13 August 2009
Project No. 43177672

Crown Project Services Pty Ltd
Level 15, 3 Spring Street
Sydney NSW 2000

Attention: Brodie McHutchinson
Senior Project Manager

Dear Brodie

Subject: Response to Department of Planning Comments on Proposed Knauf Insulation Glass Wool Manufacturing Facility - Air Quality and Greenhouse Gas Assessment

1 Overview

This letter provides a response to adequacy review comments of the Proposed Knauf Insulation (KI) Glass Wool Manufacturing Facility - Air Quality and Greenhouse Gas Assessments prepared by URS (2009). Specifically, the letter report is set out in the following manner:

1. **Section 2** - Further description of stack calculations and justification of values presented in the Environmental Assessment (EA);
2. **Section 3** - Further discussion of emission rates;
3. **Section 4** - Further discussion of the revised modelling for odour to ensure compliance with guidelines;
4. **Section 5** - Additional discussion of the potential dust and odour issues potentially occurring during construction and operation and management of those issues
5. **Section 6** - Further discussion of miscellaneous issues, errors or misunderstandings highlighted during the review of the EA.
6. **Section 7** – Further discussion of the Greenhouse Gas Assessment.

2 Stack Emission Calculations

This section addresses the requests of NSW Department of Planning (DoP), PAEHolmes, Newcastle City Council (NCC) and the Department of Environment, Climate Change and Water (DECCW) for further clarification of how stack emissions were generated.

2.1 Odour

2.1.1 Generation of Odour Emission Rates

The following paragraphs provide greater clarification on the generation of odour emission rates.

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Equation 1 shows the equation used to generate the odour emission rates:

$$OER = OC \times Q \qquad \text{(Equation 1)}$$

OER = odour emission rate (ou/s)

OC = odour concentration (ou)

Q = volumetric flow rate (wet, corrected to a laboratory room temperature of 25^0C)

The odour concentrations were supplied by KI for three sources including:

1) Wet Electrostatic Precipitator (Referred to as the Wet EP);

2) White Wool (referred to as the Scrubber); and

3) Dry EP.

Odour concentrations were analysed by dynamic olfactometry and provided in concentrations of C_{OD} [$ou_E m^{-3}$]. It is considered that the concentrations provided in C_{OD} [$ou_E m^{-3}$] are the equivalent of odour concentrations of odour units (ou), as generated through the methods contained in Standards Australia 2001, *Stationary source emissions. Part 3: Determination of odour concentration by dynamic olfactometry* (AS4323.3:2001).

The odour concentrations used in the modelling were based on the average results provided by KI (three odour concentrations were provided for each source as well as the average concentration) and multiplied by the appropriate volumetric flow rate in order to generate odour emission rates. The wet volumetric flow rate was used, in accordance with standard practice for odour sampling of stacks, which involves the collection of a sample of the air including moisture. This type of sampling method is employed as odorous volatile compounds can be contained within the moisture and released into the atmosphere upon venting from the stack.

The odour assessment has also been refined and the stack height of the Blowing Wool Stack was elevated to 55m, and emissions from the Wet EP reduced (during Emergency Scenarios) thus resulting in odour concentrations within the community being present below odour concentrations of 2 ou. This is further discussed in **Section 4.1**.

2.2 Moisture Content

Moisture contents for relevant stack emissions, based on data provided by KI, and adopted in the EA are provided in **Table 1**.

Table 1 – In-Stack Moisture Contents Adopted in the EA

Stack Source	Moisture Content (%)
Dry EP	9.9
Emergency stack	58.2
Wet EP	4
Facing Pit	~0
Blowing Wool	~0

KI propose to use oxy-firing technology which involves the combustion of natural gas in the presence of purified oxygen. Stoichiometrically, combustion of natural gas (primarily methane) in oxygen (i.e. with no excess of either natural gas or oxygen) would result in an exhaust stream with a moisture content of around 66%. This forms an upper limit for moisture content, and is roughly representative of the scenario where no cooling (ambient) air is introduced into the furnace. URS provide the following responses to the explanations requested by DECCW:

- *Why the exhaust stream from the wet ESP is less moist than the dry ESP:*
  KI have indicated that the Wet EP emits air at a temperature only slightly higher than ambient. Hence the ability of the wet EP exhaust stream (saturated at ~2% moisture) to carry moisture is significantly lower than for the dry EP, which has a temperature of around 200ºC (saturated at ~10% moisture).
- *Why the normalised flow rates for the dry ESP stack and emergency stack are significantly different when they are from the same process*:
  During maintenance of the Dry EP, the furnace fans are turned off, which results in the significant reduction of flow rate through the furnace.
- *Why the moisture content of the emergency stack exhaust stream is approximately six times greater than the moisture content in the dry ESP stack when they are from the same process:*
  Whilst the two stacks are from the same process, when the Dry EP is bypassed, the furnace fans are turned off. In this case, products of combustion become more concentrated in the exhaust stream; KI have indicated a moisture content of 58.2% and a corresponding CO_2 content of 28.4% (wet) during these conditions. Greater than 95% of the moisture is a product of combustion, with the remainder originating from the feed materials.

2.3 Nitrogen Dioxide

All NO_X emitted from the plant has conservatively been assumed to be NO_2.

2.4 Metals

It should be noted that the concentration of Type 1 and Type 2 metals were each modelled during normal operation at concentrations of 1 mg/Nm^3. This is considered conservative as the regulatory limit of 1 mg/Nm^3 applies to the sum of Type 1 and Type 2 metals.

2.5 Cullet Quality

It should be noted that cullet quality can vary significantly. KI is not able to provide data, nor is URS aware of publically available data that assesses the difference in the emissions of odour, particulates and metals based on cullet quality. Consequently no further discussion can be provided on this issue.

3 Emergency Stack Emissions

This section addresses DoP, PAEHolmes and DECCW's request for further clarification of how the emergency stack emissions compares to in stack regulatory guidelines.

3.1 Particulates

Production during routine maintenance is scheduled to be reduced to approximately 5% capacity to limit particulate matter emissions during this period. This capacity of 5% is the lowest limit achievable whilst maintaining plant operation. At this capacity, the limit of particulate (and metals) emissions has been revised based on further information provided by KI and discussions with the DECCW. Given the use of electrostatic precipitators to treat process emissions of particulate matter, it is considered that under normal operation, particulate matter will not represent a significant air quality issue. However, during the scheduled maintenance of the Dry EP, which will occur for up to 6 days per year, the emissions from the blast furnace will be directed to the Emergency Stack. Given that this process can be scheduled, KI can reduce production in order to limit emissions, specifically particulate emissions. Whilst the emission characteristics modelled in the EA show a volumetric flow of 10,000 Nm^3/hr and PM_{10} concentration of 750 mg/m^3, it is estimated that volumetric flow may be lower, at approximately 7,000 Nm^3/hr with PM_{10} concentrations during routine maintenance of approximately 286 mg/Nm^3. It is acknowledged that 286 mg/Nm^3 is above the regulatory limit of 50 mg/Nm^3.

Whilst the use of the Dry EP is considered to be best available technology economically achievable (anticipated to operate with concentrations of PM_{10} between 15-20 mg/Nm^3 when compared to regulatory criteria of 50 mg/Nm^3), after discussions between KI, CPS and DECCW on Friday 7th August 2009, KI have indicated that the operation of the emergency stack with a PM_{10} concentration of 286 mg/Nm^3 is the lowest possible limit using current plant designs. Given this operational restriction, it is understood DECCW are considering allowance of this situation for a certain period, potentially up to two years. However, KI has indicated that they will further investigate the use of feedstock and process modifications within the first two years after commissioning of the plant to identify what steps can be taken to reduce particulate matter emissions during maintenance periods in order to meet regulatory criteria. After two years, should it be identified that KI cannot modify the existing routine maintenance process to meet particulate matter concentrations of 50 mg/Nm^3, then KI will require additional particulate matter control technologies to be installed in order to meeting regulatory criteria.

3.2 Metals

The EA has presented worst case emissions of metals based on a cumulative total of metals to the POEO Regulations and speciated according to information provided by KI.

Total Heavy Metals from the Emergency Stack have been reported by KI at 1.3 mg/Nm^3. This is above the POEO regulation of 1 mg/Nm^3, however, the sum of the speciated heavy metals in the same reference is 0.8 mg/Nm^3. Given that the emissions were based on the plant operating at full (100%) production and that production is likely to be scaled back to approximately 5% during maintenance, the emissions would also be reduced. The likely concentration of total heavy metals (comprising Type 1 and Type 2 substances) cannot be precisely determined at this stage, as data is not currently available, however concentrations significantly below 1 mg/Nm^3, are expected which is below the regulatory limit. Consequently, emission limits of metals during emergency stack use at an operating capacity of 5% are not envisaged to exceed regulatory criteria.

In addition, KI have not provided specific mercury emissions on the basis that mercury emissions are negligible, hence they have not been included in the assessment.

4 Revised Modelling and Assessment

This section addresses DoP, PAEHolmes, NCC and DECCW's request for further assessment of how odour criteria can be met and further discussion on ground level concentrations of PM_{10}.

4.1 Odour

4.1.1 Ground Level Concentrations

The odour modelling was re-performed using an increased stack height of the Blowing Wool Stack and a reduction in odour concentration from the Wet EP on the basis that downstream processes are not operational during emergency scenarios (including routine maintenance of the Dry EP).

Specifically the Blowing Wool Stack was elevated to 55m (from 40m) and emissions from the Wet EP were reduced by 90% given the cessation of downstream operations during emergency scenarios. All other modelling parameters remained the same, including the conservative assumption that odour emissions from the Emergency Stack and Blowing Wool Stack were emitting odour that occurs at full production rates. The peak odour concentration predicted to occur anywhere within the modelled domain, which includes the area covered by residential receptors, was 1.8 ou during normal operation and 2.4 ou during the emergency scenario. However, the peak odour concentrations of 2.4 ou during the emergency scenario was confined to site and only odour concentrations less then 2 ou were predicted off site. Consequently, it is considered that the odour impact resulting from the plant is below the odour performance criterion of 2 ou. Contour plots are provided in the Figures Section (Revised Figure 2-6).

4.1.2 Boundary Odour Concentrations

The odour modelling shows odour concentrations of approximately 1 ou or less at the boundary of the plant. As 1 ou is at the lower limit of human detection and cannot be measured accurately in an odour laboratory, the odour scenario presented by URS is consistent with the information provided by KI for the Czech plant i.e. that odour at the plant boundary is not detectable.

4.2 Particulate Matter

Further discussion of PM_{10} in relation to the increase of the blowing wool stack height to 55m, is shown in the following table at each of the nine receptors identified in the EA for peak background[1] concentrations of PM_{10}. The peak cumulative concentration of 49.7 µg/m^3 during operation and emergency scenarios have a background concentration of 48.5 µg/m^3. The peak incremental impacts of the plant show a maximum concentration of 5.6 µg/m^3 during operation. Thus under normal operation, which occurs for the vast majority of the year, PM_{10} concentrations in the ambient air surrounding the plant are expected to be less than 5 µg/m^3 (10% of the regulatory limit) and unlikely to result in elevated concentrations at sensitive receptors, even when considering emitters of particulate matter in the area.

[1] Peak background for this assessment is the highest background concentration of PM_{10} below 50 µg/m^3.

During emergency situations, the peak incremental impact was shown to be 25.1 µg/m^3. Neither operational nor emergency scenarios showed cumulative concentrations that exceed the regulatory criteria of 50 µg/m^3. It should be re-iterated that peak concentrations during emergency situations have been modelled for every day of the year, when actual operation would be up to 6 days per year and the use of the emergency stack for routine maintenance can be scheduled to minimise the potential for adverse impacts at sensitive receptors during periods of elevated particulate matter in the ambient air.

PM_{10} Concentrations during Scenario 1 - Operation showing peak cumulative and peak incremental concentrations at receptors

Scenario 1 (Operational) - Highest Background PM_{10} at Receptors				
Receptor	Incremental (µg/m^3)	Date	Background (µg/m^3)	Cumulative (µg/m^3)
1	0	13/10/2004	48.5	48.5
2	0.2	13/10/2004	48.5	48.7
3	0.3	13/10/2004	48.5	48.8
4	0.2	13/10/2004	48.5	48.7
5	1.1	13/10/2004	48.5	49.6
6	1.2	13/10/2004	48.5	49.7
7	0.2	13/10/2004	48.5	48.7
8	0.1	13/10/2004	48.5	48.6
9	0.1	13/10/2004	48.5	48.6
Scenario 1 (Operational)– Highest Incremental at Receptors				
Receptor	**Increment (µg/m^3)**	**Date**	**Background (µg/m^3)**	**Cumulative (µg/m^3)**
1	3.49	4/03/2004	20	23.49
2	2.9	10/12/2004	13.4	16.3
3	3.05	10/12/2004	13.4	16.45
4	3.66	1/11/2004	21.7	25.36
5	5.61	5/12/2004	16.5	22.11
6	3.9	5/12/2004	16.5	20.4
7	5.23	12/03/2004	26.6	31.83
8	5.1	12/03/2004	26.6	31.7
9	4.87	12/03/2004	26.6	31.47

PM_{10} Concentrations during Scenario 2 – Emergency, showing peak cumulative and peak incremental concentrations at receptors

Scenario 2 (Emergency) – Highest Background PM_{10} at Receptors				
Receptor	Incremental (µg/m³)	Date	Background (µg/m³)	Cumulative (µg/m³)
1	0	13/10/2004	48.5	48.5
2	0.3	13/10/2004	48.5	48.8
3	0.4	13/10/2004	48.5	48.9
4	0.2	13/10/2004	48.5	48.7
5	1	13/10/2004	48.5	49.5
6	1.2	13/10/2004	48.5	49.7
7	0	13/10/2004	48.5	48.5
8	0	13/10/2004	48.5	48.5
9	0	13/10/2004	48.5	48.5
Scenario 2 (Emergency) – Highest Incremental Impact from Plant At Receptors				
Receptor	**Increment (µg/m³)**	**Date**	**Background (µg/m³)**	**Cumulative (µg/m³)**
1	25.1	7/12/2004	16.4	41.5
2	24.3	7/12/2004	16.4	40.7
3	20.2	29/03/2004	18.2	38.4
4	15.1	13/01/2004	20.4	35.5
5	14.7	5/11/2004	15.5	30.2
6	14.5	8/09/2004	11.6	26.1
7	10.5	12/03/2004	26.6	37.1
8	12.3	12/03/2004	26.6	38.9
9	11.9	12/03/2004	26.6	38.5

5 Mitigation Measures

This section addresses PAEHolmes and DECCW's request for further discussion of construction and operational mitigation measures.

5.1 Construction

Prior to construction of the site for the KI development, the site will be contour levelled by the current owner (Mirvac) to facilitate construction activities. It is understood that Mirvac have applied for a construction certificate to complete the works and appropriate mitigation measures to reduce the adverse impacts of air emission will be undertaken. The mitigation measures proposed in ths letter report do not discuss the preparatory groundwork Mirvac anticipates to carry out.

A brief discussion of key mitigation measures to be employed during construction are provided below, however, a more detailed assessment of air pollutants and discussion of mitigation measures is to be provided in the Construction Environment Management Plan (CEMP).

The major concern associated with the construction phase of the project is likely to be is the disruption of soil in the primary containment area, which is a capped area, within the western area of the site. The primary containment area comprises contamination including Polycyclic Aromatic Hydrocarbons (PAH) and tar. Where contamination was previously found to exist, approximately 2m of coal washery has been overlaid to act as a capping layer (URS, 2002[2]).

[2] URS 2002 *Steel River Project – Construction Guidelines*. Prepared for Steel River Pty Ltd, 5 March 2002.

Recent investigations (Douglas Partners, 2009[3]) in ten test pits and eight bore holes on site have revealed limited evidence of odour in areas outside of the primary containment area. However, one test pit (K6), located on the edge of the primary containment area, showed the presence of a hydrocarbon odour between 2.6m and 5m. This suggests odour may be present when the primary containment area is excavated.

The construction of the KI site will involve the following significant excavation which may give rise to adverse air emissions:

- Soil excavation of the batch basement. This area to be excavated is approximately 300m x 400m and located on the western area of the site and will require excavation to greater than 2m into the ground;
- Soil excavation for construction of stormwater pipes and pits. The stormwater works are likely to require excavation to a depth greater than 2m into the ground; and
- Other pits and minor excavation in the capped area.

The potential impacts due to odour, dust, volatile or semi volatile emissions during construction and the potential for vapour intrusion into buildings have not been quantified in this assessment, however monitoring and management measures are further discussed below.

5.1.1 Particulate Matter

Environmental safeguards that would be implemented during the construction phases of the development are listed below. Any emissions of particulate matter would be specifically controlled through the implementation of these mitigation measures, which would be incorporated into a CEMP for the works.

- Before works begin, a CEMP will be prepared which addresses air monitoring and management issues;
- In dry, windy conditions, water sprays would be used to dampen down soils prior to excavation and handling. Exposed surfaces and stockpiles would also be watered, sprayed or covered where required;
- Vehicles would only be loaded to less than the height of the side and tailboards and loads of fill would be covered during transport. Any soil adhering to the undercarriage and wheels of trucks would be removed prior to departure from the site;
- Any long-term stockpiles would be stabilised using fast-seeding grass or synthetic cover spray; and
- All major access roads are sealed and vehicle speeds on unsealed site areas would be controlled to minimise dust.

[3] Douglas Partners 2009 *Report on Preliminary Geotechnical Investigation. Proposed Manufacturing Plant Lots 80 to 82, 89 to 91 and Part Lot 79 DP 270249 Channel Road Steel River Mayfield*. Prepared for Crown Project Services Pty Ltd.

Other dust mitigation measures may be included in the CEMP in order to meet regulatory requirements. It should also be noted that the above listed control measures are consistent with those measures suggested by RCA (2008[4]) for the management of the containment cell.

This particulate sampling program to be included in the CEMP would feedback into the measures necessary to be implemented during the management plan. It is considered that the most appropriate monitoring would involve real time boundary monitoring of particulates (PM_{10} or TSP). during the initial phases of excavation of the primary containment cell. The monitoring could be set to alarm once the dust concentration exceeds a certain limit, which can be agreed with the DECCW. The sampling should be conducted on a daily basis on at least the eastern and southern boundaries of the site.

5.1.2 Odour

During the construction phase, there is the potential for odour to be generated due to the excavation and handling of site soils. A quantitative odour assessment during the construction phase has not been included as part of this assessment and odour issues shall be addressed in the CEMP.

Should it be necessary, there are several mitigation measures available to control odour, which include:

- Enclosures or tents;
- Soil vapour extraction;
- In situ oxidation;
- Foams;
- Wind breaks;
- Odour suppressants; and
- Management and operational controls.

Proposed odour mitigation will be addressed in the CEMP in order to meet regulatory requirements. It should also be noted that the above listed control measures are consistent with those measures suggested by RCA (2008) for the management of the containment cell.

The odour sampling program to be included in the CEMP would then feed back into the measures necessary to be implemented during the management plan. It is considered that the most appropriate monitoring would involve field ambient odour assessment during the initial phases of excavation of the primary containment cell. The field ambient odour assessment should be conducted on a regular basis (several times a day including early morning and early evening periods when odour conditions are at their worst) by a trained and calibrated odour assessor. It is recommended that the odour assessor be restricted from working on site to limit the potential olfactory fatigue.

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[4] RCA 2008 *Operational and long-term environmental management plan. Proposed Tertiary Containment Cell Steel River Site*. Prepared for Domaine Steel River Pty Ltd.

The field ambient odour assessment will be able to provide information on the magnitude and extent of odour generated due to the construction activities. This information will be used to revise the CEMP in order to minimise odour generated during construction to ensure adverse odour impacts beyond the site boundary are minimised.

5.2 Operation

5.2.1 Particulate Matter

Given the use of both a Dry EP and Wet EP to treat process emissions of particulate matter, it is considered that under normal operation, particulate matter will not represent a significant issue. During normal operation, the particulate matter emissions from the Dry EP are estimated to be 15 mg/Nm^3, which is below the regulatory criteria of 50 mg/Nm^3. Consequently, no further particulate emission control measures are proposed for particulate emissions during normal operation.

Discussion of the minimisation of particulate matter emissions during the Emergency Scenario are presented in Section 3.1.

5.2.2 Odour

Odour can be produced from a range of processes and odour results obtained for this assessment indicate that the Wet EP and Blowing Wool stack are the main sources, with the Dry EP emissions also contributing to overall plant odour.

Odour from the Wet EP and Blowing Wool Stack are likely to be generated from the use of the binder. KI are investigating the feasibility of a new binder with reduced odour emissions and it is anticipated that odorous emissions from the plant will be lower than those presented in this report, after the successful implementation of a reduced odour binder.

6 Miscellaneous

The following comments are discussed in relation to PAEHolmes comments:

The approach to the generation of the meteorological data is considered suitable by the DECCW, consequently, no further discussion of the meteorological data is considered necessary.

The reference to the Blast furnace stack in Section 2.2.7 can be changed to the Melting Furnace Stack. These two terms are considered interchangeable.

The 24 hour average fluoride levels have been reported in both the table and text as 0.32 ug/m^3. Similarly, the 7 days average fluoride levels have been reported in both the table and text as 0.17 ug/m^3. No typographical error appears to have been made.

"SO_2" has been incorrectly referenced as "SO_X" in Tables 6-1 and 6-2. The concentrations at sensitive receptors are reported in Tables 6-1 and 6-2 and are consistent with contours shown in the figures section of the EA. It should also be noted that peak 1 hour averaged concentrations of SO_2 predicted within the modelled domain in both the Scenario 1 and Scenario 2 was 347 $\mu g/m^3$ When added to peak background concentrations of 192 $\mu g/m^3$, the cumulative concentration is 539 µg/m^3 which is below regulatory criteria of 570 µg/m^3. Consequently, no further discussion of SO_2 is considered to necessary.

KI confirms emission limits for the blowing wool facing pit would meet 20 mg/m^3.

The following comments are discussed in relation to NCC comments:

Whilst certain SIAS (Environmental Envelope Air Emission Allocation) criteria may be exceeded, the assessment notes that development may be allowed providing a full and detailed EIS is undertaken (including an air quality impact assessment) and appropriate criteria are met. It is considered that the EA sufficiently demonstrates that the impact on sensitive receptors will be within regulatory guidelines. In addition, lead concentrations predicted to occur within the Steel River site have been erroneously overestimated in the EA. The concentrations of lead in Table 6-3 and Table 6-4 of the Air Quality Impact Assessment are incorrectly reported at 2.2 and 1.6 µg/m^3 respectively and should actually read 2.2 x 10-6 and 1.6 x 10-6 µg/m^3 respectively (compared against the SIAS criteria of 1.5 µg/m^3). Consequently, all predicted ground level concentrations are predicted to comply with SIAS ambient air guidelines.

The Environmental Entitlement Certificates are the allocations of emissions that we have been provided by the Vendor (Mirvac). The Air Entitlement Certificate is presented in Attachment 1.

The details of the monitoring of the air emissions of the plant would be provided in the Environment Protection Licence, issued by the DECCW.

7 Greenhouse Gas Assessment

This section addresses DoP, PAEHolmes and DECCW's request for further provide information on greenhouse gases.

7.1 Scope 3 Assessment

The Director General's Requirements have not requested assessment of Scope 3 emissions, consequently the absence of Scope 3 emissions does not warrant further discussion.

7.2 Energy Rate of Return

The energy rate of return has been discussed by numerous insulation industry associations. The European Insulation Manufacturer's Association (EURIMA) notes that the industry is continually achieving better energy efficiency in plant and equipment, partly through the use of recycled materials. Specific data on the energy rate of return is not available for individual facilities, however the industry-wide data indicates that in Europe the energy return, expressed as tonnes CO_2 generated, is about 200 tonnes of CO_2 saved over a 50-year period per tonne of CO_2 generated in manufacturing mineral wool (an average of 3 months return period). This is similar to other data suggested by the North American and Australian industry associations, and demonstrates the product's net benefits for climate change. EURIMA also notes an average reduction in CO_2 emissions through retrofitting of insulation to houses of 43%, dependent on the climate zone in which the building is located and the nature of the installation.

7.3 Industry Best Practice

The proposed plant has an estimated energy consumption of 10 GJ/tonne of glasswool product, requiring a total of 0.6 PJ/year of energy. Studies conducted in Europe on similar facilities by EURIMA have suggested that glasswool manufacture requires between 11 and 22 GJ/tonne. This indicates that the proposed facility is energy efficient compared to other manufacturing plants.

Yours sincerely
URS Australia Pty Ltd

Stephen Bowly
Associate Air Quality Scientist

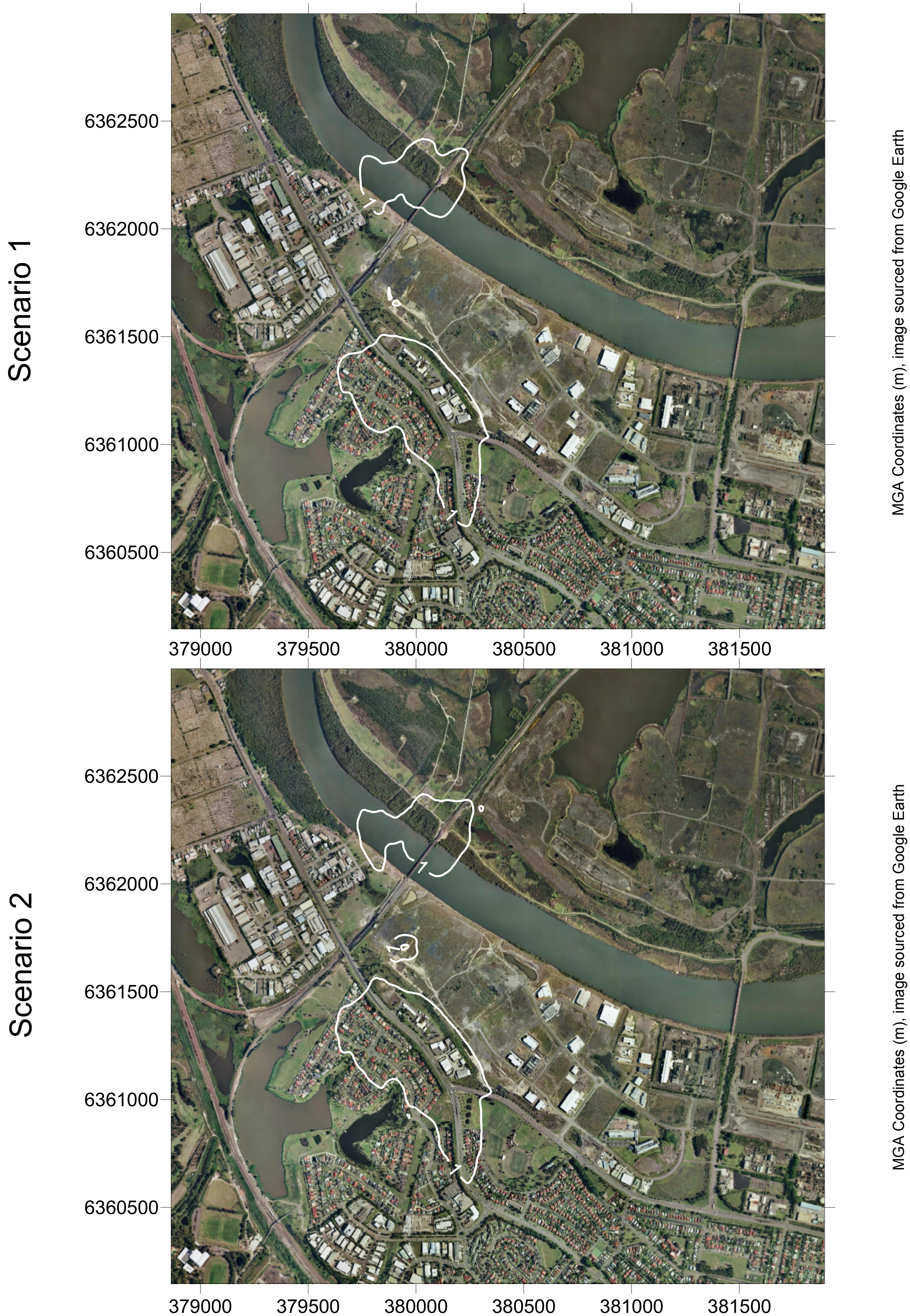
Nick Ballard
Senior Environmental Scientist

Attachments

Figures

Attachment 1 SIAS Environnemental Entitlement Certificate

Figures



Client: CROWN PROJECT SERVICES PTY LTD	Project: PROPOSED KNAUF INSULATION GLASS WOOL MANUFACTURING FACILITY STEEL RIVER NEWCASTLE AIR QUALITY IMPACT ASSESSMENT			Title: Substance: Odour Averaging Period: 1 Hour	
URS	Drawn: SWB	Approved: FINAL	Date: August 2009	Figure: 2-6	Rev: B
	Job No: 43177672	File: 43177672 Figure 2-6.srf			A4

Attachment 1 – SIAS Environmental Entitlement Certificate

SteelRiver
The Centre of Industry

Environmental Envelope - Air Emissions

Knauf Project 98136GR-Plan 7 **Area Ha** 24.6100

Calculation Date: 13-Jun-09

SIAS	CRITERIA	Air Emission Allocation
SO_2	10 mins	159.965 ug/m^3
pphm	1 hour	123.05 ug/m^3
	annual	9.844 ug/m^3
NO_2	1 hour	73.83 ug/m^3
pphm	annual	19.688 ug/m^3
TSP	annual	7.383 ug/m^3
ug/m^3		
PM 10	24 hours	7.383 ug/m^3
ug/m^3	annual	3.6915 ug/m^3
Lead	3 months	0.2461 ug/m^3
ug/m^3		

Prepared by :

Alan Norton
Development Manager
Mirvac Projects

from an original model prepared by WWC Pty Ltd

File: Steel River/ 07 Property/ Environment/ Air Entitlements/ Air allocation model.xls