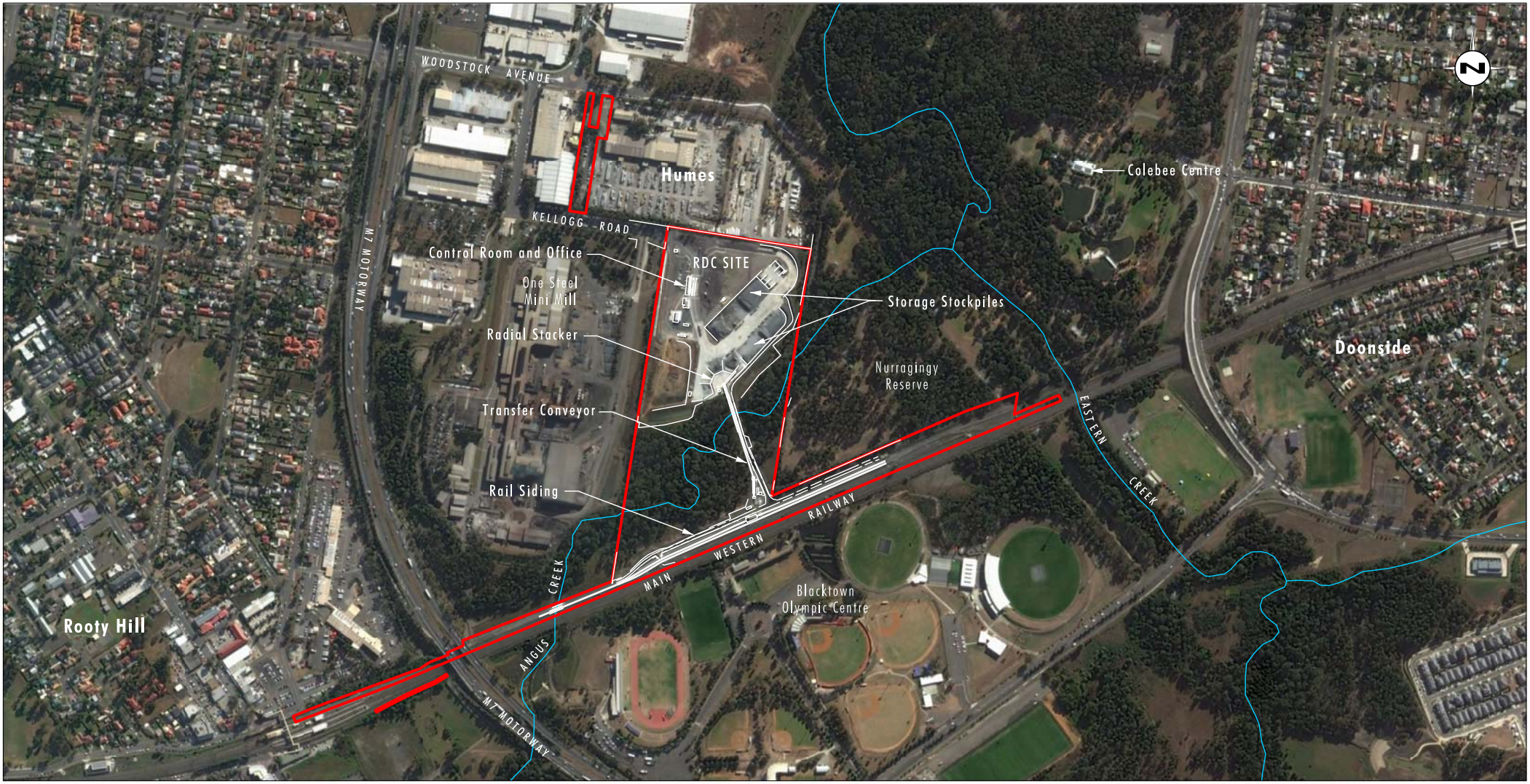


Image Source: Google Earth (2016)
Data Source: LPI (2017), Holcim (2017)

0 100 250 500m
1:10 000

Legend

Approved RDC Site Boundary

FIGURE 1.1

RDC Site Context

File Name (A4): R01/3902_001.dgn
20170227 13.19

Image Source: Holcim (2017)
Data Source: LPI (2017)

0 25 50 100m
1:2 000

Legend

- Approved RDC Site Boundary
- Approved Stockpile Area
- Proposed Stockpile Area

FIGURE 1.2

Proposed Additional Stockpile Area

1.3 Environmental Assessment Structure and Team

The purpose of this EA is to assess the potential impacts associated with the proposed minor modifications to the approved RDC. An overview of the layout of this EA is provided below.

Section 1.0 provides the background and context for the modification, an overview of the approval process and the EA project team involved in producing the EA.

Section 2.0 contains an overview of the approved Rooty Hill RDC operation.

Section 3.0 provides a detailed description of the modification, the justification for the modification and the alternatives considered.

Section 4.0 describes the planning context for the modification, including the applicability of Commonwealth and State legislation.

Section 5.0 describes the consultation undertaken as part of the environmental assessment process.

Section 6.0 contains an assessment of the environmental impacts of the modification.

Section 7.0 describes the management and monitoring measures proposed for the modification.

Section 8.0 provides a conclusion.

Section 9.0 provides a list of references referred to in the EA.

This EA has been prepared by Umwelt (Australia) Pty Limited (Umwelt), on behalf of Holcim Australia. The following organisations undertook specialist studies as part of the EA process:

- Pacific Environment – Air Quality Assessment
- Jacobs – Noise Assessment.

2.0 Approved Operations

2.1 Development Approval History

The RDC was approved in April 2006 by the Minister for Planning. Following the granting of approval by the Minister, Blacktown City Council exercised its right of appeal against the decision in the Land and Environment Court. The Land and Environment Court handed down its decision on 24 November 2006 approving the RDC but requiring some amendments to the conditions of approval imposed by the Minister.

A modification to the approval was sought in October 2010 and granted in March 2011 to allow Holcim Australia to implement a range of operational, environmental and capital benefits. The modifications generally involved changes to the site layout and configuration including material storage areas, train capacity, rail unloader and sidings and location of offices and workshops.

The RDC was commissioned in October 2015. The RDC has been constructed in a staged manner to reflect market demand, with further works to be undertaken at some point in the future, subject to market demand, to allow the RDC to achieve its approved maximum throughput capacity of 4 million tonnes per annum (Mtpa). The RDC is currently operating below 2.0 Mtpa and the current staged layout of the RDC is shown on **Figure 1.2**.

2.2 Description of Approved Operations

The RDC is the primary location for the distribution of aggregate materials from the Lynwood Quarry near Marulan south-east of Sydney into the Greater Sydney basin. Holcim Australia transports these quarry products to Sydney by train, where they are received at the RDC and transferred to the storage stockpiles. Products can then be blended (if applicable) and loaded into trucks for distribution to the Sydney market. The RDC has approval to operate 24 hours per day, seven days a week.

The quarry products received and distributed from the RDC include single size crushed aggregates, blended crushed aggregates, and natural or manufactured sands. The product sizes that are typically stored are 20 millimetre, 14 millimetre, 10 millimetre, 7 millimetre, 5 millimetre and natural or manufactured sands, however, these may vary depending on market needs.

RDC also includes a concrete batch plant (CBP) that allows Holcim to make concrete on-site for distribution to Sydney construction sites.

When operating at its approved maximum capacity of 4 Mtpa the RDC will dispatch approximately 400 heavy vehicles from the site on an average day. Heavy vehicles typically use a truck and dog configuration and have a 33 tonne payload capacity. All traffic to the RDC accesses the site via Kellogg Road. Vehicles accessing Kellogg Road to/from the south do so via Woodstock Avenue direct from the M7. Heavy vehicles accessing Kellogg Road to/from the north do so via Glendenning Road and Power Street direct from the M7.

The approved RDC consists of the following elements:

- Rail siding
- Rail unloading facility
- Level crossing

- Rail cross-overs
- Rail and road bridge over Angus Creek
- Transfer conveyors
- Road and conveyor bridge
- Radial stacker and associated stockpiles
- On-ground concrete storage bays
- Raw material load out facility
- Blending Plant/Pugmill
- On ground storage stockpiles
- Workshop and store
- RDC control room and office
- Truck wash bay
- Truck refuelling area
- Truck and car parking
- Regional office and materials testing laboratory
- Concrete batching plant
- Weighbridges
- Site access and internal roads
- Noise walls.

The approved layout for 4 Mtpa full capacity operations at the RDC is shown in **Figure 2.1**.

In addition to the Project Approval, the RDC site operates under the following relevant plans and licences:

- Operational Environmental Management Plan
    - Noise Management Plan
    - Traffic Management Plan
    - Soil and Water Management Plan
    - Dust Management Plan
    - Vegetation Management Plan

- Operational Monitoring Plan
    - Noise Monitoring Program
    - Ambient Dust Monitoring Plan
    - Transport Monitoring Plan
- Environment Protection Licence No. 20672.

Image Source: Nearmap (Nov 2016)
Data Source: Holcim (2017)

0 50 100 200m
1:5 000

Legend

- Approved RDC Site Boundary
- Indicative Modified RDC Layout

FIGURE 2.1

Approved RDC Layout

3.0 Description of the Proposed Modification

3.1 Need for the Modification

Sydney has had a significant increase in the number of infrastructure projects, including several very large infrastructure projects, coming into the construction phase in recent times. A number of these projects are road projects under the management of RMS and therefore require the supply of material from certified stockpiles. Supplying from certified stockpiles necessitates the testing, certifying and separation of materials traceable to a lot size (in most cases approximately 400 tonnes). This means that a greater number of smaller stockpiles are required in the materials storage area to allow each stockpile to be tested and certified prior to delivery to the customer. This results in the need for a larger stockpiling area to store the same amount of material at the RDC site.

At the time of the original Development Consent in 2006, the technical requirements for the certification of construction materials for RMS projects were not as stringently enforced as they currently are. The existing stockpile areas at the RDC do not have sufficient space to establish the number of smaller certification stockpiles necessary to meet current and upcoming market demand.

To be able to supply materials from the RDC to projects requiring products from certified stockpiles, Holcim needs to construct an additional stockpile area that meets the certification requirements. This additional stockpiling area can be accommodated within the existing RDC site without the need to increase the physical footprint of the site by converting a currently unused area to stockpiles.

3.2 Description of the Modification

Holcim Australia has identified the opportunity to utilise a currently unused portion of the RDC site as a stockpile area that would provide the necessary space required for the RDC to satisfy the current stockpile certification requirements required to supply RMS and other infrastructure projects.

The key elements of the proposed modification include:

- Creation of an additional stockpile area (0.43 hectares) adjacent to the existing truck parking area (refer **Figure 1.2**); the base of the stockpile would be road base, with high use areas concreted.
- Utilisation of the additional stockpile area – handling of material and loading of trucks at this location.

The physical and operational changes required for the modification are minor and all works would occur within the existing and approved disturbance area for the RDC and within the catchment of the existing water management system. There are no changes proposed to the total volume of material stored on the site or maximum annual material throughput from that currently approved. There would be no change to truck numbers entering or leaving the site, with the only operational change being that the trucks loading material from the certified stockpiles would take a different route on internal roads within the RDC site and loading of trucks would take place at an additional location within the site.

3.3 Alternatives and Justification

Alternatives

A detailed assessment of alternatives to the approved RDC was undertaken as part of the original development assessment in 2005 and for Modification 1 in 2010.

The key alternative that requires consideration in regard to the proposed modification is the 'do nothing' alternative that is, proceeding with the RDC as currently approved and not proceeding with the modification. This alternative is not considered desirable as Holcim Australia would have reduced capacity to supply construction materials that are needed for certain infrastructure projects within Sydney that require product from certified stockpiles. The supply of high quality construction materials to these infrastructure projects is critical for the timely and quality completion of these projects which are key components of the NSW Government's infrastructure improvement program.

The RDC could proceed without the modification, however, the changes provide substantial benefits to Holcim Australia and contribute to the viability of cost effective supply of materials to these important construction projects. As demonstrated in **Section 6.0**, the modification can be undertaken without resulting in significant environmental impacts. In these circumstances, it is considered that the 'do nothing' alternative is not an appropriate alternative.

Justification

Aggregates, concrete, sands, road base and other products used in the construction industry are supplied from the RDC to Sydney region customers. The continued high demand for construction materials in the Sydney region is due to the increasing population growth and need for ongoing construction of infrastructure such as roads, buildings and other facilities.

The technical requirements for the certification of construction materials for RMS projects has changed and the existing stockpile areas at the RDC do not have sufficient space to establish the number of smaller certification stockpiles necessary. The modification is required to ensure the RDC can continue to supply construction materials to infrastructure projects within Sydney that require product from certified stockpiles, including RMS projects, to meet current and upcoming market demand.

As detailed in **Section 6.0**, the modification will not result in any significant environmental impacts.

4.0 Planning Context

4.1 Commonwealth Legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), approval from the Commonwealth Minister for Environment and Energy is required for any action that may have a significant impact on matters of national environmental significance.

These matters are:

- world heritage properties
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

The original RDC project was referred in March 2005 to the Commonwealth Minister for assessment under the EPBC Act. The original RDC project was referred due to the impacts associated with clearing 1.4 hectares of Cumberland Plain Woodland (CPW) a Critically Endangered Ecological Community (CEEC). This referral resulted in the RDC being deemed not to be a controlled action.

The modification does not require any clearing of native vegetation, with all works to be undertaken in the current and approved disturbance footprint of the RDC. The modification would not have an effect on any of the matters of national environmental significance and therefore will not require approval from the Commonwealth Minister.

4.1.2 Native Title Act 1993

The Commonwealth *Native Title Act 1993* (Native Title Act) is administered by the National Native Title Tribunal. The Tribunal is responsible for maintaining a register of native title claimants and bodies to whom native title rights have been granted. The Act prescribes that native title can be extinguished under certain circumstances, including the granting of freehold land. The modification relates to a portion of the site that is freehold land and therefore further consideration of Native Title is not required.

4.2 State Legislation

4.2.1 Environmental Planning and Assessment Act 1979

As outlined in **Section 1.0**, a modification to the Project Approval is sought under Section 75W of the EP&A Act in accordance with Schedule 6A Clause 3(1) of the EP&A Act. Part 3A of the EP&A Act has been repealed, however, Schedule 6A Clause 3(1) of the EP&A Act provides for the continuation of Part 3A for approved projects. As the 2006 Project Approval was granted under Part 3A of the EP&A Act, Section 75W is the appropriate statutory path to provide for the proposed minor modification to the RDC.

4.2.2 Blacktown Local Environment Plan 2015

Under the Blacktown Local Environmental Plan 2015 (BLEP 2015) the main part of the RDC site incorporating the modification is zoned General Industrial (IN1). The modified RDC would be consistent with the objectives of the General Industrial (IN1) zone and would be permissible with development consent.

The objectives of the General Industrial (IN1) zone are:

- To provide a wide range of industrial and warehouse land uses
- To encourage employment opportunities
- To minimise any adverse effect of industry on other land uses
- To support and protect industrial land for industrial uses
- To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area
- To minimise adverse impacts on the natural environment.

4.2.3 Other Legislation

For projects approved under Part 3A of the EP&A Act, a number of approvals, which may otherwise have been relevant, are not required to carry out the project (refer to **Table 4.1**). It is noted that regardless of the exemption that applies, none of the approvals identified in **Table 4.1** would have been triggered for the modification.

Table 4.1 Approvals Legislation Which Does Not Apply

Act	Approval
Fisheries Management Act 1994 (FM Act)	Permit for works or structures within a waterway
Heritage Act 1977 (Heritage Act)	Disturbance to an item listed on State Heritage Register or Interim Heritage Order; Excavation permit
National Parks & Wildlife Act 1974 (NP&W Act)	Preliminary research permit; consent to destroy relics

Act	Approval
Water Management Act 2000 (WM Act)	Water use approval, water management work approval or activity approval
Native Vegetation Act 2003	An authorisation to clear native vegetation
Rivers and Foreshores Improvement Act 1948	A permit under Part 3A
Rural Fires Act 1997	A bush fire safety authority
Coastal Protection Act 1979	Concurrence of the Minister

A summary of the other State Acts potentially applicable to the modification is included in **Table 4.2** along with an indication of whether additional approvals will be required for the modification.

Table 4.2 Summary of Potentially Relevant State Legislation

Act	Comments	Approval Required
Protection of the Environment Operations Act 1997	Holcim holds an Environment Protection Licence (EPL No. 20672) for the RDC site. As there are no changes to the licenced activity, volumes, monitoring program or management controls as a result of the modification, it is considered that no changes to the EPL are required. Holcim Australia will, however, consult with the EPA to confirm that no changes are required.	No
Roads Act 1993	The *Roads Act 1993* determines the rights of the public and adjacent land owners to use public roads, and establishes procedures for the opening and closing of public roads. Under the Act applications are required to be made for the closure of roads and for works in road reserves. No road closures or road works are proposed as part of the modification.	No
Crown Lands Act 1989	The Crown Lands Act provides for the administration and management of Crown land in the eastern and central divisions of NSW. Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the *Crown Land (Continued Tenures) Act 1989*. The proposed stockpile area is not within an area of Crown land and no areas of Crown land would be affected.	No

Act	Comments	Approval Required
Environmentally Hazardous Chemicals Act 1985	Under the *Environmentally Hazardous Chemicals Act 1985* a licence is required for any storage, transport or use of prescribed chemicals. Holcim Australia does not propose to store, transport or use any chemicals currently subject to a Chemical Control Order (CCO) under this Act as part of the modification.	No

4.2.4 State Environment Planning Policies

State Environmental Planning Policies (SEPPs) are environmental planning instruments created by the State government. The SEPPs that are potentially relevant to the modification are discussed in the following section.

State Environmental Planning Polices (State and Regional Development) 2011

The State and Regional Development SEPP commenced on 1 October 2011, on the date Part 3A of the EP&A Act was repealed. The SEPP identifies development that is State Significant Development. The RDC, if a new proposed development, would be of a class of development listed as State Significant Development under the SEPP. As discussed in **Section 4.2.1**, as the original consent was granted under Part 3A of the EP&A Act and Schedule 6A Clause 3(1) of the EP&A Act provides for the continuation of Part 3A for approved projects, Section 75W of the EP&A Act is the appropriate approach to modify the existing consent.

State Environmental Planning Policy (Western Sydney Parklands)

The rail sidings to the east of the RDC are located on land covered by the State Environmental Planning Policy (Western Sydney Parklands) 2009. The aim of this SEPP is to put in place planning controls that will enable the Western Sydney Parklands Trust to develop the Western Parklands into multi-use urban parkland for the region of western Sydney. The modification to create an additional stockpile area within the main part of the RDC would have no effect on the development of the Western Parklands.

State Environmental Planning Policy 33 Hazardous and Offensive Development

SEPP No. 33 – Hazardous and Offensive Development requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. A hazard assessment was completed for the 2005 EA to assist the consent authority to determine acceptability. The hazard assessment identified that the RDC is not potentially hazardous and the proposed minor modification would not change this finding.

The RDC site has been operating generally in accordance with EPL No. 20672 for over 12 months and is not an offensive industry. The addition of a stockpile area with no change to the nature of activities at the site, truck numbers or site throughput will not change the classification of the RDC with regard to hazardous or offensive industry.

State Environmental Planning Policy 44 Koala Habitat Protection

SEPP 44 applies to the extent that in any LGA which is listed in the SEPP, the relevant council is restricted from granting development consent for proposals on land identified as core koala habitat without preparation of a plan of management. Blacktown is not listed on Schedule 1 of the SEPP and therefore the SEPP is not relevant to the modification.

State Environmental Planning Policy 55 (Remediation of Land) 1998

SEPP No. 55 requires the consent authority to consider whether the land on which the proposal will be undertaken is contaminated. Furthermore, if the land is contaminated, whether it is suitable for the purpose of the proposed development and if the land requires remediation to be made suitable for the purpose of the proposed development.

Prior to development of the RDC site, large amounts of fill from construction of the adjacent OneSteel Mini Mill was placed on the central part of the RDC site. Previous testing of this fill indicated that it did not contain contaminated material (NECS, 2005). The RDC site is not subject to any remediation orders and SEPP 55 does not place any restrictions on the modification.

5.0 Stakeholder Consultation

Authority consultation for the modification consisted of a letter dated 3 February 2017 to the Department of Planning and Environment (DP&E) describing the proposed changes to the project, outlining the development approval pathway, identifying the key environmental and community issues and proposed assessment and seeking confirmation of the approval pathway.

At the RDC Holcim Australia consults with the local community through periodic newsletters providing information about progress and activities on site. The modification will be communicated to the community through an update in the next newsletter. Approval of the modification would trigger communication to the community, with a newsletter to be distributed within 6 weeks of approval being granted.

As the modification involves no change to the project footprint, traffic numbers, volume of materials, or employment and has minimal potential to change the interactions of the RDC with the surrounding community.

6.0 Environmental Assessment

6.1 Identification of Key Environmental and Community Issues

The key environmental and community issues that need to be assessed in this EA have been identified through consideration of:

- the existing approved operations (**Section 2.0**)
- the description of the modification (**Section 3.0**)
- the findings of the 2005 EA (NECS, 2005) and the 2010 EA (Umwelt, 2010)
- the planning and environmental context for the locality (**Sections 1.2** and **4.0**)

Through consideration of the above factors it was determined that the key environmental issues were noise and dust and an assessment including quantitative modelling has been undertaken to determine the potential impacts for these aspects. Other issues have been assessed qualitatively with the results of the assessments presented in **Sections 6.2**, **6.3** and **6.4**.

6.2 Air

The modification will not result in any new activities being undertaken at the RDC, however, it will change the locations in which some material stockpiling and truck loading will occur at the site. The modification was therefore identified as having potential to result in changes to the existing and approved air quality impacts of the RDC. To assess this potential change in impacts an air quality assessment was completed in accordance with the procedures outlined in the recently updated NSW Environment Protection Authority's (EPA) document titled "*Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*" (NSW EPA, 2016) (the Approved Methods). The full assessment is presented in **Appendix 1** with a summary of the key findings provided in this section.

6.2.1 Methodology

To assess potential changes to operational air quality as a result of the modification two key tasks were undertaken: update of the RDC operational air quality model to reflect the proposed modification and evaluation of air quality predictions from the updated model against the applicable criteria.

Off-site dust concentration and deposition levels due to the RDC were predicted using the dispersion model AERMOD based on a maximum production rate for the current layout of the RDC of 2.5 Mtpa. In estimating dust emissions, consideration has been given to best practice management with applicable controls applied to significant dust sources consistent with the current management approaches in place at the RDC.

6.2.2 Assessment Criteria

The Approved Methods specifies air quality assessment criteria relevant for assessing impacts from air pollution. These criteria are health-based (i.e. they are set at levels to protect against health effects) and for PM_{10} and $PM_{2.5}$ are consistent with *Amended National Environment Protection Measure for Ambient Air Quality* (Ambient Air-NEPM) (NEPC, 2016). In addition, the Approved Methods include other measures of air quality, namely dust deposition and Total Suspended Particulates (TSP) which are not stated in the Ambient Air-NEPM. It is noted that the recent updates to the Approved Methods to lower the PM_{10} annual

average criteria from 30 µg/m^3 to 25 µg/m^3 and the introduction of criteria for $PM_{2.5}$ are changes to dust criteria since the approval of the RDC and 2010 modification. For this reason the existing air quality criteria in the Project Approval are different to those specified in the Approved Methods. For this assessment the criteria in the Approved Methods have been used.

Table 6.1 presents the air quality criteria for pollutants that are relevant to this study. It is important to note that the criteria are applied to the cumulative impacts due to the RDC and other sources.

Table 6.1 NSW EPA Air Quality Standards/Goals for Particulate Matter Concentrations

Pollutant	Standard	Averaging Period	Source
TSP	90 µg/m^3	Annual	NSW EPA (2016) (assessment criteria)
PM_{10}	50 µg/m^3 25 µg/m^3	24-Hour Annual	NSW EPA (2016) (assessment criteria)
$PM_{2.5}$	25 µg/m^3 8 µg/m^3	24-Hour Annual	NSW EPA (2016) (assessment criteria)

Notes: µg/m3 – micrograms per cubic metre.

In addition to health impacts, airborne dust also has the potential to cause nuisance effects by depositing on surfaces, including vegetation. Dust deposition can soil materials and generally degrade aesthetic elements of the environment, and are assessed for nuisance or amenity impacts. **Table 6.2** shows the maximum acceptable increase in dust deposition over the existing dust levels from an amenity perspective. These criteria for dust deposition levels are set to protect against nuisance impacts (NSW EPA, 2016).

Table 6.2 EPA Criteria for Dust (Insoluble Solids) Fallout

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

6.2.3 Operational Air Quality Assessment

The modelling predictions for the modified RDC for average annual TSP, PM_{10}, $PM_{2.5}$ and dust deposition as well as 24-hour average PM_{10} and $PM_{2.5}$ are presented in **Tables 6.3** and **6.4** below. Contour plots showing the indicative concentrations that could potentially be reached at various locations are presented in **Appendix 1**. An estimate of the total amount of dust produced from the modified RDC activities based on a maximum production rate of 2.5 Mtpa is also presented in **Appendix 1**. The proposed modification results in less than 1% increase in total emissions compared with the approved operations.

6.2.3.1 Annual Average Concentrations

Table 6.3 Average annual TSP, PM_{10}, $PM_{2.5}$ and dust deposition for the nearest receivers for modified RDC

Receiver	Average Annual TSP		Average Annual PM_{10}		Average Annual $PM_{2.5}$		Average Annual Dust Deposition	
	RDC	RDC + background	RDC	RDC + background	RDC	RDC + background	RDC	RDC + background
	Criteria = N/A	Criteria = 90µg/m^3	Criteria = N/A	Criteria = 25µg/m^3	Criteria = N/A	Criteria = 8µg/m^3	Criteria = 2g/m^2/month	Criteria= 4g/m^2/month
R1	1.8	53.0	0.5	21.0	0.4	8.2	0.04	2.34
R2	2.5	53.7	0.6	21.1	0.5	8.3	0.06	2.36
R3	2.4	53.6	0.6	21.1	0.4	8.2	0.06	2.36
R4	2.2	53.4	0.5	21.0	0.3	8.1	0.05	2.35
R5	1.6	52.8	0.4	20.9	0.3	8.1	0.03	2.33
R6	0.7	51.9	0.2	20.7	0.2	8.0	0.02	2.32
R7	0.4	51.6	0.1	20.6	0.1	7.9	0.01	2.31
R8	0.4	51.6	0.1	20.6	0.1	7.9	0.01	2.31
R9	0.8	52.0	0.2	20.7	0.2	8.0	0.02	2.32
R10	1.3	52.5	0.3	20.8	0.3	8.1	0.03	2.33
R11	0.9	52.1	0.5	20.7	0.2	8.0	0.02	2.32

Annual Average TSP

The results show that there are no sensitive receivers predicted to experience annual average TSP concentrations above the impact assessment criterion of 90 µg/m^3 with the modified RDC contributing a maximum of 2.5 µg/m^3 (2.7% of the criterion) at the sensitive receivers.

Annual Average PM_{10}

There are no sensitive receivers predicted to experience annual average PM_{10} concentrations above the impact assessment criteria of 25 µg/m^3 with the modified RDC contributing a maximum of 0.6 µg/m^3 (2.4% of the criterion) at the sensitive receivers.

Annual Average $PM_{2.5}$

The existing background annual average concentration of $PM_{2.5}$ is 7.8 µg/m^3 as measured at the OEH monitoring station at St Marys. Annual average $PM_{2.5}$ concentrations do not vary significantly across the state, with all OEH monitoring stations that measure $PM_{2.5}$ concentrations, recording annual average concentrations close to, or above the criteria.

The results show that for the modified RDC the cumulative predictions are marginally above the assessment criterion of 8 µg/m^3 with a maximum of 8.3 µg/m^3 at R2. The modified RDC would contribute only 0.5 µg/m^3 (6.3% of the criterion) to the cumulative concentration of 8.3 µg/m^3. The emissions from the proposed modification represents a minor increase compared with the approved activities.

Annual Average Dust Deposition

There are no sensitive receivers predicted to experience annual average dust deposition levels above the impact assessment criteria of 2 g/m^2/month as a result of the modified RDC alone or the cumulative criterion of 4 g/m^2/month with the modified RDC contributing a maximum of 0.06 g/m^2/month (3% of the criterion) at the sensitive receivers.

6.2.3.2 24-hour Average Concentrations

Table 6.4 presents the maximum 24-hour average PM_{10} concentrations due to the modified RDC for all sensitive receivers. The modified RDC contributes a maximum of 7.5 µg/m^3 (15% of the cumulative criterion of 50 µg/m^3) at the sensitive receivers. The air quality assessment found that there are no additional predicted exceedances of the assessment criterion as a result of the modification.

For maximum 24-hour average $PM_{2.5}$ concentrations, the modified RDC contributes a maximum of 2.4 µg/m^3 (9.6% of the cumulative criterion of 25 µg/m^3) at the sensitive receivers. The air quality assessment found that there are no additional predicted exceedances of the assessment criterion.

Table 6.4 24-hour average PM_{10} and $PM_{2.5}$

Receiver	Maximum 24-hour average PM_{10} (µg/m3)	Maximum 24-hour average $PM_{2.5}$ (µg/m3)
R1	6.4	2.4
R2	7.9	1.7
R3	3.6	0.8

Receiver	Maximum 24-hour average PM_{10} (µg/m3)	Maximum 24-hour average $PM_{2.5}$ (µg/m3)
R4	3.4	0.8
R5	2.4	0.6
R6	1.0	0.4
R7	0.6	0.2
R8	1.3	0.3
R9	1.2	0.4
R10	1.6	0.6
R11	1.3	0.5

Overall, the RDC with the proposed modification will be a minor contributor to 24-hour average PM_{10} and $PM_{2.5}$ concentrations and is not predicted to result in any additional exceedances of the 24-hour criteria.

The OEMP for the RDC outlines a range of air quality management measures which will be applied for the modification. In particular, sprinklers will be installed to service the additional stockpile area, in order to supress dust from the material stockpiles themselves and from trafficable areas.

6.3 Noise

The modification will not result in any new activities being undertaken at the RDC, however, it will change the locations in which some material stockpiling and truck loading will occur at the site. It was therefore identified as having potential, although minor, to result in changes to noise impacts from the RDC. To assess this potential change in impacts an operational noise assessment in accordance with the NSW Industrial Noise Policy was undertaken by Jacobs. The full assessment is presented in **Appendix 2** with a summary of the key findings provided below.

6.3.1 Methodology

To assess potential changes to operational noise levels as a result of the modification two key tasks were undertaken: update of the RDC operational noise model to reflect the proposed modification and evaluation of noise predictions from the updated model against the applicable criteria.

The existing noise model developed for the RDC was updated to address changes as a result of the modification. The modelled predictions included predictions both with and without the modification to show the relative noise, which were then evaluated against the site noise criteria in the Project Approval.

6.3.2 Assessment Criteria

The criteria for operational noise are detailed in the Project Approval. These limits are reproduced below in **Table 6.5**. The criteria presented in **Table 6.5** have been used in the assessment of noise impacts associated with the modification.

Table 6.5 RDC Operational Noise Criteria

Location	Morning shoulder	Day	Evening	Night	
	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{A1\ 1\ minute}$ dB(A)
Any residence in Station Street	39	44	44	39	53
Any residence in Crawford Street	40	40	39	39	53
Any residence in Mavis Street	35	35	35	35	53
Nurrangingy Reserve	When in-use - LAeq 15 minute 50 dB(A)				
Colebee Centre	When in-use - LAeq 15 minute 50 dB(A)				
Blacktown Olympic Park (Active recreation areas)	When in-use - LAeq 15 minute 55 dB(A)				

Notes:

Morning shoulder refers to 6am to 7am Monday to Saturday and 6am to 8am Sundays and Public holidays

Day refers to 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public holidays

Evening refers to 6pm to 10pm Monday to Sunday

Night refers to 10pm to 7am Monday to Saturday and 10pm to 8am Sunday

6.3.3 Operational Noise Assessment

A comparison of noise levels predicted during operation of the RDC both with (Proposed Modification) and without (Current Operations) the modification is provided in **Table 6.6**. It is noted that the predicted noise levels for the existing and proposed operations consider the existing noise mitigation measures for site operations, including noise walls and plant configuration.

Table 6.6 Comparison of predicted noise levels from the current and proposed operating scenarios

Receiver	Operational noise criteria $L_{Aeq\ 15\ minute}$ dB(A)				Current Operations	Proposed Modification
	Morning shoulder	Day	Evening	Night		
132 Station Street	39	44	44	39	30	30
Crawford Street	40	40	39	39	35	38
Mavis Street	35	35	35	35	32	32
Boronia shelter (Nurrangingy Reserve south)	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				47	49
Lomandra shelter (Nurrangingy Reserve north)	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				47	49
54 Station street	39	44	44	39	31	32
Colebee Centre	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				39	40
Blacktown Olympic Park	When in-use - $L_{Aeq\ 15\ minute}$ 55 dB(A)				51	51

These results indicate that the RDC with the modification will meet the relevant noise criteria. A small increase in noise levels at some surrounding receiver locations will occur as a result of the modification, however, these increases are not of a magnitude which would result in the exceedance of the criteria at any of these locations during any time of day.

Regarding the night time $L_{A1\ 1\ minute}$ criteria for evaluating sleep disturbance impacts; the assessment found that the predicted $L_{A1\ 1\ minute}$ noise levels would comply with the 53 dB(A) criterion specified in the Project Approval for surrounding residential receivers.

As the predicted noise levels with the modification will meet the noise criteria in the Project Approval and considering the range of noise mitigation controls already in place at the RDC, no further mitigation measures are recommended for the proposed stockpiling area beyond those already detailed in the OEMP.

6.4 Other Issues

As the location of the proposed modification is within the already constructed RDC, in a previously disturbed area, there will be no change to the scale of operations and there will be only minor change to the nature of the current operations, there is limited potential for a change in impacts for the majority of environmental and community issues.

Table 6.7 provides an assessment of each of the potentially relevant environmental and community issues for the modification.

Table 6.7 Assessment of Other Environmental and Community Issues

Environmental Aspect	Environmental Assessment
Land use	The modification would result in a currently unused portion of the site being converted to a stockpile area with associated loading activities and truck movements. There would be no change to the land use undertaken at the RDC site or surrounding areas. The modification would not result in changes in the nature of the interactions of the RDC on surrounding land uses.
Public Infrastructure	The modification would not result in any changes to public infrastructure. The changes proposed are all internal within the existing RDC site.
Traffic	No changes to the traffic volumes or the traffic routes to the RDC site are proposed due to the modification. The traffic impacts associated with the operation of the RDC as identified in the 2005 and 2010 EAs are therefore unchanged. There would be no change to the entry and egress points of the RDC site.
Ecology	The modification would not result in any change to the disturbance footprint of the approved project. The proposed additional stockpile site is wholly within the RDC site in a previously cleared area which currently consists of a grassed/wood chipped area. There are no native vegetation communities or habitats within the proposed stockpile area.
Groundwater	The modification would not alter the footprint or depth of any excavation within the RDC site and will not impact on groundwater.

Environmental Aspect	Environmental Assessment
Surface Water	The area proposed for the stockpiles is within the existing water management system (WMS) for the RDC. The modification would result in some changes to the currently permeable surface, with high use areas being concreted. This would result in a small increase in potential runoff into the existing water management system from that part of the RDC site. The existing WMS for the approved RDC includes the interception and diversion of runoff entering the site from external catchments, silt traps and Humeceptors for the treatment of runoff from hardstand areas and sediment basins that overflow into Angus Creek. The detailed design of the new stockpile area would include determination of the need for specific drains and sump(s) to manage runoff from the stockpile area prior to entering into the existing WMS drainage structures. The drainage system will be designed in accordance with Landcom's Managing Urban Stormwater Soils and Construction: Volume 1 (2004) (the 'Blue Book'). The potential small increase in runoff from one part of the site as a result of the modification will be addressed by the design of the WMS and is expected to have negligible impact on the operation of the approved WMS.
Visual	No additional visual impacts are anticipated as a result of the proposed modification. The proposed stockpile area is surrounded on all sides by the existing industrial land and is shielded from viewpoints within the surrounding landscape. The existing fences and stockpile areas shield views from the east, north-east and south-east while other industrial sites shield views from the north and west. The proposed stockpiles would be a typical height of 4.5 metres and are not expected to be visible from any public viewing areas except from the road entry to the site which is from within an industrial area. The modification is not expected to change the nature or scale of visual impacts associated with the RDC.
Aboriginal Heritage	The proposed stockpile is located within an existing and approved disturbed area and has been previously assessed for Aboriginal archaeological constraints and approved for development. The modification will not result in any impacts on Aboriginal Heritage.
Historic Heritage	The proposed stockpile is located within an existing and approved disturbed area and has been previously assessed for historic heritage constraints and approved for development. The modification will not result in any impacts on historic heritage.

Environmental Aspect	Environmental Assessment
Socio-economic	The potential for socio-economic impacts associated with the RDC is largely related to the amenity issues where impacts could affect the surrounding community (noise, air quality, visual, traffic), impacts related to employment and population and economic impacts. In regard to noise and air impacts, as identified in **Sections 6.2** and **6.3** only minor changes to existing impacts are predicted as a result of the modification and relevant criteria are proposed to be met for all parameters for noise and air quality (except for annual average $PM_{2.5}$ which is due to high to high background levels with minimal contribution from the RDC). As discussed above, no adverse visual impacts are predicted as a result of the modification. There would be no change to employment or traffic numbers as a result of the modification. In regard to economic impacts, Holcim Australia and the wider community can potentially benefit from the modification through the ability to supply Sydney infrastructure projects from a centrally located distribution centre that is able to meet the stockpile specifications. The secure supply of quality construction materials to these projects is essential to deliver of the NSW Government's infrastructure improvement program and will contribute to the socio-economic benefits afforded by these projects.
Greenhouse Gas and energy	The modification would not change traffic numbers or total volume of product through the RDC site so would have negligible impact on emissions compared to the approved project.
Hazards	As discussed in **Section 4.2.4**, the approved RDC was determined as part of the original environmental assessment and approval process to not be a hazardous or offensive development. The addition of another stockpile site does not change the nature of the site and there would be no storage of hazardous materials as a result of the modification.
Contaminated land	Prior to development of the RDC site, a large amount of fill from construction of the adjacent OneSteel Mini Mill was placed on the central part of the RDC site. Previous testing of this fill indicated that it did not contain contaminated material (NECS, 2005). A January 2017 search of the OEH contaminated land database identified that there are no registered contaminated sites in the Rooty Hill area. The modification would not cause or disturb any contaminated land.

7.0 Management & Monitoring

Holcim Australia has an established environmental management system for the RDC site incorporating a range of environmental management plans (EMPs) and monitoring programs which provide detail on the management of key environmental issues.

As the modification represents a small change to the existing RDC operations, ongoing implementation of the existing EMPs and monitoring programs will be the most efficient and effective way of managing site operations. The management and monitoring plans for the RDC site are as follows:

- Operational Environmental Management Plan
    - Noise Management Plan
    - Traffic Management Plan
    - Soil and Water Management Plan
    - Dust Management Plan
    - Vegetation Management Plan
- Operational Monitoring Plan
    - Noise Monitoring Program
    - Ambient Dust Monitoring Plan
    - Transport Monitoring Plan.

As the modification will result in only relatively minor changes to the operations at the RDC and comprehensive environmental management measures are in place at the RDC, the application of the existing controls to the new stockpiling area is considered appropriate. In particular, as per the existing OEMP, sprinklers will be installed to service the additional stockpile area, in order to supress dust from the material stockpiles themselves and from trafficable areas.

8.0 Conclusion

Holcim Australia is seeking to modify the existing RDC approval to include an additional stockpile area within a currently unused portion of the site. The proposed modification would allow Holcim Australia to meet the current stockpile certification requirements to be able to supply RMS and other infrastructure projects within the increasing Sydney market.

This EA has identified that the modification would result in minimal changes to impacts compared to those of the currently approved operations. For the majority of environmental and community issues there would be no or negligible change. Noise modelling results indicate that changes in noise levels at surrounding receivers from the RDC will be small and are predicted to remain within the relevant criteria. In regard to air impacts only small changes to existing impacts are predicted as a result of the modification and relevant criteria are proposed to be met for all parameters except for annual average $PM_{2.5}$ which is due to high to high background levels with minimal contribution from the RDC. A range of air quality management measures are proposed to be implemented as part of the modification to minimise air quality impacts.

This EA has identified the required management measures to be implemented as part of the modification, building on the measures provided in the existing environmental management system.

On considering the balance of the potential minor impacts of the proposed minor modification to the RDC on the environment and community, and the benefits of the proposed changes, it would be reasonable to conclude that the benefits of the proposed minor modification outweigh the impacts.

9.0 References

Landcom. (2004), *Managing Urban Stormwater: Soils and Construction, Volume 1.*

National Environmental Consulting Services Pty Ltd. (2005), *Environmental Assessment Report: Proposed Regional Distribution Centre, Rooty Hill. Sydney.*

National Environment Protection Council (NEPC) (2016)*, Ambient Air – National Environment Protection Measures (Ambient Air Quality) Measure as amended*

NSW EPA (2016). *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*

Umwelt. (2010), *Environmental Assessment: Proposed Minor Modification to Holcim Regional Distribution Centre (RDC) Rooty Hill, NSW.*

APPENDIX 1

Air Quality Assessment

Final report

Holcim Australia Rooty Hill RDC Air Quality Assessment

Document control number: AQU-NW-003-20328F

Date: 27 February 2017

Pacific Environment

Project name: Holcim Australia Rooty Hill RDC Air Quality Assessment

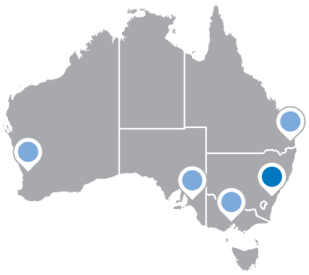
Document control number: AQU-NW-003-20328F

Prepared for: Holcim Australia c/- Umwelt

Approved for release by: Judith Cox

Disclaimer & copyright:

Version	Date	Comment	Prepared by	Reviewed by
D1	15/02/2017	Draft 1	Li Fitzmaurice/Judith Cox	Jane Barnett
D2	17/02/2017	Draft 2	Li Fitzmaurice/Judith Cox	Jane Barnett
R1	27/02/2017	Final	Li Fitzmaurice/Judith Cox	Jane Barnett



Adelaide

35 Edward Street,
Norwood SA 5067
PO Box 3187, Norwood SA 5067
Ph: +61 8 8332 0960
Fax: +61 7 3844 5858

Brisbane

Level 19, 240 Queen Street
Brisbane Qld 4000
Ph: +61 7 3004 6400
Fax: +61 7 3844 5858

Melbourne

Level 17, 31 Queen Street
Melbourne Vic 3000
Ph: +61 3 9111 0021
Fax: +61 2 9870 0999

Perth

Level 1, Suite 3
34 Queen Street, Perth WA 6000
Ph: +61 8 9481 4961
Fax: +61 2 9870 0999

Sydney Head Office

Suite 1, Level 1, 146 Arthur Street
North Sydney, NSW 2060
Ph: +61 2 9870 0900
Fax: +61 2 9870 0999

Disclaimer

Pacific Environment acts in all professional matters as a faithful advisor to the Client and exercises all reasonable skill and care in the provision of its professional services.

Reports are commissioned by and prepared for the exclusive use of the Client. They are subject to and issued in accordance with the agreement between the Client and Pacific Environment. Pacific Environment is not responsible for any liability and accepts no responsibility whatsoever arising from the misapplication or misinterpretation by third parties of the contents of its reports.

Except where expressly stated, Pacific Environment does not attempt to verify the accuracy, validity or comprehensiveness of any information supplied to Pacific Environment for its reports.

Reports cannot be copied or reproduced in whole or part for any purpose without the prior written agreement of Pacific Environment.

Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by the client or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Pacific Environment is both complete and accurate. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise.

Table of contents

List of Figures

List of Tables

1 Introduction

This report has been prepared by Pacific Environment for Umwelt (Australia) Pty Limited who in turn are acting on behalf of Holcim (Australia) Pty Limited (Holcim Australia). It presents an assessment of the air quality impacts associated with the Holcim Australia Regional Distribution Centre (RDC) at Rooty Hill, including the proposed minor modification detailed in **Section 2**.

The assessment is based on a conventional approach following the procedures outlined in the recently updated NSW Environment Protection Authority's (EPA) document titled "Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW" (NSW EPA, 2016) (the Approved Methods).

In summary, the report provides information on the following:

- A description of the proposed operations and the local setting
- Air quality criteria that need to be met to protect the air quality environment
- Meteorological conditions in the area
- Existing air quality conditions in the area
- The methods used to estimate dust emissions and the way in which dust emissions from the RDC would disperse and fallout
- The expected dispersion and dust fallout patterns due to emissions from the RDC and a comparison between the predicted dust concentration and fallout levels and the relevant air quality criteria
- The control methods to be used at the RDC to reduce dust impacts.

2 Project description

Holcim Australia has identified the opportunity to utilise a currently unused portion of the RDC site as a stockpile area that would provide the necessary space required for the RDC to satisfy the current stockpile certification requirements required to supply RMS and other infrastructure projects.

The key elements of the proposed modification include:

- creation of an additional stockpile area (0.43 hectares) adjacent to the existing truck parking area; the base of the stockpile would be road base, with high-traffic areas concreted.
- utilisation of the additional stockpile area – handling of material and loading of trucks at this location.

The physical and operational changes required for the modification are minor and all works would occur within the existing and approved disturbance area for the RDC. There are no changes proposed to the total volume of material stored on the site or maximum annual

material throughput from that currently approved. There would be no change to truck numbers entering or leaving the site, with the only operational change being that the trucks loading material from the certified stockpiles would take a different route on internal roads within the RDC site and loading of trucks would take place at an additional location within the site.

The RDC location is presented in **Figure 2-1**. Eleven representative residential receptor locations are identified, as shown on the figure from R1 to R11. Also shown are the air quality monitoring locations, discussed further in **Section 4.2**.

Figure 2-1: Site Location, sensitive receptors and air quality monitoring locations

3 Air quality criteria

The Approved Methods (**NSW EPA, 2016**) specifies air quality assessment criteria relevant for assessing impacts from air pollution.

These criteria are health-based (i.e. they are set at levels to protect against health effects) and for PM_{10} and $PM_{2.5}$ are consistent with Amended National Environment Protection Measure for Ambient Air Quality (Ambient Air-NEPM) (**NEPC, 2016**). In addition, the Approved Methods include other measures of air quality, namely dust deposition and Total Suspended Particulates (TSP) which are not stated in the Ambient Air-NEPM. The Approved Methods were updated at the end of 2016 to make the annual average PM_{10} criterion equivalent to the NEPM (25 $\mu g/m^3$), prior to this the criterion was 30 $\mu g/m^3$. The updated Approved Methods also introduced criteria for 24-hour average and annual average $PM_{2.5}$.

Table 3.1 presents the air quality criteria for pollutants that are relevant to this study. It is important to note that the criteria are applied to the cumulative impacts due to the RDC and other sources.

Table 3.1: NSW EPA Air Quality Standards/Goals for Particulate Matter Concentrations

Pollutant	Standard	Averaging Period	Source
TSP	90 $\mu g/m^3$	Annual	NSW EPA (2016) (assessment criteria)
PM_{10}	50 $\mu g/m^3$ 25 $\mu g/m^3$	24-Hour Annual	NSW EPA (2016) (assessment criteria)
$PM_{2.5}$	25 $\mu g/m^3$ 8 $\mu g/m^3$	24-Hour Annual	NSW EPA (2016) (assessment criteria)

Notes: $\mu g/m^3$ – micrograms per cubic metre.

In addition to health impacts, airborne dust also has the potential to cause nuisance effects by depositing on surfaces, including vegetation. Larger particles do not tend to remain suspended in the atmosphere for long periods of time and will fall out relatively close to source. Dust deposition can soil materials and generally degrade aesthetic elements of the environment, and are assessed for nuisance or amenity impacts.

Table 3.2 shows the maximum acceptable increase in dust deposition over the existing dust levels from an amenity perspective. These criteria for dust deposition levels are set to protect against nuisance impacts (**NSW EPA, 2016**).

Table 3.2: EPA Criteria for Dust (Insoluble Solids) Fallout

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

4 Existing environment

4.1 Meteorology

4.1.1 Local wind data

There is an onsite meteorological station to measure the weather parameters such as wind speed, wind direction, temperature, and relative humidity. However, it is not compliant with Australian Standard 3580.14-2011 (Methods for sampling and analysis of ambient air; Part 14: Meteorological monitoring for ambient air quality monitoring applications). The mast for wind sensor is 2.5 m (compared with 10m required by the Australian Standard) and there are obstructions in some directions. Therefore, meteorological data measured at St Marys by NSW Office of Environment and Heritage (OEH), which is approximately 9 km to the west-southwest of the project, were used for this modelling study.

Annual and seasonal wind roses for St Marys for 2015 are presented in **Figure 4-1**. The predominant wind directions were from the south and south southwest. There was a high frequency of calm wind (less than 0.5 m/s), which represented 33.9% on the annual basis.

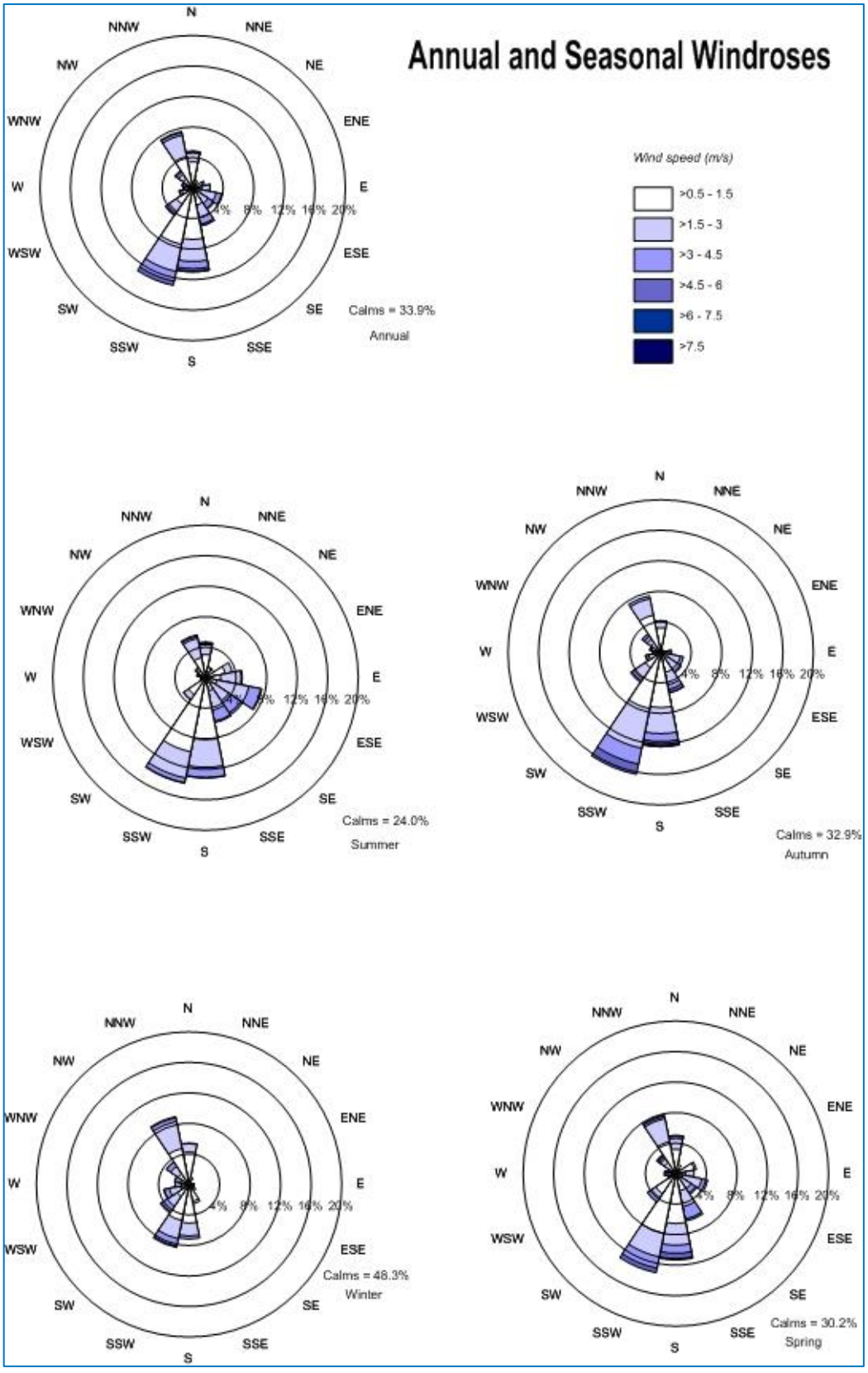


Figure 4-1: *Annual and seasonal wind roses for St Marys in 2015*

4.2 Existing air quality

4.2.1 Introduction

The NSW EPA air quality assessment criteria refer to pollutant levels that include the contribution from specific projects and existing sources, that is, the cumulative concentrations. To fully assess impacts against all the relevant air quality assessment criteria it is necessary to have information on existing dust concentration and deposition levels in the area in which the assessed activity is likely to contribute to these levels.

As shown on **Figure 2-1** and in **Table 4.1**, Holcim Australia operates the following air quality monitoring equipment:

- Three dust gauges to measure dust deposition.
- Two High Volume Air Sampler (HVAS) to measure PM_{10} every sixth day.
    - TSP concentrations are estimated by multiplying PM_{10} concentrations by 2.5 (**Laing, 2017**).

It is important to note that the existing air quality data are influenced by the currently approved operations at the RDC facility.

Table 4.1 *Air quality monitoring sites operated by Holcim Australia*

ID	Description	Easting	Northing
HVAS 1	Site Office	301197	6261909
HVAS 2	Blacktown Sports Centre	301105	6261346
DDG1	Site	301333	6261932
DDG2	Blacktown Sports Centre	301105	6261346
DDG3	Rail siding	301273	6261545.

In addition to the monitoring stations operated by Holcim Australia, monitoring data from the OEH air quality monitoring station located at St Marys were also reviewed.

The following sections provide a summary of the monitoring results.

4.2.2 TSP concentrations

Two HVAS measuring PM_{10} concentrations every sixth day are operated by Holcim Australia at Rooty Hill with TSP estimated based on PM_{10} times 2.5 (**Laing, 2017**). Annual average TSP concentrations for the period 2013 to 2016 are presented in **Table 4.2**.

The data shows that annual average TSP concentrations are significantly lower than the NSW EPA TSP criterion of 90 µg/m^3. It is noted that the annual average at HVAS 2 in 2016 is a lot lower than any other year. Communication from Jacobs (who manage this equipment) suggests this is because the field that the monitor is located in is no longer in regular use and as such there is much less local influence from turf use by the Wanderers football team and mowing etc. (**Laing, 2017**).

Table 4.2: Total suspended particulate data (µg/m³)

Year	Estimated annual average TSP concentrations ((µg/m³)	
	HVAS 1	HVAS 2
2013	No data	55.9
2014	70.9*	56.5
2015	51.5	43.1
2016	61.0	19.6
Average all data	**51.2**	

*Data available from 24 May 2014

The average of all data (51.2 µg/m³) was adopted as the background TSP concentration in this assessment. This is considered to be a conservative estimate as the data are already influenced by the activities at the approved RDC that are also included in the emissions inventory used the air quality assessment.

4.2.3 PM_{10} concentrations

PM_{10} concentrations are measured every sixth day at two locations at Rooty Hill. NSW OEH operate a Tapered Element Oscillating Microbalance (TEOM) at St Marys that continuously collects PM_{10} data.

Annual average PM_{10} concentrations for the period 2013 to 2016 are presented in **Table 4.3**, along with the TEOM data collected at the NSW OEH site at St Marys.

The data show that annual average PM_{10} concentrations were all less than the NSW EPA PM_{10} criterion of 25 µg/m³. Whilst the Holcim Australia HVAS data already include the contribution from existing approved operations at the RDC, the average of the data collected by Holcim Australia i.e. 20.5 µg/m³ has been conservatively applied as background.

Table 4.3: Annual Average PM_{10} Concentration data (µg/m³)

Year	Annual average PM_{10} concentrations (µg/m³)		
	HVAS 1	HVAS 2	St Marys OEH
2013	No data	22.3	16.1
2014	28.3*	22.6	16.7
2015	20.6	17.2	15.1
2016	24.4	7.9	16.0
Average all data	**20.5**		**16.0**

*Data available from 24 May 2014

The 24-hour average concentrations measured at the Holcim Australia HVASs and the OEH monitoring station at St Marys OEH are shown in **Figure 4-2**. At HVAS 2 (located off-site at the Blacktown Sports Centre) there were three days exceeding the NSW assessment criterion of 50 µg/m³ during the last four years. At HVAS 1 (located at the Site Office), there were two days exceeding the NSW assessment criterion between May 2014 and December 2016. At the OEH monitoring station at St Marys, there were six days of exceedance from 2013 to 2016 (inclusive). In 2015, the year that matches the meteorological data used in the dispersion modelling there was one exceedance.

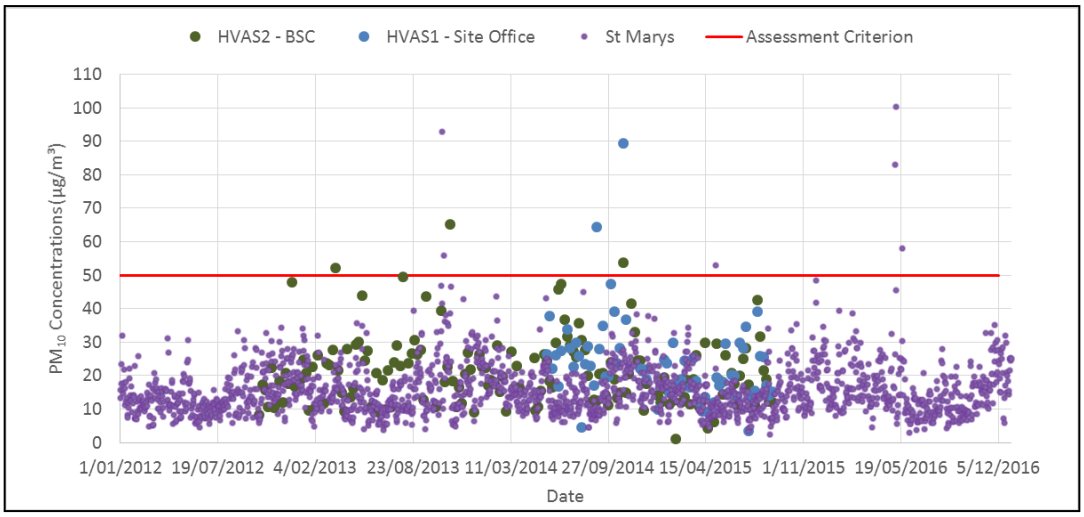


Figure 4-2: 24-hour average PM_{10} concentrations

For predicting cumulative 24-hour concentrations of PM_{10}, the St Marys' 24-hour average PM_{10} data were used as the two Holcim Australia HVAS station data contain the contribution from the existing operations of the RDC.

4.2.4 $PM_{2.5}$ concentrations

As there are no $PM_{2.5}$ concentrations measured at the Holcim Australia monitoring stations at Rooty Hill, data from the OEH monitoring station at St Marys' are presented in **Table 4.4** and **Figure 4-3** for the period since the station commenced operation on 15 March 2016 to 7 February 2017.

The annual average $PM_{2.5}$ data shown in **Table 4.4** show that the annual average NEPM standard of 8 µg/m^3 was not exceeded at St Marys, with an average $PM_{2.5}$ concentration of 7.8 µg/m^3 over the almost 11 months of data available at the time of writing. Annual average $PM_{2.5}$ concentrations do not vary significantly across the state, with all OEH monitoring stations that measure $PM_{2.5}$ concentrations, recording annual average concentrations close to, or above the criteria. The Sydney Particle Study (**Cope et al, 2014**) measured $PM_{2.5}$ concentrations at Westmead (approximately 13km south-east of the RDC) over two sampling campaigns approximately one-month in duration in summer and autumn. The results from the summer monitoring identified sea salt (34%) and organic matter (OM; primary and secondary; 34%) as being the major components of $PM_{2.5}$, with secondary inorganic aerosol (15%), soil (11%) and elemental carbon (6%) also being present in significant amounts. A limited isotopic analysis of the OM carbon (based on six samples) indicated that up to 70% of the analysed carbon is modern- thus secondary organic aerosol formed from biogenic sources. The autumn observation program saw a much reduced sea salt contribution (5%) and an increased contribution from organic matter (57%). The contribution from elemental carbon was also larger (16%) while the secondary inorganic aerosol contribution was the same (15%). The primary emissions from the RDC will be wind-blown dust from material movement and storage.

Table 4.4: Annual Average $PM_{2.5}$ Concentration data (µg/m³)

$PM_{2.5}$ Annual Average Concentration - µg/m³	
St Marys	
15 March 2016 - 7 February 2017	7.8

The data in **Figure 4-3** shows that measured 24-hour average $PM_{2.5}$ concentrations at St Marys OEH monitoring stations have been predominantly well below the NEPM standard of 25 µg/m³. There were only five occasions over the approximately one year period when the NEPM standard was exceeded at this site. Four of these exceedances occurred in May 2016 when significant hazard reduction burns were taking place resulting in poor air quality across the entire Sydney area.

For predicting cumulative 24-hour concentrations of $PM_{2.5}$, the ratio of $PM_{2.5}$: PM_{10} concentrations for the data at St Marys was calculated to be 0.487. This value was applied to the St Marys PM_{10} 24-hour average data for 2015 to estimate the background $PM_{2.5}$ concentrations.

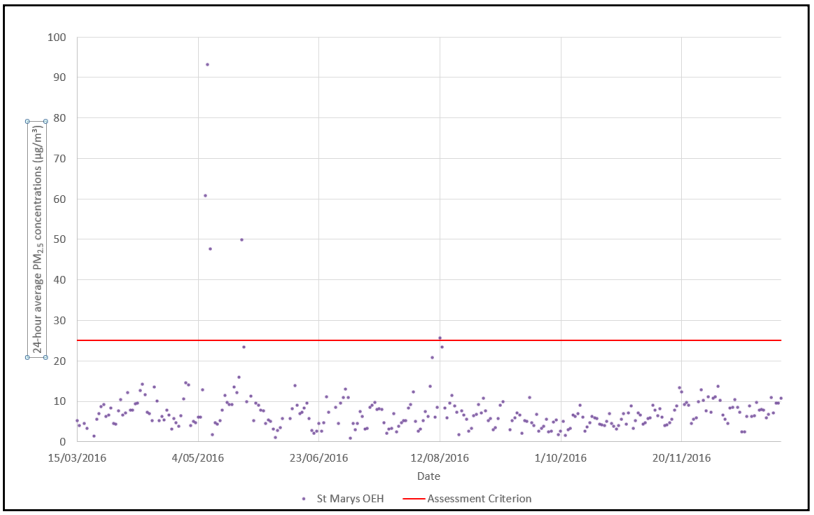


Figure 4-3: 24-hour average $PM_{2.5}$ concentrations at OEH St Marys

4.2.5 Dust Deposition

Dust deposition is monitored using dust deposition gauges at three locations in the vicinity of the RDC.

Dust deposition gauges use a simple device consisting of a funnel and bottle to estimate the rate at which dust settles onto the surface over a period of one month. The measured dust fallout levels include the effects of all existing sources of particulate matter including the surrounding industrial operations.

Data collected from the gauges between 2013 and June 2016 are summarised in **Table 4.5**.

The data show that deposition levels are generally low and within the EPA's cumulative annual average assessment criteria of 4 g/m²/month for insoluble solids. The average of all data equal to 2.3 g/m²/month has been used as the background for the cumulative assessment.

Table 4.5: Annual average dust deposition data (insoluble solids) (g/m^2/month)

Year	DDG 1	DDG 2	DDG 3
2013	2.6	2.0	2.3
2014	2.1	2.5	1.7
2015	1.9	3.3	1.8
2016	2.7	3.2	1.9
Average all data		2.3	

4.2.6 Summary of background data

From the monitoring data available it has been assumed that the following background concentrations apply at the nearest sensitive receivers:

- Annual average TSP of 51.2 µg/m^3 – estimated from average of RDC HVAS PM_{10} data
- Annual average PM_{10} of 20.5 µg/m^3 – average of RDC HVAS PM_{10} data
- Annual average $PM_{2.5}$ of 7.8 µg/m^3 – St Marys OEH
- Annual average dust deposition of 2.3 g/m^2/month – average of data collected at RDC.

5 Modelling approach

5.1 Overview of dispersion model

Off-site dust concentration and deposition levels due to the RDC (including the modification) have been predicted using the dispersion model AERMOD.

AERMOD was chosen as a suitable model due to the source types, location of nearest receptors and nature of local topography. AERMOD is the US-EPA's recommended steady-state plume dispersion model for regulatory purposes. AERMOD replaced the Industrial Source Complex (ISC) model for regulatory purposes in the US in December 2006 as it incorporates more recent, and potentially more accurate, algorithms to represent both meteorological interactions and air quality dispersion. AUSPLUME, the dispersion model previously used to assess impacts from the operations was based on ISC.

A significant feature of AERMOD is that the Pasquill-Gifford stability based dispersion is replaced with a turbulence-based approach that uses the Monin-Obukhov length scale to account for the effects of atmospheric turbulence based dispersion.

The AERMOD system includes AERMET, used for the preparation of meteorological input files and AERMAP, used for the preparation of terrain data.

Terrain data was sourced from NASA's Shuttle Radar Topography Mission (SRTM) Data (1 arc-second, or ~30 m resolution) and processed within AERMAP to create the necessary input files.

AERMET requires surface and upper air meteorological data as input. Surface data was sourced from the OEH St Marys monitoring station, and cloud data from the BoM Bankstown station located approximately 18 km from the site.

Appropriate values for three surface characteristics are required for AERMET as follows;

- surface roughness, which is the height at which the mean horizontal wind speed approaches zero, based on a logarithmic profile,
- albedo, which is an indicator of reflectivity of the surface, and
- Bowen ratio, which is an indicator of surface moisture.

Values of surface roughness, Bowen ratio and albedo were determined for 12 sectors based on a review of aerial photography for a radius of 3 km centred on the site. Default values for urban and grass land use were chosen to represent the surrounding area.

A summary of the model setup is provided in **Appendix A**.

5.2 Source details

The locations of sources modelled for the assessment are shown in **Figure 5-1** and **Table 5.1** summarises the activities allocated to each source. As the current staged layout of the RDC is capable of handling up to 2.5 Mtpa of quarry materials, the modelling was undertaken using this maximum throughput level.

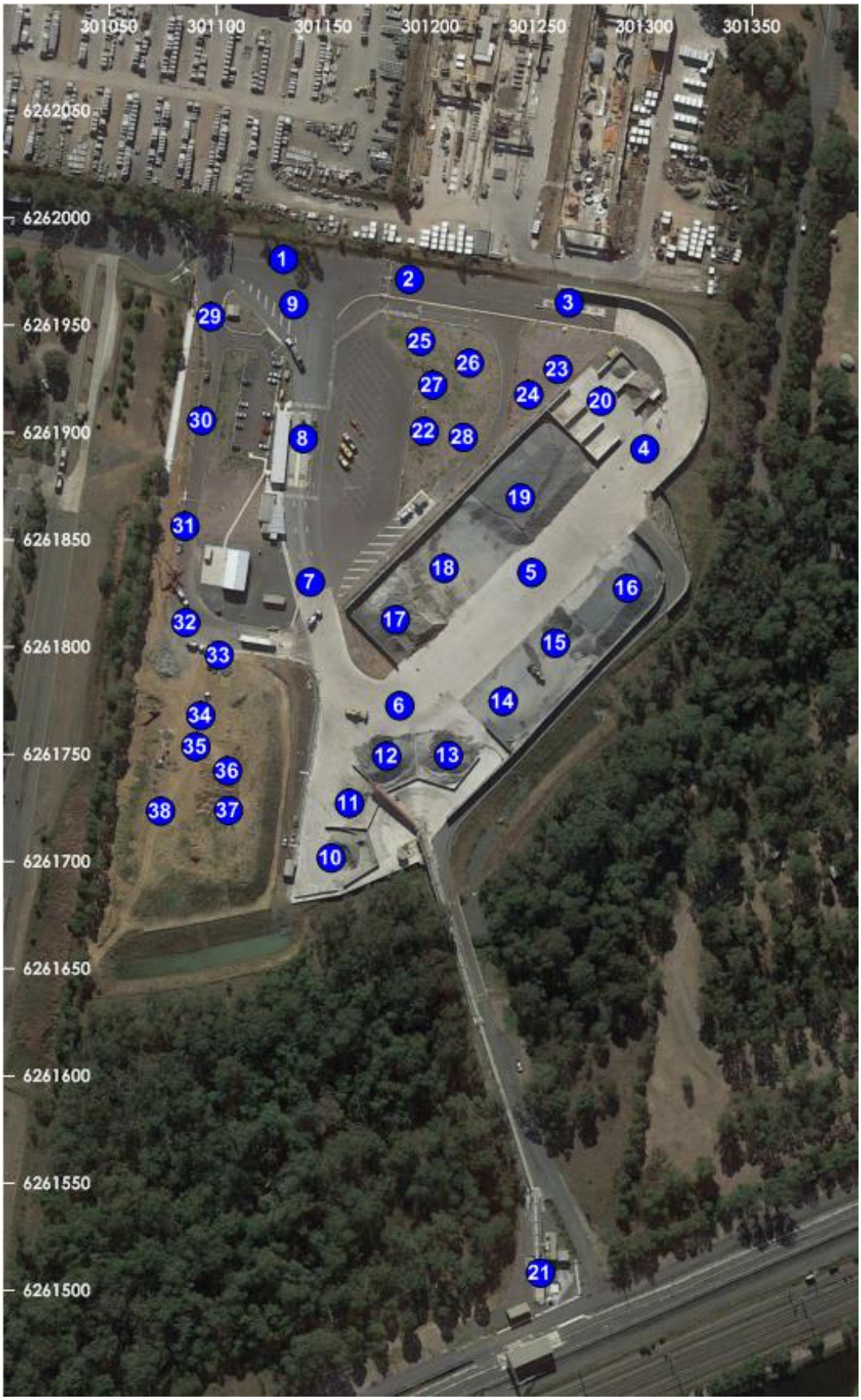


Figure 5-1: Source locations

Table 5.1: Summary of source allocation by activity

ACTIVITY*	Source ID
RDC: Trains unloading to unloading station	21
RDC: Transfer conveyors unloading to radial stacker to ground-stockpiles	10 - 13
RDC: FEL loading trucks for transfer to current and proposed stockpiles	11 - 13
RDC: Trucks movements on site (sealed road) between stockpiles	2 - 5, 7 - 9
RDC: Unload to current stockpiles/storage bins	14 - 20
RDC: Unload to proposed stockpiles	23 - 28
RDC: FEL loading products to trucks current stockpiles	14 - 20
RDC: FEL loading products to trucks proposed stockpiles	23 - 28
RDC: Trucks movements on site (sealed road) taking product to site boundary	1 - 9
RDC: Wind erosion from Main sand stockpile	17 - 18
RDC: Wind erosion from 20/14 AGG stockpile	14 - 15
RDC: Wind erosion from 10/7 AGG stockpile	19
RDC: Wind erosion from 20/7 AGG stockpile	16
RDC: Wind erosion from bunkers	20
RDC: Wind erosion from radial stackers	10 - 13
RDC: Wind erosion from proposed stockpiles	23 - 28
Pugmill: FEL transfer from stacker bays 1, 3 or 4 to pugmill	22, 10, 12, 13
Pugmill: Conveying from pugmill (uncovered)	2, 6-9
Pugmill: Transfer from conveyor to trucks	22
CBP: Vehicles on site	29 - 33
CBP: Vehicle exhausts	29 - 33
CBP: Dumping to ground bins	36 - 38
CBP: FEL loading to hoppers	35
CBP: Residual dust from loading cement/ash to silos	34
CBP: Unloading from bins to trucks	34
CBP: Wind erosion from exposed areas	34 - 38

* RDC: the main activities of the Regional Distribution Centre. CBP: Concrete Batching Plant

6 Emissions to air

Dust emissions from the RDC (including the modification) can be expected from the activities including:

- Material loading and unloading
- Hauling along sealed surfaces
- Wind erosion on stockpiles

In estimating dust emissions, consideration has been given to best practice management (BPM) and applicable controls have been applied to significant dust sources. An overview of BPM is provided in **Table 6.1**. Whilst water carts and street sweepers will also be in use, it is not possible to capture the level of emissions control afforded by them. The control is somewhat reflected in the surface silt content on the sealed roads that is component of the emission factor equation.

Table 6.1: Best Practice Management Measures

ACTIVITY	Assumed Control Measure	Control Applied (%)
Unloading trains	Enclosed	70
All stockpiles	Water sprays	50

An estimate of the amount of dust produced from the RDC (including the modification) activities is presented in **Table 6.2** based on a maximum production rate of 2.5 Mtpa. The increase in emissions due to the Modification are shown in **Table 6.3** and show that the proposed modification results in less than 1% increase in total emissions compared with approved operations.

Detailed emissions inventories for TSP, PM_{10} and $PM_{2.5}$ are presented in **Appendix B**.

Table 6.2: Estimated Dust Emissions – Total RDC including Modification

ACTIVITY *	TSP Emissions (kg/y)	PM_{10} Emissions (kg/y)	$PM_{2.5}$ Emissions (kg/y)
RDC: Trains unloading to unloading station	499	236	36
RDC: Transfer conveyors unloading from radial stacker to ground-stockpiles	1,664	787	119
RDC: FEL transferring from on radial stacker to stockpiles	1,664	787	119
RDC: Trucks movements on site (sealed road) between stockpiles	9,157	1,758	425
RDC: Unloaded to current stockpiles	998	472	71
RDC: Unloaded to proposed stockpiles	665	315	48
RDC: FEL loading products to trucks current stockpiles	998	472	71
RDC: FEL loading products to trucks proposed stockpiles	665	315	48
RDC: Trucks movements on site (sealed road) taking product to site boundary	10,683	2,051	496
RDC: Wind erosion from Mansand stockpile	110	55	8
RDC: Wind erosion from 20/14 AGG stockpile	83	42	6
RDC: Wind erosion from 10/7 AGG stockpile	74	37	6
RDC: Wind erosion from 20/7 AGG stockpile	57	28	4
RDC: Wind erosion from bunkers	70	35	5
RDC: Wind erosion from ground-stockpiles at radial stacker	79	39	6
RDC: Wind erosion from proposed stockpiles	180	90	13
Pugmill: FEL transfer from stacker bays 1, 3 or 4 to pugmill	23	11	2
Pugmill: Conveying from pugmill (uncovered)	9	4	1
Pugmill: Transfer from conveyor to trucks	9	4	1
CBP: Vehicles on site traveling on paved roads	5,008	982	257
CBP: Dumping to ground bins	319	151	23
CBP: FEL loading to hoppers	319	151	23
CBP: Residual dust from loading cement/ash to silos	658	658	658
CBP: Unloading from bins to trucks	266	126	19
CBP: Wind erosion from exposed areas	175	88	13
TOTAL**	**34,432**	**9,694**	**2,478**

* RDC: the main activities of the Regional Distribution Centre. CBP: Concrete Batching Plant
**Totals may not be exact due to rounding

Table 6.3: Estimated Dust Emissions – Modification only

ACTIVITY	TSP	PM_{10}	$PM^{2.5}$
RDC: Wind erosion from proposed stockpiles	180	90	13
Total Increase in Emissions Due to Modification (kg/y)	**180**	**90**	**13**
% of Total Emissions	**0.5**	**0.9**	**0.5**

7 Assessment of impacts

7.1 Introduction

The modelling predictions for the RDC (including the modification) are presented in the sections below. The contour plots are indicative of the concentrations that could potentially be reached at various locations due to the RDC (including the modification).

It is important to note that the isopleth figures are presented to provide a visual representation of the predicted impacts. To produce the isopleths, it is necessary to make interpolations, and as a result the isopleths will not always match exactly with predicted impacts at any specific location.

In the case of maximum 24-hour average results it is also important to note that individual contour plots do not represent one moment in time, but rather an indication of the maximum 24-hour average that could potentially occur at a receptor over the year.

The background concentrations used in this chapter have been outlined previously in **Section 4.2.6**.

7.2 Annual average TSP

Table 7.1 presents the TSP results for both the RDC (including the modification) alone and with other sources for all sensitive receivers.

Contour plots of the predicted annual average concentrations due to the RDC (including the modification) alone and cumulative TSP are presented in **Figure 7-1** and **Figure 7-2**, respectively.

The results show that there are no sensitive receivers predicted to experience annual average TSP concentrations above the impact assessment criterion of 90 µg/m^3 with the RDC (including the modification) contributing a maximum of 2.5 µg/m^3 (2.7% of the criterion) at the sensitive receivers

Table 7.1: Annual average TSP concentrations (µg/m^3)

Receiver ID	RDC alone (including the modification)	RDC (including the modification) plus background
	Annual average TSP (µg/m^3)	
	Assessment criteria = N/A	*Assessment criteria = 90 µg/m^3*
R1	1.8	53.0
R2	2.5	53.7
R3	2.4	53.6
R4	2.2	53.4
R5	1.6	52.8
R6	0.7	51.9
R7	0.4	51.6
R8	0.4	51.6
R9	0.8	52.0
R10	1.3	52.5
R11	0.9	52.1

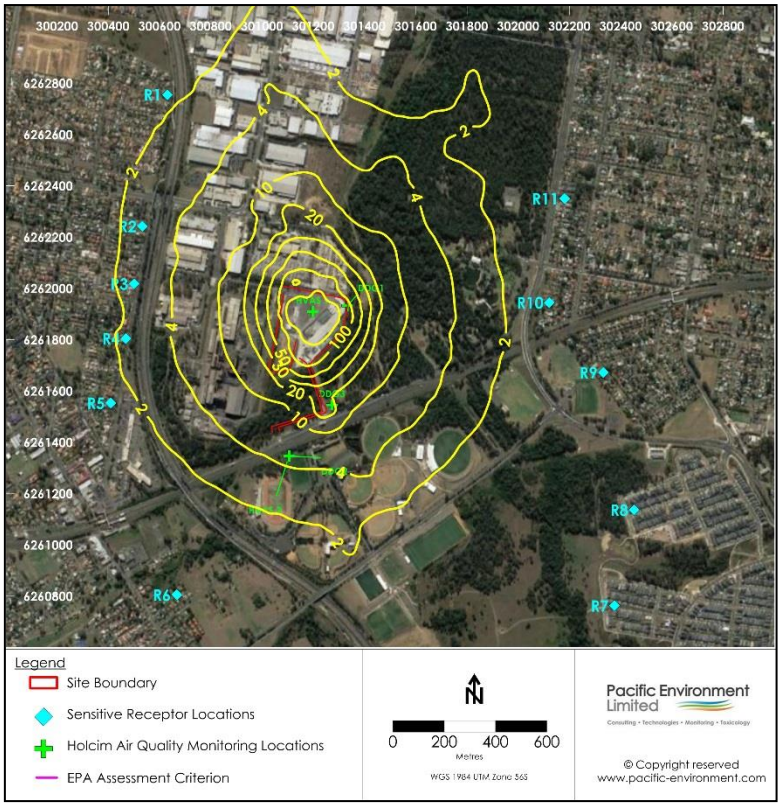


Figure 7-1: Predicted annual average TSP concentrations from the RDC only (μg/m³)

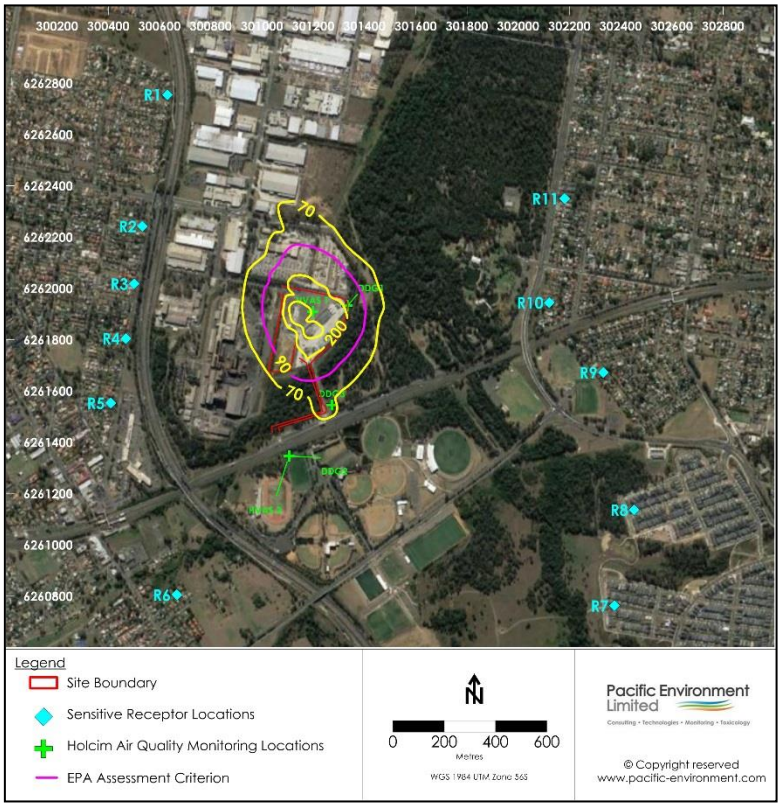


Figure 7-2: Predicted annual average TSP concentrations from the RDC plus background (μg/m³)

7.3 Annual average PM_{10}

Table 7.2 presents the PM_{10} results for both the RDC (including the modification) alone and with other sources for all sensitive receivers.

Contour plots of the predicted annual average concentrations due to the RDC (including the modification) alone and cumulative PM_{10} are presented in **Figure 7-3** and **Figure 7-4**, respectively.

The results show that there are no sensitive receivers predicted to experience annual average PM_{10} concentrations above the impact assessment criteria of 25 µg/m^3 with the RDC (including the modification) contributing a maximum of 0.6 µg/m^3 (2.4% of the criterion) at the sensitive receivers.

Table 7.2: Annual average PM_{10} concentrations (µg/m^3)

Receiver ID	RDC alone (including the modification)	RDC (including the modification) plus background
	Annual average PM_{10} (µg/m^3)	
	Assessment criteria = N/A	*Assessment criteria = 25 µg/m^3*
R1	0.5	21.0
R2	0.6	21.1
R3	0.6	21.1
R4	0.5	21.0
R5	0.4	20.9
R6	0.2	20.7
R7	0.1	20.6
R8	0.1	20.6
R9	0.2	20.7
R10	0.3	20.8
R11	0.5	20.7

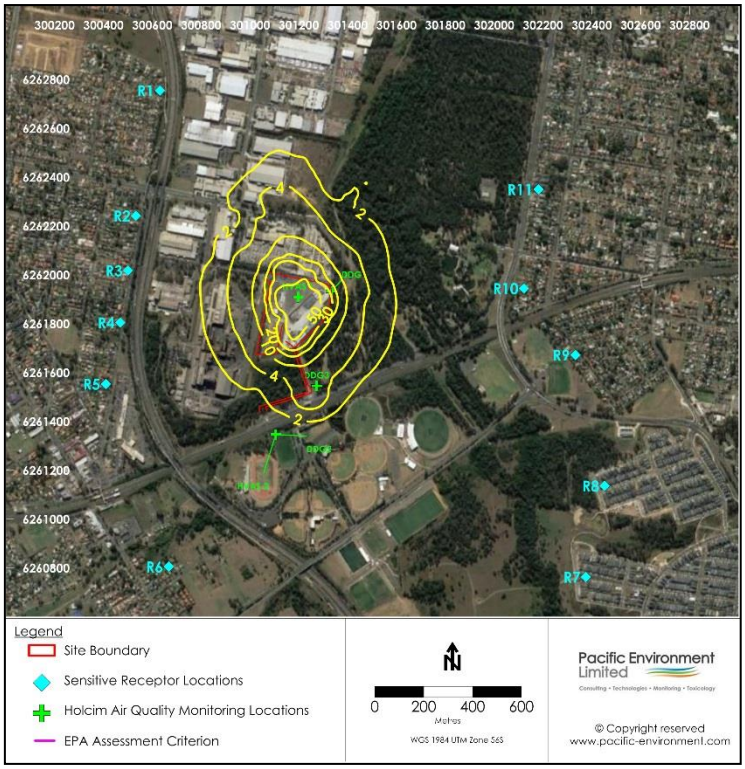


Figure 7-3: Predicted annual average PM_{10} concentrations from the RDC only ($\mu g/m^3$)

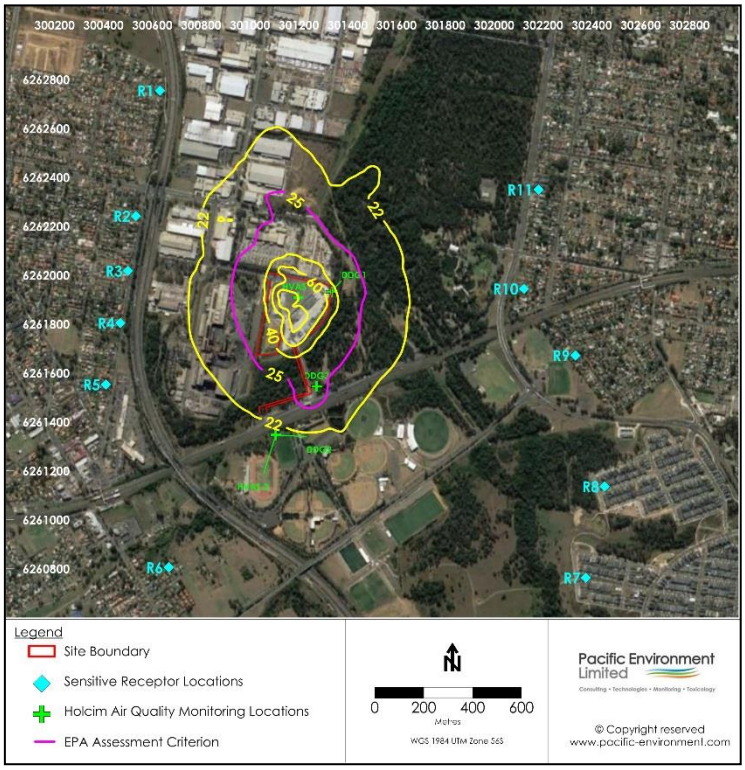


Figure 7-4: Predicted annual average PM_{10} concentrations from the RDC plus background ($\mu g/m^3$)

7.4 Annual average $PM_{2.5}$

Table 7.3 presents the $PM_{2.5}$ results for both the RDC (including the modification) alone and with other sources for all sensitive receivers.

Figure 7-5 and **Figure 7-6** present the predicted annual average $PM_{2.5}$ concentrations for both the RDC (including the modification) alone and with other sources for all sensitive receivers.

The results show that cumulative predictions are marginally above the assessment criterion of 8 µg/m^3 with a maximum of 8.3 µg/m^3 at R2. However, as shown in **Section 4.2.4**, the existing annual average concentration of $PM_{2.5}$ is 7.8 µg/m^3, with the RDC (including the modification) contributing only 0.5 µg/m^3 (6.3% of the criterion) to the cumulative concentration of 8.3 µg/m^3.

As shown in **Section 6** - **Table 6.3 -** the emissions from the proposed modification represent less than a 1% increase compared with the approved activities. In addition, $PM_{2.5}$ concentrations are typically measured using BAMs (Beta-Attenuation Method) that have a sensitivity limit of +/-2 µg/m^3. It therefore considered that the small predicted increase would not be detectable.

Table 7.3: Annual average $PM_{2.5}$ concentrations (µg/m^3)

Receiver ID	RDC alone (including the modification)	RDC (including the modification) plus background
	Annual average $PM_{2.5}$ (µg/m^3)	
	Assessment criteria = N/A	*Assessment criteria = 8 µg/m^3*
R1	0.4	8.2
R2	0.5	8.3
R3	0.4	8.2
R4	0.3	8.1
R5	0.3	8.1
R6	0.2	8.0
R7	0.1	7.9
R8	0.1	7.9
R9	0.2	8.0
R10	0.3	8.1
R11	0.2	8.0

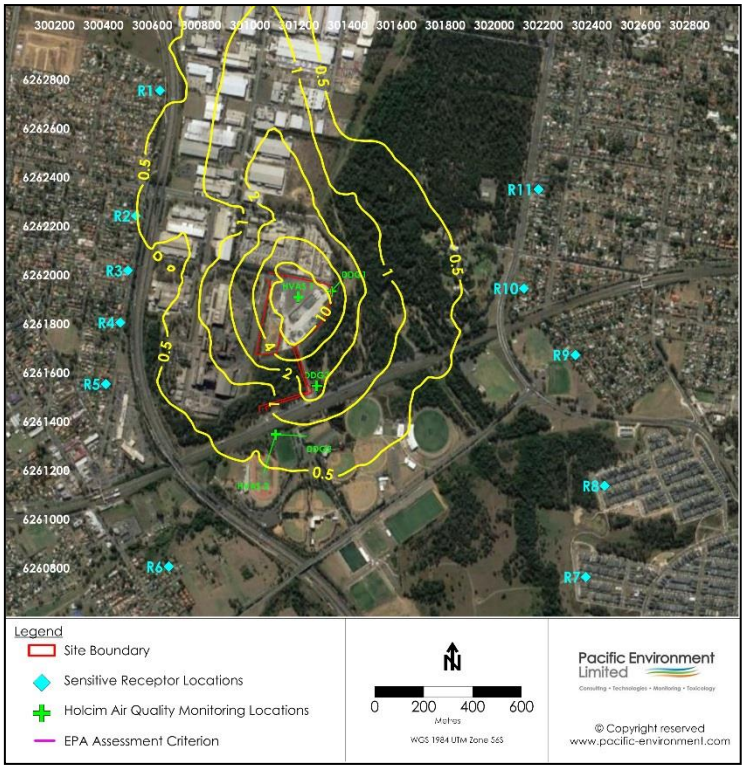


Figure 7-5: Predicted annual average $PM_{2.5}$ concentrations from the RDC only ($\mu g/m^3$)

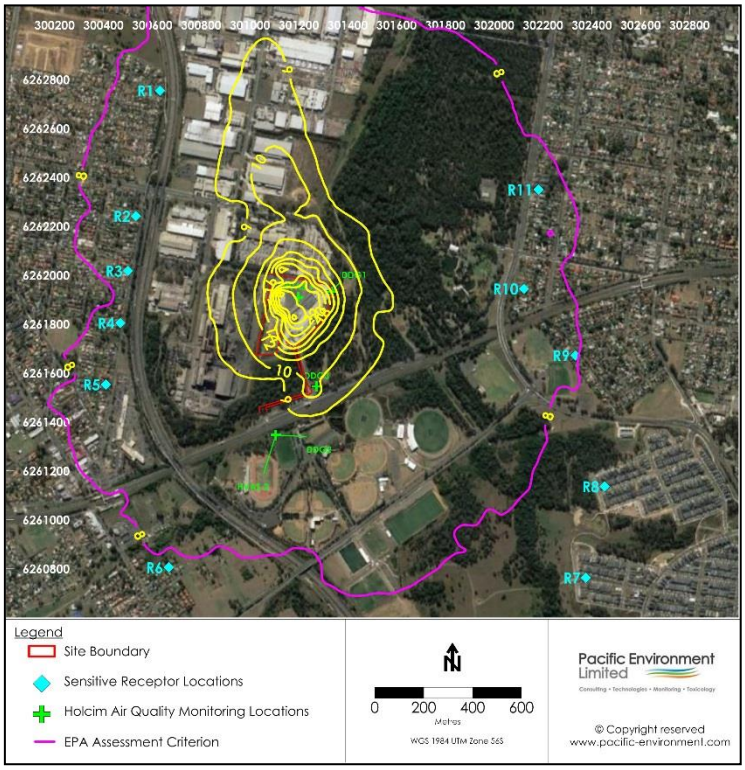


Figure 7-6: Predicted annual average $PM_{2.5}$ concentrations from the RDC plus background ($\mu g/m^3$)

7.5 Annual average dust deposition

Table 7.4 presents the dust deposition results for both the RDC (including the modification) alone and with other sources for all sensitive receivers.

Figure 7-7 and **Figure 7-8** present the predicted annual average dust deposition levels from the RDC (including the modification) and the RDC and other sources, respectively.

The results show that there are no sensitive receivers predicted to experience annual average dust deposition levels above the impact assessment criteria of 2 g/m^2/month as a result of the RDC (including the modification) alone or the cumulative criterion of 4 g/m^2/month with the RDC (including the modification) contributing a maximum of 0.06 g/m^2/month (3% of the criterion) at the sensitive receivers that could not even be measured using dust deposition gauges.

Table 7.4: Annual average dust deposition levels (g/m^2/month)

Receiver ID	RDC alone (including the modification)	RDC (including the modification) plus background
	Annual average dust deposition (g/m^2/month)	
	Assessment criteria = 2 g/m^2/month	*Assessment criteria = 4 g/m^2/month*
R1	0.04	2.34
R2	0.06	2.36
R3	0.06	2.36
R4	0.05	2.35
R5	0.03	2.33
R6	0.02	2.32
R7	0.01	2.31
R8	0.01	2.31
R9	0.02	2.32
R10	0.03	2.33
R11	0.02	2.32

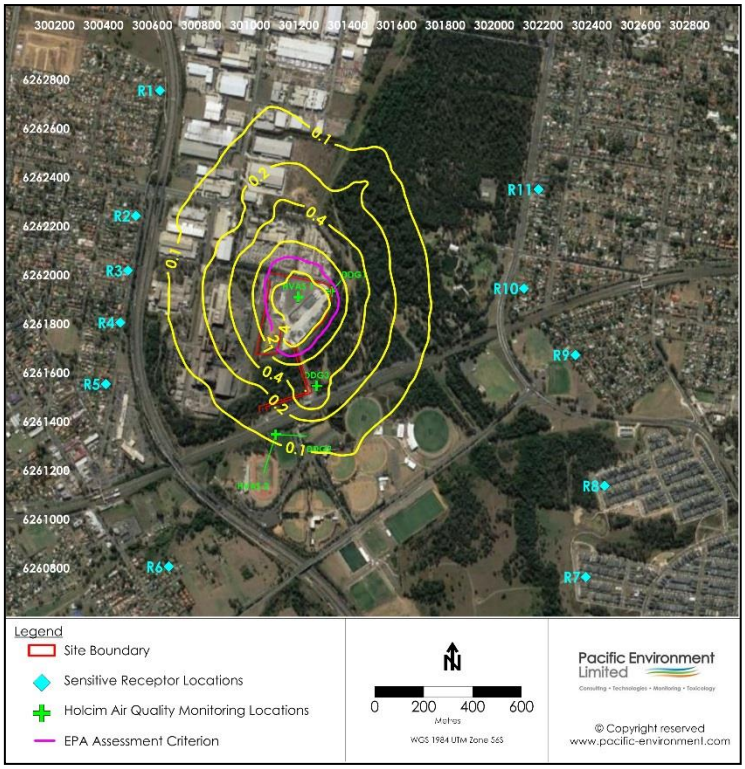


Figure 7-7: Predicted annual average dust deposition levels from the RDC only (g/m^2/month)

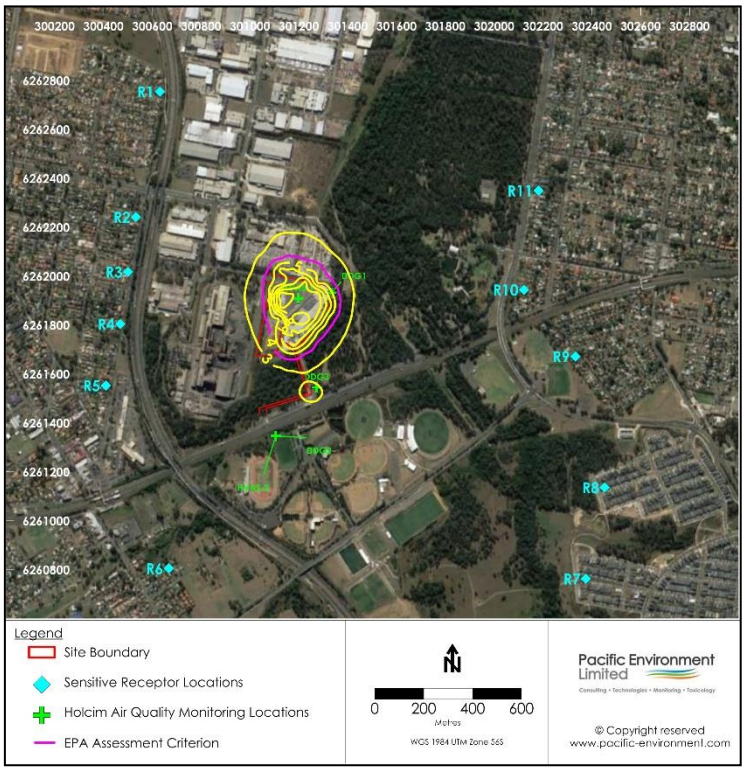


Figure 7-8: Predicted annual average dust deposition levels from the RDC plus background (g/m^2/month)

7.6 24-hour average concentrations

7.6.1 Introduction

It is important to note that it is not possible to accurately predict cumulative 24-hour average concentrations many years into the future using dispersion modelling, principally due to the variability in ambient levels and spatial and temporal variation in any day to day anthropogenic activity. Experience shows that the worst-case 24-hour PM_{10} concentrations are strongly influenced by other sources in the area, such as bushfires and dust storms, which are essentially unpredictable.

The ability to complete a meaningful cumulative assessment of 24-hour concentrations is further compounded by the fact there are no monitoring data that can be considered representative of background concentrations of PM_{10} or $PM_{2.5}$ in the vicinity of the RDC, as all data collected includes contribution from the current operations. In addition, the HVAS data were collected only once every six days and there is insufficient data to provide background data for every day of the year modelled. For this reason, the PM_{10} data collected at the OEH monitoring station at St Marys during 2015 have been applied. As noted in **Section 4.2.4**, background $PM_{2.5}$ concentrations have been estimated by applying the ratio of $PM_{2.5}$ to PM_{10}.

7.6.2 24-hour average PM_{10}

Table 7.5 presents the maximum 24-hour average PM_{10} concentrations due to the RDC (including the modification) for all sensitive receivers. The RDC (including the modification) contributes a maximum of 7.5 µg/m^3 (15% of the cumulative criterion of 50 µg/m^3) at the sensitive receivers.

Appendix C presents the cumulative concentrations for each sensitive receptor as stacked bar-charts, with the measured background concentration at St Marys OEH for the 2015 modelling period shown in blue, and the RDC (including the modification) contribution shown in orange. The background data from St Marys School contains one day that exceeds the assessment criterion of 50 µg/m^3 (53 µg/m^3 on 6 May 2015). There are no additional predicted exceedances of the assessment criterion due to the operation of the RDC (including the modification).

Table 7.5: Maximum predicted incremental 24-hour average PM_{10} concentrations (µg/m^3)

Receiver ID	RDC alone (including the modification) Maximum 24-h average PM_{10} (µg/m^3) *Assessment criteria = N/A*
R1	6.4
R2	7.9
R3	3.6
R4	3.4
R5	2.4
R6	1.0
R7	0.6
R8	1.3
R9	1.2
R10	1.6
R11	1.3

7.6.3 24-hour average $PM_{2.5}$

Table 7.6 presents the maximum 24-hour average $PM_{2.5}$ concentrations due to the RDC alone (including the modification) for all sensitive receivers. The RDC (including the modification) contributes a maximum of 2.4 µg/m^3 (9.6% of the cumulative criterion of 25 µg/m^3) at the sensitive receivers.

Appendix C presents the cumulative concentrations for each sensitive receptor as stacked bar-charts, with the measured background concentration at St Marys OEH for the 2015 modelling period shown in blue, and the RDC (including the modification) contribution shown in orange. The background data from St Marys School contains one day that exceeds the assessment criterion of 25 µg/m^3 (25.8 µg/m^3 on 6 May 2015). There are no additional predicted exceedances of the assessment criterion due to the operation of the RDC (including the modification).

Table 7.6: Maximum predicted incremental 24-hour average $PM_{2.5}$ concentrations (µg/m^3)

Receiver ID	RDC alone (including the modification) Maximum 24-h average $PM_{2.5}$ (µg/m^3) *Assessment criteria = N/A*
R1	2.4
R2	1.7
R3	0.8
R4	0.8
R5	0.6
R6	0.4
R7	0.2
R8	0.3
R9	0.4
R10	0.6
R11	0.5

8 Management and mitigation

Holcim Australia have an Operational Environmental Management Plan (OEMP) (Jacobs, 2015) for the RDC site that contains a dust management plan (DMP). The DMP outlines measures to minimise and manage any impacts from the operation of the project on local air quality. The actions identified in the DMP remain relevant for the operation of the RDC operation when considering the inclusion of the modification.

Holcim Australia has the following controls in place minimise dust emissions associated with the operation of the RDC:

- all conveyor transfer points are enclosed;
- conveyors are covered on at least three sides;
- water sprays are used within the transfer point enclosures, rail unloading facility and in other enclosures as required to further minimise dust;
- water spray systems are installed to service all stockpiles;
- the rail unloading facility is enclosed in a building that is open at each end to allow trains to pass through;
- all paved trafficable areas are swept as required by a permanently stationed street sweeper to minimise dust;
- all trafficable areas on the site are maintained in a condition that minimises the generation or emission of windblown or traffic generated dust from the site at all times;
- plant and equipment is not be left idling when not in use;
- the radial stacker and associated stockpiles have water sprays which are used when the facility is in operation, including when loading vehicles, as required to suppress dust;
- vehicle movements are confined to designated areas, and vehicles only travel on sealed roads; heavy vehicles entering and leaving the site that are carrying loads are covered at all times, except during loading and unloading activities; and
- all equipment used on site is maintained in good working order and in accordance with manufacturers specifications to minimise emissions.

As part of daily activities, the Environmental Representative visually monitors site operations including but not limited to weather conditions (wind strength, visible dust plumes, surface water runoff), condition of silt fences or waste material. Where conditions on site have the potential to result in environmental impacts, the Site Manager is notified to address them.

9 Conclusions

This report has assessed the predicted ground-level concentrations of TSP, PM_{10}, $PM_{2.5}$ and dust deposition associated with Rooty Hill Regional Distribution Centre, including the proposed modification. An operating scenario based on a maximum production rate of 2.5 Mtpa has been assessed to represent the potential air quality impacts that the RDC (including the modification) would have on nearby sensitive receptors (e.g. residences). It is shown that the modification results in a small increase (<1%) in total emissions compared with the current operations.

Dispersion modelling has been used to assess the impact that dust emissions from the operation would have on the local air quality. The emissions inventories developed have been used with local meteorological data and the AERMET/AERMOD model to predict the maximum 24-hour average PM_{10} and $PM_{2.5}$, annual average TSP, PM_{10} and $PM_{2.5}$ concentrations and annual average dust deposition (insoluble solids) levels. The modelling has been undertaken to show the effects of the Rooty Hill RDC (including the Modification) alone and with background dust levels considered.

As the PM_{10} and dust monitoring data collected at the RDC includes the contribution from the approved RDC operations, it is important to note that the assumptions for background concentrations already includes contribution from the existing operations, as such there is some element of double counting.

It is concluded that air quality impacts would not exceed the annual assessment criteria at any of the surrounding sensitive receivers for TSP, PM_{10} or dust deposition. There are minor predicted exceedances of the annual average $PM_{2.5}$ criterion of 8 □g/m3, with a maximum predicted concentration of 8.3 μg/m3 at R2. The existing background is already 7.8 $\mu g/m^3$ and the RDC (including the modification) at R2 contributes a maximum of 0.5 $\mu g/m^3$. It is considered that this minor predicted change with the RDC being a minor contributor to the cumulative $PM_{2.5}$ level which is driven by background sources. It is considered unlikely that a measureable difference in $PM_{2.5}$ levels would occur due to the RDC.

Cumulative 24-hour average concentrations show there are no additional exceedances predicted of either the PM_{10} or $PM_{2.5}$ 24-hour average criteria of 50 $\mu g/m^3$ and 25 $\mu g/m^3$, respectively.

10 References

Cope Martin, Melita Keywood, Kathryn Emmerson, Ian Galbally, Kate Boast, Scott Chambers, Min Cheng, Suzanne Crumeyrolle, Erin Dunne, Rosemary Fedele, Rob Gillett, Alan Griffiths, James Harnwell, Jack Katzfey, Dale Hess, Sarah Lawson, Branka Miljevic, Suzie Molloy, Jenny Powell, Fabienne Reisen, Zoran Ristovski, Paul Selleck, Jason Ward, Chuanfu Zhang, Jianrong Zeng Compe (2014). Sydney Particle Study- Stage-II. The Centre for Australian Weather and Climate Research. A partnership between CSIRO and the Bureau of Meteorology.

Laing (2017). Email communication between Judith Cox (Pacific Environment) and Greer Laing (Jacobs).

NEPC (2016). Ambient Air – National Environment Protection Measures (Ambient Air Quality) Measure as amended. 25 February 2016. National Environment Protection Council.

NSW EPA (2016). Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, January 2017.

Appendix A: AERMOD model set-up

AERMET/AERMOD Set-up

AERMOD				
Meteorology				
Meteorological data for Surface Files	St Marys OEH Meteorological Station • Air temperature • Relative Humidity • Wind speed • Wind direction • Station Pressure Bankstown BoM station • Cloud cover • Cloud height			
Year of analysis	January 2015 - December 2015			
Model Set up				
South-west corner of domain (easting, northing)	299975, 6260675			
MGA coordinate zone	56 S			
Grid domain size	2.45km x 2.455km			
Grid spacing	50m			
Number of grid points	50 x 50			
Terrain data	SRTM3 at 30m resolution			
Urban Mode	Selected			
Particle parameters				
Particle type	**TSP**	**PM_{10}**	**$PM_{2.5}$**	**Dust deposition**
Particle Method	Method 1	Method 1	Method 1	Selected
Particle diameter (microns)	17	5	1	17
Mass Fraction	1	1	1	1
Particle Density	2.5	2.5	2.5	2.5
Dry depletion	Selected	Selected	Selected	Selected
Output Options				
Highest values				

Appendix B: TSP, PM_{10} and $PM_{2.5}$ Emissions Inventories

TSP Emissions

ACTIVITY	TSP (kg/y)	Emission factor	Units	Variable 1	Units	Variable 2	Units	Variable 3	Units	Variable 4	Units	Variable 5	Units	Controls		
RDC: Trains unloading to unloading station	499	0.00020	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)							70	% Control	enclosed bin
RDC: Transfer conveyors unloading from radial stacker to ground-stockpiles	1,664	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL transferring from on radial stacker to stockpiles	1,664	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Trucks movements on site (sealed road) between stockpiles	9,157	0.004	kg/t	33	t/load	32.5	Mean vehicle mass (t)	0.60	km/return trip	0.20	kg/VKT	1.7	g/m2 silt loading			
RDC: Unloaded to current stockpiles	998	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Unloaded to proposed stockpiles	665	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL loading products to trucks current stockpiles	998	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL loading products to trucks proposed stockpiles	665	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Trucks movements on site (sealed road) taking product to site boundary	10,683	0.004	kg/t	33	t/load	32.5	Mean vehicle mass (t)	0.70	km/return trip	0.20	kg/VKT	1.7	g/m2 silt loading			
RDC: Wind erosion from Mansand stockpile	110	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 20/14 AGG stockpile	83	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 10/7 AGG stockpile	74	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 20/7 AGG stockpile	57	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from bunkers	70	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from ground-stockpiles at radial stacker	79	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from proposed stockpiles	180	438	kg/ha/y	0.05	kg/ha/h	8760	h/y							50	% Control	water sprays
Pugmill: FEL transfer from stacker bays 1, 3 or 4 to pugmill	23	0.00038	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	3	moisture content (%)									
Pugmill: Conveying from pugmill (uncovered)	9	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	6	moisture content (%)									
Pugmill: Transfer from conveyor to trucks	9	0.00014	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	6	moisture content (%)									
CBP: Vehicles on site traveling on paved roads	5,008															
CBP: Dumping to ground bins	319	0.00067	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: FEL loading to hoppers	319	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: Residual dust from loading cement/ash to silos	658	50	Conc limit (mg/Nm3)	108.3	Air volume (Nm3/minute)	1	Time (min/t)									
CBP: Unloading from bins to trucks	266	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: Wind erosion from exposed areas	175	876	kg/ha/y	0.1	kg/ha/h	8,760	h/y									
Total	34,433															

PM_{10} Emissions

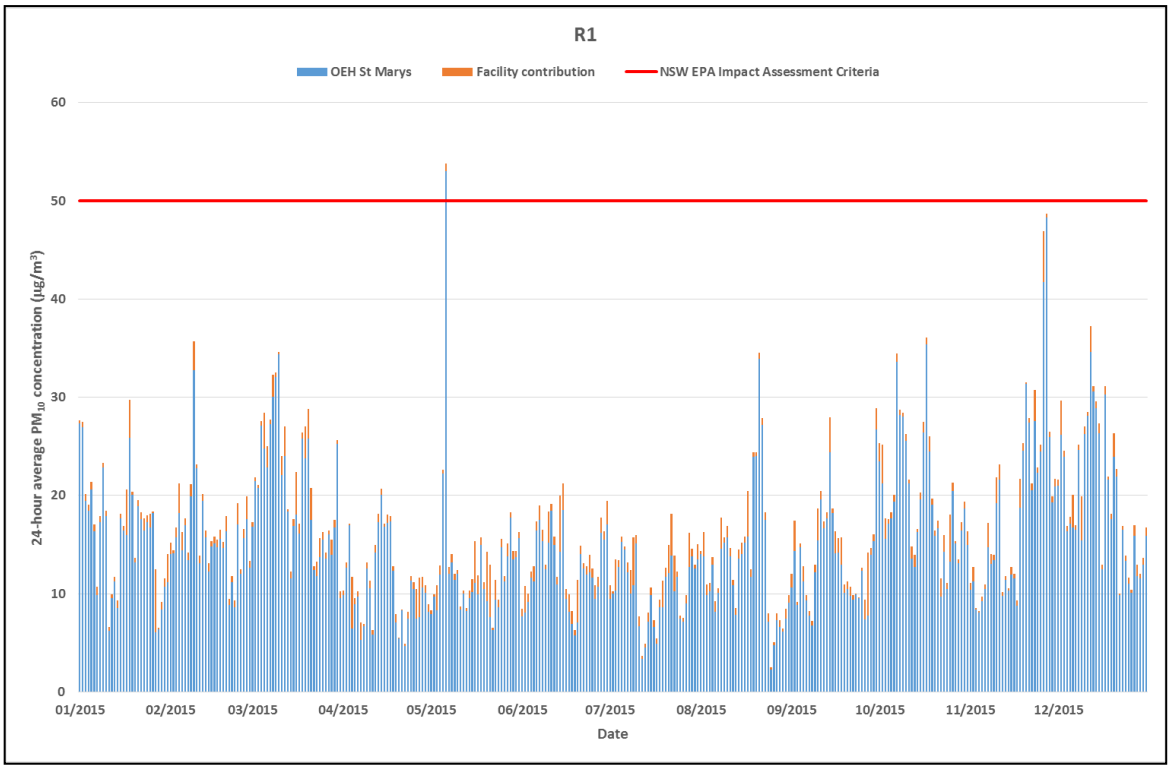
ACTIVITY	PM10	Intensity	Units	Emission factor	Units	Variable 1	Units	Variable 2	Units	Variable 3	Units	Variable 4	Units	Variable 5	Units	Controls		
RDC: Trains unloading to unloading station	236	2,500,000	t/y	0.00009	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)							70	% Control	enclosed bin
RDC: Transfer conveyors unloading from radial stacker to ground-stockpiles	787	2,500,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL transferring from on radial stacker to stockpiles	787	2,500,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Trucks movements on site (sealed road) between stockpiles	1,758	2,500,000	t/y	0.001	kg/t	33	t/load	32.5	Mean vehicle mass (t)	0.60	km/return trip	0.039	kg/VKT	1.7	g/m2 silt loading			
RDC: Unloaded to current stockpiles	472	1,500,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Unloaded to proposed stockpiles	315	1,000,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL loading products to trucks current stockpiles	472	1,500,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL loading products to trucks proposed stockpiles	315	1,000,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Trucks movements on site (sealed road) taking product to site boundary	2,051	2,500,000	t/y	0.001	kg/t	33	t/load	32.5	Mean vehicle mass (t)	0.70	km/return trip	0.039	kg/VKT	1.7	g/m2 silt loading			
RDC: Wind erosion from Mansand stockpile	55	0.25	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 20/14 AGG stockpile	42	0.19	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 10/7 AGG stockpile	37	0.17	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 20/7 AGG stockpile	28	0.13	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from bunkers	35	0.16	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from ground-stockpiles at radial stacker	39	0.18	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from proposed stockpiles	90	0.41	ha	219	kg/ha/y	0.025	kg/ha/h	8760	h/y							50	% Control	water sprays
Pugmill: FEL transfer from stacker bays 1, 3 or 4 to pugmill	11	60,000	t/y	0.00018	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	3	moisture content (%)									
Pugmill: Conveying from pugmill (uncovered)	4	60,000.00	t/y	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	6	moisture content (%)									
Pugmill: Transfer from conveyor to trucks	4	60,000	t/y	0.00007	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	6	moisture content (%)									
CBP: Vehicles on site traveling on paved roads	982																	
CBP: Dumping to ground bins	151	480,000	t/y	0.00031	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: FEL loading to hoppers	151	480,000.00	t/y	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: Residual dust from loading cement/ash to silos	658	121,500	t/y	50	Conc limit (mg/Nm3)	108.3	Air volume (Nm3/minute)	1	Time (min/t)									
CBP: Unloading from bins to trucks	126	400,000.00	t/y	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: Wind erosion from exposed areas	88	0.2	ha	438	kg/ha/y	0.05	kg/ha/h	8,760	h/y									
Total	9,693																	

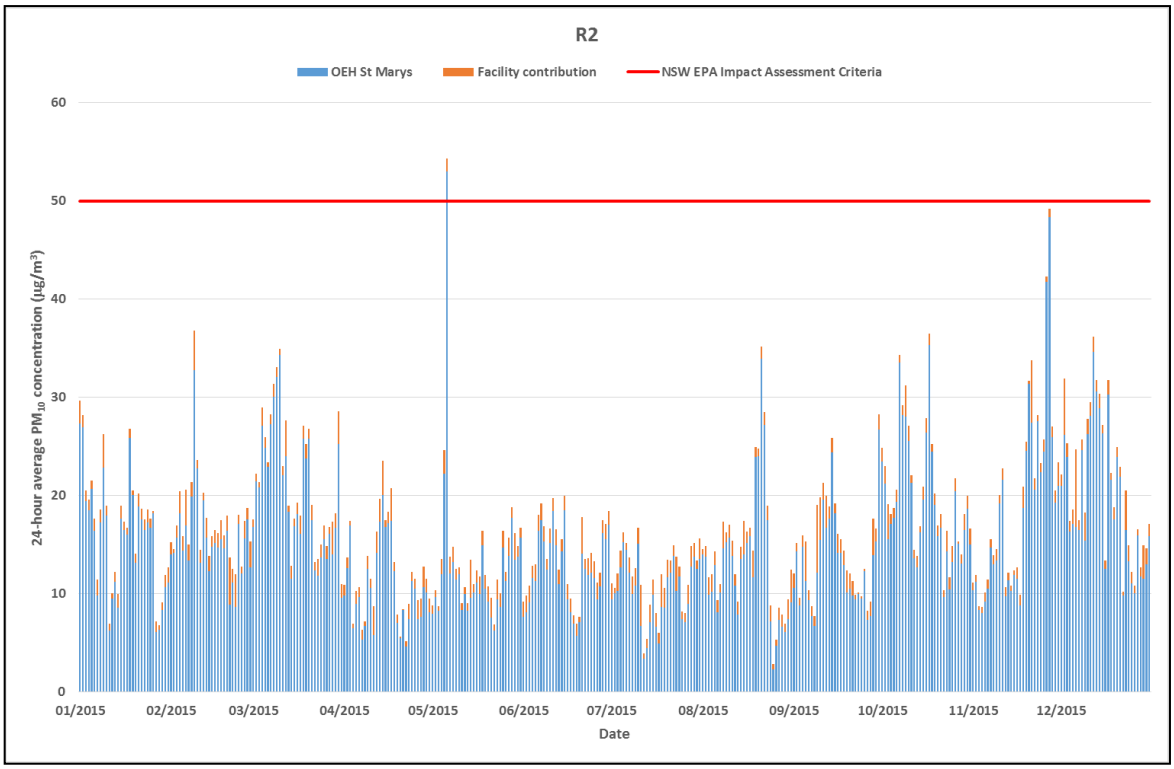
$PM_{2.5}$ Emissions

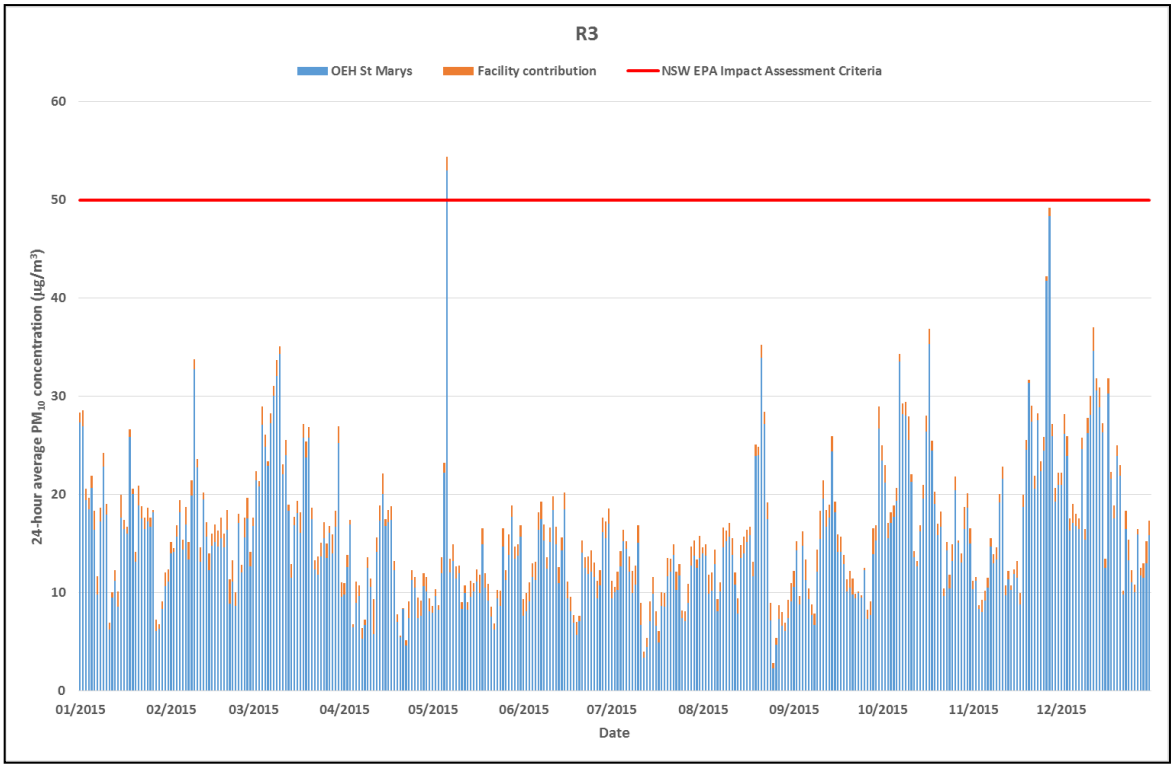
ACTIVITY	PM2.5	Intensity	Units	Emission factor	Units	Variable 1	Units	Variable 2	Units	Variable 3	Units	Variable 4	Units	Variable 5	Units	Controls		
RDC: FEL transferring from on radial stacker to stockpiles	119	2,500,000	t/y	0.00005	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Trucks movements on site (sealed road) between stockpiles	425	2,500,000	t/y	0.000	kg/t	33	t/load	32.5	Mean vehicle mass (t)	0.60	km/return trip	0.009	kg/VKT	1.7	g/m2 silt loading			
RDC: Unloaded to current stockpiles	71	1,500,000	t/y	0.00005	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Unloaded to proposed stockpiles	48	1,000,000	t/y	0.00005	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL loading products to trucks current stockpiles	71	1,500,000	t/y	0.00005	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: FEL loading products to trucks proposed stockpiles	48	1,000,000	t/y	0.00005	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
RDC: Trucks movements on site (sealed road) taking product to site boundary	496	2,500,000	t/y	0.000	kg/t	33	t/load	32.5	Mean vehicle mass (t)	0.70	km/return trip	0.009	kg/VKT	1.7	g/m2 silt loading			
RDC: Wind erosion from Mansand stockpile	8	0.25	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 20/14 AGG stockpile	6	0.19	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 10/7 AGG stockpile	6	0.17	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from 20/7 AGG stockpile	4	0.13	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from bunkers	5	0.16	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from ground-stockpiles at radial stacker	6	0.18	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
RDC: Wind erosion from proposed stockpiles	13	0.41	ha	33	kg/ha/y	0.00375	kg/ha/h	8760	h/y							50	% Control	water sprays
Pugmill: FEL transfer from stacker bays 1, 3 or 4 to pugmill	2	60,000	t/y	0.00003	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	3	moisture content (%)									
Pugmill: Conveying from pugmill (uncovered)	1	60,000.00	t/y	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	6	moisture content (%)									
Pugmill: Transfer from conveyor to trucks	1	60,000	t/y	0.00001	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	6	moisture content (%)									
CBP: Vehicles on site traveling on paved roads	257																	
CBP: Dumping to ground bins	23	480,000	t/y	0.00005	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: FEL loading to hoppers	23	480,000.00	t/y	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: Residual dust from loading cement/ash to silos	658	121,500	t/y	50	Conc limit (mg/Nm3)	108.3	Air volume (Nm3/minute)	1	Time (min/t)									
CBP: Unloading from bins to trucks	19	400,000.00	t/y	0	kg/t	0.562	average of (wind speed/2.2)^1.3 in m/s	2	moisture content (%)									
CBP: Wind erosion from exposed areas	13	0.2	ha	66	kg/ha/y	0.0075	kg/ha/h	8,760	h/y									
Total	**2,479**																	

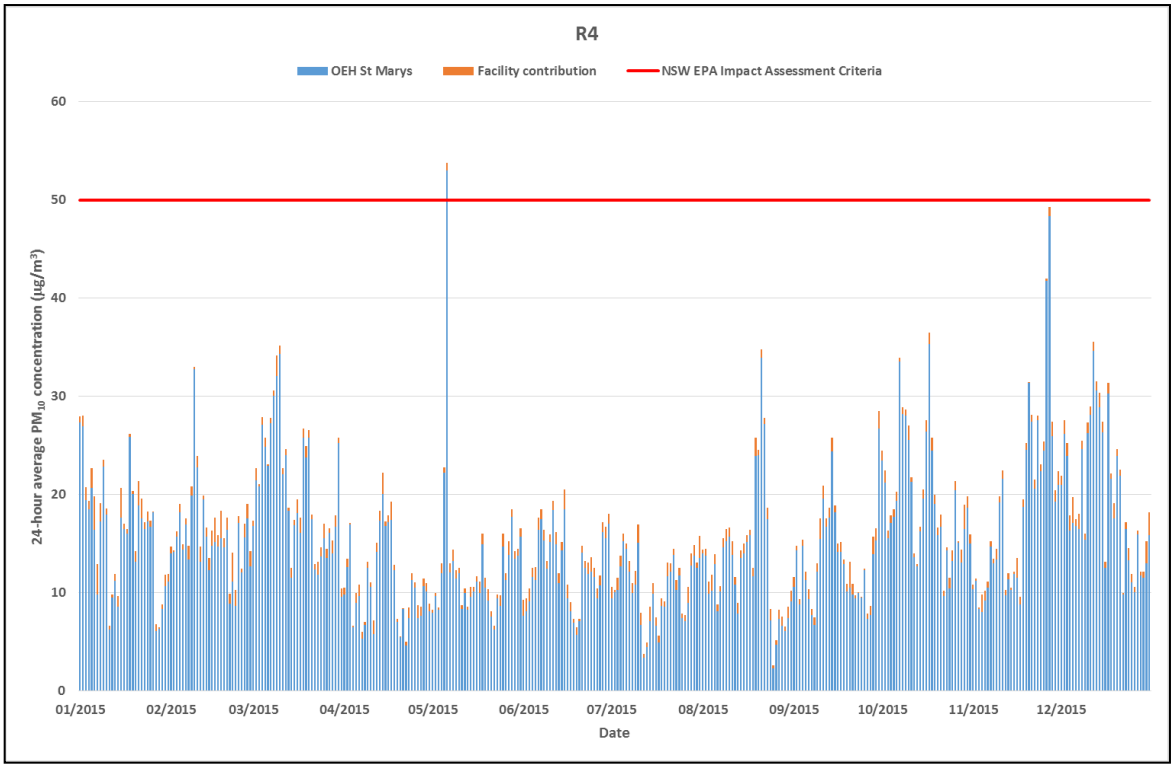
Appendix C: Cumulative 24-hour average PM_{10} and $PM_{2.5}$ plots

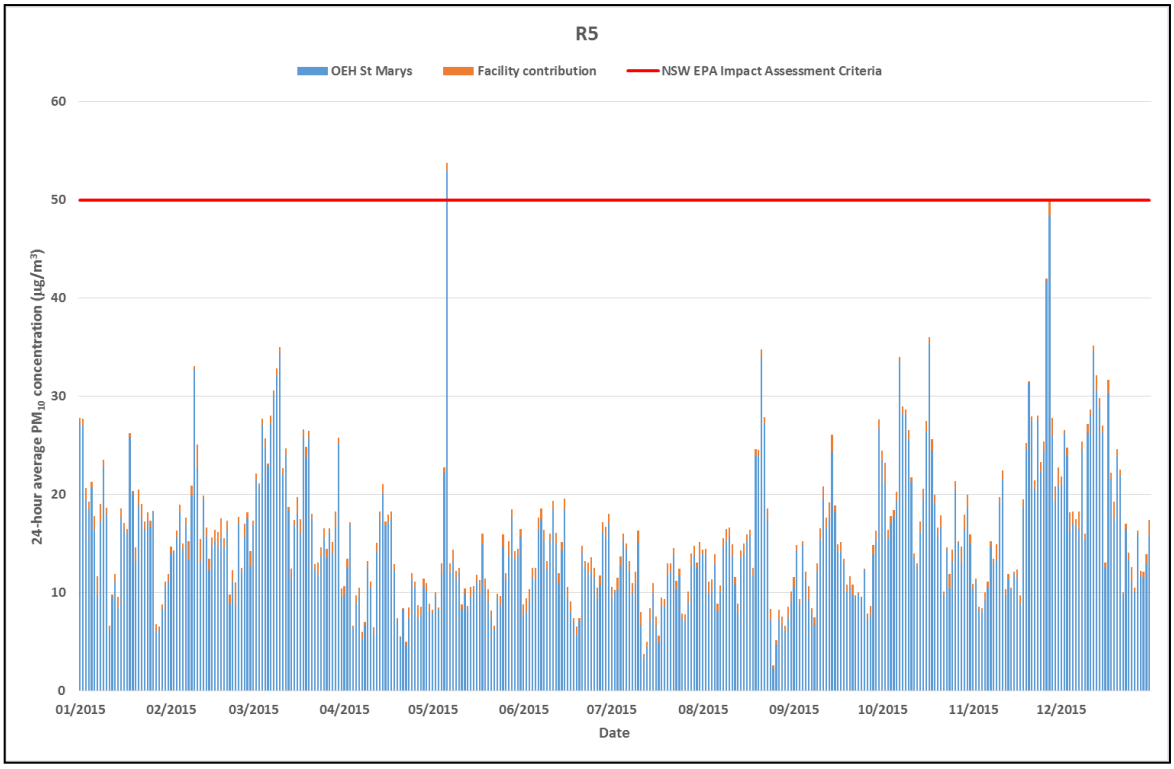
Cumulative 24-hour average PM_{10} concentrations

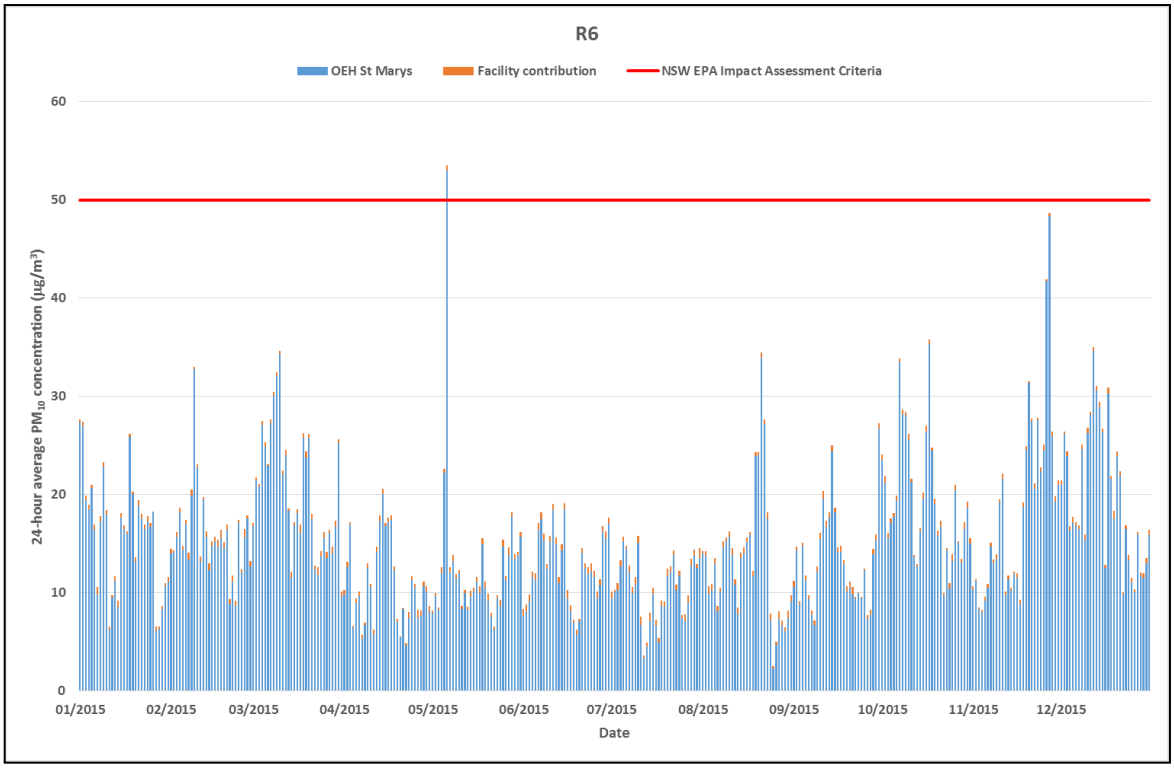


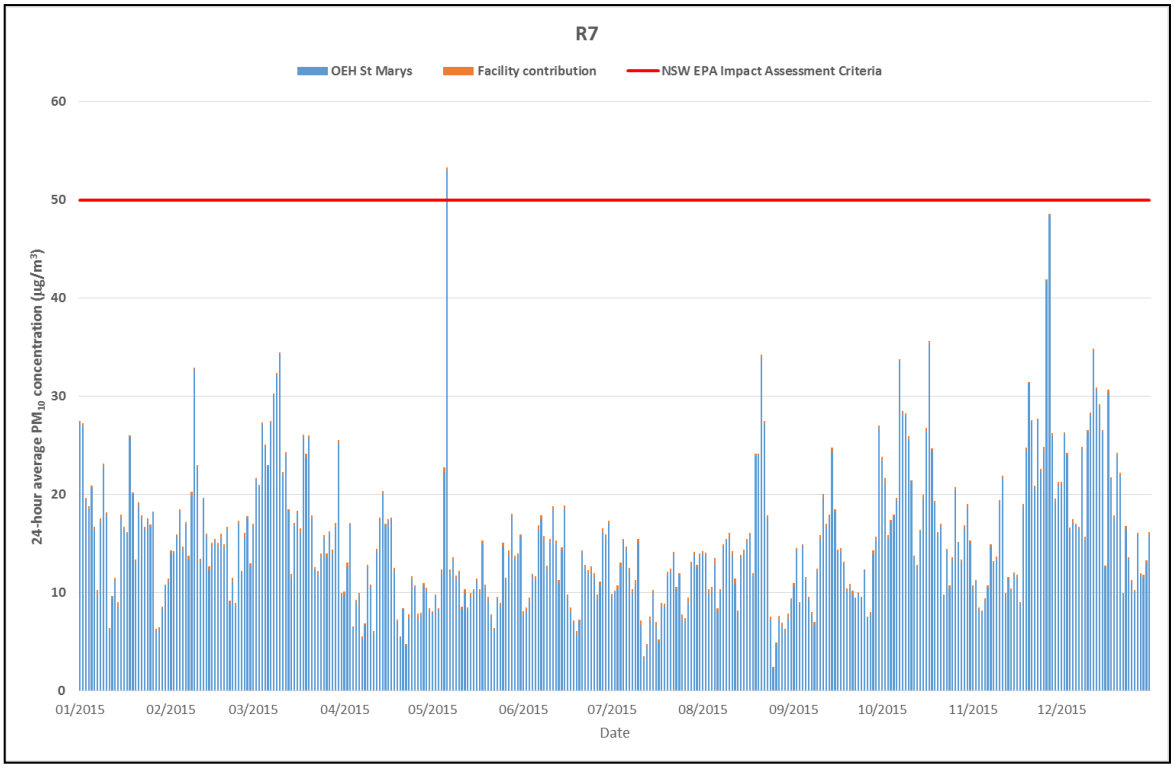


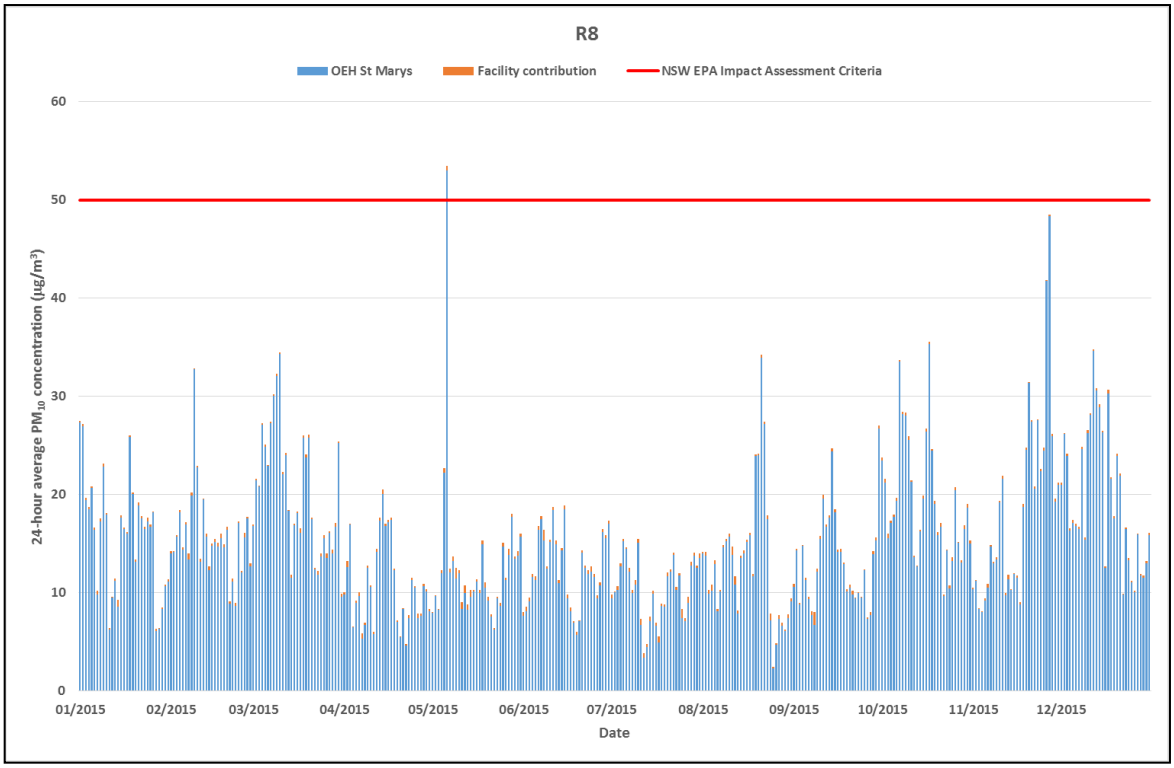


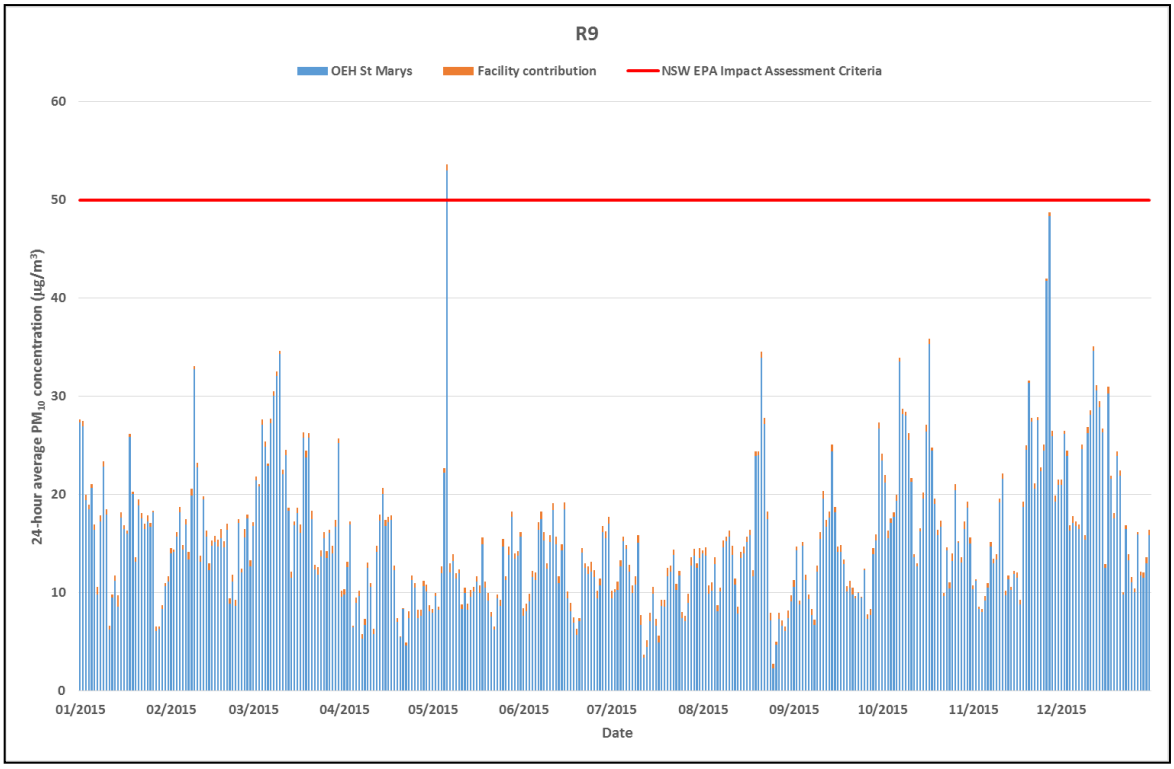


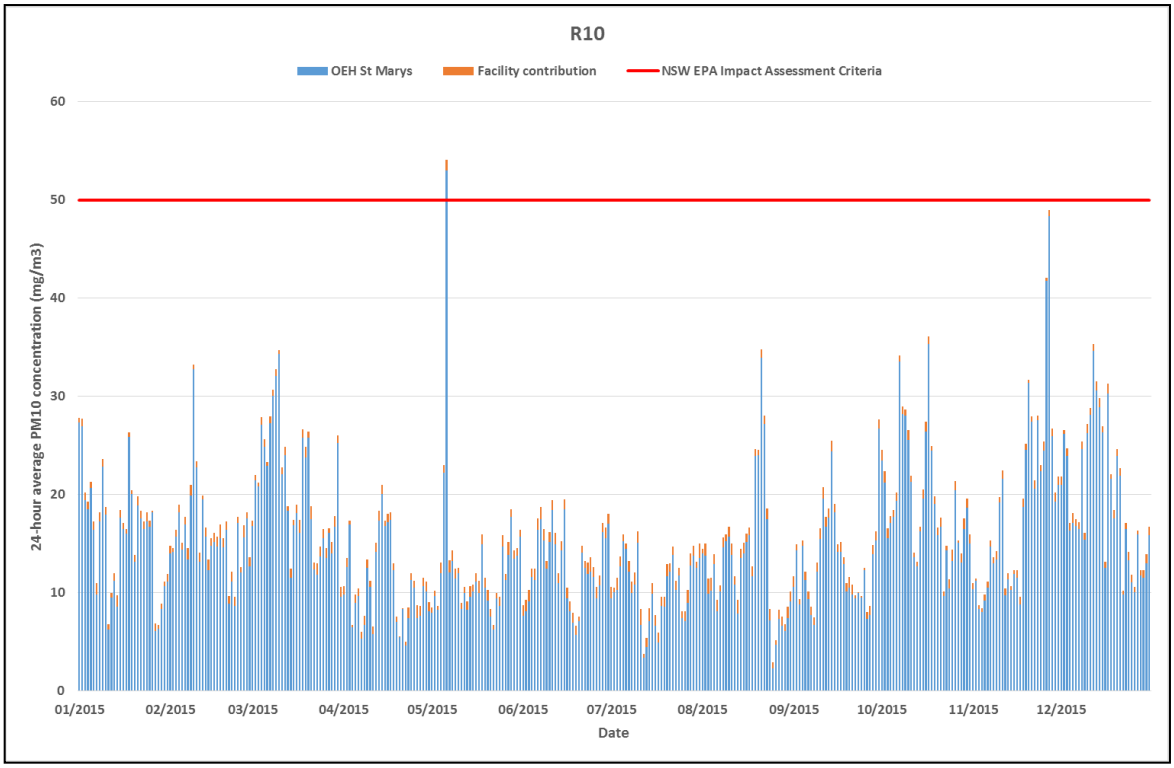


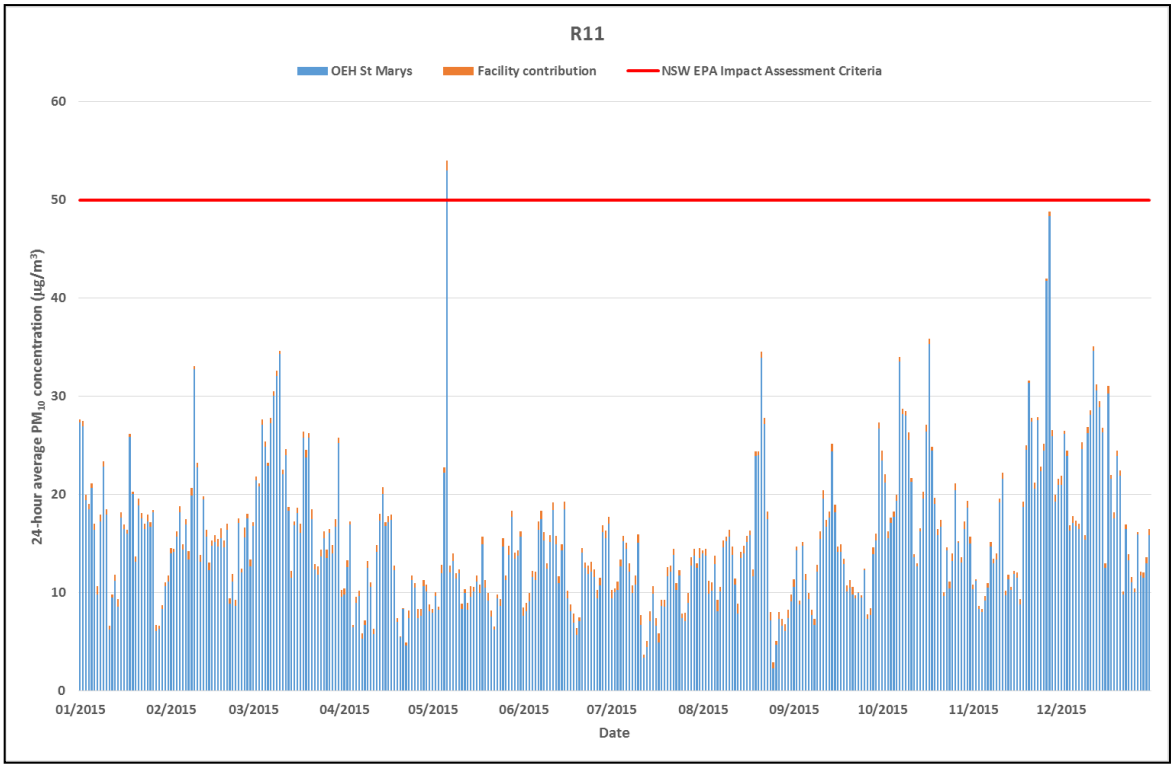




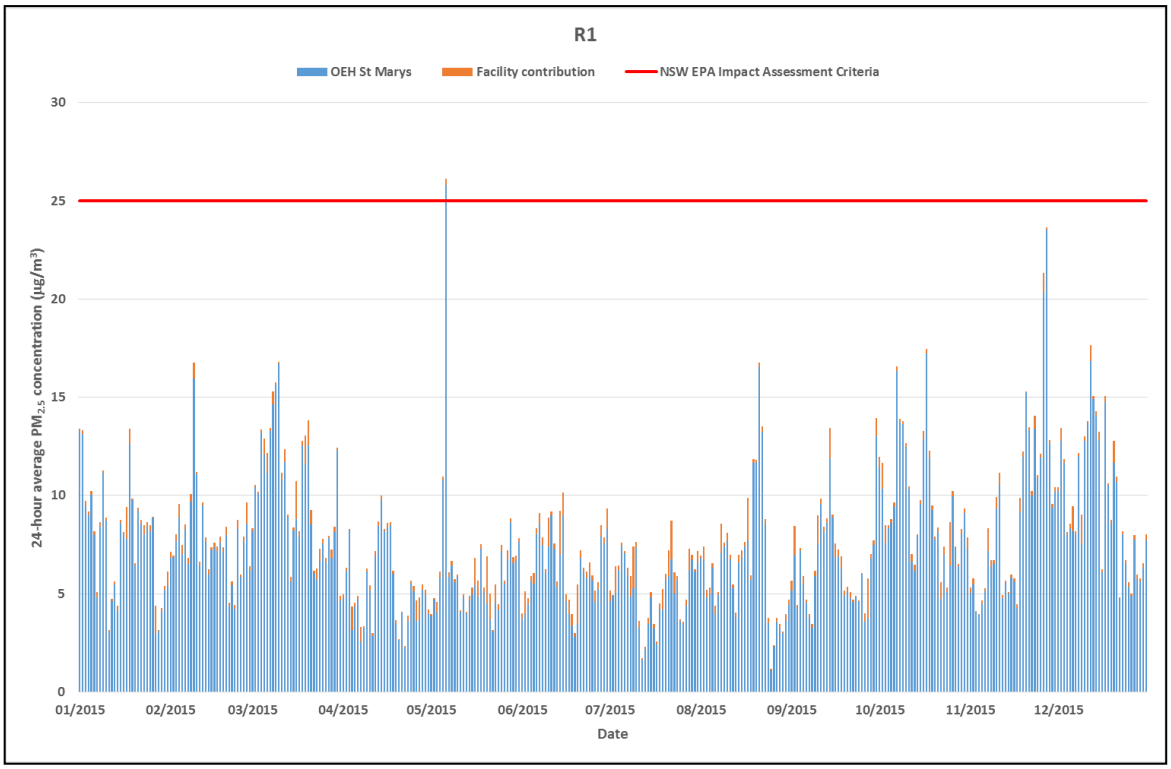


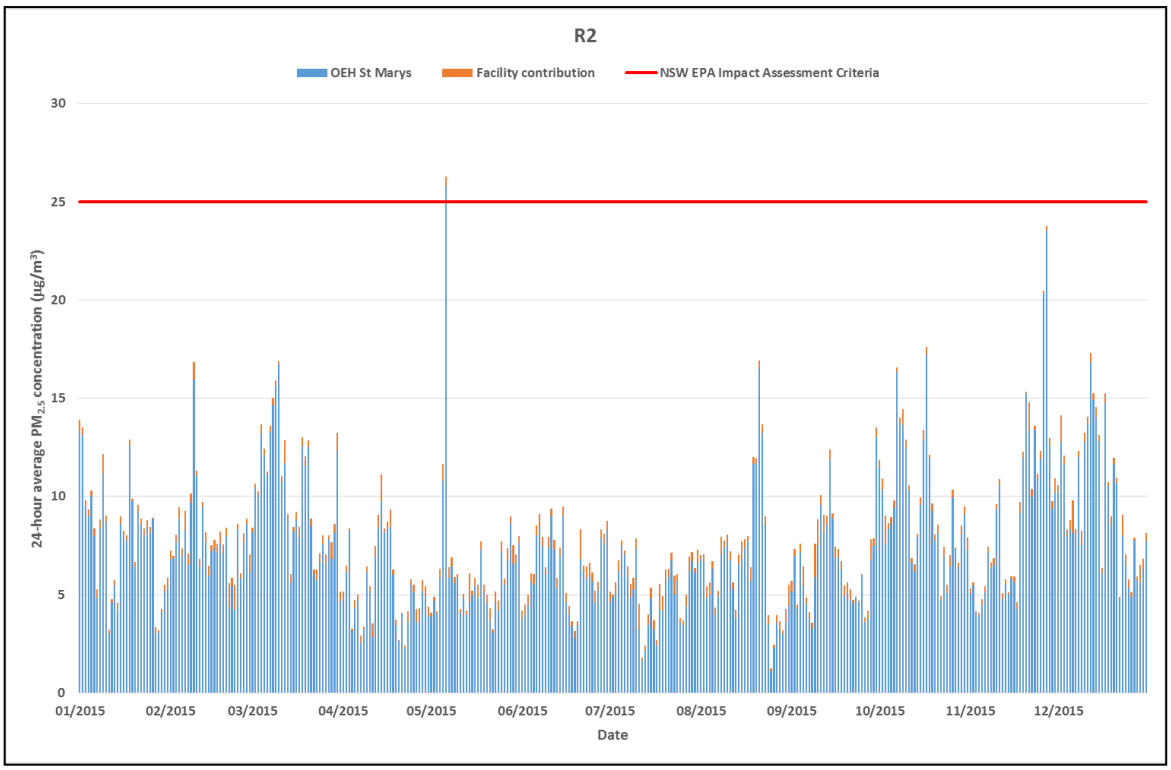


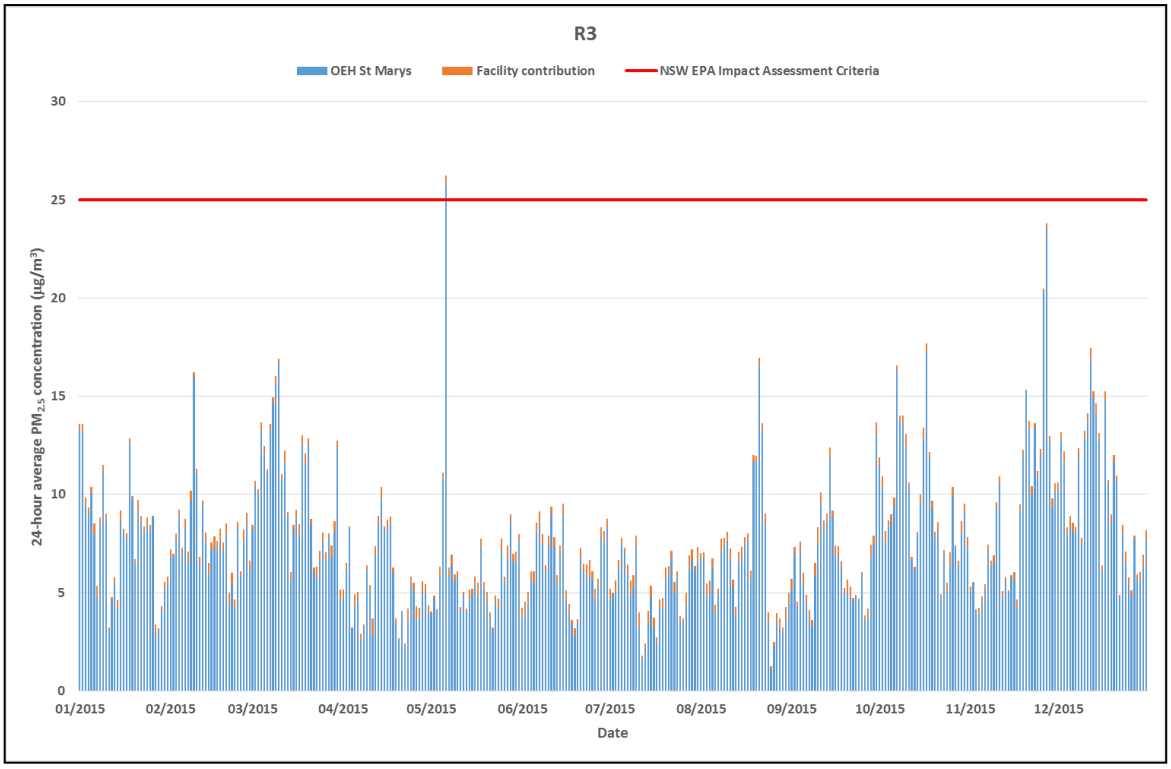


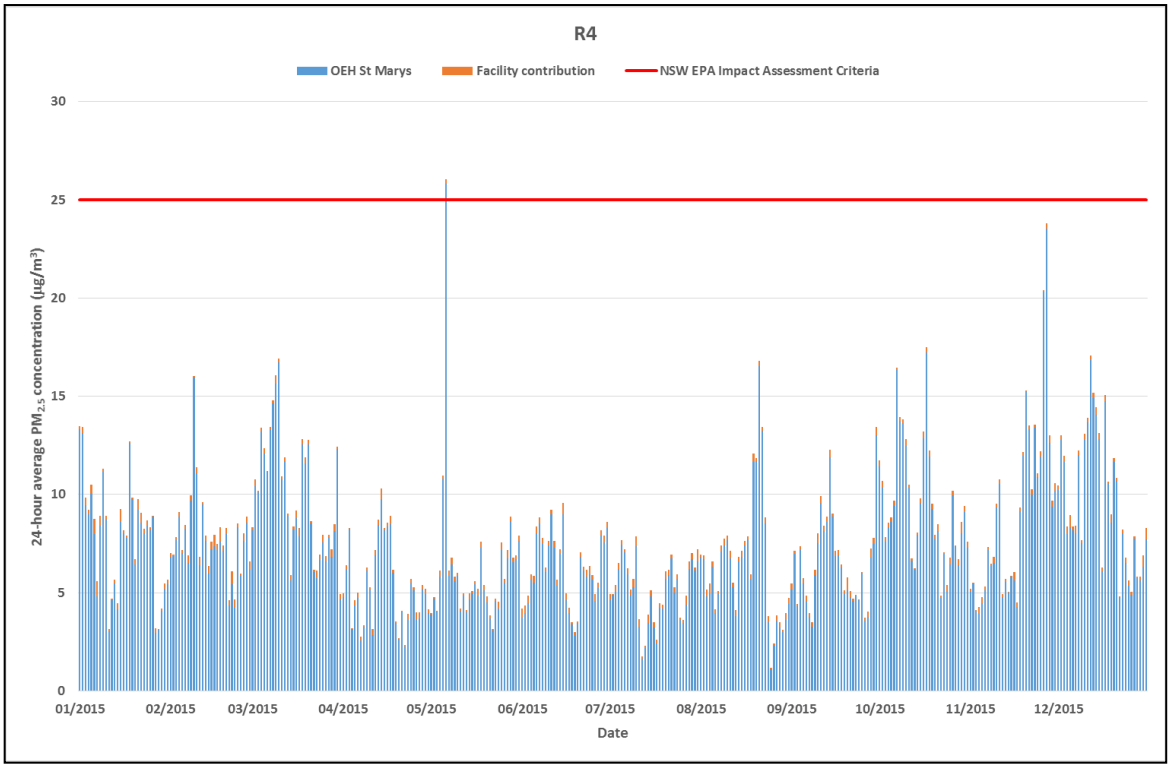


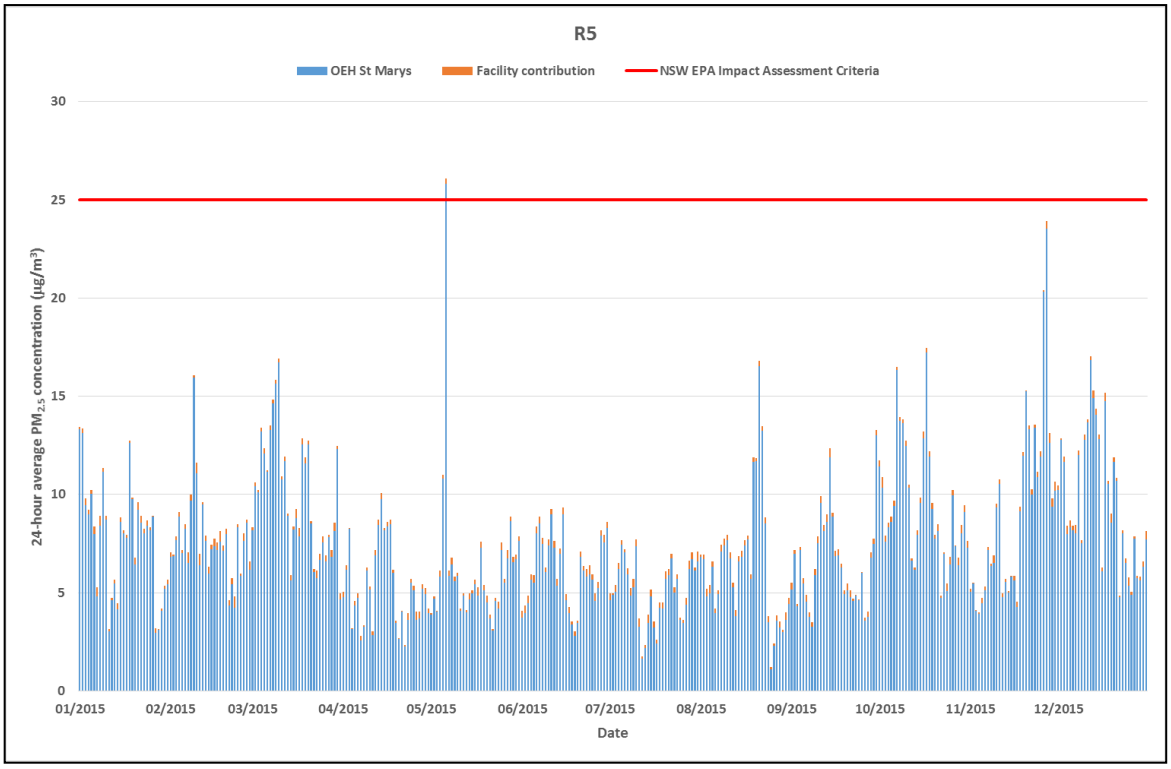
Cumulative 24-hour average $PM_{2.5}$ concentrations

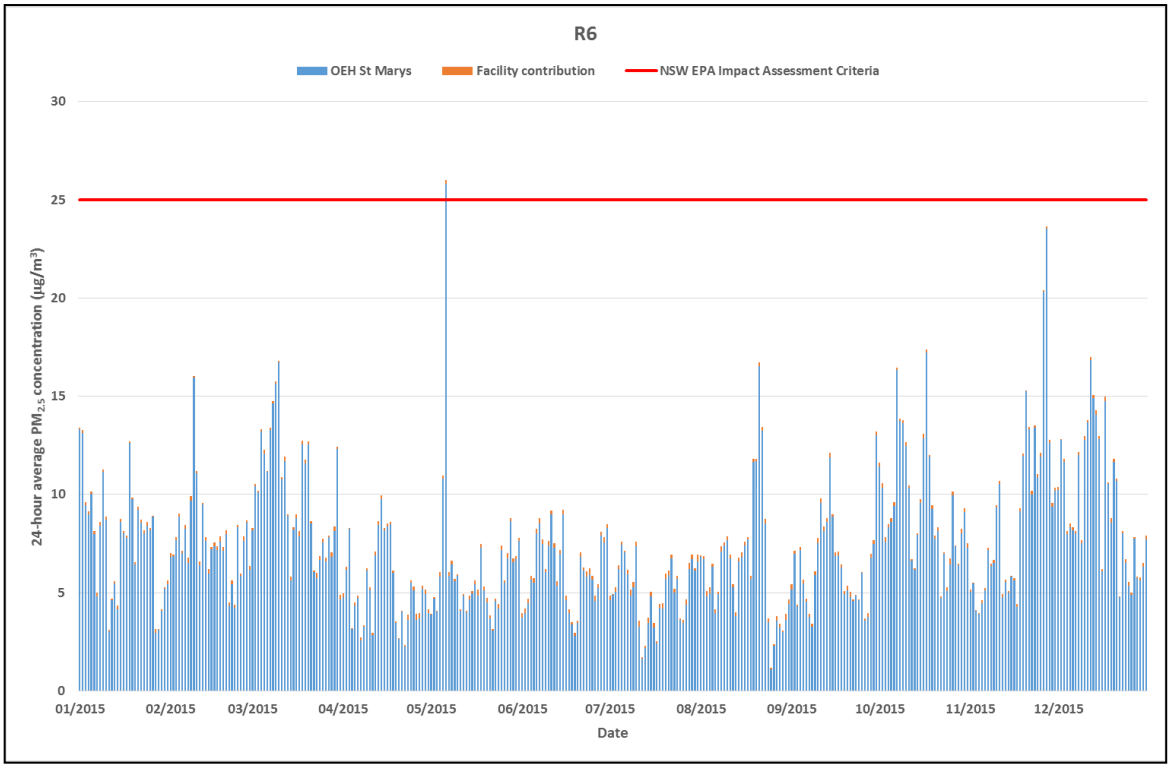


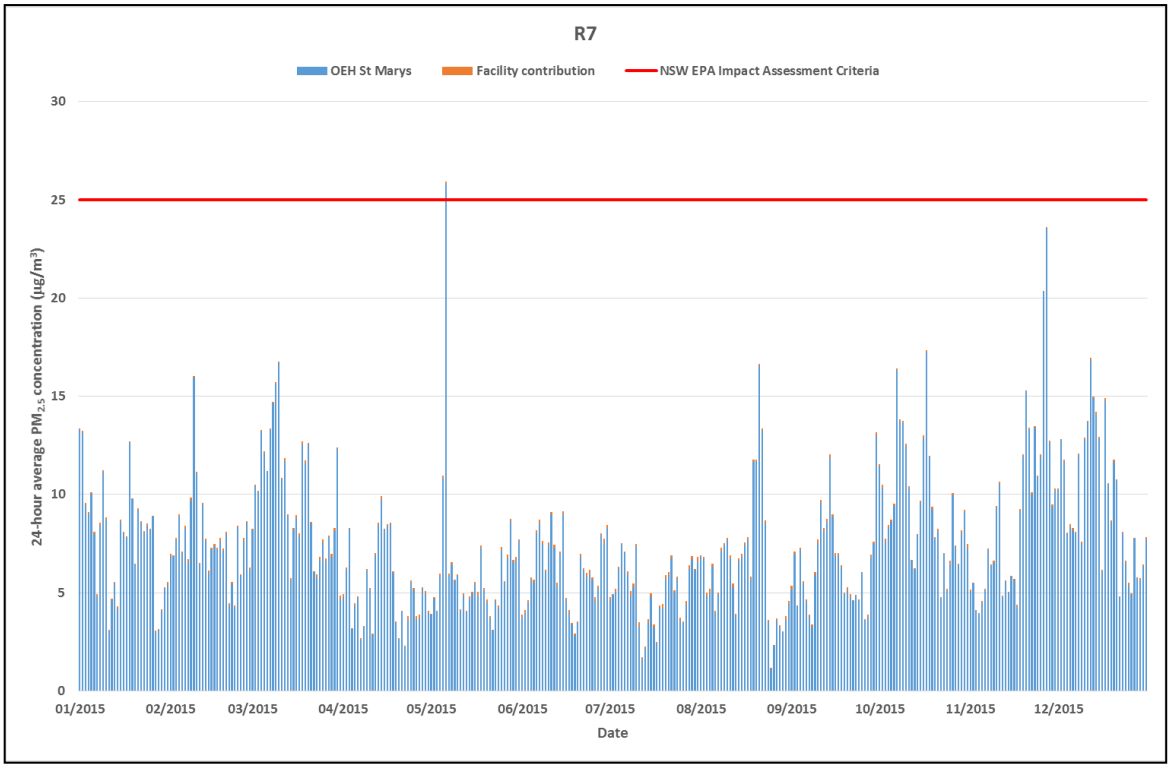


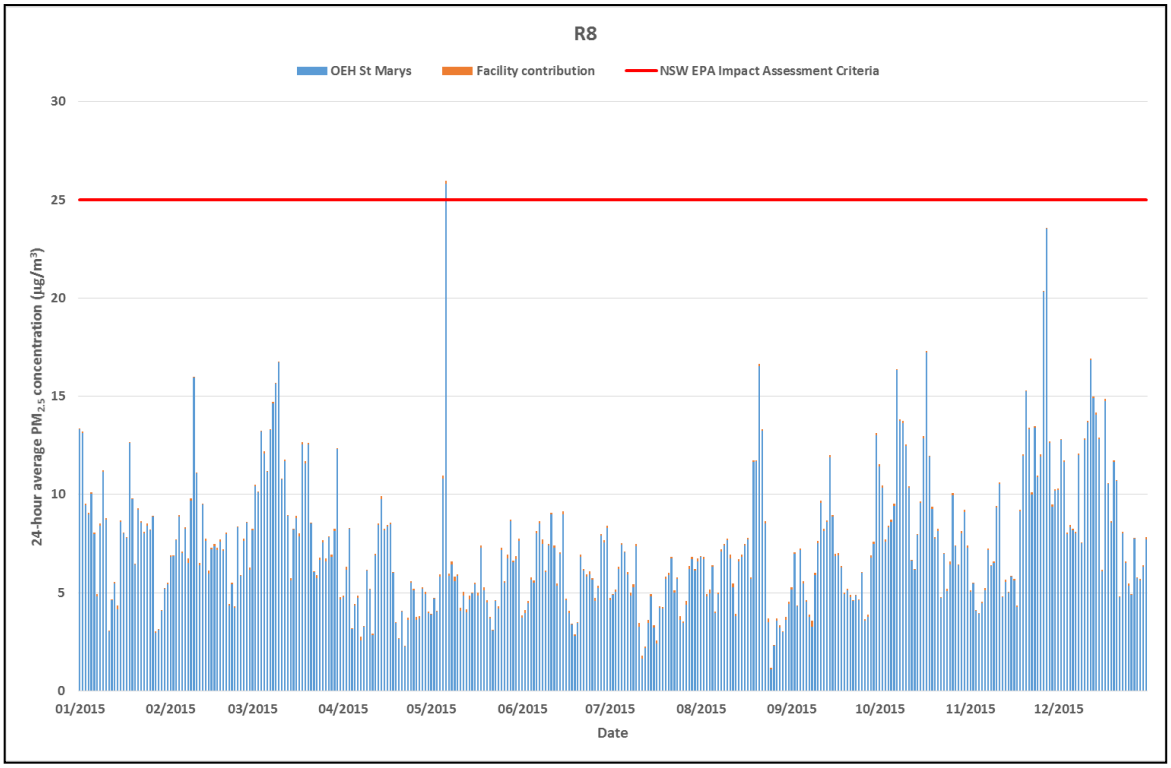


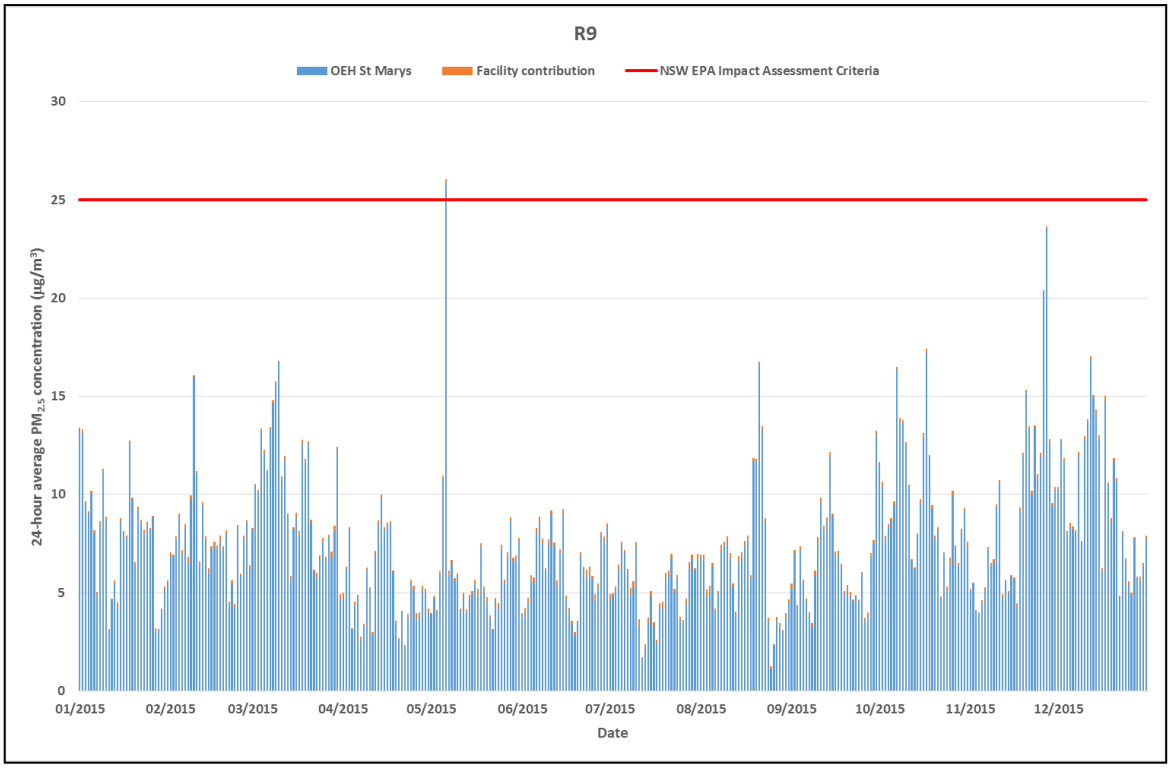


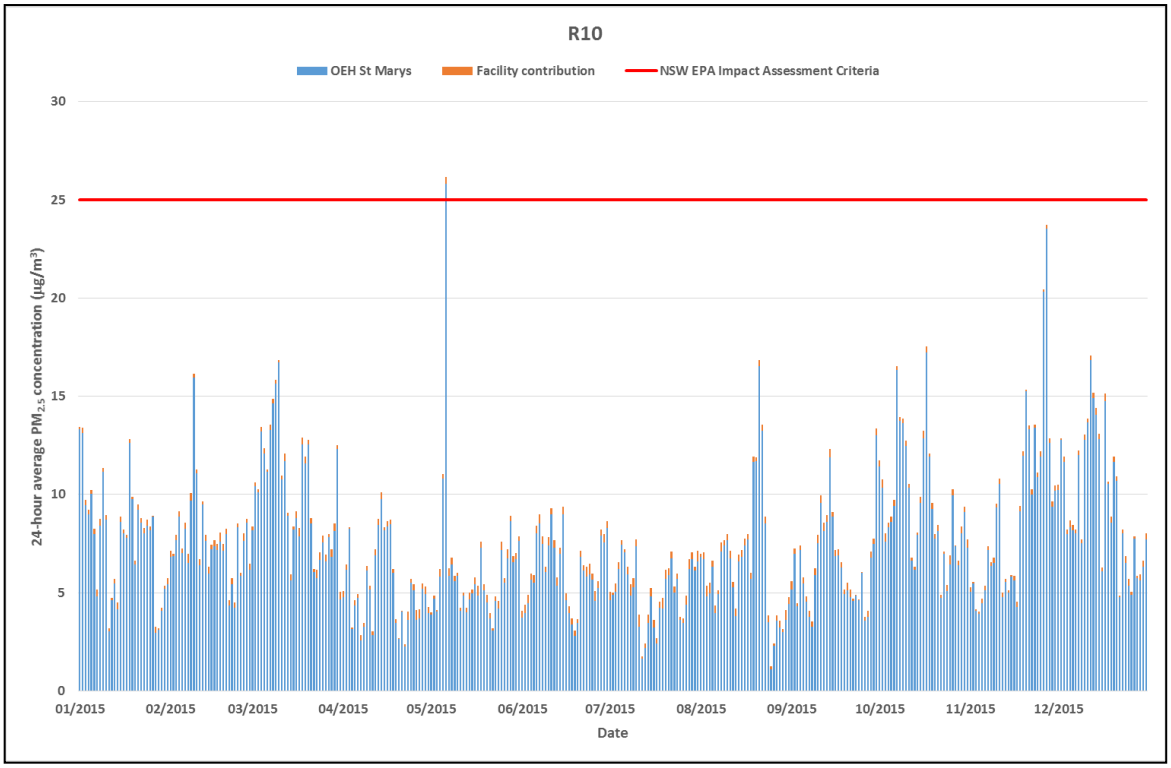


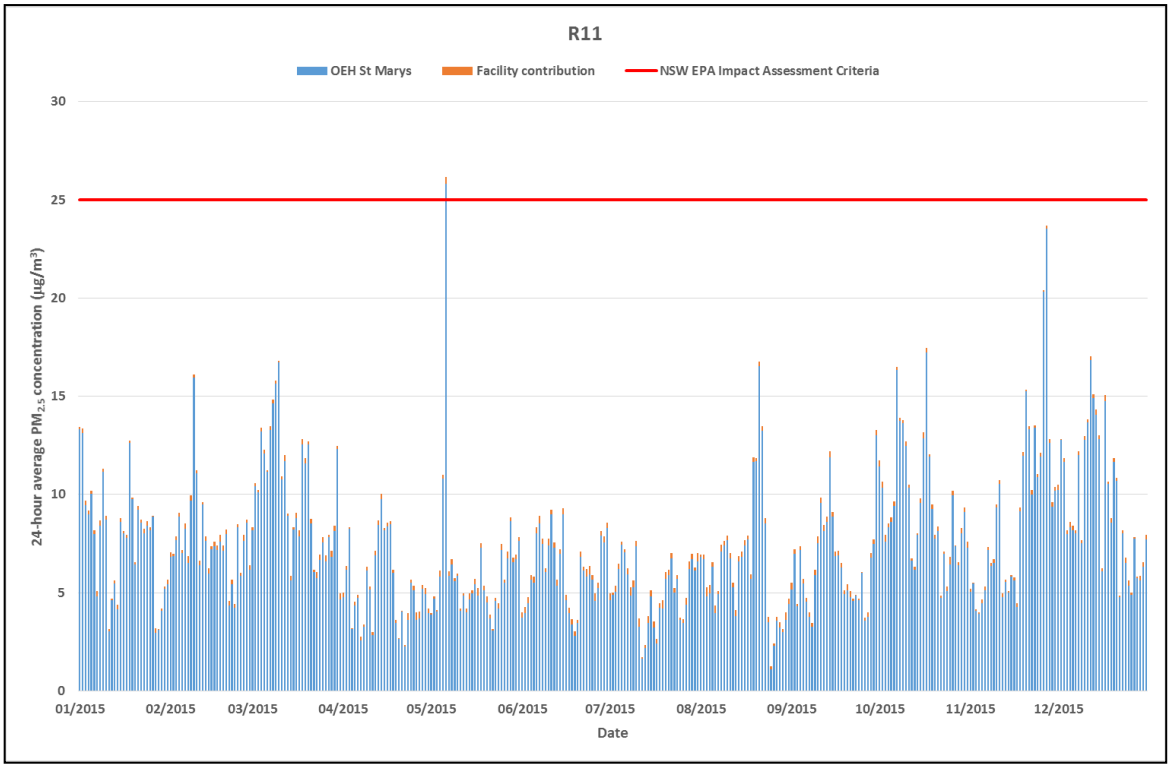


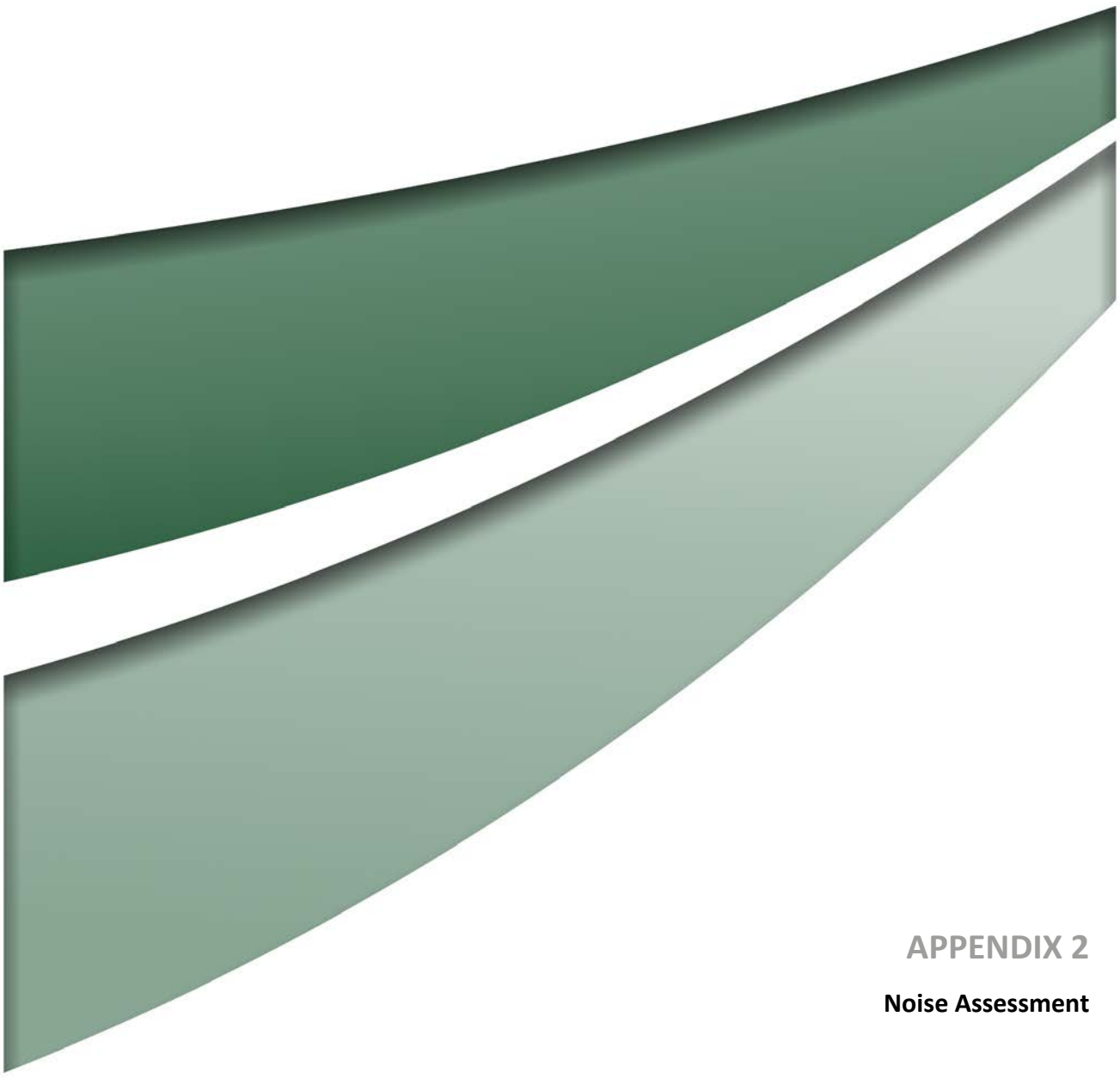












APPENDIX 2

Noise Assessment

Rooty Hill Distribution Centre - Section 75W application to support proposed on-site storage re-arrangements

Umwelt Australia Pty Limited

Operational noise review

F0 | V0

13 February 2017

3902/LS/20161125

Rooty Hill Distribution Centre - Section 75W application to support proposed on-site storage re-arrangements

Project No: IA137500.1
Document Title: Operational noise review
Document No.: F0
Revision: V0
Date: 13 February 2017
Client Name: Umwelt Australia Pty limited

Project Manager: Luke Spencer
Author: Luke Spencer
File Name: E:\IA089300_Holcim\Final\IA137500.1_S75W_Noise_F0v0.docx

Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
710 Hunter Street
Newcastle West NSW 2302 Australia
PO Box 2147 Dangar NSW 2309 Australia
T +61 2 4979 2600
F +61 2 4979 2666
www.jacobs.com

Document history and status

Revision	Date	Description	By	Review	Approved
D0v0	25/01/2017	First draft issued for internal peer review	LS	RS	25/01/2017
D0v1	25/01/2017	Peer reviewed draft issued for client review	LS		
D0v2	02/02/2017	Updated to address client comments	LS		
F0v0	13/02/2017	Updated to address consistency review edits	LS		

Contents

1. Introduction

The Rooty Hill Distribution Centre (RHDC) located off Kellogg Road at Rooty Hill, NSW is owned and operated by Holcim Australia Pty Ltd (Holcim Australia). The facility receives construction materials by rail from a quarry located outside of the Sydney Basin, blends these materials to meet customer specifications and distributes the final products by road to the Sydney market. Approval of the RHDC was granted under Part 3A of the *Environmental Planning and Assessment (EP&A) Act 1979* in April 2006 (Approval No. 05_0051).

It is understood the material stockpiling arrangements at the facility are not presently consistent with the recently updated requirements for construction materials management specified by the NSW Roads and Maritime Services. To address this inconsistency Holcim Australia is proposing to modify their existing Project Approval so that an additional area within the existing site footprint can be utilised for materials storage purposes.

Umwelt Australia Pty Limited (Umwelt) has been engaged by Holcim Australia to assist with the preparation of a modification application to permit these intended changes. Jacobs was appointed by Umwelt to assist with the assessment of any potential changes to noise emitted from the facility as a result of these proposed changes.

As such, the purpose of this report is to detail the method and outcomes of an assessment of operational noise impacts associated with these proposed changes. In achieving this purpose, the main objectives of this assessment were to:

- Describe key details of the proposed modification specifically with respect to any changes to operational noise (**Section 2**).
- Outline the method of assessment of the proposed changes (**Section 3**).
- Detail criteria applicable for the assessment (**Section 4**).
- Evaluate any changes to operational noise with respect to these criteria (**Section 5**).

2. Details of proposed modification

The modification is required so that the facility can comply with recently updated requirements for construction materials management specified by the NSW Roads and Maritime Services. To achieve this, additional room is required for the storage of materials at the site. The new storage areas intended to meet this requirement are proposed to be developed in the central northern portion of the site. The areas would total an area of approximately 4,100 m^2 and would house stockpiles to an average height of around 4.5 m.

Inclusion of the proposed storage areas would require a minor change to some operations at the site. Changes in present and proposed operational arrangements are displayed below in **Figure 2-1**.

No material changes to traffic operations are anticipated across the site as a result of the proposal. The area would be serviced by the sites existing front end loaders, with utilisation of an onsite street sweeper and water cart around the stockpile to control potential air quality emissions.

Figure 2-1 RHDC layout of existing (top) and proposed (bottom) operations

3. Methodology

To assess changes to potential operational noise levels resulting from the RHDC as a result of the proposal the following method of assessment was applied.

Table 3-1 Assessment methodology

Task	Description
Update of the RHDC operational noise model	Jacobs has previously developed a noise model for evaluation of potential operational noise impacts associated with the development of the RHDC facility. The model was updated to address changes arising from the proposed modification.
Evaluation of predictions from the updated operational arrangement.	Modelled predictions were evaluated against the site noise criteria presented in Project Approval No. 05_0051. The model was developed to meet the relevant requirements for assessment detailed in the *NSW Industrial Noise Policy*, (NSW Environment Protection Authority, 2000).

4. Assessment criteria

Approved noise limits at surrounding receivers from the site are presented below in **Table 4-1**.

Table 4-1 RHDC Operational noise criteria

Location	Morning shoulder	Day	Evening	Night	
	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{Aeq\ 15\ minute}$ dB(A)	$L_{A1\ 1\ minute}$ dB(A)
Any residence in Station Street	39	44	44	39	53
Any residence in Crawford Street	40	40	39	39	53
Any residence in Mavis Street	35	35	35	35	53
Nurrangingy Reserve	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				
Colebee Centre	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				
Blacktown Olympic Park (Active recreation areas)	When in-use - $L_{Aeq\ 15\ minute}$ 55 dB(A)				

Notes:

Morning shoulder refers to 6am to 7am Monday to Saturday and 6am to 8am Sundays and Public holidays

Day refers to 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public holidays

Evening refers to 6pm to 10pm Monday to Sunday

Night refers to 10pm to 7am Monday to Saturday and 10pm to 8am Sunday

These assessment locations are displayed below in **Figure 4-1**.

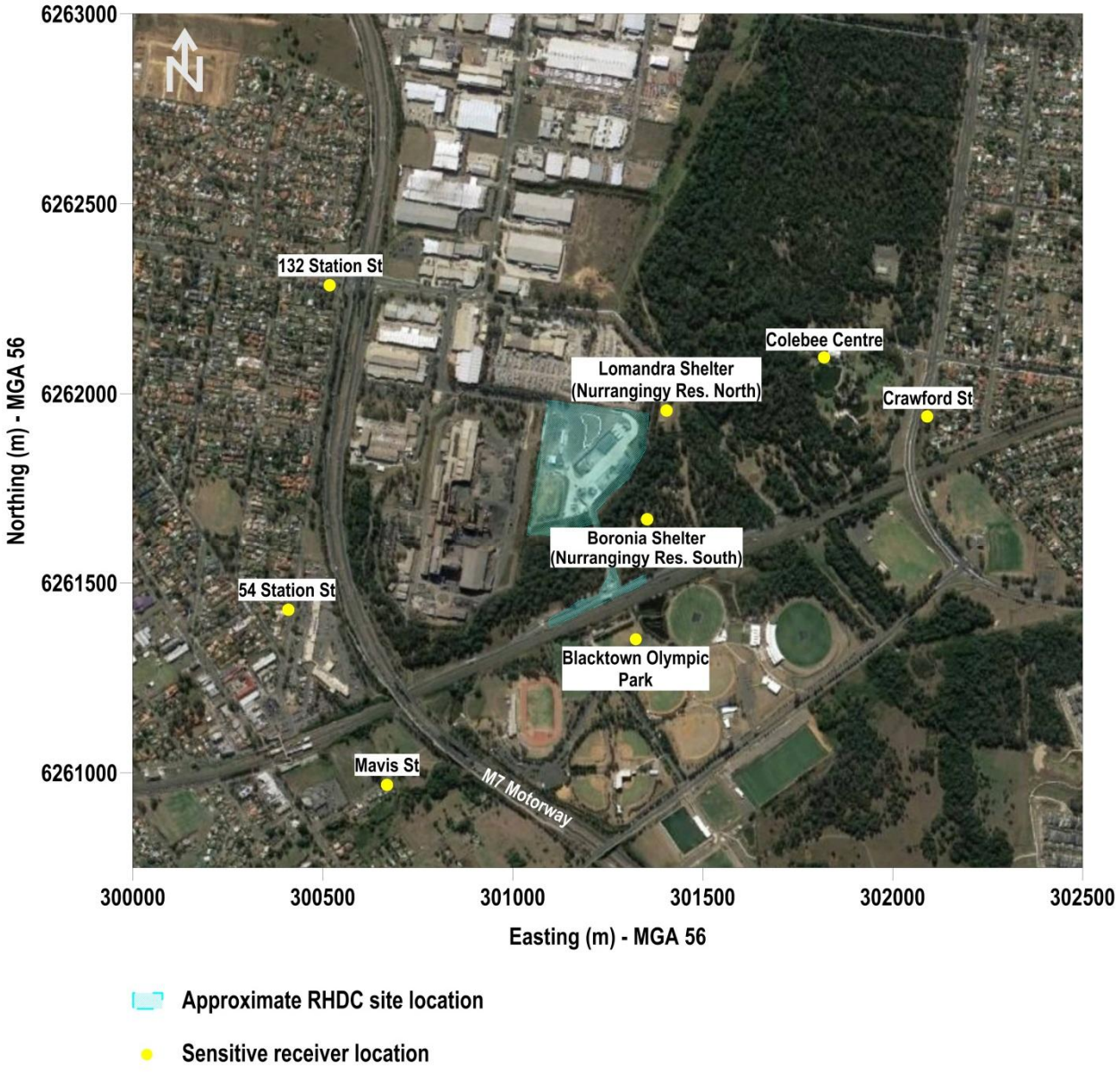


Figure 4-1 RHDC and surrounding receiver assessment locations

5. Operational noise review

A comparison of noise levels predicted during operations associated with the present and proposed operating activities are displayed below in Error! Reference source not found.. It is noted that the values for existing operations consider the application of mitigation measures for site operations, including noise walls and plant configuration. Noise levels were predicted at surrounding receiver locations as a result of the proposed change to operations for the current layout of the RDC and for the full 4 Million tonnes per annum (Mtpa) scale of operations at the RHDC site.

Table 5-1 Comparison of predicted noise levels from the present and proposed operational scenarios

Receiver	Operational noise criteria $L_{Aeq\ 15\ minute}$ dB(A)				Present activities		Proposed storage re-arrangements	
	Morning shoulder	Day	Evening	Night	Existing production	Future full-scale operations	Existing production	Future full-scale operations
132 Station Street	39	44	44	39	30	30	30	30
Crawford Street	40	40	39	39	35	35	38	37
Mavis Street	35	35	35	35	32	31	32	32
Boronia shelter (Nurrangingy Reserve south)	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				47	47	49	47
Lomandra shelter (Nurrangingy Reserve north)	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				47	48	49	50
54 Station street	39	44	44	39	31	31	32	32
Colebee Centre	When in-use - $L_{Aeq\ 15\ minute}$ 50 dB(A)				39	39	40	40
Blacktown Olympic Park	When in-use - $L_{Aeq\ 15\ minute}$ 55 dB(A)				51	51	51	51

These results indicate that noise levels arising from present and future full-scale operations at the site may result in small increases in noise levels at surrounding receiver locations, but not of a magnitude which would result in the exceedance of the approved $L_{Aeq\ 15\ minute}$ criteria at any of these locations during any time of day.

Regarding the night time $L_{A1\ 1\ minute}$ criteria for evaluating sleep disturbance impacts; applying a 10 dB(A) correction to the $L_{Aeq\ 15\ minute}$ predictions results to approximate $L_{A1\ 1\ minute}$ levels which indicates noise levels less than the 53 dB(A) criterion specified in the approval conditions for surrounding residential receivers.

Considering these results, no further mitigation measures are recommended for the proposed stockpiling area beyond those already detailed in the OEMP.

6. Conclusion

Holcim Australia is seeking to modify its Project Approval for the RHDC to allow for additional room for the storage of materials in the central northern portion of the facility. Umwelt was engaged by Holcim Australia to prepare a Section 75W Application to modify the Development Application, for which Jacobs has assessed potential changes to operational noise emissions as a result of the proposal.

The assessment was completed by updating the existing computational noise model Jacobs has developed for the site, and comparing the predicted results from proposed stockpiling arrangements against noise arising from present operations and site criteria from the Project Approval. This comparison was performed for present and full-scale activities planned at the facility.

This assessment found that changes in resulting operational noise levels at surrounding nearby receiver location would marginally increase as a result of the proposed modification, but that levels would remain below the approved criteria at the surrounding receiver locations. No further mitigation or management measures are recommended beyond those already detailed in the OEMP.

umwelt

Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

Perth

PO Box 783
West Perth WA 6872
First Floor
9 Havelock Street
West Perth WA 6005

Ph. 08 6260 0700

Canberra

PO Box 6135
56 Bluebell Street
O'Connor ACT 2602

Ph. 02 6262 9484

Sydney

50 York Street
Sydney NSW 2000

Ph. 1300 793 267

Brisbane

Level 11
500 Queen Street
Brisbane QLD 4000

Ph. 1300 793 267

www.umwelt.com.au