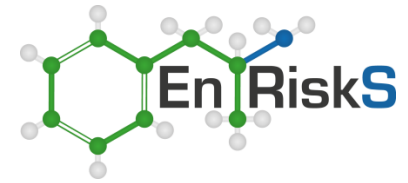


# Appendix H Health Impact Assessment and Human Health Risk Assessment







21 April 2015

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## Technical Working Paper: Health Impact Assessment – Moorebank Intermodal Terminal – Revised Project

### 1.0 Introduction

The Environmental Impact Statement (EIS) for the Moorebank Intermodal Terminal (the Project) was placed on public exhibition between the 8 October and 8 December 2014. Following the public exhibition a Response to Submissions Report has been prepared to address issues raised in community and agency submissions, describe proposed amendments to the development, and document additional investigations undertaken since the EIS public exhibition.

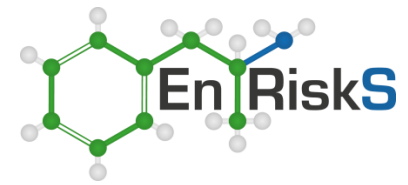
The Response to Submissions Report, which this report accompanies, documents and assesses proposed amendments to the Moorebank Intermodal Project ('the Project') following the public exhibition of the EIS. The revised Project has been developed as a result of an agreement being reached between the Moorebank Intermodal Company (MIC) and Sydney Intermodal Terminal Alliance (SIMTA) that will result in the development of both the Moorebank Intermodal Terminal (IMT) site ('the Project site') (the subject of the EIS summary and the Response to Submissions Report) and the SIMTA IMT site to create an intermodal precinct solution.

The proposed development of the precinct has resulted in changes to some of the key technical studies presented in the EIS. This letter has been prepared to evaluate how these changes affect the assessment presented in EIS Technical Paper 16: Health Impact Assessment (HIA) compared to the revised Project.

### 2.0 Overview of the Proposed Amendments to the Project

Amendments to the Project layout and built form comprise:

- changes to the layout and operation of the IMT terminal, including the location of the warehousing, working tracks and storage tracks, IMT freight village precinct, IMEX and interstate equipment storage and repair area and detention ponds;
- confirmation that the southern rail access into the site will be required (the EIS summary sought flexibility to build either a southern, central or northern rail access into the site from the SSFL) and a minor amendments to the alignment and a reduction in the southern rail access corridor;
- changes to the upgrade of Moorebank Avenue as described in the EIS summary (changes in the extent and timing of the upgrade works);
- changes to access and circulation including heavy and light vehicle access to the facility via the Moorebank Avenue and Anzac Road intersection along a dedicated road at the north and along the western boundary of the Project site; and
- an increase in the size of the conservation area as a result of the new IMT.



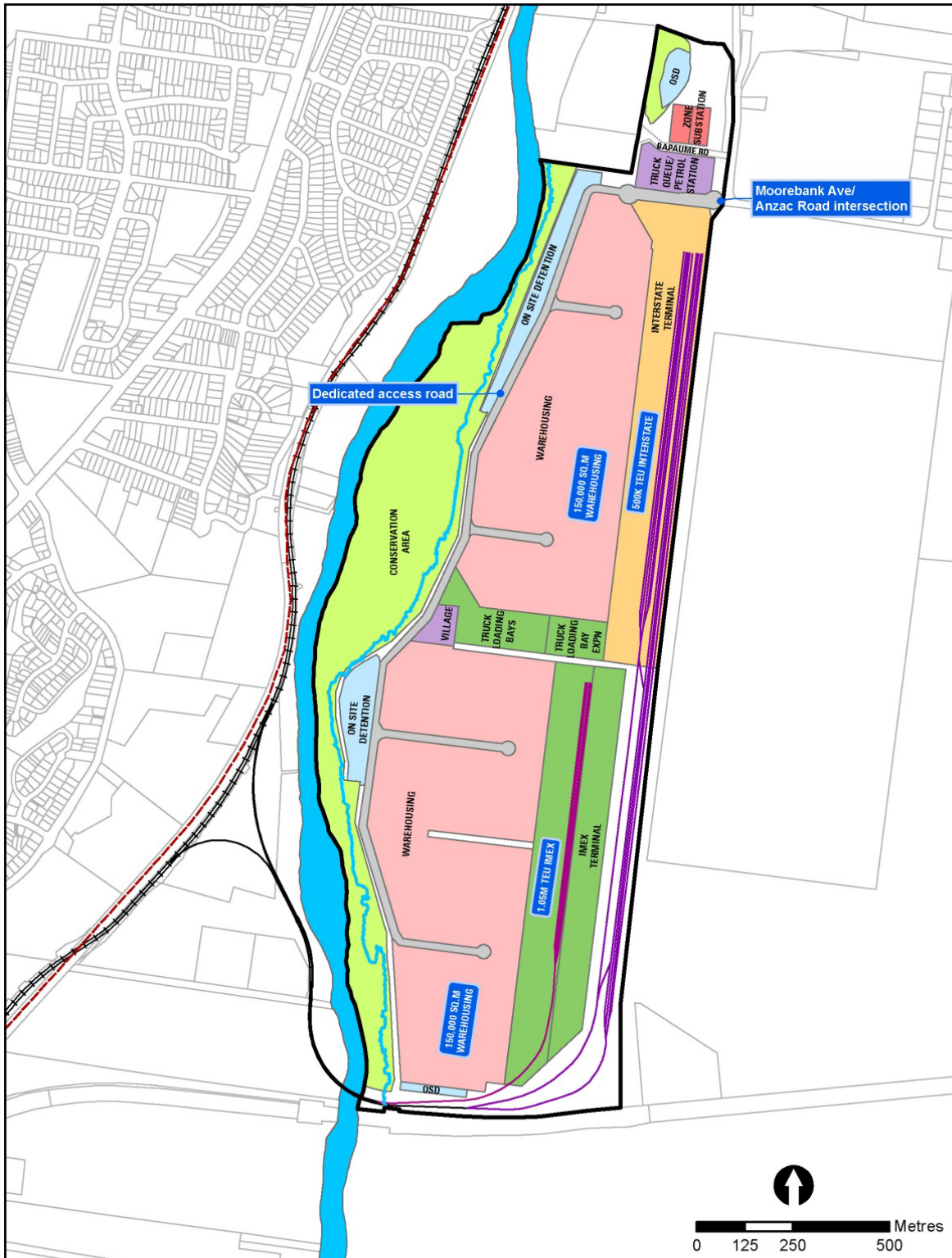
In terms of warehousing, the site built form controls associated with heights, setbacks and floor space ratio remain unchanged (refer section 7.7.2 of the EIS); however the setback control on Moorebank Avenue is no longer required as warehouses are no longer proposed on the eastern boundary of the site. To supplement the setback controls, asset protection zones will be established between the conservation area and the proposed warehouse buildings to safeguard against bushfire risk.

The revised terminal layout consists of (refer to **Figure 1** for full build layout):

- Confirmation of the development of a southern rail access from the SSFL to the western boundary of the Project site.
- Reorientation of the terminal layout to place warehousing (approximately 300,000 sq. metres) on the western area of the Project site bordering the proposed conservation area and set-back for bushfire control. Final layout and footprint of the individual warehouse buildings will be confirmed as part of the Stage 2 SSD process.
- Reorientation to place the intermodal infrastructure including rail tracks (working tracks and storage tracks) on the eastern side of the Project site adjacent to the terminals and bordering Moorebank Avenue.
- Changes to the site access and vehicle circulation within the Project site.
- Modification to the locations and footprint of the detention basin and administrative office

As a result of the above changes there are also changes in the Project development phasing and timing.



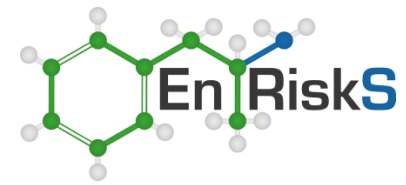


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- |  |   |   |
|--|---|---|
|  1% AEP flood level                     |  IMEX Terminal                             |  Dedicated Access Road |
|  Existing south rail line               |  Interstate Terminal                       |  Georges River         |
|  Proposed IMEX Rail line                |  Warehousing                               |  On Site Detention     |
|  Proposed interstate terminal rail line |  Services Freight Village / Petrol station |  Conservation Area     |
|  Southern rail connection               |  Zone Substation                           |   |
|  Southern Sydney Freight Line           |   |   |

**Revised IMT layout  
at Full Build (2030)**

**Figure 1**



Based on the revised Project the technical studies have been amended to consider the following four scenarios (as illustrated in **Figure 2**):

- **Scenario 1** (2016) during **Phase A** (construction only – construction of 250,000 TEU IMEX terminal and 100,000 sq. m of warehousing).
- **Scenario 2a** (2019) during **Phase B** (construction and operation - operation of 250,000 TEU IMEX terminal and 100,000 sq. m of warehousing, construction and operation of 250,000 TEU of interstate rail and terminal, and construction of additional 250,000 TEU IMEX terminal).
- **Scenario 2b** (2023) (construction and operation - operation of 500,000 TEU IMEX terminal, 100,000 TEU warehousing, operation of 250,000 TEU Interstate Terminal, and construction of 150,000 sq. m warehousing).
- **Scenario 3** or Full Build (2030) (operation only - operation of 1.05m TEU IMEX terminal and 500,000 TEU interstate terminal, 300,000 sq. m of warehousing).

In addition, the following cumulative scenarios have been assessed which are relevant for operations on both the SIMTA and Moorebank site have been considered.

- **Cumulative Scenario A** (previously Scenario 1 in the EIS) – at 2030 full build:

Cumulative Scenario A assumes that the SIMTA site would operate as an intensified warehousing development that would support the operation of the Moorebank IMT Project. A number of assumptions have been made to define and assess cumulative scenario A including:

- The Moorebank IMT would operate as proposed in the EIS;
- The SIMTA development would have indicative warehouse capacity of 300,000 sq. m gross floor area (GFA)
- Both sites would operate 24 hours a day, seven days a week; and
- The SIMTA development would have an operational workforce of 1,470 staff on site per day (three shifts).

- **Cumulative Scenario B** (previously Scenario 3 in the EIS) at 2030 full build:

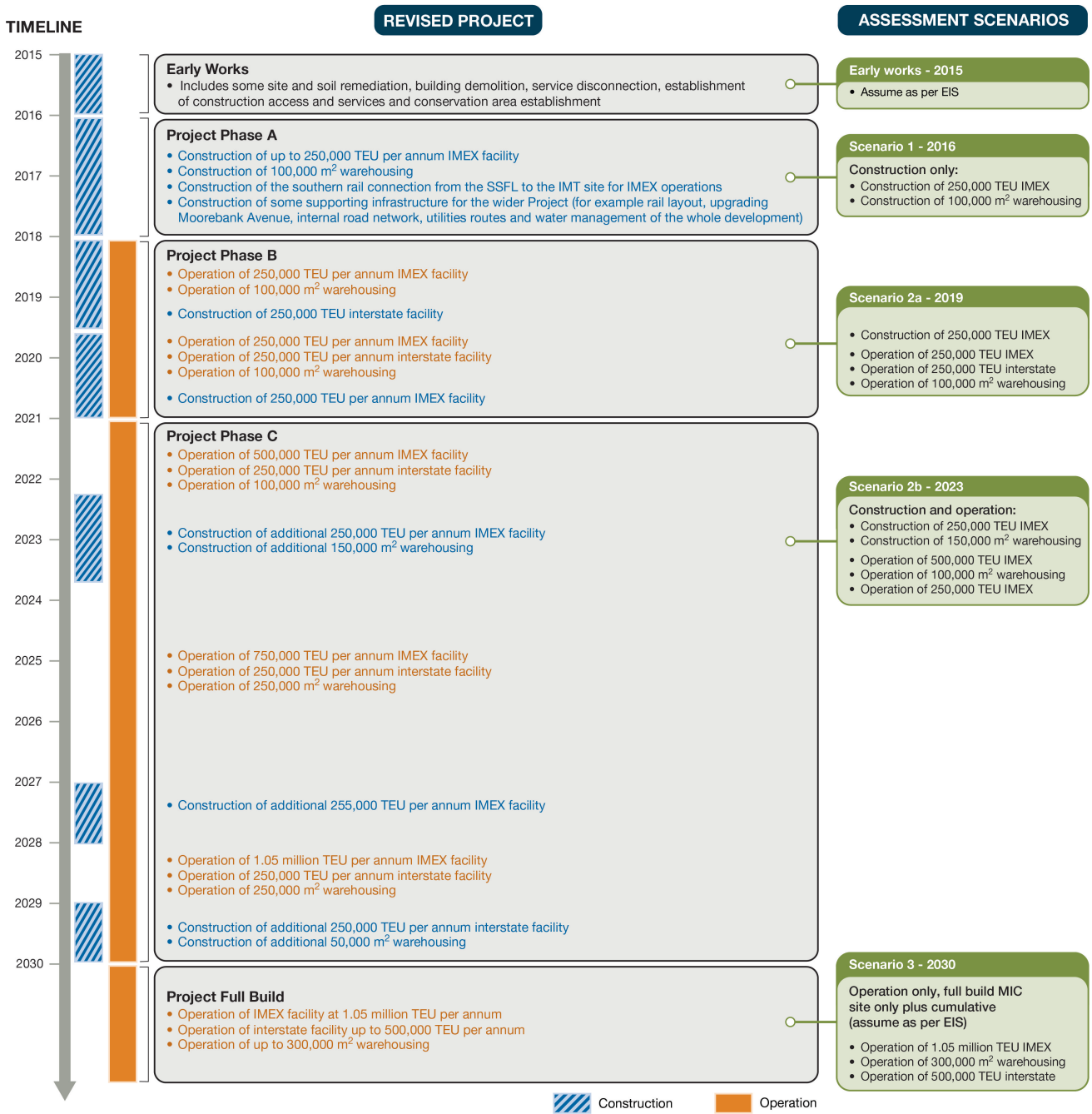
Cumulative Scenario B consists of an IMEX terminal on the SIMTA site only with throughput of 1 million TEU per year, as well as 300,000 sq. m of warehousing. An interstate terminal of 500,000 TEU per year and 300,000 sq. m of warehousing would be located on the Project site. The following assumptions were made for cumulative Scenario B:

- Both sites would operate 24 hours a day, seven days a week;
- The SIMTA development would have an operational workforce of 2,258 staff on site per day (three shifts per day)
- The Moorebank IMT site would have an operational workforce of 1,800 staff per day.

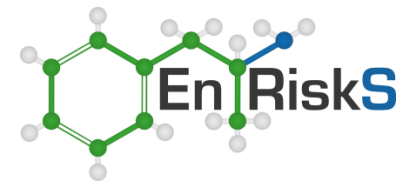
- **Cumulative Scenario C:**

Cumulative scenario C has been split into C1 (an interim scenario at 2020) and C2 (final scenario from 2030):

- Cumulative scenario C1: consisting of the Moorebank IMT site operating at 250,000 TEU IMEX, 250,000 TEU Interstate and 100,000 sq. m warehousing. The SIMTA site would operate at 250,000 TEU IMEX (asper the SIMPTA Stage 1 DA) and 200,000 sq. m warehousing.
- Cumulative scenario C2: consisting of the Moorebank IMT site operating at 550,000 TEU IMEX, 500,000 TEU Interstate and 300,000 sq. m warehousing. The SIMTA site would operate at 500,000 TEU IMEX (their ultimate capacity under the PAC determination) and 300,000 sq. m warehousing.



**Figure 2 Revised Project Timeline and Assessment Scenarios**



## 3.0 Changes to the HIA

### 3.1 General

The HIA presented in the EIS provided a structured desk-top assessment of the direct and indirect impacts associated with the Project on the health of the community. The HIA considered all aspects of the Project in relation to community health and well-being and hence draws on the technical assessments presented in the EIS to identify positive and negative impacts. Outcomes of the HIA were used to determine recommendations for the collection of further data and/or measures that may be able to be implemented in the Project to minimise or mitigate identified negative impacts, and maximise positive impacts.

The methodology, approach and community profile adopted for the conduct of the HIA is outlined in the EIS and has not changed. Some of the key technical studies have been revised to assess the revised Project, with Scenarios 1, 2a, 2b and 3 evaluated (where relevant to the technical study) and the cumulative scenarios (Scenarios A, B, C1 and C2). The key technical studies that have been revised relate to traffic, noise, local air quality and human health risks. These were the key aspects identified that required detailed evaluation within the HIA. The following sections present a review of the changes to the technical assessments presented in relation to traffic, noise, air quality and human health risk, and how these may affect the assessment, outcomes and recommendations presented in the HIA in the EIS.

### 3.2 Traffic

#### ***Specialist Study***

The assessment of the revised Project in relation to traffic has been assessed by Parsons Brinckerhoff. This assessment outlines the changes to the assessment of traffic assessment presented in the EIS as a result of the assessment of the revised Project.

#### **Moorebank IMT**

The proposed upgrade of Moorebank Avenue has changed significantly since the EIS. The EIS design proposed an upgrade for Moorebank Avenue (including duelling and signalisation) between the M5 and East Hills rail line, as well as numerous entry and egress points from the Project site onto Moorebank Avenue. The revised Project consists of a single entry point only – at the intersection of Moorebank Avenue and Anzac Road. The revised design provides for the upgrading of Moorebank Avenue to a four-lane carriageway from the M5 to that entry point, with no further upgrade to the south, on the basis that no truck traffic will travel to and from the south of Anzac Road along Moorebank Avenue. In addition to the upgrade of the Anzac Road intersection, relocation and upgrade of Bapaume Road and its intersection with Moorebank Avenue will be undertaken.

Impacts of the revised Project on the operation of Moorebank Avenue as well as congestion on other intersections and roadways in the surrounding area have been evaluated. For the revised Project the assessment has identified the following:

- Some aspects of the traffic assessment, particularly in relation to rail movements, parking provisions and public transport, remain unchanged from the EIS.
- Upgrading of Moorebank Avenue north of Anzac Road, and the upgrading of the Anzac Road intersection to a major signalised intersection in order for this to function as the main entry point into the Project site, is essential to the effective functioning of traffic access and egress. The proposed modifications to Moorebank Avenue include widening Moorebank Avenue to a dual carriageway, four-lane road (two lanes in each direction), between the M5 intersection and the southernmost Project site access road; and the expansion of the Moorebank Avenue/Anzac Road intersection.



- While the traffic impacts at 2030 are a slight improvement relative the predictions made in the EIS, the analysis continues to show that by 2030, all intersections will have experienced a reduced level of service as a result of background traffic growth and the impacts of the Project. Some of these will have deteriorated to an unacceptable level of service without mitigation.
- The percentage increase from the traffic generated by Moorebank IMT on the M5 Motorway is under 3.3% of total M5 traffic during the 2030 AM and PM peak hours.
- Mitigation measures in the form of intersection treatments are prescribed by the report in order to ensure that by 2030, current (2015) levels of service are maintained.

#### **Cumulative Assessment:**

An assessment was undertaken of traffic impacts associated with Cumulative Scenarios A, B, C1 and C2. Overall, the combined traffic associated with the Moorebank IMT and an adjacent SIMTA operation could be accommodated within the proposed upgrades to Moorebank Avenue for Cumulative Scenarios A, B, C1 and C2. However Cumulative Scenario B would require further modifications to the following intersections to relieve queue lengths for the right turn from Moorebank Avenue onto Anzac Road and the right turn out of both the SIMTA Northern and Central Accesses:

- Moorebank Avenue and Anzac Road
- Moorebank Avenue, DNSDC Access and SIMTA Northern Access
- Moorebank Avenue and SIMTA Central Access.

The cumulative scenarios are not likely to have a substantial impact on the operation of the M5 Motorway or the regional road network.

#### ***Assessment of Health Outcomes***

Congested traffic has the potential to impact on health in a number of ways. Increased anxiety, reduced air quality, increased noise, and poor perceptions of an area due to safety issues are all possible. The assessment in relation to the revised Project has identified some changes to the proposed upgrade of Moorebank Avenue, however the traffic impacts present in the EIS have not changed. From a health impact perspective the conclusions presented in the EIS remain unchanged, that is the health outcomes of the Project relating to traffic congestion should be positive as long as all the proposed mitigation measures are implemented.

#### ***Can the Outcomes be Enhances/Mitigated?***

A range of measures are outlined in the HIA of the EIS to mitigate impacts of changes in traffic on the local community. These mitigation measures have not changed as a result of the changes considered for the revised Project.

### **3.3 Noise**

#### ***Specialist Study***

The assessment of the revised Project in relation to noise and vibration is presented in the “Revised Project Report, Noise and Vibration Impact Assessment” (SLR, 2015). This assessment outlines the changes to the assessment of noise and vibration presented in the EIS as a result of the assessment of the revised Project.

The existing noise environment and the noise assessment criteria, which are based on the protection of community health, remain unchanged from those presented and considered in the EIS. The assessment has considered the changes to the revised Project and has undertaken a detailed assessment of potential impacts during construction and operational phases of the revised Project, as well as the cumulative scenarios.

### **Noise Impacts during Construction**

Construction activities have been assessed during Scenarios 1 to 3, where the following impacts were identified:

- Scenario 1 (2016): noise impacts above the noise management levels were identified at Casula (during piling, excavation, compaction and construction of the SSFL rail access and on-site track), Wattle Grove (during piling, excavation, compaction and concreting), Glenfield (during piling and construction of the SSFL rail access and on-site track) and Liverpool (during piling).
- Scenario 2a (2019): noise impacts above the noise management levels were identified at Casula (during piling), Wattle Grove (during piling, excavation and compaction) and Liverpool (during piling).
- Scenario 2b (2023): noise impacts above the noise management levels were identified at Casula (during piling, excavation and compaction), Wattle Grove (during piling, excavation and compaction) and Glenfield (during concreting).

The revised assessment has resulted in some redistribution of noise impacts from those presented in the EIS, however reasonable and feasible noise management measures to reduce the noise to acceptable levels during construction activities will still need to be implemented as presented in the EIS.

### **Noise Impacts during Operations**

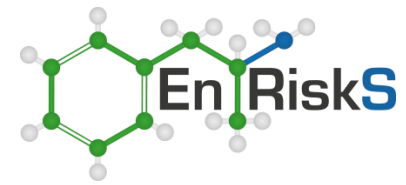
Operational activities have been assessed on the site during Scenario 2a, Scenario 2c and Scenario 3 (full build) and the cumulative SIMTA scenarios:

- Scenario 2a: Under adverse meteorological condition, predicted noise impacts complied with the noise criteria at all assessed receptors, with the exception of the western extent of Anzac Road where a marginal 1 to 2 dBA  $L_{Aeq}$  exceedance of the noise criteria was predicted. Predicted noise levels comply with noise criteria at the majority of receptors, but exceed the noise criteria by 2 to 3 dBA  $L_{Aeq}$  at nearest receptors at the northern extent of Casula and by 2 dB  $L_{Aeq}$  at nearest receptors at Wattle Grove. At the western extent of Anzac Road noise levels exceed the night-time noise criteria by up to 5 dBA  $L_{Aeq}$ .
- Scenario 2b: Under adverse weather conditions, the assessment identified noise levels comply with daytime and evening noise criteria at all assessed receptors with the exception of the western extent of Anzac Road where the noise levels exceed the criteria by 1 to 2 dBA  $L_{Aeq}$ . The Project should consider feasible and reasonable noise mitigation measures to reduce night-time noise levels by up to 4 dBA  $L_{Aeq}$  at the northern extent of Casula and the nearest receptors in Wattle Grove.
- Scenario 3: Under adverse weather conditions, the assessment identified noise levels comply with the daytime and evening noise criteria at all assessed receptors in Casula, Glenfield and Wattle Grove with the exception of the western extent of Anzac Road, where noise levels are up to 2 to 3 dBA  $L_{Aeq}$  in exceedance of the daytime and evening noise criteria. The Project should consider feasible and reasonable noise mitigation measures to reduce night-time noise levels by up to 6 dBA  $L_{Aeq}$  at the nearest Casula, by up to 4 dBA  $L_{Aeq}$  at the northern and southern most extents of Wattle Grove and by 6 dBA  $L_{Aeq}$  at the western extent of Wattle Grove.

An assessment of sleep disturbance associated with operations at the Project site determined that the maximum predicted noise impacts comply with the sleep disturbance criteria in all offsite community locations.

Assessment of the rail access connection indicated that all predicted noise levels in assessment Scenario 2a, Scenario 2b and Scenario 3 complied with daytime, evening and night-time noise criteria at all receptors for noise related to the movement of rail engines and cars.

The revised assessment has resulted in some redistribution of noise impacts from those presented in the EIS, however reasonable and feasible noise management measures to reduce the noise to acceptable levels during operations will still need to be implemented as presented in the EIS.



To demonstrate that noise mitigation would be effective, the assessment evaluated noise impacts at full build, Scenario 3, with noise mitigation measures (low noise plant and equipment and placement of noise barriers) in place. Under this scenario the noise criteria were met under all conditions and over all hours of the day.

In relation to the assessment of road noise, there are no changes to the assessment presented in the EIS.

### **Cumulative Assessment**

For the cumulative scenarios evaluated the following noise impacts were identified:

- Cumulative Scenario A: the assessment identified noise impacts in excess of the adopted night-time noise level criteria at Casula. The Project should consider feasible and reasonable noise mitigation measures to reduce noise levels by up to 4 dBA LAeq.
- Cumulative Scenario B: the assessment identified noise impacts in excess of the adopted night-time noise level criteria at Wattle Grove. The Project should consider feasible and reasonable noise mitigation measures to reduce noise levels by up to 5 dBA LAeq.
- Cumulative Scenarios C1 and C2: the assessment identified noise impacts in excess of the adopted night-time noise level criteria at Casula and Wattle Grove. The Project should consider feasible and reasonable noise mitigation measures to reduce noise levels by up to 2 dBA LAeq for Scenario C1 and up to 3 dB LAeq for Scenario C2.

The revised assessment has resulted in lower noise impacts (up to 7 dB less) from those presented in the EIS, however the requirement to undertaken reasonable and feasible noise management measures to reduce the noise to acceptable levels as presented in the EIS remains unchanged.

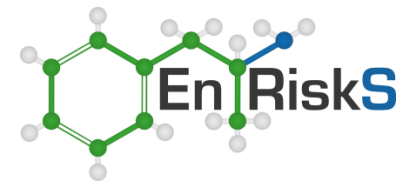
### ***Assessment of Health Outcomes***

The assessment presented in the EIS identified that where the noise criteria were not met there was the potential for adverse effects on the health of the community. For the revised scenarios, as with the other scenarios presented in the EIS, the worst case assessment predicts that noise criteria would be exceeded at some locations without additional noise mitigation measures. Such measures have been included in the plans for the Project. It will be essential to adopt proposed noise mitigation measures to ensure the health outcomes related to noise are neutral for the Project.

### ***Can the Outcomes be Enhances/Mitigated?***

As outlined in the EIS, a range of mitigation measures are proposed during construction and operations to ensure compliance with the noise criteria. These remain unchanged, however the noise assessment has indicated the need for some noise mitigation measures for the revised Project that are in addition to those outlined in the EIS, and include:

- Automated container handling areas in the IMEX and interstate terminals to avoid the use of alarms or beepers on the RMGs.
- Electrification of all plant and equipment at the IMEX and interstate terminals, or alternatively sourcing plant and equipment with noise emission levels equivalent to electrified plant.
- Permanently coupled wagons to limit impact noise events from wagon bunching on the freight trains.
- Minimise the need for reversing of vehicles operating within the Main IMT site equipment to prevent nuisance caused by reversing alarms. This can be achieved through one-way traffic systems and the use of traffic lights which can also limit the use of vehicle horns.
- To further mitigate potential noise from vehicle horns, the practical application of radio contact between operators and limiting the use of vehicle horns to the daylight hours only would be investigated.



- Broadband reversing alarms are to be used instead of tonal reversing alarms, in particular between the hours of 6.00 pm to 7.00 am. This requirement would extend to the heavy vehicles (trucks) entering and leaving the site and where possible (particularly for night works). This should be included as a contractual requirement for all operators accessing the main IMT site.

### 3.4 Air Quality and Human Impacts

#### ***Specialist Studies***

Assessment of local air quality has been revised (“Proposed Moorebank Intermodal Terminal – Revised Project Design – Local Air Quality Impact Assessment” prepared by Environ 2015) to evaluate the revised Project design. In addition, the assessment of the impacts of the changes in local air quality on community health has been considered (“Technical Working Paper: Human Health Risk Assessment – Moorebank Intermodal Terminal – Revised Project”, prepared by enRiskS 2015).

The methodology adopted for the assessment of local air quality has not changed and is outlined in detail in the EIS.

The assessment of local air quality has been revised to address the following scenarios on the Project site:

- Scenario 1 (Phase A); and
- Scenario 3 (Full Build)

These scenarios have been evaluated for all the air pollutants addressed in the EIS.

In addition, the local air quality assessment has been revised to address the 4 cumulative scenarios (Cumulative Scenarios A, B, C1 and C2). The cumulative scenarios have considered impacts from key pollutants (indicator) only, namely nitrogen dioxide and particulates (as  $PM_{10}$  and  $PM_{2.5}$ ).

For these scenarios the air quality assessment has been revised to account for the changes to the Project construction and operations that affect emissions to air of the pollutants assessed. The modelling of changes in air quality in the surrounding community have then been revised. The assessment provides revised ground level concentrations at the sensitive receptor locations (as addressed in the EIS) in the surrounding community. These ground level concentrations have been further evaluated in conjunction with relevant regulatory criteria as well as health based criteria/assessment methods as outlined in the EIS.

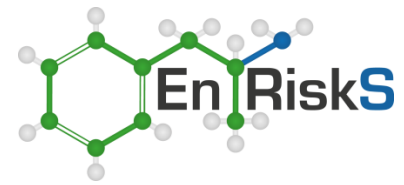
#### ***Potential for Impacts***

Predicted air quality impacts from both the revised Project in isolation and cumulative operations at the Project and SIMTA sites showed minor variance from the impacts predicted in the EIS. The levels of oxides of nitrogen, sulfur dioxide, carbon monoxide, volatile organic compounds and polycyclic aromatic hydrocarbons during construction and operation are all estimated to be acceptable for all Project and cumulative scenarios evaluated. That is, the estimated concentrations (incremental and cumulative) in air within the surrounding community (assessed at the sensitive receiver locations) were smaller than National and International guidelines that are based on the protection of all adverse health effects for all members of the population including sensitive subpopulations.

Exceedance of the  $PM_{2.5}$  advisory reporting goals for the cumulative concentrations are predicted, but only at a receptor location that is likely to be within the SIMTA development. The assessment of health impacts associated with changes in both  $PM_{2.5}$  and  $PM_{10}$  concentrations in the local community has been revised based on the changes in the ground level concentrations predicted for the assessment scenarios evaluated. The assessment has identified minor variations in the health risks and impacts presented in the EIS, however the conclusions presented in the EIS remain unchanged, which are:

- In relation to the assessment of key phases of the revised Project, potential health impacts are low (not significant) in the surrounding community. Regardless of this assessment, where best available technology and mitigation measures should be implemented to minimise exposures to particulates in the community.





- In relation to the assessment of cumulative impacts from the operation of both the Moorebank and SIMTA sites, the predicted health impacts are generally considered to be low (not significant); however there is the potential for risks in adjacent commercial/industrial areas to be at a level that are considered unacceptable. Mitigation measures need to be implemented to minimise exposure to particulates in the adjacent workplaces.

#### ***Can the Outcomes be Enhanced/Mitigated?***

The EIS presents a range of mitigation measures and emission controls that can be implemented during construction and operations to minimize air quality impacts. No additional mitigation measures have been identified in relation to the revised Project.

The HIA presented in the EIS also provided a range of other recommendations to minimise impacts of the project on the health of the community. These recommendations remain unchanged.

## **4.0 Conclusions**

Following public exhibition of the EIS in relation to the Moorebank Intermodal Terminal, MIC and SIMTA have reached in-principle agreement for SIMTA to develop and operate a precinct-wide intermodal facility and associated warehousing across the Moorebank and SIMTA sites. The revised Project design relevant to the Moorebank site as well as revised cumulative scenarios associated with the operation of both the SIMTA and Moorebank site have been further evaluated in relation to health impacts to the community.

Based on the revised Project scenarios considered, the conclusions presented in the EIS in relation to impacts on the health of the local community are unchanged. In addition, the recommendations presented in the EIS in relation to mitigation or enhancing health benefits remain unchanged. Some additional noise mitigation measures have been outlined for the revised Project and these should be considered in conjunction with other mitigation measures outlined in the relevant assessments.

## **5.0 Limitations**

Environmental Risk Sciences has prepared this letter for the use of Parsons Brinckerhoff in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this letter.

It is prepared in accordance with the scope of work and for the purpose outlined in this letter.

The methodology adopted and sources of information used are outlined in this letter. Environmental Risk Sciences has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions. No indications were found that information provided for use in this review was false.

This letter was prepared in February 2015 and is based on the information provided and reviewed at that time. Environmental Risk Sciences disclaims responsibility for any changes that may have occurred after this time.

This letter should be read in full. No responsibility is accepted for use of any part of this letter in any other context or for any other purpose or by third parties. This letter does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.



Please contact Jackie on (02) 9614 0297 or 0425 206 295 if you require any additional information in relation to the above.

Yours sincerely,

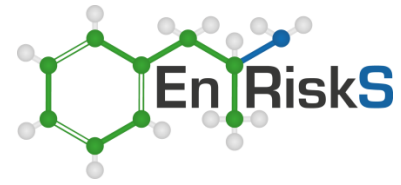
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# Appendix H Health Impact Assessment and Human Health Risk Assessment









21 April 2015

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## **Technical Working Paper: Human Health Risk Assessment – Moorebank Intermodal Terminal – Revised Project**

### **1.0 Introduction**

The Environmental Impact Statement (EIS) for the Moorebank Intermodal Terminal (the Project) was placed on public exhibition between the 8 October and 8 December 2014. Following the public exhibition a Response to Submissions Report has been prepared to address issues raised in community and agency submissions, describe proposed amendments to the development, and document additional investigations undertaken since the EIS public exhibition.

The Response to Submissions Report, which this report accompanies, documents and assesses proposed amendments to the Moorebank Intermodal Project ('the Project') following the public exhibition of the EIS. The revised Project has been developed as a result of an agreement being reached between the Moorebank Intermodal Company (MIC) and Sydney Intermodal Terminal Alliance (SIMTA) that will result in the development of both the Moorebank Intermodal Terminal (IMT) site ('the Project site') (the subject of the EIS summary and the Response to Submissions Report) and the SIMTA IMT site to create an intermodal precinct solution.

The proposed development of the precinct has resulted in changes to some of the key technical studies presented in the EIS. This letter has been prepared to evaluate how these changes affect the assessment presented in EIS Technical Paper 15: Human Health Risk Assessment (HHRA) compared to the revised Project.

### **2.0 Overview of the Proposed Amendments to the Project**

Amendments to the Project layout and built form comprise:

- changes to the layout and operation of the IMT terminal, including the location of the warehousing, working tracks and storage tracks, IMT freight village precinct, IMEX and interstate equipment storage and repair area and detention ponds;
- confirmation that the southern rail access into the site will be required (the EIS summary sought flexibility to build either a southern, central or northern rail access into the site from the SSFL) and a minor amendments to the alignment and a reduction in the southern rail access corridor;
- changes to the upgrade of Moorebank Avenue as described in the EIS summary (changes in the extent and timing of the upgrade works);
- changes to access and circulation including heavy and light vehicle access to the facility via the Moorebank Avenue and Anzac Road intersection along a dedicated road at the north and along the western boundary of the Project site; and
- an increase in the size of the conservation area as a result of the new IMT.

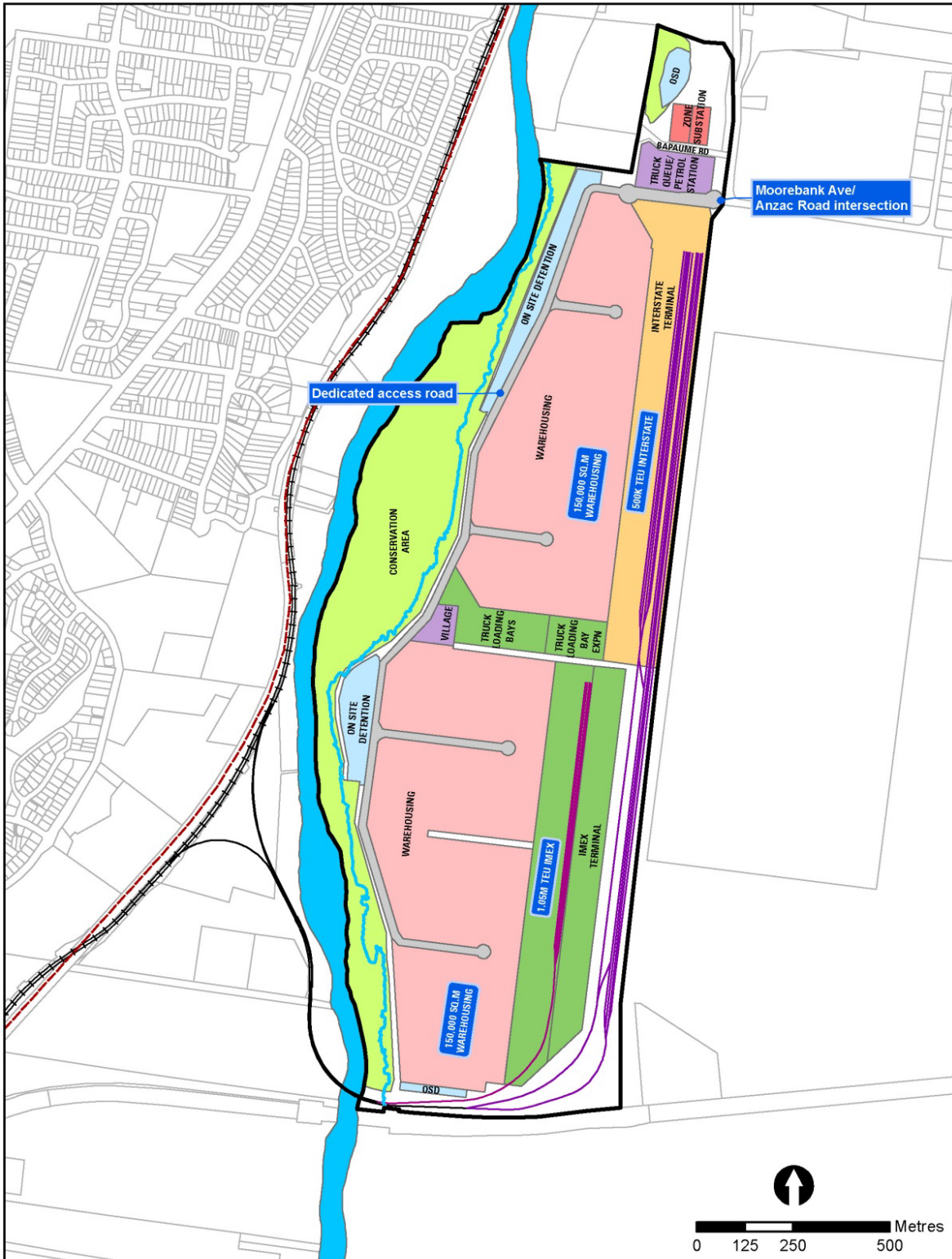


In terms of warehousing, the site built form controls associated with heights, setbacks and floor space ratio remain unchanged (refer section 7.7.2 of the EIS); however the setback control on Moorebank Avenue is no longer required as warehouses are no longer proposed on the eastern boundary of the site. To supplement the setback controls, asset protection zones will be established between the conservation area and the proposed warehouse buildings to safeguard against bushfire risk.
















The revised terminal layout consists of (refer to **Figure 1** for full build layout):

- Confirmation of the development of a southern rail access from the SSFL to the western boundary of the Project site.
- Reorientation of the terminal layout to place warehousing (approximately 300,000 sq. metres) on the western area of the Project site bordering the proposed conservation area and set-back for bushfire control. Final layout and footprint of the individual warehouse buildings will be confirmed as part of the Stage 2 SSD process.
- Reorientation to place the intermodal infrastructure including rail tracks (working tracks and storage tracks) on the eastern side of the Project site adjacent to the terminals and bordering Moorebank Avenue.
- Changes to the site access and vehicle circulation within the Project site.
- Modification to the locations and footprint of the detention basin and administrative office

As a result of the above changes there are also changes in the Project development phasing and timing.

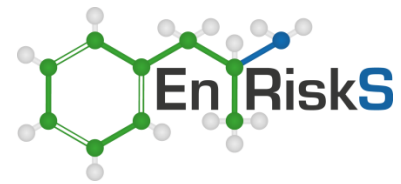


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- |  |   |   |
|--|---|---|
|  1% AEP flood level                     |  IMEX Terminal                             |  Dedicated Access Road |
|  Existing south rail line               |  Interstate Terminal                       |  Georges River         |
|  Proposed IMEX Rail line                |  Warehousing                               |  On Site Detention     |
|  Proposed interstate terminal rail line |  Services Freight Village / Petrol station |  Conservation Area     |
|  Southern rail connection               |  Zone Substation                           |   |
|  Southern Sydney Freight Line           |   |   |

**Revised IMT layout at Full Build (2030)**

**Figure 1**



Based on the revised Project the technical studies have been amended to consider the following four scenarios (as illustrated in **Figure 2**):

- **Scenario 1** (2016) during **Phase A** (construction only – construction of 250,000 TEU IMEX terminal and 100,000 sq. m of warehousing).
- **Scenario 2a** (2019) during **Phase B** (construction and operation - operation of 250,000 TEU IMEX terminal and 100,000 sq. m of warehousing, construction and operation of 250,000 TEU of interstate rail and terminal, and construction of additional 250,000 TEU IMEX terminal).
- **Scenario 2b** (2023) (construction and operation - operation of 500,000 TEU IMEX terminal, 100,000 TEU warehousing, operation of 250,000 TEU Interstate Terminal, and construction of 150,000 sq. m warehousing).
- **Scenario 3** or Full Build (2030) (operation only - operation of 1.05m TEU IMEX terminal and 500,000 TEU interstate terminal, 300,000 sq. m of warehousing).

In addition, the following cumulative scenarios have been assessed which are relevant for operations on both the SIMTA and Moorebank site have been considered.

- **Cumulative Scenario A** (previously Scenario 1 in the EIS) – at 2030 full build:

Cumulative Scenario A assumes that the SIMTA site would operate as an intensified warehousing development that would support the operation of the Moorebank IMT Project. A number of assumptions have been made to define and assess cumulative scenario A including:

- The Moorebank IMT would operate as proposed in the EIS;
- The SIMTA development would have indicative warehouse capacity of 300,000 sq. m gross floor area (GFA)
- Both sites would operate 24 hours a day, seven days a week; and
- The SIMTA development would have an operational workforce of 1,470 staff on site per day (three shifts).

- **Cumulative Scenario B** (previously Scenario 3 in the EIS) at 2030 full build:

Cumulative Scenario B consists of an IMEX terminal on the SIMTA site only with throughput of 1 million TEU per year, as well as 300,000 sq. m of warehousing. An interstate terminal of 500,000 TEU per year and 300,000 sq. m of warehousing would be located on the Project site. The following assumptions were made for cumulative Scenario B:

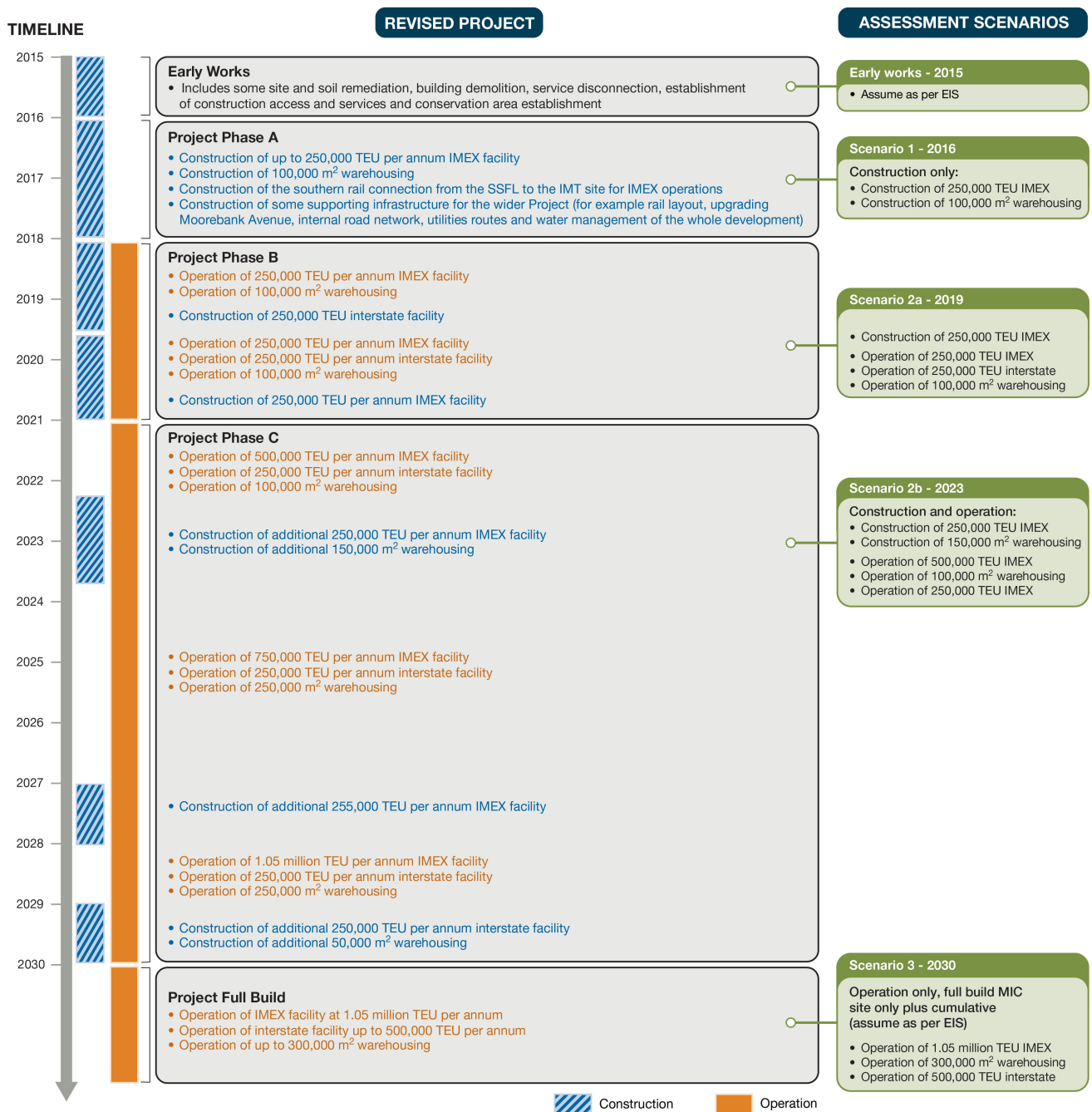
- Both sites would operate 24 hours a day, seven days a week;
- The SIMTA development would have an operational workforce of 2,258 staff on site per day (three shifts per day)
- The Moorebank IMT site would have an operational workforce of 1,800 staff per day.

- **Cumulative Scenario C:**

Cumulative scenario C has been split into C1 (an interim scenario at 2020) and C2 (final scenario from 2030):

- Cumulative scenario C1: consisting of the Moorebank IMT site operating at 250,000 TEU IMEX, 250,000 TEU Interstate and 100,000 sq. m warehousing. The SIMTA site would operate at 250,000 TEU IMEX (asper the SIMPTA Stage 1 DA) and 200,000 sq. m warehousing.
- Cumulative scenario C2: consisting of the Moorebank IMT site operating at 550,000 TEU IMEX, 500,000 TEU Interstate and 300,000 sq. m warehousing. The SIMTA site would operate at 500,000 TEU IMEX (their ultimate capacity under the PAC determination) and 300,000 sq. m warehousing.





**Figure 2 Revised Project Timeline and Assessment Scenarios**



### 3.0 Changes to the HHRA

#### 3.1 General

The HHRA was undertaken in the EIS to evaluate the impact of changes in local air quality on the health of the local community. As such the HHRA incorporates outputs from the assessment of local air quality.

The assessment of local air quality has been revised to address the following Project stages on the site:

- Scenario 1 (Phase A); and
- Scenario 3 (Full build).

These scenarios have been evaluated for all the air pollutants addressed in the EIS.

In addition the local air quality assessment has been revised to address the 4 cumulative scenarios (Scenarios A, B, C1 and C2). The cumulative scenarios have considered impacts from key pollutants (indicator) only, namely nitrogen dioxide and particulates (as PM<sub>10</sub> and PM<sub>2.5</sub>).

For these scenarios the air quality assessment has been revised to account for the changes to the Project construction and operations that affect emissions to air. The modelling of changes in air quality in the surrounding community have then been revised. The assessment provides revised ground level concentrations at the sensitive receptor locations (as addressed in the EIS) in the surrounding community. These concentrations have been further evaluated in relation to impacts on community health, on the basis of the methodology and assumptions outlined in detail in HHRA.

In relation to the air pollutants addressed in the HHRA the following sections provide a summary of the revised calculations and assessment undertaken, relative to the assessment presented in the EIS.

#### 3.2 Key Air Pollutants

The assessment of emissions to air of oxides of nitrogen (specifically nitrogen dioxide, carbon monoxide and sulfur dioxide) involved comparison of predicted concentrations and comparison with guidelines that are based on the protection of community health, relevant to acute and chronic exposures. These have been evaluated for the Project site as well as the cumulative scenario (for nitrogen dioxide only).

##### *Nitrogen Dioxide:*

The assessment of exposures to nitrogen dioxide involved evaluation of acute and chronic exposures. The guidelines relate to the total concentration of nitrogen dioxide in air, from the project as well as all other sources (as a cumulative concentration). **Table 1** presents a comparison of the predicted cumulative acute and chronic air concentrations with the relevant health based guideline. The table also includes the maximum predicted concentrations presented in the EIS for the purpose of comparison.

**Table 1 Review of potential health impacts – nitrogen dioxide**

Scenario	Acute Exposures Maximum 1-hour average concentrations (µg/m <sup>3</sup> )	Chronic Exposures Maximum annual average concentrations (µg/m <sup>3</sup> )
<b>Project site</b>		
Scenario 1	115	24
Scenario 3	136	37
Maximum from EIS	133	39
<b>Cumulative</b>		
Scenario A	143	42
Scenario B	138	38
Scenario C1	139	39
Scenario C2	140	39
Maximum from EIS	146	43
<b>Health Based Guideline</b>	<b>246</b>	<b>62</b>



All the concentrations of nitrogen dioxide presented in the above table are well below the relevant health based guideline. Hence there are no adverse health effects expected in relation to exposures to nitrogen dioxide in the local area surrounding the Project. The concentrations predicted are similar to those presented in the EIS and the outcomes in relation to impacts on public health are unchanged from those presented in the EIS.

*Carbon Monoxide:*

The assessment of exposures to carbon monoxide involved evaluation of acute and chronic exposures. The guidelines relate to the total concentration of carbon monoxide in air, from the project as well as all other sources (as a cumulative concentration). **Table 2** presents a comparison of the predicted cumulative acute and chronic air concentrations with the relevant health based guideline. The table also includes the maximum predicted concentrations presented in the EIS for the purpose of comparison.

**Table 2 Review of potential health impacts – Carbon monoxide**

Scenario	Acute Exposures Maximum 1-hour average concentrations ( $\mu\text{g}/\text{m}^3$ )	Chronic Exposures Maximum 8-hour average concentrations ( $\mu\text{g}/\text{m}^3$ )
<b>Project site</b>		
Scenario 1	5 000	2064
Scenario 3	5 000	2168
Maximum from EIS	4 604	2112
<b>Health Based Guideline</b>	<b>30 000</b>	<b>10 000</b>

All the concentrations of carbon monoxide presented in the above table are well below the relevant health based guideline. Hence there are no adverse health effects expected in relation to exposures to carbon monoxide in the local area surrounding the Project. The concentrations predicted are similar to those presented in the EIS and the outcomes in relation to impacts on public health are unchanged from those presented in the EIS.

*Sulfur Dioxide:*

The assessment of exposures to sulfur dioxide involved evaluation of acute and chronic exposures. The guidelines relate to the total concentration of sulfur dioxide in air, from the project as well as all other sources (as a cumulative concentration). **Table 3** presents a comparison of the predicted cumulative acute and chronic air concentrations with the relevant health based guideline. The table also includes the maximum predicted concentrations presented in the EIS for the purpose of comparison.

**Table 3 Review of potential health impacts – Sulfur dioxide**

Scenario	Acute Exposures Maximum 1-hour average concentrations ( $\mu\text{g}/\text{m}^3$ )	Acute Exposures Maximum 24-hour average concentrations ( $\mu\text{g}/\text{m}^3$ )	Chronic Exposures Maximum annual average concentrations ( $\mu\text{g}/\text{m}^3$ )
<b>Project site</b>			
Scenario 1	34.3	8.9	1.9
Scenario 3	34.4	8.9	2.0
Maximum from EIS	31.6	8.2	1.9
<b>Health Based Guideline</b>	<b>570</b>	<b>228</b>	<b>60</b>



All the concentrations of sulfur dioxide presented in the above table are well below the relevant health based guideline. Hence there are no adverse health effects expected in relation to exposures to sulfur dioxide in the local EIS area surrounding the Project. The concentrations predicted are similar to those presented in the EIS and the outcomes in relation to impacts on public health are unchanged from those presented in the EIS.

### 3.3 Polycyclic Aromatic Hydrocarbons and Volatile Organic Compounds

The assessment of exposures to volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) involved evaluation of key individual compounds (relevant to emissions to air from combustion sources) for both acute and chronic exposures (where relevant). The assessment involved comparison of the predicted concentration of individual VOCs and PAHs derived from the project to health based air guidelines. The comparison involved calculation of a hazard index (HI, the ratio of the concentration predicted to the health based guideline). The HI's for each individual chemical were summed to enable an assessment of community exposures to all these compounds together (at the same time). **Tables 4 and 5** presents the assessment of potential acute and chronic exposures to VOCs and PAHs derived from the project. The table also includes the range of calculated HIs presented in the EIS for the purpose of comparison.

**Table 4 Review of potential health impacts – Acute Exposure to VOCs**

Key VOC	Proportion of total VOCs*	Maximum predicted acute 1-hour average concentration ** ( $\mu\text{g}/\text{m}^3$ )		Health based acute guideline ( $\mu\text{g}/\text{m}^3$ )	Calculated acute HI	
		Scenario 1	Scenario 3		Scenario 1	Scenario 3
Total VOCs		3.1	146.8			
Benzene	0.16%	0.0050	0.23	29 <sup>A</sup> to 170 <sup>T1</sup>	0.00017	0.0081
Toluene	0.06%	0.0018	0.082	4500 <sup>T2</sup>	0.0000039	0.000018
Xylenes	0.07%	0.0021	0.10	2200 <sup>T3</sup>	0.0000010	0.000045
1,3-Butadiene	0.02%	0.00058	0.027	660 <sup>O1</sup>	0.0000088	0.000041
Formaldehyde	1.35%	0.043	2.0	15 <sup>T4</sup>	0.0028	0.13
Acetaldehyde	0.23%	0.0071	0.33	470 <sup>O2</sup>	0.000015	0.00070
<b>Total acute HI</b>					<b>0.0030</b>	<b>0.14</b>
Range from EIS					0.034 to 0.064	
<b>Acceptable HI (based on protection of health for all members of community)</b>					$\leq 1$	$\leq 1$

**Notes for Table 4:**

- \* Concentrations presented for the 1 hour average are the predicted incremental 99.9<sup>th</sup> percentile concentrations (as provided from the revisions to the LAQIA)
- A: Acute inhalation guideline (for exposures from 1 hour to 14 days) from review by ATSDR 2008 for benzene
- T1: TCEQ 2007, Benzene, Development Support Document. Texas Commission of Environmental Quality, 1 hour average guideline value (include additional 3.3 fold safety factor). This acute guideline is lower than that derived by the OEHHA (based on older studies)
- T2: TCEQ 2008, Toluene, Development Support Document. Texas Commission of Environmental Quality, 1 hour average guideline value (include additional 3.3 fold safety factor)
- T3: TCEQ 2009, Xylenes, Development Support Document. Texas Commission of Environmental Quality, 1 hour average guideline value (include additional 3.3 fold safety factor)
- T4: TCEQ 2008, Formaldehyde, Development Support Document. Texas Commission of Environmental Quality, 1 hour average guideline value (include additional 3.3 fold safety factor). This guideline is noted to be lower than the acute guideline available from the WHO (2000a, 2010) of 100  $\mu\text{g}/\text{m}^3$  for formaldehyde
- O1: OEHHA 2013, Acute (1 hour average) guideline derived by the California Office of Environmental Health Hazard Assessment. The guideline developed is lower than developed by TCEQ (2008) based on the same critical study
- O2: OEHHA 2008, Acute (1 hour average) guideline derived by the California Office of Environmental Health Hazard Assessment

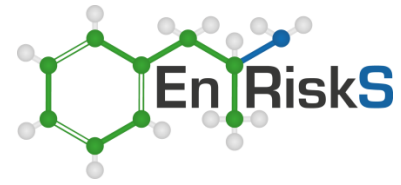
**Table 5 Review of potential health impacts – Chronic Exposures to VOCs and PAHs**

Key VOC	% total VOCs or PAHs	Maximum predicted chronic annual average concentration * ( $\mu\text{g}/\text{m}^3$ )		Health based chronic guideline ( $\mu\text{g}/\text{m}^3$ )	Calculated chronic HI	
		Scenario 1	Scenario 3		Scenario 1	Scenario 3
<b>Total VOCs</b>		<b>0.15</b>	<b>39.3</b>			
Benzene	0.16%	0.00023	0.062	1.7 <sup>W#</sup>	0.0000081	0.0022
Toluene	0.06%	0.00008	0.0220	5000 <sup>U</sup>	0.00000018	0.0000049
Xylenes	0.07%	0.00010	0.027	220 <sup>A1</sup>	0.00000045	0.000012
1,3-Butadiene	0.02%	0.00003	0.0073	0.3 <sup>U2</sup>	0.00000041	0.000011
Formaldehyde	1.35%	0.0020	0.53	3.3 <sup>T1</sup>	0.00013	0.035
Acetaldehyde	0.23%	0.00033	0.089	9 <sup>U3</sup>	0.0000071	0.00019
<b>Total PAHs</b>		<b>0.0012</b>	<b>0.0048</b>			
Naphthalene	87.65%	0.0010	0.0042	3 <sup>U4</sup>	0.00034	0.0014
Acenaphthylene	4.02%	4.7E-05	1.9E-04	200 <sup>U5S</sup>	0.0000024	0.0000097
Acenaphthene	1.96%	2.3E-05	9.4E-05	200 <sup>U5S</sup>	0.0000011	0.0000047
Fluorene	3.31%	3.9E-05	1.6E-04	140 <sup>U5</sup>	0.0000028	0.000011
Phenanthrene	1.68%	2.0E-05	8.1E-05	140 <sup>U5S</sup>	0.0000014	0.0000058
Anthracene	0.07%	8.2E-07	3.4E-06	100 <sup>U5</sup>	0.000000089	0.00000034
Fluoranthene	0.26%	3.0E-06	1.2E-05	140 <sup>U5</sup>	0.00000021	0.00000088
Pyrene	0.49%	5.7E-06	2.4E-05	100 <sup>U5</sup>	0.00000057	0.0000024
Benzo(a)pyrene TEQ	0.11%	1.3E-06	5.5E-06	0.00012 <sup>W2</sup>	0.011	0.046
<b>Total chronic HI</b>					<b>0.012</b>	<b>0.085</b>
Range from EIS					0.012 to 0.11	
<b>Acceptable HI (based on protection of health for all members of community)</b>					$\leq 1$	$\leq 1$

**Notes for Table 5:**

- \* Percentage of each individual PAH is based on data from DEH ((DEH 2003), page 91 for heavy-duty vehicle Segment 1 – congested traffic flow). The percentages adopted are expected to be conservative for the assessment of current and future diesel vehicles as emission standards for newer vehicles have improved over time, and will continue to improve to and beyond 2030.
- W1: WHO 2000 Air Quality Guidelines, value for benzene is based on non-threshold carcinogenic effects (excess lifetime risk of leukaemia). Guideline value based on incremental cancer risk of  $1 \times 10^{-5}$ , consistent with guidance provided by NEPM (1999 amended 2013) and enHealth (2012)
- W2: WHO 2010 Guidelines for Indoor Air Quality, value for BaP is based on non-threshold carcinogenic effects from occupational study of coke workers (lung cancer is critical effect). Guideline value based on incremental cancer risk of  $1 \times 10^{-5}$ , consistent with guidance provided by NEPM (1999 amended 2013) and enHealth (2012)
- T1: TCEQ 2008, Formaldehyde, Development Support Document. Texas Commission of Environmental Quality. The air guideline is derived on the basis of irritation of the eyes and airway discomfort in humans, with review of carcinogenic and other non-carcinogenic effects found to be adequately protected by this guideline. The guideline is more conservative than derived by the WHO (2010)
- A1: ATSDR 2007, Toxicological Profile for Xylene, chronic inhalation guideline derived is the most current robust evaluation
- U1: USEPA evaluation for toluene (most recently reviewed in 2005). This is the most current evaluation of effects associated with chronic inhalation exposure to toluene and is consistent with the value used to derive the NEPM (1999 amended 2013) health based guidelines
- U2: USEPA evaluation of 1,3-butadiene (most recently updated in 2002) with the chronic guideline adopted as the lower from the evaluation of non-threshold carcinogenic effects and non-cancer effects. This is the most conservative evaluation of this compound. A more recent review by TCEQ (2013) on the basis of the same critical studies as well as more current studies resulted in a higher chronic air guideline value.
- U3: USEPA evaluation of acetaldehyde (most recently updated in 1991). The guideline established is lower than more recent reviews undertaken by the WHO (2000) and the Californian OEHHA where less conservative evaluations are presented.
- U4: USEPA evaluation of naphthalene (most recently updated in 1998). The guideline established is and is consistent with the value used to derive the NEPM (1999 amended 2013) health based guidelines
- U5: Guideline available from the USEPA. Chronic guidelines for non-carcinogenic polycyclic aromatic hydrocarbons are based on criteria derived from oral studies (for critical effects on the liver, kidney and haematology) which are then converted to an inhalation value (relevant for the protection of public health, including the use of safety factors) for use in this assessment. The value presented in the above table has been converted from an acceptable dose in mg/kg/day to an acceptable air concentration assuming a body weight of 70kg and inhalation of 20 m<sup>3</sup>/day (as per (USEPA 2009a))
- U5S: No guideline available for individual polycyclic aromatic hydrocarbon, hence a surrogate compound has been used for the purpose of screening. The surrogate compound is a polycyclic aromatic hydrocarbon of similar structure and toxicity. In relation to the surrogates adopted in this evaluation, acenaphthene has been adopted as a surrogate for acenaphthylene, fluoranthene has been adopted as a surrogate for phenanthrene





All the maximum predicted concentration of all key VOCs and PAHs likely to be derived from emission sources (all vehicles and locomotives) associated with the Project are well below acute and chronic guidelines that are based on the protection of human health (including sensitive individuals). Hence there are no adverse health effects expected in relation to exposures to VOCs and PAHs in the local area surrounding the Project. The concentrations predicted are similar to those presented in the EIS and the outcomes in relation to impacts on public health are unchanged from those presented in the EIS.

### 3.4 Particulates

The assessment of potential health impact associated with particulate emissions from the Project have been assessed on the basis of the following:

- Assessment of cumulative impacts (derived from operations at the Project site as well as all other sources in the area) and comparison with NEPM guidelines, based on the protection of community health. This assessment is presented in the air quality assessment where the outcomes presented in the EIS remain unchanged. This review will not include any further detail in relation to this aspect.
- Assessment of incremental impacts of emissions to air from the Project. This has been undertaken by calculating incremental risks to human health that are associated with primary and secondary health indicators (health effects where robust associations have been identified between increases in exposure concentrations and an increase in a health indicator such as hospitalisations or mortality). In addition the increased incidence of the changes in particulate matter concentrations affecting the incidence of the primary health indicators in the community has been evaluated. The health indicators discussed and presented in the HHRA have been further evaluated for the revised Project proposal.

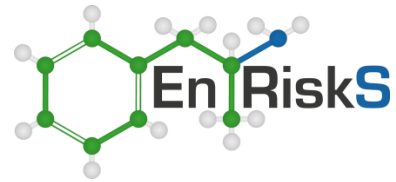
Where relevant the assessment has considered exposure to  $PM_{10}$  (more coarse particulate sizes typically present as a result of construction activities) and  $PM_{2.5}$  (the finer particulates associated with emissions from combustion sources). In addition to these particulate sizes, an assessment of  $PM_{2.5}$  as diesel particulate matter (DPM, assuming 100% of the  $PM_{2.5}$  is DPM) has been undertaken.

**Tables 6 and 7** presents a summary of the calculated incremental risks for the primary and secondary health indicators evaluated, in relation to the revised Project Scenario 1 and Scenario 3 operations and the cumulative scenarios. **Table 8** presents a summary of the calculated increased incidence for the primary health endpoints considered in the assessment. In addition the calculated increase in use of bronchodilators by young children (5-14 years) is presented. The maximum of calculated risks and increased incidence presented in the EIS have been included in the table for the purpose of comparison.

**Attachment A** presents the detailed calculations undertaken for these scenarios, for each of the sensitive receivers considered in the HHRA.

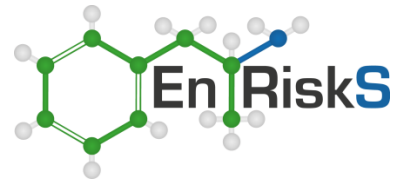
**Table 6 Summary of calculated incremental annual risks associated with exposure to PM<sub>2.5</sub> – Primary health indicators**

Scenario and receptor group	Calculated incremental annual risks for the following primary health endpoints – maximum for receptor groups evaluated		
	Mortality all causes (long-term exposure, ages ≥30 years)	Cardiovascular hospitalisations (short-term exposure, ages ≥65 years)	Respiratory hospitalisations (short-term exposure, ages ≥65 years)
<b>Revised Project</b>			
<b>Scenario 1</b>			
- residential	2.4x10 <sup>-6</sup>	7.1x10 <sup>-6</sup>	1.4x10 <sup>-6</sup>
- school	1.4x10 <sup>-6</sup>	4.2x10 <sup>-6</sup>	8.2x10 <sup>-7</sup>
- recreational	1.2x10 <sup>-7</sup>	3.6x10 <sup>-7</sup>	6.9x10 <sup>-8</sup>
- workplace	4.2x10 <sup>-6</sup>	1.3x10 <sup>-5</sup>	2.4x10 <sup>-6</sup>
<b>Scenario 3</b>			
- residential	1.5x10 <sup>-5</sup>	4.8x10 <sup>-5</sup>	9.3x10 <sup>-6</sup>
- school	6.3x10 <sup>-6</sup>	1.9x10 <sup>-5</sup>	3.6x10 <sup>-6</sup>
- recreational	8.5x10 <sup>-7</sup>	2.5x10 <sup>-6</sup>	4.9x10 <sup>-7</sup>
- workplace	2.0x10 <sup>-5</sup>	6.0x10 <sup>-5</sup>	1.2x10 <sup>-5</sup>
<b>Maximum from EIS</b>			
- residential	2.0x10 <sup>-5</sup>	5.9x10 <sup>-5</sup>	1.1x10 <sup>-5</sup>
- school	5.8x10 <sup>-6</sup>	1.7x10 <sup>-5</sup>	3.3x10 <sup>-6</sup>
- recreational	9.2x10 <sup>-7</sup>	2.7x10 <sup>-6</sup>	5.3x10 <sup>-7</sup>
- workplace	1.7x10 <sup>-5</sup>	5.1x10 <sup>-5</sup>	9.9x10 <sup>-6</sup>
<b>Cumulative</b>			
<b>Scenario A</b>			
- residential	2.2x10 <sup>-5</sup>	6.6x10 <sup>-5</sup>	1.3x10 <sup>-5</sup>
- school	1.1x10 <sup>-5</sup>	3.3x10 <sup>-5</sup>	6.4x10 <sup>-6</sup>
- recreational	1.1x10 <sup>-6</sup>	3.4x10 <sup>-6</sup>	6.5x10 <sup>-7</sup>
- workplace	4.4x10 <sup>-5</sup>	1.3x10 <sup>-4</sup>	2.5x10 <sup>-5</sup>
<b>Scenario B</b>			
- residential	1.3x10 <sup>-5</sup>	3.9x10 <sup>-5</sup>	7.6x10 <sup>-6</sup>
- school	8.2x10 <sup>-6</sup>	2.4x10 <sup>-5</sup>	4.7x10 <sup>-6</sup>
- recreational	6.2x10 <sup>-7</sup>	1.8x10 <sup>-6</sup>	3.6x10 <sup>-7</sup>
- workplace	3.1x10 <sup>-5</sup>	9.2x10 <sup>-5</sup>	1.8x10 <sup>-5</sup>
<b>Scenario C1</b>			
- residential	1.5x10 <sup>-5</sup>	4.3x10 <sup>-5</sup>	8.3x10 <sup>-6</sup>
- school	9.0x10 <sup>-6</sup>	2.7x10 <sup>-5</sup>	5.2x10 <sup>-6</sup>
- recreational	7.4x10 <sup>-7</sup>	2.2x10 <sup>-6</sup>	4.3x10 <sup>-7</sup>
- workplace	3.1x10 <sup>-5</sup>	9.3x10 <sup>-5</sup>	2.8x10 <sup>-5</sup>
<b>Scenario C2</b>			
- residential	1.3x10 <sup>-5</sup>	3.9x10 <sup>-5</sup>	7.6x10 <sup>-6</sup>
- school	8.4x10 <sup>-6</sup>	2.5x10 <sup>-5</sup>	4.8x10 <sup>-6</sup>
- recreational	6.1x10 <sup>-7</sup>	1.8x10 <sup>-6</sup>	3.5x10 <sup>-7</sup>
- workplace	3.2x10 <sup>-5</sup>	9.4x10 <sup>-5</sup>	1.8x10 <sup>-5</sup>
<b>Maximum from EIS</b>			
- residential	2.0x10 <sup>-5</sup>	6.0x10 <sup>-5</sup>	1.2x10 <sup>-5</sup>
- school	8.2x10 <sup>-6</sup>	2.4x10 <sup>-5</sup>	4.7x10 <sup>-6</sup>
- recreational	1.2x10 <sup>-6</sup>	3.5x10 <sup>-6</sup>	6.7x10 <sup>-7</sup>
- workplace	3.9x10 <sup>-5</sup>	1.2x10 <sup>-4</sup>	2.2x10 <sup>-5</sup>



**Table 7 Summary of calculated incremental risks for secondary health indicators – Exposure to PM<sub>2.5</sub> and PM<sub>10</sub> – Northern rail access**

Particulate fraction:	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	DPM
Health endpoint:	Mortality - All Causes, Short-Term, All ages	Mortality - All Causes, Short-Term, All ages	Mortality – Cardiopulmonary Long-term, ≥ 30 years	Mortality – Cardiovascular Short-Term, All ages	Mortality – Respiratory, Short-Term, All ages	Lung cancer – all ages
Scenario and receptor group	Risk	Risk	Risk	Risk	Risk	Lifetime Risk
<b>Revised Project</b>						
<b>Scenario 1</b>						
- residential	1.1 x10 <sup>-6</sup>	2.4X10 <sup>-7</sup>	2.4X10 <sup>-6</sup>	6.0X10 <sup>-8</sup>	4.1X10 <sup>-8</sup>	1.3X10 <sup>-6</sup>
- school	6.5X10 <sup>-7</sup>	1.4X10 <sup>-7</sup>	1.4X10 <sup>-6</sup>	3.6X10 <sup>-8</sup>	2.4X10 <sup>-8</sup>	7.7X10 <sup>-7</sup>
- recreational	1.1X10 <sup>-8</sup>	1.2X10 <sup>-8</sup>	1.2X10 <sup>-7</sup>	3.1X10 <sup>-9</sup>	2.1X10 <sup>-9</sup>	6.5X10 <sup>-8</sup>
- workplace	1.9X10 <sup>-6</sup>	4.2X10 <sup>-7</sup>	4.3X10 <sup>-6</sup>	1.1X10 <sup>-7</sup>	7.3X10 <sup>-8</sup>	2.3X10 <sup>-6</sup>
<b>Scenario 3</b>						
- residential	1.1X10 <sup>-6</sup>	1.6X10 <sup>-6</sup>	1.6X10 <sup>-5</sup>	4.1X10 <sup>-7</sup>	2.8X10 <sup>-7</sup>	8.8X10 <sup>-6</sup>
- school	4.1X10 <sup>-7</sup>	6.3X10 <sup>-7</sup>	6.4X10 <sup>-6</sup>	1.6X10 <sup>-7</sup>	1.1X10 <sup>-7</sup>	3.4X10 <sup>-6</sup>
- recreational	5.4X10 <sup>-8</sup>	8.5X10 <sup>-8</sup>	8.6X10 <sup>-7</sup>	2.1X10 <sup>-8</sup>	1.5X10 <sup>-8</sup>	4.6X10 <sup>-7</sup>
- workplace	1.3X10 <sup>-6</sup>	2.0X10 <sup>-6</sup>	2.1X10 <sup>-5</sup>	5.1X10 <sup>-7</sup>	3.5X10 <sup>-7</sup>	1.1X10 <sup>-5</sup>
<b>Maximum from EIS</b>						
- residential	1.4X10 <sup>-6</sup>	2.0X10 <sup>-6</sup>	2.0X10 <sup>-5</sup>	5.0X10 <sup>-7</sup>	5.4X10 <sup>-7</sup>	1.1X10 <sup>-5</sup>
- school	4.7X10 <sup>-7</sup>	5.8X10 <sup>-7</sup>	5.9X10 <sup>-6</sup>	1.5X10 <sup>-7</sup>	1.0X10 <sup>-7</sup>	3.1X10 <sup>-6</sup>
- recreational	5.9X10 <sup>-8</sup>	9.2X10 <sup>-8</sup>	9.3X10 <sup>-7</sup>	2.3X10 <sup>-8</sup>	1.6X10 <sup>-8</sup>	5.0X10 <sup>-7</sup>
- workplace	1.3X10 <sup>-6</sup>	1.7X10 <sup>-6</sup>	1.7X10 <sup>-5</sup>	4.3X10 <sup>-7</sup>	3.0X10 <sup>-7</sup>	9.3X10 <sup>-6</sup>
<b>Cumulative</b>						
<b>Scenario A</b>						
- residential	1.4X10 <sup>-6</sup>	2.2X10 <sup>-6</sup>	2.2X10 <sup>-5</sup>	5.6X10 <sup>-7</sup>	3.8X10 <sup>-7</sup>	1.2X10 <sup>-5</sup>
- school	7.3X10 <sup>-7</sup>	1.1X10 <sup>-6</sup>	1.1X10 <sup>-5</sup>	2.8X10 <sup>-7</sup>	1.9X10 <sup>-7</sup>	6.0X10 <sup>-6</sup>
- recreational	7.2X10 <sup>-8</sup>	1.1X10 <sup>-7</sup>	1.1X10 <sup>-6</sup>	2.9X10 <sup>-8</sup>	1.9X10 <sup>-8</sup>	6.1X10 <sup>-7</sup>
- workplace	2.8X10 <sup>-6</sup>	4.4X10 <sup>-6</sup>	4.4X10 <sup>-5</sup>	1.1X10 <sup>-6</sup>	7.5X10 <sup>-7</sup>	2.4X10 <sup>-5</sup>
<b>Scenario B</b>						
- residential	8.7X10 <sup>-7</sup>	1.3X10 <sup>-6</sup>	1.3X10 <sup>-5</sup>	3.4X10 <sup>-7</sup>	2.3X10 <sup>-7</sup>	7.2X10 <sup>-6</sup>
- school	5.4X10 <sup>-7</sup>	8.2X10 <sup>-7</sup>	8.3X10 <sup>-6</sup>	2.1X10 <sup>-7</sup>	1.4X10 <sup>-7</sup>	4.4X10 <sup>-6</sup>
- recreational	4.0X10 <sup>-8</sup>	6.2X10 <sup>-8</sup>	6.3X10 <sup>-7</sup>	1.6X10 <sup>-8</sup>	1.1X10 <sup>-8</sup>	3.4X10 <sup>-7</sup>



Particulate fraction:	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	DPM
Health endpoint:	Mortality - All Causes, Short-Term, All ages	Mortality - All Causes, Short-Term, All ages	Mortality – Cardiopulmonary Long-term, ≥ 30 years	Mortality – Cardiovascular Short-Term, All ages	Mortality – Respiratory, Short-Term, All ages	Lung cancer – all ages
Scenario and receptor group	Risk	Risk	Risk	Risk	Risk	Lifetime Risk
- workplace	2.0X10 <sup>-6</sup>	3.1X10 <sup>-6</sup>	3.1X10 <sup>-5</sup>	7.9X10 <sup>-7</sup>	5.3X10 <sup>-7</sup>	1.7X10 <sup>-5</sup>
<b>Scenario C1</b>						
- residential	1.9X10 <sup>-6</sup>	1.5X10 <sup>-6</sup>	1.5X10 <sup>-5</sup>	3.7X10 <sup>-7</sup>	2.5X10 <sup>-7</sup>	7.9X10 <sup>-6</sup>
- school	8.6X10 <sup>-7</sup>	9.0X10 <sup>-7</sup>	9.1X10 <sup>-6</sup>	2.3X10 <sup>-7</sup>	1.5X10 <sup>-7</sup>	4.9X10 <sup>-6</sup>
- recreational	4.7X10 <sup>-8</sup>	7.4X10 <sup>-8</sup>	7.5X10 <sup>-7</sup>	1.9X10 <sup>-8</sup>	1.3X10 <sup>-8</sup>	4.0X10 <sup>-7</sup>
- workplace	2.5X10 <sup>-6</sup>	3.1X10 <sup>-6</sup>	3.2X10 <sup>-5</sup>	7.9X10 <sup>-7</sup>	5.4X10 <sup>-7</sup>	1.7X10 <sup>-5</sup>
<b>Scenario C2</b>						
- residential	8.7X10 <sup>-7</sup>	1.3X10 <sup>-6</sup>	1.3X10 <sup>-5</sup>	3.3X10 <sup>-7</sup>	2.3X10 <sup>-7</sup>	7.1X10 <sup>-6</sup>
- school	5.5X10 <sup>-7</sup>	8.4X10 <sup>-7</sup>	8.5X10 <sup>-6</sup>	2.1X10 <sup>-7</sup>	1.4X10 <sup>-7</sup>	4.6X10 <sup>-6</sup>
- recreational	3.9X10 <sup>-8</sup>	6.1X10 <sup>-8</sup>	6.2X10 <sup>-7</sup>	1.5X10 <sup>-8</sup>	1.1X10 <sup>-8</sup>	3.3X10 <sup>-7</sup>
- workplace	2.1X10 <sup>-6</sup>	3.2X10 <sup>-6</sup>	3.2X10 <sup>-5</sup>	8.0X10 <sup>-7</sup>	5.4X10 <sup>-7</sup>	1.7X10 <sup>-5</sup>
<b>Maximum from EIS</b>						
- residential	1.3X10 <sup>-6</sup>	2.0X10 <sup>-6</sup>	2.0X10 <sup>-5</sup>	5.1X10 <sup>-7</sup>	3.5X10 <sup>-7</sup>	1.1X10 <sup>-5</sup>
- school	5.4X10 <sup>-7</sup>	8.2X10 <sup>-7</sup>	8.3X10 <sup>-6</sup>	2.1X10 <sup>-7</sup>	1.4X10 <sup>-7</sup>	4.4X10 <sup>-6</sup>
- recreational	7.5X10 <sup>-8</sup>	1.2X10 <sup>-7</sup>	1.2X10 <sup>-6</sup>	3.0X10 <sup>-8</sup>	2.0 X10 <sup>-8</sup>	6.3X10 <sup>-7</sup>
- workplace	2.6X10 <sup>-6</sup>	3.9X10 <sup>-6</sup>	3.9 X10 <sup>-5</sup>	9.8X10 <sup>-7</sup>	6.7X10 <sup>-7</sup>	2.1X10 <sup>-5</sup>



**Table 8** Calculated increased population incidence (additional cases per year) – Exposure to PM<sub>2.5</sub>: Primary indicators and PM<sub>10</sub>: Asthma in young children

Scenario	Calculated incremental annual incidence for the following primary health endpoints (summed over all suburbs) associated with exposure to PM <sub>2.5</sub>			Calculated Increase in use of bronchodilator, young children (5-14 years) based on exposure to PM <sub>10</sub> – additional uses of bronchodilator per year
	Mortality all causes (long-term exposure, ages ≥30 years)	Cardiovascular hospitalisations (short-term exposure, ages ≥65 years)	Respiratory hospitalisations (short-term exposure, ages ≥65 years)	
<b>Revised Project</b>				
- Scenario 1	0.02	0.01	0.002	1.4
- Scenario 3	0.1	0.08	0.02	1.4
Maximum from EIS	0.1	0.07	0.01	1.4
<b>Cumulative</b>				
- Scenario A	0.2	0.1	0.02	2.3
- Scenario B	0.1	0.08	0.01	1.5
- Scenario C1	0.2	0.09	0.02	2.8
- Scenario C2	0.1	0.08	0.01	1.5
Maximum from EIS	0.2	0.1	0.02	2.1

The interpretation of calculated risks and increased incidence associated with community exposures to increased concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> in the community is complex. The HHRA provides a detailed discussion of the approach adopted in the assessment for determining whether a calculated exposure may be considered negligible, tolerable or potentially unacceptable.

The calculated risks and population incidence associated with exposure to PM<sub>10</sub> and PM<sub>2.5</sub> in the community associated with the Project are consistent with the levels of risk and increased incidence presented in the HHRA in the EIS. On this basis the conclusions presented in the EIS remain unchanged in relation to potential exposures to PM<sub>10</sub> and PM<sub>2.5</sub> derived from the Project, which are:

- In relation to the assessment of key phases of the revised Project, potential health impacts are low (not significant) in the surrounding community. Regardless of this assessment, where possible the best available technology and mitigation measures should be implemented to minimise exposures to particulates in the community.
- In relation to the assessment of cumulative impacts from the operation of both the Moorebank and SIMTA sites, the predicted health impacts are generally considered to be low (not significant); however there is the potential for risks in adjacent commercial/industrial areas to be at a level that is considered unacceptable. Mitigation measures need to be implemented to minimise exposure to particulates in the adjacent workplaces.

## 4.0 Conclusions

Following public exhibition of the EIS in relation to the Moorebank Intermodal Terminal, MIC and SIMTA have reached in-principle agreement for SIMTA to develop and operate a precinct-wide intermodal facility and associated warehousing across the Moorebank and SIMTA sites. The revised Project plans relevant to the Moorebank site as well as revised cumulative scenarios associated with the operation of both the SIMTA and Moorebank site have been further evaluated.

Based on the revised Project scenarios considered the conclusions presented in the EIS in relation to impacts on the health of the local community are unchanged.





## 5.0 Limitations

Environmental Risk Sciences has prepared this letter for the use of Parsons Brinckerhoff in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this letter.

It is prepared in accordance with the scope of work and for the purpose outlined in this letter.

The methodology adopted and sources of information used are outlined in this letter. Environmental Risk Sciences has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions. No indications were found that information provided for use in this review was false.

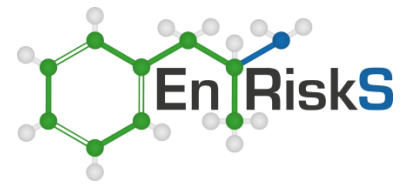
This letter was prepared in February 2015 and is based on the information provided and reviewed at that time. Environmental Risk Sciences disclaims responsibility for any changes that may have occurred after this time.

This letter should be read in full. No responsibility is accepted for use of any part of this letter in any other context or for any other purpose or by third parties. This letter does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Please contact Jackie on (02) 9614 0297 or 0425 206 295 if you require any additional information in relation to the above.

Yours sincerely,

Jackie Wright  
Principal/Director  
Environmental Risk Sciences Pty Ltd



## **Attachment A Revised Risk Calculations**

**Quantification of Effects - PM2.5 and PM10**  
**Revised Project: Scenario 1**

	Particulate Fraction:			PM2.5	PM2.5	PM2.5	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	Incremental Risk -DPM  (based on WHO)  Unit Risk
	Endpoint:			Mortality - All Causes	Hospitalisations - Cardiovascular	Hospitalisations - Respiratory	Mortality - All Causes	Mortality - All Causes	Mortality - Cardiopulmonary	Mortality - Cardiovascular	Mortality - Respiratory		
	Effect Exposure Duration:			Long-term	Short-term	Short-term	Short-Term	Short-Term	Long-term	Short-Term	Short-Term		
	Age Group:			≥ 30 years	≥ 65 years	≥ 65 years	All ages	All ages	≥ 30 years	All ages	All ages		
	<b>β (change in effect per 1 µg/m<sup>3</sup> PM) (as per Table 4.1)</b>			0.0058	0.0008	0.00041	0.0006	0.00094	0.013	0.00097	0.0019		
	<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>			1087	23352	8807	670	670	490	164	57		
	<b>Baseline incidence (per person)</b>			0.01087	0.23352	0.08807	0.0067	0.0067	0.0049	0.00164	0.00057		
	<b>Modifying factor for commercial/industrial exposures (refer to Section 4.3.4 in report)</b>			0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
	<b>Modifying factor for recreational exposures (refer to Section 4.3.4 in report)</b>			0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	

Receptor		Increase in Annual Average PM10 Concentration (µg/m <sup>3</sup> )	Increase in Annual Average PM2.5 Concentration (µg/m <sup>3</sup> )	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk	
<b>Maximum Receptor</b>													
Boundary location	Commercial/Industrial	2.1	0.30	4.2E-06	1.3E-05	2.4E-06		1.9E-06	4.2E-07	4.3E-06	1.1E-07	7.3E-08	2.3E-06
<b>Sensitive Receptors</b>													
<b>Wattle Grove</b>													
Wallcliff Cres	Residential	0.099	0.014	8.9E-07	2.6E-06	5.1E-07		4.0E-07	8.9E-08	9.0E-07	2.2E-08	1.5E-08	4.8E-07
Corryton Ct	Residential	0.095	0.014	8.5E-07	2.5E-06	4.9E-07		3.8E-07	8.5E-08	8.6E-07	2.2E-08	1.5E-08	4.6E-07
Martindale Ct (Receptor 3 in Simta Report)	Residential	0.087	0.013	7.9E-07	2.3E-06	4.5E-07		3.5E-07	7.9E-08	8.0E-07	2.0E-08	1.4E-08	4.3E-07
Anzac Road (Receptor 2 in Simta report)	Residential	0.10	0.017	1.1E-06	3.1E-06	6.1E-07		4.2E-07	3.1E-08	1.1E-07	1.1E-06	1.8E-08	5.7E-07
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.10	0.017	2.3E-07	6.9E-07	1.3E-07		9.3E-08	2.3E-08	2.4E-07	5.9E-09	4.0E-09	1.3E-07
Yallum Cres (Receptor 1 in Simta report)	Residential	0.11	0.016	9.9E-07	2.9E-06	5.7E-07		4.4E-07	9.9E-08	1.0E-06	2.5E-08	1.7E-08	5.3E-07
Wattle Grove Public School	Residential/School	0.082	0.012	7.4E-07	2.2E-06	4.2E-07		3.3E-07	7.4E-08	7.4E-07	1.9E-08	1.3E-08	4.0E-07
St Marks Coptic College	Residential/School	0.059	0.0085	5.4E-07	1.6E-06	3.1E-07		2.4E-07	5.3E-08	5.4E-07	1.4E-08	9.2E-09	2.9E-07
Anzac Creek Park	Residential	0.060	0.0091	5.8E-07	1.7E-06	3.3E-07		2.4E-07	5.8E-08	5.8E-07	1.5E-08	9.9E-09	3.1E-07
Anzac Creek Park	Recreational	0.060	0.0091	2.7E-08	8.0E-08	1.6E-08		1.1E-08	2.7E-09	2.7E-08	6.8E-10	4.7E-10	1.5E-08
<b>Average Residential</b>		<b>0.084</b>	<b>0.012</b>	<b>7.8E-07</b>	<b>2.3E-06</b>	<b>4.6E-07</b>		<b>3.4E-07</b>	<b>7.8E-08</b>	<b>7.9E-07</b>	<b>2.0E-08</b>	<b>1.3E-08</b>	<b>4.2E-07</b>
<b>Moorebank</b>													
Church Road (Receptor 7 in Simta report)	Residential	0.052	0.0087	5.5E-07	1.6E-06	3.1E-07		2.1E-07	5.5E-08	5.5E-07	1.4E-08	9.4E-09	3.0E-07
Anzac Road (Receptor 2 in Simta report)	Residential	0.10	0.017	1.1E-06	3.1E-06	6.1E-07		4.2E-07	1.1E-07	1.1E-06	2.7E-08	1.8E-08	5.7E-07
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.10	0.017	2.3E-07	6.9E-07	1.3E-07		9.3E-08	2.3E-08	2.4E-07	5.9E-09	4.0E-09	1.3E-07
DNSDC proposed relocation	Commercial/Industrial	0.093	0.014	1.9E-07	5.7E-07	1.1E-07		8.2E-08	1.9E-08	1.9E-07	4.8E-09	3.3E-09	1.0E-07
<b>Average Residential</b>		<b>0.078</b>	<b>0.013</b>	<b>8.0E-07</b>	<b>2.4E-06</b>	<b>4.6E-07</b>		<b>3.1E-07</b>	<b>8.0E-08</b>	<b>8.1E-07</b>	<b>2.0E-08</b>	<b>1.4E-08</b>	<b>4.3E-07</b>
<b>Liverpool</b>													
Al Amanah College Liverpool Campus Liverpool	Residential/School	0.033	0.0052	3.3E-07	9.7E-07	1.9E-07		1.3E-07	3.3E-08	3.3E-07	8.2E-09	5.6E-09	1.8E-07
Liverpool West Public School	Residential/School	0.025	0.0038	2.4E-07	7.1E-07	1.4E-07		1.0E-07	2.4E-08	2.4E-07	6.0E-09	4.1E-09	1.3E-07
Liverpool Public School	Residential/School	0.021	0.0031	2.0E-07	5.9E-07	1.1E-07		8.3E-08	2.0E-08	2.0E-07	5.0E-09	3.4E-09	1.1E-07
<b>Average Residential</b>		<b>0.026</b>	<b>0.0040</b>	<b>2.5E-07</b>	<b>7.5E-07</b>	<b>1.5E-07</b>		<b>1.1E-07</b>	<b>2.5E-08</b>	<b>2.6E-07</b>	<b>6.4E-09</b>	<b>4.4E-09</b>	<b>1.4E-07</b>
<b>Lurnea</b>													
Lurnea High School	Residential/School	0.043	0.0061	3.9E-07	1.1E-06	2.2E-07		1.7E-07	3.9E-08	3.9E-07	9.8E-09	6.7E-09	2.1E-07
St Francis Xavier Primary School Lurnea	Residential/School	0.031	0.0046	2.9E-07	8.6E-07	1.7E-07		1.3E-07	2.9E-08	2.9E-07	7.3E-09	5.0E-09	1.6E-07
<b>Average Residential</b>		<b>0.037</b>	<b>0.0054</b>	<b>3.4E-07</b>	<b>1.0E-06</b>	<b>1.9E-07</b>		<b>1.5E-07</b>	<b>3.4E-08</b>	<b>3.4E-07</b>	<b>8.6E-09</b>	<b>5.8E-09</b>	<b>1.8E-07</b>
<b>Casula</b>													
Lakewood Crescent	Residential	0.14	0.022	1.4E-06	4.1E-06	7.9E-07		5.6E-07	1.4E-07	1.4E-06	3.5E-08	2.4E-08	7.5E-07
St Andrews Boulevard	Residential	0.22	0.032	2.0E-06	6.0E-06	1.2E-06		8.7E-07	2.0E-07	2.0E-06	5.1E-08	3.5E-08	1.1E-06
Buckland Rd Receiver (Receptor 6 in Simta Report)	Residential	0.26	0.038	2.4E-06	7.1E-06	1.4E-06		1.1E-06	2.4E-07	2.4E-06	6.0E-08	4.1E-08	1.3E-06
Dunmore Cres	Residential	0.23	0.032	2.0E-06	6.0E-06	1.2E-06		9.2E-07	2.0E-07	2.0E-06	5.1E-08	3.5E-08	1.1E-06
Leacocks Lane	Residential	0.11	0.015	9.6E-07	2.9E-06	5.5E-07		4.4E-07	9.6E-08	9.7E-07	2.4E-08	1.7E-08	5.2E-07
Leacocks Lane Mid (Receptor 5 in Simta Report)	Residential	0.17	0.024	1.5E-06	4.6E-06	8.8E-07		7.0E-07	1.5E-07	1.6E-06	3.9E-08	2.6E-08	8.3E-07
Slessor Road	Residential	0.10	0.015	9.2E-07	2.7E-06	5.3E-07		4.2E-07	9.2E-08	9.3E-07	2.3E-08	1.6E-08	5.0E-07
Maple Grove Retirement Village	Residential	0.051	0.0073	4.6E-07	1.4E-06	2.6E-07		2.1E-07	4.6E-08	4.6E-07	1.2E-08	7.9E-09	2.5E-07
All Saints Catholic Senior College	Residential/School	0.16	0.023	1.4E-06	4.2E-06	8.2E-07		6.5E-07	1.4E-07	1.4E-06	3.6E-08	2.4E-08	7.7E-07
Casula High School	Residential/School	0.048	0.0069	4.3E-07	1.3E-06	2.5E-07		1.9E-07	4.3E-08	4.4E-07	1.1E-08	7.5E-09	2.3E-07
Casula Public School	Residential/School	0.10	0.015	9.2E-07	2.7E-06	5.3E-07		4.1E-07	9.2E-08	9.3E-07	2.3E-08	1.6E-08	5.0E-07
Casula Powerhouse Arts Centre	Recreational	0.29	0.041	1.2E-07	3.6E-07	6.9E-08		7.7E-09	1.2E-08	1.2E-07	3.1E-09	2.1E-09	6.5E-08
<b>Average Residential</b>		<b>0.16</b>	<b>0.023</b>	<b>1.4E-06</b>	<b>4.2E-06</b>	<b>8.1E-07</b>		<b>6.3E-07</b>	<b>1.4E-07</b>	<b>1.4E-06</b>	<b>3.6E-08</b>	<b>2.4E-08</b>	<b>7.7E-07</b>
<b>Glenfield</b>													
Canterbury Road	Residential	0.048	0.0067	4.2E-07	1.2E-06	2.4E-07		1.9E-07	4.2E-08	4.3E-07	1.1E-08	7.2E-09	2.3E-07
Ferguson Street	Residential	0.055	0.0078	4.9E-07	1.5E-06	2.8E-07		2.2E-07	4.9E-08	5.0E-07	1.2E-08	8.4E-09	2.6E-07
Good enough St (Receptor 4 in Simta Report)	Residential	0.072	0.010	6.4E-07	1.9E-06	3.7E-07		2.9E-07	6.4E-08	6.4E-07	1.6E-08	1.1E-08	3.4E-07
Cambridge Avenue	Residential	0.072	0.010	6.4E-07	1.9E-06	3.7E-07		2.9E-07	6.4E-08	6.5E-07	1.6E-08	1.1E-08	3.5E-07
Glenwood Public School	Residential/School	0.033	0.0047	3.0E-07	8.8E-07	1.7E-07		1.3E-07	3.0E-08	3.0E-07	7.5E-09	5.1E-09	1.6E-07
Glenfield Public School	Residential/School	0.032	0.0045	2.9E-07	8.5E-07	1.6E-07		1.3E-07	2.9E-08	2.9E-07	7.2E-09	4.9E-09	1.5E-07
Hurstone Agricultural High School	Residential/School	0.029	0.0041	2.6E-07	7.7E-07	1.5E-07		1.2E-07	2.6E-08	2.6E-07	6.6E-09	4.5E-09	1.4E-07
Glenfield new land release	Residential	0.065	0.0091	5.7E-07	1.7E-06	3.3E-07		2.6E-07	5.7E-08	5.8E-07	1.4E-08	9.8E-09	3.1E-07
Playground Learning Centre, Chesham Parade	Residential	0.035	0.0049	3.1E-07	9.1E-07	1.8E-07		1.4E-07	3.1E-08	3.1E-07	7.7E-09	5.3E-09	1.7E-07
<b>Average Residential</b>		<b>0.049</b>	<b>0.0069</b>	<b>4.3E-07</b>	<b>1.3E-06</b>	<b>2.5E-07</b>		<b>2.0E-07</b>	<b>4.3E-08</b>	<b>4.4E-07</b>	<b>1.1E-08</b>	<b>7.5E-09</b>	<b>2.3E-07</b>
<b>Macquarie Fields</b>													
Hickory Place	Residential	0.018	0.0025	1.6E-07	4.7E-07	9.2E-08		7.2E-08	1.6E-08	1.6E-07	4.0E-09	2.7E-09	8.6E-08
<b>Maximum residential receptors</b>		<b>0.26</b>	<b>0.038</b>	<b>2.4E-06</b>	<b>7.1E-06</b>	<b>1.4E-06</b>		<b>1.1E-06</b>	<b>2.4E-07</b>	<b>2.4E-06</b>	<b>6.0E-08</b>	<b>4.1E-08</b>	<b>1.3E-06</b>
<b>Maximum school receptors</b>		<b>0.16</b>	<b>0.023</b>	<b>1.4E-06</b>	<b>4.2E-06</b>	<b>8.2E-07</b>		<b>6.5E-07</b>	<b>1.4E-07</b>	<b>1.4E-06</b>	<b>3.6E-08</b>	<b>2.4E-08</b>	<b>7.7E-07</b>
<b>Maximum recreational receptors</b>		<b>0.29</b>	<b>0.041</b>	<b>1.2E-07</b>	<b>3.6E-07</b>	<b>6.9E-08</b>		<b>1.1E-08</b>	<b>1.2E-08</b>	<b>1.2E-07</b>	<b>3.1E-09</b>	<b>2.1E-09</b>	<b>6.5E-08</b>
<b>Maximum commercial/industrial receptors</b>		<b>2.1</b>	<b>0.30</b>	<b>4.2E-06</b>	<b>1.3E-05</b>	<b>2.4E-06</b>		<b>1.9E-06</b>	<b>4.2E-07</b>	<b>4.3E-06</b>	<b>1.1E-07</b>	<b>7.3E-08</b>	<b>2.3E-06</b>

**Quantification of Effects - PM2.5 and PM10**  
**Revised Project: Scenario 3**

Particulate Fraction:	PM2.5	PM2.5	PM2.5	PM10	PM2.5	PM2.5	PM2.5	PM2.5	Incremental Risk -DPM
	Endpoint: Mortality - All Causes	Hospitalisations - Cardiovascular	Hospitalisations - Respiratory	Mortality - All Causes	Mortality - All Causes	Mortality - Cardiopulmonary	Mortality - Cardiovascular	Mortality - Respiratory	
Effect Exposure Duration:	Long-term	Short-term	Short-term	Short-Term	Short-Term	Long-term	Short-Term	Short-Term	(based on WHO)
Age Group:	≥ 30 years	≥ 65 years	≥ 65 years	All ages	All ages	≥ 30 years	All ages	All ages	Unit Risk
β (change in effect per 1 µg/m <sup>3</sup> PM) (as per Table 4.1)	0.0058	0.0008	0.0041	0.0006	0.00094	0.013	0.00097	0.0019	
Baseline Incidence (per 100,000) (as per Table 2.3)	1087	23352	8807	670	670	490	164	57	
Baseline Incidence (per person)	0.01087	0.23352	0.08807	0.0067	0.0067	0.0049	0.00164	0.00057	
Modifying factor for commercial/industrial exposures (refer to Section 4.3.4 in report)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Modifying factor for recreational exposures (refer to Section 4.3.4 in report)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047

Receptor		Increase in Annual Average PM10 Concentration (µg/m <sup>3</sup> )	Increase in Annual Average PM2.5 Concentration (µg/m <sup>3</sup> )	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk	
<b>Maximum Receptor</b>												
Boundary location	Commercial/Industrial	1.5	1.5	2.0E-05	6.0E-05	1.2E-05	1.3E-06	2.0E-06	2.1E-05	5.1E-07	3.5E-07	1.1E-05
<b>Sensitive Receptors</b>												
<b>Wattle Grove</b>												
Wallcliff Cres	Residential	0.098	0.10	6.1E-06	1.8E-05	3.5E-06	3.9E-07	6.1E-07	6.1E-06	1.5E-07	1.0E-07	3.3E-06
Corryton Ct	Residential	0.10	0.10	6.4E-06	1.9E-05	3.7E-06	4.1E-07	6.4E-07	6.4E-06	1.6E-07	1.1E-07	3.4E-06
Marindale Ct (Receptor 3 in Simta Report)	Residential	0.098	0.10	6.1E-06	1.8E-05	3.5E-06	3.9E-07	6.1E-07	6.1E-06	1.5E-07	1.0E-07	3.3E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.14	0.14	9.0E-06	2.7E-05	5.1E-06	5.8E-07	9.0E-07	9.1E-06	2.3E-07	1.5E-07	4.8E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.14	0.14	2.0E-06	5.9E-06	1.1E-06	1.3E-07	2.0E-07	2.0E-06	5.0E-08	3.4E-08	1.1E-06
Yallum Cres (Receptor 1 in Simta report)	Residential	0.11	0.11	7.0E-06	2.1E-05	4.0E-06	4.5E-07	7.0E-07	7.0E-06	1.8E-07	1.2E-07	3.8E-06
Wattle Grove Public School	Residential/School	0.083	0.082	5.2E-06	1.5E-05	3.0E-06	3.3E-07	5.2E-07	5.2E-06	1.3E-07	8.9E-08	2.8E-06
St Marks Coptic College	Residential/School	0.057	0.057	3.6E-06	1.1E-05	2.0E-06	2.3E-07	3.6E-07	3.6E-06	9.0E-08	6.1E-08	1.9E-06
Anzac Creek Park	Residential	0.070	0.070	4.4E-06	1.3E-05	2.5E-06	2.8E-07	4.4E-07	4.4E-06	1.1E-07	7.5E-08	2.4E-06
Anzac Creek Park	Recreational	0.070	0.070	2.1E-07	6.1E-07	1.2E-07	1.3E-08	2.1E-08	2.1E-07	5.2E-09	3.5E-09	1.1E-07
<b>Average Residential</b>		<b>0.093</b>	<b>0.092</b>	<b>3.7E-06</b>	<b>1.7E-05</b>	<b>3.3E-06</b>	<b>3.7E-07</b>	<b>6.8E-07</b>	<b>5.8E-06</b>	<b>1.5E-07</b>	<b>9.9E-08</b>	<b>3.1E-06</b>
<b>Moorebank</b>												
Church Road (Receptor 7 in Simta report)	Residential	0.064	0.063	4.0E-06	1.2E-05	2.3E-06	2.6E-07	4.0E-07	4.0E-06	1.0E-07	6.9E-08	2.2E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.14	0.14	9.0E-06	2.7E-05	5.1E-06	5.8E-07	9.0E-07	9.1E-06	2.3E-07	1.5E-07	4.8E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.14	0.14	2.0E-06	5.9E-06	1.1E-06	1.3E-07	2.0E-07	2.0E-06	5.0E-08	3.4E-08	1.1E-06
DNSDC proposed relocation	Commercial/Industrial	0.12	0.12	1.6E-06	4.9E-06	9.4E-07	1.1E-07	1.6E-07	1.7E-06	4.1E-08	2.8E-08	8.8E-07
<b>Average Residential</b>		<b>0.10</b>	<b>0.10</b>	<b>6.5E-06</b>	<b>1.9E-05</b>	<b>3.7E-06</b>	<b>4.2E-07</b>	<b>6.5E-07</b>	<b>6.6E-06</b>	<b>1.6E-07</b>	<b>1.1E-07</b>	<b>3.5E-06</b>
<b>Liverpool</b>												
Al Amanah College Liverpool Campus Liverpool	Residential/School	0.043	0.042	2.7E-06	7.9E-06	1.5E-06	1.7E-07	2.7E-07	2.7E-06	6.7E-08	4.6E-08	1.4E-06
Liverpool West Public Schoo	Residential/School	0.029	0.028	1.8E-06	5.3E-06	1.0E-06	1.1E-07	1.8E-07	1.8E-06	4.5E-08	3.0E-08	9.6E-07
Liverpool Public School	Residential/School	0.026	0.025	1.6E-06	4.7E-06	9.1E-07	1.0E-07	1.6E-07	1.6E-06	4.0E-08	2.7E-08	8.6E-07
<b>Average Residential</b>		<b>0.032</b>	<b>0.032</b>	<b>1.3E-06</b>	<b>6.0E-06</b>	<b>1.2E-06</b>	<b>1.3E-07</b>	<b>2.0E-07</b>	<b>2.0E-06</b>	<b>5.1E-08</b>	<b>3.5E-08</b>	<b>1.1E-06</b>
<b>Lurnea</b>												
Lurnea High Schoo	Residential/School	0.038	0.037	2.3E-06	6.9E-06	1.3E-06	1.5E-07	2.3E-07	2.4E-06	5.9E-08	4.0E-08	1.3E-06
St Francis Xavier Primary School Lurnea	Residential/School	0.032	0.032	2.0E-06	5.9E-06	1.1E-06	1.3E-07	2.0E-07	2.0E-06	5.0E-08	3.4E-08	1.1E-06
<b>Average Residential</b>		<b>0.035</b>	<b>0.034</b>	<b>2.2E-06</b>	<b>6.4E-06</b>	<b>1.2E-06</b>	<b>1.4E-07</b>	<b>2.2E-07</b>	<b>2.2E-06</b>	<b>5.5E-08</b>	<b>3.7E-08</b>	<b>1.2E-06</b>
<b>Casula</b>												
Lakewood Crescent	Residential	0.15	0.15	9.3E-06	2.7E-05	5.3E-06	6.0E-07	9.3E-07	9.4E-06	2.3E-07	1.6E-07	5.0E-06
St Andrews Boulevard	Residential	0.21	0.21	1.3E-05	3.8E-05	7.4E-06	8.4E-07	1.3E-06	1.3E-05	3.3E-07	2.2E-07	7.0E-06
Buckland Rd Receiver (Receptor 6 in Simta Report)	Residential	0.26	0.26	1.6E-05	4.8E-05	9.3E-06	1.1E-06	1.6E-06	1.6E-05	4.1E-07	2.8E-07	8.8E-06
Dunmore Cres	Residential	0.23	0.23	1.4E-05	4.2E-05	8.2E-06	9.3E-07	1.4E-06	1.4E-05	3.6E-07	2.5E-07	7.7E-06
Leacocks Lane	Residential	0.072	0.071	4.5E-06	1.3E-05	2.6E-06	2.9E-07	4.5E-07	4.5E-06	1.1E-07	7.7E-08	2.4E-06
Leacocks Lane_Mid (Receptor 5 in Simta Report)	Residential	0.11	0.11	6.7E-06	2.0E-05	3.8E-06	4.3E-07	6.7E-07	6.7E-06	1.7E-07	1.1E-07	3.6E-06
Slessor Road	Residential	0.087	0.086	5.4E-06	1.6E-05	3.1E-06	3.5E-07	5.4E-07	5.5E-06	1.4E-07	9.3E-08	2.9E-06
Maple Grove Retirement Village	Residential	0.038	0.037	2.3E-06	7.0E-06	1.3E-06	1.5E-07	2.3E-07	2.4E-06	5.9E-08	4.0E-08	1.3E-06
All Saints Catholic Senior Collegt	Residential/School	0.10	0.10	6.3E-06	1.9E-05	3.6E-06	4.1E-07	6.3E-07	6.4E-06	1.6E-07	1.1E-07	3.4E-06
Casula High Schoo	Residential/School	0.035	0.034	2.2E-06	6.4E-06	1.2E-06	1.4E-07	2.2E-07	2.2E-06	5.4E-08	3.7E-08	1.2E-06
Casula Public School	Residential/School	0.099	0.10	6.1E-06	1.8E-05	3.5E-06	4.0E-07	6.1E-07	6.2E-06	1.6E-07	1.1E-07	3.3E-06
Casula Powerhouse Arts Centre	Recreational	0.29	0.29	8.5E-07	2.5E-06	4.9E-07	5.4E-08	8.5E-08	8.6E-07	2.1E-08	1.5E-08	4.6E-07
<b>Average Residential</b>		<b>0.14</b>	<b>0.14</b>	<b>8.7E-06</b>	<b>2.6E-05</b>	<b>5.0E-06</b>	<b>5.6E-07</b>	<b>8.7E-07</b>	<b>8.8E-06</b>	<b>2.2E-07</b>	<b>1.5E-07</b>	<b>4.7E-06</b>
<b>Glenfield</b>												
Canterbury Road	Residential	0.050	0.049	3.1E-06	9.2E-06	1.8E-06	2.0E-07	3.1E-07	3.1E-06	7.8E-08	5.3E-08	1.7E-06
Ferguson Street	Residential	0.058	0.057	3.6E-06	1.1E-05	2.1E-06	2.3E-07	3.6E-07	3.6E-06	9.1E-08	6.2E-08	1.9E-06
Good enough St (Receptor 4 in Simta Report)	Residential	0.077	0.076	4.8E-06	1.4E-05	2.7E-06	3.1E-07	4.8E-07	4.8E-06	1.2E-07	8.2E-08	2.6E-06
Cambridge Avenue	Residential	0.070	0.069	4.3E-06	1.3E-05	2.5E-06	2.8E-07	4.3E-07	4.4E-06	1.1E-07	7.5E-08	2.3E-06
Glenwood Public School	Residential/School	0.033	0.032	2.0E-06	6.0E-06	1.2E-06	1.3E-07	2.0E-07	2.1E-06	5.1E-08	3.5E-08	1.1E-06
Glenfield Public School	Residential/School	0.035	0.034	2.1E-06	6.4E-06	1.2E-06	1.4E-07	2.1E-07	2.2E-06	5.4E-08	3.7E-08	1.2E-06
Hurlstone Agricultural High Schoo	Residential/School	0.028	0.028	1.9E-06	5.3E-06	1.0E-06	1.2E-07	1.9E-07	1.8E-06	4.5E-08	3.1E-08	9.7E-07
Glenfield new land release	Residential	0.061	0.060	3.8E-06	1.1E-05	2.2E-06	2.4E-07	3.8E-07	3.8E-06	9.5E-08	6.5E-08	2.0E-06
Playground/Leaning Centre, Chesham Parade	Residential	0.037	0.036	2.3E-06	6.7E-06	1.3E-06	1.5E-07	2.3E-07	2.3E-06	5.7E-08	3.9E-08	1.2E-06
<b>Average Residential</b>		<b>0.050</b>	<b>0.049</b>	<b>3.1E-06</b>	<b>9.2E-06</b>	<b>1.8E-06</b>	<b>2.0E-07</b>	<b>3.1E-07</b>	<b>3.1E-06</b>	<b>7.8E-08</b>	<b>5.3E-08</b>	<b>1.7E-06</b>
<b>Macquarie Fields</b>												
Hickory Place	Residential	0.017	0.016	1.0E-06	3.0E-06	5.9E-07	6.7E-08	1.0E-07	1.0E-06	2.6E-08	1.8E-08	5.5E-07
<b>Maximum residential receptors</b>		<b>0.2615</b>	<b>0.2575</b>	<b>1.6E-05</b>	<b>4.8E-05</b>	<b>9.3E-06</b>	<b>1.1E-06</b>	<b>1.6E-06</b>	<b>1.6E-05</b>	<b>4.1E-07</b>	<b>2.8E-07</b>	<b>8.8E-06</b>
<b>Maximum school receptors</b>		<b>0.1021</b>	<b>0.1006</b>	<b>6.3E-06</b>	<b>1.9E-05</b>	<b>3.6E-06</b>	<b>4.1E-07</b>	<b>6.3E-07</b>	<b>6.4E-06</b>	<b>1.6E-07</b>	<b>1.1E-07</b>	<b>3.4E-06</b>
<b>Maximum recreational receptors</b>		<b>0.2906</b>	<b>0.2863</b>	<b>8.5E-07</b>	<b>2.5E-06</b>	<b>4.9E-07</b>	<b>5.4E-08</b>	<b>8.5E-08</b>	<b>8.6E-07</b>	<b>2.1E-08</b>	<b>1.5E-08</b>	<b>4.6E-07</b>
<b>Maximum commercial/industrial receptors</b>		<b>1.4750</b>	<b>1.4668</b>	<b>2.0E-05</b>	<b>6.0E-05</b>	<b>1.2E-05</b>	<b>1.3E-06</b>	<b>2.0E-06</b>	<b>2.1E-05</b>	<b>5.1E-07</b>	<b>3.5E-07</b>	<b>1.1E-05</b>

**Quantification of Effects - PM2.5 and PM10**  
**Revised Project: Cumulative Scenario A**

Particulate Fraction	PM2.5	PM2.5	PM2.5	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	Incremental Risk -DPM
Endpoint:	Mortality - All Causes	Hospitalisations - Cardiovascular	Hospitalisations - Respiratory	Mortality - All Causes	Mortality - All Causes	Mortality - Cardiovascular	Mortality - Cardiovascular	Mortality - Respiratory	Mortality - Respiratory	Incremental Risk -DPM
Effect Exposure Duration:	Long-term	Short-term	Short-term	Short-Term	Short-Term	Long-term	Short-Term	Short-Term	Short-Term	(based on WHO)
Age Group:	≥ 30 years	≥ 65 years	≥ 65 years	All ages	All ages	≥ 30 years	All ages	All ages	All ages	Unit Risk
β (change in effect per 1 µg/m <sup>3</sup> PM) (as per Table 4.1)	0.0058	0.0008	0.00041	0.0006	0.00094	0.013	0.00097	0.0019		
Baseline Incidence (per 100,000) (as per Table 2.3)	1087	23352	8807	670	670	490	164	57		
Baseline Incidence (per person)	0.01087	0.23352	0.08807	0.0067	0.0067	0.0049	0.00164	0.00057		
Modifying factor for commercial/industrial exposures (refer to Section 4.3.4 in report)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22		0.22
Modifying factor for recreational exposures (refer to Section 4.3.4 in report)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047		0.047

Receptor		Increase in Annual Average PM10 Concentration (µg/m <sup>3</sup> )	Increase in Annual Average PM2.5 Concentration (µg/m <sup>3</sup> )	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	
<b>Maximum Receptor</b>												
Boundary location	Commercial/Industrial	3.2	3.2	4.4E-05	1.3E-04	2.5E-05	2.8E-06	4.4E-06	4.4E-05	1.1E-06	7.5E-07	2.4E-05
<b>Sensitive Receptors</b>												
<b>Wattle Grove</b>												
Wallcliff Cres	Residential	0.19	0.19	1.2E-05	3.5E-05	6.8E-06	7.7E-07	1.2E-06	1.2E-05	3.0E-07	2.0E-07	6.4E-06
Corryton Ct	Residential	0.24	0.24	1.5E-05	4.5E-05	8.6E-06	9.8E-07	1.5E-06	1.5E-05	3.8E-07	2.6E-07	8.1E-06
Martindale Ct (Receptor 3 in Simta report)	Residential	0.24	0.24	1.5E-05	4.4E-05	8.5E-06	9.7E-07	1.5E-06	1.5E-05	3.7E-07	2.5E-07	8.0E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.30	0.30	1.9E-05	5.6E-05	1.1E-05	1.2E-06	1.9E-06	1.9E-05	4.7E-07	3.2E-07	1.0E-05
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.30	0.30	4.1E-06	1.2E-05	2.4E-06	2.7E-07	4.1E-07	4.2E-06	1.0E-07	7.1E-08	2.2E-06
Yallum Cres (Receptor 1 in Simta report)	Residential	0.24	0.24	1.5E-05	4.4E-05	8.5E-06	9.7E-07	1.5E-06	1.5E-05	3.7E-07	2.5E-07	8.0E-06
Wattle Grove Public School	Residential/School	0.18	0.18	1.1E-05	3.3E-05	6.4E-06	7.3E-07	1.1E-06	1.1E-05	2.8E-07	1.9E-07	6.0E-06
St Marks Coptic College	Residential/School	0.12	0.12	7.4E-06	2.2E-05	4.2E-06	4.8E-07	7.4E-07	7.5E-06	1.9E-07	1.3E-07	4.0E-06
Anzac Creek Park	Residential	0.15	0.14	9.0E-06	2.7E-05	5.2E-06	5.9E-07	9.0E-07	9.1E-06	2.3E-07	1.6E-07	4.9E-06
Anzac Creek Park	Recreational	0.15	0.14	4.2E-07	1.3E-06	2.4E-06	2.8E-08	4.2E-08	4.3E-07	1.1E-08	7.3E-09	2.3E-07
<b>Average Residential</b>		<b>0.20</b>	<b>0.20</b>	<b>1.2E-05</b>	<b>3.7E-05</b>	<b>7.1E-06</b>	<b>8.1E-07</b>	<b>1.2E-06</b>	<b>1.3E-05</b>	<b>3.1E-07</b>	<b>2.1E-07</b>	<b>6.7E-06</b>
<b>Moorebank</b>												
Church Road (Receptor 7 in Simta report)	Residential	0.12	0.11	7.1E-06	2.1E-05	4.1E-06	4.6E-07	7.1E-07	7.2E-06	1.8E-07	1.2E-07	3.8E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.30	0.30	1.9E-05	5.6E-05	1.1E-05	1.2E-06	1.9E-06	1.9E-05	4.7E-07	3.2E-07	1.0E-05
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.30	0.30	4.1E-06	1.2E-05	2.4E-06	2.7E-07	4.1E-07	4.2E-06	1.0E-07	7.1E-08	2.2E-06
DNSDC proposed relocation	Commercial/Industrial	0.32	0.31	4.3E-06	1.3E-05	2.5E-06	2.8E-07	4.3E-07	4.3E-06	1.1E-07	7.4E-08	2.3E-06
<b>Average Residential</b>		<b>0.21</b>	<b>0.21</b>	<b>1.3E-05</b>	<b>3.8E-05</b>	<b>7.4E-06</b>	<b>8.4E-07</b>	<b>1.3E-06</b>	<b>1.3E-05</b>	<b>3.3E-07</b>	<b>2.2E-07</b>	<b>7.0E-06</b>
<b>Liverpool</b>												
Al Amanah College Liverpool Campus Liverpool	Residential/School	0.072	0.071	4.5E-06	1.3E-05	2.6E-06	2.9E-07	4.5E-07	4.5E-06	1.1E-07	7.7E-08	2.4E-06
Liverpool West Public School	Residential/School	0.046	0.045	2.9E-06	8.5E-06	1.6E-06	2.9E-07	2.9E-07	2.9E-06	7.2E-08	4.9E-08	1.5E-06
Liverpool Public School	Residential/School	0.044	0.043	2.7E-06	8.0E-06	1.5E-06	1.8E-07	2.7E-07	2.7E-06	6.8E-08	4.6E-08	1.5E-06
<b>Average Residential</b>		<b>0.054</b>	<b>0.053</b>	<b>3.3E-06</b>	<b>9.9E-06</b>	<b>1.5E-06</b>	<b>2.2E-07</b>	<b>3.3E-07</b>	<b>3.4E-06</b>	<b>8.4E-08</b>	<b>5.7E-08</b>	<b>1.8E-06</b>
<b>Lurnea</b>												
Lurnea High School	Residential/School	0.056	0.055	3.5E-06	1.0E-05	2.0E-06	2.2E-07	3.5E-07	3.5E-06	8.7E-08	5.9E-08	1.9E-06
St Francis Xavier Primary School Lurnea	Residential/School	0.050	0.049	3.1E-06	9.2E-06	1.8E-06	2.0E-07	3.1E-07	3.1E-06	7.8E-08	5.3E-08	1.7E-06
<b>Average Residential</b>		<b>0.053</b>	<b>0.052</b>	<b>3.3E-06</b>	<b>9.7E-06</b>	<b>1.9E-06</b>	<b>2.1E-07</b>	<b>3.3E-07</b>	<b>3.3E-06</b>	<b>8.3E-08</b>	<b>5.6E-08</b>	<b>1.8E-06</b>
<b>Casula</b>												
Lakewood Crescent	Residential	0.23	0.22	1.4E-05	4.1E-05	8.0E-06	9.0E-07	1.4E-06	1.4E-05	3.5E-07	2.4E-07	7.5E-06
St Andrews Boulevard	Residential	0.30	0.29	1.8E-05	5.4E-05	1.0E-05	1.2E-06	1.8E-06	1.9E-05	4.6E-07	3.1E-07	9.9E-06
Buckland Rd Receiver (Receptor 6 in Simta Report)	Residential	0.36	0.35	2.2E-05	6.6E-05	1.3E-05	1.4E-06	2.2E-06	2.2E-05	5.6E-07	3.8E-07	1.2E-05
Dunmore Cres	Residential	0.31	0.31	1.9E-05	5.8E-05	1.1E-05	1.3E-06	1.9E-06	2.0E-05	4.9E-07	3.3E-07	1.0E-05
Leacocks Lane	Residential	0.10	0.10	6.4E-06	1.9E-05	3.6E-06	4.1E-07	6.4E-07	6.4E-06	1.6E-07	1.1E-07	3.4E-06
Leacocks Lane_Mid (Receptor 5 in Simta Report)	Residential	0.15	0.15	9.3E-06	2.7E-05	5.3E-06	6.0E-07	9.2E-07	9.4E-06	2.3E-07	1.6E-07	5.0E-06
Slessor Road	Residential	0.12	0.12	7.5E-06	2.2E-05	4.3E-06	4.9E-07	7.5E-07	7.6E-06	1.9E-07	1.3E-07	4.0E-06
Maple Grove Retirement Village	Residential	0.057	0.056	3.5E-06	1.0E-05	2.0E-06	2.3E-07	3.5E-07	3.5E-06	8.8E-08	6.0E-08	1.9E-06
All Saints Catholic Senior College	Residential/School	0.14	0.14	8.9E-06	2.6E-05	5.1E-06	5.8E-07	8.8E-07	8.9E-06	2.2E-07	1.5E-07	4.8E-06
Casula High School	Residential/School	0.052	0.051	3.2E-06	9.5E-06	1.8E-06	2.1E-07	3.2E-07	3.2E-06	8.1E-08	5.5E-08	1.7E-06
Casula Public School	Residential/School	0.14	0.14	8.9E-06	2.6E-05	5.1E-06	5.8E-07	8.9E-07	9.0E-06	2.3E-07	1.5E-07	4.8E-06
Casula Powerhouse Arts Centre	Recreational	0.39	0.38	1.1E-06	3.4E-06	6.5E-07	7.2E-08	1.1E-07	1.1E-06	2.9E-08	1.9E-08	6.1E-07
<b>Average Residential</b>		<b>0.20</b>	<b>0.19</b>	<b>1.2E-05</b>	<b>3.6E-05</b>	<b>6.9E-06</b>	<b>7.9E-07</b>	<b>1.2E-06</b>	<b>1.2E-05</b>	<b>3.1E-07</b>	<b>2.1E-07</b>	<b>6.5E-06</b>
<b>Glenfield</b>												
Canterbury Road	Residential	0.072	0.070	4.4E-06	1.3E-05	2.5E-06	2.9E-07	4.4E-07	4.5E-06	1.1E-07	7.6E-08	2.4E-06
Ferguson Street	Residential	0.082	0.081	5.1E-06	1.5E-05	2.9E-06	3.3E-07	5.1E-07	5.1E-06	1.3E-07	8.7E-08	2.7E-06
Good enough St (Receptor 4 in Simta Report)	Residential	0.11	0.11	6.7E-06	2.0E-05	3.8E-06	4.3E-07	6.7E-07	6.7E-06	1.7E-07	1.1E-07	3.6E-06
Cambridge Avenue	Residential	0.098	0.096	6.1E-06	1.8E-05	3.5E-06	3.9E-07	6.0E-07	6.1E-06	1.5E-07	1.0E-07	3.3E-06
Glenwood Public School	Residential/School	0.048	0.047	3.0E-06	8.9E-06	1.7E-06	1.9E-07	3.0E-07	3.0E-06	7.6E-08	5.1E-08	1.6E-06
Glenfield Public School	Residential/School	0.051	0.050	3.1E-06	9.3E-06	1.8E-06	2.0E-07	3.1E-07	3.2E-06	7.9E-08	5.4E-08	1.7E-06
Hurlstone Agricultural High School	Residential/School	0.043	0.042	2.7E-06	7.9E-06	1.5E-06	1.7E-07	2.7E-07	2.7E-06	6.7E-08	4.6E-08	1.4E-06
Glenfield new land release	Residential	0.086	0.085	6.3E-06	1.8E-05	3.1E-06	3.5E-07	5.3E-07	5.4E-06	1.3E-07	9.2E-08	2.9E-06
Playground Learning Centre, Chesham Parade	Residential	0.053	0.052	3.3E-06	9.8E-06	1.9E-06	2.1E-07	3.3E-07	3.3E-06	8.3E-08	5.7E-08	1.8E-06
<b>Average Residential</b>		<b>0.071</b>	<b>0.070</b>	<b>4.4E-06</b>	<b>1.3E-05</b>	<b>2.5E-06</b>	<b>2.9E-07</b>	<b>4.4E-07</b>	<b>4.5E-06</b>	<b>1.1E-07</b>	<b>7.6E-08</b>	<b>2.4E-06</b>
<b>Macquarie Fields</b>												
Hickory Place	Residential	0.026	0.025	1.6E-06	4.7E-06	9.1E-07	1.0E-07	1.6E-07	1.6E-06	4.0E-08	2.7E-08	8.6E-07
<b>Maximum residential receptors</b>		<b>0.36</b>	<b>0.35</b>	<b>2.2E-05</b>	<b>6.6E-05</b>	<b>1.3E-05</b>	<b>1.4E-06</b>	<b>2.2E-06</b>	<b>2.2E-05</b>	<b>5.6E-07</b>	<b>3.8E-07</b>	<b>1.2E-05</b>
<b>Maximum school receptors</b>		<b>0.18</b>	<b>0.18</b>	<b>1.1E-05</b>	<b>3.3E-05</b>	<b>6.4E-06</b>	<b>7.3E-07</b>	<b>1.1E-06</b>	<b>1.1E-05</b>	<b>2.8E-07</b>	<b>1.9E-07</b>	<b>6.0E-06</b>
<b>Maximum recreational receptors</b>		<b>0.39</b>	<b>0.38</b>	<b>1.1E-06</b>	<b>3.4E-06</b>	<b>6.5E-07</b>	<b>7.2E-08</b>	<b>1.1E-07</b>	<b>1.1E-06</b>	<b>2.9E-08</b>	<b>1.9E-08</b>	<b>6.1E-07</b>
<b>Maximum commercial/industrial receptors</b>		<b>3.2</b>	<b>3.2</b>	<b>4.4E-05</b>	<b>1.3E-04</b>	<b>2.5E-05</b>	<b>2.8E-06</b>	<b>4.4E-06</b>	<b>4.4E-05</b>	<b>1.1E-06</b>	<b>7.5E-07</b>	<b>2.4E-05</b>



**Quantification of Effects - PM2.5 and PM10**  
**Revised Project: Cumulative Scenario B**

Particulate Fraction:	PM2.5			PM10			PM2.5			PM2.5			Incremental Risk -DPM
	Endpoint:	Mortality - All Causes	Hospitalisations - Cardiovascular	Hospitalisations - Respiratory	Mortality - All Causes	Mortality - All Causes	Mortality - Cardiopulmonary	Mortality - Cardiovascular	Mortality - Respiratory				
Effect Exposure Duration:	Long-term	Short-term	Short-term	Short-Term	Short-Term	Long-term	Short-Term	Short-Term	Short-Term	(based on WHO)			
Age Group:	≥ 30 years	≥ 65 years	≥ 65 years	All ages	All ages	≥ 30 years	All ages	All ages	All ages	Unit Risk			
β (change in effect per 1 µg/m <sup>3</sup> PM) (as per Table 4.1)	0.0058	0.0008	0.0041	0.0006	0.00094	0.013	0.00097	0.0019					
Baseline Incidence (per 100,000) (as per Table 2.3)	1087	23352	8807	670	670	490	164	57					
Baseline Incidence (per person)	0.01087	0.23352	0.08807	0.0067	0.0067	0.0049	0.00164	0.00057					
Modifying factor for commercial/industrial exposures (refer to Section 4.3.4 in report)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22					
Modifying factor for recreational exposures (refer to Section 4.3.4 in report)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047					

Receptor	Increase in Annual Average PM10 Concentration (µg/m <sup>3</sup> )	Increase in Annual Average PM2.5 Concentration (µg/m <sup>3</sup> )	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk	
<b>Maximum Receptor</b>												
Boundary location	Commercial/Industrial	2.3	2.2	3.1E-05	9.2E-05	1.8E-05	2.0E-06	3.1E-06	3.1E-05	7.9E-07	5.3E-07	1.7E-05
<b>Sensitive Receptors</b>												
<b>Wattle Grove</b>												
Wallciff Cres	Residential	0.14	0.13	8.4E-06	2.5E-05	4.8E-06	5.5E-07	8.4E-07	8.5E-06	2.1E-07	1.4E-07	4.5E-06
Corryton Ct	Residential	0.19	0.18	1.1E-05	3.4E-05	6.5E-06	7.4E-07	1.1E-06	1.1E-05	2.9E-07	2.0E-07	6.1E-06
Martindale Ct (Receptor 3 in Simta Report)	Residential	0.18	0.18	1.1E-05	3.3E-05	6.4E-06	7.4E-07	1.1E-06	1.1E-05	2.8E-07	1.9E-07	6.1E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.22	0.21	1.3E-05	3.9E-05	7.6E-06	8.7E-07	1.3E-06	1.3E-05	3.4E-07	2.3E-07	7.2E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.22	0.21	2.9E-06	8.7E-06	1.7E-06	1.9E-07	2.9E-07	3.0E-06	7.4E-08	5.0E-08	1.6E-06
Yallum Cres (Receptor 1 in Simta report)	Residential	0.18	0.17	1.1E-05	3.2E-05	6.2E-06	7.1E-07	1.1E-06	1.1E-05	2.7E-07	1.9E-07	5.9E-06
Wattle Grove Public School	Residential/Schoo	0.13	0.13	8.2E-06	2.4E-05	4.7E-06	5.4E-07	8.2E-07	8.3E-06	2.1E-07	1.4E-07	4.4E-06
St Marks Coptic College	Residential/Schoo	0.086	0.084	5.3E-06	1.6E-05	3.0E-06	3.5E-07	5.3E-07	5.4E-06	1.3E-07	9.1E-08	2.9E-06
Anzac Creek Park	Residential	0.10	0.10	6.4E-06	1.9E-05	3.7E-06	4.2E-07	6.4E-07	6.5E-06	1.6E-07	1.1E-07	3.5E-06
Anzac Creek Park	Recreational	0.10	0.10	3.0E-07	8.9E-07	1.7E-07	2.0E-08	3.0E-08	3.0E-07	7.6E-09	5.2E-09	1.6E-07
<b>Average Residential</b>		<b>0.15</b>	<b>0.14</b>	<b>9.1E-06</b>	<b>2.7E-05</b>	<b>5.2E-06</b>	<b>5.9E-07</b>	<b>9.0E-07</b>	<b>9.2E-06</b>	<b>2.3E-07</b>	<b>1.6E-07</b>	<b>4.9E-06</b>
<b>Moorebank</b>												
Church Road (Receptor 7 in Simta report)	Residential	0.077	0.075	4.8E-06	1.4E-05	2.7E-06	3.1E-07	4.8E-07	4.8E-06	1.2E-07	8.2E-08	2.6E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.22	0.21	1.3E-05	3.9E-05	7.6E-06	8.7E-07	1.3E-06	1.3E-05	3.4E-07	2.3E-07	7.2E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.22	0.21	2.9E-06	8.7E-06	1.7E-06	1.9E-07	2.9E-07	3.0E-06	7.4E-08	5.0E-08	1.6E-06
DNSDC proposed relocation	Commercial/Industrial	0.24	0.24	3.3E-06	9.8E-06	1.9E-06	2.2E-07	3.3E-07	3.3E-06	8.3E-08	5.7E-08	1.8E-06
<b>Average Residential</b>		<b>0.15</b>	<b>0.14</b>	<b>9.0E-06</b>	<b>2.7E-05</b>	<b>5.2E-06</b>	<b>5.9E-07</b>	<b>9.0E-07</b>	<b>9.1E-06</b>	<b>2.3E-07</b>	<b>1.6E-07</b>	<b>4.9E-06</b>
<b>Liverpool</b>												
Al Amanah College Liverpool Campus Liverpool	Residential/Schoo	0.047	0.046	2.9E-06	8.5E-06	1.6E-06	1.9E-07	2.9E-07	2.9E-06	7.3E-08	4.9E-08	1.6E-06
Liverpool West Public Schoo	Residential/Schoo	0.029	0.029	1.8E-06	5.4E-06	1.0E-06	1.2E-07	1.8E-07	1.8E-06	3.1E-08	9.7E-07	9.7E-07
Liverpool Public School	Residential/Schoo	0.029	0.028	1.8E-06	5.2E-06	1.0E-06	1.1E-07	1.8E-07	1.8E-06	4.4E-08	3.0E-08	9.5E-07
<b>Average Residential</b>		<b>0.035</b>	<b>0.034</b>	<b>2.1E-06</b>	<b>6.4E-06</b>	<b>1.2E-06</b>	<b>1.4E-07</b>	<b>2.1E-07</b>	<b>2.2E-06</b>	<b>5.4E-08</b>	<b>3.7E-08</b>	<b>1.2E-06</b>
<b>Lurnea</b>												
Lurnea High School	Residential/Schoo	0.034	0.033	2.1E-06	6.1E-06	1.2E-06	1.4E-07	2.1E-07	2.1E-06	5.2E-08	3.6E-08	1.1E-06
St Francis Xavier Primary School Lurnea	Residential/Schoo	0.031	0.030	1.9E-06	5.7E-06	1.1E-06	1.3E-07	1.9E-07	1.9E-06	4.8E-08	3.3E-08	1.0E-06
<b>Average Residential</b>		<b>0.032</b>	<b>0.032</b>	<b>2.0E-06</b>	<b>5.9E-06</b>	<b>1.1E-06</b>	<b>1.3E-07</b>	<b>2.0E-07</b>	<b>2.0E-06</b>	<b>5.0E-08</b>	<b>3.4E-08</b>	<b>1.1E-06</b>
<b>Casula</b>												
Lakewood Crescent	Residential	0.14	0.13	8.4E-06	2.5E-05	4.8E-06	5.5E-07	8.4E-07	8.5E-06	2.1E-07	1.4E-07	4.5E-06
St Andrews Boulevard	Residential	0.17	0.17	1.1E-05	3.1E-05	6.1E-06	6.9E-07	1.1E-06	1.1E-05	2.7E-07	1.8E-07	5.7E-06
Buckland Rd Receiver (Receptor 6 in Simta Report)	Residential	0.20	0.20	1.2E-05	3.7E-05	7.1E-06	8.1E-07	1.2E-06	1.2E-05	3.1E-07	2.1E-07	6.7E-06
Dunmore Cres	Residential	0.18	0.17	1.1E-05	3.2E-05	6.2E-06	7.1E-07	1.1E-06	1.1E-05	2.7E-07	1.9E-07	5.9E-06
Leacocks Lane	Residential	0.060	0.059	3.7E-06	1.1E-05	2.1E-06	2.4E-07	3.7E-07	3.7E-06	9.3E-08	6.4E-08	2.0E-06
Leacocks Lane_Mid (Receptor 5 in Simta Report)	Residential	0.086	0.084	5.3E-06	1.6E-05	3.0E-06	3.5E-07	5.3E-07	5.4E-06	1.3E-07	9.1E-08	2.9E-06
Slessor Road	Residential	0.071	0.069	4.4E-06	1.3E-05	2.5E-06	2.8E-07	4.4E-07	4.4E-06	1.1E-07	7.5E-08	2.3E-06
Maple Grove Retirement Village	Residential	0.034	0.033	2.1E-06	6.2E-06	1.2E-06	1.4E-07	2.1E-07	2.1E-06	5.3E-08	3.6E-08	1.1E-06
All Saints Catholic Senior College	Residential/Schoo	0.083	0.081	5.1E-06	1.5E-05	2.9E-06	3.3E-07	5.1E-07	5.1E-06	1.3E-07	8.7E-08	2.7E-06
Casula High School	Residential/Schoo	0.031	0.031	1.9E-06	5.7E-06	1.1E-06	1.3E-07	1.9E-07	1.9E-06	4.9E-08	3.3E-08	1.0E-06
Casula Public School	Residential/Schoo	0.085	0.083	5.3E-06	1.6E-05	3.0E-06	3.4E-07	5.2E-07	5.3E-06	1.3E-07	9.0E-08	2.8E-06
Casula Powerhouse Arts Centre	Recreational	0.22	0.21	8.2E-07	1.8E-06	3.6E-07	4.0E-08	6.2E-08	6.3E-07	1.6E-08	1.1E-08	3.4E-07
<b>Average Residential</b>		<b>0.11</b>	<b>0.11</b>	<b>6.9E-06</b>	<b>2.1E-05</b>	<b>4.0E-06</b>	<b>4.5E-07</b>	<b>6.9E-07</b>	<b>7.0E-06</b>	<b>1.7E-07</b>	<b>1.2E-07</b>	<b>3.7E-06</b>
<b>Glenfield</b>												
Canterbury Road	Residential	0.043	0.042	2.6E-06	7.8E-06	1.5E-06	1.7E-07	2.6E-07	2.7E-06	6.6E-08	4.5E-08	1.4E-06
Ferguson Street	Residential	0.049	0.048	3.0E-06	8.9E-06	1.7E-06	2.0E-07	3.0E-07	3.0E-06	5.2E-08	1.6E-08	1.6E-06
Good enough St (Receptor 4 in Simta Report)	Residential	0.064	0.062	3.9E-06	1.2E-05	2.3E-06	2.6E-07	3.9E-07	4.0E-06	9.9E-08	6.8E-08	2.1E-06
Cambridge Avenue	Residential	0.058	0.056	3.5E-06	1.0E-05	2.0E-06	2.3E-07	3.5E-07	3.6E-06	8.9E-08	6.1E-08	1.9E-06
Glenwood Public School	Residential/Schoo	0.029	0.029	1.8E-06	5.4E-06	1.0E-06	1.2E-07	1.8E-07	1.8E-06	4.6E-08	3.1E-08	9.8E-07
Glenfield Public School	Residential/Schoo	0.031	0.030	1.9E-06	5.6E-06	1.1E-06	1.2E-07	1.9E-07	1.9E-06	4.8E-08	3.2E-08	1.0E-06
Hurlstone Agricultural High Schoo	Residential/Schoo	0.026	0.026	1.6E-06	4.9E-06	9.2E-07	1.1E-07	1.6E-07	1.6E-06	4.1E-08	2.8E-08	8.7E-07
Glenfield new land release	Residential	0.061	0.050	3.1E-06	9.3E-06	1.8E-06	2.1E-07	3.1E-07	3.2E-06	7.9E-08	5.4E-08	1.7E-06
Playground Learning Centre, Chesham Parade	Residential	0.032	0.031	2.0E-06	5.9E-06	1.1E-06	1.3E-07	2.0E-07	2.0E-06	5.0E-08	3.4E-08	1.1E-06
<b>Average Residential</b>		<b>0.043</b>	<b>0.042</b>	<b>2.6E-06</b>	<b>7.8E-06</b>	<b>1.5E-06</b>	<b>1.7E-07</b>	<b>2.6E-07</b>	<b>2.6E-06</b>	<b>6.6E-08</b>	<b>4.5E-08</b>	<b>1.4E-06</b>
<b>Macquarie Fields</b>												
Hickory Place	Residential	0.016	0.016	9.8E-07	2.9E-06	5.6E-07	6.4E-08	9.8E-08	9.9E-07	2.5E-08	1.7E-08	5.3E-07
<b>Maximum residential receptors</b>		<b>0.22</b>	<b>0.21</b>	<b>1.3E-05</b>	<b>3.9E-05</b>	<b>7.6E-06</b>	<b>8.7E-07</b>	<b>1.3E-06</b>	<b>1.3E-05</b>	<b>3.4E-07</b>	<b>2.3E-07</b>	<b>7.2E-06</b>
<b>Maximum school receptors</b>		<b>0.13</b>	<b>0.13</b>	<b>8.2E-06</b>	<b>2.4E-05</b>	<b>4.7E-06</b>	<b>5.4E-07</b>	<b>8.2E-07</b>	<b>8.3E-06</b>	<b>2.1E-07</b>	<b>1.4E-07</b>	<b>4.4E-06</b>
<b>Maximum recreational receptors</b>		<b>0.22</b>	<b>0.21</b>	<b>6.2E-07</b>	<b>1.8E-06</b>	<b>3.6E-07</b>	<b>4.0E-08</b>	<b>6.2E-08</b>	<b>6.3E-07</b>	<b>1.6E-08</b>	<b>1.1E-08</b>	<b>3.4E-07</b>
<b>Maximum commercial/industrial receptors</b>		<b>2.3</b>	<b>2.2</b>	<b>3.1E-05</b>	<b>9.2E-05</b>	<b>1.8E-05</b>	<b>2.0E-06</b>	<b>3.1E-06</b>	<b>3.1E-05</b>	<b>7.9E-07</b>	<b>5.3E-07</b>	<b>1.7E-05</b>

**Quantification of Effects - PM2.5 and PM10**  
**Revised Project: Cumulative Scenario C1**

Effect Exposure Duration:	Particulate Fraction:	PM2.5	PM2.5	PM2.5	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	Incremental Risk -DPM
	Endpoint:	Mortality - All Causes	Hospitalisations - Cardiovascular	Hospitalisations - Respiratory	Mortality - All Causes	Mortality - All Causes	Mortality - Cardiopulmonary	Mortality - Cardiovascular	Mortality - Respiratory		
	Age Group:	Long-term	Short-term	Short-term	Short-Term	Short-Term	Long-term	Short-Term	Short-Term		
		≥ 30 years	≥ 65 years	≥ 65 years	All ages	All ages	≥ 30 years	All ages	All ages		(based on WHO)
		0.0058	0.0008	0.00041	0.0006	0.00094	0.013	0.00097	0.0019		Unit Risk
		1087	23352	8807	670	670	490	164	57		
		0.01087	0.23352	0.08807	0.0067	0.0067	0.0049	0.00164	0.00057		
		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22		0.22
		0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047		0.047

Receptor		Increase in Annual Average PM10 Concentration (µg/m³)	Increase in Annual Average PM2.5 Concentration (µg/m³)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk	
<b>Maximum Receptor</b>												
Boundary location	Commercial/Industrial	2.9	2.3	3.1E-05	9.3E-05	1.8E-05	2.5E-06	3.1E-06	3.2E-05	7.9E-07	5.4E-07	1.7E-05
<b>Sensitive Receptors</b>												
<b>Wattle Grove</b>												
Wallcliff Cres	Residential	0.23	0.15	9.4E-06	2.8E-05	5.4E-06	9.4E-07	9.4E-07	9.5E-06	2.4E-07	1.6E-07	5.1E-06
Corryton Ct	Residential	0.28	0.19	1.2E-05	3.6E-05	7.0E-06	1.1E-06	1.2E-06	1.2E-05	3.1E-07	2.1E-07	6.6E-06
Martindale Ct (Receptor 3 in Simta Report)	Residential	0.27	0.19	1.2E-05	3.6E-05	6.9E-06	1.1E-06	1.2E-06	1.2E-05	3.0E-07	2.1E-07	6.5E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.32	0.22	1.4E-05	4.2E-05	8.0E-06	1.3E-06	1.4E-06	1.4E-05	3.5E-07	2.4E-07	7.6E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.32	0.22	3.1E-06	9.1E-06	1.8E-06	2.9E-07	3.1E-07	3.1E-06	7.9E-08	5.3E-08	1.7E-06
Yallum Cres (Receptor 1 in Simta report)	Residential	0.28	0.19	1.2E-05	3.5E-05	6.9E-06	1.1E-06	1.2E-06	1.2E-05	3.0E-07	2.1E-07	6.5E-06
Wattle Grove Public School	Residential/School	0.21	0.14	9.0E-06	2.7E-05	5.2E-06	8.6E-07	9.0E-07	9.1E-06	2.3E-07	1.5E-07	4.9E-06
St Marks Coptic College	Residential/School	0.14	0.093	5.9E-06	1.7E-05	3.4E-06	5.8E-07	5.9E-07	5.9E-06	1.5E-07	1.0E-07	3.2E-06
Anzac Creek Park	Residential	0.17	0.11	6.9E-06	2.0E-05	4.0E-06	6.7E-07	6.9E-07	7.0E-06	1.7E-07	1.2E-07	3.7E-06
Anzac Creek Park	Recreational	0.17	0.11	3.2E-07	9.6E-07	1.9E-07	3.1E-08	3.2E-08	3.3E-07	8.2E-09	5.6E-09	1.8E-07
<b>Average Residential</b>		<b>0.23</b>	<b>0.16</b>	<b>9.3E-06</b>	<b>2.9E-05</b>	<b>5.6E-06</b>	<b>9.3E-07</b>	<b>9.8E-07</b>	<b>9.9E-06</b>	<b>2.5E-07</b>	<b>1.7E-07</b>	<b>5.3E-06</b>
<b>Moorebank</b>												
Church Road (Receptor 7 in Simta report)	Residential	0.13	0.084	5.3E-06	1.6E-05	3.0E-06	5.3E-07	5.3E-07	5.3E-06	1.3E-07	9.1E-08	2.8E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.32	0.22	1.4E-05	4.2E-05	8.0E-06	1.3E-06	1.4E-06	1.4E-05	3.5E-07	2.4E-07	7.6E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.32	0.22	3.1E-06	9.1E-06	1.8E-06	2.9E-07	3.1E-07	3.1E-06	7.9E-08	5.3E-08	1.7E-06
DNSDC proposed relocation	Commercial/Industrial	0.34	0.25	3.5E-06	1.0E-05	2.0E-06	3.0E-07	3.5E-07	3.5E-06	8.7E-08	5.9E-08	1.9E-06
<b>Average Residential</b>		<b>0.23</b>	<b>0.15</b>	<b>9.7E-06</b>	<b>2.9E-05</b>	<b>5.5E-06</b>	<b>9.2E-07</b>	<b>9.6E-07</b>	<b>9.8E-06</b>	<b>2.4E-07</b>	<b>1.7E-07</b>	<b>5.2E-06</b>
<b>Liverpool</b>												
Al Amanah College Liverpool Campus Liverpool	Residential/School	0.082	0.051	3.2E-06	9.5E-06	1.8E-06	3.3E-07	3.2E-07	3.2E-06	8.1E-08	5.5E-08	1.7E-06
Liverpool West Public School	Residential/School	0.055	0.032	2.0E-06	6.1E-06	1.2E-06	2.2E-07	2.0E-07	2.1E-06	5.2E-08	3.5E-08	1.1E-06
Liverpool Public School	Residential/School	0.050	0.031	2.0E-06	5.8E-06	1.1E-06	2.0E-07	2.0E-07	2.0E-06	4.9E-08	3.4E-08	1.1E-06
<b>Average Residential</b>		<b>0.062</b>	<b>0.038</b>	<b>2.4E-06</b>	<b>7.1E-06</b>	<b>1.4E-06</b>	<b>2.5E-07</b>	<b>2.4E-07</b>	<b>2.4E-06</b>	<b>6.1E-08</b>	<b>4.1E-08</b>	<b>1.3E-06</b>
<b>Lurnea</b>												
Lurnea High School	Residential/School	0.068	0.038	2.4E-06	7.1E-06	1.4E-06	2.7E-07	2.4E-07	2.4E-06	6.1E-08	4.1E-08	1.3E-06
St Francis Xavier Primary School Lurnea	Residential/School	0.059	0.035	2.2E-06	6.4E-06	1.2E-06	2.2E-07	2.2E-07	2.2E-06	5.5E-08	3.7E-08	1.2E-06
<b>Average Residential</b>		<b>0.063</b>	<b>0.036</b>	<b>2.3E-06</b>	<b>6.8E-06</b>	<b>1.3E-06</b>	<b>2.6E-07</b>	<b>2.3E-07</b>	<b>2.3E-06</b>	<b>5.8E-08</b>	<b>3.9E-08</b>	<b>1.2E-06</b>
<b>Casula</b>												
Lakewood Crescent	Residential	0.28	0.15	9.7E-06	2.9E-05	5.6E-06	1.1E-06	9.7E-07	9.8E-06	2.5E-07	1.7E-07	5.2E-06
St Andrews Boulevard	Residential	0.39	0.20	1.3E-05	3.7E-05	7.2E-06	1.6E-06	1.2E-06	1.3E-05	3.2E-07	2.1E-07	6.7E-06
Buckland Rd Receiver (Receptor 6 in Simta Report)	Residential	0.46	0.23	1.5E-05	4.3E-05	8.3E-06	1.9E-06	1.5E-06	1.5E-05	3.7E-07	2.5E-07	7.9E-06
Dunmore Cres	Residential	0.38	0.20	1.3E-05	3.8E-05	7.3E-06	1.5E-06	1.3E-06	1.3E-05	3.2E-07	2.2E-07	6.8E-06
Leacocks Lane	Residential	0.14	0.070	4.4E-06	1.3E-05	2.5E-06	5.5E-07	4.4E-07	4.5E-06	1.1E-07	7.6E-08	2.4E-06
Leacocks Lane_Mid (Receptor 5 in Simta Report)	Residential	0.21	0.105	6.6E-06	2.0E-05	3.8E-06	8.5E-07	6.6E-07	6.7E-06	1.7E-07	1.1E-07	3.6E-06
Slessor Road	Residential	0.16	0.086	5.4E-06	1.6E-05	3.1E-06	6.6E-07	5.4E-07	5.5E-06	1.4E-07	9.3E-08	2.9E-06
Maple Grove Retirement Village	Residential	0.071	0.039	2.5E-06	7.3E-06	1.4E-06	2.8E-07	2.5E-07	2.5E-06	6.2E-08	4.2E-08	1.3E-06
All Saints Catholic Senior College	Residential/School	0.20	0.099	6.2E-06	1.8E-05	3.6E-06	8.0E-07	6.2E-07	6.3E-06	1.6E-07	1.1E-07	3.4E-06
Casula High School	Residential/School	0.066	0.036	2.3E-06	6.7E-06	1.3E-06	2.6E-07	2.3E-07	2.3E-06	5.7E-08	3.9E-08	1.2E-06
Casula Public School	Residential/School	0.17	0.095	6.0E-06	1.8E-05	3.4E-06	6.8E-07	6.0E-07	6.1E-06	1.5E-07	1.0E-07	3.2E-06
Casula Powerhouse Arts Centre	Recreational	0.50	0.25	7.4E-07	2.2E-06	4.3E-07	4.7E-08	7.4E-08	7.5E-07	1.9E-08	1.3E-08	4.0E-07
<b>Average Residential</b>		<b>0.25</b>	<b>0.13</b>	<b>8.2E-06</b>	<b>2.4E-05</b>	<b>4.7E-06</b>	<b>1.0E-06</b>	<b>8.2E-07</b>	<b>8.3E-06</b>	<b>2.1E-07</b>	<b>1.4E-07</b>	<b>4.4E-06</b>
<b>Glenfield</b>												
Canterbury Road	Residential	0.088	0.050	3.1E-06	9.3E-06	1.8E-06	3.5E-07	3.1E-07	3.2E-06	7.9E-08	5.4E-08	1.7E-06
Ferguson Street	Residential	0.10	0.057	3.6E-06	1.1E-05	2.1E-06	4.1E-07	3.6E-07	3.6E-06	9.1E-08	6.2E-08	1.9E-06
Good enough St (Receptor 4 in Simta Report)	Residential	0.14	0.076	4.8E-06	1.4E-05	2.7E-06	5.5E-07	4.8E-07	4.8E-06	1.2E-07	8.2E-08	2.6E-06
Cambridge Avenue	Residential	0.12	0.068	4.3E-06	1.3E-05	2.5E-06	5.0E-07	4.3E-07	4.3E-06	1.1E-07	7.4E-08	2.3E-06
Glenwood Public School	Residential/School	0.060	0.034	2.1E-06	6.4E-06	1.2E-06	2.4E-07	2.1E-07	2.2E-06	5.4E-08	3.7E-08	1.2E-06
Glenfield Public School	Residential/School	0.061	0.035	2.2E-06	6.6E-06	1.3E-06	2.4E-07	2.2E-07	2.2E-06	5.6E-08	3.8E-08	1.2E-06
Hurlstone Agricultural High School	Residential/School	0.051	0.030	1.9E-06	5.6E-06	1.1E-06	2.0E-07	1.9E-07	1.9E-06	4.7E-08	3.2E-08	1.0E-06
Glenfield new land release	Residential	0.11	0.060	3.8E-06	1.1E-05	2.2E-06	4.4E-07	3.8E-07	3.8E-06	9.6E-08	6.5E-08	2.0E-06
Playground Learning Centre, Chesham Parade	Residential	0.064	0.037	2.3E-06	6.9E-06	1.3E-06	2.6E-07	2.3E-07	2.4E-06	5.9E-08	4.0E-08	1.3E-06
<b>Average Residential</b>		<b>0.088</b>	<b>0.050</b>	<b>3.1E-06</b>	<b>9.3E-06</b>	<b>1.8E-06</b>	<b>3.6E-07</b>	<b>3.1E-07</b>	<b>3.2E-06</b>	<b>7.9E-08</b>	<b>5.4E-08</b>	<b>1.7E-06</b>
<b>Macquarie Fields</b>												
Hickory Place	Residential	0.033	0.018	1.2E-06	3.4E-06	6.6E-07	1.3E-07	1.2E-07	1.2E-06	2.9E-08	2.0E-08	6.3E-07
<b>Maximum residential receptors</b>		<b>0.46</b>	<b>0.23</b>	<b>1.5E-05</b>	<b>4.3E-05</b>	<b>8.3E-06</b>	<b>1.9E-06</b>	<b>1.5E-06</b>	<b>1.5E-05</b>	<b>3.7E-07</b>	<b>2.5E-07</b>	<b>7.9E-06</b>
<b>Maximum school receptors</b>		<b>0.21</b>	<b>0.14</b>	<b>9.0E-06</b>	<b>2.7E-05</b>	<b>5.2E-06</b>	<b>8.6E-07</b>	<b>9.0E-07</b>	<b>9.1E-06</b>	<b>2.3E-07</b>	<b>1.5E-07</b>	<b>4.9E-06</b>
<b>Maximum recreational receptors</b>		<b>0.50</b>	<b>0.25</b>	<b>7.4E-07</b>	<b>2.2E-06</b>	<b>4.3E-07</b>	<b>4.7E-08</b>	<b>7.4E-08</b>	<b>7.5E-07</b>	<b>1.9E-08</b>	<b>1.3E-08</b>	<b>4.0E-07</b>
<b>Maximum commercial/industrial receptors</b>		<b>2.9</b>	<b>2.3</b>	<b>3.1E-05</b>	<b>9.3E-05</b>	<b>1.8E-05</b>	<b>2.5E-06</b>	<b>3.1E-06</b>	<b>3.2E-05</b>	<b>7.9E-07</b>	<b>5.4E-07</b>	<b>1.7E-05</b>

Quantification of Effects - PM2.5 and PM10  
Revised Project: Cumulative Scenario C2

Effect Exposure Duration:	Particulate Fraction:	PM2.5	PM2.5	PM2.5	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	Incremental Risk -DPM
	Endpoint:	Mortality - All Causes	Hospitalisations - Cardiovascular	Hospitalisations - Respiratory	Mortality - All Causes	Mortality - All Causes	Mortality - Cardiopulmonary	Mortality - Cardiovascular	Mortality - Respiratory		
Age Group:	Long-term	Short-term	Short-term	Short-term	All ages	All ages	≥ 30 years	All ages	All ages	(based on WHO)	
β (change in effect per 1 µg/m³ PM) (as per Table 4.1)	0.0058	0.0008	0.00041	0.0006	0.00094	0.013	0.00097	0.0019	Unit Risk		
Baseline Incidence (per 100,000) (as per Table 2.3)	1087	23352	8807	670	670	490	164	57			
Baseline Incidence (per person)	0.01087	0.23352	0.08807	0.0067	0.0067	0.0049	0.00164	0.00057			
Modifying factor for commercial/industrial exposures (refer to Section 4.3.4 in report)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22		
Modifying factor for recreational exposures (refer to Section 4.3.4 in report)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047		

Receptor	Increase in Annual Average PM10 Concentration (µg/m³)	Increase in Annual Average PM2.5 Concentration (µg/m³)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk (Equation 6)	Risk	
<b>Maximum Receptor</b>												
Boundary location	Commercial/Industrial	2.3	2.3	3.2E-05	9.4E-05	1.8E-05	2.1E-06	3.2E-06	3.2E-05	8.0E-07	5.4E-07	1.7E-05
<b>Sensitive Receptors</b>												
<b>Wattle Grove</b>												
Wallcliff Cres	Residential	0.14	0.14	8.8E-06	2.6E-05	5.0E-06	5.7E-07	8.8E-07	8.9E-06	2.2E-07	1.5E-07	4.7E-06
Corryton Ct	Residential	0.19	0.19	1.2E-05	3.5E-05	6.7E-06	7.6E-07	1.2E-06	1.2E-05	2.9E-07	2.0E-07	6.3E-06
Marindale Ct (Receptor 3 in Simta Report)	Residential	0.19	0.18	1.1E-05	3.4E-05	6.6E-06	7.5E-07	1.1E-06	1.2E-05	2.9E-07	2.0E-07	6.2E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.22	0.21	1.3E-05	3.9E-05	7.9E-06	8.7E-07	1.3E-06	1.3E-05	3.3E-07	2.3E-07	7.1E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.22	0.21	2.9E-06	8.6E-06	1.7E-06	1.9E-07	2.9E-07	2.9E-06	7.3E-08	5.0E-08	1.6E-06
Yallum Cres (Receptor 1 in Simta report)	Residential	0.18	0.18	1.1E-05	3.3E-05	6.4E-06	7.4E-07	1.1E-06	1.1E-05	2.8E-07	1.9E-07	6.1E-06
Wattle Grove Public School	Residential/School	0.14	0.13	8.4E-06	2.5E-05	4.8E-06	5.5E-07	8.4E-07	8.5E-06	2.1E-07	1.4E-07	4.6E-06
St Marks Coptic College	Residential/School	0.089	0.086	5.4E-06	1.6E-05	3.1E-06	3.6E-07	5.4E-07	5.5E-06	1.4E-07	9.3E-08	2.9E-06
Anzac Creek Park	Residential	0.11	0.10	6.5E-06	1.9E-05	3.7E-06	4.2E-07	6.4E-07	6.5E-06	1.6E-07	1.1E-07	3.5E-06
Anzac Creek Park	Recreational	0.11	0.10	3.0E-07	9.0E-07	1.7E-07	2.0E-08	3.0E-08	3.1E-07	7.7E-09	5.2E-09	1.6E-07
<b>Average Residential</b>		<b>0.15</b>	<b>0.15</b>	<b>9.2E-06</b>	<b>2.7E-05</b>	<b>5.3E-06</b>	<b>6.1E-07</b>	<b>9.2E-07</b>	<b>9.3E-06</b>	<b>2.3E-07</b>	<b>1.6E-07</b>	<b>5.0E-06</b>
<b>Moorebank</b>												
Church Road (Receptor 7 in Simta report)	Residential	0.076	0.074	4.7E-06	1.4E-05	2.7E-06	3.1E-07	4.7E-07	4.7E-06	1.2E-07	8.0E-08	2.5E-06
Anzac Road (Receptor 2 in Simta report)	Residential	0.22	0.21	1.3E-05	3.9E-05	7.9E-06	8.7E-07	1.3E-06	1.3E-05	3.3E-07	2.3E-07	7.1E-06
Anzac Road (Receptor 2 in Simta report)	Commercial/Industrial	0.22	0.21	2.9E-06	8.6E-06	1.7E-06	1.9E-07	2.9E-07	2.9E-06	7.3E-08	5.0E-08	1.6E-06
DNSDC proposed relocation	Commercial/Industrial	0.25	0.24	3.3E-06	9.9E-06	1.9E-06	2.2E-07	3.3E-07	3.4E-06	8.4E-08	5.7E-08	1.8E-06
<b>Average Residential</b>		<b>0.15</b>	<b>0.14</b>	<b>9.0E-06</b>	<b>2.7E-05</b>	<b>5.1E-06</b>	<b>5.9E-07</b>	<b>8.9E-07</b>	<b>9.1E-06</b>	<b>2.3E-07</b>	<b>1.5E-07</b>	<b>4.8E-06</b>
<b>Liverpool</b>												
Al Amanah College Liverpool Campus Liverpool	Residential/School	0.047	0.045	2.9E-06	8.5E-06	1.6E-06	1.9E-07	2.9E-07	2.9E-06	7.2E-08	4.9E-08	1.5E-06
Liverpool West Public School	Residential/School	0.030	0.029	1.8E-06	5.4E-06	1.0E-06	1.2E-07	1.8E-07	1.8E-06	4.6E-08	3.1E-08	9.8E-07
Liverpool Public School	Residential/School	0.029	0.028	1.8E-06	5.2E-06	1.0E-06	1.2E-07	1.8E-07	1.8E-06	4.4E-08	3.0E-08	9.5E-07
<b>Average Residential</b>		<b>0.035</b>	<b>0.034</b>	<b>2.1E-06</b>	<b>6.4E-06</b>	<b>1.2E-06</b>	<b>1.4E-07</b>	<b>2.1E-07</b>	<b>2.2E-06</b>	<b>5.4E-08</b>	<b>3.7E-08</b>	<b>1.2E-06</b>
<b>Lurnea</b>												
Lurnea High School	Residential/School	0.034	0.034	2.1E-06	6.3E-06	1.2E-06	1.4E-07	2.1E-07	2.1E-06	5.3E-08	3.6E-08	1.1E-06
St Francis Xavier Primary School Lurnea	Residential/School	0.032	0.031	1.9E-06	5.8E-06	1.1E-06	1.3E-07	1.9E-07	2.0E-06	4.9E-08	3.3E-08	1.0E-06
<b>Average Residential</b>		<b>0.033</b>	<b>0.032</b>	<b>2.0E-06</b>	<b>6.0E-06</b>	<b>1.2E-06</b>	<b>1.3E-07</b>	<b>2.0E-07</b>	<b>2.0E-06</b>	<b>5.1E-08</b>	<b>3.5E-08</b>	<b>1.1E-06</b>
<b>Casula</b>												
Lakewood Crescent	Residential	0.13	0.13	8.1E-06	2.4E-05	4.6E-06	5.3E-07	8.1E-07	8.2E-06	2.0E-07	1.4E-07	4.4E-06
St Andrews Boulevard	Residential	0.16	0.16	1.0E-05	3.0E-05	5.8E-06	6.6E-07	1.0E-06	1.0E-05	2.6E-07	1.7E-07	5.5E-06
Buckland Rd Receiver (Receptor 6 in Simta Report)	Residential	0.19	0.19	1.2E-05	3.5E-05	6.8E-06	7.8E-07	1.2E-06	1.2E-05	3.0E-07	2.0E-07	6.4E-06
Dunmore Cres	Residential	0.17	0.17	1.1E-05	3.2E-05	6.2E-06	7.0E-07	1.1E-06	1.1E-05	2.7E-07	1.8E-07	5.8E-06
Leacocks Lane	Residential	0.062	0.060	3.8E-06	1.1E-05	2.2E-06	2.5E-07	3.8E-07	3.8E-06	9.6E-08	6.5E-08	2.0E-06
Leacocks Lane_Mid (Receptor 5 in Simta Report)	Residential	0.089	0.087	5.5E-06	1.6E-05	3.1E-06	3.6E-07	5.5E-07	5.5E-06	1.4E-07	9.4E-08	3.0E-06
Slessor Road	Residential	0.075	0.073	4.6E-06	1.4E-05	2.6E-06	3.0E-07	4.6E-07	4.6E-06	1.2E-07	7.9E-08	2.5E-06
Maple Grove Retirement Village	Residential	0.035	0.034	2.2E-06	6.4E-06	1.2E-06	1.4E-07	2.2E-07	2.2E-06	5.5E-08	3.7E-08	1.2E-06
All Saints Catholic Senior College	Residential/School	0.085	0.083	5.2E-06	1.5E-05	3.0E-06	3.4E-07	5.2E-07	5.3E-06	1.3E-07	9.0E-08	2.8E-06
Casula High School	Residential/School	0.032	0.031	2.0E-06	5.8E-06	1.1E-06	1.3E-07	2.0E-07	2.0E-06	5.0E-08	3.4E-08	1.1E-06
Casula Public School	Residential/School	0.085	0.083	5.3E-06	1.6E-05	3.0E-06	3.4E-07	5.2E-07	5.3E-06	1.3E-07	9.0E-08	2.8E-06
Casula Powerhouse Arts Centre	Recreational	0.21	0.21	6.1E-07	1.8E-06	3.5E-07	3.9E-08	6.1E-08	6.2E-07	1.5E-08	1.1E-08	3.3E-07
<b>Average Residential</b>		<b>0.11</b>	<b>0.11</b>	<b>6.9E-06</b>	<b>2.0E-05</b>	<b>3.9E-06</b>	<b>4.5E-07</b>	<b>6.9E-07</b>	<b>6.9E-06</b>	<b>1.7E-07</b>	<b>1.2E-07</b>	<b>3.7E-06</b>
<b>Glenfield</b>												
Canterbury Road	Residential	0.045	0.044	2.8E-06	8.2E-06	1.6E-06	1.8E-07	2.8E-07	2.8E-06	7.0E-08	4.8E-08	1.5E-06
Ferguson Street	Residential	0.052	0.051	3.2E-06	9.5E-06	1.8E-06	2.1E-07	3.2E-07	3.2E-06	8.0E-08	5.5E-08	1.7E-06
Good enough St (Receptor 4 in Simta Report)	Residential	0.068	0.067	4.2E-06	1.2E-05	2.4E-06	2.8E-07	4.2E-07	4.3E-06	1.1E-07	7.2E-08	2.3E-06
Cambridge Avenue	Residential	0.061	0.060	3.8E-06	1.1E-05	2.2E-06	2.5E-07	3.8E-07	3.8E-06	9.5E-08	6.5E-08	2.0E-06
Glenwood Public School	Residential/School	0.031	0.030	1.9E-06	5.7E-06	1.1E-06	1.3E-07	1.9E-07	1.9E-06	4.8E-08	3.3E-08	1.0E-06
Glenfield Public School	Residential/School	0.032	0.032	2.0E-06	5.9E-06	1.1E-06	1.3E-07	2.0E-07	2.0E-06	5.0E-08	3.4E-08	1.1E-06
Hurlstone Agricultural High School	Residential/School	0.028	0.027	1.7E-06	5.0E-06	9.7E-07	1.1E-07	1.7E-07	1.7E-06	4.3E-08	2.9E-08	9.1E-07
Glenfield new land release	Residential	0.054	0.053	3.3E-06	9.9E-06	1.9E-06	2.2E-07	3.3E-07	3.4E-06	8.4E-08	5.7E-08	1.8E-06
Playground Learning Centre, Chesham Parade	Residential	0.034	0.033	2.1E-06	6.2E-06	1.2E-06	1.4E-07	2.1E-07	2.1E-06	5.3E-08	3.6E-08	1.1E-06
<b>Average Residential</b>		<b>0.045</b>	<b>0.044</b>	<b>2.8E-06</b>	<b>8.2E-06</b>	<b>1.6E-06</b>	<b>1.8E-07</b>	<b>2.8E-07</b>	<b>2.8E-06</b>	<b>7.0E-08</b>	<b>4.8E-08</b>	<b>1.5E-06</b>
<b>Macquarie Fields</b>												
Hickory Place	Residential	0.017	0.016	1.0E-06	3.0E-06	5.9E-07	6.7E-08	1.0E-07	1.0E-06	2.6E-08	1.8E-08	5.5E-07
<b>Maximum residential receptors</b>		<b>0.22</b>	<b>0.21</b>	<b>1.3E-05</b>	<b>3.9E-05</b>	<b>7.6E-06</b>	<b>8.7E-07</b>	<b>1.3E-06</b>	<b>1.3E-05</b>	<b>3.3E-07</b>	<b>2.3E-07</b>	<b>7.1E-06</b>
<b>Maximum school receptors</b>		<b>0.14</b>	<b>0.13</b>	<b>8.4E-06</b>	<b>2.5E-05</b>	<b>4.8E-06</b>	<b>5.6E-07</b>	<b>8.4E-07</b>	<b>8.6E-06</b>	<b>2.1E-07</b>	<b>1.4E-07</b>	<b>4.6E-06</b>
<b>Maximum recreational receptors</b>		<b>0.21</b>	<b>0.21</b>	<b>6.1E-07</b>	<b>1.8E-06</b>	<b>3.5E-07</b>	<b>3.9E-08</b>	<b>6.1E-08</b>	<b>6.2E-07</b>	<b>1.5E-08</b>	<b>1.1E-08</b>	<b>3.3E-07</b>
<b>Maximum commercial/industrial receptors</b>		<b>2.3</b>	<b>2.3</b>	<b>3.2E-05</b>	<b>9.4E-05</b>	<b>1.8E-05</b>	<b>2.1E-06</b>	<b>3.2E-06</b>	<b>3.2E-05</b>	<b>8.0E-07</b>	<b>5.4E-07</b>	<b>1.7E-05</b>

**Assessment of Increased Incidence**  
**Revised Project: Scenario 1**

Health Endpoint:	Primary Indicators (PM2.5)			Secondary Indicators (PM2.5)				Asthma (PM10)
	Mortality - All Causes, Long-term	Hospitalisations - Cardiovascular, Short-term	Hospitalisations - Respiratory, Short-term	Mortality - All Causes, Short-term	Mortality - Cardiopulmonary, Long-term	Mortality - Cardiovascular, Short-term	Mortality - Respiratory, Short-term	Increased use of bronchodilator
<b>Age Group:</b>	≥ 30 years	≥ 65 years	≥ 65 years	All ages	≥ 30 years	All ages	All ages	5-14 years
<b>β (change in effect per 1 µg/m<sup>3</sup> PM) (as per Table 4.1)</b>	0.0058	0.0008	0.00041	0.00094	0.013	0.00097	0.0019	0.0004
<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>	1087	23352	8807	670	490	164	57	
<b>Baseline Incidence (per person)</b>	0.01087	0.23352	0.08807	0.0067	0.0049	0.00164	0.00057	5.548
<b>Wattle Grove</b>								
Total Population:	8192	8192	8192	8192	8192	8192	8192	8192
% population in assessment age-group:	45%	5%	5%	100%	45%	100%	100%	18%
Suburb average Δx (µg/m <sup>3</sup> ):	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.084
Relative Risk:	1.000072	1.000010	1.000005	1.000012	1.000161	1.000012	1.000023	1.000034
Attributable fraction (AF):	7.2E-05	9.9E-06	5.1E-06	1.2E-05	1.6E-04	1.2E-05	2.3E-05	3.4E-05
Increased number of cases in population:	0.0029	0.0010	0.00019	0.00064	0.0029	0.00016	0.00011	0.27
<b>Moorebank</b>								
Total Population:	1647	1647	1647	1647	1647	1647	1647	1647
% population in assessment age-group:	60%	13%	13%	100%	60%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.078
Relative Risk:	1.000074	1.000010	1.000005	1.000012	1.000166	1.000012	1.000024	1.000031
Attributable fraction (AF):	7.4E-05	1.0E-05	5.2E-06	1.2E-05	1.7E-04	1.2E-05	2.4E-05	3.1E-05
Increased number of cases in population:	0.00079	0.00050	0.00010	0.00013	0.00080	0.000033	0.000023	0.038
<b>Liverpool</b>								
Total Population:	17420	17420	17420	17420	17420	17420	17420	17420
% population in assessment age-group:	51%	11%	11%	100%	51%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0264
Relative Risk:	1.000023	1.000003	1.000002	1.000004	1.000053	1.000004	1.000008	1.000011
Attributable fraction (AF):	2.3E-05	3.2E-06	1.7E-06	3.8E-06	5.3E-05	3.9E-06	7.7E-06	1.1E-05
Increased number of cases in population:	0.0023	0.0015	0.00028	0.00044	0.0023	0.00011	0.000076	0.13
<b>Lurnea</b>								
Total Population:	8611	8611	8611	8611	8611	8611	8611	8611
% population in assessment age-group:	70%	12%	12%	100%	70%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	0.0371
Relative Risk:	1.000031	1.000004	1.000002	1.000005	1.000070	1.000005	1.000010	1.000015
Attributable fraction (AF):	3.1E-05	4.3E-06	2.2E-06	5.1E-06	7.0E-05	5.2E-06	1.0E-05	1.5E-05
Increased number of cases in population:	0.0020	0.0011	0.00021	0.00029	0.0021	0.000074	0.000050	0.11
<b>Casula</b>								
Total Population:	14366	14366	14366	14366	14366	14366	14366	14366
% population in assessment age-group:	49%	10%	10%	100%	49%	100%	100%	15%
Suburb average Δx (µg/m <sup>3</sup> ):	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.157
Relative Risk:	1.000131	1.000018	1.000009	1.000021	1.000293	1.000022	1.000043	1.000063
Attributable fraction (AF):	1.3E-04	1.8E-05	9.2E-06	2.1E-05	2.9E-04	2.2E-05	4.3E-05	6.3E-05
Increased number of cases in population:	0.010	0.0062	0.0012	0.0020	0.010	0.00052	0.00035	0.74
<b>Glenfield</b>								
Total Population:	7550	7550	7550	7550	7550	7550	7550	7550
% population in assessment age-group:	67%	14%	14%	100%	67%	100%	100%	12%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0491
Relative Risk:	1.000040	1.000006	1.000003	1.000006	1.000090	1.000007	1.000013	1.000020
Attributable fraction (AF):	4.0E-05	5.5E-06	2.8E-06	6.5E-06	9.0E-05	6.7E-06	1.3E-05	2.0E-05
Increased number of cases in population:	0.0022	0.0014	0.00026	0.00033	0.0022	0.000083	0.000056	0.10
<b>Macquarie Fields</b>								
Total Population:	3582	3582	3582	3582	3582	3582	3582	3582
% population in assessment age-group:	53%	10%	10%	100%	53%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0179
Relative Risk:	1.000015	1.000002	1.000001	1.000002	1.000033	1.000002	1.000005	1.000007
Attributable fraction (AF):	1.5E-05	2.0E-06	1.0E-06	2.4E-06	3.3E-05	2.5E-06	4.8E-06	7.2E-06
Increased number of cases in population:	0.00030	0.00016	0.000031	0.000057	0.00031	0.000014	0.000010	0.022
<b>Total - All Suburbs</b>	<b>0.02</b>	<b>0.01</b>	<b>0.002</b>	<b>0.004</b>	<b>0.02</b>	<b>0.0010</b>	<b>0.0007</b>	<b>1.4</b>

**Assessment of Increased Incidence**  
**Revised Project: Scenario 3**

Health Endpoint:	Primary Indicators (PM2.5)			Secondary Indicators (PM2.5)				Asthma (PM10)
	Mortality - All Causes, Long-term	Hospitalisations - Cardiovascular, Short-term	Hospitalisations - Respiratory, Short-term	Mortality - All Causes, Short-term	Mortality - Cardiopulmonary, Long-term	Mortality - Cardiovascular, Short-term	Mortality - Respiratory, Short-term	Increased use of bronchodilator
<b>Age Group:</b>	≥ 30 years	≥ 65 years	≥ 65 years	All ages	≥ 30 years	All ages	All ages	5-14 years
<b>β (change in effect per 1 µg/m<sup>3</sup> PM) (as per Table 4.1)</b>	0.0058	0.0008	0.00041	0.00094	0.013	0.00097	0.0019	0.0004
<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>	1087	23352	8807	670	490	164	57	
<b>Baseline Incidence (per person)</b>	0.01087	0.23352	0.08807	0.0067	0.0049	0.00164	0.00057	5.548
<b>Wattle Grove</b>								
Total Population:	8192	8192	8192	8192	8192	8192	8192	8192
% population in assessment age-group:	45%	5%	5%	100%	45%	100%	100%	18%
Suburb average Δx (µg/m <sup>3</sup> ):	0.092	0.092	0.092	0.092	0.092	0.092	0.092	0.093
Relative Risk:	1.000532	1.000073	1.000038	1.000086	1.001192	1.000089	1.000174	1.000037
Attributable fraction (AF):	5.3E-04	7.3E-05	3.8E-05	8.6E-05	1.2E-03	8.9E-05	1.7E-04	3.7E-05
Increased number of cases in population:	0.021	0.007	0.0014	0.0047	0.022	0.0012	0.00081	0.30
<b>Moorebank</b>								
Total Population:	1647	1647	1647	1647	1647	1647	1647	1647
% population in assessment age-group:	60%	13%	13%	100%	60%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.103	0.103	0.103	0.103	0.103	0.103	0.103	0.104
Relative Risk:	1.000597	1.000082	1.000042	1.000097	1.001339	1.000100	1.000196	1.000042
Attributable fraction (AF):	6.0E-04	8.2E-05	4.2E-05	9.7E-05	1.3E-03	1.0E-04	2.0E-04	4.2E-05
Increased number of cases in population:	0.0064	0.0041	0.00078	0.0011	0.0065	0.00027	0.00018	0.050
<b>Liverpool</b>								
Total Population:	17420	17420	17420	17420	17420	17420	17420	17420
% population in assessment age-group:	51%	11%	11%	100%	51%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0319	0.0319	0.0319	0.0319	0.0319	0.0319	0.0319	0.0324
Relative Risk:	1.000185	1.000026	1.000013	1.000030	1.000415	1.000031	1.000061	1.000013
Attributable fraction (AF):	1.9E-04	2.6E-05	1.3E-05	3.0E-05	4.1E-04	3.1E-05	6.1E-05	1.3E-05
Increased number of cases in population:	0.018	0.012	0.0022	0.0035	0.018	0.00088	0.00060	0.16
<b>Lurnea</b>								
Total Population:	8611	8611	8611	8611	8611	8611	8611	8611
% population in assessment age-group:	70%	12%	12%	100%	70%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0343	0.0343	0.0343	0.0343	0.0343	0.0343	0.0343	0.0348
Relative Risk:	1.000199	1.000027	1.000014	1.000032	1.000446	1.000033	1.000065	1.000014
Attributable fraction (AF):	2.0E-04	2.7E-05	1.4E-05	3.2E-05	4.5E-04	3.3E-05	6.5E-05	1.4E-05
Increased number of cases in population:	0.013	0.0068	0.0013	0.0019	0.013	0.00047	0.00032	0.11
<b>Casula</b>								
Total Population:	14366	14366	14366	14366	14366	14366	14366	14366
% population in assessment age-group:	49%	10%	10%	100%	49%	100%	100%	15%
Suburb average Δx (µg/m <sup>3</sup> ):	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.140
Relative Risk:	1.000801	1.000110	1.000057	1.000130	1.001795	1.000134	1.000262	1.000056
Attributable fraction (AF):	8.0E-04	1.1E-04	5.7E-05	1.3E-04	1.8E-03	1.3E-04	2.6E-04	5.6E-05
Increased number of cases in population:	0.061	0.038	0.0074	0.012	0.062	0.0032	0.0021	0.66
<b>Glenfield</b>								
Total Population:	7550	7550	7550	7550	7550	7550	7550	7550
% population in assessment age-group:	67%	14%	14%	100%	67%	100%	100%	12%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0498
Relative Risk:	1.000284	1.000039	1.000020	1.000046	1.000638	1.000048	1.000093	1.000020
Attributable fraction (AF):	2.8E-04	3.9E-05	2.0E-05	4.6E-05	6.4E-04	4.8E-05	9.3E-05	2.0E-05
Increased number of cases in population:	0.016	0.0096	0.0019	0.0023	0.016	0.00059	0.00040	0.10
<b>Macquarie Fields</b>								
Total Population:	3582	3582	3582	3582	3582	3582	3582	3582
% population in assessment age-group:	53%	10%	10%	100%	53%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0166
Relative Risk:	1.000095	1.000013	1.000007	1.000015	1.000212	1.000016	1.000031	1.000007
Attributable fraction (AF):	9.5E-05	1.3E-05	6.7E-06	1.5E-05	2.1E-04	1.6E-05	3.1E-05	6.6E-06
Increased number of cases in population:	0.0020	0.0010	0.00020	0.00037	0.0020	0.000093	0.000063	0.021
<b>Total - All Suburbs</b>	<b>0.1</b>	<b>0.08</b>	<b>0.02</b>	<b>0.03</b>	<b>0.1</b>	<b>0.007</b>	<b>0.005</b>	<b>1.4</b>



**Assessment of Increased Incidence**  
**Revised Project: Cumulative Scenario A**

Health Endpoint:	Primary Indicators (PM2.5)			Secondary Indicators (PM2.5)				Asthma (PM10)
	Mortality - All Causes, Long-term	Hospitalisations - Cardiovascular, Short-term	Hospitalisations - Respiratory, Short-term	Mortality - All Causes, Short-term	Mortality - Cardiopulmonary, Long-term	Mortality - Cardiovascular, Short-term	Mortality - Respiratory, Short-term	Increased use of bronchodilator
<b>Age Group:</b>	≥ 30 years	≥ 65 years	≥ 65 years	All ages	≥ 30 years	All ages	All ages	5-14 years
<b>β (change in effect per 1 µg/m<sup>3</sup> PM) (as per Table 4.1)</b>	0.0058	0.0008	0.00041	0.00094	0.013	0.00097	0.0019	0.0004
<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>	1087	23352	8807	670	490	164	57	
<b>Baseline Incidence (per person)</b>	0.01087	0.23352	0.08807	0.0067	0.0049	0.00164	0.00057	5.548
<b>Wattle Grove</b>								
Total Population:	8192	8192	8192	8192	8192	8192	8192	8192
% population in assessment age-group:	45%	5%	5%	100%	45%	100%	100%	18%
Suburb average Δx (µg/m <sup>3</sup> ):	0.197	0.197	0.197	0.197	0.197	0.197	0.197	0.202
Relative Risk:	1.001146	1.000158	1.000081	1.000186	1.002570	1.000192	1.000375	1.000081
Attributable fraction (AF):	1.1E-03	1.6E-04	8.1E-05	1.9E-04	2.6E-03	1.9E-04	3.8E-04	8.1E-05
Increased number of cases in population:	0.046	0.016	0.0030	0.010	0.046	0.0026	0.0018	0.65
<b>Moorebank</b>								
Total Population:	1647	1647	1647	1647	1647	1647	1647	1647
% population in assessment age-group:	60%	13%	13%	100%	60%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.210
Relative Risk:	1.001190	1.000164	1.000084	1.000193	1.002670	1.000199	1.000390	1.000084
Attributable fraction (AF):	1.2E-03	1.6E-04	8.4E-05	1.9E-04	2.7E-03	2.0E-04	3.9E-04	8.4E-05
Increased number of cases in population:	0.013	0.0081	0.0016	0.0021	0.013	0.00054	0.00037	0.10
<b>Liverpool</b>								
Total Population:	17420	17420	17420	17420	17420	17420	17420	17420
% population in assessment age-group:	51%	11%	11%	100%	51%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0530	0.0530	0.0530	0.0530	0.0530	0.0530	0.0530	0.0541
Relative Risk:	1.000308	1.000042	1.000022	1.000050	1.000690	1.000051	1.000101	1.000022
Attributable fraction (AF):	3.1E-04	4.2E-05	2.2E-05	5.0E-05	6.9E-04	5.1E-05	1.0E-04	2.2E-05
Increased number of cases in population:	0.030	0.019	0.0037	0.0058	0.030	0.0015	0.0010	0.26
<b>Lurnea</b>								
Total Population:	8611	8611	8611	8611	8611	8611	8611	8611
% population in assessment age-group:	70%	12%	12%	100%	70%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0521	0.0521	0.0521	0.0521	0.0521	0.0521	0.0521	0.0531
Relative Risk:	1.000302	1.000042	1.000021	1.000049	1.000677	1.000050	1.000099	1.000021
Attributable fraction (AF):	3.0E-04	4.2E-05	2.1E-05	4.9E-05	6.8E-04	5.0E-05	9.9E-05	2.1E-05
Increased number of cases in population:	0.020	0.010	0.0020	0.0028	0.020	0.00071	0.00049	0.16
<b>Casula</b>								
Total Population:	14366	14366	14366	14366	14366	14366	14366	14366
% population in assessment age-group:	49%	10%	10%	100%	49%	100%	100%	15%
Suburb average Δx (µg/m <sup>3</sup> ):	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.196
Relative Risk:	1.001116	1.000154	1.000079	1.000181	1.002503	1.000187	1.000365	1.000078
Attributable fraction (AF):	1.1E-03	1.5E-04	7.9E-05	1.8E-04	2.5E-03	1.9E-04	3.7E-04	7.8E-05
Increased number of cases in population:	0.085	0.053	0.010	0.017	0.086	0.0044	0.0030	0.92
<b>Glenfield</b>								
Total Population:	7550	7550	7550	7550	7550	7550	7550	7550
% population in assessment age-group:	67%	14%	14%	100%	67%	100%	100%	12%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0699	0.0699	0.0699	0.0699	0.0699	0.0699	0.0699	0.0713
Relative Risk:	1.000405	1.000056	1.000029	1.000066	1.000909	1.000068	1.000133	1.000029
Attributable fraction (AF):	4.1E-04	5.6E-05	2.9E-05	6.6E-05	9.1E-04	6.8E-05	1.3E-04	2.9E-05
Increased number of cases in population:	0.022	0.014	0.0026	0.0033	0.023	0.00084	0.00057	0.15
<b>Macquarie Fields</b>								
Total Population:	3582	3582	3582	3582	3582	3582	3582	3582
% population in assessment age-group:	53%	10%	10%	100%	53%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0257
Relative Risk:	1.000146	1.000020	1.000010	1.000024	1.000327	1.000024	1.000048	1.000010
Attributable fraction (AF):	1.5E-04	2.0E-05	1.0E-05	2.4E-05	3.3E-04	2.4E-05	4.8E-05	1.0E-05
Increased number of cases in population:	0.0030	0.0016	0.00031	0.00057	0.0030	0.00014	0.000098	0.032
<b>Total - All Suburbs</b>	<b>0.2</b>	<b>0.1</b>	<b>0.02</b>	<b>0.04</b>	<b>0.2</b>	<b>0.011</b>	<b>0.007</b>	<b>2.3</b>

**Assessment of Increased Incidence  
Revised Project: Cumulative Scenario B**

Health Endpoint:	Primary Indicators (PM2.5)			Secondary Indicators (PM2.5)				Asthma (PM10)
	Mortality - All Causes, Long-term	Hospitalisations - Cardiovascular, Short-term	Hospitalisations - Respiratory, Short-term	Mortality - All Causes, Short-term	Mortality - Cardiopulmonary, Long-term	Mortality - Cardiovascular, Short-term	Mortality - Respiratory, Short-term	Increased use of bronchodilator
<b>Age Group:</b>	≥ 30 years	≥ 65 years	≥ 65 years	All ages	≥ 30 years	All ages	All ages	5-14 years
<b>β (change in effect per 1 µg/m<sup>3</sup> PM) (as per Table 4.1)</b>	0.0058	0.0008	0.00041	0.00094	0.013	0.00097	0.0019	0.0004
<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>	1087	23352	8807	670	490	164	57	
<b>Baseline Incidence (per person)</b>	0.01087	0.23352	0.08807	0.0067	0.0049	0.00164	0.00057	5.548
<b>Wattle Grove</b>								
Total Population:	8192	8192	8192	8192	8192	8192	8192	8192
% population in assessment age-group:	45%	5%	5%	100%	45%	100%	100%	18%
Suburb average Δx (µg/m <sup>3</sup> ):	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.148
Relative Risk:	1.000834	1.000115	1.000059	1.000135	1.001869	1.000139	1.000273	1.000059
Attributable fraction (AF):	8.3E-04	1.1E-04	5.9E-05	1.4E-04	1.9E-03	1.4E-04	2.7E-04	5.9E-05
Increased number of cases in population:	0.033	0.011	0.0022	0.0074	0.034	0.0019	0.0013	0.47
<b>Moorebank</b>								
Total Population:	1647	1647	1647	1647	1647	1647	1647	1647
% population in assessment age-group:	60%	13%	13%	100%	60%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.147
Relative Risk:	1.000831	1.000115	1.000059	1.000135	1.001864	1.000139	1.000272	1.000059
Attributable fraction (AF):	8.3E-04	1.1E-04	5.9E-05	1.3E-04	1.9E-03	1.4E-04	2.7E-04	5.9E-05
Increased number of cases in population:	0.0089	0.0056	0.0011	0.0015	0.0090	0.00038	0.00026	0.071
<b>Liverpool</b>								
Total Population:	17420	17420	17420	17420	17420	17420	17420	17420
% population in assessment age-group:	51%	11%	11%	100%	51%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340	0.0349
Relative Risk:	1.000197	1.000027	1.000014	1.000032	1.000443	1.000033	1.000065	1.000014
Attributable fraction (AF):	2.0E-04	2.7E-05	1.4E-05	3.2E-05	4.4E-04	3.3E-05	6.5E-05	1.4E-05
Increased number of cases in population:	0.019	0.012	0.0024	0.0037	0.019	0.00094	0.00064	0.17
<b>Lurnea</b>								
Total Population:	8611	8611	8611	8611	8611	8611	8611	8611
% population in assessment age-group:	70%	12%	12%	100%	70%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0317	0.0317	0.0317	0.0317	0.0317	0.0317	0.0317	0.0325
Relative Risk:	1.000184	1.000025	1.000013	1.000030	1.000412	1.000031	1.000060	1.000013
Attributable fraction (AF):	1.8E-04	2.5E-05	1.3E-05	3.0E-05	4.1E-04	3.1E-05	6.0E-05	1.3E-05
Increased number of cases in population:	0.012	0.0063	0.0012	0.0017	0.012	0.00043	0.00030	0.10
<b>Casula</b>								
Total Population:	14366	14366	14366	14366	14366	14366	14366	14366
% population in assessment age-group:	49%	10%	10%	100%	49%	100%	100%	15%
Suburb average Δx (µg/m <sup>3</sup> ):	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.113
Relative Risk:	1.000638	1.000088	1.000045	1.000103	1.001431	1.000107	1.000209	1.000045
Attributable fraction (AF):	6.4E-04	8.8E-05	4.5E-05	1.0E-04	1.4E-03	1.1E-04	2.1E-04	4.5E-05
Increased number of cases in population:	0.049	0.030	0.0059	0.0099	0.049	0.0025	0.0017	0.53
<b>Glenfield</b>								
Total Population:	7550	7550	7550	7550	7550	7550	7550	7550
% population in assessment age-group:	67%	14%	14%	100%	67%	100%	100%	12%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0415	0.0415	0.0415	0.0415	0.0415	0.0415	0.0415	0.0425
Relative Risk:	1.000241	1.000033	1.000017	1.000039	1.000540	1.000040	1.000079	1.000017
Attributable fraction (AF):	2.4E-04	3.3E-05	1.7E-05	3.9E-05	5.4E-04	4.0E-05	7.9E-05	1.7E-05
Increased number of cases in population:	0.013	0.0081	0.0016	0.0020	0.013	0.00050	0.00034	0.087
<b>Macquarie Fields</b>								
Total Population:	3582	3582	3582	3582	3582	3582	3582	3582
% population in assessment age-group:	53%	10%	10%	100%	53%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0160
Relative Risk:	1.000090	1.000012	1.000006	1.000015	1.000203	1.000015	1.000030	1.000006
Attributable fraction (AF):	9.0E-05	1.2E-05	6.4E-06	1.5E-05	2.0E-04	1.5E-05	3.0E-05	6.4E-06
Increased number of cases in population:	0.0019	0.0010	0.00019	0.00035	0.0019	0.000089	0.000060	0.020
<b>Total - All Suburbs</b>	<b>0.1</b>	<b>0.08</b>	<b>0.01</b>	<b>0.03</b>	<b>0.1</b>	<b>0.007</b>	<b>0.005</b>	<b>1.5</b>

**Assessment of Increased Incidence**  
**Revised Project: Cumulative Scenario C1**

Health Endpoint:	Primary Indicators (PM2.5)			Secondary Indicators (PM2.5)				Asthma (PM10)
	Mortality - All Causes, Long-term	Hospitalisations - Cardiovascular, Short-term	Hospitalisations - Respiratory, Short-term	Mortality - All Causes, Short-term	Mortality - Cardiopulmonary, Long-term	Mortality - Cardiovascular, Short-term	Mortality - Respiratory, Short-term	Increased use of bronchodilator
<b>Age Group:</b>	≥ 30 years	≥ 65 years	≥ 65 years	All ages	≥ 30 years	All ages	All ages	5-14 years
<b>β (change in effect per 1 µg/m<sup>3</sup> PM) (as per Table 4.1)</b>	0.0058	0.0008	0.00041	0.00094	0.013	0.00097	0.0019	0.0004
<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>	1087	23352	8807	670	490	164	57	
<b>Baseline Incidence (per person)</b>	0.01087	0.23352	0.08807	0.0067	0.0049	0.00164	0.00057	5.548
<b>Wattle Grove</b>								
Total Population:	8192	8192	8192	8192	8192	8192	8192	8192
% population in assessment age-group:	45%	5%	5%	100%	45%	100%	100%	18%
Suburb average Δx (µg/m <sup>3</sup> ):	0.156	0.156	0.156	0.156	0.156	0.156	0.156	0.231
Relative Risk:	1.000904	1.000125	1.000064	1.000147	1.002028	1.000151	1.000296	1.000092
Attributable fraction (AF):	9.0E-04	1.2E-04	6.4E-05	1.5E-04	2.0E-03	1.5E-04	3.0E-04	9.2E-05
Increased number of cases in population:	0.036	0.012	0.0024	0.0080	0.037	0.0020	0.0014	0.74
<b>Moorebank</b>								
Total Population:	1647	1647	1647	1647	1647	1647	1647	1647
% population in assessment age-group:	60%	13%	13%	100%	60%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.153	0.153	0.153	0.153	0.153	0.153	0.153	0.228
Relative Risk:	1.000888	1.000122	1.000063	1.000144	1.001992	1.000148	1.000291	1.000091
Attributable fraction (AF):	8.9E-04	1.2E-04	6.3E-05	1.4E-04	2.0E-03	1.5E-04	2.9E-04	9.1E-05
Increased number of cases in population:	0.0095	0.0060	0.0012	0.0016	0.0096	0.00040	0.00027	0.110
<b>Liverpool</b>								
Total Population:	17420	17420	17420	17420	17420	17420	17420	17420
% population in assessment age-group:	51%	11%	11%	100%	51%	100%	100%	13%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0381	0.0381	0.0381	0.0381	0.0381	0.0381	0.0381	0.0624
Relative Risk:	1.000221	1.000030	1.000016	1.000036	1.000495	1.000037	1.000072	1.000025
Attributable fraction (AF):	2.2E-04	3.0E-05	1.6E-05	3.6E-05	4.9E-04	3.7E-05	7.2E-05	2.5E-05
Increased number of cases in population:	0.021	0.014	0.0027	0.0042	0.022	0.00105	0.00072	0.30
<b>Lurnea</b>								
Total Population:	8611	8611	8611	8611	8611	8611	8611	8611
% population in assessment age-group:	70%	12%	12%	100%	70%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0364	0.0364	0.0364	0.0364	0.0364	0.0364	0.0364	0.0634
Relative Risk:	1.000211	1.000029	1.000015	1.000034	1.000473	1.000035	1.000069	1.000025
Attributable fraction (AF):	2.1E-04	2.9E-05	1.5E-05	3.4E-05	4.7E-04	3.5E-05	6.9E-05	2.5E-05
Increased number of cases in population:	0.014	0.0072	0.0014	0.0020	0.014	0.00050	0.00034	0.20
<b>Casula</b>								
Total Population:	14366	14366	14366	14366	14366	14366	14366	14366
% population in assessment age-group:	49%	10%	10%	100%	49%	100%	100%	15%
Suburb average Δx (µg/m <sup>3</sup> ):	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.253
Relative Risk:	1.000757	1.000104	1.000054	1.000123	1.001698	1.000127	1.000248	1.000101
Attributable fraction (AF):	7.6E-04	1.0E-04	5.4E-05	1.2E-04	1.7E-03	1.3E-04	2.5E-04	1.0E-04
Increased number of cases in population:	0.058	0.036	0.0070	0.0118	0.058	0.0030	0.0020	1.20
<b>Glenfield</b>								
Total Population:	7550	7550	7550	7550	7550	7550	7550	7550
% population in assessment age-group:	67%	14%	14%	100%	67%	100%	100%	12%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0496	0.0496	0.0496	0.0496	0.0496	0.0496	0.0496	0.0885
Relative Risk:	1.000288	1.000040	1.000020	1.000047	1.000645	1.000048	1.000094	1.000035
Attributable fraction (AF):	2.9E-04	4.0E-05	2.0E-05	4.7E-05	6.4E-04	4.8E-05	9.4E-05	3.5E-05
Increased number of cases in population:	0.016	0.0097	0.0019	0.0024	0.016	0.00060	0.00041	0.181
<b>Macquarie Fields</b>								
Total Population:	3582	3582	3582	3582	3582	3582	3582	3582
% population in assessment age-group:	53%	10%	10%	100%	53%	100%	100%	16%
Suburb average Δx (µg/m <sup>3</sup> ):	0.0184	0.0184	0.0184	0.0184	0.0184	0.0184	0.0184	0.0330
Relative Risk:	1.000107	1.000015	1.000008	1.000017	1.000239	1.000018	1.000035	1.000013
Attributable fraction (AF):	1.1E-04	1.5E-05	7.6E-06	1.7E-05	2.4E-04	1.8E-05	3.5E-05	1.3E-05
Increased number of cases in population:	0.0022	0.0012	0.00023	0.00042	0.0022	0.000105	0.000071	0.041
<b>Total - All Suburbs</b>	<b>0.2</b>	<b>0.09</b>	<b>0.02</b>	<b>0.03</b>	<b>0.2</b>	<b>0.008</b>	<b>0.005</b>	<b>2.8</b>

**Assessment of Increased Incidence**  
**Revised Project: Cumulative Scenario C2**

Health Endpoint:	Primary Indicators (PM2.5)			Secondary Indicators (PM2.5)				Asthma (PM10)
	Mortality - All Causes, Long-term	Hospitalisations - Cardiovascular, Short-term	Hospitalisations - Respiratory, Short-term	Mortality - All Causes, Short-term	Mortality - Cardiopulmonary, Long-term	Mortality - Cardiovascular, Short-term	Mortality - Respiratory, Short-term	Increased use of bronchodilator
<b>Age Group:</b>	≥ 30 years	≥ 65 years	≥ 65 years	All ages	≥ 30 years	All ages	All ages	5-14 years
<b>β (change in effect per 1 µg/m³ PM) (as per Table 4.1)</b>	0.0058	0.0008	0.00041	0.00094	0.013	0.00097	0.0019	0.0004
<b>Baseline Incidence (per 100,000) (as per Table 2.3)</b>	1087	23352	8807	670	490	164	57	
<b>Baseline Incidence (per person)</b>	0.01087	0.23352	0.08807	0.0067	0.0049	0.00164	0.00057	5.548
<b>Wattle Grove</b>								
Total Population:	8192	8192	8192	8192	8192	8192	8192	8192
% population in assessment age-group:	45%	5%	5%	100%	45%	100%	100%	18%
Suburb average Δx (µg/m³):	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.151
Relative Risk:	1.000851	1.000117	1.000060	1.000138	1.001907	1.000142	1.000279	1.000060
Attributable fraction (AF):	8.5E-04	1.2E-04	6.0E-05	1.4E-04	1.9E-03	1.4E-04	2.8E-04	6.0E-05
Increased number of cases in population:	0.034	0.012	0.0023	0.0076	0.034	0.0019	0.0013	0.48
<b>Moorebank</b>								
Total Population:	1647	1647	1647	1647	1647	1647	1647	1647
% population in assessment age-group:	60%	13%	13%	100%	60%	100%	100%	13%
Suburb average Δx (µg/m³):	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.146
Relative Risk:	1.000825	1.000114	1.000058	1.000134	1.001849	1.000138	1.000270	1.000058
Attributable fraction (AF):	8.2E-04	1.1E-04	5.8E-05	1.3E-04	1.8E-03	1.4E-04	2.7E-04	5.8E-05
Increased number of cases in population:	0.0088	0.0056	0.0011	0.0015	0.0089	0.00037	0.00025	0.070
<b>Liverpool</b>								
Total Population:	17420	17420	17420	17420	17420	17420	17420	17420
% population in assessment age-group:	51%	11%	11%	100%	51%	100%	100%	13%
Suburb average Δx (µg/m³):	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340	0.0349
Relative Risk:	1.000197	1.000027	1.000014	1.000032	1.000443	1.000033	1.000065	1.000014
Attributable fraction (AF):	2.0E-04	2.7E-05	1.4E-05	3.2E-05	4.4E-04	3.3E-05	6.5E-05	1.4E-05
Increased number of cases in population:	0.019	0.012	0.0024	0.0037	0.019	0.00094	0.00064	0.17
<b>Lurnea</b>								
Total Population:	8611	8611	8611	8611	8611	8611	8611	8611
% population in assessment age-group:	70%	12%	12%	100%	70%	100%	100%	16%
Suburb average Δx (µg/m³):	0.0322	0.0322	0.0322	0.0322	0.0322	0.0322	0.0322	0.0330
Relative Risk:	1.000187	1.000026	1.000013	1.000030	1.000418	1.000031	1.000061	1.000013
Attributable fraction (AF):	1.9E-04	2.6E-05	1.3E-05	3.0E-05	4.2E-04	3.1E-05	6.1E-05	1.3E-05
Increased number of cases in population:	0.012	0.0064	0.0012	0.0017	0.012	0.00044	0.00030	0.10
<b>Casula</b>								
Total Population:	14366	14366	14366	14366	14366	14366	14366	14366
% population in assessment age-group:	49%	10%	10%	100%	49%	100%	100%	15%
Suburb average Δx (µg/m³):	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.112
Relative Risk:	1.000632	1.000087	1.000045	1.000102	1.001418	1.000106	1.000207	1.000045
Attributable fraction (AF):	6.3E-04	8.7E-05	4.5E-05	1.0E-04	1.4E-03	1.1E-04	2.1E-04	4.5E-05
Increased number of cases in population:	0.048	0.030	0.0058	0.0099	0.049	0.0025	0.0017	0.53
<b>Glenfield</b>								
Total Population:	7550	7550	7550	7550	7550	7550	7550	7550
% population in assessment age-group:	67%	14%	14%	100%	67%	100%	100%	12%
Suburb average Δx (µg/m³):	0.0440	0.0440	0.0440	0.0440	0.0440	0.0440	0.0440	0.0451
Relative Risk:	1.000255	1.000035	1.000018	1.000041	1.000572	1.000043	1.000084	1.000018
Attributable fraction (AF):	2.6E-04	3.5E-05	1.8E-05	4.1E-05	5.7E-04	4.3E-05	8.4E-05	1.8E-05
Increased number of cases in population:	0.014	0.0086	0.0017	0.0021	0.014	0.00053	0.00036	0.092
<b>Macquarie Fields</b>								
Total Population:	3582	3582	3582	3582	3582	3582	3582	3582
% population in assessment age-group:	53%	10%	10%	100%	53%	100%	100%	16%
Suburb average Δx (µg/m³):	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0167
Relative Risk:	1.000095	1.000013	1.000007	1.000015	1.000212	1.000016	1.000031	1.000007
Attributable fraction (AF):	9.5E-05	1.3E-05	6.7E-06	1.5E-05	2.1E-04	1.6E-05	3.1E-05	6.7E-06
Increased number of cases in population:	0.0020	0.0010	0.00020	0.00037	0.0020	0.000093	0.000063	0.021
<b>Total - All Suburbs</b>	<b>0.1</b>	<b>0.08</b>	<b>0.01</b>	<b>0.03</b>	<b>0.1</b>	<b>0.007</b>	<b>0.005</b>	<b>1.5</b>