view R1

Existing View

Simulated View

view R01

Viewing Location	South of site, Moorebank Avenue (rail overpass)
Visual Adaptation	
Approximate Viewing Distance	60m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The Moorebank Avenue rail overpass is located 800m south of the proposed development. It has unobstructed elevated views of the existing city rail passenger railway line. The proposed freight railway line is directly adjacent to the existing railway line and would be highly prominent from this location. No other part of the development would be visible from this location.
Landscape Compatability	The landscape on either side of the railway lines (existing and proposed) is highly vegetated, consisting of large trees and shrubs. The addition of the proposed railway line will moderately detract from the existing landscape amenity.
Visual Sensitivity	Traffic that passes along this portion of Moorebank Avenue will have access to prominent views of the proposed railway line. However, due to the views being predominantly brief and the importance of amenity to the viewers not being great, the visual sensitivity at this location would be moderate.
Visual Impact	The addition of the proposed railway line is not a substantial change to the existing landscape amenity. The visual impact at this location will be moderate.

view R2

Existing View

Simulated View

view R02

Viewing Location	South of site, Moorebank Avenue (rail overpass)
Visual Adaptation	
Approximate Viewing Distance	50m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The Moorebank Avenue rail overpass is located 650m south of the proposed development. It has unobstructed elevated views of the existing city rail passenger railway line. The proposed freight railway line is directly adjacent to the existing railway line and turns to Rail Corp land North to SIMTA site.
Landscape Compatability	The landscape on either side of the railway lines (existing and proposed) and existing rail to DNSDC are highly vegetated, consisting of large trees and shrubs. The addition of the proposed railway line will moderately detract from the existing landscape amenity.
Visual Sensitivity	Traffic that passes along this portion of Moorebank Avenue will have access to prominent views of the proposed railway line. However, due to the views being predominantly brief and the importance of amenity to the viewers not being great, the visual sensitivity at this location would be moderate.
Visual Impact	The addition of the proposed railway line is not a substantial change to the existing landscape amenity. The visual impact at this location will be moderate.

view R3

Existing View

Simulated View

view R03

Viewing Location	South-west of site, Corner of Canterbury Road and Cambridge Avenue
Visual Adaptation	
Approximate Viewing Distance	1,200m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed development is not visible from this location. The proposed railway line will be entirely screened by the heavy vegetation and existing dwellings.
Landscape Compatability	In the foreground is the intersection of Cambridge Avenue and Canterbury Road. The existing landscape comprises of some heavy vegetation. Amongst this vegetation are some existing dwellings.
Visual Sensitivity	The visual sensitivity in this location is low. The views will be from passing traffic through the intersection, and will be of short duration. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

view R4

Existing View

Simulated View

view R04

Viewing Location	South-west of site, Glenfield Road
Visual Adaptation	
Approximate Viewing Distance	1,000m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed railway line is not visible from this location.
Landscape Compatability	In the foreground is Leacock Regional Park. Beyond this park is the existing city rail passenger railway line. Further beyond the existing rail way line is some heavy vegetation that totally screens the proposed railway line.
Visual Sensitivity	The visual sensitivity in this location is low. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

view R5

Existing View

Simulated View

view R05

Viewing Location	South-West of site, Glenfield Road (within Leacock Regional Reserve)
Visual Adaptation	
Approximate Viewing Distance	1,000m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed railway line is not visible from this location.
Landscape Compatability	In the foreground is Leacock Regional Park. Beyond this park is the existing city rail passenger railway line. Further beyond the existing rail way line is some heavy vegetation that totally screens the proposed railway line.
Visual Sensitivity	The visual sensitivity in this location is low. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

view R6

Existing View

Simulated View

view R06

Viewing Location	South-west of site, Leacocks Lane
Visual Adaptation	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed railway line is not visible from this location.
Landscape Compatability	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed railway line and proposed development.
Visual Sensitivity	The visual sensitivity in this location is high. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

view R7

Existing View

Simulated View

view R07

Viewing Location	South-West of site, Leacocks Lane
Visual Adaptation	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed railway line is not visible from this location.
Landscape Compatability	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed railway line and proposed development.
Visual Sensitivity	The visual sensitivity in this location is high. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

view R8

Existing View

Simulated View

view R08

Viewing Location	West of site, Leacocks Lane
Visual Adaptation	
Approximate Viewing Distance	470m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed railway line is not visible from this location.
Landscape Compatability	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed railway line and proposed development.
Visual Sensitivity	The visual sensitivity in this location is high. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

view R9

Existing View

Simulated View

view R09

Viewing Location	West of site, Leacocks Lane
Visual Adaptation	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed rail line (approx.)
Prominence of the Development	The proposed railway line is not visible from this location.
Landscape Compatability	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed railway line and proposed development.
Visual Sensitivity	The visual sensitivity in this location is high. Because the proposed development will not be visible, the visual amenity will be unchanged.
Visual Impact	There will be no change to the visual amenity at this location, therefore this will result in no visual impact.

07.2 visual impacts during construction

The construction program for the SIMTA development is yet to be determined, however it is anticipated that the following indicative staging sequence is appropriate for consideration:

Stage 1: Construction of the rail link, terminal and sidings to accommodate trains of a length of approximately 650m (including locomotives).

Stage 2: Construction of warehouse and distribution facilities with ancillary offices with associated access, car parking, and landscaping works.

Stage 3: Construction of potential extension of the rail siding and further warehouse and distribution facilities with ancillary offices and associated access, car parking, landscaping and works to the completion of the overall development and Intermodal Facility.

During each of these stages, construction cranes are likely to be the most visible element during construction and would be potentially viewed from some of the key viewpoints discussed above, however given the low-rise nature of the proposed development it is unlikely these would be any more intrusive than the terminal operating equipment and would be highly localised.

Other sources of visual impact during construction, such as the establishment of hoardings and construction fencing would tend to create highly localised visual impacts primarily along Moorebank Avenue and Anzac Road.

08 light spill assessment

08.1 introduction and methodology

The Sydney Intermodal Terminal Alliance (SIMTA) is a consortium of Qube Logistics and QR National. The SIMTA Moorebank Intermodal Terminal Facility (SIMTA proposal) is proposed to be located on the land parcel currently occupied by the Defence National Storage and Distribution Centre (DNSDC) on Moorebank Avenue, Moorebank, south-west of Sydney.

SIMTA proposes to develop the DNSDC occupied site into an intermodal terminal facility and warehouse/ distribution facility, which will offer container storage and warehousing solutions with direct rail access to Port Botany. Construction of the rail connection from the SIMTA site to the Souther Sydney Freight Line (SSFL) will be undertaken as part of the first stage of works for the SIMTA proposal.

The SIMTA site is located in the Liverpool Local Government Area. It is 27 kilometres west of the Sydney CBD, 17 kilometres south of the Parramatta CBD, 5 kilometres east of the M5/M7 Interchange, 2 kilometres from the main north-south rail line and future Southern Sydney Freight Line, and 0.6 kilometres from the M5 motorway.

The SIMTA site, approximately 83 hectares in area, is currently operating as a Defence storage and distribution centre. The SIMTA site is legally identified as Lot 1 in DP1048263 and zoned as General Industrial under Liverpool City Council LEP 2008. The parcels of land to the south and south west that would be utilised for the proposed rail link are referred to as the rail corridor. The proposed rail corridor covers approximately 75 hectares and adjoins the Main Southern Railway to the north. The rail line is approximately 3.5 kilometres in length, 20 metres in width (variable width) and includes two connections to the SSFL, one south and one north.

The proposed rail corridor is owned by third parties, including the Commonwealth of Australia, RailCorp, private owners and Crown Land held by the Department of Primary Industries, and would link the SIMTA site with the Southern Sydney Freight Line. Existing uses include vacant land, existing rail corridors (East Hills Railway and Main Southern Railway), extractive industries, and a waste disposal facility. The rail corridor is intersected by Moorebank Avenue, Georges River and Anzac Creek. Native vegetation cover includes woodland, forest and wetland communities in varying condition. The proposed rail corridor is zoned partly ‘SP2 Infrastructure (Defence and Railway)’ and partly ‘ RE1 - Public Recreation’. The surrounding Commonwealth lands are zoned ‘SP2 Infrastructure (Defence)’.

The SIMTA proposal will be undertaken as a staged development. An annual operating capacity of one million TEU throughput is anticipated in the ultimate stage, when fully developed.

Hyder has prepared this light spill study to examine the potential lighting requirements for the operation of the SIMTA site and investigate through the modelling of a concept lighting design, its compliance with the Australian Standard - AS4282- 1997, ‘Control of Obtrusive Effects of Outdoor Lighting’.

The actual lighting design will be developed and detailed during ongoing design development of the stages of SIMTA. Each stage will require further analysis based upon the actual luminaires to be adopted to ensure their compliance with the above standard, and to mitigate any impact on the surrounding environment.

08.2 methodology

The scope of the light spill study is to predict:

- Spill light to residential boundaries in the form of a vertical Illuminance/intensity calculation grid on a vertical plane at a height of 1.5m within the specified area, derived in the specified manner.
- Special criteria operation such as local airfields or astronomical observatories that could be affected from spill light.

The results of the modelling which depicts the alignment of the limiting illuminance, is shown in Figure 9.

Software used for the illuminance modelling/calculation is the visual lighting design software AGi32: version 2.02 provided by light lab international (www.lsa.com.au) and (www.visuallightingsoftware.com).

The assessment methodology has generally not included the beneficial effect of buildings, trees and bushes and can thus be considered conservative.

The extent or scale of values likely to be affected as a result of the SIMTA proposal are outlined further within this report. The extent or scale refers to areas within the SIMTA site and rail link construction footprint. Design information regarding the location of the rail link within the rail corridor is not available at this time. As a result, potential impacts within the rail corridor may be reviewed once design and siting studies are completed for the project application stages.

08.3 australian standards for spill light

In accordance with Table 2.1 of Australian Standard AS4282-1997 'Control of the Obtrusive Effect of Outdoor Lighting', the following light levels have been adopted as the limiting values in the assessment of spill light:

Light Technical Parameter		Residential Areas	
		Light Surrounds	Dark Surrounds
Illuminance in Vertical Plane	Pre-curfew Hours	10 lx	10 lx
	Curfew Hours	2 lx	1 lx
Luminous Intensity Emitted by Luminaries	Pre-curfew Hours	100,000 cd (for a large area with Level 1 control)	100,000 cd (for a large area with Level 1 control)
	Curfew Hours	1,000 cd	500 cd

Table 1 - Light Limiting Values in accordance with Table 2.1 - AS4282 - 1997

A copy of Table 2.1 – AS4282 – 1997 is located in Appendix A

These limiting values are based upon the assumption that the criteria for curfew hours will apply, since the site lighting will be operational for 24 hours per day.

It should be noted that additional light spill can be accepted in an area where a lot of light already prevalent, whereas the same light spill will be seen as more obtrusive in dark residential areas.

08.4 design parameters and assumptions

site description

The SIMTA site is divided into two main usages:

- The rail transfer and container loading area, which is located on the western Moorebank Avenue frontage of the site.
- Warehousing area located on the eastern, Wattle Grove side of the site.

It is considered the location with the most potential for light spill is the rail transfer and container loading area.

The rail transfer and container loading area is an open area which will be lit by luminaires on high standards (assumed for the purposes of the modelling only as 40m), so as to provide relatively high levels of light in both horizontal/vertical planes. The level of light is intended to safely support operations of the intermodal terminal such as:

- crane operations and positioning
- shared vehicular and pedestrian usage hazard
- container movement activities

The warehousing is located on the eastern boundary and should be similar in operation to any large warehouse complex. The warehouses are expected to have their front of house entries facing the eastern boundary of the site, with loading and unloading of the buildings along the northern and southern building faces.

operational lighting standards

There are no Australian standards which specifically address minimum standards of lighting for an exterior work area with this type of application. In these instances, the international standard *CIE 129-1998 Guide for lighting exterior work areas* is generally adopted.

The CIE standard specifies 50 lux for ‘rough works’ which includes continuous handling of large units and raw materials, loading and unloading of freight, lifting and deseeding location for cranes, open loading platforms.

The following design parameters have therefore been adopted for relevant calculations to analyse the effects of obtrusive light from the proposed lighting system;

- Maintained Average Horizontal Illuminance = 50 lux
- Light Loss Factor = 0.70
- Initial lamp output = 220,000 lumens/lamp
- Horizontal Illuminance based at ground level
- Calculation Grid Size over field = 5m x 5m

luminaire adopted for modelling

For the purposes of modelling to satisfy AS4282 – 1997, the following lighting luminaire and standard have been adopted:

- Philips Optivision floodlight luminaires with 2000 watt double ended short arc metal halide lamp
- 40 metre high standards, located at approximately 120 metre centres

The Phillips Optivision luminaire has been specifically chosen for a number of reasons:

- it is commonly available in Australia and commonly adopted in similar uses such as external industrial sites and sports facilities.
- the Optivision luminaire uses an asymmetric reflector of very high efficiency.

Asymmetric reflectors in luminaires are used for down lighting in open industrial or sporting fixtures specifically to control spill-light and limit glare and upward light leakage. Figure 7 shows how a light beam from an asymmetrical luminaire provides a more focussed light beam.

A brochure for the Optivision product is included in Appendix B and a copy of the lighting performance curves used for the modelling is shown in Figure 8.

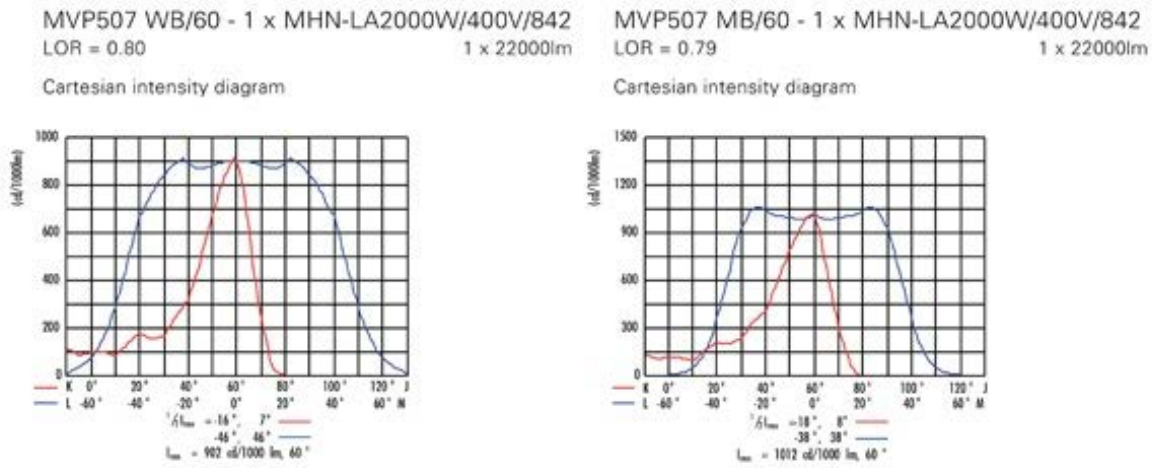
An asymmetric reflector means that the maximum beam intensity is emitted at an angle to the front of the glass so that spill is secured at a peak intensity at 60º and a sharp cut-off of light at 80º. The following photograph demonstrates the beam from an assymetrical reflector on a similar type of luminaire.

Figure 7 - Example of Light Beam from an Asummetric reflector

Standard luminaires with a symmetrical reflector need to be tilted to angles up to75^0 to be able to achieve the spread and intensity of a beam over a wide area, whereas an asymmetrical reflector can achieve the same level with only a tilt of just 100 thus reducing risk of light spill to adjoining properties.

A combination of wide beam and medium beam reflectors would be used in the fittings to contain the lighting to a specific area without creating significant bright spots on site.

Philips Optivision 2000 Watt Light Fitting



Photometric of the Light Fitting

Figure 8 - Lighting Performance Diagram for Philips Optivision 2000 watts

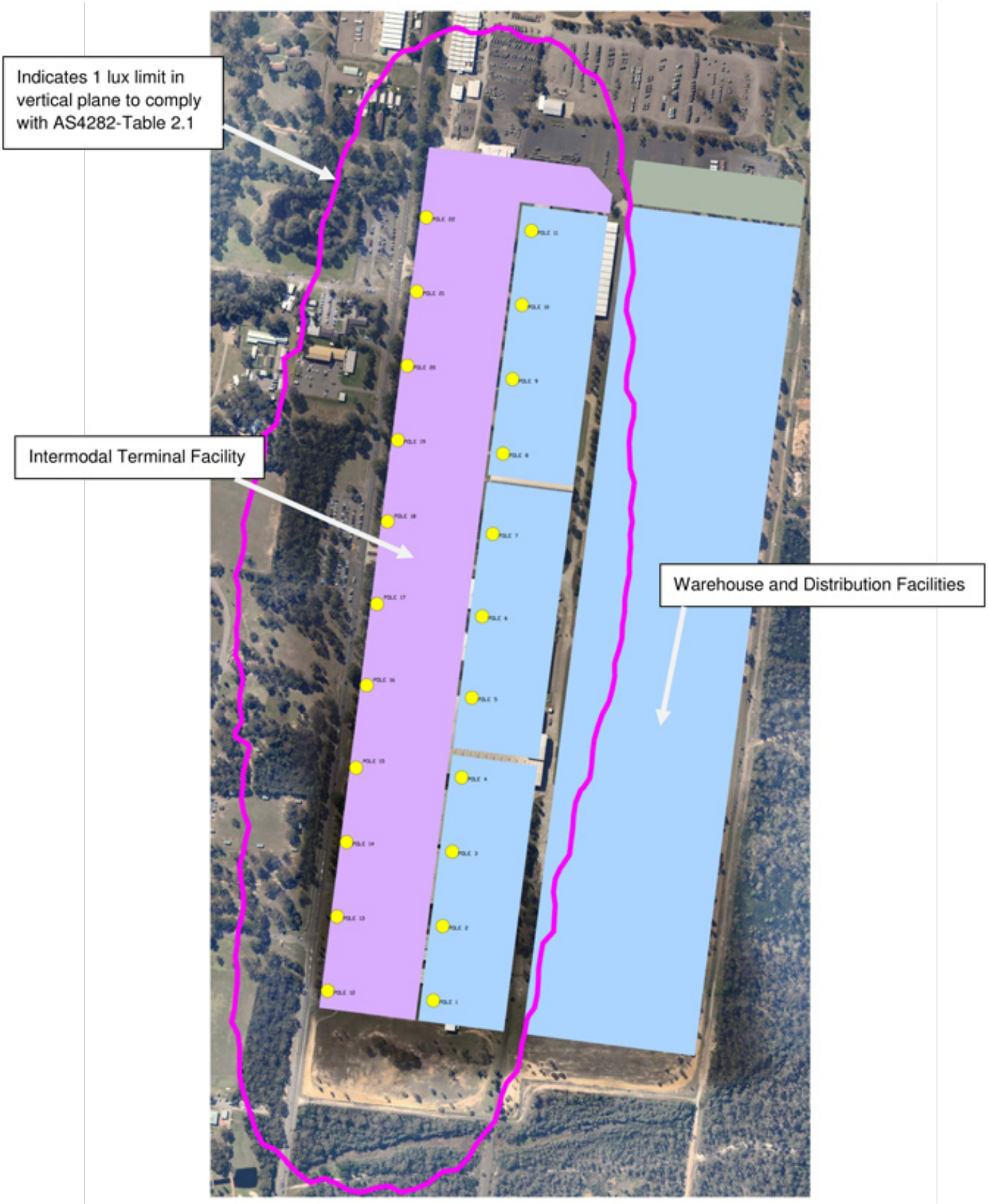


Figure 9 - Isolux result (Vertical Illuminance at 1.5m above ground)

08.4 results and conclusions

The results of the modelling using Philips Optivision 2000 watt luminaires mounted on 40m standards at approximately 120m centres are as follows:

- The most stringent requirement under Table 2.1 of AS4282 1997 of 1 lux in residential dark surrounds during curfew hours, is achieved approximately 150 metre from the light source as shown in Figure 9.

- Residential properties are approximately 400 metres from the eastern boundary and so will not be impacted by the light spill from the development.

- Along the eastern boundary where the uses are more consistent with a standard street in a commercial/ industrial area, the light level is expected to be equivalent to a standard street level of lighting as per AS1158.3.1 ‘Lighting for roads and public spaces - Pedestrian area (Category P) lighting - Performance and design requirements’, category P3. Note that the requirements set for P3 is minimum 0.3 lux and hence unlikely to impact on the nearest residences.

The results of the modelling are shown on drawing SKC041 located in Appendix C.

The modelling shows that the luminous intensity from lighting within the SIMTA site can be easily designed to be below the prescribed maximum value of 500 cd (for curfew hours: 11.00 pm to 6.00 am) at the nearest residences.

Therefore the impact of spill light to the residential properties will be well within the required criteria as specified in Australian Standard AS4282-1997 ‘Control of the Obtrusive Effect of Outdoor Lighting’.

Further detailed design development of the terminal will aim to reduce the proposed 40 metre standards to a lesser height whilst maintaining the 50 Lux levels required for terminal operations. This reduced standard height (and increased standard frequency) may further reduce the surrounding light spill Isolux levels indicated indicated in Figure 9, however the full extent of this reduction will not be fully recognised until further detailed design modelling is undertaken.

09 cumulative impact assessment

09.1 introduction

The NSW Department of Planning and Infrastructure has requested that SIMTA consider and provide comment on the possible cumulative impact of adjacent development proposals, specifically the proposed Defence Logistics Transformation Project (DLTP) and the Moorebank Intermodal Company Limited (MICL - formerly known as the Moorebank Project Office/MPO proposal).

The purpose of the cumulative impact assessment is to identify any potential increase to visual sensitivity and impact at selected view points due to these additional developments, over and above the impact of the SIMTA proposal as demonstrated in Section 7 of this report.

It is important to note that only limited conceptual information on both the DLTP and MICL projects is available at the present time, and therefore the cumulative assessment of these developments is confined to broad visual descriptors based on publicly available information at the time of authoring and known land boundaries for each development.

For information purposes, an indicative aerial view of the proposed MICL and DLTP development proposals showing possible building and infrastructure outlines is shown at Figure 10. The detail of the respective proposals has been compiled from publicly available masterplans and documents[1].

summary of DLTP planned works

The DLTP Moorebank project is proposed for the relocation and consolidation of the Defence National Storage and Distribution Centre (DNSDC) currently occupying the SIMTA site onto adjacent land owned by the Commonwealth to the north and east known as West Wattle Grove.

As defined on the Department of Defence website, the development includes the construction of the following new facilities:

- signalised entry of Moorebank Avenue, staff car-park, vehicle check point and guardhouse including pass office;
- office building for the DNSDC headquarters staff;
- general storage warehouse of approximately 42,000sqm;
- storage of loan and repair pool equipment;
- storage and maintenance facility for aerial delivery equipment;
- warehouse for cargo consolidation and other support to operations;
- workshop for the maintenance of vehicles and other equipment;
- secure storage and maintenance facility;
- dangerous goods storage facility;
- pavement for the storage of vehicles and other equipment (for example containers and generation); and
- in ground engineering services, roads and perimeter fencing to support the above works.

summary of MICL planned works

The MICL proposal on behalf of the Department of Finance and Deregulation (Finance) proposes the development of an intermodal terminal and logistics centre known as the 'Moorebank Intermodal Terminal Project' (MITP).

The proposal includes the redevelopment of approximately 220 hectares of land currently occupied by the Department of Defence School of Military Engineering (SME) and is located on the opposite side of Moorebank Avenue to the SIMTA proposal.

A document created by Parsons Brinkerhoff on behalf of Finance titled 'Moorebank Intermodal Terminal Preliminary Project Environmental Overview in Support of the Application', dated December 2011 describes the MICL planned works to include:

- A port shuttle terminal area and an interstate terminal area, which would both include:
  - working tracks for the movement of rail freight, and the loading and unloading of containers within the site;
  - storage tracks for the storage of freight carriages within the site;
  - container laydown/storage areas;
- Internal site roads, stormwater management infrastructure, power and utilities;
- A commercial development area, including warehousing provisions;
- Support (administrative and rail/container maintenance/repair) functions for the terminal;
- An environmental conservation zone on the eastern bank of the Georges River;
- Rail link and bridge span crossing the Georges River at the north-western area of the site;
- Vehicle access, including for heavy and light vehicles, into the site off Moorebank Avenue;
- Potential upgrades to Moorebank Avenue including the Anzac Road intersection.

It is also noted that a separate proposal titled 'Planning Proposal: Proposed Amendment to Liverpool Local Environment Plan 2008', date January 2013, has also been lodged to the NSW Department of Planning and Infrastructure by Parsons Brinkerhoff on behalf of Finance in relation to the MITP, seeking changes to land zoning, floor space ratios, permissible building heights and minimum lot sizes.

Given the absence of detailed publicly available information of both the DLTP and MICL proposals, the visual sensitivity in cumulative terms is based on the general descriptions of each development and the likely visibility of lands being the subject of development at selected view points.

[1]The following websites are referenced for use of publicly available materials utilised in this section of the report at the time of authoring:

- http://www.defence.gov.au/jlc/DLTP.html (Department of Defence)
- http://www.defence.gov.au/jlc/infrastructure/sites/moorebank.html (Department of Defence)
- http://www.finance.gov.au/property/property/moorebank-intermodal-freight-terminal/index.html (Finance)
- http://www.finance.gov.au/property/property/moorebank-intermodal-freight-terminal/environmental-planning.html (Finance)
- http://leptracking.planning.nsw.gov.au/PublicDetails.aspx?Id=915 (DoPI)