Intermodal Logistics Centre at Enfield

Modification Application No. 5

On Site Management of Unsuitable Engineering Fill

May 2011

ILC - E - PT3A - Modification App No _5 On Site Mgmt of Fill Final v1.0 19 May 2011.docx

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Abbreviations

DECCW	Department of Environment, Climate Change and Water (now Office of Environment and Heritage)
DoPI	Department of Planning & Infrastructure
DP	Deposited Plan
DUAP	Department of Urban Affairs and Planning (now Department of Planning & Infrastructure)
EA	Environmental Assessment
EEC	Endangered Ecological Community
EIA	Environmental Impact Assessment (as defined by the *Environmental Planning and Assessment Act, 1979*)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environment Protection Authority (now part of the Office of Environment and Heritage)
EP&A Act	*Environmental Planning & Assessment Act 1979*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
EPI	Environmental Planning Instrument
ILC	Intermodal Logistics Centre
LGA	Local Government Area
OHS	Occupational Health and Safety
PM	Particulate Matter
POEO Act	*Protection of the Environment Operations Act 1997*
PSO	Planning Scheme Ordinance
RTA	Roads and Traffic Authority
TSC Act	*Threatened Species Conservation Act 1995*

1 Introduction

Sydney Ports submits this application to the Department of Planning & Infrastructure (DoPI) to modify the Project Approval granted by the Minister for Planning on the 5 September 2007 under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the development of an Intermodal Logistic Centre (ILC) at Enfield (Application Number 05_0147).

This application, submitted under Section 75W of the EP&A Act, applies to the onsite relocation and reuse of excavated material deemed unsuitable for engineering fill at the ILC operational areas to the southern part of the site. It is proposed to place the fill on and around the stockpile located at the southern part of the site and referred to in this document as "Mt Enfield", as shown on Figures 1.2, 1.3 and 1.4.

This application is made as part of Sydney Ports' commitment to reduce local area traffic impacts and to continually investigate and propose mitigation measures that minimise off-site impacts by internalising project activities. Benefits of the proposal are discussed in Section 2.4.

In this document, the site is defined as the land to be developed as part of the ILC project and defined in the Project Approval as the land to which Major Project Application 05_0147 applies. The proposed reuse area is located in Lot 14 DP 1007302 and within the ILC approved land site (refer to Figure 1.1).

PLAN LIMITATION STATEMENT

This plan has been prepared in accordance with accepted practice for the use only of Sydney Ports Corporation for a specific purpose. No Warranty or representation, expressed or implied is made to any other party regarding this survey and plan. This plan should not be relied upon for any other purpose or use by any party including Sydney Ports Corporation as the plan may not contain sufficient information for that purpose or use.

THIS NOTE IS AN INTEGRAL PART OF THIS PLAN

NOTE : STATED MEASUREMENTS ARE INDICATIVE ONLY AND SUBJECT TO SURVEY

50m 0 50 100 150 200 250 300 350 400 450 500m

Scale in Metres

N

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PLAN PRODUCED ON MGA GRID

FIGURE 1.1
ILC AT ENFIELD
LOCATION OF "MT ENFIELD" WITHIN THE ILC AND SURROUNDING LAND USES

DRAFTED BY: A.K.	DATE: 04/05/2011	PLAN SCALE: AS PER SCALE BAR
	PROJECT CODE: ILC-ECI-DR-C-FIG 1.1 MOD 5	DWG NO: SENP092A

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ILC Site Boundary

Location of Reuse area

Scale in Metres

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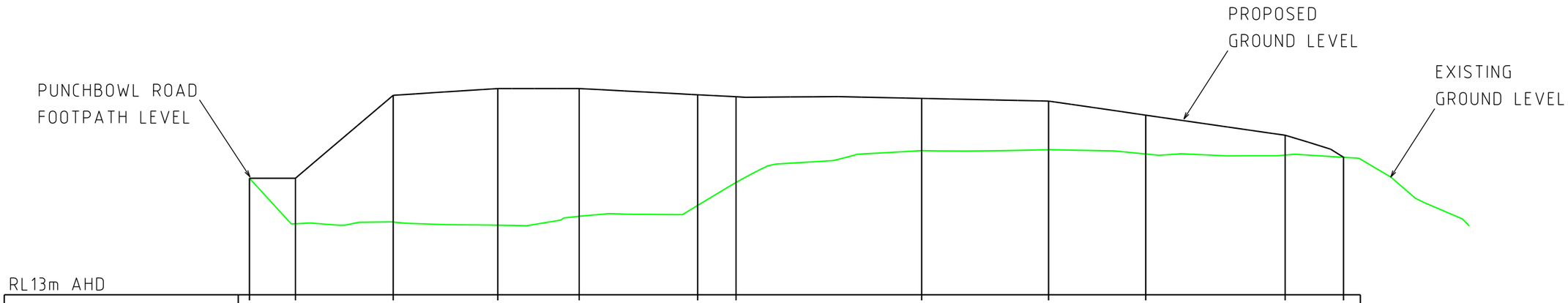
PLAN PRODUCED ON MGA GRID

FIGURE 1.2
ILC AT ENFIELD
LOCATION OF FILL REUSE AREA

DRAFTED BY: J.T.	DATE: 03/05/2011	PLAN SCALE: AS PER SCALE BAR
PROJECT CODE: ILC-ECI-DR-C-Fig 1.2 Mod 5		DWG NO: SEDP169A



PRPOSED GL	26 000	25 998	35 250	36 000	36 000	35 310	35 086	34 902	34 600	33 035	30 800	28 332
EXISTING GL	25 998	20 921	21 108	20 762	21 759	22 962	25 515	29 076	29 179	28 703	28 582	28 333
Depth OF FILL	-0 002	-5 077	-14 142	-15 238	-14 241	-12 348	-9 572	-5 826	-5 421	-4 332	-2 218	0 001
Chainage	0 000	10 252	32 084	55 413	73 574	100 000	108 574	150 000	178 313	200 000	231 083	244 133

5m 0 5 10 15 20 25 30 35 40 45 50m
Scale in Metres (Horizontal)

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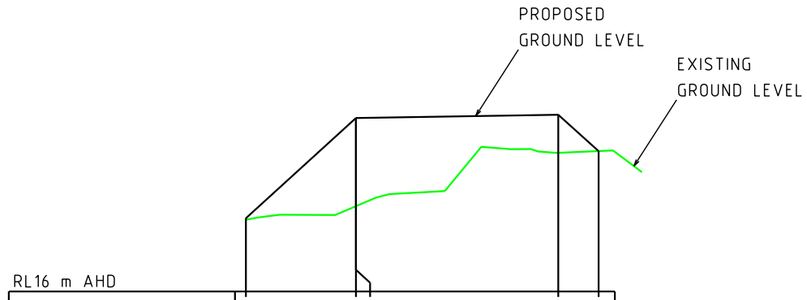
PLAN PRODUCED ON MGA GRID

FIGURE 1.3
ILC AT ENFIELD
FILL REUSE AREA LONG SECTION

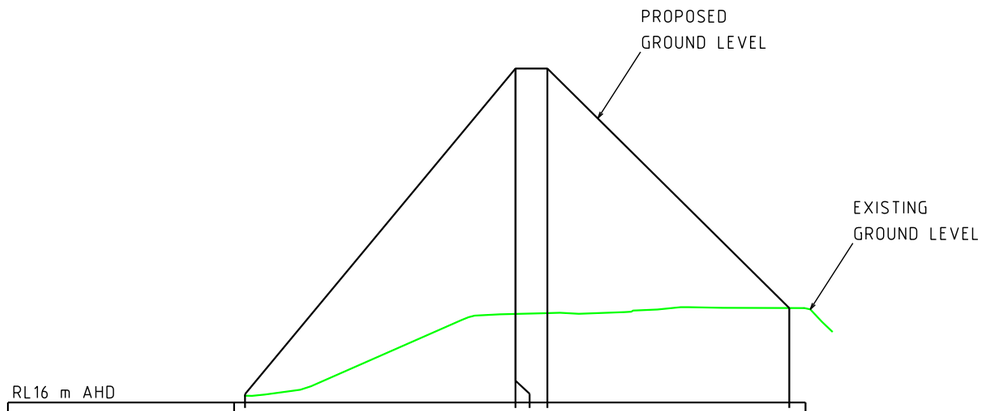
DRAFTED BY: J.T.	DATE: 03/05/2011	PLAN SCALE: AS PER SCALE BAR
PROJECT CODE: ILC-ECI-DR-C-FIG 1.3 Mod 5		DWG NO: SEDP170A



RL16 m AHD

PROPOSED GL	20 225	25 998 25 998	26 185	24 091
EXISTING GL	20 143	20 921 20 921	23 994	24 091
Depth OF FILL	-0 081	-5 077 -5 077	-2 192	0 000
Chainage	-12 700	0 000 0 000	23 334	27 992

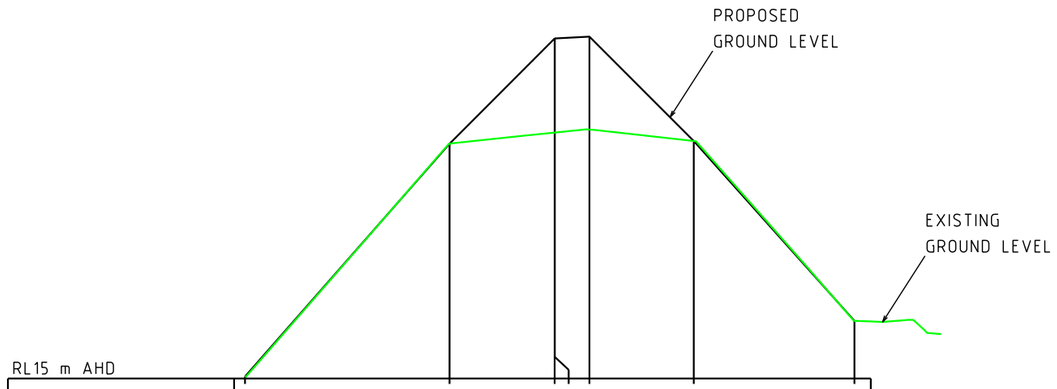
X SECT CH10 252



RL16 m AHD

PROPOSED GL	16 479	35 250 35 250 35 250	21 443
EXISTING GL	16 386	21 108 21 108 21 151	21 443
Depth OF FILL	-0 093	-14 142 -14 142 -14 099	0 000
Chainage	-31 207	-0 000 0 000 3 682	31 581

X SECT CH23 083



RL15 m AHD

PROPOSED GL	15 113	28 535	34 600 34 600 34 710	28 688	18 325
EXISTING GL	15 113	28 535	29 179 29 179 29 351	28 688	18 324
Depth OF FILL	-0 000	-0 000	-5 421 -5 421 -5 359	0 000	-0 001
Chainage	-35 719	-12 130	-0 000 0 000 4 010	16 053	34 585

X SECT CH178 312

5m 0 5 10 15 20 25 30 35 40 45 50m
Scale in Metres (Horizontal)

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PLAN PRODUCED ON MGA GRID

FIGURE 1.4
ILC AT ENFIELD
FILL REUSE AREA CROSS SECTIONS

DRAFTED BY: J.T.	DATE: 03/05/2011	PLAN SCALE: AS PER SCALE BAR
PROJECT CODE: ILC-ECI-DR-C-Fig 1.4 Mod 5		DWG NO: SEDP171A

2 Description of the Proposal

2.1 Background

The Environmental Assessment for the ILC (SKM, 2005) estimated that approximately 37,000 m^3 of material unsuitable for engineering fill would be removed from the site and disposed off site to a landfill facility. Recent site investigations undertaken as part of the design development phase of the project indicate that the volume of unsuitable material at the site which must be disposed of may be up to 60,000 m^3.

The proposal subject to this Modification Application involves the relocation and reuse of the unsuitable material to the southern part of the site on and around Mt Enfield. Mt Enfield would be expanded and raised by approximately 6.7 m at its highest point, flattened at the top and landscaped. For details refer to Figures 1.2, 1.3 and 1.4.

2.2 Construction

The proposed relocation of material will be undertaken progressively during the main construction phase of the project, which is expected to last approximately 18 months. Approximately 80% of the material will be relocated to Mt Enfield in the first 6 months, with the remainder occurring progressively over the following 12 months, after which time landscaping works will be carried out.

During main construction, which will include site grading and cut and fill works, material will be sorted using excavators. Material unsuitable for engineering fill will be separated, loaded into trucks from the main construction area and hauled to the southern part of the site via a designated internal haul route.

The nature and quantity of unsuitable material to be relocated is anticipated to be composed of:

- Grubbed vegetation (soil mixed with vegetation material): approximately 10,000 m^3
- Wet and unsuitable gravels/clay fill: approximately 20,000 m^3
- Boulders, unsuitable materials and sleepers: approximately 30,000 m^3.

The material will be deposited in designated prepared areas on and around Mt Enfield. An excavator or bulldozer will spread, level and track roll to nominally compact the material. A watercart will spray water onto the internal haul route and material deposition area to control any potential dust.

Based on a material volume of 60,000 m^3, or 120,000 tonnes, approximately 8,000 short truck movements (to and back) will be required to transport the material internally within the site, based on a standard 30 tonne truck and dog rig. This is equivalent to an average of about 26 to 48 internal truck movements per standard working day or 2 to 5 internal movements per hour over the estimated 18 month relocation period. The truck movements will be short in distance, ranging from 400 m to a maximum of 2 km, and will not involve the use of any public roads.

On completion, landscaping will be undertaken in accordance with the landscape plan prepared in accordance with Condition of Approval 6.3 d) and provided in Appendix C.

Earthworks and excavation activities at the main ILC site will remain as described and assessed in the EA (SKM, 2005). Consequently this modification application addresses the impacts associated with the reuse of fill at the southern part of the site, and not construction site activities at the operational areas of the ILC site which were assessed in the EA.

2.3 Post-Construction

The reshaped and landscaped Mt Enfield will be visible from a number of residential areas and Punchbowl Road, as discussed in the visual assessment presented in Section 3.2.1. The highest point of Mt Enfield will be raised from 29.3 m AHD to approximately 36.0 m AHD.

The level of the footpath on the northern side of Punchbowl Road is approximately 26 m AHD. The area within the ILC site immediately north of Punchbowl Road will be filled to the same level as the footpath for a distance of approximately 10 - 12 m, before rising at a slope of 1V:2.5H to 35.25 m AHD and then flattening out to the highest point of 36 m AHD. The northern, eastern and western sides of Mt Enfield will have a slope of 1V:2H.

Controlled and restricted public access to a lookout at the top Mt Enfield will be provided. Visitors will be able to access the lookout area via a secure pathway, accompanied by Sydney Ports' personnel or an authorised contractor. Visits will be organised on a pre-booking arrangement.

2.4 Benefits of the Proposal and Justification

This proposal to place material unsuitable for engineering fill on and around Mt Enfield will provide a number of benefits to the project and the local community, including:

- avoiding the traffic impacts of around 8,000 truck movements on public roads for the off-site transport of fill to a landfill facility;
- avoiding the energy consumption and greenhouse gas emissions which would result from the off-site removal of the material;
- not using 60,000 m^3 of landfill space;
- recovery and capture of the unsuitable engineering material from the site at one managed location on the site;
- potential acoustic benefits to residents in Strathfield South by providing shielding against rail noise from the adjacent RailCorp Marshalling Yards and traffic noise from Punchbowl Road;
- stabilising and reshaping Mt Enfield to a more regular shape to allow easier landscaping and maintenance, and potential community opportunities;
- improved the ecology on Mt Enfield due to the landscaping with endemic native species.

The proposal is justified by the benefits described above. The proposal is not anticipated to be impacted by any future project modifications as the volume of material unsuitable for engineering fill identified in this proposal is assumed to be the maximum possible. Any potential future changes in site layout in operational areas will still require the management of material unsuitable for engineering fill.

3 Assessment

3.1 Construction Phase

3.1.1 Noise

Sydney Ports commissioned SLR Consulting Australia Pty Ltd (SLR) to undertake a construction noise impact assessment for the proposed modification. The assessment is provided in full in Appendix A. The results of the assessment are summarised below.

Existing Environment and Previous Assessment

A Noise Impact Assessment (NIA) was undertaken by Renzo Tonin & Associates Pty Ltd (RT) as part of the Environmental Assessment (EA) (SKM, 2005) for the construction and operation of the proposed ILC. The location of the nearest noise sensitive receivers to the proposed works at Mt Enfield are provided in Table 3.1 below. Figure 3 in Appendix A shows these locations graphically.

Table 3.1: Nearest Noise Sensitive Receivers to Proposed Work at Mt Enfield

Assessment Location	Address	Receiver Type	Approximate Distance from Mt Enfield
A3	Wentworth Street	Residential	330 m
A5	Cosgrove Road	Residential	90 m
A6	Punchbowl Road	Residential	60 m

The RT NIA assessed the potential noise impacts from the various construction stages of the ILC in accordance with the then current *Environment Noise Control Manual* (Roads and Traffic Authority, 2001). Subsequently, the NSW Department of Environment, Climate Change and Water released the *Interim Construction Noise Guideline* (ICNG) in July 2009. SLR considered that the criteria provided in the ICNG were appropriate for the assessment of the potential construction noise impacts from the proposed modified ILC earthworks. Both criteria, together with the background noise levels, are provided in Table 3.2 below.

Table 3.2: Construction Noise Assessment Criteria - Daytime (dBA)

Assessment Location	Background Noise Level	Construction Criterion	
	L_{A90} Source: EA	$L_{A10(15\ min)}$ Source: ENCM (Superseded)	$L_{Aeq(15\ min)}$ Source: ICNG
A3	44	49	54
A5	41	46	51
A6	41	46	51

Assessment

The RT NIA noise assessment presented in the EA included the activities approved under the Project Approval. The SLR noise assessment carried out for this Modification Application predicted the noise emissions from the proposed filling activities at Mt Enfield. The SLR NIA also provides the cumulative noise emissions from both the approved activities (predicted by RT) and the additional filling activities at Mt Enfield.

Both assessments are based on the worst case noise generation scenario where shielding from intervening structures and noise control treatments are not considered, all plant are assumed to be operating simultaneously and construction noise sources are assumed to be located at the closest possible point to residences. Further details of the assumptions made for the SLR modelling are provided in Appendix A of this Modification Application.

Table 3.3 below provides the results for the RT and SLR NIAs.

Table 3.3: Predicted Worst Case Intrusive Construction Noise Levels (dBA)

Assessment Location	ICNG Construction Criterion $L_{Aeq\ (15\ min)}$	RT NIA Predicted Noise Level Source: EA	SLR NIA Mt Enfield Modification Noise Level	Cumulative Construction Noise Level	Increase on RT NIA Noise Level
A3	54	68	46	68	0
A5	51	81	55	81	0
A6	51	75	66	76	<1

The results shown in Table 3.3 are consistent with the EA indicating the risk of occasional potential exceedances of the project construction noise criteria at the nearest residences under worst case scenario and assuming no noise controls are in place. However, the additional noise contribution from the proposed modification is negligible (0 or <1 dBA) at all surrounding residences.

SLR's results indicate that the construction activities associated with the modification would not result in noticeable increases to the ILC site construction noise emission levels predicted in the EA. As was found in the EA, SLR's results indicate that under worst case scenario with equipment operating at their closest point to residences, no control measures in place and all equipment operating at once, potential occasional exceedances could occur, but these can be mitigated through the implementation of the following measures:

- plant items to have their noise emission levels measured before they are used at the spoil reuse area to check against assumed assessment sound power levels in the RT NIA;
- plant and equipment to be inspected regularly to ensure it is in good running order, regularly maintained and free of defective components to minimise noise emissions;
- noisy plant and equipment to be located as far as possible from noise sensitive areas, optimising attenuation effects from topography, material stockpiles and existing built barriers;
- plant operators to be inducted in noise management to operate the equipment in the quietest way possible;
- compliance noise monitoring to be undertaken on a regular basis (eg. monthly) during fill placement activities at the nearest residential areas;
- regular community consultation, including notification of the works in advance, to be undertaken;
- complaints to be dealt with in accordance with the Contractor's documented complaints handling procedure;
- work must be carried out within the standard working hours provided in the Project Approval, unless approval has been obtained from the DoPI for out of hours works.

The above mitigation measures will be included in the CEMP for the works.

3.1.2 Dust

Sydney Ports commissioned SLR Consulting Australia Pty Ltd (SLR) to undertake a construction air quality impact assessment for the proposed modification. The assessment is provided in full in Appendix B. The results of the assessment are summarised below.

Existing Environment and Previous Assessment

An Air Quality Impact Assessment (AQIA) was undertaken as part of the Environmental Assessment (EA) (SKM, 2005) for the construction and operation of the proposed ILC.

The EA AQIA identified that the highest risks to air quality associated with the project were impacts from emissions of particulate matter during the earthworks phase of the project, when cut and fill activities were being carried out.

The modelling results indicated that there was only a low risk of exceedance of the maximum 24-hour average PM_{10} criterion at the off-site residential areas to the southeast of the site if mitigation measures were implemented.

The air quality goals adopted for both the EA and this assessment are those specified in *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DECCW, 2005). The adopted goals, presented in Table 3.4, are also consistent with the goals identified in the Project Approval.

Table 3.4: Project Air Quality Criteria

Pollutant	Averaging Time	NSW OEH Criteria
PM_{10}	24 hours Annual	50 µg/m^3 30 µg/m^3
Total Suspended Particle (TSP)	Annual	90 µg/m^3
Dust Deposition	Annual	Maximum increase of 2 g/m^2/month Maximum Total of 4 g/m^2/month

Total particulate emissions from the construction activities, as outlined in the EA AQIA, have been included in the results. The calculated incremental results at sensitive receptors have been added to the results from the EA AQIA. Both emissions from the construction activities and background data are thus included in the background results.

The proposed fill reuse activities are anticipated to occur during the construction cut and fill works. Predicted EA cut and fill dust impacts have therefore been used as background data in this assessment.

Assessment

The Ausplume Gaussian Plume Dispersion Model software (Version 6.0) developed by the Victorian EPA has been utilised within this assessment. Air pollutant concentrations were simulated for a regular Cartesian receptor grid covering a 2 km by 3 km domain centred on the ILC Site, with a grid resolution of 100 m. Concentrations were also predicted at the various discrete receptor points (R1-R5) identified in the EA and shown in Appendix B. Receptors R1 and R2 are located in the residential areas to the south-east of the site, receptors R3 and R4 are located in the residential areas to the south-west of the site, and receptor R5 is located to the north-west of the site.

Table 3.5, Table 3.6, Table 3.7 and Table 3.8 show the worst case scenario results of the dispersion modelling assessment for dust deposition, TSP, PM_{10} concentrations (annual average) and PM_{10} concentrations (24 h average) respectively.

Table 3.5: Predicted Incremental and Cumulative Dust Deposition (annual average g/m^2/month)

Receptor ID	Predicted increment due to filling works	Background EA	Increment EA	Cumulative	Assessment Criteria	
					Increment	Cumulative
R1	<0.1	2.0	1.2	3.2	2.0	4.0
R2	<0.1	2.0	0.5	2.6	2.0	4.0
R3	<0.1	2.0	0.0	2.0	2.0	4.0
R4	<0.1	2.0	0.1	2.1	2.0	4.0
R5	<0.1	2.0	2.0	4.0	2.0	4.0

Table 3.6: Predicted incremental and cumulative TSP concentrations (annual average µg/m^3)

Receptor ID	Predicted increment due to filling works	Background EA	Cumulative	Assessment Criterion
R1	0.5	38.1	38.6	90
R2	0.9	32.9	33.8	90
R3	0.2	30.3	30.5	90
R4	0.2	31	31.2	90
R5	<0.1	37.4	37.4	90

Table 3.7: Predicted incremental and cumulative PM_{10} concentrations (annual average µg/m^3)

Receptor ID	Predicted increment due to filling works	Background EA	Cumulative	Assessment Criterion
R1	0.2	20.6	20.8	30
R2	0.4	17.9	18.3	30
R3	<0.1	16.2	16.2	30
R4	0.1	16.4	16.5	30
R5	<0.1	19.3	19.3	30

Table 3.8: Predicted incremental and cumulative TSP concentrations (24h average µg/m^3)

Receptor ID	Predicted increment due to filling works	Background EA Cut and fill	Cumulative	Assessment Criterion
R1	2.1	62.6	64.7	50
R2	4.8	47.0	51.8	50
R3	1.6	38.5	40.1	50
R4	1.6	38.5	40.1	50
R5	0.4	56.5	56.9	50

As shown in the results above, dust deposition, annual average TSP and annual average PM_{10} concentrations are predicted to be below the assessment criteria at all sensitive receptors.

SRL also found that there is only a low risk of offsite impacts from short term (24h average) PM_{10} levels due to the fill emplacement activities at surrounding receptors if dust mitigation measures are implemented. Model results are based on conservative model assumptions and worst case scenarios (such as existing PM_{10} background concentrations in the order of 40 µg/m^3, all plant operating at once, large areas of the site exposed, etc), which are considered unlikely to occur concurrently.

Potential short term PM_{10} impacts can be managed by implementing the following dust management and mitigation measures, some of which are already being implemented:

- Continuation of real-time meteorological and PM_{10} monitoring activities at the south-eastern part of the site to identify periods when work activities may result in adverse off-site impacts.
- Progressive rehabilitation of completed fill areas at Mt Enfield, including as required the use of dust suppressants, revegetation or other suitable methods.
- Continuation of the use of water carts along internal roads and at the reuse area.
- Minimisation of the active reuse area as far as practicable.

On site real-time air quality monitoring of PM_{10} concentrations indicates that no exceedance of the 24-hour average PM_{10} criteria due to current construction activities has occurred to date. Management practices and mitigation measures have been shown to be effective. The predicted worst case occasional exceedances are most likely due to the conservative nature of the assessments and are unlikely to be experienced in reality.

3.1.3 Soil and Water

Existing Environment

The ILC at Enfield site is located within the Upper Cooks River Catchment, which covers an area of approximately 2,200 ha. Four drainage lines flow beneath the ILC site, including Cox's Creek in the southern part of the site, north of Mt Enfield, in the vicinity of the soil reuse area. Cox's Creek, which flows into the Cooks River, has a catchment of 589 ha (SKM, 2005), which includes parts of Lakemba, Wiley Park, Belfield and Enfield (SMC et al., 2010) and is heavily urbanised.

Cox's Creek crosses the ILC site as an underground reinforced concrete culvert that discharges into an open concrete lined canal within the site near Cosgrove Road. A smaller open concrete lined channel joins the Cox's Creek canal upstream of Cosgrove Road, on the left bank (refer to Figure 1.2). The catchment of the smaller channel consists of approximately 97 ha of urbanised and industrial area extending upstream of the New Enfield Marshalling Yards from the Wentworth Street cul-de-sac west to Waterloo Road, Greenacre (for further details refer to SKM, 2005).

The Mt Enfield fill reuse area is located in the Cox's Creek channel catchment.

The EA (SKM, 2005) presented a summary of water quality data collated from a review of existing data for the study area. The data for Cox's Creek, upstream and downstream of the ILC site, are reproduced below in Table 3.9. Table 3.9 also includes the relevant Australian and New Zealand Environment and Conservation Council (ANZECC, 2000) criteria for aquatic ecosystem protection in lowland rivers in south-eastern Australia. For faecal coliforms, the ANZECC (2000) guideline for secondary contact recreation is presented.

Table 3.9: Mean Water Quality in Cox's Creek

Parameter	Guideline concentration (ANZECC 2000)*	Upstream of the ILC at Punchbowl Road		Downstream of the ILC at Madeline Road gauging station	
		Mean dry weather	Wet weather	Mean dry weather	Wet weather
Faecal coliforms (cfu/100 mL)	1,000	4248	57,000	1222	54,000
Total phosphorous (µg/L)	25	244.1	198	98.8	211
Total nitrogen (mg/L)	0.35	2.69	4.10	1.15	3.28
Suspended solids (mg/L)	-	13.1	14.0	4.5	50.0
Turbidity (NTU)	6 - 50	20	46	10	144
Dissolved oxygen (mg/L)	>6	14.5	10.6	10.1	8.9
BOD (mg/L)	-	8.3	4.0	2.6	5.0
pH	6.5 – 8.5	9.6	8.1	8.5	8.0
Grease (mg/L)	-	1	10.0	0.9	2.0
Copper (µg/L)	1.4	21	20	2.3	34
Lead (µg/L)	3.4	8	20	1.6	36
Zinc (µg/L)	8.0	34.9	130	35.5	240

** ANZECC (2000) Water quality guidelines for protection of aquatic ecosystems. Faecal coliforrm guideline for secondary contact recreation*

The monitoring results in Table 3.9 indicate that the existing water quality in Cox's Creek is generally poor. Faecal coliform levels exceeded the ANZECC guideline for secondary contact recreation and nutrient and heavy metal concentrations were generally above guideline concentrations. The results show elevated concentrations for heavy metals downstream of the site, in particular lead and zinc, turbidity and suspended solids. However, pH, dissolved oxygen (DO) and turbidity levels were generally within the guideline limits for the protection of aquatic ecosystems.

The proposed fill placement area is currently vacant land and largely occupied by Mt Enfield, which is approximately 10-14 m above the surrounding ground level. The mound is not a natural feature and was created in the 1990s from the relocation of a large stockpile in the adjacent RailCorp New Enfield Marshalling Yard. As part of the remediation works of the Marshalling Yards, the material in the mound was validated and reported to comply with the adopted land use criteria (CMFS&F, 1996). Additional sampling undertaken in 1999 indicated that the material in the mound was below the site landuse criteria for the range of parameters sampled (CH2MHill, 1999 a and b).

Soils at or near the ILC site are classified disturbed soils under the *Soil Landscapes of the Sydney 1:100,000 Sheet* (Soil Conservation Service of NSW, Chapman et al, 1989). The erodibility of these soils is highly variable.

The majority of the site has no known occurrence of acid sulphate soil (ASS) material. There is a small section in the south east of the site adjacent to Cox's Creek where there is a low probability of ASS occurring at depths greater than 3 m below ground surface.

Assessment

The main water quality impacts which could occur during the filling in and around Mt Enfield would be the export of sediments and other pollutants, such as nutrients, to Cox's Creek due to the exposure of soils to erosion. Sediments from construction sites into waterways can cause a decline in water quality and potential damage to aquatic ecosystems. Although the water quality in Cox's Creek is reported to be poor and the Cox's Creek concrete channel provides limited opportunities for aquatic ecosystems, mitigation measures will be implemented to minimise impacts on the water quality of the flow in the channel.

The frog ponds recently constructed in the proposed Frog Habitat Creation Area (FHCA) and located between Mt Enfield and Cox's Creek could also be potentially impacted if construction stormwater runoff enters the ponds. Although the FHCA will not be completed until the end of the Main Construction Works (Stage 3) when the permanent water supply to the ponds will be available and the frog corridor completed, mitigation measures will be implemented to avoid water quality impacts on the constructed frog ponds.

Potential contamination issues are discussed in Section 3.1.5

The following mitigation measures will be implemented as part of the works:

- The contractor will implement a soil and water quality management plan as part of the CEMP for the works. The soil and water management plan will be prepared in accordance with Landcom's '*Managing Urban Stormwater: Soils and Construction'*.
- Exposed working areas will be minimised as much as feasible at any one time.
- Completed fill areas will be progressively rehabilitated.
- Clean stormwater runoff will be diverted from the fill emplacement area.
- Weather forecasts and current weather will be monitored and works planned accordingly.
- The velocity (and erosivity) of runoff will be minimised by reducing flow lengths through the installation of sandbags, check banks, speed humps and other devices in exposed areas.
- Appropriate sedimentation control devices, including sediment fences, will be installed downstream of the active fill emplacement working area.

- The frog ponds and surrounding fringing pond area will be separated from the works by a sediment fence. Construction machinery will not be allowed to enter the fenced frog pond area.
- Sedimentation basins, sized in accordance with Landcom's Blue Book, will be established, if required, to capture turbid site runoff. Water captured in sediment basins will be manage and treated, preferably for reuse on-site or controlled discharge where necessary.
- Erosion and sediment controls will be retained during construction and until all ground surfaces have been stabilised.
- Chemical storage and refuelling activities will not be permitted in the fill emplacement area.

3.1.4 Flora and Fauna

Existing Environment

A Flora and Fauna study was undertaken for the ILC development by Biosphere Environmental Consultants (refer Appendix G of the Environmental Assessment (SKM, 2005)). The study included flora and fauna surveys in the southern part of the site, including Mt Enfield.

The Flora and Fauna study concluded that Mt Enfield had become overgrown and colonised by vigorous weedy shrubs, vines and herbs. Wattles had become established around the lower parts of the mound but these have to compete with invasive vines and tall weeds that threaten to overgrow them. The report also indicated that there are no significant plant species in this area.

The Flora and Fauna study concluded that the only endangered species, population or community recorded on the ILC site is the Green and Golden Bell Frog (GGBF) *Litoria aurea*. The species was recorded by Greer (pers. Comm) in 1995. Frog surveys conducted on the ILC site in 2001, 2004, 2008 and 2011 failed to locate any GGBF.

Existing potential GGBF habitat area is located approximately 100 m to the north of Mt Enfield (Biosphere Consultants, June 2009). This area has been provided with frog protection fencing.

Sydney Ports' contractor is constructing a Frog Creation Habitat Area (FHCA), including frog ponds within the potential GGBF habitat, in accordance with the CoA 2.48 of the Project Approval. The frog ponds and immediate surrounding fringing area will be completed by around mid 2011. Once completed, the frog ponds will also be provided with frog protection fencing.

Assessment

Potential GGBF area located about 100 m to the north of Mt Enfield will not be affected by the proposed filling works at Mt Enfield. The frog ponds and potential habitat will remain frog fenced for the duration of the filling works. As indicated above, the frog ponds and surrounding fringing pond area will be separated from the works by a sediment fence and construction machinery will not be allowed to enter the fenced frog pond area. The Frog Protection Plan (Biosphere, June 2009), which is attached as Appendix F to Sydney Ports' Construction Environmental Management Plan Framework, will continue to be implemented during the filling works.

As Mt Enfield is overgrown by invasive weeds and does not contain significant plant or animal species, the filling of the mound is not anticipated to have significant negative impacts on flora and fauna. In the long term, the re-vegetation of Mt Enfield with suitable native species will have a positive impact on the ecology of the area.

3.1.5 Spoil Management and Contamination Issues

Remediation works were undertaken at the ILC site during 2009 and 2010 in accordance with the Project Approval and Site Audit Statements (SAS) issued by a Site Auditor accredited under the CLM Act. In accordance with the Site Auditor's requirements, any unexpected contamination found in the fill during cut and fill activities will be managed in accordance with the Contamination Management Plan for Construction (Coffey, 25 November 2009) (attached to Sydney Ports' Construction Environmental Management Plan Framework).

A Spoil Management Procedure will be developed and implemented during the relocation of the unsuitable fill to ensure that material reused at the southern part of the ILC site meets the industrial/commercial land use criteria applicable to the ILC site (for landuse details refer to Section 3.2.4). The Spoil Management Procedure will be submitted to the Site Auditor accredited under the *Contaminated Land Management Act 1997* as part of the documentation prepared under Conditions of Approval 2.42 and 2.43. Works will not commence until the procedure has been reviewed and endorsed by the Site Auditor.

Contaminated material may be found during cut and fill activities. Any proposals to contain/encapsulate contaminated material within the site, including at the Mt Enfield fill emplacement area, will be undertaken in accordance with the site Remedial Action Plan (Coffey, 23 June 2009), the requirements of the Site Auditor and Conditions of Approval 2.42 and 2.43.

3.1.6 Heritage

Non-Indigenous Heritage

The Tarpaulin Factory and the relocated Pillar Water Tank, located in the southern area of the site in the vicinity of Mt Enfield, have been assessed as having heritage significance. These items have been recommended for listing as state significant (SKM, 2005), however neither are currently state or local heritage listed.

The disused Tarpaulin Factory is located about 30 - 40 m from the base of Mt Enfield. In accordance with the Part 3A Project Approval, the Pillar Water Tank has been relocated to the area immediately south of the Tarpaulin Factory, approximately 60 m from the proposed filling area. The Pillar Water tank is currently fenced.

The two items are physically separated from the work area by a disused rail line and will not be impacted by the filling works. The mitigation measures identified in the Heritage Protection Plan (attached in Sydney Ports' CEMP Framework) will continue to be implemented during the works. This will include

- temporary fencing of the Pillar Water tank during the works;
- installation of a demarcation fence at the northern end of the Tarpaulin Factory to ensure that no machinery is able to access the area in the vicinity of the Tarpaulin Factory.

Indigenous Heritage

An assessment of indigenous heritage was undertaken by Navin Officer as part of the EA (SKM, 2005). No indigenous heritage items were identified during the study. It was concluded that no archaeological potential exists on the site due to the high degree of disturbance of the site since the early 20th century.

3.1.7 Traffic

As stated in Section 2.2 above, the proposal will have significant positive impacts on traffic as approximately 8,000 truck movements will be avoided on public roads.

Based on a volume of 60,000 m^3 of material, or up to 120,000 tonnes, it will take about 8,000 truck movements (to and back) to transport the material internally within the site, based on a standard 30 tonne truck and dog rig. This is equivalent to an average of about 26 to 48 internal truck movements per standard working day or 2 to 5 movements per hour over the estimated 18 month relocation period.

The truck movements will be short in distance, ranging from 400 m to a maximum of 2 km, and will not involve the use of any public roads.

3.1.8 Visual

The visual impacts of the construction of the fill emplacement activities at Mt Enfield will be temporary and typical of a construction site in an urban area. The works will be visible from a small number of residences located to the south, south-east and west of the site, users of Punchbowl Road and to some extent Cosgrove Road. Given the temporary nature of the proposed fill emplacement works, construction visual impacts are not considered significant and have not been considered further. Long term visual impacts are discussed in Section 3.2.1.

Shade cloth will be placed at the site fence along sections of Punchbowl Road and Cosgrove Road to minimise construction visual impacts.

3.1.9 Utilities

The southern edge of the proposed filling area is located over a section of an active underground RailCorp signalling cable, the location of which is shown on Figure 1.2. However it is recognised by RailCorp that the signalling cable which services the 304 points is redundant, and the rail to these points (denoted as the DELEC south sidings) is no longer required for network operations.

Accordingly RailCorp is making internal enquiries to allow Sydney Ports to “straight rail” a section of rail adjacent to the Tarpaulin Shed which will then allow the signalling cable to be decommissioned. No filling work over the RailCorp signalling cable will be undertaken until RailCorp’s agreement is received to either undertake these additional works or the signalling has been isolated to RailCorp’s satisfaction.

An underground high pressure ethylene pipeline is located on the eastern side of Mt Enfield and the ILC Site. The pipeline is located about 10 m to the east of the fill emplacement area, as shown on Figure 1.2. The ethylene pipeline is owned by Qenos. Savcor ART is contracted to Qenos Pty Ltd to patrol and maintain the Qenos Ethylene Pipeline. Extreme caution will be employed while working in the vicinity of the ethylene pipeline. The Contractor will liaise and comply with the requirements of Savcor ART and Qenos for any works in the vicinity of the high pressure ethylene gas pipeline.

Prior to commencing the filling works, the Contractor will carry out a services search to confirm no services will be impacted by the filling works.

3.2 Operational Phase

3.2.1 Visual Assessment

Existing Environment

The ILC site lies within predominantly industrial land, with some residential areas and major transport corridor developments close to the geographic centre of Sydney.

The proposed fill emplacement area is located at the southern part of the ILC site. It is surrounded by industrial land and a rail corridor to the west, Punchbowl Road corridor and a rail corridor to the south, the disused Tarpaulin Factory and Cosgrove Road residential area to the east and the remainder of the ILC site (future industrial land) to the north.

Major arterial or collector roads, including Punchbowl Road, Cosgrove Road, and a freight rail corridor and New Enfield Marshalling Yards are located immediately adjacent to the fill emplacement area to the south, east and west respectively. The scale of the existing rail corridor makes it a prominent landscape feature in the area (SKM, 2005).

To the south east of the fill emplacement area and Tarpaulin Factory there is low density residential development on Cosgrove Road and Punchbowl Road. Partial views of Mt Enfield can be obtained from a small number of residences fronting Cosgrove Road and Punchbowl Road. Distant views of Mt Enfield (approximately 400-500m distance) can be obtained from some residences in Wentworth Street, located to the west of Mt Enfield. Mt Enfield is visible to drivers using Punchbowl Road and to some extent Cosgrove Road.

The existing landuses surrounding the site are shown in Figure 1.2.

Currently, the top of Mt Enfield is approximately 10-14 m above the surrounding land and is overgrown with weeds and exotic plants.

Assessment

The pattern of development adjoining the southern part of the ILC site provides considerable screening to the fill emplacement area from much of the surrounding area. Partial views will occur along corridors created by streets and roads located at the southern end of the site and where topography provides some elevation above potential obstructions to views. A relatively small number of residences to the south, south-east and west of the site, as well as users of Punchbowl Road and to some extent Cosgrove Road will have views of the fill emplacement area. The daytime visual impact of the proposal has been assessed by evaluating the views to the reconfigured Mt Enfield from three identified key viewpoints:

- View 1 from Punchbowl Road facing north-west;
- View 2 from Wentworth Street facing east;
- View 3 from Cosgrove Road facing west.

The location of key viewpoints is shown on Figure 1.2. The evaluation of daytime visual impact from these key viewpoints follows. It is not proposed to light the fill emplacement area during the night and therefore night time visual impacts are not applicable to the proposal.

View 1 Punchbowl Road facing north-west

Figure 3.1: Existing View from Punchbowl Road facing north-west

Figure 3.2: Simulated View from Punchbowl Road facing north-west

Viewing situation	Punchbowl Road overpass facing north-west and residences fronting Punchbowl Road in the vicinity of the rail corridor
Visual modification	
Approximate viewing distance	20 – 300 m
Prominence of the development	The Punchbowl Road rail overpass is located on the southern boundary of the site and currently has unobstructed elevated views of the site to the north. The proposed filling would be prominent from this location, with the filled area in the foreground being the most dominant component on the landscape and much closer to Punchbowl Road than existing.
Landscape compatibility	The existing landscape character of the site from the Punchbowl Road rail overpass reflects the disused character of the former Enfield Marshalling Yards and the wide rail corridor and associated structures of the New Enfield Marshalling Yards. The landscape amenity is generally low and the establishment of a filled and landscaped area closer to Punchbowl Road would not result in a reduction in the visual amenity of this component of the landscape. The filling will provide some screening of the New Enfield Marshalling Yards to the north west.
Visual sensitivity	High volumes of traffic cross the Punchbowl Road rail overpass (according to SKM (2005) traffic in the road is about 35,000 vehicles per day), with the alignment of the road allowing eastbound vehicle users to view the filling most readily, although expansive potential views are available to westbound vehicle users as well. A small number of residences fronting Punchbowl Road (3) will also have direct views of the filled area. The high number of potential viewers using Punchbowl Road suggests that the visual sensitivity at this location would be high, however due to views being predominantly brief, the visual sensitivity at this location would be moderate. For the limited number of potential viewers in the houses fronting Punchbowl Road with views of Mt Enfield across Punchbowl Road, the visual sensitivity is also considered moderate given the high level of traffic on Punchbowl Road, which is major arterial road.
Visual impact	The high level of visual modification and the moderate visual sensitivity are moderated by the overall improvement to the visual amenity provided by the filled and landscaped area. A low to moderate visual impact would be expected.

View 2 Wentworth Street facing east

Figure 3.3: Existing View from Wentworth Street facing east

Figure 3.4: Simulated View from Wentworth Street facing east

Viewing situation	View from Wentworth Street facing east
Visual modification	
Approximate viewing distance	400 m
Prominence of the development	The section of Wentworth Street that runs in a north/south direction off Juno Parade is elevated and subject to views across the southern part of the site to Mt Enfield and beyond to the roof of the Tarpaulin Factory. The filling and landscaping of Mt Enfield will be visible from this location. At the southern end of the ILC site the filling will screen views of the roof of the Tarpaulin Factory.
Landscape compatibility	The existing Mt Enfield provides some landscape amenity at this location. Railway and industrial elements are also prominent in the foreground of the landscape, with a new industrial development being constructed immediately east of Wentworth Street (between the residences and the Marshalling Yard). The extent of this development is not known, and it may screen views to a section of the reconfigured Mt Enfield. A small effect on the character of the landscape at this location would be expected with increased prominence of landscaping and filling features, especially at the southern end of the ILC site.
Visual sensitivity	This part of Wentworth Avenue is residential and therefore has a higher visual sensitivity. The views would be from a significant distance (about 400 m) and possibly largely screened by industrial buildings currently being constructed in this area.
Visual impact	The higher visual sensitivity and visibility of the filling from this location is counteracted by the distance to the Mt Enfield and the unlikelihood of a major change in landscape character. A bigger visual impact is expected to be caused by the industrial development in Wentworth Street which is currently under construction. A low visual impact from the proposed filling works is expected at this location.

View 3 View from Cosgrove Road facing west

Figure 3.5: Existing View from Cosgrove Road facing west

Figure 3.6: Simulated View from Cosgrove Road facing west

Viewing situation	View from Cosgrove Road facing west
Visual modification	
Approximate viewing distance	100 m
Prominence of the development	The residential area at the southern end of Cosgrove Road borders the site and has views to the Tarpaulin Factory, warehousing and an approximately 15 - 20 m wide section of Mt Enfield. At this location, Mt Enfield will be approximately 3 m higher than existing. There will be no significant additional fill on the side of Mt Enfield at this location, which will therefore appear no closer to the residences than existing. The mound will be densely vegetated, which should improve the existing visual amenity.
Landscape compatibility	Existing mature trees along Cosgrove Road add to the visual amenity and reduce the negative impacts on visual amenity from the tarpaulin shed and other industrial elements in the landscape. The new filling and landscaping elements will be compatible with this landscape.
Visual sensitivity	Being a residential area, the visual sensitivity of this end of Cosgrove Road is higher than adjoining industrial areas.
Visual impact	The limited visibility of the filling and the proposed landscaping (despite a higher visual sensitivity) suggests a relatively low level of visual impact at this location.

Overall, it is concluded that considering the existing degraded visual environment in the southern part of the ILC site, the proposed reshaped and landscaped Mt Enfield will not have significant negative visual impacts for surrounding landuses. In fact, the proposed landscape treatment will, in the longer term, result in an improvement in the visual amenity in the south of the ILC site.

3.2.2 Landscaping

In accordance with the requirements of Condition of Approval 6.3 d), the proposed fill emplacement area will be landscaped with locally-endemic native species. The proposed planting plan and schedule are provided in Appendix C. The landscaping area shown in Appendix C covers the reconfigured Mt Enfield plus adjacent areas at the southern part of the ILC site, including the Frog Habitat Creation Area which is landscaped in accordance with the Frog Management Plan (attached in Sydney Ports' CEMP Framework)..

Plant communities to be used on the reconfigured Mt Enfield comprise native species mostly from the locally occurring Cumberland Plains Woodland including:

- Native Grass Mix (NGM) *Capillipodium specigerum*
  Sorghum leilocladum
  Themeda australis

▪ Native Slope Grass Mix	(NSM)	*Chloris ventricosa* *Danthonia spp* *Imperata cylindrica* *Lomandra longifolia* *Microlaena stipoides*
▪ River Sheoak Monoculture	(RSM)	*Casuarina littoralis*
▪ Native Slope Tree & Shrub Mix	(NSTM)	*Acacia decurrens* *Acacia implexa* *Casuarina littoralis* *Dodonaea viscosa ssp. cuneata* *Indigophora australis*

These plants have been adopted as being suitable to the conditions and slopes expected on the reconfigured Mt Enfield.

Landscaping will be undertaken by a landscaping contractor who will be contractually required to comply with a landscape specification, which will include landscaping performance and maintenance requirements for a defects liability period of 52 weeks. Sydney Ports will include landscaping areas in their assets maintenance schedule after the end of the Contractor's defects liability period.

3.2.3 Hydrology/Flooding

No impacts on flooding for floods up to and including the 100 year Average Recurrence Interval (ARI) event are anticipated as the proposed filling will be located above the 100 year ARI flood level.

Environmental Assessment Flood Modelling

A preliminary hydrologic and hydraulic study for the concept ILC development was provided in Appendix D of the Environmental Assessment (SKM, 2005). The study comprised the establishment of hydrologic and hydraulic models to quantify the potential changes to the flooding regime of Cox's Creek due to the proposed development and identify mitigation measures for flood events up to the 100 year ARI event.

The modelling results indicated that the proposed ILC development resulted in a negligible impact on flood levels (<0.01 m increase) both upstream and downstream of the Marshalling Yards and ILC site for the 100 year ARI event.

Figure 3.7 shows the extent of flooding for the 10, 20 and 100 year ARI events as determined in the EA.

Detailed Design Flood Assessment

As part of the detailed design of the Enfield ILC, AECOM undertook additional hydraulic modelling in 2009 to confirm that the development would not impact on Cox's Creek flood levels upstream of the Enfield Marshalling Yards, downstream of the ILC site or through the ILC site.

SKM's hydraulic model was modified to take into account changes to the existing Cox's Creek floodplain as a result of the proposed ILC development works associated with the detailed design. The model cross-sections defining the geometric creek data for existing conditions were updated

within the ILC site to include new ground survey obtained in this area as part of the detailed design works and the cross-sections were then modified to reflect the proposed development works.

Flood levels were assessed at critical locations across the Cox's Creek floodplain using the revised hydraulic model. The resultant flood levels for pre and post-development conditions are summarised in Table 3.10 below for locations upstream and downstream of the ILC Site near Mt Enfield.

Table 3.10: 100 year ARI Flood Levels (m AHD) near Mt Enfield

Location	Pre-Dev	Post-Dev
U/S Enfield Marshalling Yards at culvert entrance	16.76	16.75
Boundary Enfield Marshalling Yards	16.75	16.73
D/S railway arch culverts	12.63	12.63
U/S Cosgrove Rd culverts	13.26	13.26

Note: Results are quoted to the nearest 0.01 m which is considered the limit of modelling accuracy.

Proposed Filling Levels

The proposed filling at Mt Enfield will occur at levels above 16.75 m AHD to avoid impacts on flooding for floods up to and including the 100 year ARI event. No filling will occur within the 100 year ARI floodplain (shown on Figure 3.7 below).

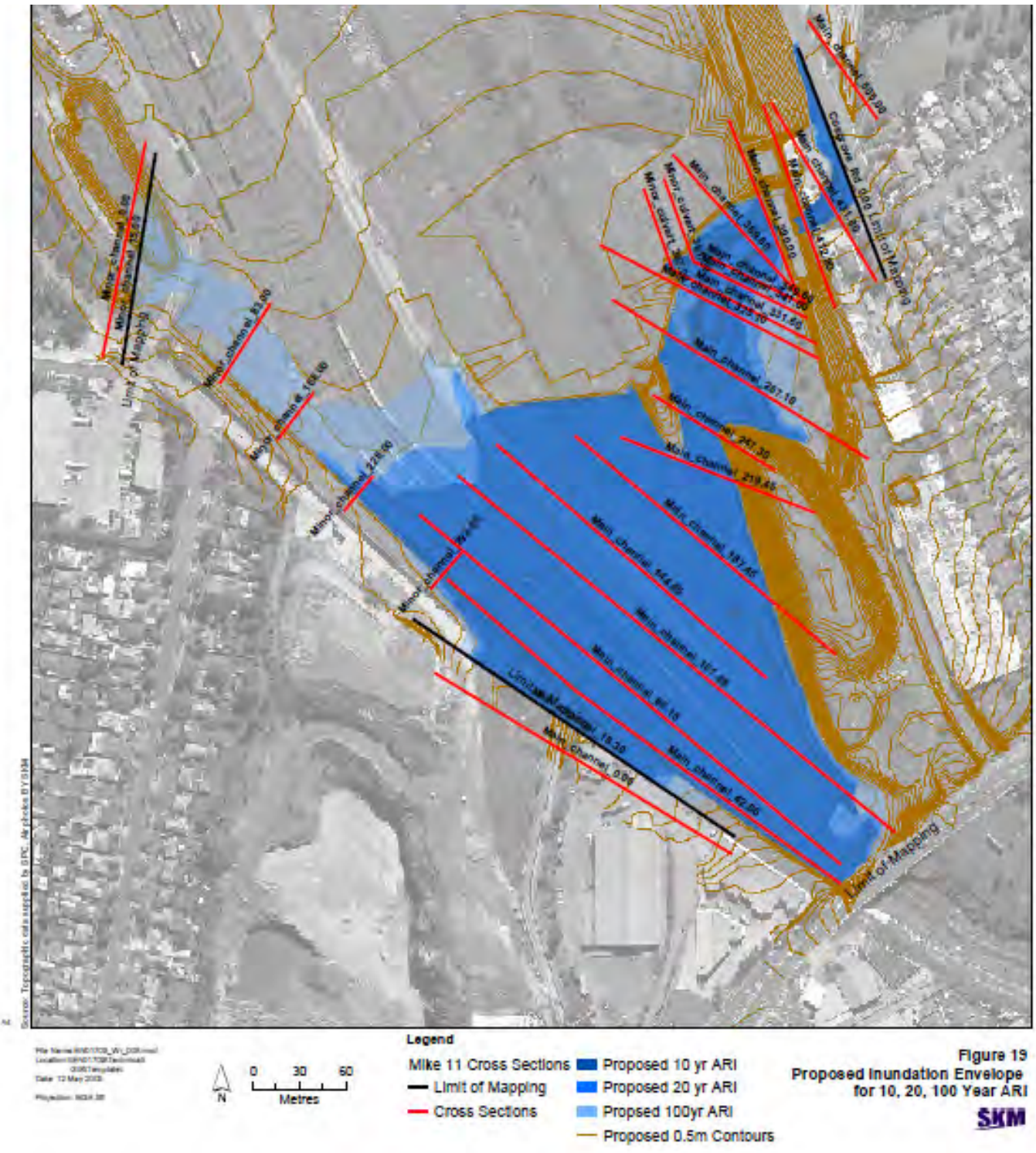

Figure 3.7: Inundation Envelope (10, 20 and 100 year ARI events)

3.2.4 Land Use

Existing Environment

This fill emplacement area is located in Lot 14 DP 1007302 within the ILC site, on land owned by Sydney Ports. The land is shown in Figure 1.1.

Land uses immediately adjacent to the fill placement area are shown on Figure 1.1 and include the operational (once constructed) ILC site to the north, vacant land and the RailCorp Marshalling Yard to the west, Punchbowl Road and rail corridor to the south, and the disused Tarpaulin Factory and Cosgrove Road to the east. Cosgrove Road residential development occurs to the east of the Tarpaulin Factory.

The ILC site, including the fill emplacement area, is located in the Strathfield Local Government Area (LGA). Bankstown LGA is located to the west of the site (generally west of Roberts Road) and Canterbury LGA is located immediately south of Punchbowl Road.

The current zoning of the proposed fill placement area is Special Uses "B" (Railways) (Special Use Zone) under Strathfield Council's Planning Scheme Ordinance. It is expected that the land will retain an industrial landuse zoning in the new LEP currently being prepared by Council.

Assessment

The reconfigured and landscaped Mt Enfield will remain as an undeveloped precinct within the Sydney Ports owned industrial commercial ILC site. Mt Enfield and adjoining FHCA will serve as a buffer between the operational ILC areas in the north and the residential area to the south east.

The southern part of the ILC site (shown in landscaping plans in Appendix C) and which includes the reconfigured Mt Enfield, will be fenced, landscaped and have restricted access by the general public as discussed below. At this stage, it is anticipated that the southern part of the ILC would be divided into the following sub-areas:

- **Mt Enfield**: this area will contain the reconfigured Mt Enfield. Controlled public access will be provided along a secured delineated pathway. Visitors will be escorted by Sydney Ports' personnel or authorised contractor and will be able to access a lookout area at the top of Mt Enfield via the secured pathway (refer to Appendix C). Sydney Ports' personnel and authorised contractors will have authorised unescorted access to this sub-area for maintenance purposes.
- **Green and Golden Bell Frog Habitat Creation Area (FHCA)**: this area includes frog ponds, frog movement corridor and frog foraging area. Sydney Ports' personnel and authorised contractors will have access to this area for maintenance purposes, including refilling and draining the frog ponds. Authorised visitors, including officers from the Office of Environment and Heritage (former DECCW) and Council officers, research program participants and Sydney Ports' Herpetologist, will be escorted to this area to inspect or monitor the FHCA.
- **RailCorp/ARTC Access Track**: this gravel access track runs from Cosgrove Road, immediately north of the Tarpaulin Shed, to the eastern side of RailCorp Marshalling Yard and Australian Rail Track Corporation's (ARTC) freight line (to be constructed). It will be used as the primary means of access for construction, maintenance, operational and emergency authorised rail and ILC personnel from Sydney Ports, Australian Rail Track Corporation (ARTC) and RailCorp. The track is accessed via a locked gate on Cosgrove Road.

- **Qenos pipeline corridor and fenced compound**: the high pressure gas pipeline corridor is located to the east of Mt Enfield and the fenced Qenos compound is located to the north of Mt Enfield. Only authorised unescorted access to Qenos and Sydney Ports' maintenance contractors/employees will be allowed to this area. Strict controls are in place regarding access to this area.
- **Industrial landscaped areas and floodplain**: this sub-area adjacent to the rail corridor and located to the west and south of Mt Enfield, will be subject to unescorted access only for authorised Sydney Ports' contractors/employees for maintenance purposes. The area immediately north of Punchbowl Road may be developed in the future for commercial/industrial purposes (eg. light industrial, retail/commercial, carparking) in connection with the future development of the Tarpaulin Factory. Any future development in the area immediately north of Punchbowl Road will be subject to separate assessment and approval in accordance with the EP&A Act.
- **Heritage Precinct** (excluding the Tarpaulin Factory which is not part of the Part 3A Project Approval): this sub-area, located to the south of the Tarpaulin Factory, will be used for the display of the reinstated Pillar Water Tank and heritage interpretation panels relating to the previous use of the site as a rail marshalling yard. Access to the heritage precinct will be restricted to authorised maintenance personnel and escorted public access to the heritage items from a secured delineated pathway once the heritage precinct has been constructed.
- **Tarpaulin Factory and curtilage**: Sydney Ports, in consultation with Strathfield Council, is currently preparing a feasibility study into possible reuse options for the Tarpaulin Factory. Options being considered include a multi-use development consisting of industrial and retail spaces. The development may be integrated with the display of the reinstated Pillar Water Tank and heritage interpretation panels. Any future development of the Tarpaulin Factory will be subject to separate assessment and approval in accordance with the EP&A Act.
- **Intermodal Terminal (IMT) Southern Rail Corridor,** located to the west of Mt Enfield and immediately adjacent to the existing New Marshalling Yard will contain the rail connection from the main freight line to the ILC intermodal terminal. Sydney Ports' personnel and authorised contractors will be allowed authorised unescorted access to this area for maintenance purposes.

The areas discussed above are shown on the Landscaping Drawings contained in Appendix C and Figure 1.1.

4 Consultation

Results of consultation with the DoPI regarding this Modification Application is contained in Appendix D.

Sydney Ports presented the proposal to the Community Liaison Committee (CLC) during CLC Meeting no. 8 held on 4 May 2011. The CLC unanimously supported the proposal recognising that the changes will result in a substantial improvement in the visual quality of Mount Enfield and on balance would be a major benefit to the local community provided adequate measures are taken during construction to mitigate dust impacts and to manage the internal traffic movements appropriately across any potential frog corridors within the site.

Strathfield Municipal Council (SMC) and Bankstown City Council (BCC) are updated on project progress by Sydney Ports on a quarterly basis. Sydney Ports presented the proposal to SMC in a meeting held on the 13 May 2011. Sydney Ports will update BCC on the proposal during the next quarterly update.

5 Conclusion

5.1 General

Sydney Ports submits this application to the DoPI to modify the Project Approval granted by the Minister for Planning on the 5 September 2007 under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the development of an Intermodal Logistic Centre (ILC) at Enfield (Application Number 05_0147).

The proposal subject to this Modification Application involves the relocation and reuse of the unsuitable material to the southern part of the site on and around Mt Enfield. Mt Enfield would be expanded and raised by approximately 6.7 m at its highest point, flattened at the top and landscaped. These works were not assessed as part of the EA prepared by SKM in 2005.

This assessment concludes that the proposed modification is not expected to have significant negative impacts on the environment either during construction or in the long term, provided mitigation measures are implemented in accordance with the assessment presented in this report. It is considered that the proposal will bring significant project and environmental benefits particularly in terms of higher sustainability (lower energy consumption and greenhouse emissions, and reduced usage of available landfill space) and reduced traffic impacts in the road network. The visual amenity, acoustic shielding and ecology in the south of the site will also be improved.

5.2 Summary of Mitigation Measures

5.2.1 Construction

Noise

- Plant items to have their noise emission levels measured before they are used at the spoil reuse area to check against assumed assessment sound power levels in the RT NIA.
- Plant and equipment to be inspected regularly to ensure it is in good running order, regularly maintained and free of defective components to minimise noise emissions.
- Noisy plant and equipment to be located as far as possible from noise sensitive areas, optimising attenuation effects from topography, material stockpiles and existing built barriers.
- Plant operators to be inducted in noise management to operate the equipment in the quietest way possible.
- Compliance noise monitoring to be undertaken on a regular basis (eg. monthly) during fill placement activities at the nearest residential areas.
- Regular community consultation, including notification of the works in advance, to be undertaken.
- Complaints to be dealt with in accordance with the Contractor's documented complaints handling procedure.
- Work must be carried out within the standard working hours provided in the Project Approval, unless approval has been obtained from the DoPI for out of hours works.

Dust

Potential short term air quality impacts can be managed by implementing the following dust management and mitigation measures, some of which are already being implemented:

- continuation of real-time meteorological and PM_{10} monitoring activities at the south-eastern part of the site to identify periods when work activities may result in adverse off-site impacts;
- progressive rehabilitation of completed fill areas at Mt Enfield, including as required the use of dust suppressants, revegetation or other suitable methods;
- continuation of the use of water carts along internal roads and at the reuse area; and
- minimisation of the active reuse area as far as practicable.

Soil and Water Management

- The contractor will implement a soil and water quality management plan as part of the CEMP for the works. The soil and water management plan will be prepared in accordance with Landcom's '*Managing Urban Stormwater: Soils and Construction'*.
- Exposed working areas will be minimised as much as feasible at any one time.
- Completed fill areas will be progressively rehabilitated.
- Clean stormwater runoff will be diverted from the fill emplacement area.
- Weather forecasts and current weather will be monitored and works planned accordingly.
- The velocity (and erosivity) of runoff will be minimised by reducing flow lengths through the installation of sandbags, check banks, speed humps and other devices in exposed areas.
- Appropriate sedimentation control devices, including sediment fences, will be installed downstream of the active fill emplacement working area.
- The frog ponds and surrounding fringing pond area will be separated from the works by a sediment fence. Construction machinery will not be allowed to enter the fenced frog pond area.
- Sedimentation basins, sized in accordance with Landcom's Blue Book, will be established, if required, to capture turbid site runoff. Water captured in sediment basins will be manage and treated, preferably for reuse on-site or controlled discharge where necessary.
- Erosion and sediment controls will be retained during construction and until all ground surfaces have been stabilised.
- Chemical storage and refuelling activities will not be permitted in the fill emplacement area.

Flora and Fauna

- The frog ponds and potential habitat will remain frog fenced for the duration of the filling works. Construction machinery will not be allowed to enter the fenced frog pond area.
- The Frog Protection Plan (Biosphere, June 2009), which is attached as Appendix F to Sydney Ports' Construction Environmental Management Plan Framework, will continue to be implemented during the filling works.

Spoil and Contamination Management

- Any unexpected contamination found during the fill cut and fill activities will be managed in accordance with the Contamination Management Plan for Construction (Coffey, 25 November 2009)
- Contractor to implement a Spoil Management Procedure which will be endorsed by the Site Auditor accredited under the *Contaminated Land Management Act* 1997 prior to commencement of works.

Heritage Protection

- Provide temporary fencing of the Pillar Water tank during the works;
- Install a demarcation fence at the northern end of the Tarpaulin Factory to ensure that no machinery is able to access the area in the vicinity of the Tarpaulin Factory.

Visual Impact Management

- Shade cloth to be placed at the site fence along the sections of Punchbowl Road and Cosgrove Road where the filling works are visible to minimise construction visual impacts.

Utilities

- Prior to commencing the filling works, the Contractor must carry out a services search to confirm no services will be impacted by the filling works.
- No filling work over RailCorp signalling cable will be undertaken until RailCorp's agreement is received to either undertake "straight rail" works in a section of the rail adjacent to the Tarpaulin Shed or the signalling has been isolated to RailCorp's satisfaction.
- Extreme caution to be employed while working in the vicinity of the ethylene pipeline. The Contractor will liaise and comply with the requirements of Savcor ART and Qenos for any works in the vicinity of the high pressure ethylene gas pipeline.

5.2.2 Operation

Landscaping and Visual

- Landscaping to be carried out in accordance with the proposed planting plan and schedule provided in Appendix C with locally-endemic native species, in accordance with the requirements of Condition of Approval 6.3 d

Flooding

- Filling to occur above the 100 year ARI flood level (RL 16.75 m AHD) to avoid impacts on local flood levels for flood events up to and including the 100 year ARI event.

6 References

Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000). *Australian and Marine Guidelines for Marine and Fresh Waters.*

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Intermodal Logistics Centre at Enfield

Modification Application No. 5

On Site Management of Unsuitable Engineering Fill

Appendix A:
Noise Impact Assessment

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Intermodal Logistics Centre, Enfield

Project Modification

On-site Management of Unsuitable Engineering Fill

Construction Noise Impact Assessment

Report Number 610.10395-R2R2

ILC – SLR – E – REP – Construction Noise Assessment Mod 5 Final v1.2 18 May 2011

18 May 2011

Sydney Ports Corporation
Level 4, 20 Windmill Street
Walsh Bay NSW 2000

Version: Revision 2

Intermodal Logistics Centre, Enfield

Project Modification

On-site Management of Unsuitable Engineering Fill

Construction Noise Impact Assessment

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DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
610.10395-R2R2	Revision 2	18 May 2011	Mark Blake	Ryan Wakeling	Mark Blake
610.10395-R2R1	Revision 1	4 May 2011	Mark Blake	Ryan Wakeling	Mark Blake
610.10395-R2	Revision 0	28 April 2011	Mark Blake	Ryan Wakeling	Mark Blake

EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR Consulting) has been commissioned by Sydney Ports Corporation (Sydney Ports) to undertake a noise impact assessment for modification of the approved Intermodal Logistics Centre (ILC) at Enfield, NSW. This modification involves the relocation and reuse of approximately 60,000 m^3 of unsuitable engineering fill material within the 60 ha Enfield construction site.

A noise impact assessment was carried out, as part of the environmental assessment (EA) (SKM, 2005), for different stages of construction. The results from the EA (SKM, 2005) have been used within this report to calculate the cumulative impact from the proposed modification and the approved construction activities.

The noise emission levels from the proposed modification we predicted at the nearest identified potentially noise sensitive receivers under a typical worst case noise emission scenario.

The results indicate that the construction activities associated with the modification would not result in noticeable increases to the ILC site construction noise emission levels predicted in the EA (SKM, 2005). As per the EA (SKM, 2005), the results indicate that under worst case scenario with equipment operating at their closest point to residences, no control measures in place and all equipment operating at once, potential occasional exceedances could occur, but these can be mitigated if mitigation measures are implemented. Mitigation measures have been recommended to ensure that construction noise does not cause significant impacts on residential areas.

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FIGURES

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) has been commissioned by Sydney Ports to undertake a construction noise impact assessment for the proposed modification to the approved Intermodal Logistics Centre (ILC) at Enfield, NSW. This modification involves the relocation and reuse of approximately 60,000 m^3 of unsuitable engineering fill material within the 60 ha Enfield construction site.

1.1 Project Overview

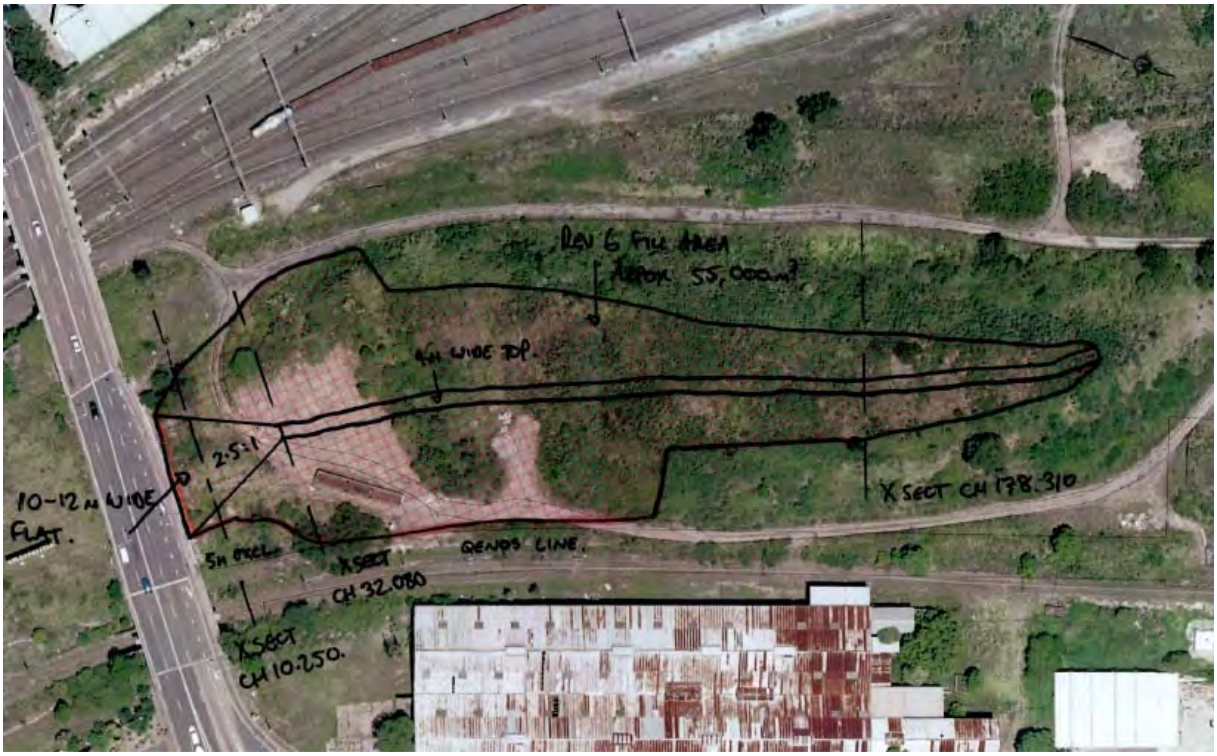
The material is proposed to be relocated to the southern part of the site at and about the existing stockpile located at the southern part of site and referred to in this report as "Mt Enfield" (shown in **Figure 1**).

Figure 1 Location of Mt Enfield

Mt Enfield is proposed to be expanded and raised by approximately 6.7 m at the highest point, flattened at the top and landscaped, as shown in **Figure 2**. According to the project description, the proposed relocation of material will be progressively undertaken during the main construction phase of the project over approximately 18 months duration, with a majority of the material (80 %) being relocated in the first 6 months. On completion, the mound will be revegetated. The material will be internally transported by trucks to the southern part of the site.

Mt Enfield is located approximately 80-100m from the closest residential locations. On occasion, it is proposed that equipment will be operating at the top of Mt Enfield, which is higher than the surrounding residential areas.

Figure 2 Sketch of Mt Enfield



1.2 Previous Assessments

A noise impact assessment was undertaken by Renzo Tonin & Associates Pty Ltd (RTA) as part of the environmental assessment (EA) (SKM, 2005), for construction and operation of the proposed ILC site, and the results presented in the report *Intermodal Logistics Centre at Enfield – Environment Impact Assessment – Noise and Vibration Impact Assessment* (NIA) (RTA, 2005) dated 27 June 2005.

The NIA (RTA, 2005) assessed the potential noise impacts from different construction stages in accordance with the then current Environment Noise Control Manual and identified a number of potential exceedances and consequent noise management measures to minimise the impact on surrounding sensitive receptors.

2 NOISE SENSITIVE RECIEVERS

The NIA (RTA, 2005) identifies the nearest potentially noise sensitive receivers and is reproduced in **Figure 3**. The nearest receivers to the proposed earthworks are identified in **Table 1**.

Figure 3 Nearest Noise Sensitive Receivers

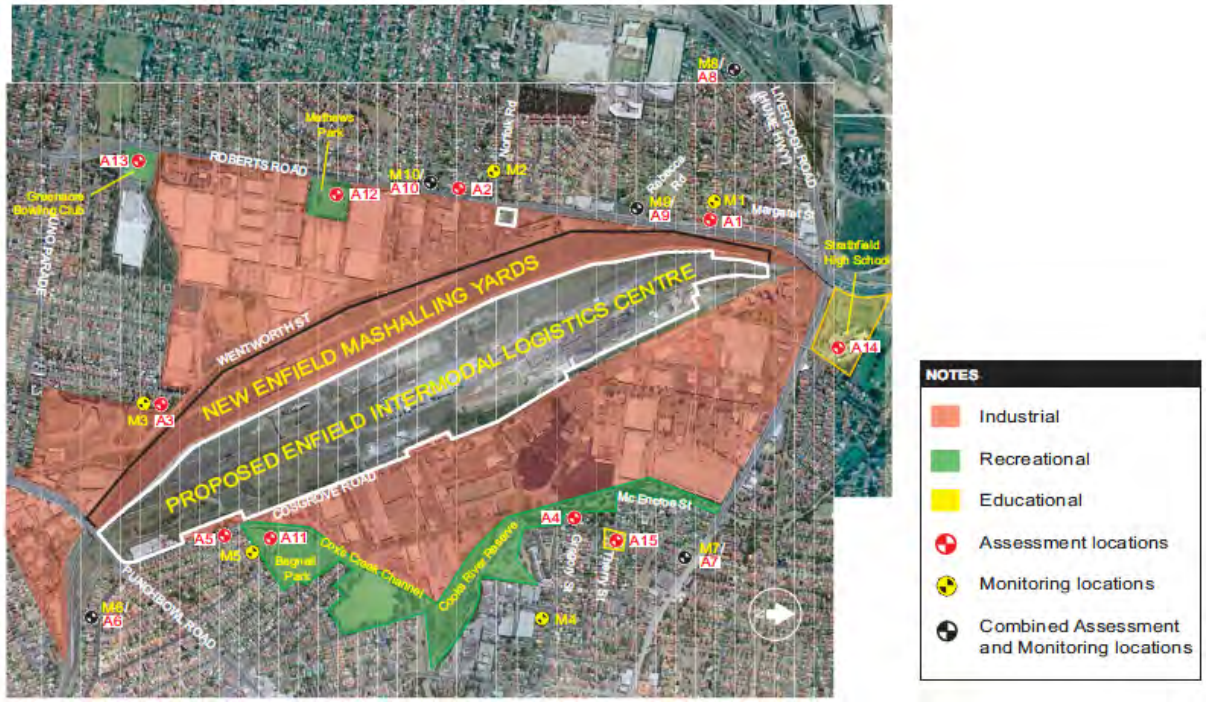


Table 1 Nearest Noise Sensitive Receivers to Proposed work at Mt Enfield

Assessment Location	Address	Receiver Type	Near point to Mt Enfield
A3	Wentworth Street	Residential	330 m
A5	Cosgrove Road	Residential	90 m
A6	Punchbowl Road	Residential	60 m

3 NOISE CRITERIA

The Sydney Ports Corporation was granted approval to develop the ILC by the Minister for Planning on 5 September 2011 under Application Number 05_0147 (Project Approval, PA).

The NIA (RTA, 2005), prepared as part of the EA (SKM, 2005) and the application to the Minister, assessed the potential noise impacts in accordance with the then current Environment Noise Control Manual (ENCM). However, the NSW Office of Environment and Heritage (OEH, formerly the NSW Department of Environment, Climate Change and Water) released the *Interim Construction Noise Guideline* (ICNG) in July 2009. It is therefore appropriate to assess the potential construction noise impacts from the proposed ILC modified earthworks in accordance with the ICNG.

The corresponding noise assessment criteria applicable to the assessment are presented in **Table 2**.

Table 2 Construction Noise Assessment Criteria - Daytime (dBA)

Assessment Location	EA L_{A90} Background Noise Level	Superseded ENCM $L_{A10(15minute)}$ Construction Criterion	ICNG $L_{Aeq(15minute)}$ Construction Criterion
A3	44	49	54
A5	41	46	51
A6	41	46	51

4 NOISE MODEL

4.1 Model Assumptions

Presented below are the assumptions included in the noise modelling for the purpose of assessing the likely maximum noise emission operational scenario.

- All operations are assumed to operate for 11 hours a day (7 am to 6 pm), Monday-Friday, and 5 hours on Saturdays (8 am to 1 pm), excluding holidays.
- 60,000 m^3 (or 120,000 t) is assumed to be relocated during the construction period. It is assumed that a majority of the material will be relocated during the first 6 months.
- It is assumed that one excavator is used to spread and level the material.
- Capacity for haulage trucks (truck and dog) is assumed to be 30 t.
- Tare weight for the truck and dog combination is assumed to be 10.5 t.
- Earthworks and haulage of spoil within the ILC PA has previously been assessed in the NIA (RTA, 2005) and the noise emission levels presented in the NIA (RTA, 2005) are representative of the proposed site activities. It is acknowledged that the NIA (RTA, 2005) assumed worst case scenario.
- A maximum of two haulage trucks would dump material on Mt Enfield within a single 15 minute period (ie 4 passby movements per 15 minute period). Note, the maximum of 5 passby movements per hour is anticipated.
- Each truck would operate for 5 minutes duration per 15 minute assessment period within the Mt Enfield area.
- The excavator would operate continuously on Mt Enfield for the duration of the 15 minute assessment period.
- The following $L_{Aeq(15minute)}$ plant sound power levels (dB re 1ρW):
    - Dump Truck – 103 dBA
    - Dozer – 109 dBA
- Noise emissions were predicted using the algorithm for noise propagation over a hard surface in accordance with Australian Standard AS 2436 (2010) *Guide to noise and vibration control on construction, demolition and maintenance sites* (AS 2436, 2010).
- Noise emissions were predicted for all equipment operating simultaneously at the nearpoint to each assessment location.
- A cumulative ILC construction noise emission level is presented assuming that the ILC PA NIA (NIA, 2005) construction noise emission levels are currently being achieved and that the proposed ILC modified earthworks are introduced as an additional noise emission source from the ILC site.

5 NOISE IMPACT ASSESSMENT

Table 3 presents the results predicted noise emission levels from the proposed modification together with the approved construction noise emissions and resulting cumulative construction noise levels. As per the noise assessment in the EA (SKM, 2005), the assessment presents a worst case scenario which does not consider shielding from intervening structures, noise control treatments, assumes all plant operating at once and construction noise sources operating at their closest likely point to residences.

Table 3 Predicted Worst Case Intrusive and Cumulative Construction Noise Levels (dBA)

Assessment Location	EA/PA Noise Level	Mt Enfield Modification Noise Level	Cumulative Construction Noise Level	Increase to EA Noise Level	ICNG $L_{Aeq(15minute)}$ Construction Criterion
A3	68	46	68	0	54
A5	81	55	81	0	51
A6	75	66	76	<1	51

The above findings are consistent with the ILC EA (SKM, 2005) and confirms the identification of occasional potential exceedances of the project construction noise criteria at the nearest residences under worst case scenario and assuming no noise controls are in place. However, the additional noise contribution from the proposed modification is negligible (<1 dBA) at all surrounding residences.

It is therefore recommended that, consistent with the EA (SKM, 2005), the following noise mitigation and management measures are implemented for the duration of the proposed construction activities:

- Plant items to have their noise emission levels measured before they are used at the spoil reuse area as a check against assumed assessment sound power levels in the NIA (RTA, 2005).
- All plant and equipment to be inspected regularly to ensure that they are in good running order, regularly maintained and free of defective components to minimise noise emissions
- Noisy plant equipment to be located as far as possible from noise sensitive areas, optimising attenuation effects from topography, material stockpiles and existing built barriers
- Plant operators to be inducted in noise management in order to operate the equipment in the quietest way possible
- Compliance noise monitoring to be undertaken on a regular basis (eg. monthly) during fill placement activities at the nearest residential areas
- Undertake regular community consultation, including notification of the works in advance. Any complaints should be dealt with expeditiously
- Apply the time restrictions provided in the project approval (ie. works within standard working hours)

6 CONCLUSION

A noise impact assessment was carried out for SKM, as part of the environmental assessment (SKM, 2005), for different stages of construction. The results from the EA (SKM, 2005) have been used within this report to calculate the cumulative impact from the proposed modification and the approved construction activities.

The noise emission levels from the proposed modification were predicted at the nearest identified potentially noise sensitive receivers.

The results indicate that the construction activities associated with the modification would not result in noticeable increases to the ILC site construction noise emission levels predicted in the EA (SKM, 2005). As per the EA (SKM, 2005), the results indicate that under worst case scenario with equipment operating at their closest point to residences, no control measures in place and all equipment operating at once, potential occasional exceedances could occur, but these can be mitigated if mitigation measures are implemented. Mitigation measures have been recommended to ensure that construction noise does not cause significant impacts on residential areas.

7 CLOSURE

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Sydney Ports Corporation. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR Consulting.

SLR Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Intermodal Logistics Centre at Enfield

Modification Application No. 5

On Site Management of Unsuitable Engineering Fill

Appendix B:
Air Quality Assessment

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Intermodal Logistics Centre, Enfield

Project Modification

On-Site Management of Unsuitable Engineering Fill

Construction Air Quality Impact Assessment

Report Number 610.10395-R1R1

ILC – SLR – E – REP – Construction Air Quality Assessment Mod 5 Final v1.1 18 May 2011

18 May 2011

Sydney Ports Corporation
Level 4, 20 Windmill Street
Walsh Bay NSW 2000

Version: Revision 1

Intermodal Logistics Centre, Enfield

Project Modification

On-Site Management of Unsuitable Engineering Fill

Construction Air Quality Impact Assessment

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610.10395-R1R1	Revision 1	18 May 2011	Martin Doyle	Gary Graham	Gary Graham
610.10395-R1	Revision 0	3 May 2011	Martin Doyle	Gary Graham	Gary Graham

EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR Consulting) has been commissioned by Sydney Ports Corporation (Sydney Ports) to undertake an air quality impact assessment for modification of the approved Intermodal Logistics Centre (ILC) at Enfield, NSW. This modification involves the relocation and reuse of approximately 60,000 m^3 of unsuitable engineer fill material within the 60 ha Enfield construction site.

An air quality impact assessment was carried out by SKM (2005), as part of the environmental impact assessment, for different stages of construction. The results from that assessment have been used within this report to calculate the cumulative impact of the modification and current construction activities.

Dispersion modelling has been carried out using the AUSPLUME dispersion model for a full year of meteorological data in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, (DECCW, 2005).

The modelling results are based on conservative assumptions and worst case scenarios (such as existing PM_{10} background concentrations in the order of 40 µg/m^3, all plant operating at once, large areas of the site exposed).

Dust deposition, annual average PM_{10} concentrations and annual average TSP concentrations are predicted to be less than the assessment criteria at all sensitive receptors. The assessment also predicts that there is only a low risk of exceedances of the short term PM_{10} criteria at surrounding receptors if dust mitigation measures are implemented.

Potential short term PM_{10} impacts can be managed by implementing the following dust management and mitigation measures, some of which are already being implemented on the ILC site:

- Continuation of real-time meteorological and PM_{10} monitoring activities at the south-eastern part of the site to identify periods when work activities may result in adverse off-site impacts.
- Undertake progressive rehabilitation of completed fill areas at Mt Enfield, including as required the use of dust suppressants, revegetation or other suitable methods.
- Continuation of the use of water carts along internal roads and at the reuse area.
- Minimisation of the active reuse area as far as practicable.

On site real-time air quality monitoring of PM_{10} concentrations indicates that no exceedance of the 24-hour average PM_{10} criteria due to current construction activities has occurred to date. Management practices and mitigation measures have been shown to be effective. The predicted exceedances are most likely due to the conservative nature of the assessments and are unlikely to be experienced in reality.

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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) has been commissioned by Sydney Ports Corporation (Sydney Ports) to undertake an air quality impact assessment for modification of the approved Intermodal Logistics Centre (ILC) at Enfield, NSW. This modification involves the relocation and reuse of approximately 60,000 cubic metres (m^3) of unsuitable engineer fill material within the 60 hectare (ha) Enfield construction site.

1.1 Project Overview

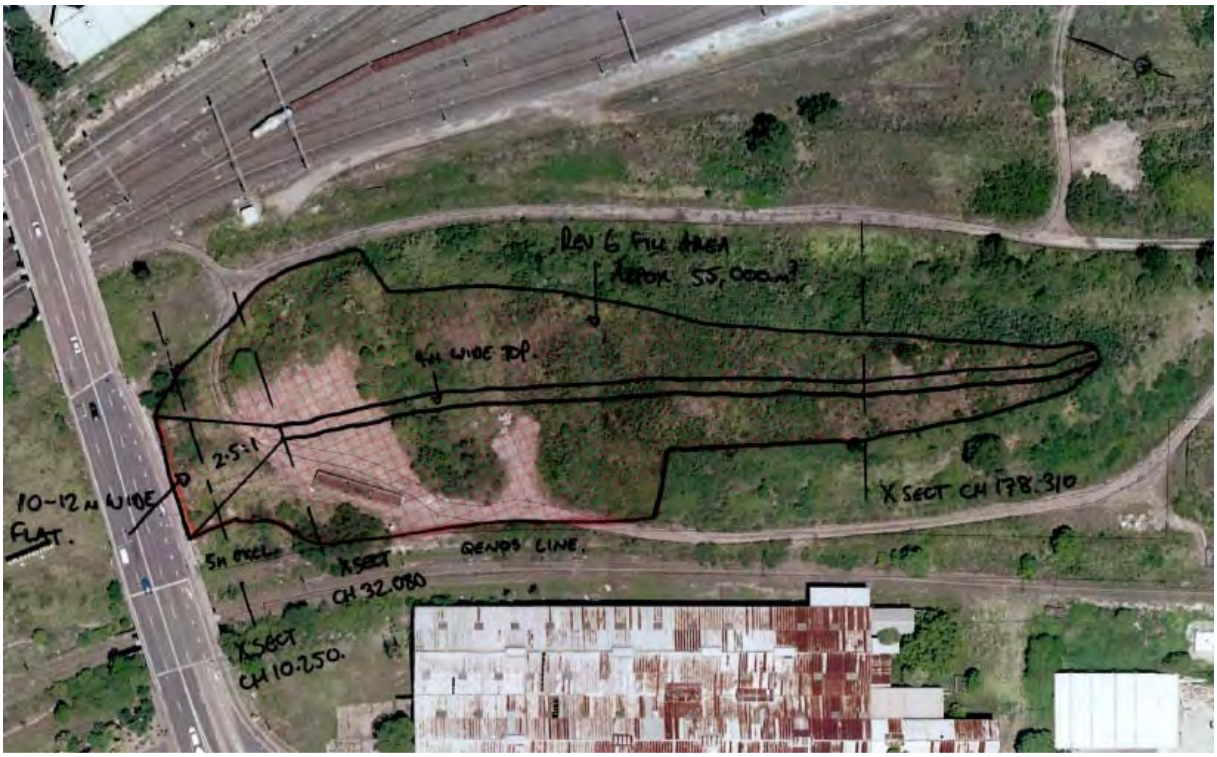
The material is proposed to be relocated to the southern part of the site at and about the existing stockpile located at the southern part of the site and referred to in this report as “Mt Enfield” (shown in **Figure 1**).

Figure 1 Location of Mt Enfield

Mt Enfield is proposed to be expanded and raised by approximately 6.7 metres (m) at the highest point, flattened at the top and landscaped, as shown in **Figure 2**. According to the project description, the proposed relocation of material will be progressively undertaken during the main construction phase of the project over approximately 18 months duration, with the majority of the material (about 80%) being relocated in the first six months. On completion, the mound will be revegetated. The material will be moved internally by trucks to the southern part of the site.

Mt Enfield is located approximately 80-100 m from the closest residential locations. On occasion, it is proposed that equipment will be operating at the top of Mt Enfield, which is at a higher elevation than the surrounding residential areas.

Figure 2 Sketch of Mt Enfield



A quantitative Air Quality Impact Assessment (AQIA), comprising Total Suspended Particulate (TSP), PM_{10} and dust deposition, has been undertaken for the modified Project, with predicted cumulative impacts for the modification and the approved construction work, compared against criteria published by the NSW Office of Environment and Heritage (OEH, previously the Department of Environment, Climate Change and Water [DECCW]). Specific attention was paid to the dust impacts predicted at various potentially sensitive receptor locations which predominantly comprise neighbouring residential properties.

1.2 Previous Assessments

An AQIA was undertaken as part of the environmental impact assessment, for construction and operation of the proposed ILC site (SKM 2005).

It was determined that the highest risks associated with the project were air quality impacts from emissions of particulate matter. The construction works were assessed to be carried out in different stages. It was the determined that the highest risk for adverse air quality impact was during the earthworks when most of the cut and fill activities were to be completed.

The modelling results indicated that there was only a low risk of exceedances of the maximum 24-hour average PM_{10} criterion at the off-site residential areas to the southeast if mitigation measures were implemented.

2 AIR QUALITY CRITERIA

2.1 Goals Applicable to Particulate Matter Less than 10 Microns (PM_{10})

The term *"particulate matter"* refers to a category of airborne particles typically less than 50 microns (µm) in diameter and ranging down to 0.1 µm in size. Particles less than 10 µm are referred to in this report as PM_{10}.

Emissions of PM_{10} particles are considered important pollutants in terms of impact due to their ability to penetrate into the respiratory system. Potential adverse health impacts associated with exposure to PM_{10} include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

One of the difficulties in dealing with air quality goals governing fine particles such as PM_{10} is that the medical community has not been able to establish a threshold value below which there are no adverse health impacts.

The NSW OEH PM_{10} impact assessment goals, as expressed in their document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, (DECCW, 2005) ("Approved Methods") are:

- A 24-hour maximum of 50 µg/m^3; and,
- An annual average of 30 µg/m^3.

The 24-hour PM_{10} reporting standard of 50 µg/m^3 is numerically identical to the equivalent National Environment Protection Measure (or NEPM) reporting standard except that the NEPM reporting standard allows for five exceedances per year. These NEPM goals were developed by the National Environmental Protection Council (NEPC) in 1998 to be achieved within 10 years of commencement.

2.2 Goals Applicable to Total Suspended Particulate (TSP)

The annual goal for Total Suspended Particulates (or TSP) is given as 90 µg/m^3 within the Approved Methods. It is noted that 90 µg/m^3 is identical to the goal recommended by the National Health and Medical Research Council (NHMRC) at their 92nd session in October 1981. It was developed before the more recent results of epidemiological studies suggested a relationship between health impacts and exposure to PM_{10} concentrations.

2.3 Nuisance Impacts of Fugitive Emissions

The preceding sections are concerned in large part with the health impacts of particulate matter. Nuisance impacts need also to be considered, mainly in relation to dust. In NSW, accepted practice regarding the nuisance impact of dust is that dust-related nuisance can be expected to impact on residential areas when annual average dust deposition levels exceed 4 g/m^2/month.

Table 1 presents the NSW OEH impact assessment goals for dust fallout, showing the allowable increase in dust deposition level over the ambient (background) level which would be acceptable so that dust nuisance could be avoided.

Table 1 NSW OEH Goals for Allowable Dust Deposition

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m^2/month	4 g/m^2/month

Source: "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales", DECCW 2005.

2.4 Project Air Quality Goals - Fugitive Emissions

The air quality goals adopted in this report are those specified in the *Approved Methods.* The adopted goals, presented in **Table 2**, are also consistent with the goals used in EA Air Quality Assessment and Project Approval.

Table 2 Project Air Quality Criteria

Pollutant	Averaging Time	NSW OEH Criteria
PM_{10}	24 hours Annual	50 µg/m^3 30 µg/m^3
TSP	Annual	90 µg/m^3
Dust Deposition	Annual	Maximum Increase of 2 g/m^2/month Maximum Total of 4 g/m^2/month

3 EXISTING AIR QUALITY ENVIRONMENT

Total particulate emissions from the construction activities, as outlined in the EA AQ Report (SKM, 2005), have been included in the results. The calculated incremental results at sensitive receptors will be added to the previous results from the EA Report. Both emissions from the construction activities and background data are thus included in the background results.

The proposed fill reuse activities are anticipated to occur during the construction cut and fill works. Predicted EA cut and fill dust impacts have therefore been used as background data in this assessment.

4 DISPERSION METEOROLOGY

The original EA AQ assessment (SKM, 2005) used meteorological data from the NSW OEH maintained Lidcombe weather station for the year 1999.

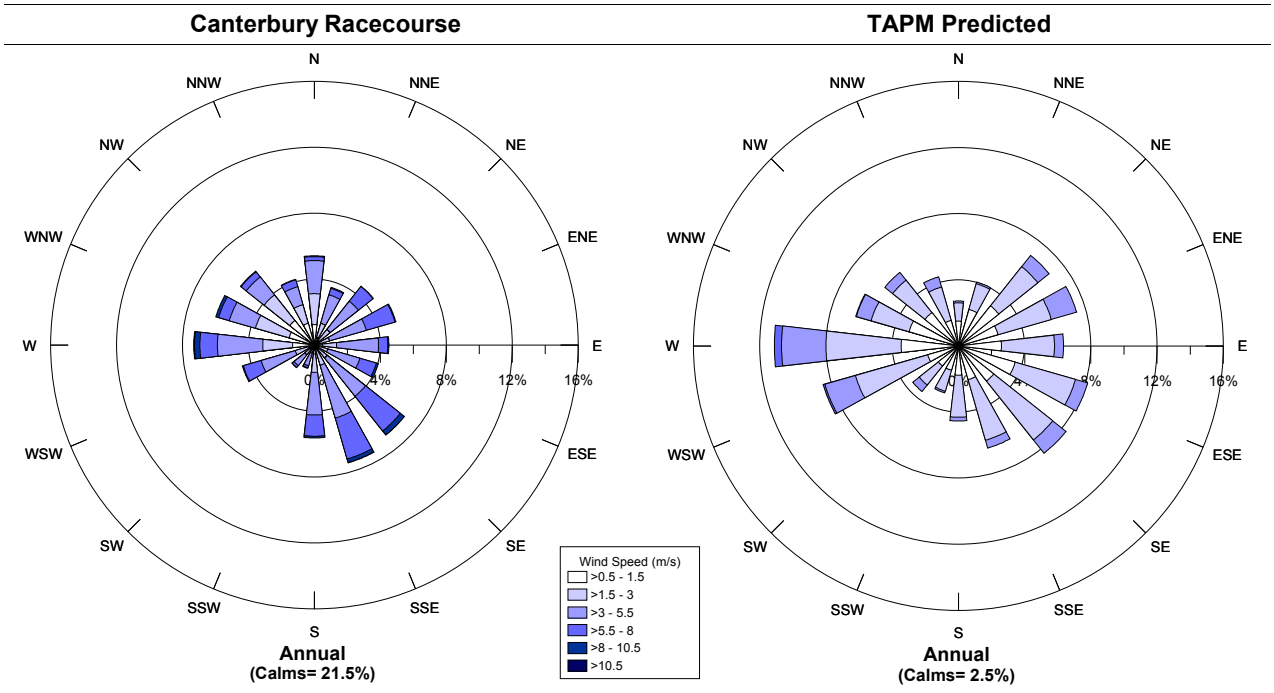
Annual and seasonal wind roses from the closest Bureau of Meteorology (BOM) AWS, at Canterbury Racecourse, located 4 km from the site, were analysed over the period 2005 to 2009. The wind roses displayed very little difference between the analysed years, and therefore the most current data set from 2009 was therefore used in this assessment.

Parameters required in dispersion modelling such as mixing height and atmospheric stability class were generated with TAPM. TAPM, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a prognostic model which may be used to predict three-dimensional meteorological data and air pollution concentrations, with no local data inputs required.

The TAPM model predicts wind speed and direction, temperature, pressure, water vapour, cloud, rain water and turbulence. The program allows the user to generate synthetic observations by referencing databases (covering terrain, vegetation and soil type, sea surface temperature and synoptic scale meteorological analyses) which are subsequently used in the model input to generate site-specific hourly meteorological observations.

Comparison of wind roses for Lidcombe 1999 and TAPM generated data set for 2009 show good agreement. The TAPM 2009 data set has therefore been used in this assessment. Seasonal wind roses at 9 am and 3 pm wind roses are shown in **Appendix A**.

Figure 3 Annual Wind Roses (2009)



5 DISPERSION MODELLING

The Ausplume Gaussian Plume Dispersion Model software (Version 6.0) developed by the Victorian EPA has been utilised within this assessment. Ausplume is a steady state model with the ability to model point, area and volume sources and is able to take account of building downwash.

Air pollutant concentrations were simulated for a regular Cartesian receptor grid covering a 2 km by 3 km domain centred on the Project Site, with a grid resolution of 100 m. Concentrations were also predicted at the various discrete receptor points, shown in **Figure 4**.

Figure 4 Surrounding Sensitive Receptors

5.1 Emission Factors

Table 3 presents the emission factors for particulate matter from the ILC modification used in the dispersion modelling for this assessment.

Table 3 Particulate Emission Factors for Air Quality Dispersion Modelling

Activity	Total Particulate Emission Factor	PM10 Emission Factor	Emission Factor Units
Excavator on Stockpile and Trucks Dumping	0.025	0.012	kg/t
Wheel Dust – Unpaved	0.208	0.055	kg/VKT
Wind Erosion	0.4	0.2	kg/ha/hr

Note: VKT = Vehicle Kilometre Travelled

In general, default emission factors have been used as contained in Table 1 of the *Emission Estimation Technique Manual for Mining, Version 2.3*, (hereafter, "EETMM") (Environment Australia, 2001). In some instances, the moisture content of materials at the site is not adequately reflected within the default emission factors contained in the EETMM, and the equations given in either Table 1 of the EETMM document or USEPA AP-42 documentation were therefore used to derive representative emission factors. The following emission factors were derived using this method.

5.1.1 Miscellaneous Handling of Overburden (Excavator, FEL, loading/unloading of material)

The EETMM specifies the following equation when calculating emissions for miscellaneous handling of overburden:

$$EF = k \times 0.0016 \times \left(\frac{U}{2.2}\right)^{1.3} \left(\frac{M}{2}\right)^{-1.4} \quad \text{kg/t}$$

where k=0.74 for TSP and 0.35 for PM_{10}, U = mean wind speed and M = moisture content.

The equation listed within Table 1 of the EETMM is identified as producing significantly lower results than actual measurement studies. Subsequently, it is recommended that the default values are adopted as below:

Table 4 Default factors for the Handling of Overburden

Emission Factor (kg/t)		Source
TSP	**PM_{10}**	
0.025	0.012	EETMM (Table 1)

This emission factor accounts for the entire process – FEL/excavator scooping load, movement to load position, dumping material into truck/stockpile. Consequently, there is no need to include additional sources for each component.

5.1.2 Haul truck wheel dust – Unpaved Roads (USEPA AP-42)

The emission factor for wheel generated dust from unpaved roads is estimated from the USEPA emission equation for Wheel Generated Dust from Unpaved Roads (2003).

$$EF = \left(k \times \left(\frac{s}{12} \right)^{a} \times \left(\frac{W}{3} \right)^{0.45} \times \left(\frac{281.9}{1000} \right) \right) \times \left(\frac{(365 - N)}{365} \right) \text{ kg/VKT}$$

where k=4.9 for TSP and 1.5 for PM_{10}, a=0.7 for TSP and 0.9 for PM_{10}, s = silt content, W = vehicle gross mass and N = number of days with more than 0.254mm of rainfall.

5.1.3 Stockpile Wind Erosion

Default emission factors from EETMM were used to calculate wind erosion.

While the US EPA's AP42 (US EPA, 2006) emission control factor would normally be used it has been found that TAPM V4 does not predict many wind speeds sufficiently strong to trigger the wind speed threshold friction velocity used in this method. Rather than arbitrarily decide on a lower threshold friction velocity it was decided to use the NPI methodology.

5.2 Model Assumptions

The following sections detail the assumptions made in creating the emissions inventory for the operational scenario.

- All operations are assumed to operate for 11 hours a day (7 am to 6 pm) Monday to Friday, and 5 hours on Saturday (8 am to 1 pm), excluding public holidays, 305 days a year.
- 60,000 m^3 (or 120,000 t, using a material density of 2 t/m^3) of material is assumed to be relocated during the construction period. It is assumed that the majority of the material (80%) will be relocated during the first six months with the remainder in the next 12 months.
- It is assumed that one excavator is used to spread and level the material.
- Capacity for haulage trucks (truck and dog) is assumed to be 30 t.
- Tare weight for the truck and dog combination is assumed to be 10.5 t.
- The distance of travel (on unsealed internal haul routes) is assumed to range from 400 m to 2 km. The 2 km route has been used in the assessment to account for worst case emissions, corresponding to a pick-up point at the northern end of the compound.
- It is assumed that the silt content of the unsealed roads is 6%.
- It is assumed a water cart will be used on haul roads and stockpile for dust suppression and compaction of material.
- Flocchini (1994) identified that the application of water to an unsealed road would reduce dust generation by 87% +/- 6%. Consequently, an emissions reduction factor of 87% has been applied to unsealed haul routes.
- Dust generation from the dumping of material and the operation of the excavator on the stockpile is assumed to be reduced by 50% with the application of water (EETMM, 2001).
- Wind erosion from the stockpile is assumed to be reduced by 50% with the application of water (EETMM, 2001).
- 10% of the total stockpile area of 0.75 ha is assumed to be active at any one time (0.07 ha). The remaining area of the stockpile has been assumed to be inactive with no material available for erosion by wind, due to surface crusting.
- For worst case wind erosion is has been assumed that the active stockpile area is active 24 hours per day throughout the year.

6 AIR QUALITY IMPACT ASSESSMENT

6.1 Dust Deposition

Table 5 shows the results of the dispersion modelling assessment for dust deposition from the ILC modification, using the emission rates calculated in **Section 5.1**, at each of the identified receptors.

As detailed in **Section 3** the annual average background dust deposition for the site has been assumed to consist of the predicted impact of cut and fill construction activities as calculated in the EA AQ Report (SKM, 2005).

The results presented in **Table 5** indicate that the total mean monthly dust deposition (background plus increment) associated with the Project are predicted to be less than 4 g/m^2/month, at all the nearest sensitive receptors. The assessment criterion, both for incremental increase (2 g/m^2/month) and total dust deposition (4 g/m^2/month), is not exceeded at any receptor, as a result of the modification.

Table 5 Predicted Incremental and Cumulative Dust Deposition

Receptor ID	Dust Deposition – Annual Average (g/m^2/month)					
					Assessment Criteria	
	Predicted Increment for Modification Works	Background EA	Increment EA	Cumulative	Increment	Cumulative
R1	<0.1	2.0	1.2	3.2	2.0	4.0
R2	<0.1	2.0	0.5	2.6	2.0	4.0
R3	<0.1	2.0	0.0	2.0	2.0	4.0
R4	<0.1	2.0	0.1	2.1	2.0	4.0
R5	<0.1	2.0	2.0	4.0	2.0	4.0

6.2 TSP Concentrations

Table 6 shows the results of the dispersion modelling for annual average TSP concentrations from the ILC construction site, using the emission rates calculated in **Section 5.1**, at each of the identified receptors.

As detailed in **Section 3** the annual average background concentration of TSP for the site has been assumed to consist of the predicted impact of cut and fill construction activities as calculated in the EA AQ Report (SKM, 2005).

The results presented in **Table 6** indicate that annual average TSP concentrations (background plus increment) associated with the Project are predicted to be below the assessment criterion of 90 µg/m^3 (annual average) at each receptor.

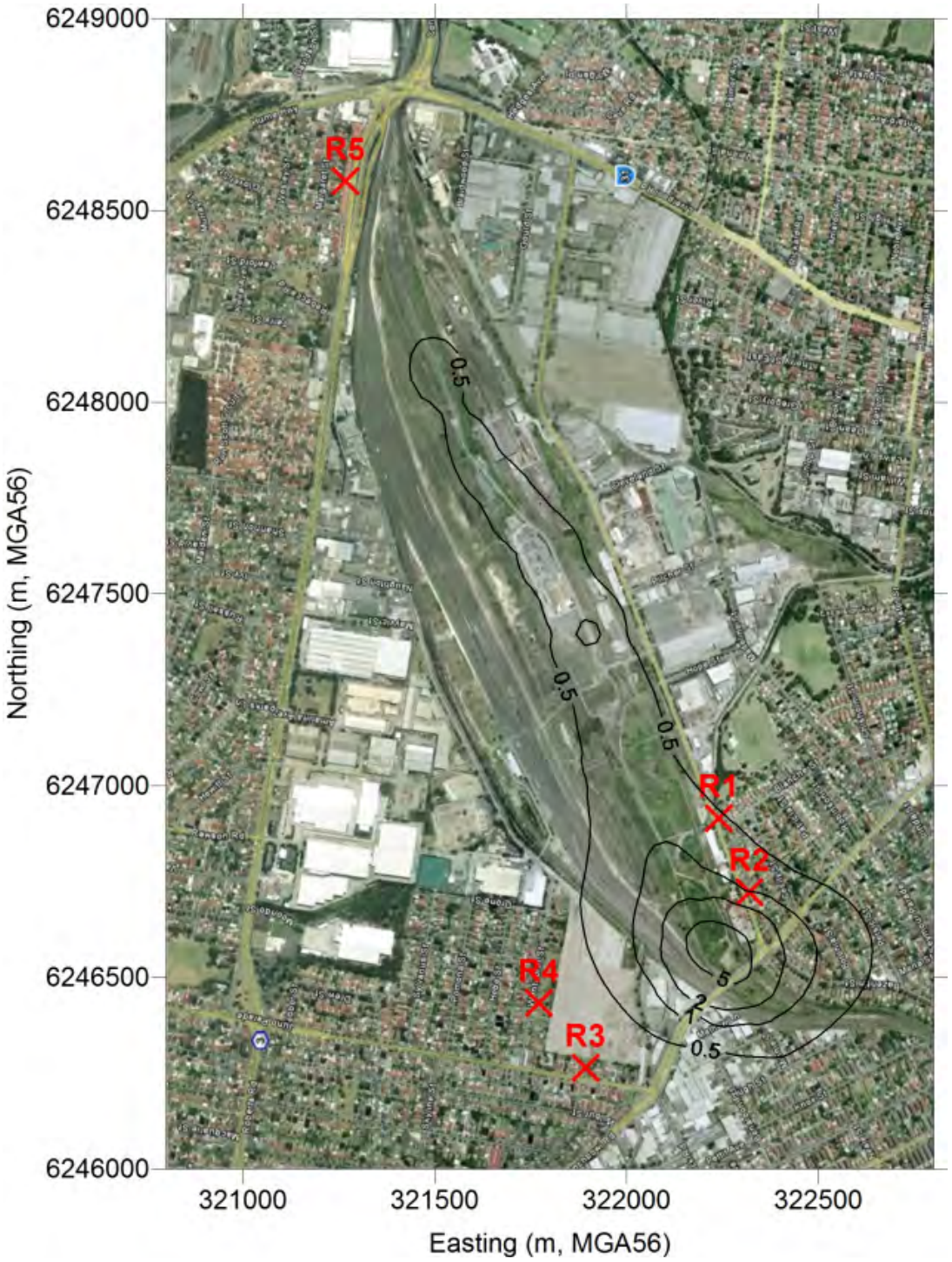
Table 6 Predicted Incremental and Cumulative TSP Concentrations

Receptor ID	TSP– Annual Average (µg/m^3)			
	Predicted Increment for Modification Works	Background EA	Cumulative	Assessment Criterion
R1	0.5	38.1	38.6	90
R2	0.9	32.9	33.8	90
R3	0.2	30.3	30.5	90

R4	0.2	31.0	31.2	90
R5	<0.1	37.4	37.4	90

A contour plot of the annual average TSP concentrations (incremental) attributable to the modification is presented in **Figure 5**.

Figure 5 Contours of Predicted Incremental TSP Concentrations



6.3 PM_{10} Concentrations (Annual Average)

Table 16 shows the results of the dispersion modelling for annual average PM_{10} concentrations from the ILC construction site, using the emission rates calculated in **Section 5.1**, at each of the identified receptors.

As detailed in **Section 3** the annual average background concentration of PM_{10} for the site has been assumed to consist of predicted impact of cut and fill construction activities as calculated in the EA AQ Report (SKM, 2005).

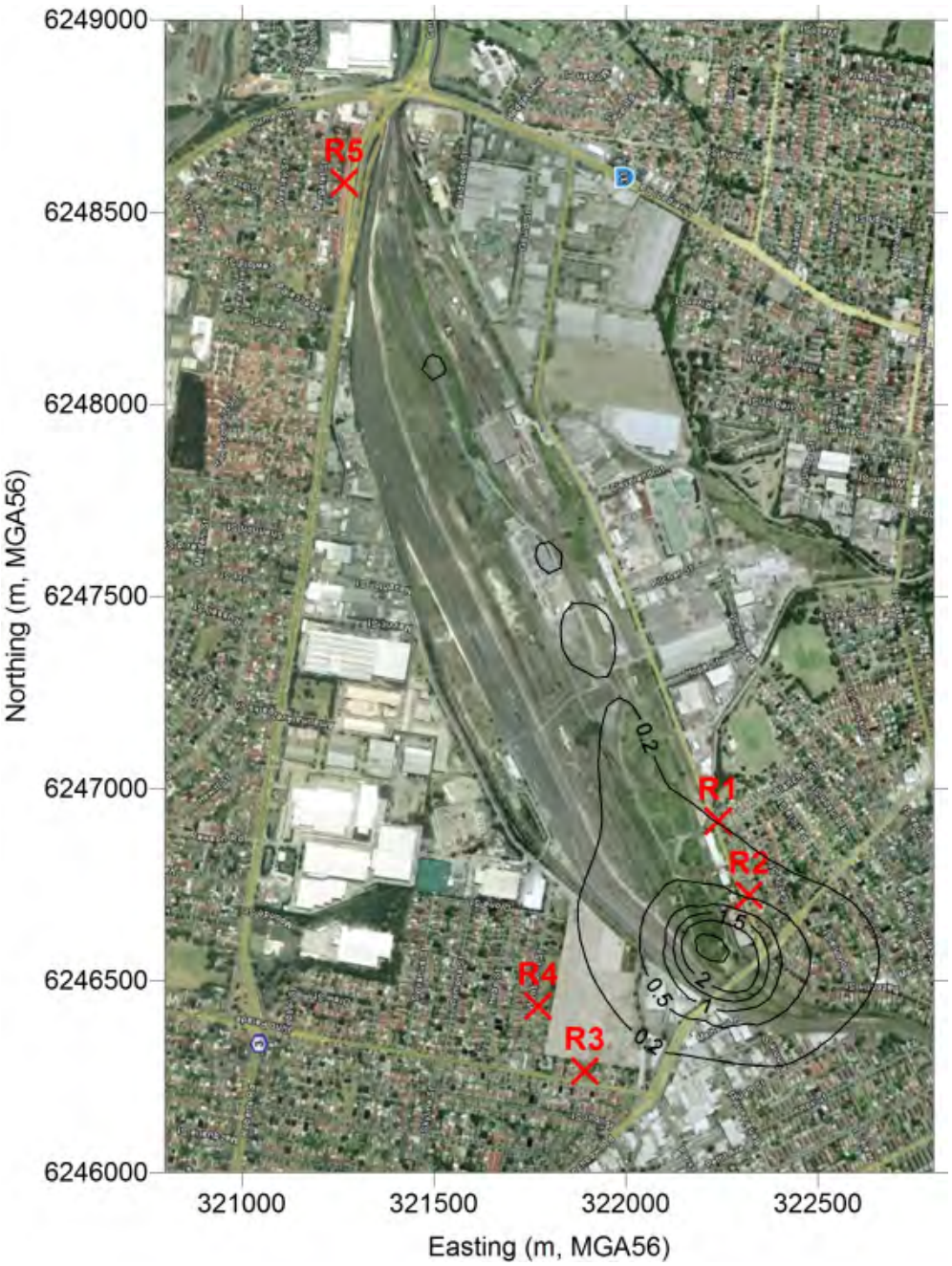
The results presented in **Table 16** indicate that annual average PM_{10} concentrations (background plus increment) associated with the Project are predicted to be below the assessment criterion of 30 µg/m^3 (annual average) at each receptor.

Table 7 Predicted Incremental and Cumulative PM_{10} Concentrations (Annual Average)

Receptor ID	PM_{10}– Annual Average (µg/m^3)			
	Predicted Increment for Modification Works	**Background EA**	**Cumulative**	**Assessment Criterion**
R1	0.2	20.6	20.8	30
R2	0.4	17.9	18.3	30
R3	<0.1	16.2	16.2	30
R4	0.1	16.4	16.5	30
R5	<0.1	19.3	19.3	30

A contour plot of the annual average PM_{10} concentrations (incremental) attributable to the modification is presented in **Figure 6**.

Figure 6 Contours of Predicted Incremental PM_{10} Concentrations (Annual Average)



6.4 PM_{10} Concentrations (24-hour Average)

Table 8 shows the results of the dispersion modelling for 24-hour average PM_{10} concentrations from the site, using the emission rates calculated in **Section 5.1**, at each of the identified receptors.

As detailed in **Section 3** the 24-hour average background concentration of PM_{10} for the site during reuse activities has been assumed to be the predicted impact of cut and fill construction activities as calculated in the EA AQ Report (SKM, 2005). It is noted that the EA assessment presented a worst case scenario with all plant operating at once, large parts of the site exposed and existing PM_{10} background concentrations of the order of 40 µg/m^3.

Table 8 Predicted Incremental and Cumulative PM_{10} Concentrations (24-hour Average)

Receptor ID	PM_{10}– Maximum 24-hour Average (µg/m^3)			
	Increment	Background EA Stage 2	Cumulative	Assessment Criterion[1]
R1	2.1	62.6	64.7	50
R2	4.8	47.0	51.8	50
R3	1.6	38.5	40.1	50
R4	1.6	38.5	40.1	50
R5	0.4	56.5	56.9	50

Note (1) A maximum of 5 exceedances allowed per year

In accordance with Section 5 of the Approved Methods, the purpose of this assessment is to demonstrate that no *additional* exceedances of the impact assessment criterion would occur as a result of the modified Project. The assessment criterion was modelled in the EA to be occasionally exceeded at receptor R1 and R5 during cut and fill construction activities under worst case conditions. The additional impact is minor in comparison with the background (cut and fill) values.

The assessment criterion is also modelled to be occasionally and marginally exceeded at receptor R2, due to the incremental increase in emissions from the ILC modification. However, the maximum cumulative impact is determined assuming that the maximum 24-hour concentration for the modification and for the cut and fill works would occur on the same day. This is considered unlikely. The actual maximum impact is therefore likely to be considerably lower.

A contour plot of the maximum incremental 24-hour PM_{10} concentrations attributable to operations at the ILC construction site is presented in **Figure 7**.

Figure 7 Contours of Predicted Incremental PM_{10} Concentrations (24-hours Average)

In summary, it is not considered that air quality impacts from the proposed modification will have a significant impact on predicted cumulative maximum 24-hour PM_{10} concentrations, as reported in the EA (SKM 2005). Predicted maximum incremental 24-hour PM_{10} concentrations due to the proposed modification are less than 4.8 µg/m^3. It is therefore concluded that there is only a low risk of off-site impacts from short term (24-hour average) PM_{10} levels due to the fill emplacement activities at surrounding receptors if dust management and mitigation measures are implemented. These dust management and mitigation measures, some of which are already being implemented, include:

- Continuation of real-time meteorological and PM_{10} monitoring activities at the south-eastern part of the site to identify periods when work activities may result in adverse off-site impacts.

- Undertake progressive rehabilitation of completed fill areas at Mt Enfield, including as required the use of dust suppressants, revegetation or other suitable methods.
- Continuation of the use of water carts along internal roads and at the reuse area.
- Minimisation of the active reuse area as far as practicable.

7 CONCLUSION

An air quality impact assessment was carried out by SKM (2005), as part of the environmental impact assessment, for different stages of construction of the ILC. The results from that assessment have been used within this report to calculate the potential cumulative impact of the modification and current construction activities.

Dispersion modelling has been carried out using the AUSPLUME dispersion model for a full year of meteorological data in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, (DECCW, 2005).

Dust deposition, annual average PM_{10} concentrations and annual average TSP concentrations are predicted to be below the assessment criteria at all sensitive receptors.

There is only a low risk of off-site impacts from short term (24-hour average) PM_{10} levels due to the fill emplacement activities at surrounding receptors if dust mitigation measures are implemented. Model results are based on conservative model assumptions and worst case scenarios (such as existing PM10 background concentrations in the order of 40 µg/m3, all plant operating at once, large areas of the site exposed, etc), which are considered unlikely to occur.

Potential short term PM_{10} impacts can be managed by implementing the following dust management and mitigation measures, some of which are already being implemented:

- Continuation of real-time meteorological and PM_{10} monitoring activities at the south-eastern part of the site to identify periods when work activities may result in adverse off-site impacts.
- Undertake progressive rehabilitation of completed fill areas at Mt Enfield, including as required the use of dust suppressants, revegetation or other suitable methods.
- Continuation of the use of water carts along internal roads and at the reuse area.
- Minimisation of the active reuse area as far as practicable.

On site real-time air quality monitoring of PM_{10} concentrations indicates that no exceedance of the 24-hour average PM_{10} criteria due to current construction activities has occurred to date. Management practices and mitigation measures have been shown to be effective. The predicted occasional exceedances are most likely due to the conservative nature of the assessments and are unlikely to be experienced in reality.

8 CLOSURE

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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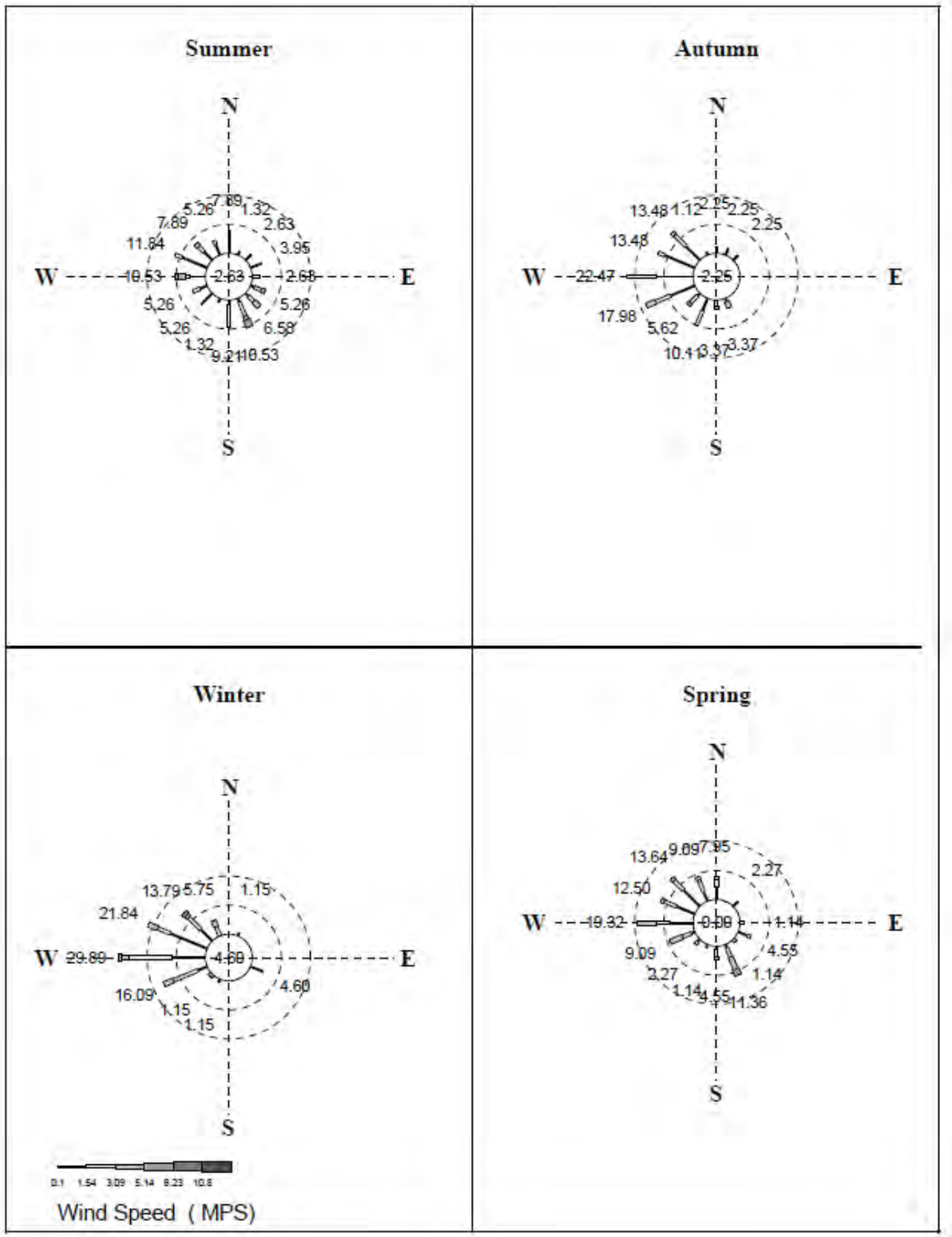
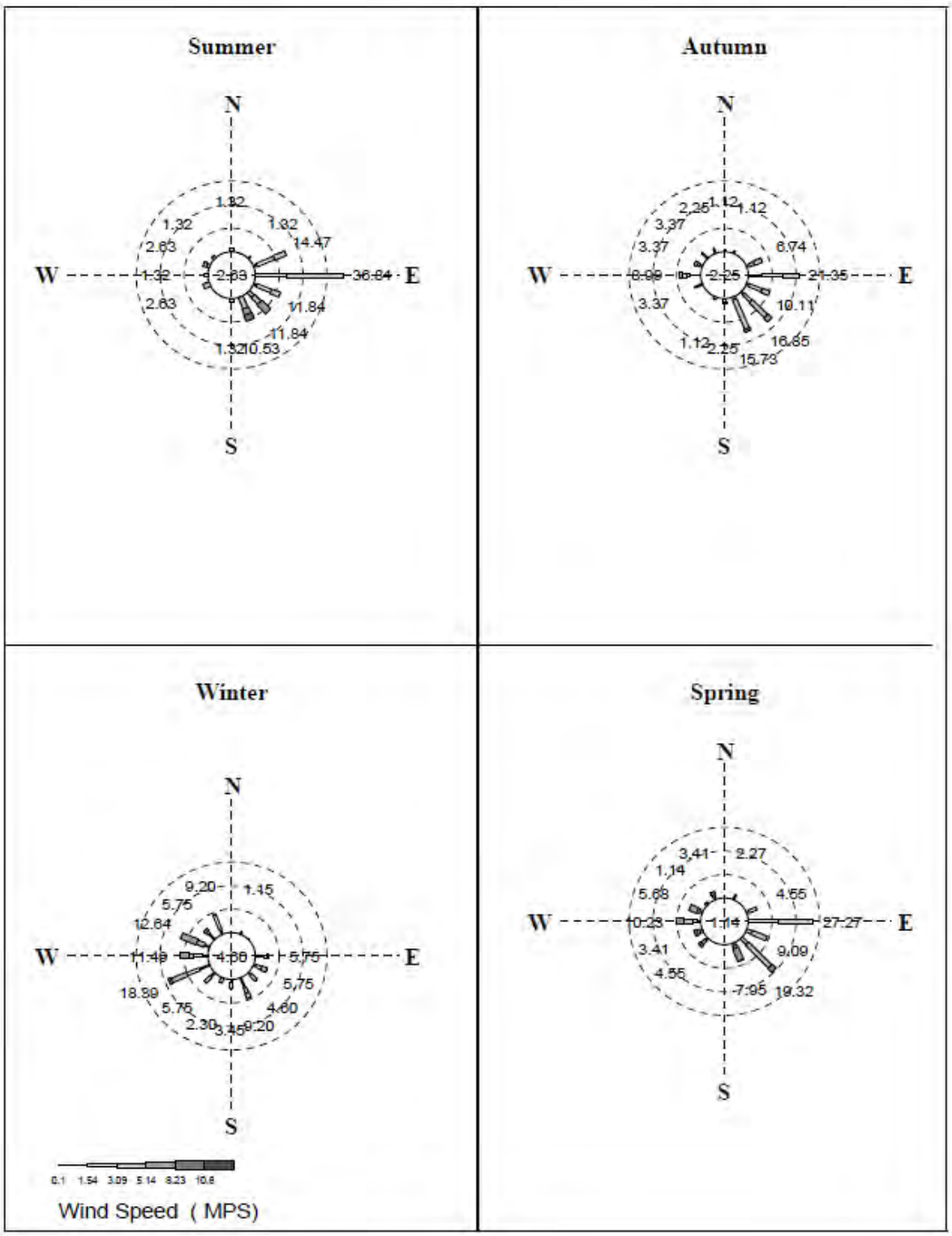
SLR Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

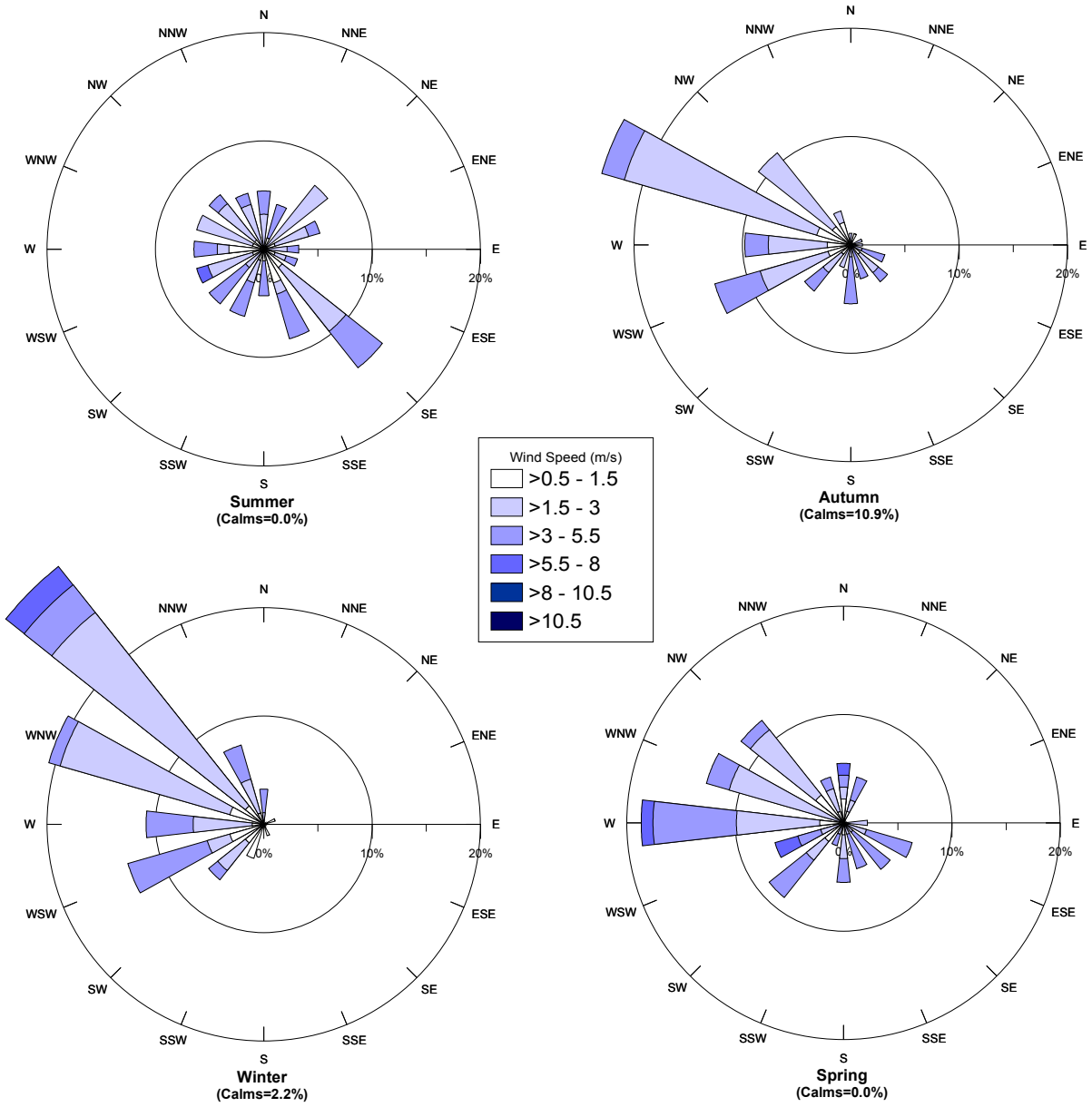
Appendix A, Figure A1: Seasonal 9 am Wind Roses for Lidcombe (1999)



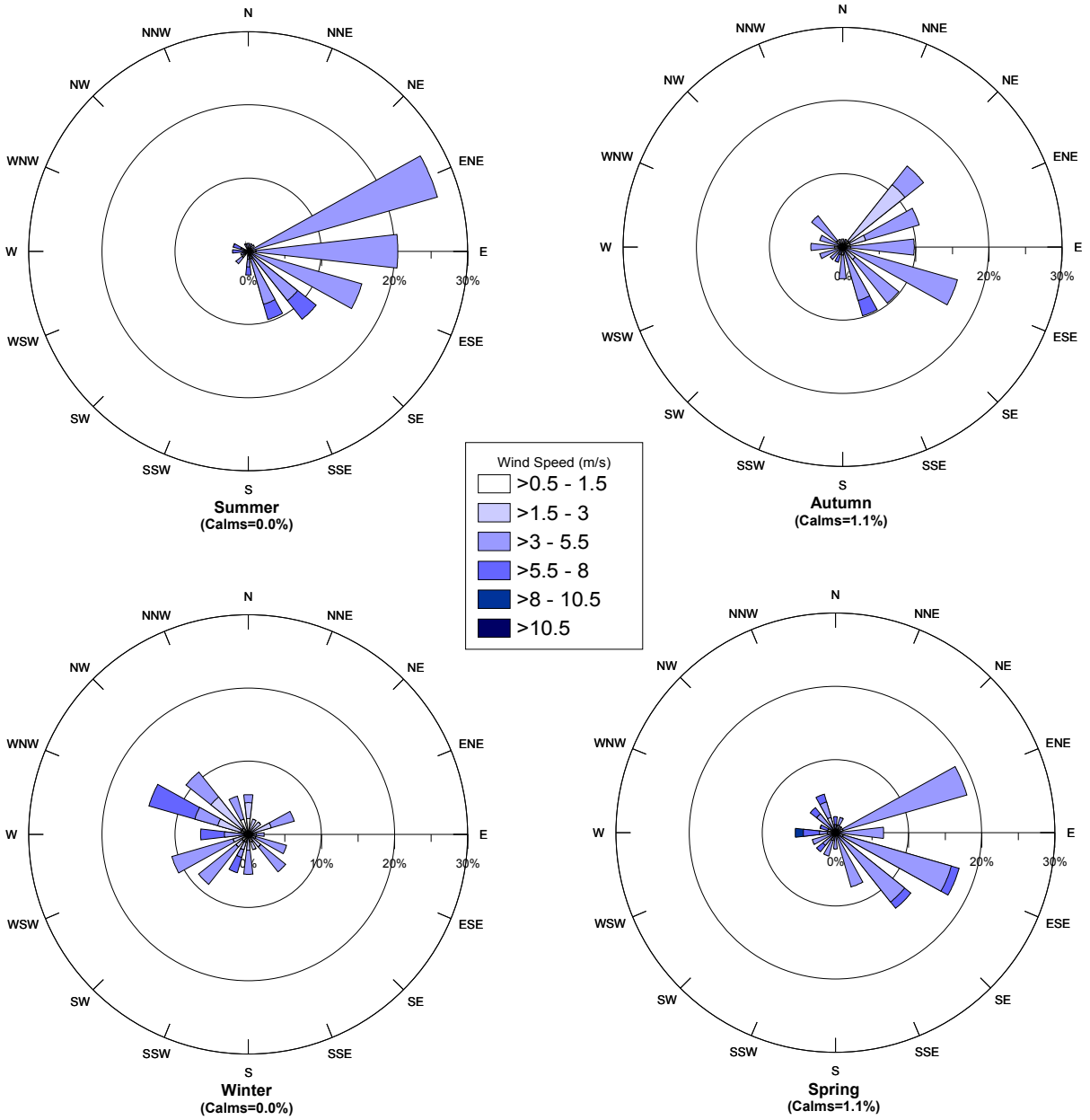
Appendix A, Figure A2: Seasonal 3 pm Wind Roses for Lidcombe (1999)



Appendix A, Figure A3: Seasonal 9 am Wind Roses Predicted by TAPM (2009)



Appendix A, Figure A4: Seasonal 3 pm Wind Roses Predicted by TAPM (2009)



Intermodal Logistics Centre at Enfield

Modification Application No. 5

On Site Management of Unsuitable Engineering Fill

Appendix C:
Landscaping Plans

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Cad ref: P:\0850 PROJECTS\08503027.00 Enfield Logistics\E Technical Data & Files\E2 CAD Drawings\E2a EDAW CAD Dwgs\E2a2 Documentation\AutoCAD\PI1Shr1\MA-MD-LU-GE-900201.dwg Last modified: 28 Apr 11 - 10:36

LEGEND

- PLANTING COMMUNITY BOUNDARY
- CPW (1) — PLANTING COMMUNITY CODE. REFER PLANTING SHEDULE FOR PLANT COMUNITY AREA TYPES SPECIES SELECTION AND QUANTITIES
- CPW (1) — CUMBERLAND PLAIN WOODLAND
- NGM (1) — NATIVE GRASS MIX
- GFC (1) — GRASSLAND - FROG MOVEMENT CORRIDOR
- IMF A (1) — IMPROVED FORAGE TYPE 1
- IMF B (1) — IMPROVED FORAGE TYPE 2. PLANT IN MONOCULTURAL SWALES
- RSM (1) — RIVER SHEOAK MONOCULTURE
- FRP (1) — FROG POND MACROPHYTES
- SWL — SWALE
- NSM — NATIVE SLOPE GRASS MIX
- NSTM — NATIVE SLOPE TREE & SHRUB MIX

REFER TO SHEET MA-MD-LU-900940 - PLANTING SHCEDULES FOR PLANT MIX, QUANTITIES AND SPACINGS

INSTALL ROOT GUARD WHERE KIKUYU MEETS GRAVEL PATHS

No.	BY	DATE	DESCRIPTION	APPD
6	CG	28/04/11	ISSUED FOR DoP APPROVAL	
5	CG	11/05/10	ISSUED FOR CONSTRUCTION	
4	CG	28/01/10	ISSUED FOR CONSTRUCTION	
3	CG	1/12/09	ISSUED FOR CONSTRUCTION	

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	SC/MB	CHECKED	SC
DRAWN	CG	CHECKED	SC
APPROVED	SC	DATE	28/04/11

SCALES:

5 0 10 20m

1:500 A1

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SYDNEY PORTS
FIRST PORT, FUTURE PORT

DESIGNER:

MAUNSELL | AECOM

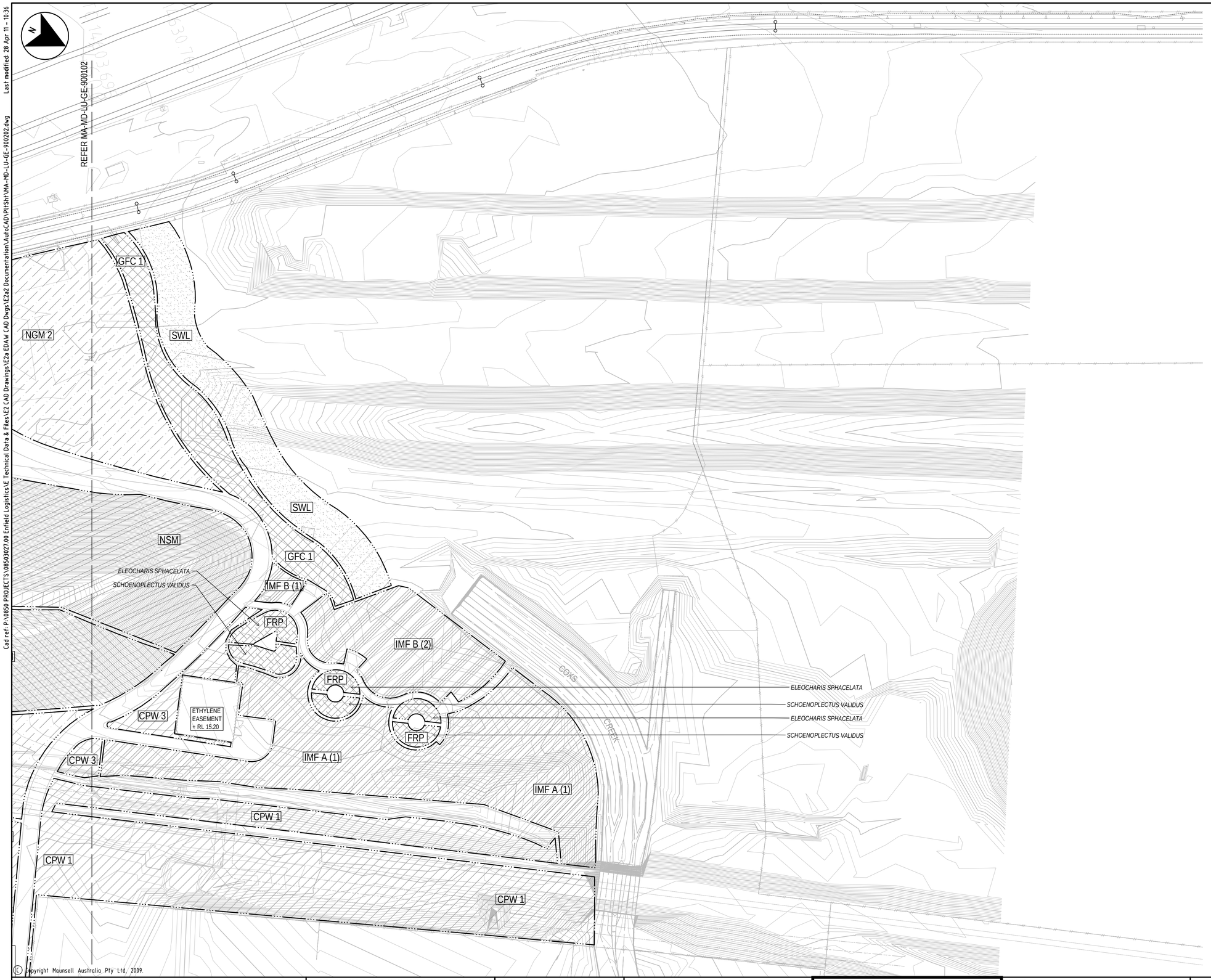
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

LANDSCAPE PLANTING PLAN

SHEET 1 OF 2

STATUS:	DRAWING NO.	REV:
FOR DoP APPROVAL	MA-MD-LU-GE-900201	06



LEGEND

- PLANTING COMMUNITY BOUNDARY
- CPW (1) — PLANTING COMMUNTY CODE. REFER PLANTING SHEDULE FOR PLANT COMUNITY AREA TYPES SPECIES SELECTION AND QUANTITIES
- CPW (1) — CUMBERLAND PLAIN WOODLAND
- NGM (1) — NATIVE GRASS MIX
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- FRP (1) — FROG POND MACROPHYTES
- SWL — SWALE
- NSM — NATIVE SLOPE GRASS MIX
- NSTM — NATIVE SLOPE TREE & SHRUB MIX

REFER TO SHEET MA-MD-LU-900940 - PLANTING SHCEDULES FOR PLANT MIX, QUANTITIES AND SPACINGS

INSTALL ROOT GUARD WHERE KIKUYU MEETS GRAVEL PATHS

No.	BY	DATE	DESCRIPTION	APPD
6	CG	28/04/11	ISSUED FOR DoP APPROVAL	
5	CG	11/05/10	ISSUED FOR CONSTRUCTION	
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DESIGNED	SC/MB	CHECKED	SC
DRAWN	CG	CHECKED	SC
APPROVED	SC	DATE	28/04/11

SCALES:

5 0 10 20m

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FIRST PORT, FUTURE PORT

DESIGNER:

MAUNSELL | AECOM

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

LANDSCAPE PLANTING PLAN

SHEET 2 OF 2

STATUS:	DRAWING NO:	REV:
FOR DoP APPROVAL	MA-MD-LU-GE-900202	06

ILC AT ENFIELD PLANT COMUNITIES SCHEDULE

ILC AT ENFILED PLANT SCHEDULE

NOTE: AREAS ARE MEASURES IN METRES (m)

Plant Community Type 1: Cumberland Plain Woodland (CPW)

					Qty				
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Area 2	Area 3	Total	
CANOPY & MIDSTRATUM TREES					*4375*	*2429*	*378*	7182	
Acacia decurrens	Cell	2500	0.16	5	35	19	3		
Acacia parramattensis	Cell	2500	0.16	5	35	19	3		
Acacia implexa	Cell	2500	0.16	5	35	19	3		
Eucalyptus crebra	Cell	2500	0.16	5	35	19	3		
Eucalyptus eugenioides	Cell	2500	0.16	10	70	39	6		
Eucalyptus molucanna	Cell	2500	0.16	30	210	117	18		
Eucalyptus tereticornis	Cell	2500	0.16	30	210	117	18		
Melaleuca decora	Cell	2500	0.16	10	70	39	6		
SHRUB UNDERSTOREY									
Acacia falcata	Cell	1200	0.69	10	302	168	26		
Bursaria spinosa	Cell	1200	0.69	60	1811	1006	156		
Dodonaea viscosa ssp. cuneata	Cell	1200	0.69	20	604	335	52		
Indigophora australis	Cell	1200	0.69	10	302	168	26		
GROUNDLAYER									
Bothriochloa decipiens/macra	Cell	325	12	1	525	291	45		
Capillipedium parviflorum	Cell	325	12	20	10500	5830	907		
Chloris ventricosa	Cell	325	12	1	525	291	45		
Commelina cyanea	Cell	325	12	1	525	291	45		
Cymbopogon refractus	Cell	325	12	1	525	291	45		
Danthonia spp	Cell	325	12	5	2625	1457	227		
Dianella longifolia	Cell	325	12	1	525	291	45		
Dichelachne micrantha	Cell	325	12	1	525	291	45		
Dichondra repens	Cell	325	12	1	525	291	45		
Imperata cylindrica	Cell	325	12	10	5250	2915	454		
Microlaena stipoides	Cell	325	12	3	1575	874	136		
Poa labillardieri	Cell	325	12	1	525	291	45		
Sorghum leilocladum	Cell	325	12	13	6825	3789	590		
Themeda australis	Cell	325	12	40	21000	11659	1814		
Walenbergia stricta/communis	Cell	325	12	1	525	291	45		

Plant Community Type 2: Native Grass Mix (NGM)

					Qty						
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Total
GROUNDLAYER					*8470*	*2789*	*5123*	*3311*	*684*	*1632*	22009
Capillipodium specigerum	Seed	NA	200	35	592900	195230	358610	231770	47880	114240	
Sorghum leilocladum	Seed	NA	200	35	592900	195230	358610	231770	47880	114240	
Themeda australis	Seed	NA	200	30	508200	167340	307380	198660	41040	97920	

Plant Community Type 3: Frog Movement Corridor (GFC)

					Qty		
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Area 2	Total
GROUNDLAYER					*831*	*3223*	4054
Capillipedium parviflorum	Cell	325	12	25	2493	9669	
Imperata cylindrica	Cell	325	12	15	1496	5801	
Lomandra filiformis subsp. filiformis	Cell	325	12	2	199	774	
Lomandra longifolia	Cell	325	12	6	598	2321	
Lomandra multiflora subsp. multiflora	Cell	325	12	2	199	774	
Microlaena stipoides	Cell	325	12	5	499	1934	
Sorghum leilocladum	Cell	325	12	20	1994	7735	
Themeda australis	Cell	325	12	25	2493	9669	

Plant Community Type 4: Improved Forage Type A (IMF A)

					Qty		
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Area 2	Total
GROUNDLAYER					*2828*	*609*	3437
Kikuyu. Sp	Rolls				2337	579	

Plant Community Type 5: Improved Forage Type B)IMF B)

					Qty			
					Area 1	Area 2	Area 3	Total
Botanic Name	Pot Size	Spacing	Per m2	% Mix	*148*	*1001*	*344*	1493
Capillipodium specigerum	Cell	325	12	30	533	3604	1238	
Sorghum leilocladum	Cell	325	12	30	533	3604	1238	
Themeda australis	Cell	325	12	40	710	4805	1651	

Plant Community Type 6: River Sheoak Monoculture (RSM)

					Qty	
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Total
GROUNDLAYER					*4420*	4420
Casuarina littoralis	Cell	1200	0.69	100	3050	

Plant Community Type 7: Bioretention System

					Qty		
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Area 2	Total
CANOPY & MIDSTRATUM TREES					*2720*	*4142*	6862
Melaleuca styphelioides	Cell	2500	0.16	3	13	20	
SHRUB UNDERSTOREY							
Banksia robur	Cell	1200	0.69	2	38	57	
Callistemon citrinus	Cell	1200	0.69	3	56	86	
Leptospermum juniperinum	Cell	1200	0.69	2	38	57	
GROUNDLAYER							
Bolboschoenus caldwellii	Cell	325	12	15	4896	7456	
Carex appressa	Cell	325	12	15	4896	7456	
Carex inversa	Cell	325	12	2	653	994	
Fimbristylis dichotoma	Cell	325	12	3	979	1491	
Gahnia sieberiana	Cell	325	12	2	653	994	
Imperata cylindrica	Cell	325	12	10	3264	4970	
Juncus usitatus	Cell	325	12	20	6528	9941	
Lomandra filiformis subsp. filiformis	Cell	325	12	3	979	1491	
Lomandra longifolia	Cell	325	12	10	3264	4970	
Lomandra multiflora subsp. multiflora	Cell	325	12	5	1632	2485	
Pteridium esculentum	Cell	325	12	5	1632	2485	

Plant Community Type 8: Frog Ponds (FRP)

					Qty			
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Area 2	Area 3	Total
GROUNDLAYER					*105*	*105*	*105*	210
Eleocharis sphacelata	Cell	325	12	50	630	630	630	
Schoenoplectus validus	Cell	325	12	50	630	630	630	

Plant Community Type 9: Swale (SWL)

					Qty	
Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Total
GROUNDLAYER					*673*	673
Carex appressa	Cell	325	12	30	2423	
Juncus usitatus	Cell	325	12	50	4038	
Paspalum distichum	Cell	325	8	20	1077	

Plant Community Type 10: Native Slope Tree & Shrub Mix (NSTM)

Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Total
GROUNDLAYER					*8951*	8951
Acacia decurrens	Cell	2500	0.16	25	358	
Acacia implexa	Cell	2500	0.16	25	358	
Casuarina littoralis	Cell	1200	0.69	25	1544	
Dodonaea viscosa ssp. cuneata	Cell	1200	0.69	25	1544	
Indigophora australis	Cell	1200	0.69	25	1544	

Plant Community Type 11: Native Slope Grass Mix (NSM)

Botanic Name	Pot Size	Spacing	Per m2	% Mix	Area 1	Total
GROUNDLAYER					*2041*	2041
Chloris ventricosa	Cell	325	12	25	6123	
Danthonia spp	Cell	325	12	25	6123	
Imperata cylindrica	Cell	325	12	25	6123	
Lomandra longifolia	Cell	325	12	25	6123	
Microlaena stipoides	Cell	325	12	25	6123	

No.	BY	DATE	DESCRIPTION	APPD
5	CG	28/04/11	ISSUED FOR DoP APPROVAL	
4	CG	28/01/10	ISSUED FOR CONSTRUCTION	
3	CG	1/12/09	ISSUED FOR CONSTRUCTION	

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	SC	CHECKED	SC
DRAWN	CG	CHECKED	SB
APPROVED	SB	DATE	28/04/11

SCALES:

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ASIA
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USA

SYDNEY PORTS
FIRST PORT, FUTURE PORT

DESIGNER:

MAUNSELL | AECOM

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

PLANTING SCHEDULE

SHEET 1 OF 1

STATUS:	DRAWING NO:	REV:
FOR DoP APPROVAL	MA-MD-LU-GE-900940	05

Intermodal Logistics Centre at Enfield

Modification Application No. 5

On Site Management of Unsuitable Engineering Fill

Appendix D: Consultation

NSW GOVERNMENT | Planning

Contact: Rebecca Newman
Phone: 02 9228 6340
Fax: 02 9228 6355
Email: rebecca.newman@planning.nsw.gov.au

Our ref: 09/03461-1
Your ref: SPB ILC-OG0536

Mr Stephen Zaczkiewicz
Enfield ILC Senior Development Manager
Sydney Ports Corporation
PO Box 25
MILLERS POINT NSW 2000

Dear Mr Zaczkiewicz

Enfield Intermodal Logistics Centre (05_0147) – On-site Management of Unsuitable Material

I refer to your letter dated 22 March 2011 advising of Sydney Port Corporation's (SPC) intention to lodge a Section 75W modification request to enable on-site reuse of excavated material deemed unsuitable for engineering fill under the Intermodal Logistics Centre facility.

The Department has considered the proposal and notes the construction and operational issues that SPC would investigate and assess as part of the modification Environmental Assessment. In addition to the issues indicated in your letter, the Department requires that the following be addressed in the Environmental Assessment:

- justification for the modification and its independence of any future modifications;
- on site traffic generation – estimated number of daily truck movements and duration of haulage activity;
- earthworks and excavation – work locations and resultant topographical changes, including any stabilisation works;
- landscaping of Mt Enfield – landscaping plans, including photomontages of the reshaped stockpile area as viewed from public vantage points; and
- access – potential for community access to Mt Enfield.

Should you have any questions regarding the above matter, please contact Rebecca Newman on the above contact details.

Yours sincerely

30/3/11

Daniel Keary
Director
Infrastructure Projects