

Chapter 7

Project built form and operations



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7. Project built form and operations

Chapter 7 provides a description of the proposal concept for the Moorebank Intermodal Terminal (IMT) Project (the Project), including key elements of the built form and operations of the import/export (IMEX) terminal, warehousing and interstate terminal. The proposal concept is based on earlier master planning; key features are concept level and indicative only, and subject to more detailed design as the Project development progresses.

This chapter provides details of the functions and ultimate capacity of the proposed IMT (i.e. at Full Build). Together, this chapter and Chapter 8 – *Project development phasing and construction* of this Environmental Impact Statement (EIS) detail what the Moorebank Intermodal Company (MIC) is seeking approval for in regard to the proposal concept. The 'proposal concept' approach is described in more detail in section 7.2.

7.1 Overview of the Project

The Project involves the development of approximately 220 hectares (ha) of Commonwealth-owned land for the construction and operation of the Moorebank IMT and associated infrastructure. The Project would be located on land currently occupied by the School of Military Engineering (SME) and a number of other Department of Defence (Defence) units. Before the start of construction on the Moorebank IMT, these Defence units would be relocated to Holsworthy in accordance with Defence's separate Moorebank Units Relocation (MUR) Project. Further details in relation to the MUR Project are provided in section 8.1.1. These MUR works do not form part of the Moorebank IMT approval application.

The IMT would comprise the following components:

- *An IMEX freight terminal* – designed with a maximum capacity of 1.05 million twenty-foot equivalent units (TEU) a year (525,000 TEU inbound and 525,000 TEU outbound) servicing international IMEX freight movement between Port Botany and the Project site.
- *An interstate freight terminal* – designed to handle up to 500,000 TEU a year (250,000 TEU inbound and 250,000 TEU outbound) of interstate freight, servicing trains travelling to, from and between Sydney and regional and interstate destinations. The interstate terminal would provide for a total of up to 500,000 TEU a year, of which approximately 406,000 TEU would generate truck movements and approximately 94,000 TEU would remain on site as transit movements (between trains only).
- *Warehousing facilities* – with capacity for up to 300,000 square metres (sq. m) of warehousing to provide an interface between the IMEX and interstate terminals and commercial users of the facilities such as freight forwarders, logistics facilities and retail distribution centres.

The Project would also include the construction and operation of a rail link to connect the Project site to the Southern Sydney Freight Line (SSFL) (refer to Figures 1.1 and 1.3 in Chapter 1 – *Introduction*). The rail connection from the SSFL would be via a bridge crossing the Georges River to the west of the Project site at either the north, south or centre of the Project site. These are referred to as the northern, southern and central rail access options respectively. All three rail access options are included as part of the proposal concept and have been assessed as part of this EIS. Once the contractor for the development and operation of the Project has been appointed, the Project will progress to the detailed design phase and one preferred location of the rail access will be confirmed. This selected option will then be subject to further Stage 2 State significant development (SSD) approval(s) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Selection of the rail access option will be based on the following:

- consideration of the potential impacts of the rail access on the environment and the community (as described throughout this EIS);
- the feasibility of obtaining land or easements required to construct and operate the rail access option; and
- the IMT layout, with the aim of achieving the most effective and efficient use of the site to support the operations of the IMEX and interstate terminals and onsite warehousing.

Further details of the rail access options are provided in section 7.5.

The final layout of the IMT would depend on the location of the selected rail access option. Therefore, the proposal concept as presented in this EIS provides three possible IMT layouts. This is intended to allow flexibility for future developers and operators of the Project, so that the most efficient and effective layout can be developed for the Project.

Arrival and departure, working and storage tracks at the IMT would need to be located with efficient access to the IMEX and interstate terminals and associated warehousing while also accommodating up to 1800 metre (m) long interstate trains from the SSFL. Vehicle access for both heavy and light vehicles accessing the IMT would be provided off Moorebank Avenue, via the M5 Motorway.

7.2 The 'proposal concept' approach

The description of the Project as provided in this chapter and also Chapter 8 – *Project development phasing and construction* is at a sufficient level of detail to meet the requirements of a Stage 1 SSD under the NSW planning approval process (i.e. it is described at a 'concept' level and referred to as the 'proposal concept'). However, in order to meet the requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) assessment process, the Project has also been described in enough detail to allow for an assessment of the Project's impacts as a 'controlled action', in accordance with the provisions of the EPBC Act.

The proposal concept provides indicative layouts of the Project, including the proposed IMEX and interstate facilities, rail and road layouts, and locations of warehousing. The concept is a high level description of the Project that defines the broad parameters of the development, such as the development footprint, precincts/land uses and height controls, while retaining flexibility for future developers and operators of the Project. Approval is specifically sought for the proposal concept, to ensure that later amendments to the detailed design within the specified parameters are permissible under the terms of the approval.

As noted in section 7.1, the proposal concept includes three rail access options from the SSFL to the IMT site, to allow a preferred option to be developed during detailed design by the contractor once appointed.

One aspect of the Project that is described in greater detail than at concept level is the proposed Early Works component (which is described in detail in section 8.3). The Early Works component is described in more detail than concept level because MIC is seeking approval for the Early Works to be carried out in accordance with section 83B(3)a of the EP&A Act, with no further approval required. MIC is therefore seeking approval under this Stage 1 SSD development approval for initial site preparation works as the first development phase of the Project (referred to as the Early Works development phase). These Early Works include demolition of existing buildings, some contaminated land remediation, establishment of the conservation area, service utility terminations and diversions, and establishment of construction facilities.

7.3 IMT operating and design principles

Figure 7.1 below provides an overview of how the IMT would operate. Further details of the Project operations are provided in later sections of this chapter.

The proposal concept has been designed to achieve efficient operation of the IMT and includes the following:

- rail access from the SSFL to the western boundary of the Project site via a crossing of the Georges River;
- heavy vehicle access to the facility via Moorebank Avenue at the eastern boundary of the Project site;
- warehousing located to allow efficient access to the IMEX terminal and Moorebank Avenue;
- support functions (terminal administration, maintenance and repair) for the IMT located close to the IMEX and interstate terminals and close to container stacks;
- rail track occupying the available space between the warehousing and the conservation area (as explained further in section 7.6 for IMEX rail and section 7.8 for interstate rail); and
- warehousing located immediately adjacent to the proposed IMEX terminal for operational efficiency and direct access between IMEX and warehousing.

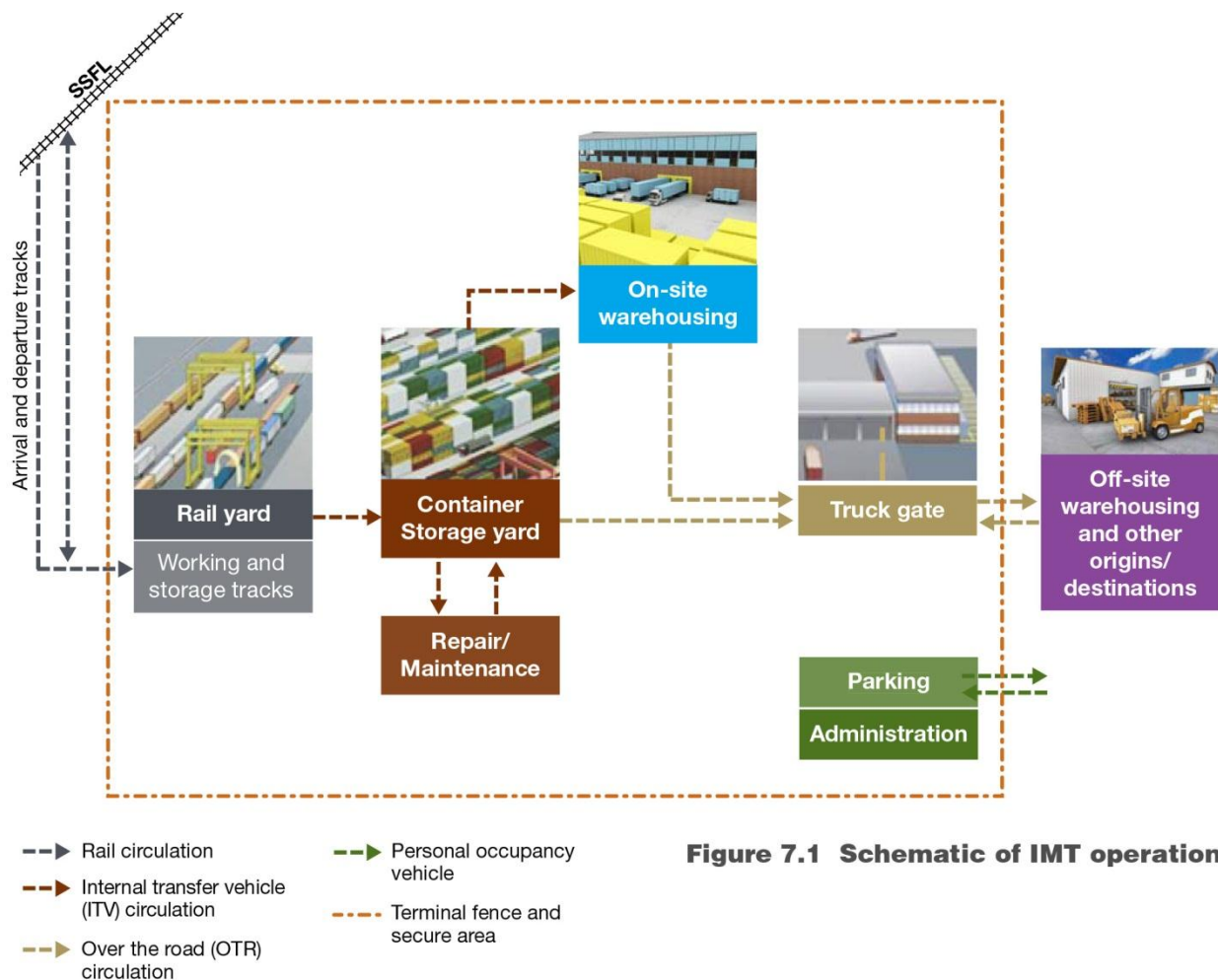


Figure 7.1 Schematic of IMT operations

The principles that guide the indicative design and planning aspects of the Project layout are focused on:

- creating a high quality, efficient and attractive development which is clearly divided into precincts, allowing for easy way-finding opportunities while also addressing both its industrial and residential neighbours;
- promoting a safe working environment by separating different uses on the Project site and providing different entry points for public, staff vehicles, trucks and rail;
- encouraging environmentally sustainable design and where possible minimising impacts on both the environment and the public; and
- allowing flexibility for future growth and staging of terminal operations and warehousing/commercial endeavours to maximise the Project site's potential.

The proposal concept has taken into account the following factors in relation to vehicle movements to promote the efficient and safe operation of the Moorebank IMT:

- in-terminal vehicles (ITV) and over the road (OTR) vehicles would be separated within the IMT as much as possible;
- one-way circulation would be adopted for vehicle movements where possible;
- conflict points between traffic would be avoided;
- inbound and outbound traffic along the main gate approach would be physically separated, and directional circulation would reduce conflicting movements between entering and departing traffic;
- emergency access and egress would be provided (with two point access generally available, depending on the circumstance);
- two-way reversible truck gates would be implemented for efficiency and tidal flow of traffic if necessary;
- the main truck gate approach would have sufficient lane widths to cater for queuing of heavy vehicles within the Project site if necessary;
- entry and egress to the Project site would be provided via Moorebank Avenue and the M5 Motorway; and
- way-finding and signage would be implemented in accordance with relevant Australian Standards to support the infrastructure layout.

7.4 Planning controls

The proposal concept provides planning controls such as building height restrictions, floor space ratios and boundary setbacks. These controls are identified in Figure 7.2 and Figure 7.3.

As the Project site occupies Commonwealth land, which is currently zoned SP Infrastructure (Defence) under the *Liverpool Local Environmental Plan 2008* (Liverpool LEP), there are no planning controls currently applicable to the site, with the exception of the Northern Council Land and the Northern Commonwealth Land (as defined in section 2.2 of this EIS), where a 21 m height restriction applies. However, given the proposed rezoning of the land required for the Project to partly IN1 General Industrial (IN1) and partly E3 Environmental Management (for the conservation area along the Georges River), it is considered appropriate to introduce planning controls that are consistent with the IN1 zone under the Liverpool LEP. As such, MIC has lodged a planning proposal with NSW DP&E which seeks to introduce height and floor area ratio planning controls to the Project site, consistent with that shown in Figure 7.2.

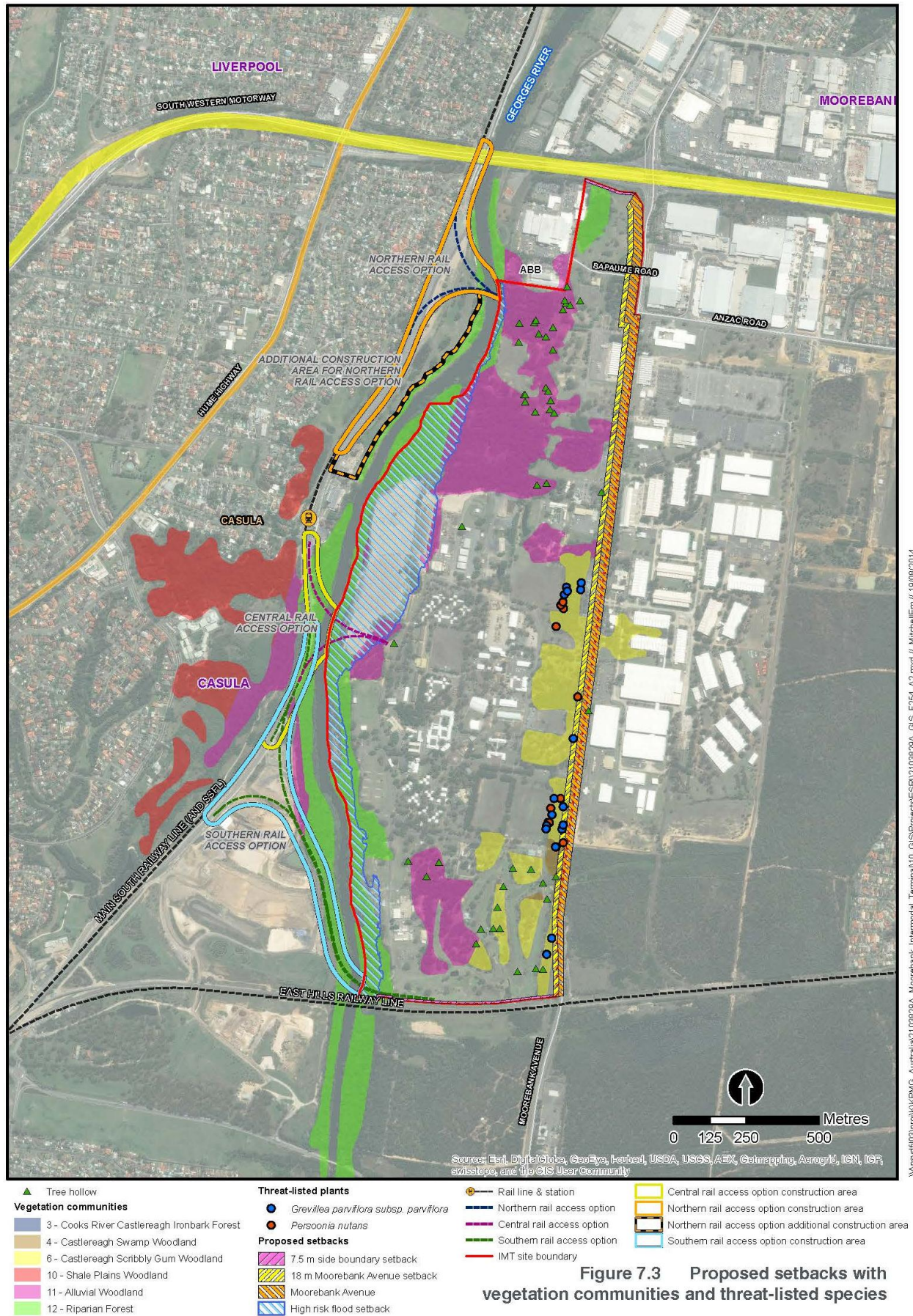
The planning controls would apply to future development on the IMT site within the IN1 zone, and development proposals will be assessed against these controls during the Stage 2 SSD development approval processes.

Under the controls applicable to the IN1 zone, building heights within the warehousing precinct, IMEX and interstate terminals and the associated administration facilities would be restricted to a maximum of 21 m. In addition, a floor space ratio of 1:1 would apply to the warehousing precinct. These proposed planning controls are consistent with those applicable to the IN1 zone in other areas of Liverpool (under the Liverpool LEP).

The western area of the Project site would consist of the conservation area, which would be landscaped to provide a visual buffer along this boundary. An 18 m building setback would apply along the Moorebank Avenue (eastern) boundary and a 7 m building setback along the other site boundaries.



Figure 7.2 Proposed development precincts, building height restrictions and floor space ratios



7.5 Rail access options and IMT site layouts

The rail layout for the IMEX terminal would be developed to service freight trains between Port Botany and the Project (known as 'port shuttle' services), whereas the rail layout for the interstate terminal would service interstate trains travelling on the metropolitan freight network and beyond. Both types of train would access the Project site via the SSFL and a rail access bridge across the Georges River.

A significant determining factor in the overall layout of the IMT site is the geometric requirements for the rail tracks, which are more stringent than for other infrastructure such as roads. These requirements, or limitations, are particularly evident in the planning for the interstate terminal where the Project would need to accommodate 1800 m long interstate trains within the IMT site itself, before these trains are broken down into train sections of 900 m or less for servicing within the terminal. The design speed for exit/entry off the SSFL (proposed as 60 kilometres per hour) must also be sufficient to avoid a detrimental impact to the operational capacity/efficiency of the SSFL. Three locations were found to be suitable to facilitate an efficient and effective link between the SSFL and the IMT site (the northern, central and southern rail access options). The three access options identified make the best use of the rectangular shape of the site while maximising the train lengths able to be handled on the Project site. The proposal concept provides three IMT layouts: one for each of the three rail access options. The layouts are indicative only and are provided within this EIS to illustrate the likely functioning and operations on the IMT site. Further details on each of the rail access options are provided below.

7.5.1 Northern rail access option and IMT site layout

The northern rail access from the SSFL to the Project site would be built at ground level to the northern end of the Northern Powerhouse Land (i.e. the former Casula golf course). The access would cross the Georges River and floodplain on an engineered structure and connect to the SSFL at the northern end of the IMT site. This access route traverses Sydney Trains-owned land (formerly RailCorp), Crown land (over the Georges River) and the site of the former Casula Powerhouse Golf Course, currently owned by Liverpool City Council (LCC). The construction footprint also extends into land owned by Sydney Trains (formerly RailCorp) and NSW Roads and Maritime Services, for the purposes of tie-in to the existing SSFL.

The bridge span would be designed to allow for both IMEX and interstate connections between the SSFL and the Project site, referred to as the northbound rail connection and the southbound rail connection respectively. Although the bridge would comprise one structure, it would split into the northbound and southbound rail connections as it crosses the Georges River.

The northbound rail connection and bridge would include a single rail track to facilitate the arrival and departure of trains to and from the north. Within the boundary of the IMT site, the single rail track would expand to form the working and storage tracks associated with the IMEX terminal (see section 7.6.1 for further detail on these tracks). The southbound connection would also consist of a single track that would expand to form the working and storage tracks for interstate trains.

The bridge span across the Georges River would be designed to allow for a 500 millimetre (mm) buffer above the 1% annual exceedance probability (AEP) flood level to ensure that potential upstream flood-related impacts were minimised. Based on the indicative design for the bridge (included within Appendix A of the Technical Report 6 - *Surface Water Assessment* in Volume 6 of this EIS), some bridge piers would be located within the Georges River and also within the Georges River floodplain. The rail access and bridge span would also need to consider existing infrastructure in the area. To ensure ongoing access to the Casula Powerhouse Arts Centre, the access road on the western bank of the Georges River would require realignment to accommodate the rail access bridge. Impacts on property and infrastructure, including utilities, are further described in Chapter 23 – *Property and infrastructure*.

An indicative internal layout of the IMT site at Full Build associated with the northern rail access option is shown in Figure 7.4. IMEX terminal operations would be located in the approximate centre of the Project site, and adjacent to the warehousing precinct along the eastern boundary of the IMT site, with IMEX equipment storage, repair and maintenance facilities to the south. An IMT freight village consisting of administration, employee facilities, convenience retail and parking would be located at the northern end of the IMT site. The IMT freight village would not be open to the general public. Road access would be provided off Moorebank Avenue and segregated according to vehicle type and destination within the Project site. Further details on the access points are provided in section 7.6 and section 7.7.

Details on utility provision and layout are provided in section 7.11.

7.5.2 Central rail access option and IMT site layout

The central rail access option would connect the IMT site to the SSFL across the Georges River, and would require development of Commonwealth land on the western bank of the Georges River (referred to as the 'hourglass land') as well as works within Sydney Trains-owned land (refer to Figure 2.4 in Chapter 2 – *Site context and environmental values*). Construction of the rail access would also require temporary occupation of the Glenfield Landfill site (Lot 103 DP 1143827) as well as LCC land (Lot 1 DP 1115187, Lot 22 DP 1132574 and Lot 24 DP 1132574) and a number of Sydney Trains lots, for the purposes of rail tie.

As with the northern rail access option, the central rail access option would allow for connections between both the IMEX and interstate terminals and the SSFL, referred to as the northbound rail connection and the southbound rail connection. The bridge design for the central rail access option would comprise two separate bridge structures, but would otherwise be similar to the design proposed for the northern rail access option; i.e. the northbound and southbound rail connections would each consist of a single track to provide for the arrival and departure of trains. The bridges would be constructed above the 1% AEP flood level, providing a 500 mm buffer.

An indicative IMT layout associated with the central rail access option at Full Build is shown in Figure 7.5. This includes an IMEX and interstate terminal in the approximate centre of the Project site; warehousing along the eastern boundary and further to the north and the south; equipment, storage, maintenance and repair facilities towards the northern end of the IMT site; and an IMT freight village precinct consisting of administration, employee facilities, convenience retail and parking in the south-eastern corner. Vehicle access to the IMT would be provided from Moorebank Avenue via a main site entry located towards the northern end of the Project site, while the primary entry for light vehicles and some vehicles associated with warehousing operations would be provided at the southern end, close to the IMEX and interstate terminal parking areas.

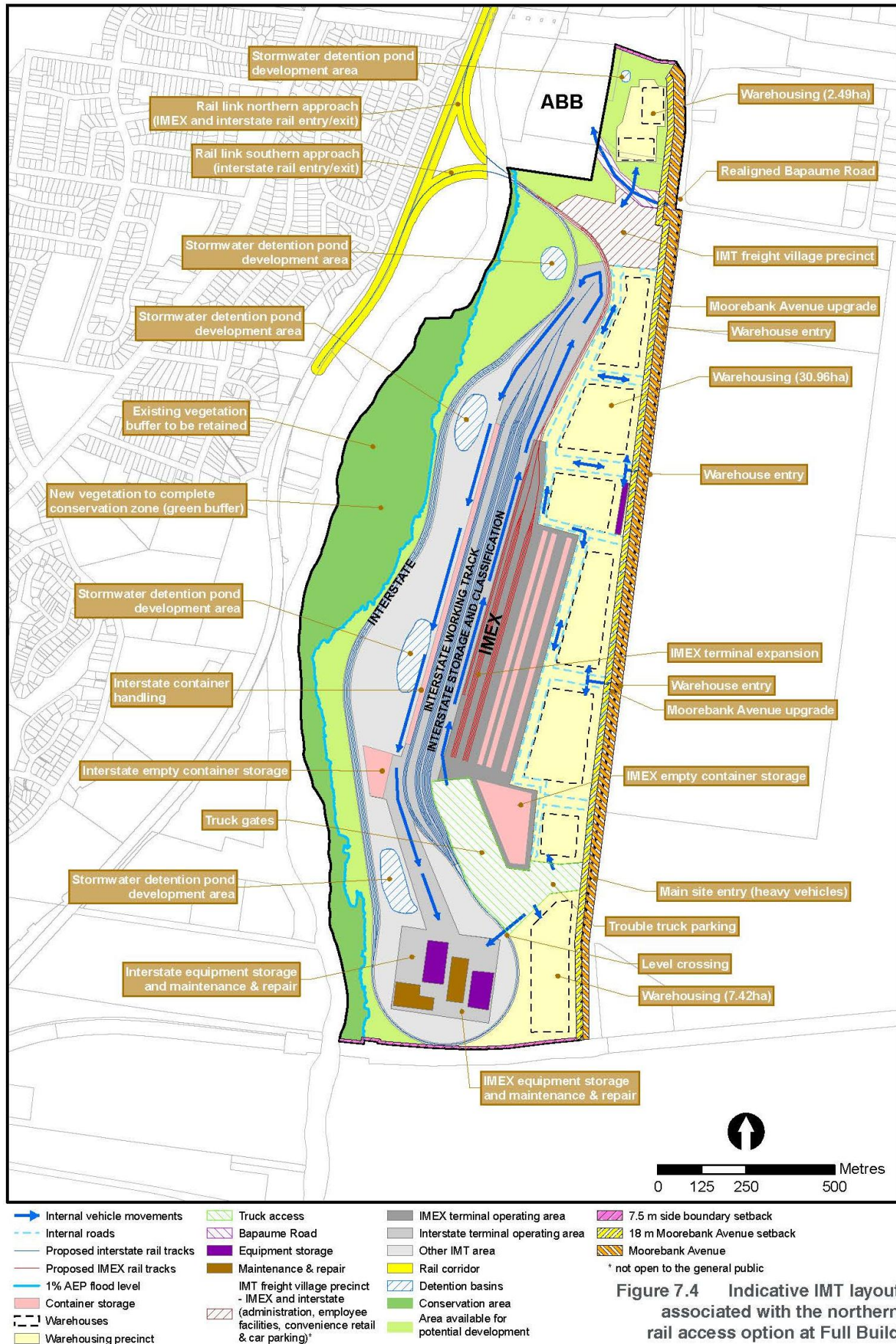
7.5.3 Southern rail access option and IMT site layout

The southern rail access option would include a connection to the SSFL north of Glenfield Junction (on Sydney Trains-owned land), crossing the Georges River and floodplain, and the Glenfield Landfill site.

At this location, the SSFL is on a flyover structure and so the connection to the SSFL would need to be either located on an elevated structure or constructed on an embankment. The details of the connection would be confirmed during detailed design.

The bridge design for the proposed southern rail access option would comprise a single bridge structure, but would otherwise be similar to the design for the northern and central rail access options (as described above).

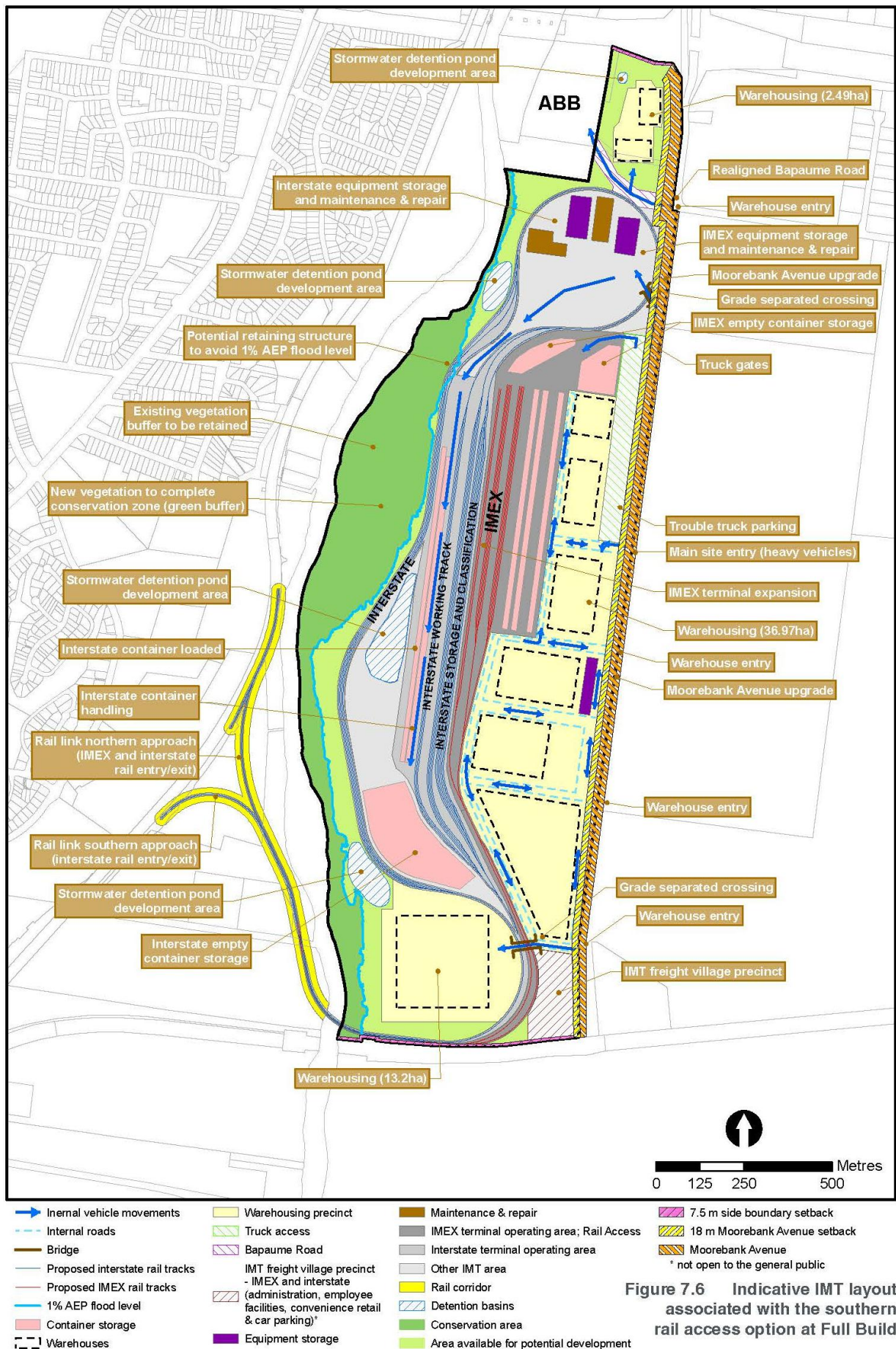
An indicative IMT site layout for the southern rail access option at Full Build is shown in Figure 7.6. This would be similar to the layout for the central rail connection option. This includes the IMEX and interstate terminals located in the centre of the Project site; IMT freight village at the southern end of the IMT site; equipment maintenance and repair towards the northern end of the site; and warehousing along the eastern boundary and further to the north and the south. The main site entry would be from Moorebank Avenue, towards the northern end of the IMT site, with a separate light vehicle entry at the south, providing access to the interstate and IMEX terminal parking areas and some vehicles associated with warehousing operations.



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Figure 7.5 Indicative IMT layout associated with the central rail access option at Full Build



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7.6 IMEX freight terminal

7.6.1 IMEX freight terminal components

A primary function of the Project is to provide handling capacity for IMEX containerised freight. The IMEX terminal would provide an operational port shuttle facility to handle IMEX freight by rail between the IMT and Port Botany. IMEX services would travel along the SSFL between Moorebank and Sefton Junction, the metropolitan freight network (MFN) to Enfield/Chullora, and the Port Botany Goods Line between Enfield/Chullora and the Port (shown in Figure 2.1 in Chapter 2 – *Site context and environmental values* and Figure 3.2 in Chapter 3 – *Strategic context and need for the Project*).

As discussed in section 7.5, the rail layout for the IMEX terminal would depend on the rail access option selected by the operator/contractor during the detailed design phase.

The IMEX rail yard within the Project site would consist of two primary track types:

- arrival/departure tracks; and
- working and storage tracks.

Indicative details of the IMEX tracks and the IMEX road layout, container and equipment storage, IMT freight village precinct and ancillary facilities are provided below.

Arrival and departure tracks

Within the boundary of the IMT site, the rail connection from the SSFL would consist of separate arrival, departure and working tracks. This would allow for the concurrent holding of trains on the arrival/departure tracks within the IMT site and servicing (loading and unloading) of trains on the working tracks.

The location of the arrival and departure tracks varies between the three IMT layouts, as shown in Figure 7.4 to Figure 7.6. The arrival/departure tracks for the IMEX terminal would be positioned outside the Georges River 1% AEP flood level.

The IMEX arrival and departure tracks would be approximately 650 m long to cater for the proposed 650 m long IMEX trains with locomotives attached at each end. The tracks have been designed to allow inbound and outbound freight trains to stand entirely clear of the SSFL to maximise efficiency and minimise delays to both the Project operations and the SSFL.

Working tracks and storage tracks

The loading and unloading of containers to and from IMEX freight trains would be undertaken along the IMEX working tracks. Shuttle trains (with a locomotive at either end) would be able to enter and depart from the working tracks and the storage tracks.

When fully developed, the IMEX terminal would include approximately eight working tracks, each capable of accommodating 650 m trains. The proposed container handling methods require the working tracks to be arranged parallel to each other in groups of four tracks, with sufficient space in between to allow for the installation of rail mounted gantry (RMG) crane footings (refer to section 7.6.2 for an explanation of container handling equipment such as RMG cranes).

Internal road layout and access

Road access to the Project site would be via access points on Moorebank Avenue, segregated according to vehicle type and destination within the terminal (refer to Figure 7.7 to Figure 7.9). Trucks travelling to and from the IMT site would access Moorebank Avenue via the M5 Motorway. All proposed road connections from the IMT on to Moorebank Avenue would be within the Project site.

The internal road layout for the IMEX terminal includes:

- a main entrance (main IMT access gate) for heavy vehicles associated with IMEX, interstate and warehouse traffic – the location of this is shown in Figure 7.7 to Figure 7.9);
- a separate entrance for light vehicles, primarily administrative and maintenance staff vehicles (shown in Figure 7.7 to Figure 7.9), which would also be designed to permit emergency vehicle access and movement of heavy vehicles as a secondary access, should the main IMT access gate be unable to be used);
- trouble truck parking – a truck parking and holding area to accommodate up to 25 trucks, to investigate instances where inbound OTR heavy vehicles are not validated by the optical character recognition; and to serve as a layover facility for trucks that arrive early and need to wait for their allocated time slot;
- access and egress for emergency service vehicles; and
- warehouse access roads – an internal road system would run adjacent to the warehouse precinct, providing access to the warehouses for heavy vehicles (separate from light vehicles) and ITVs (which would access the warehouse road via an express gate and would use the warehouse access road for direct container transfer between the terminal and warehouses). This section of internal road may also, when needed, provide additional layover areas for OTR vehicles in addition to the trouble truck parking area.

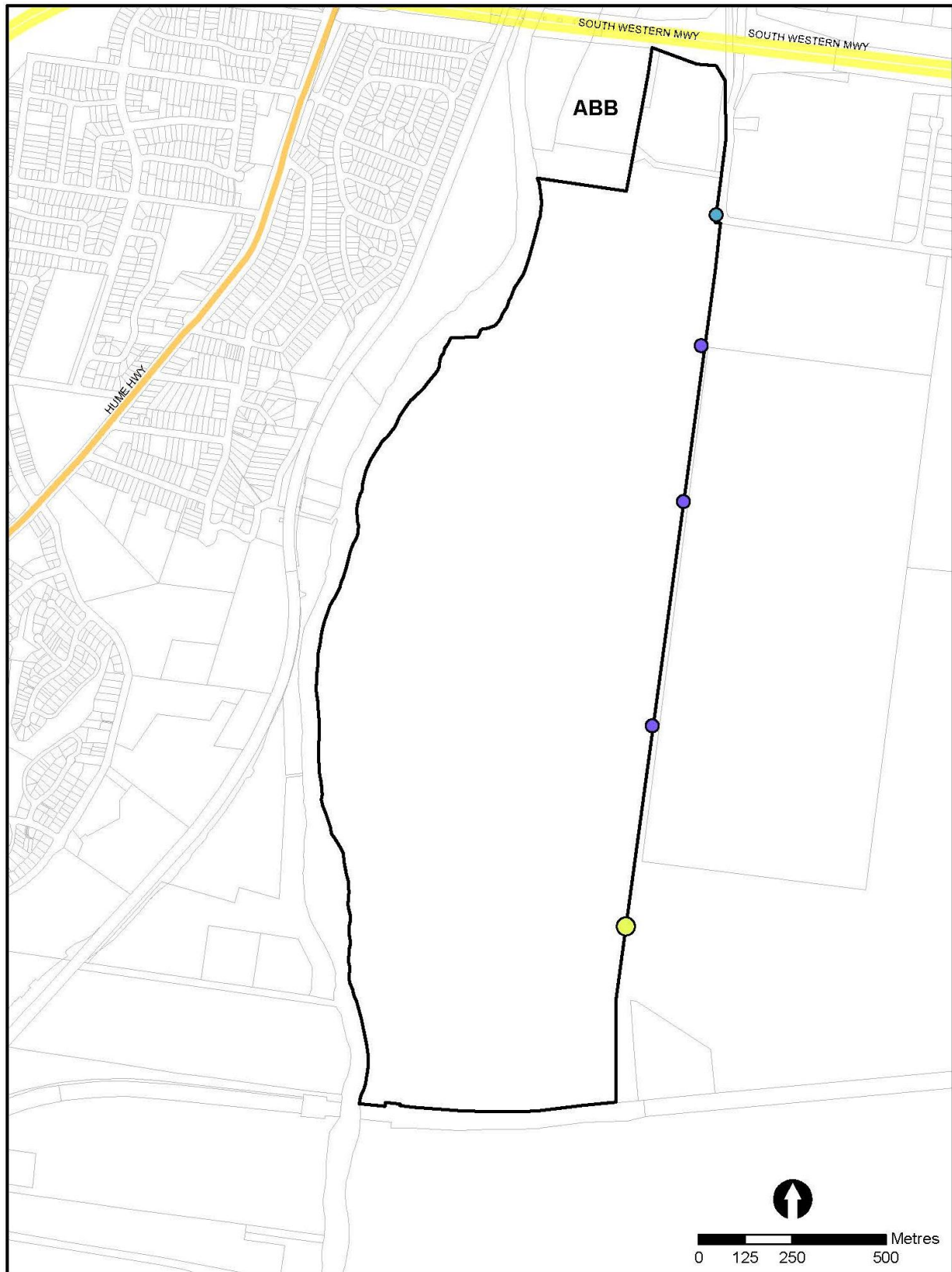
Past the main entrance, heavy vehicle movements would be segregated from light vehicle movements. The approach road to the main IMT access gate and movement through the terminal area, have also been designed to segregate OTR vehicles from IMT plant and equipment as much as possible.

For the central and southern rail access IMT layouts, a grade separated crossing over the IMEX and interstate rail track would be developed at the south of the IMT site to provide access to the warehousing precinct in the south-western corner. A grade separated crossing is required for safety reasons due to the expected frequency of IMEX trains. In addition, the IMT layout associated with the southern rail access option requires an additional grade separated crossing at the northern end of the Project site, to provide access over the interstate arrival/departure tracks. This is shown in Figure 7.5 to Figure 7.6.

Container storage yard

The container storage yard would comprise a large hardstand area for storing containers in block stacks. Loaded containers would be stored close to the working tracks to minimise the distance covered by ITVs, allowing for maximum efficiency in container handling. Typically, IMEX import containers (inbound via rail to the IMT) would stay in the terminal for up to 3 days, with the storage period dependent on the terminal operator's 'free' storage period, the desire or ability of the cargo owner to receive the container and the transport operator's ability to carry out the movement in a timely manner. IMEX export containers (outbound via rail from the IMT) may be stored in the terminal for up to 3 days to enable cargo consolidation to a vessel, though most local export movements would be scheduled to minimise the standing time between delivery into the terminal and movement by rail shuttle to the port. Loaded containers would be stacked to a height of 13 m or five containers (2.6 m high per container). Appropriate provision would be made for the storage of refrigerated containers, generally at the ends of the loaded container stack.

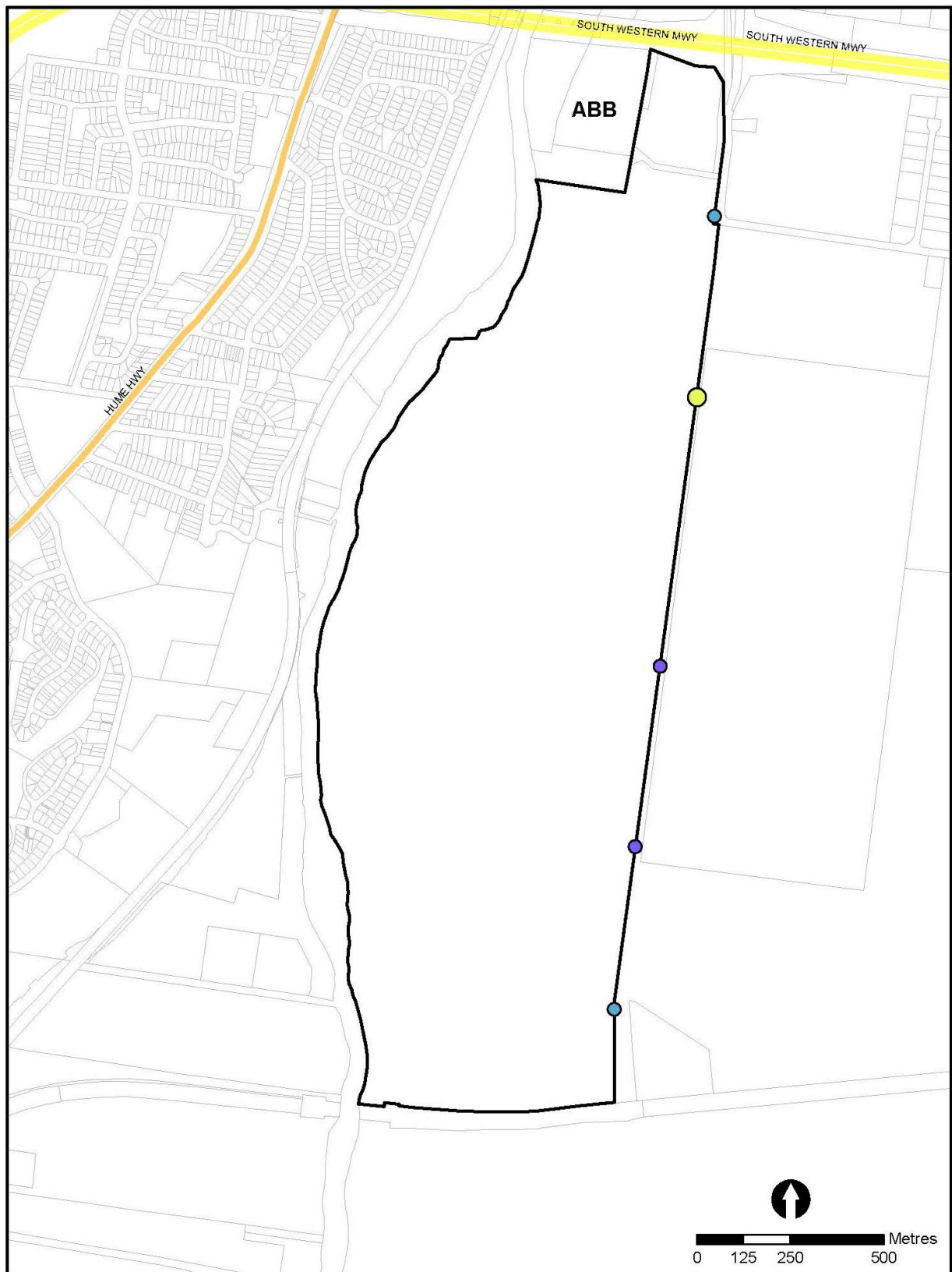
Empty containers would typically be stacked separately from loaded containers in the storage yard and the first available container picked for export. Empty storage containers would be stacked to a height of 20.8 m or eight containers (2.6 m per container). The location of the storage yard is shown in Figure 7.4 to Figure 7.6.



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Figure 7.7 Vehicle entry/exit points for the northern rail access option

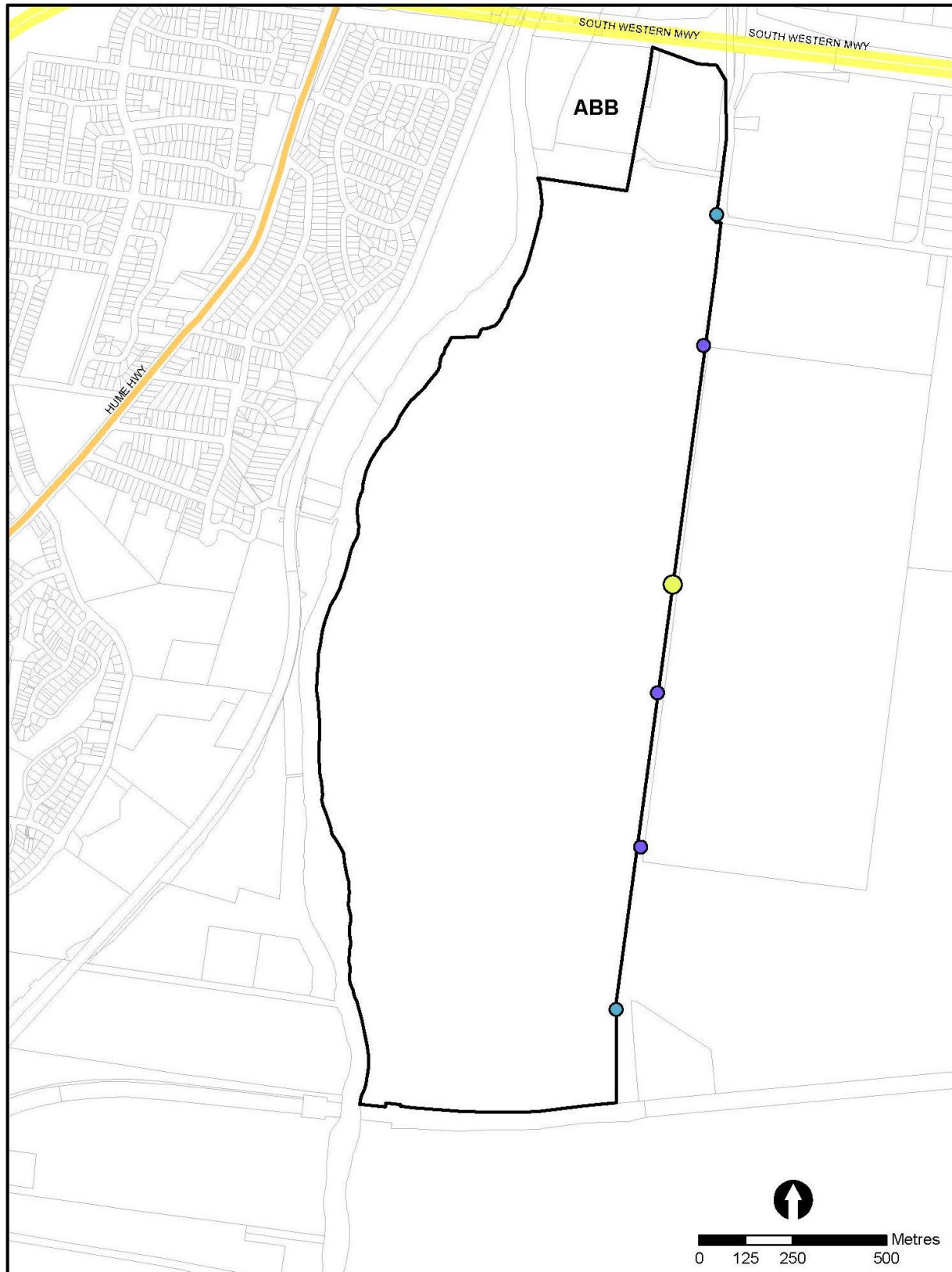
- Primary truck entry point
- Secondary truck entry points
- Car entry point
- IMT site boundary



- Primary truck entry point
- Secondary truck entry points
- Car entry points
- IMT site boundary

Figure 7.8 Vehicle entry/exit points for the central rail access option

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Figure 7.9 Vehicle entry/exit points for the southern rail access option

- Primary truck entry point
- Secondary truck entry points
- Car entry points
- IMT site boundary

IMT freight village precinct

The IMT freight village precinct would be the controlling area of the IMT and would include administration office buildings, employee facilities for operational and control staff, convenience retail and parking. The area would be separated from the main IMEX and interstate terminals and warehousing precinct to provide a safe environment for administrative staff. It would also be set back from Moorebank Avenue to conserve the natural character and streetscape along Moorebank Avenue and to allow for landscaping.

An indicative location of the IMT freight village is shown in Figure 7.4 to Figure 7.6. In the indicative IMT layout associated with the northern rail access option, the IMT freight village is located at the north of the IMT site. The indicative IMT site layouts associated with the southern and the central rail access options show the IMT freight village in the south-eastern corner of the Project site. The exact layout of individual facilities within the IMT freight village will be confirmed as part of the Stage 2 SSD development approval process, at which time the detailed design will be finalised.

The staff parking facilities would be available to the IMEX, administration and the warehousing precincts. Car spaces would be calculated based on projected staffing numbers for both IMEX and warehousing, and would take into account overlap for change of shift.

The IMEX administration may be in a separate building from the interstate administration; however, both buildings are likely to be located in the same area of the IMT.

Maintenance and repair

A plant and equipment maintenance and repair building would be constructed to provide a covered work area and parts storage for terminal equipment. This area would be an appropriate space for any maintenance of the terminal container handling equipment, such as ITVs, container trailers and side loaders. It would provide support to the logistical operation of the IMEX terminal and would include the following facilities:

- workshop for routine maintenance and repair of terminal vehicles and equipment;
- workshop for container repairs;
- bulk storage area for clean stores;
- onsite water storage;
- designated refuelling area with onsite fuel storage; and
- covered vehicle and plant storage area.

Rail maintenance and repair facilities would also be constructed as part of the IMEX terminal facilities. These would be used for minor repairs and maintenance of locomotives and rolling stock, and emergency repair of rail infrastructure. IMEX repair facilities would be developed to operate independently of future interstate facilities. However, facilities are likely to be located in the same area of the IMT.

Indicative locations for the IMEX plant and equipment maintenance and repair facilities are shown on Figure 7.4 to Figure 7.6. The indicative IMT layout associated with the northern rail access option has the IMEX plant and equipment maintenance and repair facilities located at the south of the IMT, while the IMT layouts for the southern and the central rail access options have these facilities located to the north. The exact location of these facilities within the administration precinct will be confirmed as part of the Stage 2 SSD development approval process, at which time the detailed design will be finalised.

Customs/main gate

As the IMEX facility could provide processing and handling of container freight originating from overseas, an onsite customs and quarantine clearance service may be required. An area for the customs facility has not yet been identified, but should ideally be located well within the IMT site for operational security reasons and have good access by OTR trucks.

7.6.2 IMEX freight terminal operations

IMEX terminal throughput capacity

The proposal concept (Full Build) provides sufficient capacity to handle the estimated demand of approximately 1.05 million TEU a year at the IMEX terminal, although the delivery of capacity will be phased to meet market demand (as described in Chapter 8 – *Project development phasing and construction*).

This level of throughput would equate to approximately 137 trains (or 273 train movements) a week at the facility. The proposed track layouts would allow up to five IMEX trains to be processed concurrently, depending on timing of demand for IMEX freight.

Operational hours

To handle this level of throughput, the IMEX terminal and trains, and the truck gates accessing the terminal, would operate 24 hours a day, 7 days a week. The IMEX truck gates and heavy vehicles accessing the warehousing precinct would operate for 16 hours a day, 5.5 days a week until 2030. In 2030 and beyond, IMEX truck gates and heavy vehicles accessing the warehousing would operate 24 hours a day, 7 days a week.

Terminal staff numbers

At Full Build, the IMEX terminal would provide approximately 35 full-time equivalent (FTE) administration positions, as well as 104 FTE operational and 9 FTE maintenance positions (per shift with three shifts per day). This equates to a total of approximately 374 FTE onsite operational staff.

Train arrivals and departures

IMEX trains would enter and depart the Project by the northbound rail connection (via either the northern, southern or central rail access option) to the SSFL.

The rail connection between the SSFL and Project site would be designed to allow for a maximum train speed of 60 km per hour (km/h) to or from the SSFL. The proposed rail track geometry within the Project site would allow for a maximum speed of 35 km/h. The rail speed within the terminal would be regulated at 25 km/h, to reduce maintenance requirements and provide a greater safety margin.

The rail curve radius has been designed to prevent excessive wear on rolling stock and minimise 'wheel squeal' impacts. Further discussion of the noise impacts of the Project are provided in Chapter 12 – *Noise and vibration*.

The Moorebank IMT site has been designed to satisfy the forecast throughput that can be accommodated on the SSFL. The current capacity on the SSFL is sufficient for the total demand generated by the Moorebank IMT. However, the extent to which other operators will occupy the SSFL in the future is not known and the relationship between the Moorebank IMT demand and the need for an upgrade to the SSFL is unproven. Should the proposal require upgrades to the SSFL in the future, this would become a matter to be addressed as part of the broader operations of the SSFL. The IMEX train services would also travel along the Port Botany Freight Line, which is currently being upgraded (refer Chapter 3 – *Strategic context and need for the Project*).

The freight trains travelling from the SSFL over the rail link bridge to the IMT facility would not affect the operations of the passenger train services on the adjacent Main South Line.

Locomotive refuelling

Road tankers of approximately 8000 litres capacity would move to the locomotives to refuel them at various locations around the terminal.

IMEX container handling and storage

The majority of loaded and empty containers stored at the IMEX terminal would be temporarily stored in a stack between trips by different transport modes (i.e. from truck to rail wagon, and vice versa). This temporary storage would increase flexibility and capacity in the terminal operations and allow for variations between truck and train arrivals and departures. The container storage areas would be located close to the working tracks to promote efficient handling of freight containers by minimising the travelling distance of the ITVs.

Containers would be temporarily stored in areas according to whether they were loaded or empty. Inside the storage area, containers would be handled by RMG crane. Trucks would travel through the container storage area to pick up or drop off containers.

Container handling equipment requirements, such as container lifting equipment for use on the working tracks and storage area, would be identified by the future developer/operator of the IMEX terminal. The following types of equipment represent the primary components that would move containers through the IMEX terminal while loading and unloading OTR vehicles and rail cars:

- *Working track lift equipment* – reach stackers (refer to Photo 7.1) and RMG cranes capable of spanning four working tracks and one truck loading lane (refer to Photo 7.2);
- *Loaded container storage area lift equipment* – RMG cranes capable of spanning five containers and one truck loading lane, and capable of lifting one container over a five-high container storage stack (refer to Photo 7.3);
- *Empty container storage area lift equipment* – empty handlers/side picks capable of stacking containers up to eight high (refer to Photo 7.4); and
- *ITVs* – non-street-registered truck tractors designed to pull a 'bomb cart'; used for moving containers between the working tracks and the storage area (refer to Photo 7.5).

RMG cranes would be electric powered vehicles; ITVs would be powered by liquefied natural gas (LNG).



Photo 7.1 Reach stacker – working tracks



Photo 7.2 RMG cranes – working tracks



Photo 7.3 RMG cranes – loaded container storage area



Photo 7.4 Empty handler/side pick – empty container storage area



Photo 7.5 ITV/bomb cart – non-street-registered truck tractor

Vehicle operations and access

The traffic generated by the IMT would comprise both light and heavy vehicles. Heavy vehicles would be a combination of rigid and articulated (single and double trailer) container haulage trucks, delivery trucks and maintenance trucks; light vehicles would generally comprise vehicles for administration and operation staff.

Trucks travelling to and from the IMT site would access it from Moorebank Avenue via the M5 Motorway. Road access to the Project site to and from Moorebank Avenue would be at the main IMT access gate, and there would be a separate access for light vehicles. Heavy vehicle management, including use of the main IMT access gate and a trouble truck parking area, is described in section 7.9. These provisions would avoid the need for any heavy vehicle parking on Moorebank Avenue.

7.7 Warehousing precinct

7.7.1 Warehouse design principles

The warehousing and associated commercial space would provide the facade for the Project along Moorebank Avenue and would serve as a buffer between the terminal facilities and Moorebank Avenue. Landscaping along Moorebank Avenue would be incorporated into the warehouse curtilage and would provide screening and visual relief from the otherwise industrial appearance of the warehousing facility. Landscaping details would be further developed as part of the future design and approval process, in accordance with the landscaping principles outlined in section 7.12.

The proposed warehouse development would appear from the streetscape as a business park style facility and would be consistent with planning principles in the *Liverpool Development Control Plan 2008*. The following ecologically sustainable development (ESD) elements are to be considered for the warehouse development:

- rainwater collection and reuse;
- insulated wall and roof panels;
- sun shading in the form of overhangs and mechanical sun shading devices;
- controlled natural light to minimise artificial lighting;
- natural ventilation where applicable; and
- solar panels to be incorporated to minimise power usage.

7.7.2 Warehousing precinct components

The warehousing precinct would provide a significant interface between the IMT and users of the facilities such as freight forwarders, logistics facilities and retail distribution centres. The precinct would be complementary to the IMT and would generate demand for intermodal services from warehouse users.

The warehouse precinct may extend along the eastern boundary of the IMT site and would vary in size between the three indicative IMT layout options as follows:

- approximately 38.9 ha (total warehousing precinct area) for the IMT layout associated with the northern rail access option;
- approximately 55.4 ha (total warehousing precinct area) for the IMT layout associated with the central rail access option; and
- approximately 49.5 ha (total warehousing precinct area) for the IMT layout associated with the southern rail access option.

In addition, a 2.5 ha parcel of land at the northern end of the IMT site (Northern Commonwealth Land) is also proposed for warehousing for all three rail access option IMT layouts.

The locations of the warehouse precinct are shown in Figure 7.4 to Figure 7.6. The precinct would comprise warehousing buildings developed to a maximum gross floor area capacity of up to 300,000 sq. m. Development of the warehousing would be phased, as described in Chapter 8 – *Project development phasing and construction*.

The configuration of the warehousing would depend on a number of factors, including demand across a number of industrial sectors. Therefore, as part of the proposal concept, approval is sought for flexibility in the development of the warehousing precinct, by providing for development in accordance with the planning controls shown in Figure 7.2 and Figure 7.3. Ultimately, the warehousing precinct along Moorebank Avenue would be controlled by a combination of a maximum 21 m building height restriction and a 1:1 maximum floor space ratio (FSR), as identified in Figure 7.2 and Figure 7.3. A maximum FSR has been established for the warehousing precinct to control the density, intensity and massing on the Project site, to minimise environmental impacts and maintain an appropriate visual connection with adjoining properties. These planning controls are consistent with Part 7 of the *Liverpool Development Control Plan 2008* for industrial development.

The height restriction, coupled with FSR controls, would limit development in the warehousing precinct while allowing flexibility in the final built form. All relevant planning controls in the *Liverpool Development Control Plan 2008* that relate to the Project will be considered in the Project detailed design.

Traffic access and parking facilities

The warehousing precinct would be an integral part of the IMT, with direct internal access for heavy vehicles to the warehouses from the IMEX (and eventually the interstate) terminal via the warehouse access road. Heavy vehicles would access the precinct via the main IMT access gate. Staff and visitor entry to the warehouse precinct (light vehicles) would be via direct intersections on Moorebank Avenue, as shown in Figure 7.7 to Figure 7.9. Right-turn lanes would be provided along Moorebank Avenue to provide safe entry for vehicles turning into the Project site.

Staff parking facilities would be provided as part of the IMEX and the interstate terminal parking area, as discussed above.

The traffic and access impacts of the Project are discussed in Chapter 11 – *Traffic, transport and access*.

Ancillary facilities

The proposal concept provides for ancillary facilities associated with the IMEX terminal and the warehousing precinct to be developed on the IMT site. Facilities may include a roadhouse and service station. The roadhouse would be primarily used by truck drivers and other IMT users, and would provide onsite facilities for meals and refreshments. The service station would not be open to the general public and would only service vehicles associated with the IMT.

Details of the approximate fuel quantities to be stored on site are provided in section 14.2 (in Chapter 14 – *Hazards and risks*). As the impacts of any service station would be minor in the context of the overall IMT development, its impacts are assumed to be generally incorporated as part of the broader impacts covered in Chapters 11 to 27 of this EIS. Hazard and risk impacts of the service station are specifically addressed in Chapter 14 – *Hazards and risks*. The impacts of any service station will be assessed further during detailed design and the Stage 2 SSD development approval process.

7.7.3 Warehousing operations

Warehousing would operate in line with market demands and IMEX operations. At Full Build, operations within the warehousing could operate 24 hours a day, 7 days a week. Potential phasing of vehicle access to the warehousing is described in Chapter 8 – *Project development phasing and construction* (sections 8.4 to 8.7).

At Full Build, the warehousing precinct would provide approximately 22 FTE administration positions, as well as 248 FTE operations and 248 FTE maintenance positions (per shift with three shifts per day). This equates to a total of approximately 1,509 FTE onsite operational staff per day.

7.8 Interstate freight terminal

7.8.1 Interstate freight terminal components

At Full Build, the interstate IMT would also have dedicated arrival and departure tracks, working tracks and storage, and administration and ancillary facilities, separate from those for the IMEX terminal. These are described in further detail below.

Rail connections

A separate rail connection (the southbound rail connection) from the SSFL would be constructed to provide dedicated access for trains associated with interstate operations. The southbound rail connection from the SSFL to the Project site would be required irrespective of which rail access option is selected (i.e. the northern, southern or central rail access option). Figure 7.4 to Figure 7.6 show the indicative location of the southern rail connection associated with the interstate terminal. Interstate trains would also use the northbound rail connection for each rail access layout option.

The southbound and northbound rail connections would provide access to the interstate terminal, allowing trains to enter via arrival tracks from the SSFL and depart via departure tracks in a southbound and northbound direction respectively. As discussed in section 7.5 and further detailed in section 8.4, the bridge span(s) across the Georges River would include the northbound and southbound rail connections for both the IMEX and the interstate terminals.

Internal rail layout

The interstate rail yard would comprise arrival/departure tracks, storage tracks, working tracks and classification tracks.

The proposal concept provides:

- approximately four interstate arrival and departure tracks within the Project site boundary, designed to accommodate trains up to 1800 m long;
- approximately four working tracks suitable for 900 m trains (trains longer than 900 m would be split on the arrival/departure tracks before being shunted onto working tracks);
- a separate grouping of combined storage and classification tracks; and
- a rail configuration at either the northern or southern end of the interstate terminal working tracks that allows a locomotive to be detached from one end of a train and re-positioned at the other end.

Internal road layout and access

Road infrastructure developed within the Project site for the IMEX terminal would be modified to accommodate the increased traffic volume generated by the interstate development. This would involve extending the interstate truck gates and entrance/exit roads from the interstate terminal to the existing truck gate approach developed for the IMEX terminal.

Interstate container storage yard

An additional hardstand area would be developed to provide for storage of interstate cargo. Loaded containers would be stored close to the working tracks to minimise the distance covered by ITVs and to maximise efficiency in container handling. Loaded containers would be stacked up to a maximum height of 13 m or five containers (2.6 m high per container). Empty storage containers would be stacked up to a maximum height of 20.8 m or eight containers (2.6 m high per container). Empty containers can be stacked higher than loaded containers because they are lighter and easier to move.

The location of the interstate container storage yard would depend on which rail access option and associated IMT layout is selected. As shown in Figure 7.4 to Figure 7.6, for the southern and the northern rail access options, the container storage yard would likely be located adjacent to the interstate working tracks. However, for the central rail access option, the container storage yard may be located to the south of the IMEX and interstate working tracks.

Administration and ancillary services

The location of administration buildings for the interstate terminal would depend on the rail access option and associated IMT layout selected. For the IMT layout associated with the northern rail access option, the IMT freight village precinct which includes administration and ancillary services would likely be located to the north of the Project site. For the IMT layout associated with the central and southern rail access options, IMT freight village precinct including interstate administration would likely be located in the southern-eastern corner of the IMT site.

The interstate operations may be handled by a separate operator from the IMEX operator, and as such, the administration facilities have been assumed to be developed separately.

The administration and ancillary services associated with the interstate terminal would include:

- an interstate administration building and interstate terminal staff car park in the administration precinct;
- an interstate maintenance and repair facility for container handling equipment (consistent with but separate from the IMEX facility, as they would operate independently); and
- a main gate.

The design principles of the interstate administration facilities would be consistent with the existing IMEX administration facilities. The layout for these facilities, shown in Figure 7.4 to Figure 7.6, is indicative only.

Maintenance and repair facilities

The interstate equipment, maintenance and repair facilities would be located in the same area as the IMEX maintenance and repair facilities, as shown in Figure 7.4 to Figure 7.6.

7.8.2 Interstate freight terminal operations

Interstate terminal throughput capacity

The proposal concept provides capacity for throughput of approximately 500,000 TEU a year at the interstate terminal by 2030. This throughput would equate to approximately 12 interstate trains (or 24 train movements) a week loaded and unloaded at the facility. It is expected that a further three interstate trains (six train movements) without cargo originating from or destined for Sydney may transit through the terminal. The proposed track layouts would allow up to four interstate trains to be processed concurrently, depending on timing of demand for interstate freight.

Operational hours

All operations would occur 24 hours a day, 7 days a week.

Terminal staff numbers

At Full Build, the interstate terminal would provide approximately 35 FTE administration positions, as well as 78 FTE operations and 7 FTE maintenance positions (per shift with three shifts per day). This equates to a total of approximately 290 FTE operational staff on site per day associated with the interstate terminal.

Interstate container handling and storage

The loading and unloading of containers to and from interstate freight trains would be undertaken along the interstate working tracks. Suitable container handling equipment, such as RMG cranes, would be used for loading and unloading operations.

Typically, loaded containers would be stored in the interstate terminal for no more than 3 days; although this is likely to be less (1 or 2 days) for domestic cargo. Empty containers would be stored for longer periods and picked on a first-in-first-out basis.

7.9 External road access and network enhancements

7.9.1 Main IMT gate

As discussed in section 7.5, the location of the main IMT access gate for heavy vehicles would differ depending on the IMT internal layout selected. For the IMT layout associated with the northern rail access option, the main IMT access gate would be located at the south of the eastern boundary of the IMT site, while the southern and the central rail access options would result in the main IMT access gate being located towards the north.

The main IMT access gate would be located a sufficient distance from Moorebank Avenue to allow inbound trucks to queue within the IMT boundary without impeding the flow of traffic on Moorebank Avenue or the functioning of the intersection with the M5 Motorway. Outbound traffic would also be able to queue within the IMT boundary along the approach to the main access gate.

All heavy vehicles accessing the IMT site would be required to pass through an optical character recognition point at a control gate before reaching the main access gate. For security and operational reasons, all trucks entering or leaving the IMT must pass through this control gate.

This gate would be the only truck entrance and exit point into the container storage yard. The gate would be the control point at which the change of custody for cargo is made, instructions are given to arriving trucks, and container data is collected. For instance, a driver may be directed to deliver an inbound container (mostly empty) to a specific storage area and then pick up a container to deliver to a customer.

7.9.2 Moorebank Avenue and Bapaume Road

Redevelopment of Moorebank Avenue is proposed as part of the Project. This would include:

- modification of the M5 Motorway intersection to connect to the widened Moorebank Avenue;
- widening of Moorebank Avenue to a four-lane carriageway between the M5 Motorway and the East Hills Railway Line;
- an upgrade of the Anzac Road intersection;
- a relocation of and upgrade of Bapaume Road and its intersection with Moorebank Avenue; and
- installation of traffic control devices such as a median strip, traffic lights and additional road safety signage.

Design for these upgrades will be undertaken as part of the detailed design phase of the Project.

The intersections on Moorebank Avenue would be developed to accommodate the widening of Moorebank Avenue and the additional traffic generated by the IMT and warehousing, including the following operational requirements:

- provide sufficient capacity to carry forecast traffic volumes for 2030;
- permit, where necessary, turning for the largest design vehicle; and
- provide dedicated right-turn lanes for southbound traffic, to cater for projected future traffic volumes.

The redevelopment of Moorebank Avenue would include services easements and would be completed in accordance with the standards and specifications provided in the *Road Design Guide* (RTA 1988) and Austroads *Guide to Road Design* (Austroads 2011).

Bapaume Road, the access road to the ABB site (labelled on Figure 7.2), would also be realigned and constructed outside the IMT perimeter fence so that the road is entirely separate from IMT operations and maintains access for ABB.

7.9.3 Realignment of Powerhouse Road

The northern and central rail access options would require realignment of the existing access road to the Casula Powerhouse Arts Centre on Liverpool City Council land to the west of the Georges River. The realignment is required to allow for construction and operation of the proposed rail access links to the SSFL, while also retaining access to the Arts Centre.

7.9.4 Other road network enhancements

As detailed in Chapter 11 – *Traffic, transport and access*, the traffic generated by the Project can be added to the existing and future traffic flows with minimal impact on the surrounding road infrastructure. It should be noted that the NSW Government has indicated that it will work with the Australian Government on the development of the Project to minimise impacts on the surrounding road network (refer to discussion in section 3.6.2 in Chapter 3 – *Strategic context and need for the Project*).

7.10 Conservation area

The Project would maintain and enhance the riparian vegetation between the Georges River and the 1% AEP flood level as a dedicated conservation area. The only development proposed in this area is the rail link to the SSFL, the associated Georges River bridge and the establishment of stormwater drainage channels (refer to section 7.11). The exact size of the conservation buffer area is yet to be determined and will depend on the rail access option and associated IMT layout selected during the detailed design phase. However, the vegetation area along the Georges River and the western boundary of the Project site between the East Hills Rail Line in the south to the north of the IMT site is approximately 2.5 km in length. The conservation area may be up to 270 m wide at its widest point.

The conservation area would comprise vegetation that is to be retained and would involve rehabilitation of areas which are currently weed infested. In addition, it would involve extensive replanting of areas within the riparian zone that have been previously cleared. The preservation of the riparian vegetation as a conservation area would provide connectivity to wildlife habitats on surrounding land and maintain the area as a wildlife corridor. Further, the conservation area would, over time, provide visual screening of the IMT operations to alleviate impacts on neighbouring residences in the Casula area.

The Project would take the opportunity to commence early rehabilitation and supplementary planting of local species in the conservation area. The indicative conservation areas for each of the three IMT layouts are shown on Figure 7.4 to Figure 7.6.

Rehabilitation works for the conservation area

A management plan (refer to Appendix E of the Ecological Impact Assessment in Volume 4) has been prepared for the Georges River riparian zone (i.e. the conservation area) and the parcel of land opposite the Project site on the western bank of the river at Casula (referred to as the 'hourglass land', shown in Figure 2.4). The aim of the management plan is to:

- guide rehabilitation works on the Project site to be consistent with and complementary to areas of indigenous vegetation within the conservation zone;
- ensure long-term eradication and suppression of weeds; and
- provide improved habitat for native animals and plants, particularly threatened species.

The plan would provide guidance in the short (1–5 years), medium (6–10 years) and long-term (11–20 years). As part of the plan, the site is likely to require long-term monitoring and low intensity maintenance to prevent re-emergence of weeds.

7.11 Utilities and drainage infrastructure

As the Project is still at concept level, the location and design of the utilities and drainage infrastructure is not yet confirmed. During detailed design, the utilities and drainage infrastructure requirements would be investigated and the location and design would be confirmed. The following sections provide a high level description of the infrastructure requirements for the Project and identify general principles for future infrastructure development. In addition, further details of likely drainage infrastructure are provided in Chapter 16 – *Hydrology, groundwater and water quality*; and further details of likely lighting infrastructure are provided in Chapter 22 – *Visual and urban design*.

7.11.1 Power supply

The electricity supply infrastructure proposed includes ring main power supply for the IMEX and interstate terminals, power supply for the warehousing and a main substation. Onsite power supply would be required for the RMG cranes, refrigeration facilities, site lighting, communications (access controls) and administration building requirements.

A main substation would likely be required on the Project site to supply bulk power to the IMT. Power supplies and distribution systems would be provided separately to the IMEX and interstate terminals, allowing the terminals to operate independently of each other.

Electricity demand is estimated at 15–20MVA in 2030 (with interstate operating requirements), subject to the detailed design.

The power supply infrastructure would be provided at strategic locations around the Project site via distribution substations to suit particular applications such as crane supply, administration and building supply and gates, warehousing supply, lights and security supply.

Bulk power supplies for the Project could potentially be obtained from Endeavour Energy's ANZAC Village Zone Substation, which is close to the Project site. Endeavour Energy has confirmed that this substation currently has sufficient capacity to supply the Project.

The key design objective for these electrical power supplies is that no single failure within the electrical supply and distribution system should result in the total loss of power supplies. Independent supply feeders are proposed to safeguard the Project so that, if one fails, the Project could continue to operate in a reduced capacity.

7.11.2 Gas supply

Natural gas is available to the Project site from the existing gas main located along Moorebank Avenue. As part of the redevelopment of Moorebank Avenue, the gas main would be realigned and potentially increased in size, subject to confirmation from Jemena, the gas supplier for the area. Natural gas supply for the Project would serve administration buildings, maintenance and repair facilities and the Customs building. This gas would be required for space heating, water heating and minor domestic purposes. Separate metered connections would be provided for the warehousing precinct and the interstate facility.

Onsite liquefied natural gas and liquefied petroleum gas storage for refuelling terminal plant and equipment and/or onsite vehicles is described in section 7.15.

7.11.3 Water supply mains

Water supply mains for the Project would likely be segregated between terminal operation precincts and administration/warehouse precincts. The design of the water system would follow Sydney Water Corporation (SWC) planning guidelines criteria, which are based on a future maximum demand for 2031.

The water supply main (DN200 water main) servicing the terminals, administration, maintenance and repair and warehousing buildings would be constructed during redevelopment of Moorebank Avenue and would enter the Project from Moorebank Avenue. A water supply main would be sufficient to meet the operational demands of the Project at Full Build. A separate DN300 water main would be provided in the container storage yard for fire-fighting requirements.

Water supply to the Holsworthy Defence site located south of the Project site would be maintained without service interruption during the construction of the new water main.

The water property connection would be laid in the same trench as gas mains and installed separately for IMEX, interstate and warehouse operations.

7.11.4 Sewerage systems

A network of sewage pipes would be developed to serve the Project for connection to the Sydney Water network. The sewer network would include the following components:

- IMEX and interstate terminal facilities, comprising:
 - > domestic wastewater treatment and recycling system;
 - > maintenance repair buildings, washwater treatment and recycling system;
 - > recycling system overflow and maintenance area trade waste collection sewer; and
- warehouse precinct, which would connect independently of the IMEX and interstate terminal facilities to the SWC sewer rising main that runs along Moorebank Avenue.

Subject to SWC consent, the Project site is to be serviced through connection to the existing SWC network. Sewage from the terminals, warehousing and associated commercial development areas would be sent to a nearby Sydney Water sewage treatment plant (STP) via the existing Sydney Water sewer rising main along Moorebank Avenue. Trade waste agreements with Sydney Water would need to be established to obtain a sewer connection.

In the event that there are capacity issues at the Sydney Water STP, then an alternative onsite treatment option may be provided and would include using a packaged STP, which could be developed to service the IMEX and interstate terminal buildings, administration buildings and maintenance and repair buildings of the Project. The packaged STP facility would be designed for treating an Average Dry Weather Flow (ADWF) of around 12 kilolitres per day (KL/d) (i.e. 80 persons x 150 L/d) (depending on the detailed design process) using SWC/DSP Planning Design Criteria (March 2008). It would provide a source of recycled water suitable for toilet flushing, landscape water, general external use and industrial water uses. The quality of the treated water would comply with the *Australia Guidelines for Water Recycling: Managing Health and Environmental Risk* (Environment Protection and Heritage Council, the Natural Resource Management Ministerial Council and the Australian Health Ministers' Conference 2006) and would not require any connection to the Sydney Water sewerage system (except for an emergency overflow). The feasibility of a packaged STP will be further investigated as part of the detailed design of the Project.

7.11.5 Drainage and stormwater

A combination of piped and overland flows would be developed as part of the Project to direct stormwater across the Project site. During heavy rainfall events, detention basins would capture stormwater runoff before discharging to the Georges River. The number, size and location of the detention basins and associated drainage would depend on the IMT internal site layout.

All stormwater on the Project site would contain pollutants and would be treated through onsite stormwater treatment systems (including biofiltration, swales, detention systems and sedimentation basins) designed in accordance with relevant guidelines including:

- Landcom (2006) *Managing Urban Stormwater: Soils and Construction* (the 'Blue Book');

- Landcom (Draft) *Water Sensitive Urban Design*, Books 1 to 4;
- Stormwater Trust and Upper Parramatta River Catchment Trust (2004) *Water Sensitive Urban Design – Technical Guidelines for Western Sydney*;
- NSW Government, Department of Environment and Conservation (2006) *Managing Urban Stormwater: Harvesting and Reuse*, NSW Government; and
- Water Sensitive Urban Design (WSUD) in the Sydney Region Capacity Building Program.

The Project site stormwater system would be designed to separate general stormwater runoff from contaminated stormwater runoff so that heavy loading of pollutants (though spillage or leakage) can be managed. General stormwater would arise from roadways, pavement and other areas that usually do not contain large contaminant loads. Contaminated stormwater runoff would arise from areas containing equipment where there is a risk of spillage of oil and other contaminants. Areas containing potentially contaminated surfaces, such as substations, fuel storage areas and wash areas, would be bunded and/or graded to prevent runoff flowing into the clean stormwater system. When a spill is contained, it can be managed through offsite treatment (suction truck and disposal to industrial waste treatment).

Collection sumps would be provided in the vicinity of the mechanical workshops to collect waste oil, as well as wastewater from washing and degreasing of mechanical components and machinery parts.

To address stormwater quality treatment, the following management practices have been incorporated into the proposal concept design:

- subsurface drainage;
- swales drainage; and
- sedimentation and biofiltration basins (at detention basin inlets).

The Project stormwater and drainage infrastructure would be designed to cater for Full Build (i.e. the IMEX, interstate and warehousing operating at maximum capacity). Chapter 16 – *Hydrology, groundwater and water quality* includes a more detailed description and figures of the proposed stormwater drainage system.

The Stormwater Management Plan included in the Surface Water Impact Assessment (refer Volume 6 and Chapter 16 – *Hydrology, groundwater and water quality*) has been developed to meet all relevant LCC, Sydney Trains (formerly RailCorp) and Australian Rail Track Corporation Limited (ARTC) design specifications. This includes the requirement to control the rate of stormwater runoff so that it does not exceed the pre-developed or existing rate of runoff, as discussed in section 16.4.3.

7.11.6 Information and communication technology

Information and communication technology systems would be provided separately for the IMEX and interstate terminals.

7.11.7 Container and truck wash treatment plant

A container and truck wash treatment plant is proposed to enable clean water to be recirculated for washing containers, trucks and other heavy machinery at the Project site. Make-up water for the plant would include potable water, rainwater and recycled water from the STP (if implemented). The plant would include oil removal, aeration, sand and carbon filtration, disinfection and detergent dosing equipment.

7.11.8 Rainwater harvesting system

Rainwater falling on the roofs of the main buildings within the IMEX and the interstate facilities would be collected in rainwater tanks. The collected water would be used as make-up water for the container and truck wash treatment plant, and for irrigation and toilet flushing purposes. Overflow from the rainwater collection tanks would be discharged to the clean stormwater system.

7.11.9 First-flush stormwater system

Work areas around the mechanical workshops would be bunded to contain oil spillages and contaminated stormwater runoff. The first 10–15 mm of rainfall (containing oil and other contaminants washed from the ground surfaces) would be collected in one or more first-flush tanks. Stormwater from the first-flush tanks would be pumped through an oil–water interceptor to the container and truck wash treatment plant.

7.11.10 Flood risk

Other than the rail access connections, the Project would avoid development within the 1% AEP floodplain, as shown in Figure 7.4 to Figure 7.6. While the proposed interstate arrival and departure tracks would follow the floodplain extent very closely (due to track alignment considerations), there would be no encroachment on the 1% AEP floodplain. As labelled on Figure 7.6, for the southern rail access connection layout, it is likely that a retaining structure would be required to avoid encroachment into the 1% AEP flood risk area (adjacent to the interstate tracks, in the north-west of the Project site). The Georges River bridge and rail link across the floodplain would be designed to allow for a 500 mm buffer above the 1% AEP to avoid flood flows.

7.12 Landscape design

The Project would adopt a landscape design that integrates the terminal facilities and the associated warehousing precincts through screening and breakout space for the public and staff. This would provide visual relief, as well as aiding way-finding throughout the Project site. Landscaping along Moorebank Avenue would also provide visual relief.

Along the Georges River, landscaping would be incorporated into the ESD initiatives proposed for the conservation zone, and would provide visual screening of the IMT operations to alleviate visual impacts on nearby residents.

The following landscape design principles would be applied to the Project:

- Where possible, retain existing native trees along Moorebank Avenue to mitigate visual impact; also provide additional native trees around the car park areas to maximise shade and to provide a landscape frontage that is scaled to complement the new buildings.
- Utilise opportunities to commence early rehabilitation and supplementary planting of local species to the conservation zone on the western boundary and to commence early screen planting at the junction of Moorebank Avenue and M5 Motorway to mitigate visual impact.
- Consider opportunities for supplementary street planting in the residential area west of the Project site to ameliorate floodlight impacts.
- Landscape areas to consider Crime Prevention Through Environmental Design (CPTED) principles.

- Consider localised earth mounding and provide native canopy trees in internal landscape areas on the western side of the new buildings to mitigate visual impacts on the residential area.
- Consider the use of site soils and mulching of removed native vegetation for re-use in landscape areas.

7.13 Lighting

The Project would require functional lighting 24 hours a day, 7 days a week. Lighting for the Project would include establishing lighting in the following areas:

- IMEX and interstate terminals including container handling and container storage areas, rail yards and maintenance areas;
- regular vehicle traffic, road and gate areas;
- warehousing precincts; and
- Moorebank Avenue.

Additionally, security lighting would be established, including perimeter security lighting along the Project site boundary.

Solar lighting would be used, where possible, for car parking areas and Moorebank Avenue (outside the terminal) street lighting.

The majority of the open container storage and circulation areas for the Project would be lit from equally spaced 30 m high masts. Lighting provided on internal roads, gate areas, vehicle parking, movement and maintenance areas would use 20 m poles with full cut-off type luminaires. General surveillance lighting would be provided on 10.5 m poles. The lighting along Moorebank Avenue is proposed to be mounted on poles approximately 15 m high.

The potential light spill impacts of the Project and measures to address them are described in Chapter 22 – *Visual and urban design*.

7.14 Security

A security perimeter fence would be established around the IMT facility to restrict access to the facility by the general public. Onsite security would include security cameras and base monitoring.

7.15 Fuel storage

The fuel system would be designed to conform to the relevant Australian standards. Bulk fuel storage would be located in the general vicinity of the IMT's general plant and maintenance facility, with a holding capacity of approximately 500,000 litres. Separate fuel storage would be provided for the IMEX and interstate terminals.

Fuels stored on site would include diesel (for refuelling locomotives and trucks) and unleaded petrol, liquefied petroleum gas and liquefied natural gas (for refuelling trucks and onsite vehicles). Expected quantities and further details are provided in Chapter 14 – *Hazards and risks*.

7.16 Project definition process

This proposal concept provides an overview of the Project elements, operations and activities associated with the construction and operation of the IMT. The proposal concept is indicative and the Project will be subject to further detailed design and assessment as part of the Stage 2 SSD development approval processes. The final design will be driven by:

- commercial considerations of MIC and the terminal operator, including the phased delivery of IMEX terminal capacity and warehousing capacity in line with market demand;
- agreement with MIC's shareholder representatives (for the purposes of meeting the Commonwealth's Project objectives);
- impacts and mitigation measures identified in this EIS; and
- the need to remain consistent with the EPBC Act approval and Stage 1 SSD development approval under the EP&A Act as outlined in Chapter 4 – *Planning and strategic requirements*, and any conditions of approval set by the relevant planning agencies.

Ultimately, the detailed design process will determine whether the Project would be substantially consistent with the description of the Project provided in this chapter. Finer detail, such as the location of structures and equipment (e.g. the location of the main substations for the IMEX and interstate terminals and connections to existing and proposed utilities), will be determined during detailed design.