Intermodal Logistics Centre at Enfield
Environmental Assessment

CHAPTER 12

AIR QUALITY ASSESSMENT

- October 2005

Intermodal Logistics Centre at Enfield

Contents

12. Air Quality Assessment

This chapter addresses the Director-General's requirements relating to air quality, particularly with regard to dust, vehicle and fugitive emissions of air pollutants in the area of the proposed ILC and on nearby residents and sensitive receivers. A full assessment of air quality impacts is provided in the Air Quality report in Appendix F to the EIS.

The chapter identifies the potential air quality impacts of the proposal during both the construction and the operation phases. An outline of the existing air quality within the local and regional area surrounding the ILC site is provided, with a description of the criteria relating to the particular air pollutants considered most relevant to the ILC proposal. Specifically, the chapter describes all air quality emission sources and the likely impact of these emissions on the existing air quality in the area, in accordance with the NSW Environment Protection Authority (EPA[1]) guidelines for the modelling and assessment of air pollutants in NSW. Measures to mitigate any adverse impacts are detailed in addition to any ongoing monitoring requirements.

12.1 Introduction

The Director-General's requirements did not refer to any specific assessment of the effects of air pollutants resulting from the operation of the freight rail network between Port Botany and Enfield, although the operations of trains at the proposed Intermodal Terminal were required to be considered as a source during the operation of the ILC site. The issue of air emissions from locomotives on the freight line was, however, raised by a number of Government agencies in their correspondence and by the community during consultation. This is addressed in Section 12.8.

This chapter focuses the assessment on the environmental impacts resulting from the loading / unloading operations and associated activities at Enfield. The operation of the rail transport of freight to and from Enfield falls within the existing operating licences for the freight line, and no further assessment is required.

12.2 Factors Affecting Air Quality

Air quality may be impacted upon by a number of separate pollutants, each of which has different emission sources and effects on human health and the environment. The air quality assessment is largely focused on the highest-risk impacts likely to occur during the construction and operational phases of the ILC.

During construction the highest-risk impacts are likely to occur from emissions of Total Suspended Particulate (TSP) matter in the form of airborne particulate matter (less than 10 microns in size or

[1] The NSW Environment Protection Authority (EPA) now falls under the umbrella of the NSW Department of Environment and Conservation (DEC). Where relevant, the terms EPA and DEC are used, but apply to the same organisation.

PM_{10}) and deposited dust. The main emission sources would include deposited dust created during the major earthworks activities and particulate matter emissions from plant and machinery used to undertake these activities. The highest risk to air quality would be most likely during the early phases (Stage 1 – Site Preparation and Stage 2 – Earthworks and Drainage) of construction as opposed to the latter stages (Stage 3 – Road and Rail Infrastructure and Stage 4 – Warehousing and Final Works), as described in Chapter 4 – Project Description. For this reason the air dispersion modelling concentrates only on Stages 1 and 2, therefore deriving a worst-case scenario from the assessment results.

During the operational phase of the ILC, the highest-risk impacts are likely to occur from road and rail exhaust emissions and emissions from on-site diesel powered equipment with the main emissions for consideration being oxides of nitrogen and particulate matter. Lower risk emissions would also include carbon monoxide, sulphur dioxide and volatile organic compounds from road and rail vehicle engine exhausts and storage of diesel on-site. These emissions would be associated with all container movements, including on-site handling, rail delivery and off-site road haulage, empty container management and the warehousing operations.

For the purposes of this assessment, air quality impacts during operation are predicted from emissions of nitrogen oxides and particulate matter only with the lower risk pollutants not assessed. This is generally because of the 'trigger'[2] values being more sensitive to these higher risk emissions, in addition to the reduction in future emissions predicted for some of these higher risk pollutants.

12.3 Air Impact Assessment Criteria

Air quality standards or goals are used to assess the potential for ambient air quality to give rise to health or nuisance effects. The air quality criteria relevant to the ILC proposal relate to TSP, including particulate matter (PM_{10}) and deposited dust, and nitrogen dioxide (NO_2). The origin of these specific emissions and the general effects on the environment are outlined in Appendix F – Air Quality Assessment. The air quality goals adopted by the NSW EPA, and the corresponding exceedance-criteria relevant to the ILC proposal are provided in **Table 12-1**.

Table 12-1: NSW EPA Air Quality Assessment Criteria for the Enfield ILC Proposal

Pollutant	Averaging Period	Ambient Air Quality Criteria	Number of Allowable Exceedence Days/Year
NO_2	1-hour	12 pphm* or 246 $\mu g/m^3$ **	1
NO_2	Annual	3 pphm or 62 $\mu g/m^3$	nil
TSP	Annual	90 $\mu g/m^3$	nil
PM_{10}	24-hour	50 $\mu g/m^3$	5
PM_{10}	Annual	30 $\mu g/m^3$	nil

* parts per hundred million; ** micrograms per cubic metre, at 273K and 101.3 kPa.

[2] Generally, if trigger pollutant criteria were met the lower-risk pollutant criteria would be met.

Although not associated with health effects, deposited dust, if present at sufficiently high levels, can reduce the amenity of an area. The NSW EPA set limits on acceptable dust deposition levels. **Table 12-2** provides the maximum acceptable increase in dust deposition over the existing dust levels.

Table 12-2: NSW EPA Criteria for Dust Deposition

Existing dust fallout level (g/m^2/month)	Maximum acceptable increase over existing fallout levels (g/m^2/month)	
	Residential	Other*
2	2	2
3	1	2
4	0	1

* Other refers to rural, semi-rural, urban commercial and industrial

The maximum acceptable increase in the mean dust deposition rate is $2g/m^2$/month, in those areas where the existing dust deposition rate does not exceed $2g/m^2$/month. The aim of the dust deposition criteria is to limit the total dust deposition rate to $4g/m^2$/month in suburban residential areas and to $5g/m^2$/month in rural, semi-rural, commercial and industrial areas.

12.4 Existing Environment

12.4.1 Climate and Dispersion Meteorology

The impact that air quality emissions from the ILC would have on the surrounding area is dependent on the climate and dispersion meteorology. Average climate data for the Enfield area was obtained from the Bureau of Meteorology meteorological station at Bankstown Airport, approximately 8km south west from the ILC site. However, the Bankstown Airport data do not provide sufficient details for use in air dispersion modelling, as this data represents long-term (30 years) of average meteorological conditions. For air dispersion modelling, at least twelve months of hourly site representative meteorological data must be used.

The meteorological data used in the dispersion modelling was sourced from the NSW EPA site at Lidcombe, located approximately 4 km north west of the ILC site. A description of the wind speed, wind direction, mixing height and atmospheric stability class data used in the dispersion modelling is provided in the following sections. An overview of the temperature and rainfall data obtained from Bankstown Airport is provided below, along with the dispersion meteorological data obtained from Lidcombe.

Temperature

The 9am temperatures range between 9.3°C in July to 22°C in January. The 3pm mean temperature range is between 16.4°C in July and 26.7°C in January. The warmest month of the year is January, which experiences a mean daily maximum temperature of 27.9°C and a mean daily minimum temperature of 18.0°C. July is the coolest month experiencing mean daily maximum and minimum temperatures of 17.1°C and 5.1°C respectively.

Rainfall

The rainfall data shows the warmer months of the year (January, February and March) receive the greatest amount of rainfall. March is the wettest month of the year, receiving mean monthly rainfall of 108.5 mm. The driest month in terms of average rainfall received is September receiving 46 mm. The mean annual rainfall is 900 mm occurring over an average of 115 rain days throughout the year.

Wind Speed and Direction

The 9am wind roses for Lidcombe show that during autumn and winter there is a predominance of light to moderate south west to north westerly winds with westerly winds being most predominant in winter occurring approximately 30% of the time. In autumn westerly winds are present 22% of the time. During spring the westerly winds are still dominant (occurring 19% of the time) but there is an increase in winds from the south south east (occurring 11% of the time). By summer the occurrences of westerly and south-south-easterly winds are approximately equal (11% of the time).

The 3pm wind roses for Lidcombe show that during spring and summer, winds are predominantly from the east and south east with easterly winds present 27% of the time in spring and 37% of the time in summer. By autumn, the easterly and south easterly winds are still dominant. However, there is an increase in winds from the south south east and west. During winter, moderate winds from the south west to north west are the most dominant. .

Mixed Layer Height

The mixing layer height is the height above ground through which ground-based emissions will eventually be dispersed once the plume becomes thoroughly mixed. In general, the mixed layer height and depth increases over the course of the day and is heavily influenced by wind speeds and surface roughness. The mixed layer is an important consideration for determining the dispersion of ground based pollutants such as dusts into the atmosphere. In the Lidcombe meteorological data, the greatest mixing heights (>2,000m) are most frequent between the hours of 1pm and 4pm. The smallest mixing heights, between 0 and 200m, are most frequent between 1am and 8am, and 5pm and 12am.

Atmospheric Stability Class

Atmospheric stability class is used to categorise the rate at which a plume will disperse. Generally the more unstable the condition the more rapidly will the pollutants spread throughout the mixed layer. In the Lidcombe meteorological data, the stability category of the atmosphere is largely unstable during the daytime and stable during the night. Thus, the atmosphere within the vicinity of the ILC site would provide good mixing of air parcels from the surface into higher levels of the atmosphere, with dust emissions from construction activities and emissions during operation expected to disperse rapidly and spread into higher layers of the atmosphere.

Conversely, stable conditions are expected to occur 26% of the time and during these conditions mixing is low. Thus emissions from operation of the ILC would at times be expected to spread as a low plume or “blanket” under very still conditions.

12.4.2 Existing Air Quality

The EPA ambient air quality monitoring stations nearest to, and most representative of, the ILC site at Enfield are those located at Lidcombe, approximately 4 km north west and Earlwood, approximately 6km south east of the ILC site.

Suspended Particulate Matter (PM_{10})

Monthly maximum and monthly average recordings of PM_{10} between 1996 and 2003 were compared with the criteria in **Table 12-1**. The monthly maximum and average 24-hour PM_{10} concentration recorded at Earlwood during 1996–2003 is displayed in **Table 12-3**. **Table 12-3** shows that the 50µg/m^3 criterion was never exceeded at Earlwood when the 24-hour concentrations were averaged throughout the year, although exceedances occurred for short periods on four occasions during the period.

Table 12-3: PM_{10} (24-hour) concentrations at Earlwood (1996-2000)

Year	Average of Monthly Maximum (µg/m^3)	Average of Monthly Average (µg/m^3)	NSW EPA PM_{10} (24-hour) Criteria
1996	37.4	28.5	50 µg/m3
1997	37.8	24.3	
1998	36.0	23.2	
1999	25.2	18.5	
2000	32.3	21.1	
2001	27.1	18.5	
2002	34.9	23.3	
2003	31.2	21.5	
Average	32.7	22.3	

Nitrogen Dioxide (NO_2)

Monthly maximum and monthly average recordings of nitrogen dioxide (NO_2) between 1996 and 2003 were compared with the criteria in **Table 12-1**. The monthly maximum 1-hour average NO_2 concentrations for Earlwood and Lidcombe are provided in **Table 12-4**. The results show that, on average, the NO_2 levels are below the criteria, although the 1-hour average EPA criterion of 12 pphm was exceeded at Lidcombe in February 1998.

Table 12-4: NO_2 (1-hour) concentrations at Earlwood & Lidcombe (1996-2003)

Year	Earlwood		Lidcombe		NSW EPA NO2 1-hour average criterion
	Average of Monthly Max (pphm)	Average of Monthly Average (pphm)	Average of Monthly Max (pphm)	Average of Monthly Average (pphm)	
1996	4.8	2.4	4.6	2.5	12 pphm
1997	5.4	2.7	5.0	2.7	
1998	5.0	2.7	5.4	2.7	
1999	4.4	2.7	4.6	2.8	
2000	4.4	2.6	4.9	2.6	
2001	4.7	2.7	4.9	1.6	
2002	5.0	1.4	3.7	1.3	
2003	4.2	2.4			
Average (pphm)	4.7	2.4	4.7	2.3	
Average ($\mu g/m^3$)*	96.5	49.3	96.5	47.2	

*at 273 K and 101.3 kPa

Deposited Particulate Matter (dust)

The NSW EPA criterion for dust deposition in residential areas is 4 g/m^2/month. No dust monitoring data are available from the ILC site, but an estimate of the existing background dust level in the Enfield area is 2 g/m^2/month, a conservative estimate based on typical dust deposition data for NSW. This estimate allows, for the ILC site, an increment over existing levels of 2 g/m^2/month.

12.5 Project Specific Air Quality Objectives

The project specific air quality objectives are equivalent to the NSW EPA (2001) criteria. That is, for a particular pollutant the background level plus the impact due to any site activities should not exceed the NSW EPA criterion for that pollutant.

For this study, detailed information on background pollutant levels was available from the NSW EPA Lidcombe air quality monitoring station. Hourly averages for background PM_{10} and NO_2 across the proposal site were added to the model-predicted concentrations at each modelled sample point on the site, for that hour. Subsequent pollutant concentration statistics were determined from the totals for comparison with the NSW EPA criteria.

12.6 Construction Air Quality Assessment

12.6.1 Assessment Methodology

The air quality impacts from the construction of the ILC have been assessed by predicting concentrations of particulate matter and dust deposition rates for two scenarios comprising the most intensive construction phases. Scenario 1 was developed from an estimate of the maximum level of activity planned at any time in construction Stage 1 and, similarly, Scenario 2 was developed from a highest level of activity in construction Stage 2. Stages 3 and 4 of the construction would result in limited dust production and were not modelled. ‘Gridded’ and ‘discrete’ receptors were located over and around the site for comparisons of modelled air quality impacts with the relevant air quality criteria listed in **Table 12-1**.

The assessment methodology involves incorporating emission rates for all dust sources associated with construction activities and site-representative meteorological data into the NSW EPA regulatory model AUSPLUME. The annual datasets of hourly-average meteorological and background PM_{10} data used for the dispersion modelling were constructed from NSW EPA Lidcombe station data. The processed meteorological data included hourly averages for temperature, wind speed and wind direction, mixing layer height and stability class.

Dust particle emission rates or TSP emission factors were calculated for the activities described by Scenario 1 and Scenario 2 and these were input to the AUSPLUME model. The rates derived are provided in Appendix F – Air Quality Assessment. The modelling undertaken was a cumulative assessment in that it included dust generation from the existing brick pit site to the south west of the ILC site.

Air dispersion modelling was undertaken for each of the stages presented above using the AUSPLUME model, with Lidcombe meteorological data, which is representative of the long-term meteorological data for the area and consistent with EPA requirements. Monthly averaged dust deposition rates and maximum 24-hour PM_{10} concentration plots were prepared and compared against relevant ambient air quality goals.

Selected sites were identified as discrete receptors to allow ease of impact description. These sites are shown in **Figure 12-1** and are in the following locations (approximately):

- R1 Cosgrove Road;
- R2 Punchbowl Road;
- R3 Boronia Parade;
- R4 Wentworth Street; and
- R5 Roberts Road.

12.6.2 Assessment Results

The AUSPLUME results show that the long-term air quality criteria for PM_{10} and TSP impacts (annual averages), and dust deposition impact (monthly average from annual average), would not be exceeded even by worst-case, high intensity construction activities. Therefore, the focus of the air quality impacts during the construction phase of the project was directed at the potential short-term impacts from PM_{10} concentration. As such, the NSW EPA site criterion for air quality impacts during construction is no more than 5 exceedences per year of the air quality criterion for maximum 24-hour average PM_{10} (50µg/m^3 including background levels).

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Figure 12-1
Discrete Receptor Sites

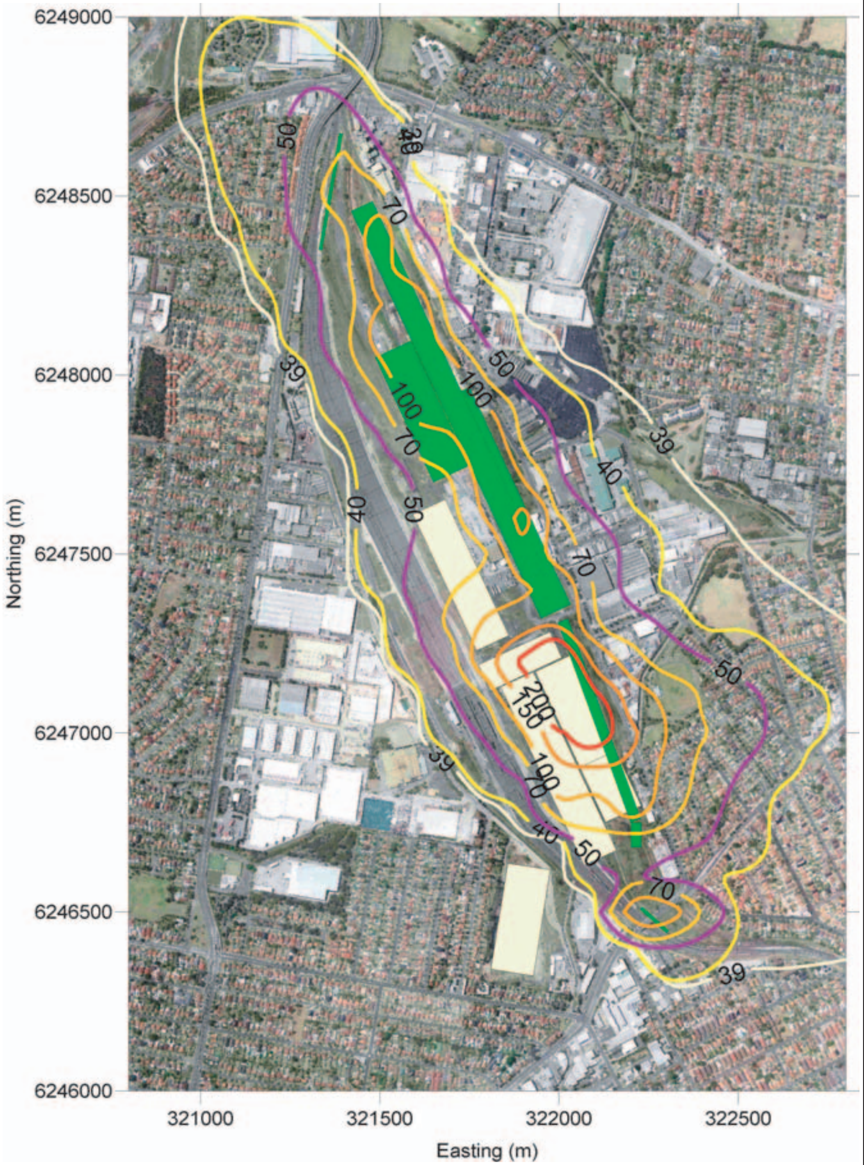
The initial modelling trials included all standard dust mitigation measures, such as use of water sprays on freshly-exposed areas, sealed haul roads, wind breaks where they existed, and water trucks applied to exposed areas used by construction vehicles. These initial trials indicated that even with the usual dust mitigation measures for a construction site, there would be significantly high levels of PM_{10}. Therefore, additional modelling trials were undertaken to determine what further management actions would be required for the modelling estimates of the PM_{10} impacts to fall below the criterion of 50 $\mu g/m^3$. In this respect a first step was to restrict activities only to periods during which hourly average wind speed was less than 5 m/s.

The air quality criterion for maximum 24-hourly average PM_{10} was still slightly exceeded off-site. Therefore the additional restriction of a complete halt to construction operations was applied for all wind speeds when the (incident) wind direction was in the sector 210^o to 340^o. This sector was chosen primarily to reduce the PM_{10} impacts predicted for the residential areas near the south east of the ILC site. The result of this additional restriction reduces the air quality impacts to acceptable levels for both Scenarios 1 and 2. These results are shown in **Figures 12-2** to **12-5.** The results show there are unlikely to be more than 5 exceedences per year of the PM_{10} 24-hour air quality criterion in the majority of areas surrounding the ILC site. They also show that two areas to the south east and north west of the site, where a number of residences exist, are contained within the allowable contour of 5 exceedences of the PM_{10} 24-hour criteria.

While wind speed and wind direction restrictions are required in the modelling to demonstrate compliance with criteria, this should not be interpreted as meaning that construction works need to cease under these meteorological conditions. Any requirement to cease work on these occasions would need to be considered if the real time monitoring devices at sensitive receivers suggest criteria are likely to be exceeded. Monitoring during construction would be undertaken in these areas to ensure air quality impacts are adequately identified and managed. This is discussed in Section 12.9.

With respect to construction stages 3 and 4, air quality impacts would be lower than those for Stages 1 and 2. As such, no dispersion modelling assessment for these stages was warranted. The general dust control measures described for Stages 1 and 2 will be implemented for Stages 3 and 4.

The results for the dust deposition determined from each of the construction scenarios are provided as a single result, determined from an annual statistic. This follows EPA (2001) guidelines where the two annual statistics for dust deposition are added together and converted to a monthly average and added to the background dust deposition of 2 g/m^2/month, determined for the site. The results for monthly average dust deposition at discrete receptors are shown in **Table 12-5**. These results show that no significant air quality impacts are expected from dust deposition, with dust mitigation measures in place.



Construction Scenario 1: Maximum 24-Hour Average PM_{10} Including Background, Criterion 50 ug/m^3 Wind Speed <5 m/s

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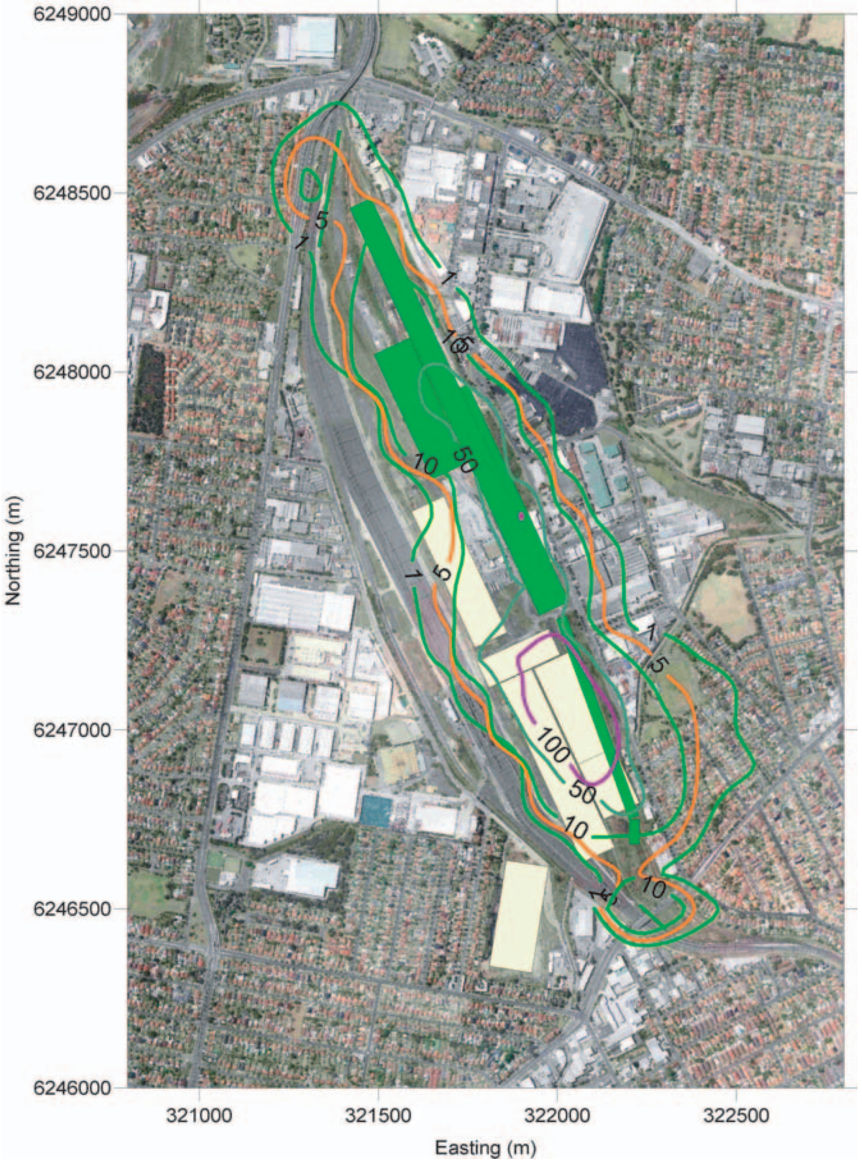
Figure 12-2
Particulate Concentrations During Construction - Scenario 1



Construction Scenario 1: Number of Exceedances of 24-Hour Average PM_{10} Criterion 50 ug/m^3 Wind Speed <5 m/s

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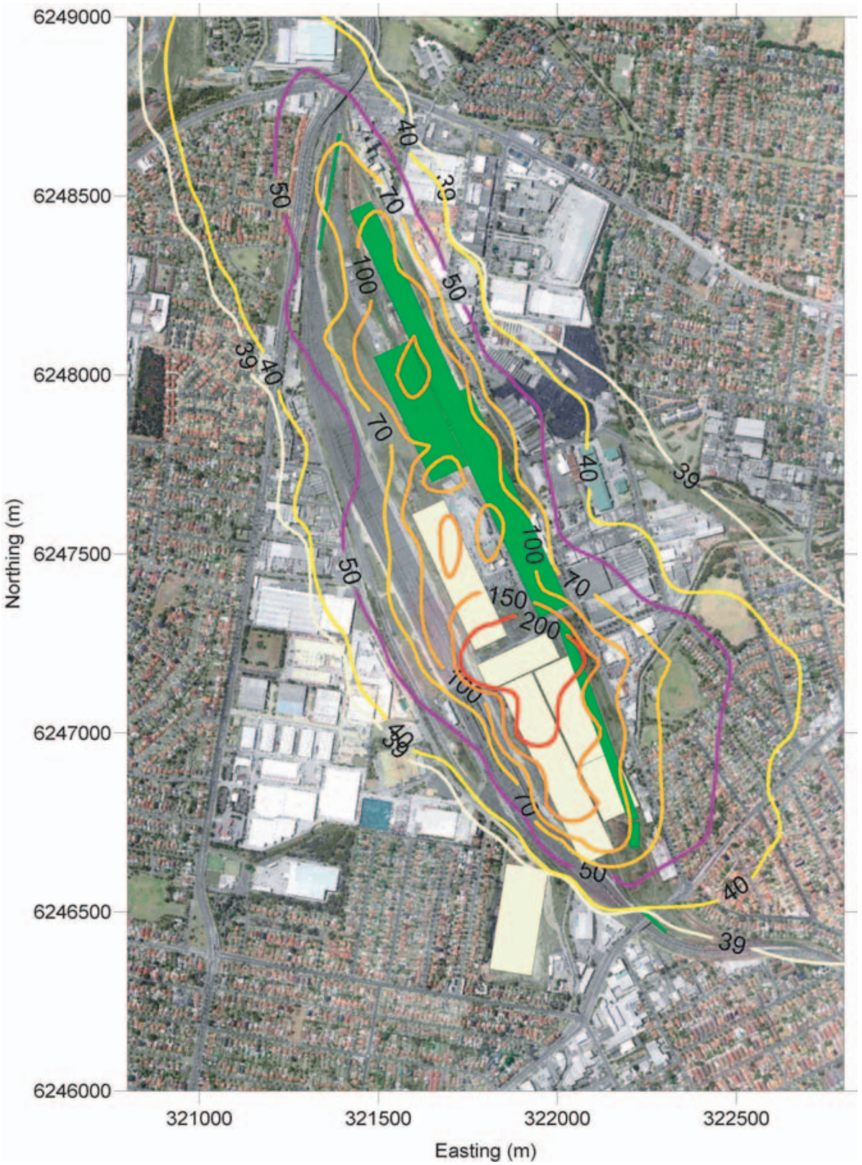
Figure 12-3
Particulate Concentrations Execeedances During Construction - Scenario 1



Construction Scenario 2: Maximum 24-Hour Average PM_{10} Including Background, Criterion 50 ug/m^3 Wind Speed <5 m/s

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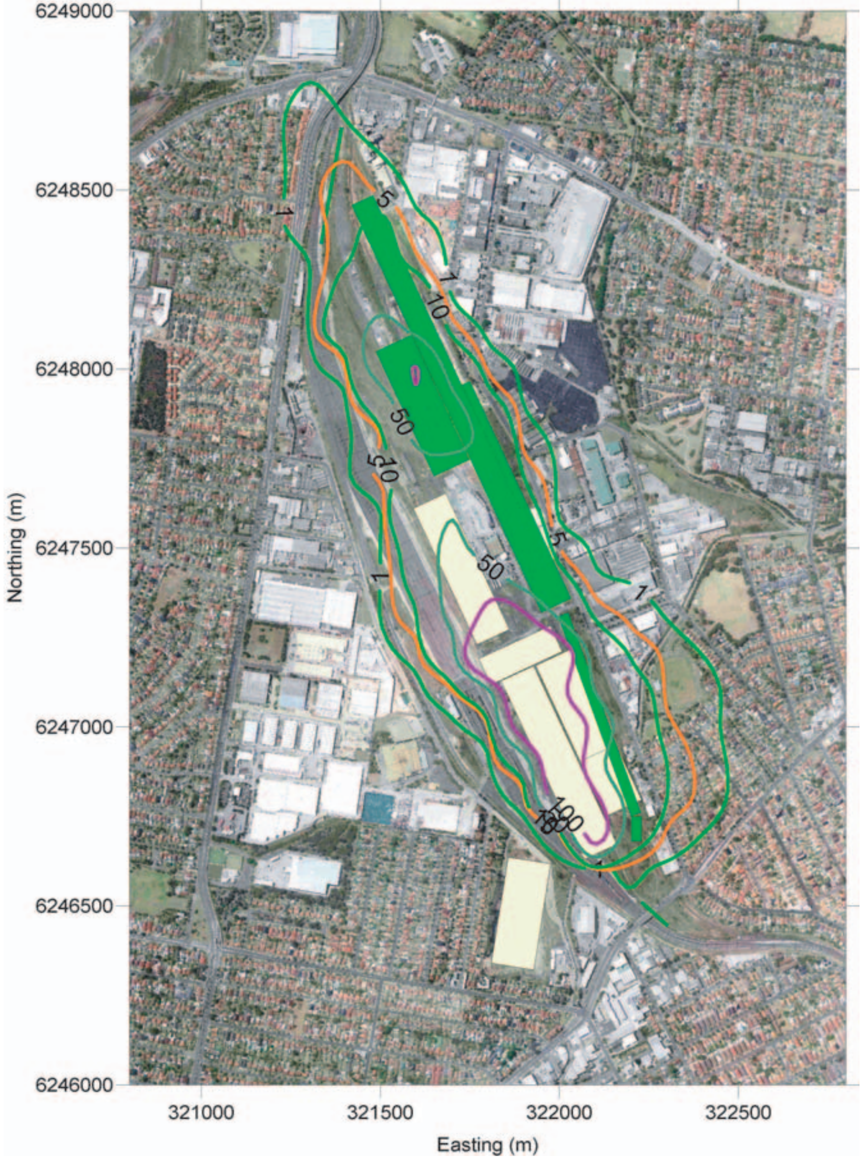
Figure 12-4
Particulate Concentrations During Construction - Scenario 2



Construction Scenario 2: Number of Exceedances of 24-Hour Average PM_{10} Criterion 50 ug/m^3 Wind Speed <5 m/s

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Figure 12-5
Particulate Concentrations Execeedances During Construction - Scenario 2

Table 12-5 Refined Monthly Average Dust deposition for the Discrete Receptors

Discrete Receptor	Site Criterion ($g/m^2/month$)	Refined Monthly Average Dust deposition ($g/m^2/month$)
R1	4.0	3.2
R2	4.0	2.5
R3	4.0	2.0
R4	4.0	2.1
R5	4.0	4.0

12.7 Operational Air Quality Assessment

12.7.1 Assessment Methodology

Oxides of Nitrogen (NO_2) and Particulate Matter (PM_{10})

The air quality impacts from an operating ILC have been assessed by predicting concentrations of PM_{10} and NO_2 for a single scenario comprising the ILC running to full capacity. This is outlined in detail in Appendix F, but includes an estimate of the busiest hourly period by the capacity of on-site machinery for a peak operating year. The equipment considered included locomotives, trucks, container handling machines such as forklifts, gantry cranes and reach stackers. Emission rates were calculated for all equipment likely to operate on the site.

Potentially affected receptors were located within (grided receptors) and around the site (discrete receptors) for comparisons of modelled air quality impacts with the NSW EPA (2001) and NEPC (1998) air quality criteria for PM_{10} and NO_2.

The same meteorological data used for the construction air quality assessment was used for the operational scenario. Air emission factors sourced from USEPA (1997), USEPA (1998) and Environment Australia (2003) were used to calculate pollutant emission rates from the vehicle/motor sources. These were combined with operations data associated with a maximum level of activity expected for the ILC to create a worst-case PM_{10} and NO_2 emissions scenario for the modelling. The air emissions were input into the AUSPLUME air dispersion model for the prediction of Ground Level Concentrations (GLCs). The AUSPLUME model was run for each pollutant and the output GLCs were compared to the relevant air quality criteria.

Road Traffic Air Quality

The study also included an assessment of the potential off-site air quality impacts associated with truck movements on the road network resulting from the operation of the proposed ILC site. The modelling for these impacts was undertaken for the roads that currently have residential developments and are likely to receive the greatest total increase in traffic volume as a result of the proposed ILC. Traffic volumes were derived from Appendix B – Traffic and Transport Assessment. The data are shown in **Table 12-6**.

Table 12-6: Daily Road Network Traffic Volumes for 2016

Road	No Enfield ILC (2016)			With Enfield ILC (2016)		
	Cars	Heavy Vehicles	Total	Cars	Heavy Vehicles	Total
Roberts Rd	58 198	7 125	65 323	58 210	7 126	65 336
Punchbowl Rd	33 094	1 723	34 817	33 625	1 749	35 374
King Georges Rd	61 524	7 583	69 107	61 789	7 616	69 405
Hume Hwy	63 910	4 208	68 118	63 635	4 185	67 820

Table 12-6 indicates that traffic volumes will increase slightly on the surrounding road network on the roads identified, with the exception of the Hume Highway where there will be a net decrease in traffic. This decrease is due to changing travel patterns which may arise from traffic congestion due to traffic growth on the network.

12.7.2 Assessment Results

Oxides of Nitrogen (NO_2)

The NO_2 concentrations at the five nearest off-site receiver locations are shown in **Table 12-7**. These results show maximum hourly NO_2 concentration, which includes background NO_2 levels. As shown by **Table 12-7** there are no exceedences of the air quality criterion for maximum hourly NO_2 concentration, of 246 $\mu g/m^3$.

Table 12-7: AUSPLUME Results for NO_2 GLC at Discrete Receptors

Discrete Receptor	Maximum Hourly NO_2 ($\mu g/m^3$)	Annual Average NO_2 ($\mu g/m^3$)
R1	190	56.7
R2	187	52.8
R3	171	51.0
R4	173	51.4
R5	187	51.6

The AUSPLUME result for all-hours average NO_2 was obtained from the same emissions scenario used to predict the maximum hourly NO_2 impact. This is an overestimate of the annual average NO_2 concentration as it is based on the busiest hour in a year, being undertaken for every hour of the year. This result also includes background NO_2 levels, and shows that no exceedences of the annual average NO_2 criterion of 62 $\mu g/m^3$ are expected to occur from a highest intensity hour of the ILC operation occurring over a whole year.

Particulate Matter (PM_{10})

The PM_{10} emission predictions for the maximum 24-hour average PM_{10} GLC that were obtained from AUSPLUME models are shown in **Table 12-8.** The results for the nearest off-site discrete receptors

'R1' to 'R5' show that there were no exceedences of the relevant 50 μg/m^{3}criterion for any of the receptors.

Table 12-8: Predictions of 24-Hour Maximum PM_{10} (μg/m^3) for Discrete Receptors

Discrete Receptor	Maximum 24-Hour Average PM_{10} (μg/m^3)*
R1	46.4
R2	42.8
R3	38.5
R4	38.5
R5	39.1

*All the results include background hourly average PM_{10}.

The AUSPLUME results based on the maximum 24-hour average PM_{10} expected in a year for each grided receptor show that there is a very low risk of air quality impacts from the exceedence of the 50 μg/m^3 criterion level at locations outside of the site. The maximum number of exceedences of this criterion predicted for any of the 651 grid receptors was three, for an on-site receptor located near the proposed Intermodal Terminal area. This is within the ambient air quality criterion for PM_{10}, of 5 allowable exceedences per year (NEPC, 1998).

The AUSPLUME result for 'all hours average PM_{10}', which provides an overestimate of annual average PM_{10} because worst-case hourly emissions were modelled for each hour of a year, shows that there is virtually no risk of the annual average PM_{10} criterion of 30 μg/m^3 being exceeded from on-site operations.

Road Traffic Air Quality

The results of the air quality impact assessment for traffic volume increases off-site show that maximum 24-hourly average concentrations of PM_{10} and NO_2 increase in range from 0 to 0.5 μg/m^3 (against the criterion of 50 μg/m^3) and 0 to 15 μg/m^3 (against the criterion of 246 μg/m^3) respectively, with the maximum increases occurring directly above the road surface. Impacts of this order are insignificant when compared with the ambient air quality criteria. This demonstrates that increased vehicle movements on any roads surrounding the ILC site which may experience increases and/or decreases in vehicle traffic as a result of the project would not affect overall air quality in the area.

12.8 Rail Operations

Chapter 8 of the Environmental Assesment indicated that, if the NSW Government policy is achieved of carrying 40% of container freight from Port Botany by 2011, the number of freight trains using the dedicated line from Port Botany would increase significantly beyond current levels, regardless of whether the ILC at Enfield is developed or not.

The proposed ILC would not be generating more freight trains along the line. Rather, it would provide a loading / unloading point for some freight trains that are expected on and must use that line. The management and regulation of air quality issues on the freight line is a matter for RailCorp (the current Environment Protection Licence (EPL) holder), the future EPL holder (ARTC from 2006) and the regulator of the licence (Department of Environment and Conservation (DEC)). No assessment was undertaken for air quality associated with locomotives using the dedicated freight rail line.

12.9 Mitigation Measures

Construction

The potential for off-site dust emissions created during the construction of the ILC would be minimised through the development and implementation of a Dust Management Plan (DMP) as part of the Construction Environmental Management Plan (CEMP) prepared as part of the project.

The DMP would include details of a dust-level monitoring program undertaken prior to the commencement of earthworks and during construction works. This would be used to establish 'background' dust levels in the vicinity of the ILC site before construction and enable comparison against levels recorded during construction. In addition, monitoring at sensitive receivers during construction would allow reporting on dust impacts on a regular basis, to determine if earthworks contribute PM_{10} levels over and above the pre-determined background levels. Specifically where excursions above PM_{10} (24-hour) – 50 $\mu g/m^3$ are reported and shown to be attributed to the earthworks at the site, dust management measures can be implemented.

A meteorological monitoring station will be installed at the site of the proposed ILC when background monitoring commences. This will allow the collection of sufficient data to identify whether adverse air quality impacts within the nearest residential areas could be attributed to construction earthworks. All monitoring would be undertaken in accordance with the NSW EPA (2001) Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales. The monitoring devices shall be located in accordance with AS 2922-1987 – Ambient Air-Guide for Siting of Sampling Units and AS2923 – Ambient Air – Guide for the Measurement of Horizontal Wind for Air Quality Applications.

To minimise potential impacts on air quality resulting from dust generation during the construction phase of the proposal the DMP would include the following mitigation measures and controls which were incorporated into the air quality modelling:

- Undertake regular watering of active work areas, including stockpiles and loads of soil being transported, to reduce wind blown dust emissions;
- Sealed haulage roads to be provided and haulage trucks to use the sealed bitumen haul roads at all times when transporting materials on-site;
- Construct wind breaks in appropriate zones to reduce wind erosion;
- Assess construction works activity and modify as appropriate if off-site real-time dust monitoring data indicates ambient air quality criteria are likely to be exceeded due to project earthworks activity;
- Minimise the area of disturbed / exposed land at any one time;
- Revegetate stockpiles, seal or progressively landscape exposed areas and where material is to remain in situ for a long period of time.

Operation

The results of the assessment show that operational impacts on air quality associated with the ILC are shown to be acceptable. On a local scale, the incremental increase in emissions of PM_{10} and NO_2 concentrations do not result in any exceedence of the NSW EPA air quality objectives. As a result, no specific air quality mitigation measures would be required during the operation of the ILC.

An Operational Environmental Management Plan (OEMP) would be prepared as part of the project development. This would include a program for the on-going management of air quality impacts associated with the ILC.

12.10 Cumulative Assessment

The assessment of both construction and operational phase air quality impacts considered cumulative impacts by including background levels of air pollution within the various modelling assessments. For this study, detailed information on background pollutant levels was available from the NSW EPA air quality monitoring stations. Hourly averages for background PM_{10} and NO_x as measured in the area were added to the model-predicted concentrations at each receptor surrounding the site, using contemporaneous meteorological data. Subsequently, the assessment considers cumulative impacts by comparing pollutant concentration statistics (including both existing background and future impact levels) with the NSW EPA criteria.

At this stage there are no other known development proposals which may contribute to air quality impacts / issues in the Enfield area at the same time as the ILC which could result in additional impact to those assessed here.

12.11 Conclusions

The construction air quality assessment shows that, with the prescribed mitigation measures in place, the ambient air quality criteria for particulate matter and deposited dust would be met around the site borders. This would be confirmed during the construction phase by continual monitoring of 24-hourly average PM_{10} levels around the site. Showing that the 24-hourly PM_{10} criterion is met will indicate the other particulate matter and dust deposition criteria have also been met. A Dust Management Plan, prepared as part of the Construction EMP, would detail all measures used to mitigate dust during the construction of the ILC.

The air quality assessment of the on-site ILC operations phase concludes that with emissions from a capacity ILC vehicle-and-machine fleet modelled 24 hours per day over the course of a year, the risk of air quality impact from the two key pollutants during operations is very low. The assessment of the air quality impacts from increases in off-site vehicle traffic indicates that only marginal increases in PM_{10} and NO_2 concentrations can be expected, and these are much less the criteria for those parameters.

Cumulative impacts were included in the assessment of both construction and operational phase air quality impacts by including background levels of air pollution within the various modelling assessments.