

# Chapter 8

## Project development phasing and construction





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## 8. Project development phasing and construction

Chapter 8 provides a description of the key construction and operational activities required for the Moorebank Intermodal Terminal (IMT) Project (the Project). The Project would involve the phased delivery of import/export (IMEX) and interstate terminals and warehousing capacity in line with the market demand for processing of containers through the IMT.

In order to assess the impacts of the Project, this Environmental Impact Statement (EIS) identifies a series of phases of project development from site preparation through to the fully developed operation of the Project (i.e. the Full Build). These phases are referred to as the 'Project development phases' and are described throughout this chapter.

Details provided in this chapter are indicative only and provided for the purpose of environmental assessment and planning approval. As explained in Chapter 1 – *Introduction* and Chapter 4 – *Planning and statutory requirements*, the Moorebank Intermodal Company (MIC) is applying for Commonwealth approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and a Stage 1 State significant development (SSD) approval under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Therefore, the details provided in this EIS are at concept level only. More information on the proposed approach to construction and operation would be provided as part of the Stage 2 SSD approval process under the EP&A Act (refer to Chapter 4 – *Planning and statutory requirements*). The exception is the Early Works development phase, for which MIC is seeking consent to undertake preliminary works as part of the Stage 1 SSD development approval, without the need for further consent. This chapter therefore also provides a full description of the Early Works development phase (refer to section 8.3).

Chapter 7 – *Project built form and operations* provides a description of the layout and operation of the Moorebank IMT at Full Build and should be read in conjunction with this chapter.

### 8.1 Precursors to the Moorebank IMT Project

There are a number of projects, either planned or underway, that will be undertaken before the development of an IMT on the Project site. These are described below.

#### 8.1.1 The Moorebank Units Relocation Project

The Project site is currently occupied by the School of Military Engineering (SME) and a range of other minor Department of Defence (Defence) units. For construction of the Project to occur, the current SME operations would need to be relocated, and any structures remaining within the future IMT footprint relocated or demolished to make way for the IMT.

In September 2012, the Federal Parliamentary Standing Committee on Public Works approved the Moorebank Units Relocation (MUR) Project to relocate 13 Defence units and four Defence facilities from the Project site. The largest of these facilities is the SME, which will be rebuilt at the nearby Holsworthy Barracks with training facilities, offices, facilities for explosive detection dogs, classrooms and accommodation.

The MUR Project will provide land for the development of the Moorebank IMT and is anticipated to be completed by mid-2015. The MUR Project includes the removal and relocation to Holsworthy of some existing items and buildings on the Project site which have been identified as having heritage value or social significance to Defence. These include items from the Royal Australian Engineers (RAE) Heritage Precinct and other memorials, including certain items of heritage significance, as detailed in section 21.2 in Chapter 21 – *European heritage* and at <http://www.defence.gov.au/id/moorebank/>.

Depending on the outcome of opportunities to conserve other items of heritage significance, all remaining structures and buildings on the site are to be removed and/or demolished as part of the site rehabilitation works (refer section 8.1.2) and the Moorebank IMT Project (refer to section 8.3). Archival recordings will be made of items of heritage significance that are not being relocated.

The MUR Project was subject to a separate environmental and planning approval process from that of the Moorebank IMT Project. The impacts of the MUR Project (such as demolition or relocation of heritage items) are not the subject of this EIS.

Further details of the MUR Project are available at <http://www.defence.gov.au/id/moorebank/>.

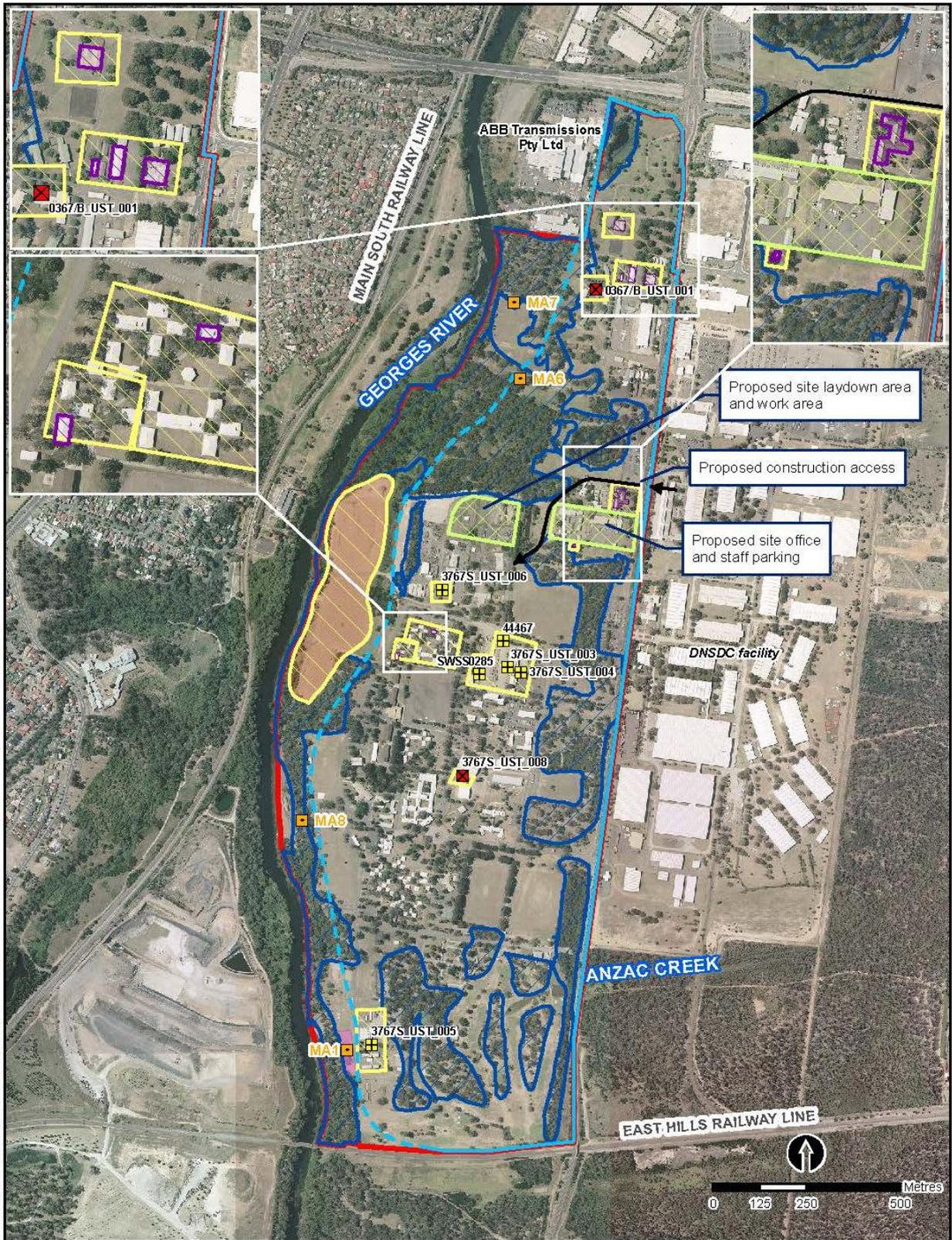
### 8.1.2 Site rehabilitation works

Following completion of the MUR Project, additional site rehabilitation works are required to reduce environmental, health and safety risks on site before the start of IMT construction. Not all buildings and structures on the Project site would be removed as part of the MUR Project; the remaining buildings would need to be removed before construction of the IMT could begin. Furthermore, site preparation activities such as decontamination of buildings with asbestos containing material, site stabilisation, and establishment of construction areas and facilities, would also be necessary before IMT construction. These activities are referred to as the 'site rehabilitation works'. These works are proposed to be completed before development of the Project, as part of the Australian Government's obligations for environmental stewardship of the land.

In March 2014, MIC provided a referral to the Commonwealth Minister for the Environment, which detailed the activities related to site rehabilitation works (referral 2014/7152). The referral sought consent to undertake these remediation and rehabilitation works before any future redevelopment of the site. The action specified under referral 2014/7152 is as follows:

- establishment of construction facilities and amenities on existing areas of hardstand, including staff parking, site offices, hygiene units and kitchen facilities, plant laydown areas and wheel wash;
- decontamination and demolition of eight buildings identified as including asbestos containing material;
- remediation of previously identified contamination hotspots, including underground storage tanks, as identified in the *Moorebank Intermodal Terminal Remediation Action Plan (RAP)* (refer to Volume 5A – Technical Paper 5 – *Environmental Site Assessment (Phase 2)*) and shown in Figure 15.1 in Chapter 15 – *Contamination and soils*;
- decontamination and site stabilisation on the site of the plant and equipment operation training area on the western side of the Project site, known as the 'dust bowl'; and
- construction of secure perimeter fencing.

Figure 8.1 provides a plan of the indicative layout of the proposed site rehabilitation works under the EPBC referral.



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**Works included in proposed action**

- Non-operational underground storage tank
- + Operational underground storage tank
- Extent of proposed action
- Proposed works compound
- Asbestos contaminated buildings

- Revegetation area
- Indicative fence line - new fencing to be location without disturbing existing vegetation and potential archaeological deposit
- Indicative fence line - renewal /replacement of existing fence

- Constraints**
- Aboriginal heritage items
  - Potential archaeological deposit
  - Vegetation exclusion area
- Site details**
- Access
  - IMT site boundary

**Figure 8.1 Indicative layout of site rehabilitation works (excluded from assessment under this EIS)**

The site rehabilitation works are being undertaken to achieve environmental good practice by reducing environmental and health and safety risks associated with the demobilisation of the Project site by Defence.

On 9 May 2014 the proposed site rehabilitation works were declared (under delegation from the Minister for the Environment) not to be a 'controlled action' and therefore not subject to further assessment under the EPBC Act. This EIS therefore excludes consideration of the site rehabilitation works.

## 8.2 Phased Project development approach

As discussed in Chapter 1 – *Introduction*, the construction and operation of the Project would be undertaken in a phased manner.

The rehabilitation works described in Section 8.1.2 (independent of the approval of the scope of this EIS) would commence in early 2015.

Following completion of the rehabilitation works and assuming approval of the IMT Project that is the subject of this EIS, the Early Works development phase would be undertaken. Development would then progress with construction and later simultaneous operation activities until the Project reaches Full Build in 2030. For the purposes of assessing the impacts of the Project, this EIS uses five development phases to describe the likely construction and operational activities as the Project develops. It is important to note that these development phases are indicative only, and would be confirmed by the contractor selected for the future construction and operation of the Project.

The five Project development phases described in this EIS are:

1. Early Works (2015);
2. Phase A – construction of initial IMEX terminal and warehousing (2015–2018) (Phase A);
3. Phase B – operation of initial IMEX terminal and warehousing, construction of additional capacity (2018–2025) (Phase B);
4. Phase C – operation of IMEX terminal and warehousing, construction of interstate terminal and additional warehousing (2025–2030) (Phase C); and
5. Full Build – operation of IMEX terminal, warehousing and interstate terminal (2030).

Figure 8.2 identifies the Project development phases, as well as the construction and operation program and timing (also refer to section 8.2.1).

This chapter provides a description of the construction and operational activities likely to occur during each Project development phase. In addition, as discussed in section 7.5 of Chapter 7 – *Project built form and operations*, the proposal concept includes three proposed rail access options from the Southern Sydney Freight Line (SSFL) (the northern, southern and central rail access options), with each access option resulting in a different IMT layout. Therefore, this chapter also describes the IMT layout associated with each of the rail access options. The final choice of rail access and IMT layout would be determined during detailed design (following Stage 1 SSD approval).

The Project development phasing provided in this chapter is indicative only. During detailed design, and once the contractor for the development and operation of the Project has been selected, the Project phasing would be confirmed. More precise details on each of the Project development phases would be developed and provided as part of the Stage 2 SSD approval process. The exception is the Early Works development phase, which MIC is seeking approval to commence as part of this Stage 1 SSD development approval. Therefore, a more detailed description of this phase is provided in this EIS (refer to section 8.3).

### 8.2.1 Project development timing

Construction of the Project is expected to begin in mid-2015, starting with the Early Works development phase. The IMEX terminal, interstate terminal and the warehousing precinct would reach capacity in 2030. The IMEX terminal's capacity at Full Build would be 1.05 million twenty-foot equivalent units (TEU) a year in 2030 (i.e. 525,000 TEU a year inbound and 525,000 TEU outbound). The interstate terminal's capacity at Full Build would be 500,000 TEU a year in 2030 (i.e. 250,000 TEU a year inbound and 250,000 TEU outbound).

Warehousing associated with the IMEX facility would be developed progressively throughout the Project development phases and would be located with efficient access to the IMEX terminal and Moorebank Avenue.

In the longer term, and as the demand increases for interstate and regional freight movements by rail, an interstate terminal would be developed on the IMT site. Interstate operations are expected to commence in 2030.

For the purposes of assessing environmental impacts, an indicative timetable of key construction and operational timeframes is provided in Table 8.1 and illustrated in Figure 8.2.

Table 8.1 Indicative Project development timetable

Project Stage	Indicative period of construction	Indicative period of operation
Early Works	Mid 2015 – end 2015	N/A
Phase A	Late 2015 – early 2018	N/A (construction only)
Phase B	Mid 2023 – mid 2025	Early 2018 – mid 2025
Phase C	Mid 2028 – mid 2030	Mid 2025 – mid 2030
Full Build	N/A	Mid 2030 onwards

## 8.3 Phase – Early Works

Following completion of the MUR Project and handover of the site to MIC, the IMT Project contractor would complete the rehabilitation works (that fall outside the scope of this EIS). The contractor would then commence the Early Works development phase. The Early Works Phase includes demolition of all remaining buildings not demolished during the rehabilitation works, and final restoration of the 'dust bowl' and conservation area. This phase is expected to start in July 2015 (or perhaps earlier) and would continue for approximately 6 months. MIC is seeking approval to commence the Early Works development phase as part of the Stage 1 SSD approval, without the need for further approval. The key activities within the Early Works development phase include:

- establishment of construction facilities, which may include a construction laydown area, site offices, hygiene units, kitchen facilities and wheel wash, if it is necessary to establish these facilities in a different location from that initially set up as part of the site rehabilitation works (refer section 8.1.2 above);

- demolition of existing buildings, structures and contaminated buildings not being removed as part of the MUR Project or the site rehabilitation works (refer section 8.1.1 and 8.1.2 above);
- some contaminated land remediation including removal of unexploded ordnance (UXO) and explosive ordnance waste (EOW) if found, removal of asbestos contaminated buildings and remediation of an area known to contain asbestos (as shown in Figure 8.3);
- relocation of trees, including hollow bearing trees (i.e. those that provide ecologically important roosting habitats);
- service utility terminations and diversions;
- establishment of the conservation area within the plant and equipment operation training area (known as the 'dust bowl') including seed banking and planting; and
- heritage impact mitigation works including archaeological salvage of Aboriginal and European potential archaeological deposit (PAD) sites.

Further detail on the key activities within the Early Works development phase is provided below. Key construction details such as earthworks, working hours, construction workforce, traffic and access, plant and equipment and waste management are provided in section 8.8.

### 8.3.1 Building decontamination, demolition and removal

Buildings not removed as part of the MUR Project and site rehabilitation works (refer section 8.1.1 and 8.1.2 above) would need to be demolished during the Early Works development phase. Buildings to be demolished include residential buildings (approx. 35,429 sq. m), a warehouse building (approx. 29,650 sq. m) and office buildings (approx. 14,923 sq. m).

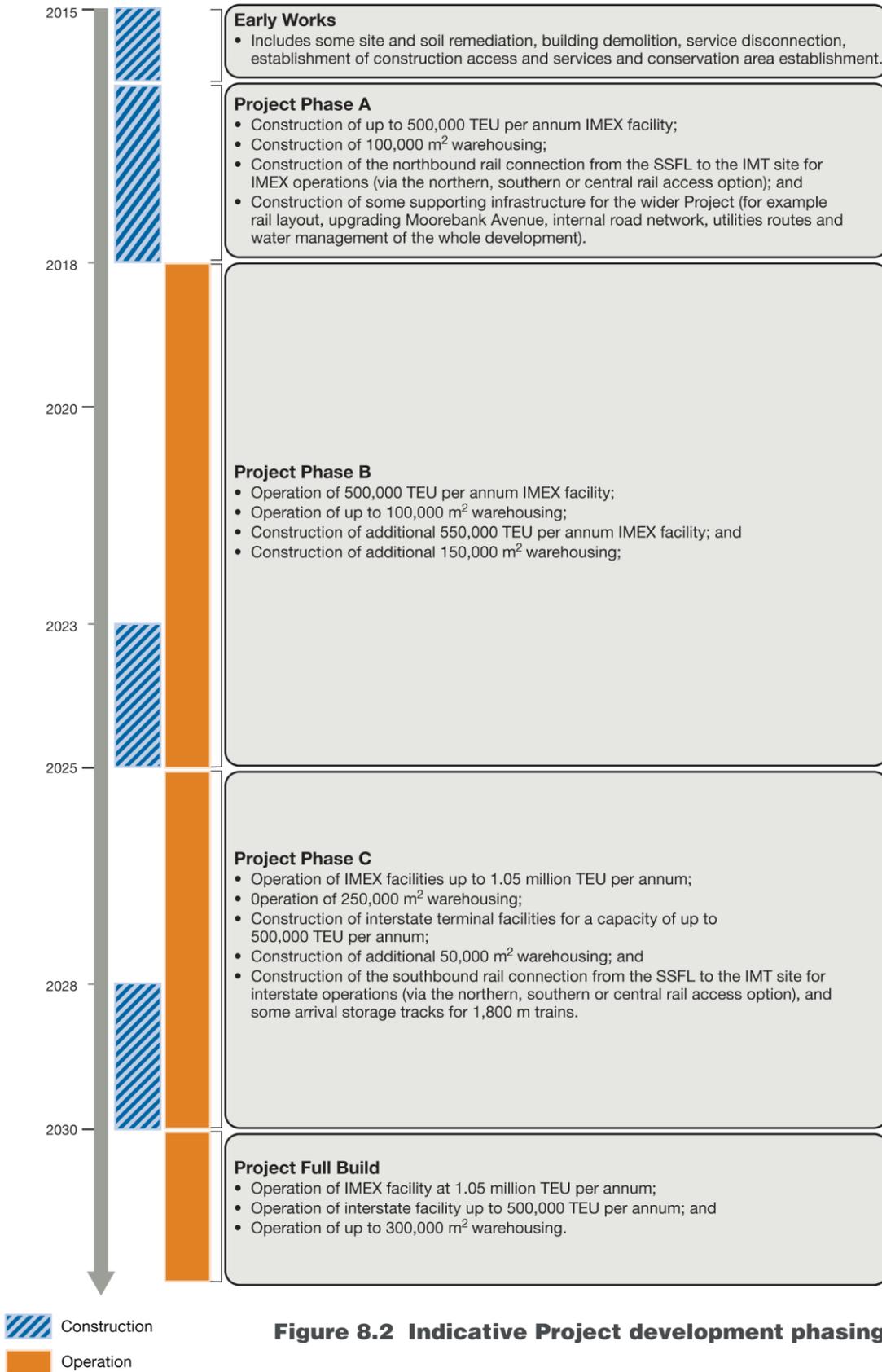
The demolition works to be carried out include clearance of all structures, including retaining structures, to ground level, and any other demolition required before construction of the Project can begin. Demolition materials would, where appropriate, be stockpiled for reuse on the Project site during construction, or lawfully disposed of at appropriate facilities. During this process Project contractors would be required to comply with NSW and Commonwealth Work Health and Safety Regulations, and to obtain relevant WorkCover insurance.

Buildings on the Project site that are known to be contaminated with asbestos would be removed as part of the Early Works development phase. The methodology and process of removal of asbestos from contaminated buildings is described in section 8.3.2 below.

A demolition plan including environmental management measures would be prepared before demolition began. The plan would detail the methods and sequences for demolition. No explosives would be used in demolition.

**TIMELINE**

**PROJECT DEVELOPMENT PHASING**



**Figure 8.2 Indicative Project development phasing**

### 8.3.2 Contaminated land investigation and remediation

Remediation of the Project site is necessary because the land has been used for Defence purposes which may be associated with potential UXO, asbestos containing materials and hydrocarbons.

The Early Works development phase would involve the investigation and removal (if found) of UXO and explosive ordnance waste (EOW). In addition, an area containing an asbestos-contaminated soil mound, located in the south-eastern portion of the Project site adjacent to Jacquinet Court (referred to as Area 18 and shown in Figure 8.3), would be remediated as part of the Early Works.

A preliminary RAP has been prepared for the Project and is included in Volume 5A – Technical Paper 5 – *Environmental Site Assessment (Phase 2)* of this EIS. The RAP identifies the processes and methods that would be followed during the investigation and remediation of the contaminated material. In addition, Section 10.1 of the RAP (Volume 5B) identifies remedial contingencies to effectively deal with contaminated material that has not been previously identified. This includes a requirement to suspend work to enable assessment of the suspected contamination and associated risks.

Section 15.5.1 of Chapter 15 – *Contamination and soils* summarises the soil and remediation methods that may be utilised throughout Early Works and the following construction phases of the Project. These methodologies include: containment and monitoring; consolidation and/or capping; excavation and offsite disposal; and excavation and onsite treatment. Once further details of the Project are known, the RAP would be updated and would confirm the remediation methodologies to be undertaken at the Project site.

#### Unexploded ordnance and explosive ordnance waste removal

A review of the Defence National UXO database has found that the Project site is not in an area with potential risk of UXO or EOW containing high explosive or other energetic material. Details of the review are provided in Chapter 15 – *Contamination and soils*. However, prior to commencement of the Early Works development phase, and in accordance with the requirements of the RAP, a UXO management plan would be developed for the Project site. This plan would detail a framework for addressing the discovery of UXO or EOW to ensure a safe environment for all project staff, visitors and contractors.

#### Decommissioning of underground/aboveground storage tanks

The removal of known underground storage tanks (USTs) (as per the NSW *Protection of the Environment Operations (POEO) (Underground Petroleum Storage Systems (UPSS)) Regulation 2008*) would primarily be undertaken as part of the site rehabilitation works (refer to section 8.1.2), and is not specifically included within this EIS. Should any additional underground storage tanks (and associated contamination) be identified during future excavation works, validation and removal would be undertaken in accordance with the contingency measures prescribed in the RAP. One aboveground storage tank (AST) has been identified on the Project site and would be removed as part of the Early Works development phase, in accordance with the measures in the RAP.

## Removal of asbestos

Previous investigations have identified buildings containing asbestos at the Project site. Prior to the demolition of any buildings onsite, testing would be undertaken to confirm the presence of asbestos material. If confirmed, the demolition of the building and the removal of asbestos material would be undertaken in accordance with the methodology provided in the RAP (and outlined below).

In addition, asbestos has been identified in an area (Area 18) adjacent to Jacquinet Court, as shown in Figure 8.3. This area would be remediated as part of Early Works. The removal of asbestos would be undertaken in accordance with the following methodology:

- During the removal of the identified asbestos containing soil/materials, the following additional processes would be implemented:
  - > all asbestos removal, transport and disposal would be performed in accordance with the Commonwealth Work Health and Safety Regulations 2011 (WHS Regulation);
  - > the removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos, 2nd Edition;
  - > as non-friable asbestos cement fragments are the key concern, a bonded asbestos removal licence issued by WorkCover would be required for the removal of asbestos contaminated soil;
  - > environmental management and work health and safety procedures would be put in place for the asbestos removal during excavation, to protect the workers, surrounding residents and the environment;
  - > temporary stockpiles of asbestos containing materials would be covered to minimise dust and potential asbestos release;
  - > an asbestos removal clearance certificate would be prepared by an occupational hygienist following the systematic removal of asbestos containing materials and any contaminated soils from the site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples);
  - > asbestos fibre air monitoring would be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with the National Occupational Health and Safety Commission's *Guidance Note on the Membrane Filter Method For Estimating Airborne Asbestos Fibre*, 2nd Edition; and
  - > validation of all excavations would be required including relevant monitoring and reporting.

## Waste

Remediation of the Project site would produce waste materials for offsite disposal, including waste classified as hazardous solid waste and general solid waste in accordance with the NSW Protection of the Environment Operations (Waste) Regulation 2005 (see Chapter 15 – *Contamination and soils*). Other less hazardous material may be classified as suitable for encapsulation on site and sealed under pavements or hardstand areas. The methodology and processes for the disposal of waste are outlined in Chapter 15 – *Contamination and soils*.

### 8.3.3 Service utility terminations and diversions

The Project contractor would undertake a services search (both desktop and onsite investigations) to verify the location and depth of services at the Project site. Services would be maintained, disconnected or relocated as appropriate. The Project contractor would be required to arrange for suitability qualified personnel to carry out the disconnections or relocations. These activities would involve obtaining the relevant approvals from service authorities.

### 8.3.4 Establishment of the conservation area

The conservation area would be established along the western boundary of the Project site during the Early Works development phase and would contribute to meeting the Project's biodiversity offset contributions. A management plan has been prepared for the Project (refer to Appendix E of the Ecological Impact Assessment in Volume 4) which would guide the rehabilitation works for the conservation area. Works would include eradication and suppression of weeds, followed by long-term monitoring and low intensity maintenance to prevent re-emergence of weeds.

### 8.3.5 Establishment of construction facilities

The Project contractor would be responsible for establishing construction facilities and amenities on the Project site. While the proposed location of construction facilities is not yet known, it is likely that this would be located close to the vehicle access off Moorebank Avenue. Construction facilities would include equipment storage, repair and maintenance facilities, contractors' office, staff parking, hygiene units, kitchen facilities, plant laydown areas and wheel wash.

### 8.3.6 Heritage salvage works

As part of the Early Works development phase, Project contractors would undertake heritage mitigation works including salvage of Aboriginal and European heritage sites. Prior to Early Works commencing, background studies and subsurface testing would be undertaken to assist in defining and scoping the heritage salvage works. This includes:

- consultation with the NSW Office of Environment and Heritage (OEH) and Registered Aboriginal Parties;
- scarred tree assessment including consultation with Registered Aboriginal Parties and field investigation;
- archival recording of affected European heritage sites and salient aspects of the broader Moorebank cultural landscape; and
- subsurface testing of MRSA2 and MA10 (refer to Figure 20.3 in Chapter 20 – *Aboriginal heritage*, which shows the location of these artefacts and archaeological deposits).

A methodology for the surface salvage of European and Aboriginal heritage sites would be prepared, and the methodology for the salvage of Aboriginal heritage sites provided to Registered Aboriginal Parties for review. During this time an Aboriginal Cultural Heritage Assessment Report (ACHAR) would be prepared and approval from OEHL to excavate the heritage sites would be sought. The methodology prepared during this process would then be used during the Early Works salvage works, which include:

- salvage of Aboriginal objects (MA1, MA2, MA3, MA4, MRS2 and MA10) and the subsurface salvage of MA5 and MA9;
- surface salvage of European sites MHPAD1 and MHPAD2;
- salvage of other Aboriginal and European heritage sites identified through the background studies and subsurface testing preceding Early Works (as described above); and
- relocation of scarred trees, where required.

Chapter 20 – *Aboriginal heritage* and Chapter 21 – *European heritage* provide further detail on these objects and sites, including the location of these heritage items.

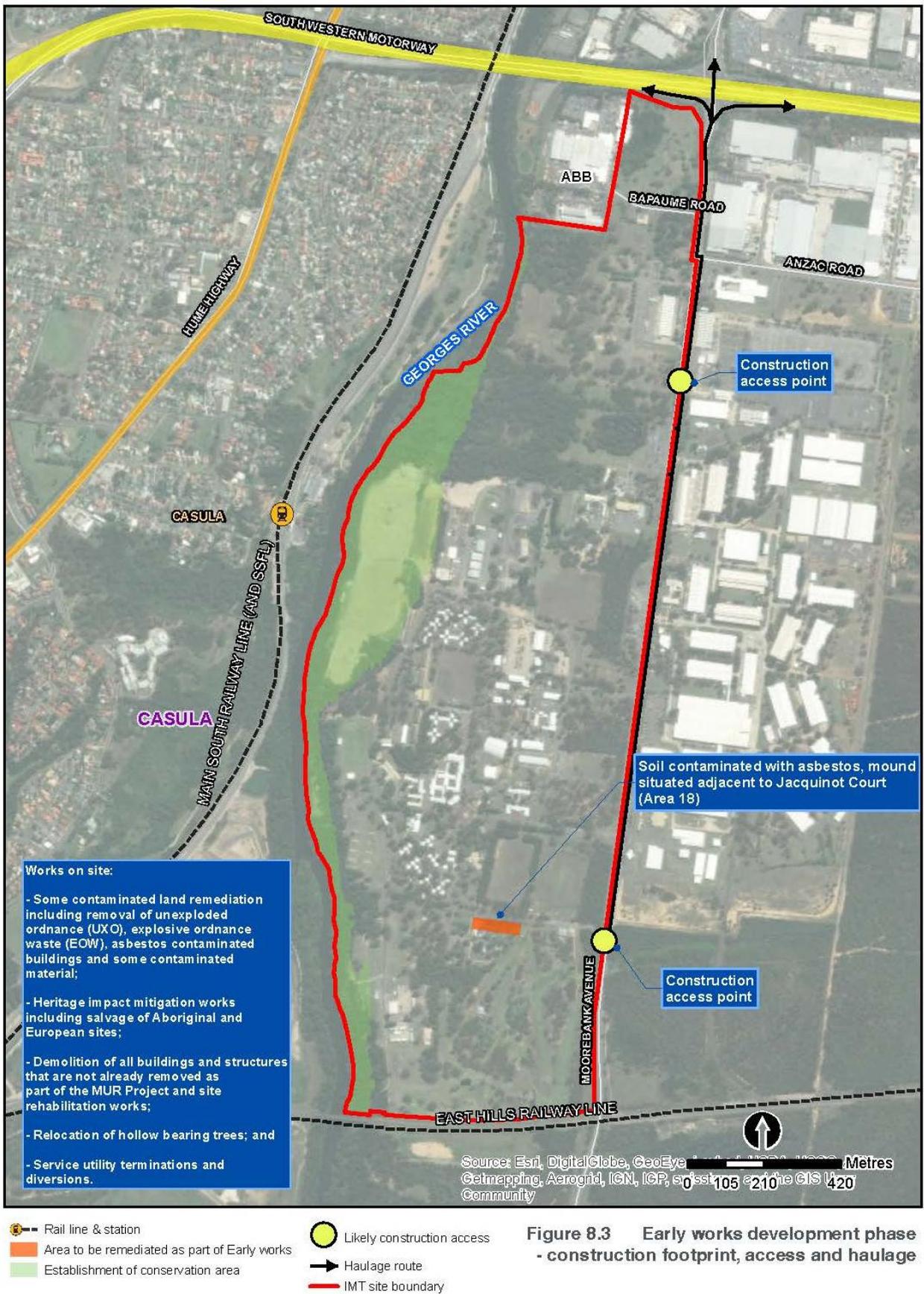
In addition, the Cullen Universal Steel Truss (CUST) Hut, the STRARCH hangar and the Transport Compound Workshop (referred to as building 99), currently located on the SME site, were identified during the MUR Project as potentially meeting the threshold for nomination to the Commonwealth Heritage List, but have not been identified for relocation as part of the MUR Project. A condition survey would be undertaken to assess the condition of these buildings and to determine the requirement for relocation off site. Options to reuse in situ would also be considered if necessary. Alternatively, if considered appropriate, these buildings would be demolished.

### 8.3.7 Building materials and soil volumes

The activities described in the sections above involve the demolition of buildings which would generate material that would need to be removed from the Project site. The likely quantities associated with these activities are provided in Table 8.2 below. In addition, the remediation of Area 18 would result in the removal of contaminated soil, with the expected volume also identified in Table 8.2.

Table 8.2 Earthworks estimates – Early Works

Activity	Item	Approx. quantity of materials/soils (m <sup>3</sup> )
Building demolition	Residential buildings	11,337
	Warehouses	7,116
	Office buildings	4,775
	Asbestos removal	287
Remediation	Remediation of Area 18	5,510



**Figure 8.3 Early works development phase - construction footprint, access and haulage**

## 8.4 Phase A – Construction of initial IMEX terminal and warehousing (2015–2018)

### 8.4.1 Construction activities

The greatest level of construction activity would likely occur during the early phase of the Project, during Phase A. This phase involves earthworks, construction of the initial IMEX terminal and warehousing facilities, construction of the rail connection from the SSFL to the IMT site and some supporting infrastructure for the wider Project.

Construction of the initial IMEX freight terminal facilities for a capacity of 500,000 TEU a year and 100,000 sq. m of warehousing is likely to commence in the third quarter of 2015. During this time, ancillary facilities including IMEX administration, the plant and equipment maintenance and repair building, and the main Moorebank IMT gate would also be developed.

The Project involves the construction of a rail access from the SSFL to the IMT site. This access would be gained via one of the rail access options (northern, central or southern) outlined in detail in section 7.5 of Chapter 7 – *Project built form and operations*. The rail access has been designed to be built in two stages. In Phase A, the bridge across the Georges River and the rail connection from the IMEX terminal (referred to as the northbound rail connection) to the SSFL would be constructed. This would facilitate train movements to and from Port Botany for the IMEX facility.

The proposed northern and southern rail access options both have only one bridge structure, which would allow for both IMEX and interstate train entry and exit to the SSFL. In the case of the northern rail access option, there is a turnout from the bridge structure on the western bank of the Georges River (refer to Figure 7.4 in Chapter 7 – *Project built form and operations*). To avoid the need for bridge works in subsequent Project development phases, both the northern and the southern rail access options would include a bridge structure over the Georges River that could accommodate both IMEX and interstate train entry and exit. For the northern rail access option, the turnout structure for interstate train entry to and exit from the SSFL would also be constructed during Phase A. Details of the construction footprint and proposed construction approach for each of the northern and southern rail access options are provided in section 8.8.

The central rail access option would require two separate bridge structures – one for the northbound rail connection and one for the southbound rail connection. Only the northbound rail connection would be constructed as part of Phase A.

All utilities, including power, gas, water, sewer and stormwater trunks, would ideally be installed during Phase A. These utilities would be capable of supplying both the IMEX and the warehousing precinct at their full capacity; however, during Phase A only connections to the IMEX and the initial warehousing (100,000 sq. m) would be made. Stub connections would be provided for future extensions to additional IMEX and warehousing and the interstate terminal, while avoiding future road openings. Internal roads would be developed as part of Phase A to suit initial IMEX and warehouse operations, while allowing for expansion in subsequent stages.

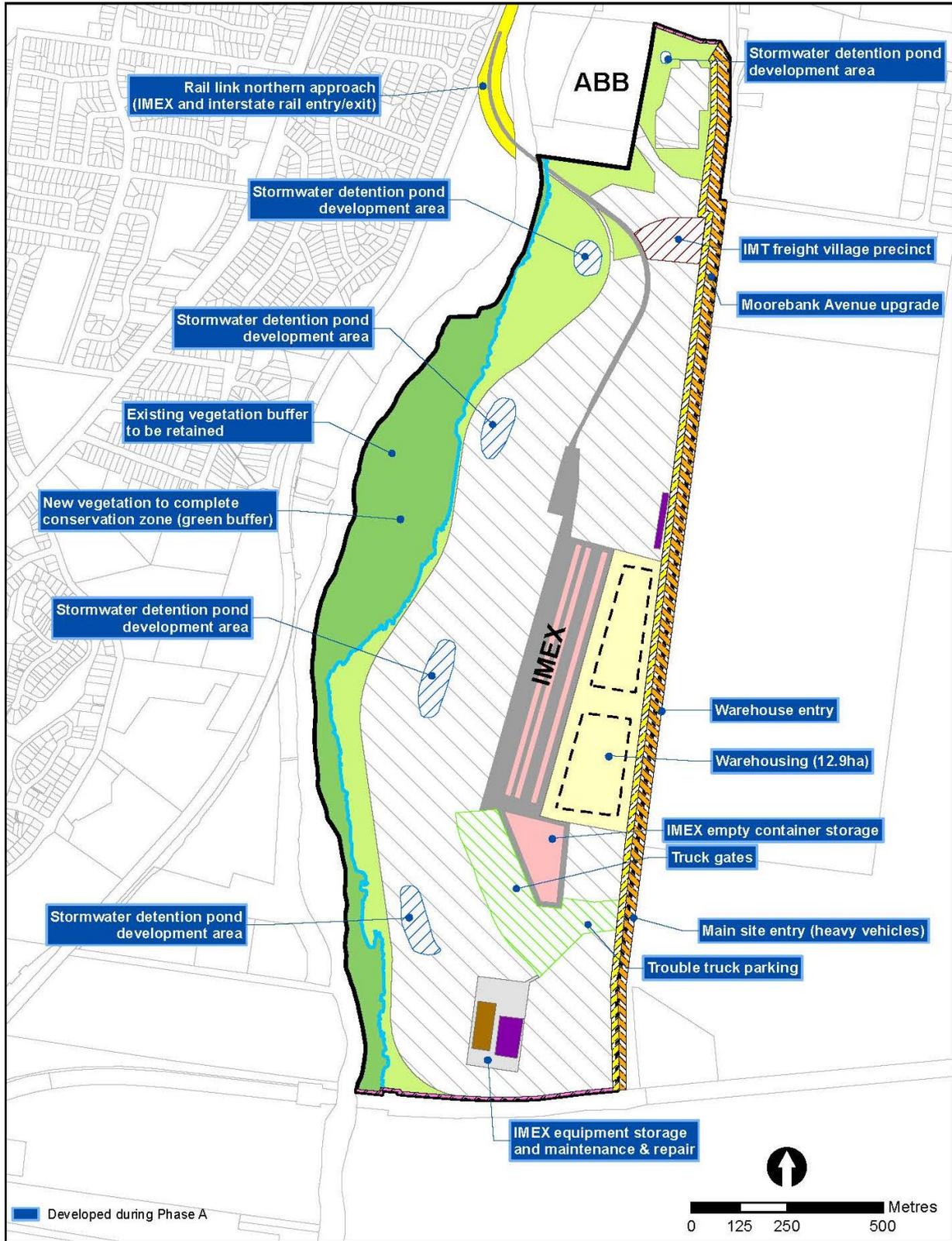
Table 8.3 identifies the key construction elements likely to occur during Phase A. These details are indicative only and would be subject to confirmation during the next stage of approval under the NSW EP&A Act (i.e. Stage 2 SSD approval). Construction would take approximately two years, followed by the start of operation of the initial IMEX terminal facilities and warehousing in 2018.

The construction footprint, access and haulage details for Phase A are described in section 8.8 and illustrated in Figures 8.13 to 8.15.

Table 8.3 Key construction elements during Phase A

Project Stage	Key construction elements
Phase A	<ul style="list-style-type: none"> <li>• Geotechnical works to determine the requirement for piles and other supporting structures for Georges River bridge;</li> <li>• Vegetation clearing within the footprint of construction footprint of Phase A to enable construction works;</li> <li>• Upgrading of Moorebank Avenue, with works north of the main IMT access gate prioritised before major onsite construction commences, and works south of the entrance undertaken progressively (Moorebank Avenue would remain open during the construction and operation period);</li> <li>• Bulk earthworks for the construction footprint of Phase A (initial IMEX);</li> <li>• Construction of IMEX terminal buildings (for a capacity of 500,000 TEU a year) including separate rail maintenance facilities and a terminal operating plant and equipment facility;</li> <li>• Construction of IMEX rail infrastructure (including rail-mounted gantry lines);</li> <li>• Retaining wall construction (where required);</li> <li>• Construction of the rail access and associated bridge structure over Georges River to service the IMEX facility (and in the case of the northern rail access option, a turnout to the interstate section of the bridge);</li> <li>• Construction of initial 100,000 square metres (sq. m) of warehouse buildings, hardstand and car parking;</li> <li>• Installation and commissioning of a utilities duct (for water, gas, electricity and sewerage) and substation for IMEX terminal and initial warehousing precinct, with stub connections provided for future extensions;</li> <li>• Installation of major drainage infrastructure and lighting;</li> <li>• Construction of internal road network and access points;</li> <li>• Construction of hardstand pavements;</li> <li>• Installation of noise attenuation infrastructure;</li> <li>• Landscaping; and</li> <li>• Construction of ancillary services (such as the service centre and truck stop).</li> </ul>

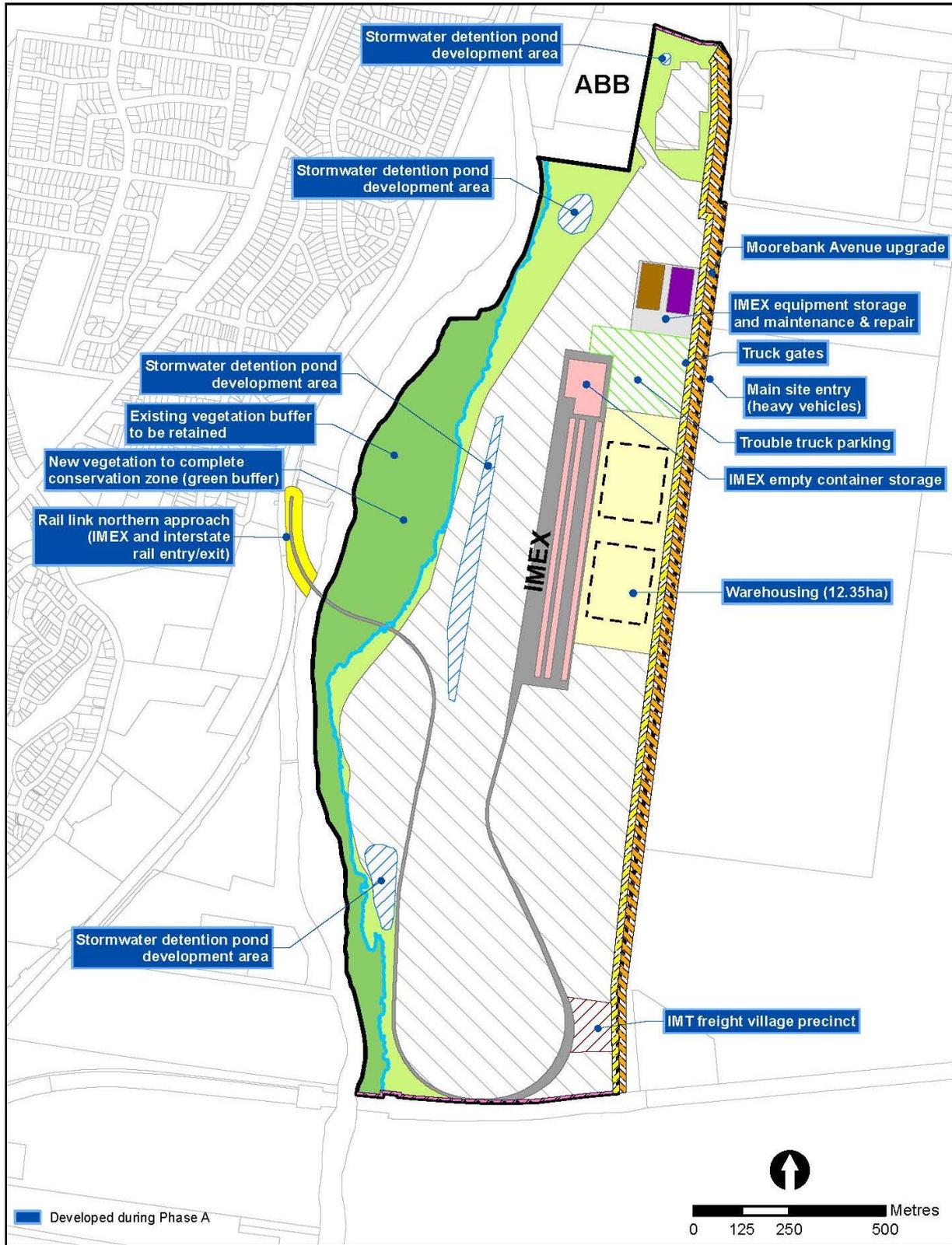
Figure 8.4 to Figure 8.6 show the location of the physical structures and infrastructure on the IMT site at the end of Phase A (at 2018), for each of the IMT layouts and rail access options.



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- |                      |  |  |
|----------------------|--|--|
| 1% AEP flood level   | IMT freight village precinct - IMEX (administration, employee facilities, convenience retail & car parking)* | Area available for potential development |
| Container storage    | IMEX terminal operating area   | Undeveloped area                         |
| Warehouses           | Rail corridor  | 7.5 m side boundary setback              |
| Warehousing precinct | Detention basins   | 18 m Moorebank Avenue setback            |
| Truck access         | Conservation area  | Moorebank Avenue                         |
| Equipment storage    |  | * not open to the general public         |
| Maintenance & repair |  |  |

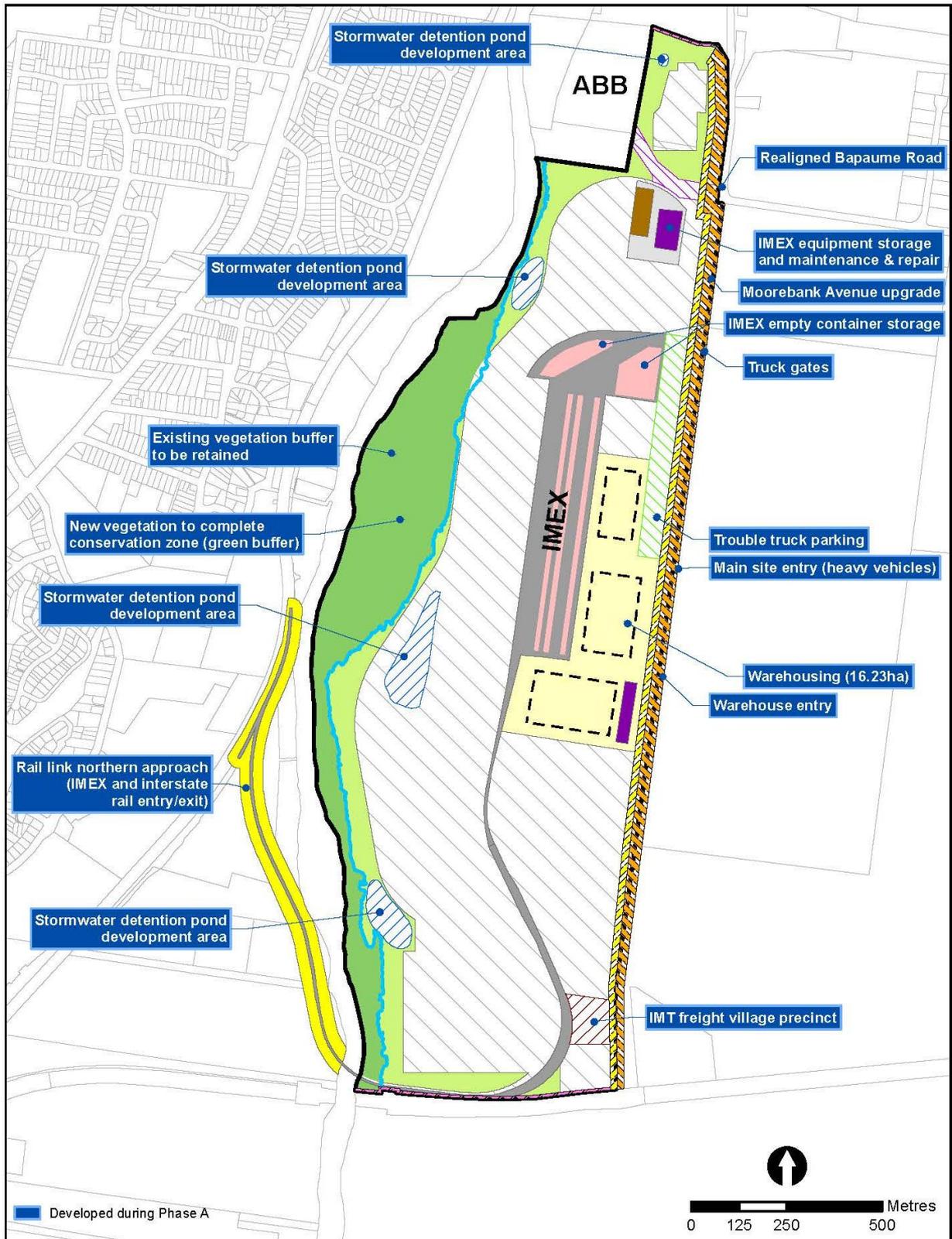
**Figure 8.4 Indicative IMT layout associated with the northern rail access option (at end of Phase A) - 2018**



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**Figure 8.5 Indicative IMT layout associated with the central rail access option (at end of Phase A) - 2018**

- 1% AEP flood level
  - Container storage
  - Warehouses
  - Warehousing precinct
  - Truck access
  - Equipment storage
  - Maintenance & repair
  - IMT freight village precinct - IMEX (administration, employee facilities, convenience retail & car parking)\*
  - IMEX terminal operating area
  - Rail corridor
  - Detention basins
  - Conservation area
  - Area available for potential development
  - Undeveloped Area
  - 7.5 m side boundary setback
  - 18 m Moorebank Avenue setback
  - Moorebank Avenue
- \* not open to the general public



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**Figure 8.6 Indicative IMT layout associated with the southern rail access option (at end of Phase A) - 2018**

- |                      |  |   |
|----------------------|--|---|
| 1% AEP flood level   | Maintenance & repair   | Conservation area                                 |
| Container storage    | IMT freight village precinct - IMEX (administration, employee facilities, convenience retail & car parking)* | Area available for potential development          |
| Warehouses           | IMEX terminal operating area   | Undeveloped area                                  |
| Warehousing precinct | Rail corridor  | 7.5 m side boundary setback                       |
| Truck access         | Detention basins   | 18 m Moorebank Avenue setback                     |
| Bapaume Road         |  | Moorebank Avenue * not open to the general public |
| Equipment storage    |  |   |

## 8.5 Phase B – Operation of initial IMEX terminal and warehousing, construction of additional IMEX and warehousing capacity (2018–2025)

### 8.5.1 Operation

The initial IMEX terminal facility (with a capacity of 500,000 TEU a year) and the initial warehousing precinct of 100,000 sq. m are expected to commence operation in 2018 and would be operational throughout Phase B, along with supporting infrastructure and ancillary services including the IMEX terminal administration, equipment repair and maintenance facilities and the main IMT access gate. The utilities and services installed as part of Phase A (power, water, gas, fire mains, stormwater, lighting and sewerage) would also come online during this phase to service the IMEX and the warehousing precinct.

The throughput capacity of the initial IMEX terminal (at 500,000 TEU a year) would equate to approximately 69 trains (or 137 train movements a week) at the facility. Up to five IMEX trains could be processed concurrently at the IMT.

The IMEX terminal, trains and warehouse precinct would operate 24 hours a day, 7 days a week. However, heavy vehicles would only access the IMEX and warehouse precinct for 16 hours a day, 5.5 days per week.

At 500,000 TEU a year capacity the IMEX terminal would provide 17.5 full-time equivalent (FTE) administration positions, 52 FTE operational positions (per shift with three shifts per day) and 4.5 FTE maintenance positions (per shift with three shifts per day). This equates to approximately 187 FTE operational staff on site each day associated with the IMEX terminal.

For the warehousing precinct at 100,000 sq. m, there would be 7.5 FTE administration positions, 82.5 FTE operational positions (per shift with three shifts per day) and 82.5 FTE maintenance positions (per shift with three shifts per day). This equates to approximately 503 FTE operational staff on site per day associated with the warehousing precinct during Phase B.

Vehicles would access the IMEX and warehouse precinct from Moorebank Avenue, with separate accesses provided for heavy and light vehicles. Internal roads on the IMT site would also be segregated for heavy and light vehicles. Further details on the access arrangements and internal road layout are provided in section 7.9 in Chapter 7 – *Built form and operations*.

The traffic impacts during Phase B are discussed in Chapter 11 – *Traffic, transport and access*.

### 8.5.2 Construction activities

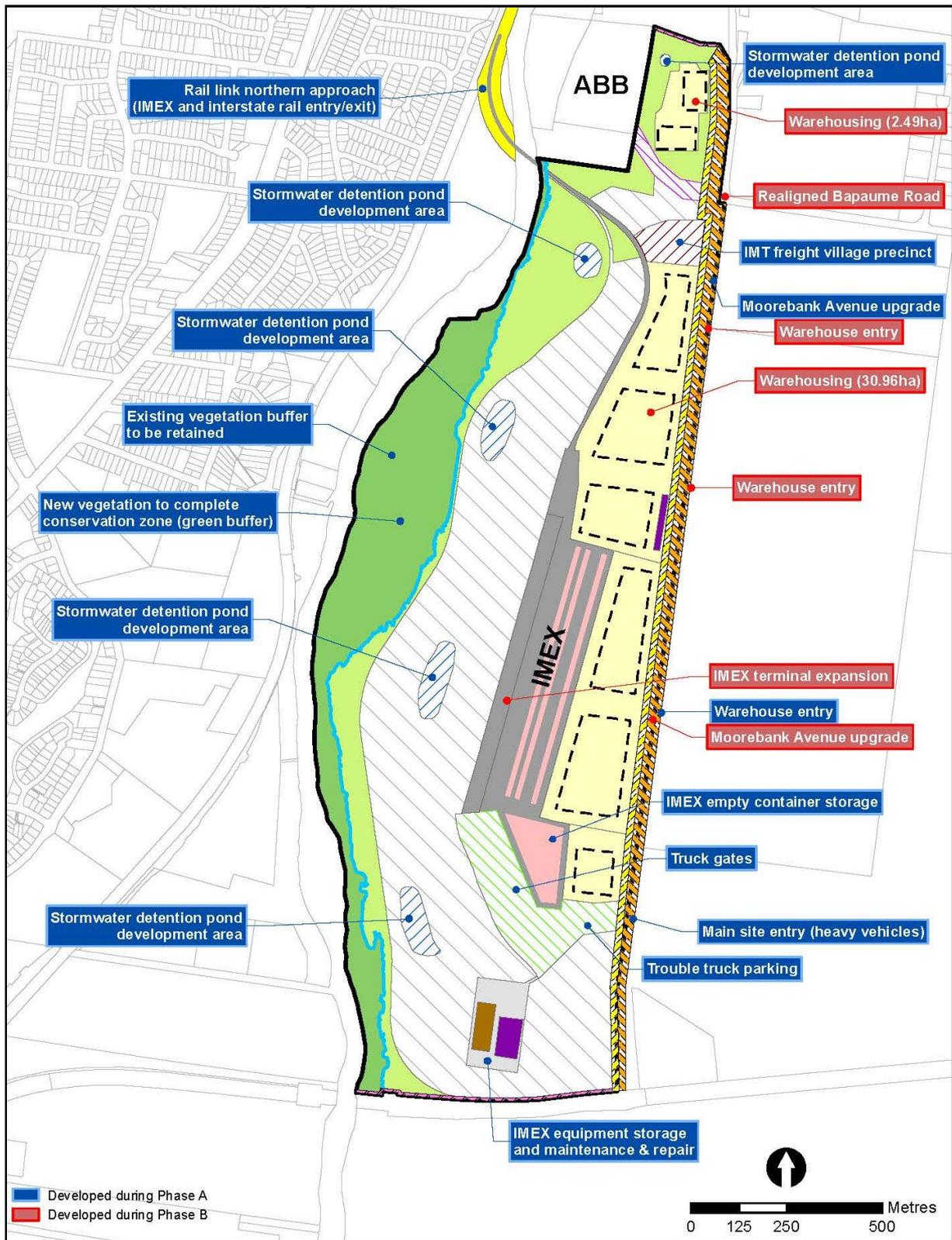
Construction activities to provide additional IMEX and warehousing capacity during Phase B are assumed to occur from 2023 to 2025. Table 8.4 identifies the likely construction elements during Phase B. These indicative elements would be confirmed during the Stage 2 SSD development approval.

The construction footprint, access and haulage details for Phase B are described in section 8.8 and illustrated in Figure 8.12 to Figure 8.14.

Table 8.4 Key construction elements during Phase B

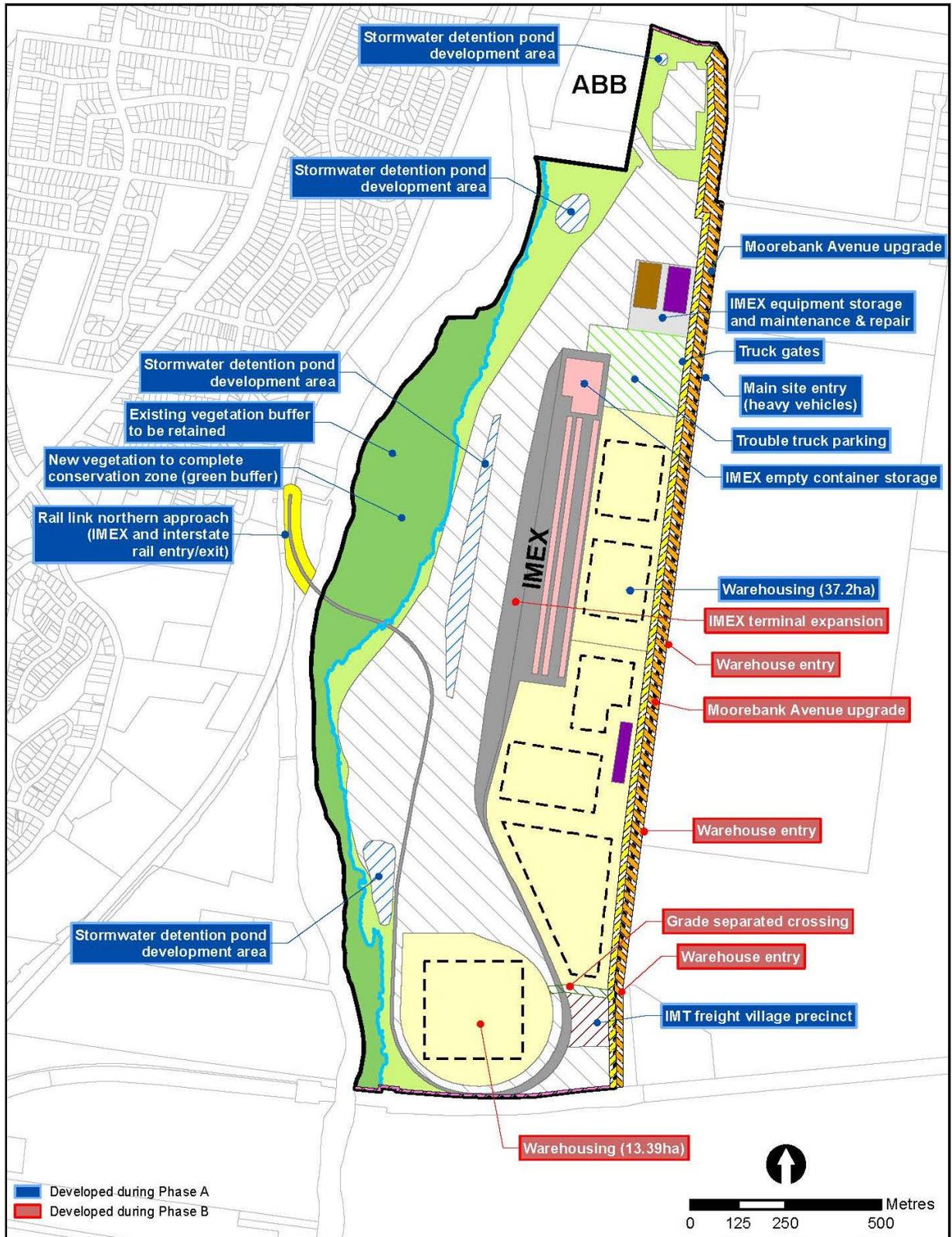
Project Stage	Key construction elements
Phase B	<ul style="list-style-type: none"> <li>• Vegetation removal, site preparation and bulk earthworks for footprint for Phase B;</li> <li>• Construction of IMEX terminal buildings and facilities for an additional 500,000 TEU a year capacity (providing for a total capacity of 1.05 million TEU a year);</li> <li>• Construction of additional 150,000 sq. m of warehousing buildings, hardstand areas and car parking;</li> <li>• Utility connections (to connect to major utilities installed during Phase A);</li> <li>• Internal road works, connecting to internal roads constructed as part of Phase A;</li> <li>• Lighting; and</li> <li>• Landscaping.</li> </ul>

Figure 8.7 to Figure 8.9 show the physical structures and infrastructure on the IMT site at the end of Phase B (at 2025).



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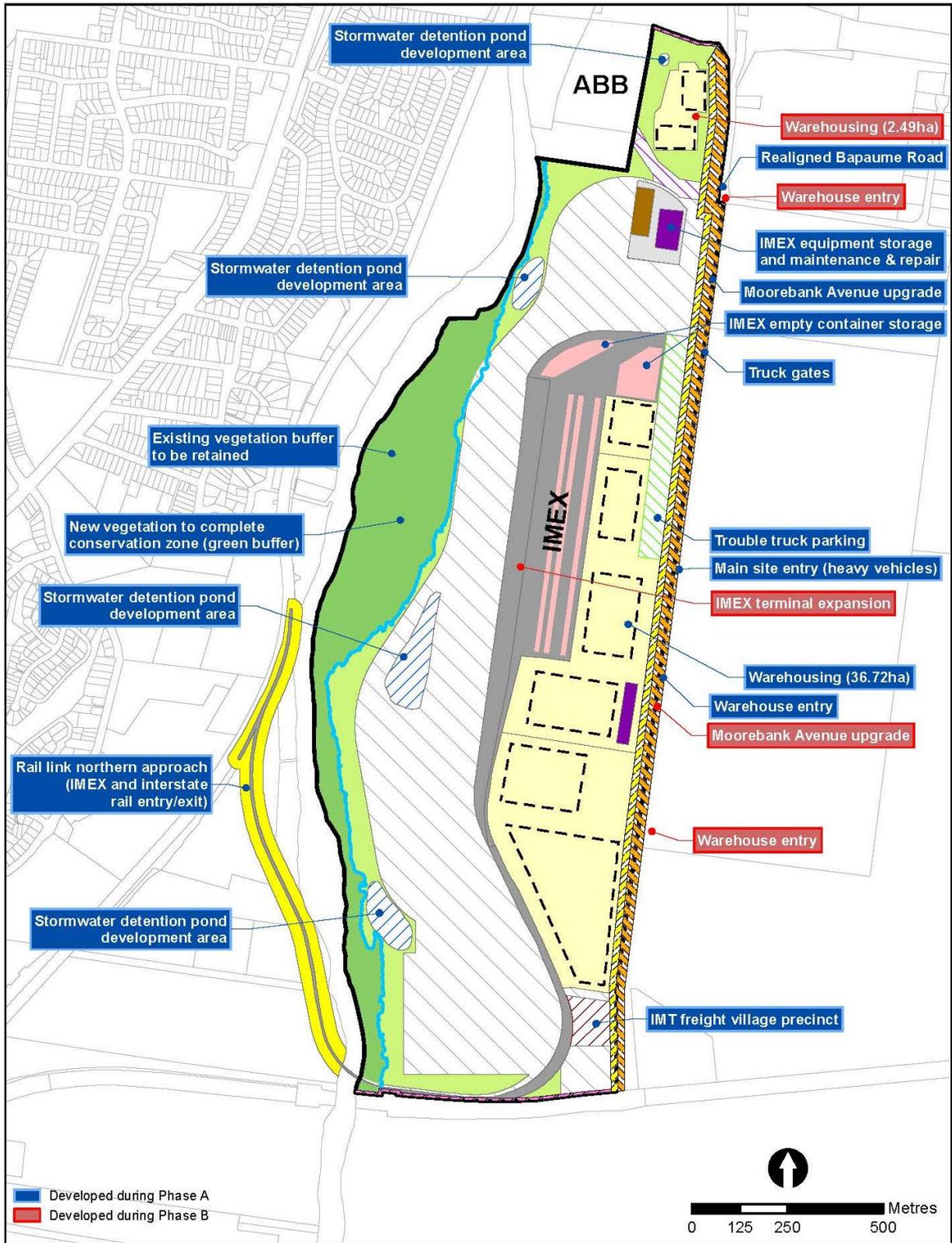
**Figure 8.7 Indicative IMT layout associated with the northern rail access option (at end of Phase B) - 2025**



- 1% AEP flood level
- Container storage
- Warehouses
- Warehousing precinct
- Truck access
- Road bridge
- Equipment storage
- Maintenance & repair
- IMT freight village precinct - IMEX (administration, employee facilities, convenience retail & car parking)\*
- IMEX terminal operating area
- Rail corridor
- Detention basins
- Conservation area
- Area available for potential development
- Undeveloped area
- 7.5 m side boundary setback
- 18 m Moorebank Avenue setback
- Moorebank Avenue
- \* not open to the general public

**Figure 8.8** Indicative IMT layout associated with the central rail access option (at end of Phase B) - 2025

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- |                      |   |  |
|----------------------|---|--|
| 1% AEP flood level   | Maintenance & repair  | Conservation area                        |
| Container storage    | IMT freight village precinct  | Area available for potential development |
| Warehouses           | - IMEX (administration, employee facilities, convenience retail & car parking)* | Undeveloped area                         |
| Warehousing precinct | IMEX terminal operating area  | 7.5 m side boundary setback              |
| Truck access         | Rail corridor   | 18 m Moorebank Avenue setback            |
| Bapaume Road         | Detention basins  | Moorebank Avenue                         |
| Equipment storage    |   | * not open to the general public         |

**Figure 8.9 Indicative IMT layout associated with the southern rail access option (at end of Phase B) - 2025**

## 8.6 Phase C – Operation of IMEX terminal and warehousing, construction of interstate terminal and additional warehousing (2025–2030)

### 8.6.1 Operation

By 2025 it is likely that the IMEX terminal would be operating at full capacity and there would be approximately 250,000 sq. m of warehousing. The IMEX terminal would provide for approximately 137 trains (273 train movements per week) at the facility. Between 2025 and 2030 the IMEX terminal and trains 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 per week.

During Phase C the IMEX terminal would provide 35 FTE administration positions, 104 FTE operational positions (per shift with three shifts per day) and 9 FTE maintenance positions (per shift with three shifts per day). This equates to approximately 374 FTE operational staff on site per day associated with the IMEX terminal.

The warehousing precinct would provide 18.5 FTE administration positions, 206.5 FTE operational positions (per shift with three shifts per day) and 206.5 FTE maintenance positions (per shift with three shifts per day). This equates to approximately 1,258 FTE operational staff on site per day associated with the warehousing precinct.

Details of IMEX throughput capacity, arrivals and departures, and container handling and storage are provided in Chapter 7 – *Project built form and operations*.

The traffic impacts during Phase C are discussed in Chapter 11 – *Traffic, transport and access*.

### 8.6.2 Construction activities

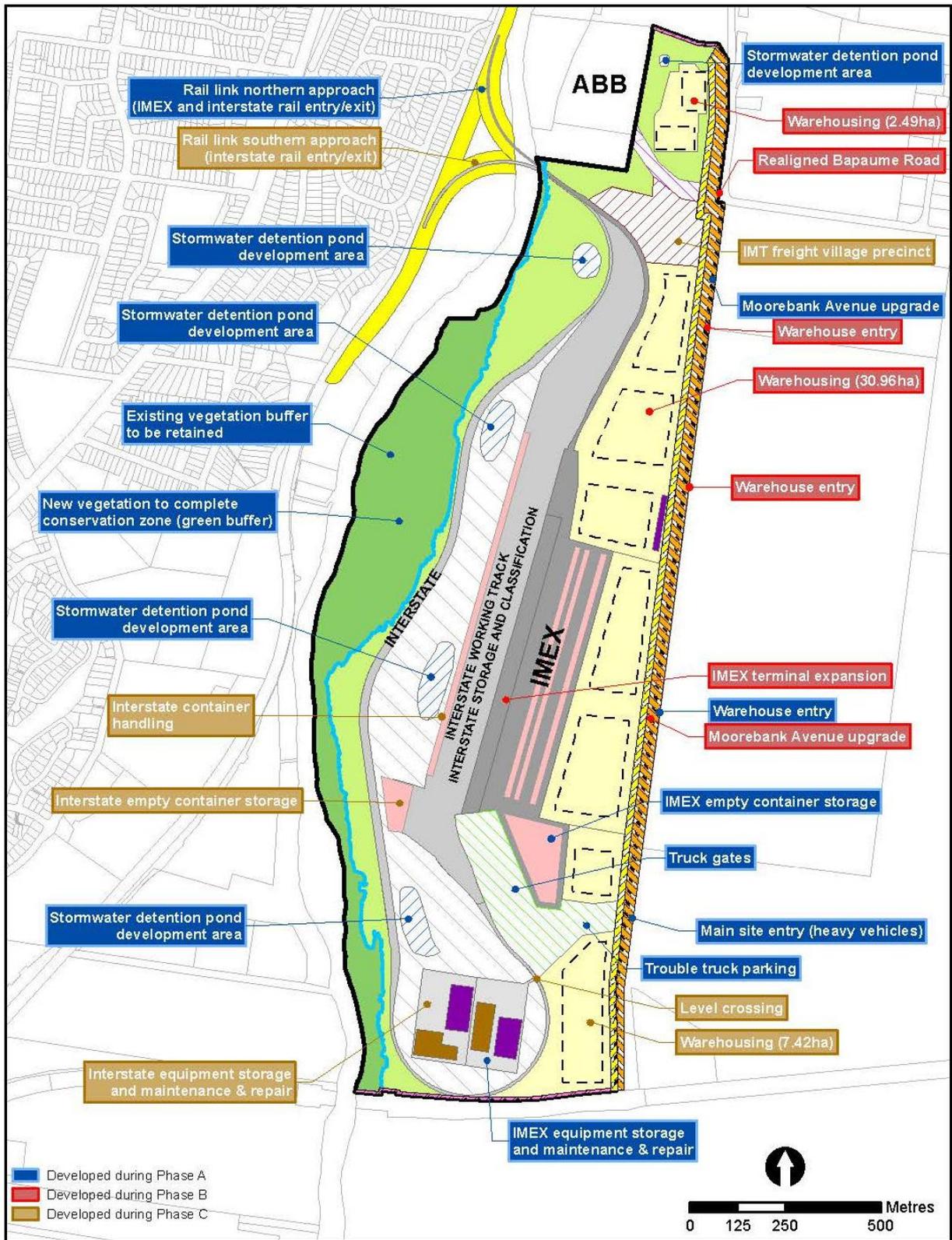
Phase C includes construction of the interstate terminal and associated works for a maximum capacity of 500,000 TEU a year, as well as construction of an additional 50,000 sq. m of warehousing. Construction works are assumed to occur between 2028 and 2030. Table 8.5 identifies the likely key construction elements during Phase C. These are indicative only and would be subject to the next stage of approval (i.e. Stage 2 SSD development approval).

The construction footprint, access and haulage details for Phase C are described in section 8.8 and illustrated in Figure 8.13 to Figure 8.15.

Table 8.5 Key construction elements during Phase C

Project Stage	Key construction elements
Phase C	<ul style="list-style-type: none"> <li>• Vegetation clearing within the construction footprint for Phase C;</li> <li>• Site preparation, including bulk earthworks and remediation of Phase C area;</li> <li>• Geotechnical works for the development of the interstate terminal area;</li> <li>• Construction of the southbound rail connection for service the interstate terminal (in the case of the central rail access option, this involves the construction of a new bridge structure over Georges River);</li> <li>• Utility connections and additional minor drainage works to connection to major utilities and drainage installed during Phase A and Phase B;</li> <li>• Construction of rail infrastructure for interstate terminal, including rail-mounted gantry lines;</li> <li>• Construction of interstate terminal buildings and associated facilities including maintenance facility, administration, car parking and fuel storage;</li> <li>• Construction of additional 50,000 sq. m of warehousing buildings, hardstand areas and car parking;</li> <li>• Construction of internal roads;</li> <li>• Construction of pavements;</li> <li>• Construction of retaining walls;</li> <li>• Installation of noise attenuation infrastructure;</li> <li>• Landscaping; and</li> <li>• Lighting.</li> </ul>

Figure 8.10 to Figure 8.12 show the physical structures and infrastructure on the IMT site at the end of Phase C (at 2030), for each of the three IMT layouts.



- |                      |   |  |
|----------------------|---|--|
| 1% AEP flood level   | IMT freight village precinct - IMEX and interstate (administration, employee facilities, convenience retail & car parking)* | Conservation area                        |
| Container storage    | IMEX terminal operating area  | Area available for potential development |
| Warehouses           | Interstate terminal operating area  | Undeveloped area                         |
| Warehousing precinct | Rail corridor   | 7.5 m side boundary setback              |
| Truck access         | Detention basins  | 18 m Moorebank Avenue setback            |
| Bapaume Road         |   | Moorebank Avenue                         |
| Equipment storage    |   | * not open to the general public         |
| Maintenance & repair |   |  |

Figure 8.10 Indicative IMT layout associated with the northern rail access option (at end of Phase C) - 2030

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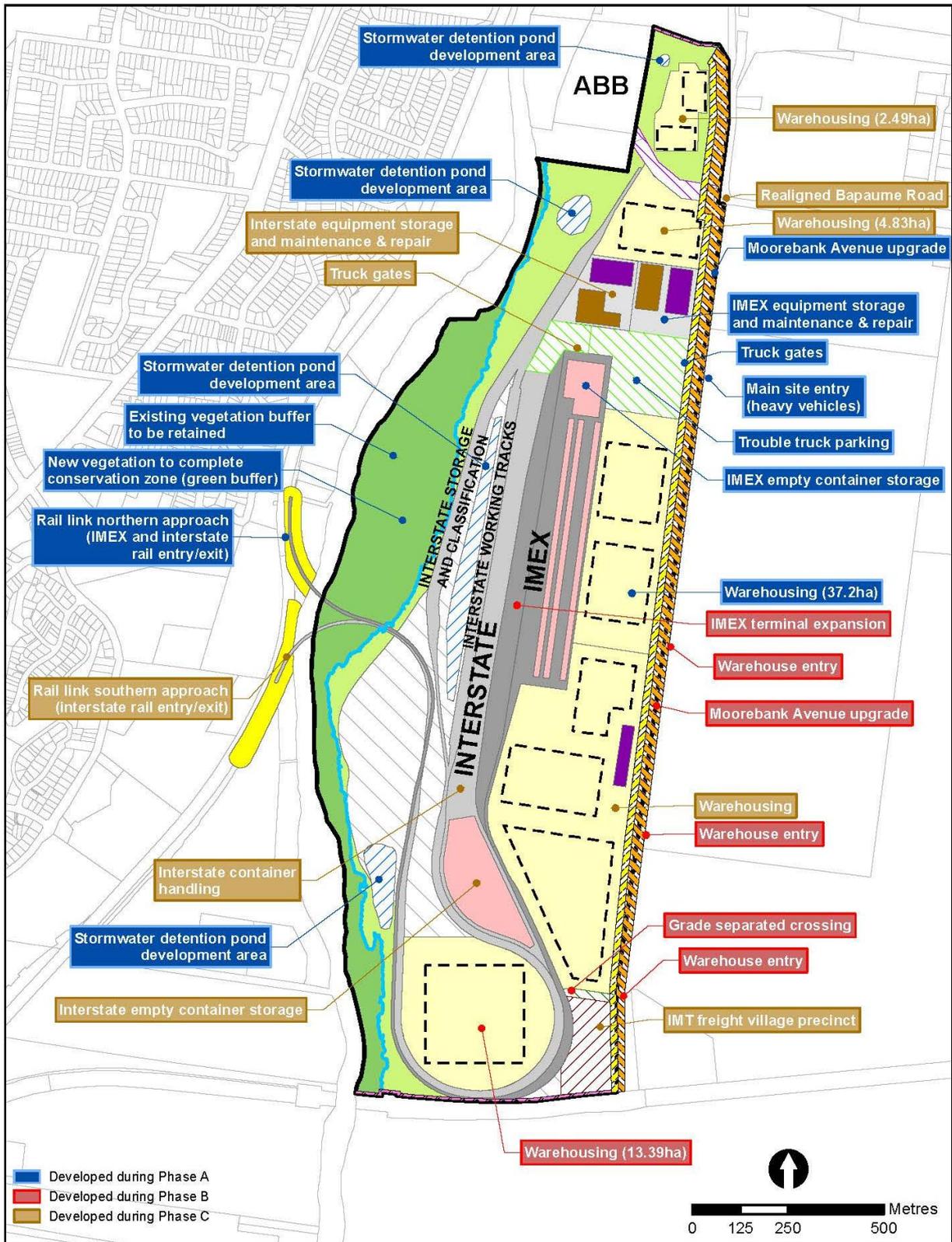
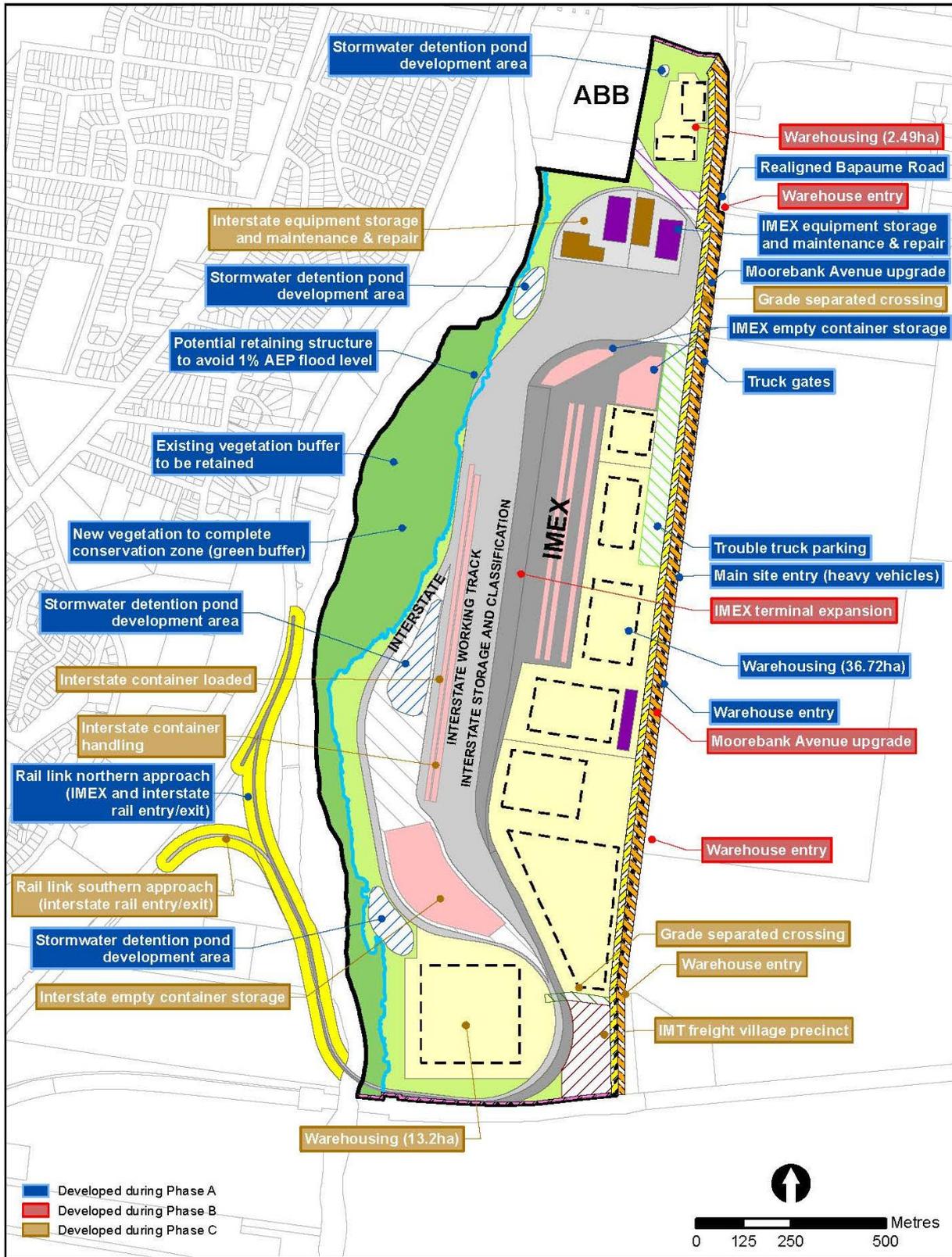


Figure 8.11 Indicative IMT layout associated with the central rail access option (at end of Phase C) - 2030

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**Figure 8.12 Indicative IMT layout associated with the southern rail access option (at end of Phase C) - 2030**

## 8.7 Full Build – Operation of IMEX terminal, warehousing and interstate terminal (2030 onwards)

### 8.7.1 Operation

By 2030 it is expected that the Moorebank IMT would reach capacity, and as such the Full Build scenario is intended to represent the developed terminal as it would operate on an ongoing basis. There would therefore be no further construction activity on the Project site. Full Build would include the IMEX terminal operating at 1.05 million TEU a year, 300,000 sq. m of warehousing and 500,000 TEU a year of interstate capacity. Detailed information on the operation of the IMEX and warehousing precinct at Full Build, including throughput capacity, arrivals and departures, container handling and storage and vehicle access is provided in Chapter 7 – *Project built form and operations*.

The IMEX facility at Full Build would accommodate approximately 137 trains (or 273 train movements) a week. This would equate to approximately 525,000 TEU inbound and 525,000 TEU outbound a year. The IMEX facility provide for 35 administrative staff, as well as 104 operational and 9 maintenance staff per shift (with three shifts per day). This equals a total of approximately 374 onsite operational staff.

The interstate terminal operating at Full Build (up to 500,000 TEU a year) would equate to approximately 12 interstate trains (or 24 train movements) a week. Depending on timing of demand for interstate freight, up to four interstate trains could be processed concurrently on site.

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

At Full Build the warehousing precinct would accommodate 22 FTE administration positions, 248 FTE operational positions (per shift with three shifts per day) and 248 FTE maintenance positions (per shift with three shifts per day). This equates to approximately 1,509 FTE operational staff on site per day associated with the warehousing precinct.

Details of the throughput capacity and staff numbers for the IMEX facility are provided in section 8.6.1.

The IMEX and interstate terminal and trains would operate 24 hours a day, 7 days a week. Heavy vehicles would also access the warehouse precinct 24 hours a day, 7 days a week.

The Full Build project development represents the proposal for which MIC is seeking approval under the Stage 1 SSD approval. Figure 7.4 to Figure 4.6 in Chapter 7 – *Project built form and operations* show the Full Build of the Project.

## 8.8 Key construction details

### 8.8.1 Project construction footprint

The construction footprint represents the area within which construction activities would occur. For the purposes of assessment, the construction footprint for each development phase has been assumed to be entirely cleared of vegetation, ready for the construction of buildings, hard surfaces and infrastructure.

Construction of the Project would occur progressively through defined phases, as outlined in the previous sections of this chapter. This approach avoids the need to remove vegetation and expose areas of the Project site long before development begins. The construction footprint during each Project development phase, for each of the three IMT layouts and associated rail access options, is shown in Figure 8.13 to Figure 8.15. The construction footprint for the Early Works development phase has been provided separately in Figure 8.3.

Construction related activities (including stockpiles and equipment storage compounds) would be contained within the construction footprint (refer also to section 8.8.3). The construction footprint includes:

- the entire Project site for the development of the IMT, except for:
  - > most of the conservation zone;
  - > some additional areas within which vegetation would be retained (as shown in Figure 8.13 to Figure 8.15);
- a section of the Georges River (including the river and the river banks) for construction of the rail bridge and for construction access (note that this varies between the three rail access options, as shown in Figure 8.13 to Figure 8.15 and further described in section 8.8.2 below);
- areas to accommodate drainage channels across the conservation area between the IMT and the Georges River;
- Moorebank Avenue for the upgrade to four lanes; and
- Bapaume Road for reconstruction works.

Construction related activities would generally be confined to the construction/development footprint. Construction activities that could occur outside the construction footprint include:

- establishment of the conservation zone, which would occur during the Early Works development phase; and
- landscaping.

### 8.8.2 Rail access construction footprint

In relation to rail access from the SSFL to the IMT site, the construction footprint extends into land on the western bank of the Georges River for all three rail access options. The extent of the construction footprint is as follows:

- Under the northern rail access option, the construction footprint includes land currently owned by Liverpool City Council (LCC), known as the 'Northern Powerhouse Land'. A corridor approximately 60 m wide (30 m either side of the rail corridor) would be provided for the construction of the rail link under this option. In addition, it is likely that the Project contractors would occupy an area of land directly south of the rail link, on the Northern Powerhouse Land, for the purposes of operation and storage of machinery and equipment. This is shown in Figure 8.13. The construction footprint also extends into Sydney Trains (formerly RailCorp) and NSW Roads and Maritime Services (RMS) land to tie-in to the existing SSFL.

- Under the central rail access option, the construction footprint extends on to Commonwealth land on the western bank of the Georges River and a 60 m wide corridor has been provided for construction, as shown in Figure 8.14. The construction footprint also extends into 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-in.
- Under the southern rail access option, the construction footprint extends into land within the Glenfield Landfill site (owned by Glenfield Waste Services). A 60 m wide corridor has been provided, as shown in Figure 8.15. Construction works would also extend into Commonwealth land (Lot 4 DP 1130937) (the 'hourglass land') and also Sydney Trains land for tie-in to the SSFL. Contractors are likely to occupy land on the Glenfield Landfill site within the area referred to as the 'potential laydown area', shown in Figure 8.15.

In terms of the construction methodology, all three rail access options would require access for labour, plant and materials predominantly from the IMT site on the eastern bank of the Georges River. However, some construction would also be undertaken on the western bank including the tie-ins to the existing SSFL.

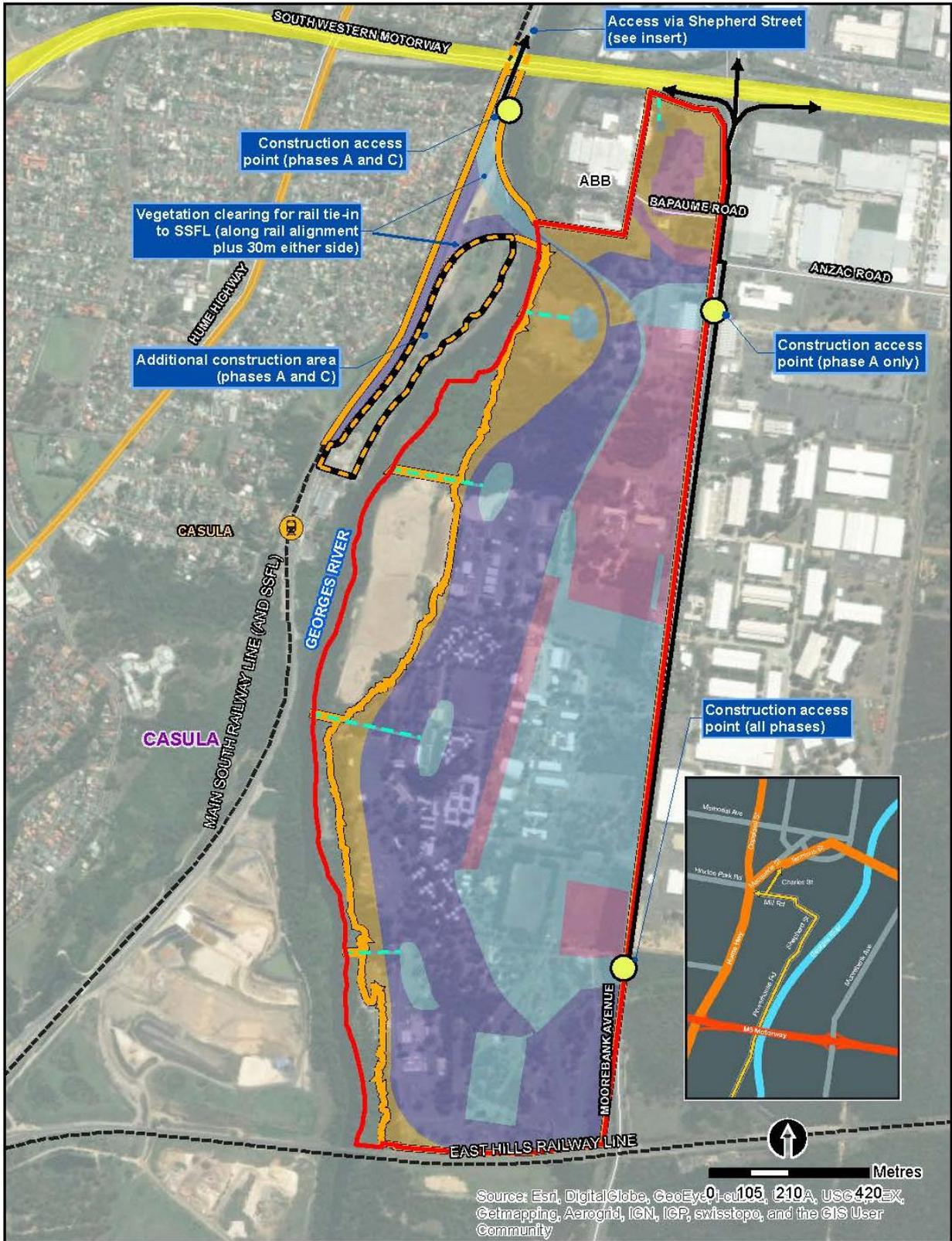
For the northern rail access option, it is anticipated that approximately 60% of the rail bridge and approach viaduct structures (including the piles, piers and deck) would be constructed from the eastern bank (from the IMT site), while the remaining 40% would be constructed from the western bank. Based on the indicative plans it is expected that construction for the northern rail access option would take approximately 18 months; however, this timing would be confirmed during Stage 2 SSD.

For the central rail access option, it is anticipated that approximately 75% of the rail bridge and approach viaduct structures would utilise access from the eastern bank (IMT site) and 25% from the western bank, on the 'hourglass' land (shown in Figure 2.3). This construction estimate is indicative only and would be subject to further refinements during the detailed design phase and Stage 2 SSD approval process.

For the southern rail access option, it is anticipated that approximately 90% of the rail bridge and approach viaduct structures would utilise access from the eastern bank (IMT site) and 10% from the western bank, on the Glenfield Landfill site. Again, this would be subject to detailed design and further refinement during the Stage 2 SSD approvals.

For both the central and the southern rail access options, the construction period is estimated at 24 months, based on the indicative site layouts. Again, the timing would be confirmed during Stage 2 SSD.

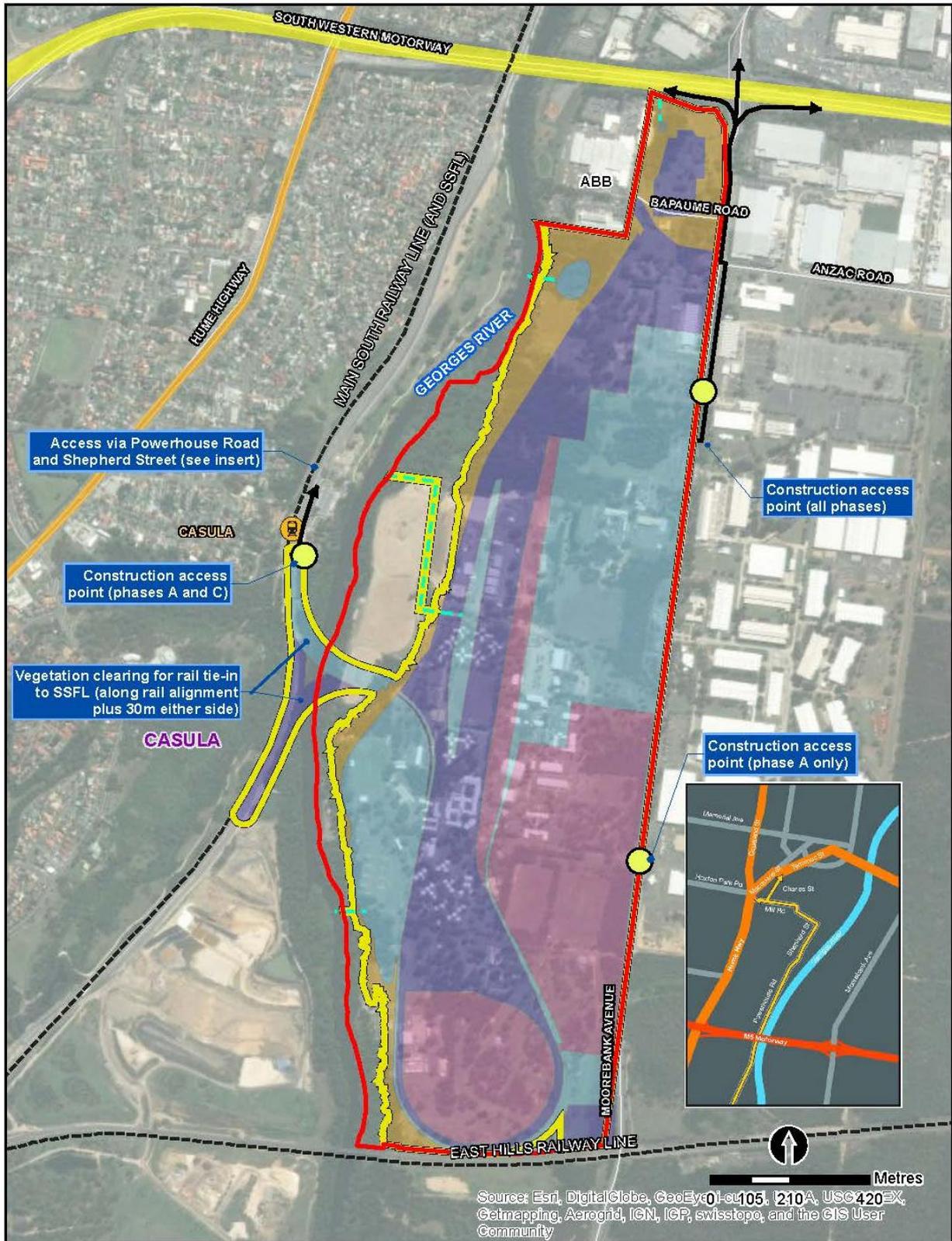
In addition, both the northern and the central rail access options would require the partial realignment of Powerhouse Road, to provide for the tie-in of the rail link to the SSFL. However, it is not likely that an extended closure of Powerhouse Road would be required.



- Rail line & station
  - Northern rail access option construction area
  - Northern rail access option additional construction area for access, laydown, stockpiling and parking. Area excludes Georges River Riparian Forest (on riverbank). Vegetation within remainder of this area retained where possible.
- | Construction Footprint |  |
|------------------------|--|
|                        | Phase A                                  |
|                        | Phase B                                  |
|                        | Phase C                                  |
|                        | Area available for potential development |
- Likely construction access
  - Haulage route
  - Basin outlet open channels
  - IMT site boundary

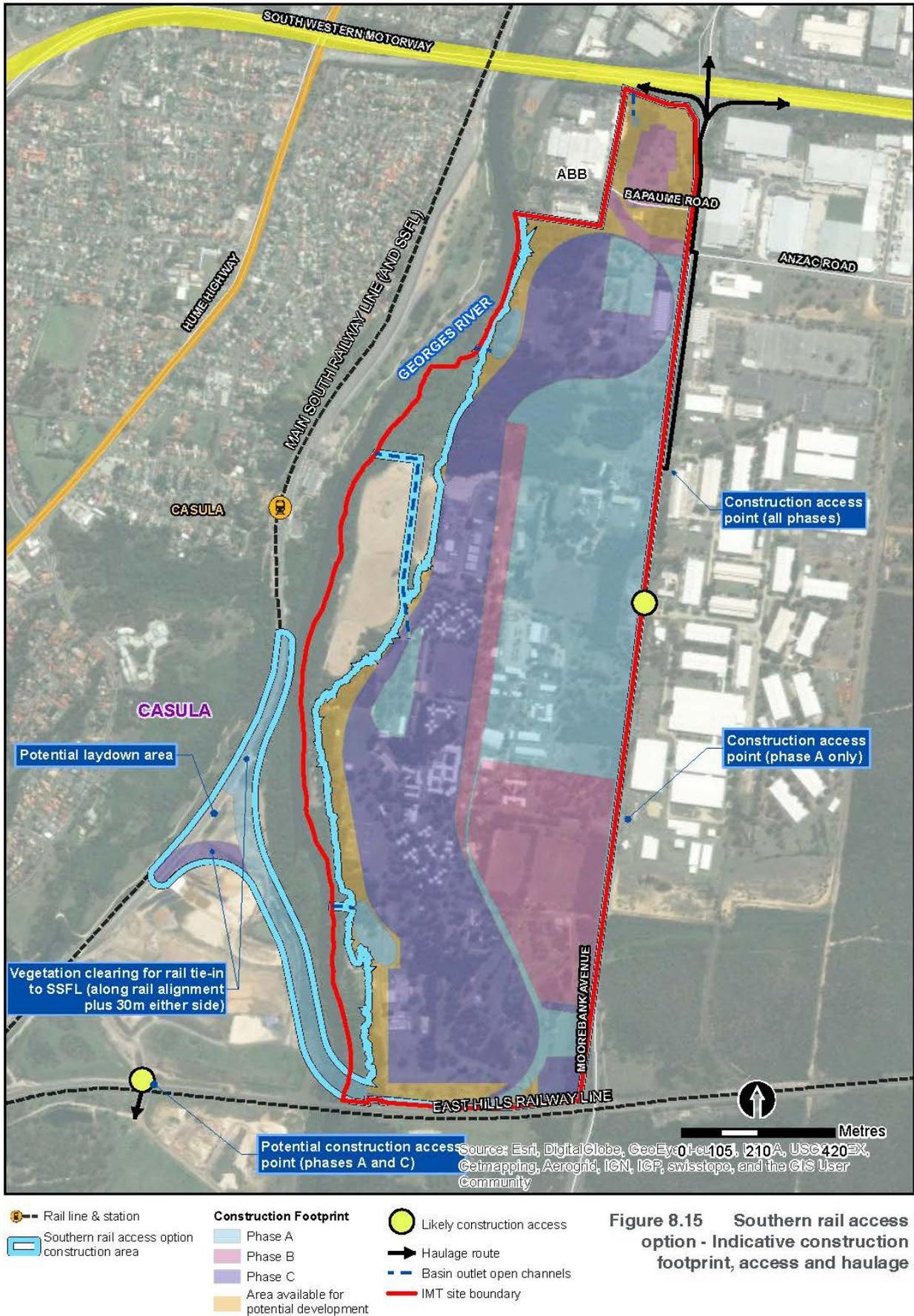
**Figure 8.13 Northern rail access option - Indicative construction footprint, access and haulage**

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- Rail line & station
- Central rail access option construction area
- Construction Footprint**
  - Phase A
  - Phase B
  - Phase C
  - Area available for potential development
- Likely construction access
- Haulage route
- Basin outlet open channels
- IMT site boundary

**Figure 8.14 Central rail access option - Indicative construction footprint, access and haulage**



### 8.8.3 Earthworks

The existing Project site has a very flat gradient (0.1%) from north to south and is tiered from west to east between the main portion of the Project site and the area adjacent to the Georges River.

The indicative design has sought to establish a level across the Project site and a minimal north-south gradient that is suitable for the efficient operation of rail infrastructure and rail-mounted gantries, which have specific requirements related to changes in surface level.

The indicative design has also focused on optimising a cut and fill balance across the IMT site to minimise the requirement for fill to be imported or excess spoil to be exported. The design has also attempted to minimise elevation of the Project site from its current natural surface level as much as practicable, in order to minimise costs and visual impacts and also to avoiding flooding of surrounding areas. There would be no change to the levels or elevation of the proposed conservation area.

The earthworks would be staged and the Project site would be progressively cleared in line with the Project development phasing. Table 8.6 shows indicative preliminary bulk earthworks estimates for the Project. It should be noted that, for some known areas of soil contamination, remediation activities would be undertaken during the Early Works phase before these bulk earthworks occur, as detailed in section 8.3 and Chapter 15 – *Contamination and soils*, and in accordance with the RAP. The volumes of materials and soils associated with the Early Works developed phase are provided in section 8.3.8 above.

Table 8.6 Bulk earthworks estimates

Item (at 30% bulking and settlement)	Phase A	Phase B	Phase C	Total
<b>Northern rail access option</b>				
Total excavated cut (m <sup>3</sup> )	682,670	434,430	434,430	1,551,530
Total fill required (m <sup>3</sup> )	346,350	206,090	313,670	866,110
Excavated material for disposal (unsuitable for use onsite) (m <sup>3</sup> ) <sup>1</sup>	518,690	330,080	330,080	1,178,850
Import required (m <sup>3</sup> ) (fill required – acceptable material)	N/A	N/A	53,040	53,040
<b>Central rail access option</b>				
Total excavated cut (m <sup>3</sup> )	819,350	449,940	403,400	1,672,690
Total fill required (m <sup>3</sup> )	393,350	213,450	432,480	1,039,280
Excavated material for disposal (unsuitable for use onsite) <sup>1</sup>	578,950	341,870	306,500	1,227,320
Import required (m <sup>3</sup> ) (fill required – acceptable material)	N/A	N/A	190,440	190,440
<b>Southern rail access option</b>				
Total excavated cut (m <sup>3</sup> )	640,840	480,980	434,430	1,556,250
Total fill required (m <sup>3</sup> )	367,740	228,170	369,100	965,010
Excavated material for disposal (unsuitable for use onsite) <sup>1</sup>	485,210	365,440	330,080	1,180,730
Import required (m <sup>3</sup> ) (fill required – acceptable material)	N/A	N/A	108,440	108,440

Notes: 1 – This includes excavated material not suitable for use on site as well as topsoil.

#### 8.8.4 Compounds, storage and stockpile areas

The Project contractor would use construction compounds on the Project site to undertake various preparatory activities and to store materials for use in finished structures. Some of the principal activities that would occur in the construction compounds include:

- office and administrative functions;
- parking for staff and construction vehicles;
- staff facilities;
- workshops and maintenance areas; and
- material and equipment storage and stockpiles.

The location and number of construction compounds would be determined by the Project contractor. In addition, construction compounds are likely to be required on the western side of the Georges River for construction of the selected rail access option. The likely locations of the construction compounds under each of the rail access options are discussed in section 8.8.2 above.

Several additional temporary stockpile sites would be required for the Project to store, prepare and distribute materials. Construction compounds and stockpiles would be located within the confines of the construction footprint (refer to Figure 8.13 to Figure 8.15) in areas that meet the following environmental criteria:

- located more than 40 m from waterways, where practicable;
- located in areas of low ecological and heritage conservation value;
- no significant clearing of native vegetation beyond that already required for the Project;
- minimise impacts on amenity of the closest sensitive receiver; and
- located on relatively level ground.

#### 8.8.5 Construction working hours

The Project would be constructed during the standard construction hours detailed in Table 8.7.

Table 8.7 Standard construction working hours

Day	Working hours
Monday to Friday	7.00 am to 6.00 pm
Saturday	8.00 am to 1.00 pm
Sundays and Public Holidays	No work

Some construction activities may be required to occur outside these hours, to minimise potential impacts on the surrounding community. Generally, works undertaken on public infrastructure, such as roads, rail, water, electricity, gas, sewage or drainage, need to be undertaken outside standard construction hours to maintain the operational integrity of the infrastructure. Potentially affected residents and relevant authorities would be notified in advance of the works intended to be performed outside standard hours.

Exemptions and approval for works outside standard hours may be required during the following circumstances:

- when works are required by utility service providers or where impacts on services cannot be reasonably managed within standard hours;
- where works require track possessions for the tie-in to the SSFL (that is, temporary rail line closures); and
- when making and unloading oversized deliveries using machinery that can only travel between certain hours (as specified by the NSW Police or RMS).

As recommended in Chapter 12 – *Noise and vibration*, other exemptions (subject to approval) may include works that are not audible at the nearest receivers or works required to maintain health and safety, avoid loss of life or injury and/or to prevent environmental damage.

### 8.8.6 Construction workforce

The construction workforce would vary depending on the phase of construction and associated activities. It is anticipated that numbers of construction workers and staff would peak at an estimated 1,236 during Phase B (as detailed in Table 8.8 below).

Table 8.8 Indicative daily construction workforce

Project Stage	Typical daily workforce (FTE)	Peak daily workforce (FTE)
Early Works	150	300
Phase A	662	1,146
Phase B	435	1,236
Phase C	275	474

### 8.8.7 Resource consumption

Chapter 26 – *Waste and resource management* details the expected resource use during construction of the Project. The Project construction would require the use of resources such as fill, electricity, water, fuel, concrete and paving materials (such as asphalt). Other resources required for tracks, signals and the construction of terminal buildings would be determined during the detailed design phase. While the construction of the Project would increase demand on local and regional resources, it is unlikely that the development of the Project alone would result in any resource becoming scarce or in short supply.

### 8.8.8 Construction traffic and access

Construction traffic volumes entering and exiting the Project site would vary over the duration of the Project construction. Indicative volumes are presented in Table 8.9 below for the Project phases involving construction (i.e. Early Works, Phase A, Phase B and Phase C). The estimates are based on the bulk earthworks and materials estimates detailed above.

Construction vehicle traffic is expected to be greatest during the main earthworks and civil construction (Phase A). Traffic would comprise vehicles transporting equipment, materials and spoil, and construction workers accessing the work site.

Table 8.9 Indicative construction traffic volumes

Project Phase	Daily one way movements		Peak hourly two way movements	
	Cars	HV	Cars	HV
Early Works	405	32	54	10
Phase A	1453	965	194	210
Phase B	1669	972	222	212
Phase C	640	197	85	42

Likely haulage routes and access points for construction vehicles have been identified in Figure 8.13 to Figure 8.15. Access to the Project site would predominantly be via the M5 Motorway and Moorebank Avenue. For the construction of the southern rail access option, the haulage route would be from Cambridge Avenue via Moorebank Avenue or Glenfield Road.

All required car parking would be provided on site. Access to the ABB site would be maintained throughout the Project construction.

Impacts on traffic and access are described in Chapter 11 – *Traffic, transport and access*, including proposed works on Moorebank Avenue. Some partial and full road closures may be required during construction. Where possible, these would occur at night during quieter traffic periods. Road closures would occur in consultation with the RMS, relevant local councils and adjacent land owners (e.g. ABB and DNSDC sites).

Moorebank Avenue between the M5 Motorway and the southern-most entry to the site would be upgraded as part of the Project, with the majority of works assumed to occur around 2016. The existing site access points would be used before the full upgrade of Moorebank Avenue and during the Early Works development phase and part of Phase A.

### 8.8.9 Construction plant and equipment

An indicative list of the major equipment to be used during the construction phases of the Project is summarised in Table 8.10. The actual quantity and types of equipment would depend on availability and the Project contractor's preferred working method.

Table 8.10 Indicative construction equipment list

Early Works	Phase A	Phase B	Phase C
	Piling plant <i>Including piling rigs, sheet piling and grout pump</i>	Piling plant <i>Including piling rigs, sheet piling and grout pump</i>	Piling plant <i>Including piling rigs, sheet piling and grout pump</i>
Plant – excavation <i>Including backhoe, grader, 7–30 t excavator, bobcat, D6 and D8 dozer, fuel truck, service truck and 2 water carts</i>	Plant – excavation <i>Including backhoe, grader, 7–30 t excavator, bobcat, D6 dozer and D8 dozer</i>	Plant – excavation <i>Including backhoe, grader, 7–30 t excavator, bobcat, D6 and D8 dozer</i>	Plant – excavation <i>Including backhoe, grader, 7–30 t excavator, bobcat, D6 and D8 dozer</i>
Plant – compaction <i>Including compactor and 2 front end loaders</i>	Plant – compaction <i>Including compactor, 13 t roller, 14,000 L water truck, multi wheel roller, padfoot roller, smooth drum roller, loader (950), 28 m<sup>3</sup> scraper, 9–13 m<sup>3</sup> self-elevating scraper, 300–450 mm trencher asphalt spreaders</i>	Plant – compaction <i>Including compactor, 13 t roller, 14,000 L water truck, multi wheel roller, padfoot roller, smooth drum roller, loader (950), 28 m<sup>3</sup> scraper, 9–13 m<sup>3</sup> self-elevating scraper, 300–450 mm trencher</i>	Plant – compaction <i>Including compactor, 13 t roller, 14,000 L water truck, multi wheel roller, padfoot roller, smooth drum roller, loader (950), 28 m<sup>3</sup> scraper, 9–13 m<sup>3</sup> self-elevating scraper, 300–400 mm trencher</i>
Plant – other <i>Street sweeper, post hole borer, one tracker</i>	Plant – other <i>Including street sweeper, 30 m boom concrete pump, dewatering equipment, manitou, disc harrow tractor</i>	Plant – other <i>Including street sweeper, 30 m boom concrete pump, dewatering equipment, manitou, disc harrow tractor</i>	Plant – other <i>Including street sweeper, 30 m boom concrete pump, dewatering equipment, manitou, disc harrow tractor</i>
Trucks <i>Including 20 m<sup>3</sup> truck and trailers, site vehicles for personnel and plant material transport</i>	Trucks <i>Including tipper, 20 m<sup>3</sup> truck and trailer, crane truck (semi), 17.7 m<sup>3</sup> dump truck, semitrailer, concrete truck, rock saws and truck-mounted drills</i>	Trucks <i>Including tipper, 20 m<sup>3</sup> truck and trailer, crane truck (semi), 17.7 m<sup>3</sup> dump truck, semitrailer, concrete truck, rock saws and truck-mounted drills</i>	Trucks <i>Including tipper, 20 m<sup>3</sup> truck and trailer, crane truck (semi), 17.7 m<sup>3</sup> dump truck, semitrailer, concrete truck, rock saws and truck-mounted drills</i>
Plant – lifting <i>Including scissor lift, 10 m boom lift, 10 t franna crane, and 30 t crane</i>	Plant – lifting <i>Including scissor lift, 10 m boom lift, 10 t franna crane, and 80 t crane</i>	Plant – lifting <i>Including scissor lift, 10 m boom lift, 10 t franna crane, and 80 t crane</i>	Plant – lifting <i>Including scissor lift, 10 m boom lift, 25 t franna crane, and 80 t crane</i>
	Miscellaneous <i>Including kerb machine, drifters, air compressors, shotcrete guns, post tensioning equipment, and scaffolding</i>	Miscellaneous <i>Including kerb machine, drifters, air compressors, shotcrete guns, post tensioning equipment, and scaffolding</i>	Miscellaneous <i>Including kerb machine, drifters, air compressors, shotcrete guns, post tensioning equipment, and scaffolding</i>
	Asphaltic plant <i>Including spreader, bitumen rucks and multi drum roller</i>	Asphaltic plant <i>Including spreader, bitumen rucks and multi drum roller</i>	Asphaltic plant <i>Including spreader, bitumen rucks and multi drum roller</i>

Early Works	Phase A	Phase B	Phase C
	Rail plant <i>Including hi-rail dumper, hi-rail crane, rail tampers, ballast regulator, rail grinder, roller, skid steer crane, rail saw, thermit welding equipment, rail threader and ballast box</i>		Rail plant <i>Including hi-rail dumper, hi-rail crane, rail tampers, ballast regulator, rail grinder, roller, skid steer crane, rail saw, thermit welding equipment, rail threader and ballast box</i>
	Barges <i>Barges on Georges River (one for services and one for construction)</i>		Barges <i>Barges on Georges River (one for services and one for construction) (for the central rail access option)</i>

Notes: t = tonne, mm = millimetre

Source: Based on information in the Noise and Vibration Assessment (Volume 3)

### 8.8.10 Waste management

Chapter 26 – *Waste and resource management* details the expected waste generation during construction of the Project, and how this waste would be managed. In summary, construction of the Project would produce various waste streams. Potential sources include demolition materials, earthworks, vegetation clearing, drainage works, equipment maintenance, road infrastructure upgrades and worksite office activities.

The CEMP would include a waste management plan (WMP), which would focus on applying the waste hierarchy of avoid, minimise, re-use/recycle and dispose. The WMP would be managed in accordance with the *NSW Waste Classification Guidelines Parts 1 and 2* (DECC 2008) and would be consistent with the *NSW Waste Avoidance and Resource Recovery Act 2001*.

Waste identified as being contaminated would be managed in accordance with the *NSW Contaminated Land Management Act 1997* and other relevant legislation.

### 8.8.11 Water and wastewater

Chapter 26 – *Waste and resource management* details the expected water use during construction of the Project. In summary, water would be required during construction for dust suppression, compaction and pavement stabilisation during earthworks, concrete batching, washing of plant and equipment and watering of landscaped areas, and for staff facilities (including toilets, hand washing and drinking).

Water could be supplied from a number of sources:

- water stored in the sediment basins installed for the construction of the Project would be re-used wherever practical;
- reticulated raw water could be provided to the Project site; and
- offsite water could be transported to site from an offsite source.

There would be no need for augmentation of existing water and sewer systems servicing the Project site for construction works, although the water main would be relocated during construction.

### 8.8.12 Drainage infrastructure and erosion and sediment controls

During construction, existing drainage would be altered to better service the construction site and, ultimately, the operational IMT. A network of detention basins, outlet culverts and channels would be installed during Phase A and would service the Project construction.

The detention basins shown in Figure 7.20 to Figure 7.22 in Chapter 7 – *Project built form and operations* would be established early in Phase A and used initially as temporary sedimentation basins to capture sediment from surface stormwater flows during construction. These would then be upgraded to permanent stormwater basins following completion of construction.

All stormwater trunk mains (east to west) would be established during Phase A, along with diversion of the existing drainage culvert from the Defence National Storage Distribution Centre (DNSDC) site, and outlet culverts and channels to the Georges River. An existing east to west channel would be temporarily diverted during construction.

Erosion and sediment control measures would be installed, managed and maintained in accordance with the 'Blue Book' (*Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004)) and *Managing Urban Stormwater: Soils and Construction, Volume 2D, Main Road Construction* (DECC 2008). Such measures would seek to minimise erosion and sediment impacts from:

- earthwork activities;
- stockpile sites;
- construction compounds and work site areas;
- works within the vicinity of the Georges River and tributaries; and
- construction of the bridge crossing the Georges River.

The application of specific erosion and sedimentation control measures for each construction element or activity would be determined on site before construction, taking into account local constraints including topography, available space and access requirements.

### 8.8.13 Dangerous and hazardous goods

During construction, hazardous materials including fuel (diesel, unleaded petrol) and cement and concrete additives (batching plant materials) would be stored on site within bunded and specified areas. No other dangerous goods would be transported to or stored on site during construction.

Storage and handling of fuel would be conducted in accordance with relevant Australian Standards. Potential contaminants would not be stored near natural waterways; refuelling of machinery would be undertaken at least 30 m from natural waterways in clearly marked designated areas designed to contain spills and leaks. Chemical spill kits would be readily accessible to construction workers and all hazardous materials spills and leaks would be reported to site managers. All appropriate spill containment measures would be adopted and incorporated into the construction environmental management plan (CEMP).

## 8.9 Construction environmental management plan (CEMP)

A CEMP would be prepared for each construction phase of the Project, including for the Early Works development phase. This CEMP would be prepared once the contractor has been appointed and before work begins on site. The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Project would be managed. It would outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP would identify how environmental mitigation measures in this EIS and within all conditions of approval would be incorporated into the construction of the Project, and would document mechanisms for demonstrating compliance with all relevant conditions of approval for the Project.

The CEMP would also identify the auditing and inspection frameworks. An Environmental Management Representative for the Project would be appointed to conduct regular audits against the CEMP, conditions of approval and other relevant approvals.

The CEMP would also identify the framework for managing the following issues:

- traffic and transport;
- noise and vibration;
- biodiversity;
- hazards and risks;
- soil contamination;
- sediment control;
- water quality and stormwater management;
- air quality (including dust);
- Aboriginal heritage;
- European heritage;
- landscape and rehabilitation;
- light spill;
- site servicing;
- community liaison;
- public safety; and
- waste management.

The CEMP would identify the mitigation and monitoring measures to be implemented to minimise environmental impacts, and establish the environmental performance objectives and targets for each aspect in the form of measurable key performance indicators. The plan would be developed based on best practice guidelines, industry standards and key recommendations.

In addition to the CEMP, environmental work procedures and site specific environmental control maps would be prepared and implemented during construction. As explained in Chapter 28 – *Environment management framework*, provisional (framework) Environmental Management Plans (EMPs) have been prepared for key environmental issues as part of this EIS (refer to Volume 2, Appendix H).

## 8.10 Project and construction definition process

As discussed in section 7.16 in Chapter 7 – *Project built form and operations*, the proposal concept provides an indicative outline of the Project built form, as well as operations and activities associated with the construction and operation of the IMT. Detailed IMT layout plans would be developed through the detailed design phase and would be subject to further approval under the EP&A Act. Construction plans and methods would be determined by the Project contractor after detailed design and before construction begins.

It is important to note that, should the Project be granted Stage 1 SSD approval, detailed engineering studies would be prepared to determine the optimal design for the Project. The final construction plan and methods would be determined as part of detailed design and would be consistent with statutory requirements (including any occupational health and safety regulations) and any associated conditions of the Stage 1 SSD development approval.

The actual construction methods may vary from the description in this chapter as a result of the studies conducted for detailed design and further investigations through the Stage 2 SSD approval process. These studies would include:

- detailed site survey;
- geotechnical investigation works;
- condition assessment of existing structures;
- identification and location of underground utilities and services;
- onsite conditions identified during pre-construction activities;
- development of the design; and
- community consultation, including consideration of submissions received.

As previously noted, the exception is the Early Works development phase, for which MIC is seeking approval as part of the Stage 1 SSD development approval.

An environmental management framework to manage and mitigate impacts is presented in Chapter 28 – *Environment management framework*. The final construction plan and methods would be consistent with this framework.