Appendix C

Traffic and transport

Concept Application for Sydney CityGrid Project & Project Application for Belmore Park Zone Substation

Traffic & Transport Assessment Report

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1. Introduction

1.1 Background

EnergyAustralia is responsible for Australia's largest electricity network serving Sydney, the Central Coast and the Hunter Region. Between 2008 and 2020, EnergyAustralia is investing in the order of $16 billion in its network to meet increasing electricity demand and further enhance the high levels of supply and reliability customers have enjoyed. This investment involves maintaining and replacing existing infrastructure and building additional capacity to support new developments.

During the next decade EnergyAustralia must augment and replace ageing infrastructure in the Sydney CBD and the inner metropolitan area in order to comply with new licensing requirements. The requirements specify that all CBD substations achieve "*n-2*" (Design, Reliability & Performance Licensing Conditions by the Minister for Energy) by 2014.

EnergyAustralia's strategy for the Sydney CBD network area is in accordance with these requirements and is based on a holistic approach to network planning, taking into account relevant planning criteria, asset replacement requirements, network reliability standards and anticipated longer term network needs. It seeks to meet network needs in a cost effective manner, while facilitating prudent longer term network investment decisions.

In order to provide a reliable supply for the Sydney CBD, EnergyAustralia must carry out the following tasks between 2008 and 2020, and beyond:

- Construction of new, or upgrade and refurbish existing, zone substations; and
- Replacement of high voltage cables supplying the CBD zone substations.

1.2 Project Information

On 11th February 2008, the Minister for Planning declared that the EnergyAustralia Sydney CityGrid Project to be a project to which *Part 3A* of *Environmental Planning and Assessment Act* (EP&A Act) applies.

The Project includes the following components.

Sydney CityGrid Project Concept Application

New and/or refurbished substations in the Sydney CBD and a tunnel network for 132 kV cables, comprising the following components.

1. Extension to the existing City South Cable Tunnel from Wade Place to Riley Street, Surry Hills (approximately 150 m).
2. Stub tunnel connection from the existing City South Cable Tunnel (nominally 20 m below Campbell Street) to Belmore Park Zone Substation.
3. Belmore Park Zone Substation, encompassing commercial/retail development (at the corner of Pitt, Hay and Campbell Streets).
4. City East Cable Tunnel (approximately 3.2 km) from Riley Street, Surry Hills to Erskine Street, at the northern end of the CBD, inclusive of potential ventilation shaft and services control room at an intermediate location along the alignment.

5. City East Zone Substation, potentially encompassing commercial/retail development (at a site yet to be determined).
6. New Sub-Transmission Switching Station (STSS) at Riley Street, Surry Hills, and potentially a tunnel services control and access to the City East Cable Tunnel (as an alternative the control and access would be located at an intermediate location along the tunnel alignment).
7. Potential refurbishment or replacement of the existing Dalley Street Zone Substation or building at a nearby site.

Belmore Park Zone Substation Project Application

A new substation located at the corner of Pitt, Hay and Campbell Streets and 132 kV cables via a tunnel connection, comprising the following components.

1. Belmore Park Zone Substation, encompassing commercial/retail development (at the corner of Pitt, Hay and Campbell Streets).
2. Stub tunnel connection from the existing City South Cable Tunnel (nominally 20 m below Campbell Street) to Belmore Park Zone Substation.

The overall Sydney CBD area and the various Project components are shown in *Figure 1.1* following.

1.3 Assessment Methodology

Traffic and transport issues associated with the proposed development relate almost entirely to the construction phase. In particular, potential impacts relate to traffic movements along spoil disposal and material delivery routes, especially in the vicinity of construction work sites.

Construction activities would be concentrated at the Riley Street construction site in Surry Hills as well as the Belmore Park Zone Substation site in the Sydney CBD. There would also be some limited construction activities associated with works at the Surry Hills Substation site at Wade Place, the proposed City East Zone Substation site (location yet to be confirmed), Dalley Street Zone Substation site, and the Cook & Phillip Park Service and Control Room site (location yet to be confirmed).

The following general methodology was adopted for this traffic assessment:

- Assessment of site access and potential spoil disposal routes for heavy vehicles to/from work sites and particularly the three main construction work zones, ie. Riley Street Site, City East Zone Substation Site and Belmore Park Zone Substation Site.
- Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of work sites.
- Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes.
- Assessment of traffic generation impacts on the surrounding road network's traffic flows.
- Development of possible traffic and transport mitigation measures.

Figure 1.1: EA CityGrid Project Components

1.4 Report Structure

This Report provides an outline and review of the likely traffic operations, analysis of critical sections of the road network, proposed traffic arrangements and spoil routes, and considers the traffic conditions in the vicinity of the construction sites.

The remainder of this report is presented as follows:

Chapter 2 describes the existing traffic & transport conditions affecting the development sites.

Chapter 3 details consultation issues from Planning NSW, and other relevant government organisations.

Chapter 4 describes the traffic generation, parking and other transport activities during construction and operation of the development.

Chapter 5 assesses potential impacts related to traffic and transport and provides possible measures to mitigate these impacts.

Chapter 6 provides a summary and conclusions to the traffic & transport assessment.

2. Existing Conditions

Traffic and transport movements within and around the Sydney CBD and East Sydney area occur using a variety of transportation modes including private vehicles, public bus services, light rail and heavy rail services, pedestrian and cyclist movements. These movements are critical for the transportation of people, goods and services and play an integral role in the prosperity and vitality of the CBD.

The following sections describe the existing conditions of the road network, on-street parking, public transport, and pedestrian and cyclist facilities surrounding the proposed Project work-sites.

2.1 Surrounding Road Network

Belmore Park Zone Substation

The Belmore Park Zone Substation site is located between Campbell and Hay Streets, east of Pitt Street. The site is surrounded by established southern CBD development including Capitol Theatre and commercial land uses on the western side of Pitt Street, commercial land uses to the north and east, and Belmore Park and Central Station to the south. At present, the proposed development site is used as a commercial car park with approximately 100 parking spaces. It has left-in/left-out access to and from Hay Street.

The proposed development site is located adjacent to local streets with direct access to the major road network. This would allow removal of spoil and delivery of construction materials almost exclusively on arterial roads, which are suitable for such purposes.

Access from the local road network is available via Hay Street and Campbell Street east to Elizabeth Street and Campbell Street west to George Street. Hay Street and Campbell Street have underpasses beneath the CityRail network lines travelling north from Central Station with a vehicle height restriction of 3.8 m for the Campbell Street underpass. Access to the major road network is as follows:

- East and west via Hay Street and Elizabeth Street south to Cleveland Street, and south from Cleveland Street onto South Dowling Street and Southern Cross Drive.
- North via Hay Street, Elizabeth Street, Wentworth Avenue, College Street, Prince Albert Road and Macquarie Street to access Cahill Expressway.

To the south of the site, Hay Street is a two-way road with separated carriageways (central median) in each direction. The eastbound carriageway is shared with the Sydney light rail route, which operates in a one-way clockwise loop crossing over Hay Street at Castlereagh Street (to the east) and from the Central Station ramp back onto Hay Street at Pitt Street, adjacent to the site. Hay Street is closed to traffic west of Pitt Street and becomes a pedestrian thoroughfare and two-way light rail route. Hay Street has a local 50 km/h speed restriction and intersects with Pitt, Castlereagh and Elizabeth Streets at signal-controlled intersections.

To the north of the site, Campbell Street is a two-way, single carriageway road with two travel lanes and adjacent parking lanes. West of Pitt Street, Campbell Street is restricted to one-way westbound flows to connect with George Street. Campbell Street has a local 50 km/h speed restriction and intersects with George, Pitt, Castlereagh and Elizabeth Streets at signal-controlled intersections. There is a right-turn restriction from Wentworth and Elizabeth Streets into Campbell Street and a vehicle height restriction of 3.8 m for the Campbell Street rail underpass.

To the west of the site, Pitt Street is a two-way, single carriageway road with four travel lanes and an adjacent parking lane on its western side. Pitt Street has a local 50 km/h speed restriction and intersects with both Hay and Campbell Streets at signal-controlled intersections.

Riley Street Site

The Riley Street construction site is located on the north-east corner of Riley and Albion Streets. The site is surrounded by a mix of medium density residential land use with some interspersed commercial land use. To the west of the site (across Riley Street) is Hills Reserve, a small recreational park. At present the proposed development site is vacant and unused with fencing preventing access to the previous excavation area.

The proposed development site is located adjacent to local streets with direct access to the major road network. This would allow removal of spoil and delivery of construction materials almost exclusively on arterial roads, which are suitable for such purposes.

Access from the local road network is available via Albion Street east to Flinders Street and west from Elizabeth Street, and Riley Street south to Foveaux Street or east along Albion Street. From there, access to the major road network is as follows:

- South via Albion Street, Flinders Street and South Dowling Street to Southern Cross Drive, or east from South Dowling Street to Moore Park Road or Anzac Parade.
- North via Riley Street, Foveaux Street, Elizabeth Street, Wentworth Avenue, College Street, Prince Albert Road and Macquarie Street to access Cahill Expressway.
- West via Riley Street, Foveaux Street, Elizabeth Street and Cleveland Street.

To the west of the site, Riley Street is a two-way, single carriageway road with two travel lanes and adjacent parking lanes. Riley Street has a 40 km/h speed restriction and intersects with Albion and Foveaux Streets at signal-controlled intersections. There is a 3-tonne weight restriction along Riley Street, south of Albion Street.

To the south of the site, Albion Street is a one-way (eastbound), single carriageway road with two central travel lanes and adjacent parking lanes. On its northern side, there is a marked bus-lane in operation during designated periods. Albion Street has a local 50 km/h speed restriction and intersects with Riley, Elizabeth and Flinders Streets at signal-controlled intersections.

City East Zone Substation

The precise location of the City East Zone Substation site has not yet been determined. Planning and feasibility studies in regard to the construction of the new substation are underway and an area within the northern CBD precinct in the general vicinity of Phillip, Bent, Bligh and O'Connell Streets is considered to be a favourable location.

Bent Street provides direct access to the Eastern Distributor while Phillip Street, together with Bridge Street, provides direct access from Cahill Expressway, both of which are part of the major road network. This would allow removal of spoil and delivery of construction materials almost exclusively on arterial roads, which are suitable for such purposes.

Access through the CBD road network to travel west is available by travelling south via Phillip Street and Elizabeth Street. This connects with King and Market Streets, which are one-way eastbound and westbound respectively, to connect with the Western Distributor.

To the north of the site, Bent Street is a two-way, single carriageway road with two to four travel lanes dependant on adjacent on-street parking restrictions. Bent Street has a 50 km/h speed restriction and intersects with Phillip Street at a signal-controlled intersection.

To the east of the site, Phillip Street is also a two-way, single carriageway road with two to four travel lanes dependant on adjacent on-street parking restrictions. Phillip Street has a local 50 km/h speed restriction.

Surry Hills Sub-Transmission Substation

The Surry Hills Sub-Transmission Substation (STS) site is located on Ann Street, north of Little Albion Street and adjacent to Wade Place. The site is surrounded by a mix of medium density residential land use with some interspersed commercial land use. To the east of the site (along Little Albion Street) is Hills Reserve, a small recreational park. The existing Surry Hills STS is currently operational on site.

Wade Place is effectively a pedestrian thoroughfare, restricted to non-vehicular traffic. It connects Ann Street to the north with Little Albion Street to the south.

To the south of the site, Little Albion Street is a narrow one-way (eastbound), single carriageway road with enough width for a single travel lane and adjacent parking lane. It becomes two-way north of Crawford Place. Little Albion Street connects Commonwealth Street to the west with Hills Reserve and Little Riley Street to the east. Little Albion Street has a local 50 km/h speed restriction and intersects with Crawford Place (midway near Wade Place) and Commonwealth Street at priority-controlled intersections.

Ann Street is a relatively narrow two-way street with limited linemarking. It has barely enough width for two opposing travel lanes and adjacent kerbside parking. Ann Street connects Commonwealth Street to the west with Riley Street and beyond to Reservoir Lane in the east. Ann Street has a local 50 km/h speed restriction and intersects with Riley Street and Commonwealth Street at priority-controlled intersections.

Dalley Street Zone Substation

The Dalley Street Zone Substation site is located on the northern side of Dalley Street, at Underwood Street. The site is surrounded by predominantly commercial land use. The existing Dalley Street Substation is currently operational.

To the south of the site, Dalley Street is a narrow one-way (eastbound) street with enough width for a single travel lane and adjacent parking lane. Dalley Street connects George Street to the west with Pitt Street to the east. It has a local 50 km/h speed restriction and intersects with Underwood Street (midway adjacent to the proposed work-site), George Street and Pitt Street at priority-controlled intersections.

Underwood Street is a narrow one-way lane travelling from Pitt Street to Dalley Street via a right-angle alignment at approximately its mid-point. Underwood Street has a local 50 km/h speed restriction and intersects with Dalley Street and Pitt Street at priority-controlled intersections.

Potential Services Control Room

An intermediate permanent shaft may be required along the tunnel alignment for the purpose of installing ventilation equipment, and for housing the permanent control room for the CECT.

An alternative location for the services control room has been identified on the southern side of St Marys Road near Yurong Parkway (known as the Cook & Phillip Park Service and Control Room site). However, alternative locations for this facility are also being considered including the Riley Street site.

The potential site is largely surrounded by recreational land uses with medium density residential to the east across Sir john Young Crescent and Riley Street, and educational to the west in the form of the St Marys Cathedral College campus.

To the north of the potential site, St Marys Road is a two-way, single carriageway road with two central travel lanes and adjacent parking lanes. It connects Prince Albert Road - College Street to the west with Yurong Parkway - Sir John Young Crescent to the east. St Marys Road has a 40 km/h school speed zone restriction and intersects with Yurong Parkway - Sir John Young Crescent at a signal-controlled intersection and with Prince Albert Road at a priority-controlled intersection, which then continues to the College Street signalised intersection.

2.2 Existing Traffic Flows

Existing traffic volumes were obtained from a number of sources including RTA count stations, RTA intersection *SCATS* data and manual counts. This data has been used to provide a benchmark with which impacts from traffic generated by the proposed developments could be assessed. Key intersections and travel routes have been identified for the major construction sites as part of this assessment (refer to *Section 4* for details). Existing traffic volumes for these locations are shown in *Table 2.1* following.

Table 2.1: Key Traffic Volume Locations

Location	RTA Count Station or TCS No.	Existing Daily Traffic	Comment
Road Sections			
Albion Street (east of Bourke Street)	02.412	16,500*	2005 AADT volume
Fitzroy Street	TCS 126	17,100*	May 2008 volume
Flinders Street (south of Albion Street)	02.243	31,224	2005 AADT volume
Foveaux Street (east of Riley Street)	TCS 1474	17,800*	May 2008 volume
Foveaux Street (east of Elizabeth Street)	TCS 293	14,250*	May 2008 volume
Elizabeth Street (between Campbell & Hay)	TCS 225 & 2562	40,700*	May 2008 volume
Elizabeth Street (between Albion & Hay)	TCS 294 & 2562	42,800*	May 2008 volume
Elizabeth Street (south of Dawson Street)	02.373	17,500*	2005 AADT volume
Cleveland Street (west of Pitt Street)	02.038	41,104	2005 AADT volume
Cleveland Street (west of South Dowling St)	02.386	37,412	2005 AADT volume

Location	RTA Count Station or TCS No.	Existing Daily Traffic	Comment
Cleveland Street (west of Regent Street)	02.384	60,063	2005 AADT volume
Cleveland Street (west of Anzac Parade)	03.022	31,655	2005 AADT volume
South Dowling Street (north of Mort Street)	02.366	32,150*	2005 AADT volume
South Dowling Street (north of Crescent St)	02.387	35,900*	2005 AADT volume
Moore Park Road (east of Driver Avenue)	03.017	33,750*	2005 AADT volume
College Street (between Oxford and William)	TCS 315 & 681	25,500*	May 2008 volume
Cahill Expressway (at Circular Quay)	01.011	42,792	2005 AADT volume
Eddy Avenue	TCS 293 & 296	32,000*	May 2008 volume
Broadway (east of Harris Street)	02.377	49,791	2005 AADT volume
Harris Street (north of May Ann Street)	01.321	26,143	2005 AADT volume
Abercrombie Street (north of Cleveland St)	02.056	18,029	2005 AADT volume
Wattle Street (south of Fig Street)	02.230	26,139	2005 AADT volume
Wattle Street (south of Pyrmont Bridge Rd)	02.398	18,729	2005 AADT volume
Pyrmont Bridge Road (east of Wattle Street)	02.271	29,239	2005 AADT volume
Anzac Bridge	20.001	128,097	2005 AADT volume
Western Distributor (on-ramp from Market St)	01.324	23,162	2005 AADT volume
Western Distributor (off-ramp to King Street)	01.325	30,320	2005 AADT volume
Intersections			
Riley – Albion	TCS 461	19,800*	May 2008 volume
Riley – Foveaux	TCS 1474	23,550*	May 2008 volume
Albion – Bourke	TCS 26	18,700*	May 2008 volume
Albion – Flinders	TCS 422	33,750*	May 2008 volume
Albion – Elizabeth	TCS 294	49,750*	May 2008 volume
Fitzroy – Foveaux – Bourke	TCS 126	22,500*	May 2008 volume
Foveaux – Elizabeth	TCS 293	49,650*	May 2008 volume
Pitt – Hay	TCS 60258	7,590*	May 2008 volume
Pitt – Campbell	TCS 2342	14,950*	May 2008 volume
Hay – Elizabeth	TCS 2562	44,800*	May 2008 volume
Hay – Castlereagh	00.970 / TCS 257	7,095	2005 AADT volume
Pitt – Eddy – Rawson	TCS 296	44,100*	May 2008 volume
Campbell – Elizabeth – Wentworth	TCS 255	45,300*	May 2008 volume
Wentworth – Oxford – College – Liverpool	00.343 / TCS 681	64,200	2002 AADT volume

Location	RTA Count Station or TCS No.	Existing Daily Traffic	Comment
College – William – Park	TCS 315	66,100*	May 2008 volume
Macquarie – Prince Albert – St James	TCS 276	49,000*	May 2008 volume
Bent – Phillip	TCS 256	16,200*	May 2008 volume
King – Castlereagh	00.975 / TCS 246	28,145	2005 AADT volume
King – Pitt	00.982 / TCS 239	21,074	2005 AADT volume
Market – Castlereagh	00.974 / TCS 248	19,541	2005 AADT volume
Elizabeth – Cleveland	TCS 529	54,200*	May 2008 volume
Fitzroy – South Dowling	TCS 44	42,250*	May 2008 volume

* *axle pairs converted to equivalent vehicles at conversion rate used for Sydney CBD by RTA traffic count data*

2.3 Parking

Belmore Park Zone Substation

Hay Street has time-restricted parking along its northern side (adjacent to the subject site). This generally comprises 2P restrictions during business hours and 4P restrictions at other times. There is also some motorbike parking along the northern side of Hay Street, east of the site.

Campbell Street has time-restricted parking along both sides. This generally comprises a combination of 4P and 'Loading Zone' restrictions.

Pitt Street has time-restricted parking along its western side (across from the subject site). This generally comprises a combination of 4P and 'Loading Zone' restrictions with 'No Parking' restrictions along its eastern side adjacent to the site.

At present, the site operates an approximate 100 space commercial car park, which has left-in/left-out access to-from Hay Street.

Riley Street Site

Riley Street has time-restricted parking along both sides (adjacent to the subject site). This generally comprises 1P restrictions during business hours and some 'Loading Zone' restrictions.

Albion Street has restricted parking along its northern side (adjacent to the subject site), which is only available when the bus lane is not in operation outside weekday morning and evening peak periods. The parking restrictions range from 2P ticket during weekdays, 3P ticket during weekday evenings, and 4P ticket during weekends and public holidays. On its southern side, there is a 'No Parking' restriction during business hours.

City East Zone Substation

Bent Street has limited on-street parking adjacent to the proposed development site. On its northern side, there is a 'No Stopping' restriction at all times, while on its southern side there is a 'No Parking' restriction during business hours and 4P parking outside business hours.

Phillip Street also has limited parking with taxi zones along both sides of the street (serving the Sofitel Wentworth Hotel and other nearby developments) as well as a bus zone near Bent Street.

Surry Hills STS

There is no parking available along Wade Place because it is not open to vehicular traffic.

Little Albion Street has time-restricted parking with a resident parking scheme along some sections of the street. The time restrictions generally comprise 1P resident parking along the northern side, while parking is restricted on the southern with a combination of 'No Parking', 'No Stopping' and 'No Standing' controls.

The 1P resident parking restriction extends to Ann Street along both of its sides. It also has some Loading Zone areas as well as a number of sections with the older style non-resident 1P parking. Little Riley Street, which connects Little Albion Street with Ann Street at the eastern end, has a similar 1P resident parking scheme along both of its sides.

Dalley Street Zone Substation

Dalley Street has 'No Stopping' along its southern side, while its northern side has a combination of 1P resident and ¼ P resident restricted parking in the vicinity of the proposed development site.

Underwood Street has 'No Parking' at all times along its western side, while there is a similar 'No Parking' restriction on its eastern side but during business hours only (7am to 7pm weekdays).

Potential Services Control Room

St Marys Road has 'No Stopping' along both sides of the road, east of Cathedral Street, which changes to 2P parking during business hours and 4P parking outside business hours along both sides of the street, west of Cathedral Street. There is also 'No Parking' available on Thursdays on its southern side.

Cathedral Street has a combination of 2P ticket parking during business hours and 4P ticket parking outside business hours, along both sides of the street.

There is no on-street parking available along Yurong Parkway, except for some limited spaces available outside weekday business hours, adjacent to the Phillip Park Children's Centre.

2.4 Public Transport

Belmore Park Zone Substation

Public transport in the vicinity of the Belmore Park Zone Substation site is plentiful with both non-road and road-based services. Non-road services operate from nearby Central Station and include CityRail suburban, inter-city and regional services, as well as state-wide CountryLink rail services. Moreover, Sydney light rail services also terminate at Central Station.

Local, regional and long-distance bus services are available from nearby Eddy Avenue and Pitt Street, adjacent to Central Station. Local bus routes that pass the site include route no's 422, 423, L23, 426, 428, L28, 308, 892 and 895, which connect various inner south-west and eastern suburbs to the Sydney CBD area. In the immediate vicinity of the site, there are bus stops on the southern side of Hay Street, between Pitt and Castlereagh Streets, and on the eastern side of Pitt Street, north of Campbell Street.

Riley Street Site

Public transport in the vicinity of the Riley Street site is restricted to bus services. Regional and long-distance bus services are available from Eddy Avenue and Pitt Street, adjacent to Central Station, some 750 m to the west. Local bus routes that pass the site eastbound along Albion Street include route no's 339, 374, 376, 391, 891, 892, and 895, which connect various eastern suburbs to the Sydney CBD area. In the immediate vicinity of the site, the only bus stop is on the northern side of Albion Street, west of Bourke Street.

City East Zone Substation

Public transport in the vicinity of the City East Zone Substation site is restricted to bus services. There are numerous local bus routes that pass along Phillip and Bent Streets, connecting various eastern and southern suburbs to the Sydney CBD area. Numerous local bus routes pass the site along Phillip Street, which is an important north-south bus corridor through the CBD, to terminate at Circular Quay. Similarly, Bent Street provides an important east-west bus connection onto the Eastern Distributor from the CBD area. In the immediate vicinity of the site, the only bus stop is on the western side of Phillip Street, south of Bent Street and the southern side of Bent Street between Phillip and Bligh Streets.

CityRail operates numerous rail services from Martin Place and Circular Quay stations, approximately 300 m south and 400 m north of the proposed site respectively.

Surry Hills STS

Public transport in the vicinity of the Surry Hills STS site is restricted to bus services along nearby Albion Street. Regional and long-distance bus services are also available from Eddy Avenue and Pitt Street, adjacent to Central Station, some 500 m to the west. Similarly, CityRail operates numerous rail services from Central Station.

Local bus routes that pass eastbound along Albion Street include route no's 339, 374, 376, 391, 891, 892, and 895, which connect various eastern suburbs to the Sydney CBD area. There are no bus stops in the immediate vicinity of the site.

Dalley Street Zone Substation

Public transport in the vicinity of the Dalley Street Zone Substation site is restricted to nearby bus and rail services. There are numerous local bus routes that pass along nearby George, Pitt and Bridge Streets, connecting various suburbs to or via the Sydney CBD area. There are no bus stops in the immediate vicinity of the site.

CityRail operates numerous rail services from Circular Quay and Wynyard stations, approximately 250 m north and south of the proposed site respectively.

Potential Services Control Room

Public transport in the vicinity of the Cook & Phillip Park Service and Control Room site is restricted to some bus services along nearby William and College Streets, as well as CityRail train services from nearby St James station. Local bus routes include route no's 200, 311, 323, 324, 325, 326, 389, and 441, which connect various inner suburban suburbs to or via the Sydney CBD area. There are no bus stops in the immediate vicinity of the site.

2.5 Pedestrian & Cyclist Access

Belmore Park Zone Substation

Hay Street, Campbell Street and Pitt Street all have footpaths running along both sides of the road surrounding the proposed development site. Pedestrian use is relatively high, particularly along Pitt Street, and typical of the southern CBD precinct.

Cyclist facilities for the Sydney CBD and surrounding areas are shown in RTA's "*Sydney Cycleways Map 10*", 2004. This document indicates that there are no formal cycle routes in the area surrounding the proposed development site. It is noted however, that bicycle couriers operate along the Sydney CBD streets including the road network surrounding the site.

Riley Street Site

Riley Street and Albion Street both have footpaths running along both sides of the road surrounding the proposed development site. Pedestrian use is moderate and typical of the Surry Hills and Darlinghurst precinct. Albion Street is perhaps less used than Riley Street due to its steeper grade.

RTA's "*Sydney Cycleways*" document indicates that there is an on-road cycleway of 'moderate difficulty' along Riley Street, passing the proposed development site. The on-road bicycle lanes run in both directions along Riley Street and are partially shared with parking lanes. Albion Street is less likely to be used as a cycle route due to its relatively steep grade.

City East Zone Substation

The City East Zone Substation site has footpaths running along both sides of the road surrounding the proposed development site. Pedestrian use is relatively high along both Bent and Phillip Streets, and typical of the northern CBD precinct.

RTA's "*Sydney Cycleways*" document indicates that there are no formal cycle routes in the area surrounding the proposed development site. It is noted however, that bicycle couriers operate along the Sydney CBD streets including the road network surrounding the site.

Surry Hills STS

The Surry Hills STS site adjoins Wade Place, which is effectively a pedestrian thoroughfare, restricted to non-vehicular traffic. It connects Ann Street to the north with Little Albion Street to the south. There are minimal available pedestrian facilities along the sides of Little Albion Street so pedestrians tend to use the road carriageway because of the very low traffic volumes. Footpaths run along both sides of Ann Street. Pedestrian use is moderate and typical of the Surry Hills and Darlinghurst precinct.

RTA's "*Sydney Cycleways*" document indicates that there are no formal cycle routes in the area surrounding the proposed development site.

Dalley Street Zone Substation

The Dalley Street Zone Substation site has limited pedestrian facilities available along both sides Dalley Street surrounding the proposed development site. Moderate pedestrian use occurs mainly along the road carriageway due to the low traffic volumes. Underwood Street is less used than Dalley Street.

RTA's "*Sydney Cycleways*" document indicates that there are no formal cycle routes in the area surrounding the proposed development site. It is noted however, that bicycle couriers operate along the Sydney CBD streets including, at times, along the road network surrounding the site.

Potential Services Control Room

The potential services control room site has footpaths running along both sides of St Marys Road as well as along nearby Yurong Parkway. Pedestrian use is moderate and typical of the CBD fringe area extending into the recreational Domain area.

RTA's "*Sydney Cycleways*" document indicates that there are no formal cycle routes in the area surrounding the proposed development site.

3. Consultation Issues

3.1 Planning NSW – Director General's Requirements

As part of the Director General's Environmental Assessment Requirements from Department of Planning, 'traffic and access impacts' were mentioned as a key assessment requirement. In this regard, the environmental assessment "*...must identify transport routes to and from the construction sites and impacts on affected streets and intersections. This must include consideration of disruption to recreational/business activities and vehicle movements/bus services, including safety impact. Restrictions on access to properties should be identified. Proposed measures/arrangements for minimising impacts on these activities must be discussed.*"

3.2 City of Sydney Council

The City of Sydney Council has raised no transport-related objections or issues with respect to the Belmore Park Zone Project Application or the Sydney City Grid Project Concept Application.

4. Traffic & Transport Impacts

4.1 Construction Site Access

Belmore Park Zone Substation

The construction of the Belmore Park Zone Substation would generate traffic movements to and from the proposed development site. This would include materials delivery for construction of the building as well as spoil removal from excavations.

Heavy vehicle construction traffic would be restricted to an entry access off Campbell Street (left and right-turn in) and an exit access to Hay Street (left-out only). It is anticipated that the 3.8 m vehicle height restriction at the Campbell Street rail underpass would not restrict the type of haul trucks or delivery vehicles assumed for use during construction. Suitable traffic control would be provided to manage the interaction of heavy vehicle turning movements and through traffic along Hay and Campbell Streets.

The internal site layout would provide adequate manoeuvring area for the largest vehicles to be used and ensure that vehicles enter and exit the site from the surrounding public road network in a forward direction only.

During the initial set-up of the site access, the temporary use of traffic lanes and/or the need for temporary road occupation may be required along Hay Street, Pitt Street and/or Campbell Street. In these cases, traffic control measures specified in "*AS 1742.3: 2002, Traffic Control Devices for Works on Roads*" and RTA's "*Traffic Control at Work Sites*" (eg. signage, traffic controllers and temporary speed zones) will be provided to ensure road safety and to warn road users in advance of the change in traffic conditions.

Any works requiring lane occupancy on any council roads, will only commence following consultation with, and where necessary approval from, City of Sydney Council.

Riley Street Site

During construction, spoil from the tunnel boring machine (TBM) would be extracted through the Riley Street site adit. Pre-cast concrete tunnel lining segments would be delivered to the tunnel via the Riley Street site access and tunnel entrance during construction.

Riley Street currently has a 3-tonne weight restriction south of Albion Street, which would require a temporary exemption for the Project's heavy vehicles between Albion Street and Foveaux Street. Heavy vehicle construction traffic would enter via a right-turn off Riley Street and exit via a left-turn onto Riley Street. Suitable traffic control would be established to manage the interaction of heavy vehicle turning movements and through traffic along Riley Street. The internal site layout would provide adequate manoeuvring area for the largest vehicles to be used and ensure that vehicles enter and exit the site from the surrounding public road network in a forward direction only.

During the initial set-up of the site access, the temporary use of traffic lanes and/or the need for temporary road occupation may be required along Riley Street and/or Albion Street. In these cases, traffic control measures specified in "*AS 1742.3: 2002, Traffic Control Devices for Works on Roads*" and RTA's "*Traffic Control at Work Sites*" (eg. signage, traffic controllers and temporary speed zones) will be provided to ensure road safety and to warn road users in advance of the change in traffic conditions.

Any works requiring lane occupancy on any council roads, will only commence following consultation with, and where necessary approval from, City of Sydney Council.

City East Zone Substation

The construction of the City East Zone Substation would generate traffic movements to and from the proposed development site. This would include materials delivery for construction of the building as well as spoil removal from excavations.

Heavy vehicle construction traffic accesses have not yet been resolved. However, it is envisaged that there would be separate entry and exit accesses off Bent and/or Phillip Streets. Suitable traffic control would be provided to manage the interaction of heavy vehicle turning movements and through traffic along Bent and/or Phillip Streets.

It is envisaged the internal site layout would provide adequate manoeuvring area for the largest vehicles to be used and ensure that vehicles enter and exit the site from the surrounding public road network in a forward direction only.

During the initial set-up of the site access, the temporary use of traffic lanes and/or the need for temporary road occupation may be required along Bent Street and/or Phillip Street. In these cases, traffic control measures specified in "*AS 1742.3: 2002, Traffic Control Devices for Works on Roads*" and RTA's "*Traffic Control at Work Sites*" (eg. signage, traffic controllers and temporary speed zones) will be provided to ensure road safety and to warn road users in advance of the change in traffic conditions.

Any works requiring lane occupancy on any council roads, will only commence following consultation with, and where necessary approval from, City of Sydney Council.

The potential closure of Gresham Street, as part of the City East Zone Substation works, would affect road network operations and travel routes in the immediate area. The potential impacts and consequent mitigation measures (which would include a suitable vehicle detour and traffic management plan with appropriate warning and detour signage) would need to be investigated in detail during the future Project Application stage for the City East Zone Substation works.

Surry Hills STS

The construction of the Surry Hills STS would only generate a minor number of traffic movements to and from the proposed work-site. Construction access points have yet to be resolved, although it is likely these will be required to be via Little Albion Street or Ann Street to enable suitable access.

Dalley Street Zone Substation

The construction of the Dalley Street Zone Substation would only generate a minor number of traffic movements to and from the proposed work-site. Construction access points have yet to be resolved, although it is likely these will be required to be via Dalley Street or Underwood Street to enable suitable access.

Potential Services Control Room

The construction of the potential services control room would only generate a minor number of traffic movements to and from the proposed work-site. Construction access points have yet to be resolved, although it is likely these will be required to be via St Marys Road to enable suitable access.

4.2 Oversize Vehicle Movements

Some plant and equipment (eg. transformers) required for the Project may be oversized and subject to relevant RTA road restrictions, requiring occasional night-time deliveries. The subject vehicles will require special RTA movement permits, and possible Police escort, if they exceed the normal vehicle length, width and height limits. Special arrangements for off-loading oversized vehicles would be prepared to ensure that they occur at a time when impacts on the road network are minimised.

At the completion of proposed works at each location, all signs and warning devices relating to oversize vehicle movement would be removed and road network conditions reinstated to their former condition.

4.3 Heavy Vehicle Routes

Traffic impacts of spoil disposal and materials delivery would be managed via a Construction Traffic Management Plan (CTMP), which would be prepared by the contractor when spoil disposal sites have been identified as it is not possible to define these sites at this stage. However, the immediate routes from the sites can be identified to the major road network. Heavy construction vehicles would follow these direct routes to the major road network from where they would be able to travel to spoil site locations. Truck drivers would be instructed to strictly use designated haul routes only. The following designated heavy vehicle routes are proposed from each of the major construction sites.

Belmore Park Zone Substation

Departure Routes

South: Hay Street – Elizabeth Street – Cleveland Street – South Dowling Street – Southern Cross Drive

East: Hay Street – Elizabeth Street – Cleveland Street – Lang Road / Anzac Parade

West: Hay Street – Elizabeth Street – Cleveland Street – South Dowling Street – Southern Cross Drive – M5 East Motorway

Inner West: Hay Street – Elizabeth Street – Cleveland Street – Abercrombie Street – Wattle Street – Pyrmont Bridge Road – Anzac Bridge – Victoria Road / City West Link

North: Hay Street – Elizabeth Street – Wentworth Avenue – College Street – Prince Albert Road – Macquarie Street – Conservatorium Road – Cahill Expressway

Approach Routes

South: Southern Cross Drive – South Dowling Street – Fitzroy Street – Foveaux Street – Elizabeth Street – Campbell Street

East: Anzac Parade / Moore Park Road – Fitzroy Street – Foveaux Street – Elizabeth Street – Campbell Street

West: M5 East Motorway – Southern Cross Drive – South Dowling Street – Fitzroy Street – Foveaux Street – Elizabeth Street – Campbell Street

Inner West: Victoria Road / City West Link – Anzac Bridge – Allen Street – Harris Street – Broadway – Pitt Street – Campbell Street

North: Cahill Expressway – Conservatorium Road – Macquarie Street – Prince Albert Road – College Street – Wentworth Avenue – Elizabeth Street – Hay Street – Pitt Street – Campbell Street

Refer to *Figure 4.1* following for a diagram of the proposed routes.

Riley Street Site

Departure Routes

South: Riley Street – Albion Street – Flinders Street – South Dowling Street – Southern Cross Drive

East: Riley Street – Albion Street – Flinders Street – Moore Park Road / Anzac Parade

West: Riley Street – Albion Street – Flinders Street – South Dowling Street – Southern Cross Drive – M5 East Motorway

Inner West: Riley Street* – Foveaux Street – Elizabeth Street – Cleveland Street – Abercrombie Street – Wattle Street – Pyrmont Bridge Road – Anzac Bridge – Victoria Road / City West Link

North: Riley Street* – Foveaux Street – Elizabeth Street – Wentworth Avenue – College Street – Prince Albert Road – Macquarie Street – Conservatorium Road – Cahill Expressway

Approach Routes

South: Southern Cross Drive – South Dowling Street – Fitzroy Street – Foveaux Street – Riley Street*

East: Anzac Parade / Moore Park Road – Fitzroy Street – Foveaux Street – Riley Street

West: M5 East Motorway – Southern Cross Drive – South Dowling Street – Fitzroy Street – Foveaux Street – Riley Street*

Inner West: Victoria Road / City West Link – Anzac Bridge – Allen Street – Harris Street – Broadway – Pitt Street – Eddy Avenue – Elizabeth Street – Albion Street – Riley Street

North: Cahill Expressway – Conservatorium Road – Macquarie Street – Prince Albert Road – College Street – Wentworth Avenue – Elizabeth Street – Albion Street – Riley Street

* *The Project's heavy vehicles would require a temporary exemption from the current 3-tonne weight restriction along Riley Street, between Albion and Foveaux Streets.*

Refer to *Figure 4.2* following for a diagram of the proposed routes.

City East Zone Substation

Departure Routes

South: Bent Street – Eastern Distributor – Southern Cross Drive

East: Bent Street – Eastern Distributor – Moore Park Road / Anzac Parade

West: Bent Street – Eastern Distributor – Southern Cross Drive – M5 East Motorway

Inner West: Phillip Street – Elizabeth Street – Market Street – Western Distributor – Anzac Bridge – Victoria Road / City West Link

North: Bent Street – Macquarie Street – Conservatorium Road – Cahill Expressway

Approach Routes

South: Southern Cross Drive – Eastern Distributor – Bent Street

East: Anzac Parade / Moore Park Road – Eastern Distributor – Bent Street

West: M5 East Motorway – Southern Cross Drive – Eastern Distributor – Bent Street

Inner West: Victoria Road / City West Link – Anzac Bridge – Western Distributor – King Street – Elizabeth Street – Phillip Street

North: Cahill Expressway – Conservatorium Road – Bridge Street – Phillip Street

Refer to *Figure 4.3* following for a diagram of the proposed routes.

Surry Hills STS Site

Departure Routes (assuming site access is available via Ann Street)

South: Ann Street – Riley Street – Albion Street – Flinders Street – South Dowling Street – Southern Cross Drive

East: Ann Street – Riley Street – Albion Street – Flinders Street – Moore Park Road / Anzac Parade

West: Ann Street – Riley Street – Albion Street – Flinders Street – South Dowling Street – Southern Cross Drive – M5 East Motorway

Inner West: Ann Street – Riley Street* – Foveaux Street – Elizabeth Street – Cleveland Street – Abercrombie Street – Wattle Street – Pyrmont Bridge Road – Anzac Bridge – Victoria Road / City West Link

North: Ann Street – Riley Street* – Foveaux Street – Elizabeth Street – Wentworth Avenue – College Street – Prince Albert Road – Macquarie Street – Conservatorium Road – Cahill Expressway

Approach Routes (assuming site access is available via Ann Street)

South: Southern Cross Drive – South Dowling Street – Fitzroy Street – Foveaux Street – Riley Street* – Ann Street

East: Anzac Parade / Moore Park Road – Fitzroy Street – Foveaux Street – Riley Street – Ann Street

West: M5 East Motorway – Southern Cross Drive – South Dowling Street – Fitzroy Street – Foveaux Street – Riley Street* – Ann Street

Inner West: Victoria Road / City West Link – Anzac Bridge – Allen Street – Harris Street – Broadway – Pitt Street – Eddy Avenue – Elizabeth Street – Albion Street – Commonwealth Street – Ann Street

North: Cahill Expressway – Conservatorium Road – Macquarie Street – Prince Albert Road – College Street – Wentworth Avenue – Elizabeth Street – Albion Street – Commonwealth Street – Ann Street

* *The Project's heavy vehicles would require a temporary exemption from the current 3-tonne weight restriction along Riley Street, between Albion and Foveaux Streets.*

Refer to *Figure 4.2* following for a diagram of the proposed routes.

Dalley Street Zone Substation

Departure Routes (assuming site access is available via Dalley Street)

South: Dalley Street – Pitt Street – Bridge Street – Macquarie Street – Eastern Distributor – Southern Cross Drive

East: Dalley Street – Pitt Street – Bridge Street – Macquarie Street – Eastern Distributor – Moore Park Road / Anzac Parade

West: Dalley Street – Pitt Street – Bridge Street – Macquarie Street – Eastern Distributor – Southern Cross Drive – M5 East Motorway

Inner West: Dalley Street – Pitt Street – Bridge Street – George Street – Market Street – Western Distributor – Anzac Bridge – Victoria Road / City West Link

North: Dalley Street – Pitt Street – Bridge Street – Macquarie Street – Conservatorium Road – Cahill Expressway

Approach Routes (assuming site access is available via Underwood Street)

South: Southern Cross Drive – Eastern Distributor – Macquarie Street – Bridge Street – Loftus Street – Alfred Street – Pitt Street – Underwood Street

East: Anzac Parade / Moore Park Road – Eastern Distributor – Macquarie Street – Bridge Street – Loftus Street – Alfred Street – Pitt Street – Underwood Street

West: M5 East Motorway – Southern Cross Drive – Eastern Distributor – Macquarie Street – Bridge Street – Loftus Street – Alfred Street – Pitt Street – Underwood Street

Inner West: Victoria Road / City West Link – Anzac Bridge – Western Distributor – King Street – George Street – Alfred Street – Pitt Street – Underwood Street

North: Cahill Expressway – Conservatorium Road – Bridge Street – Loftus Street – Alfred Street – Pitt Street – Underwood Street

Refer to *Figure 4.4* following for a diagram of the proposed routes.

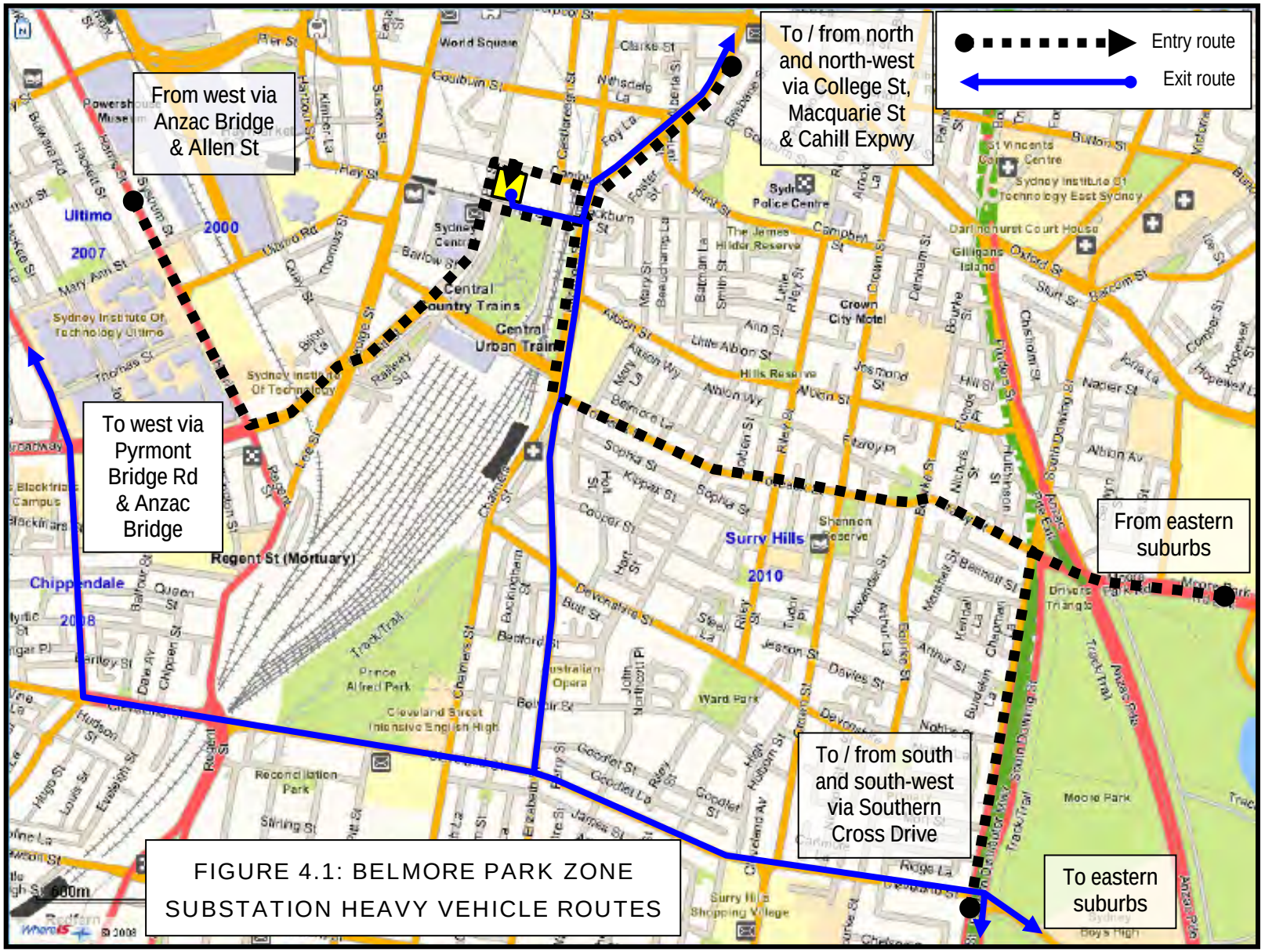

FIGURE 4.1: BELMORE PARK ZONE SUBSTATION HEAVY VEHICLE ROUTES

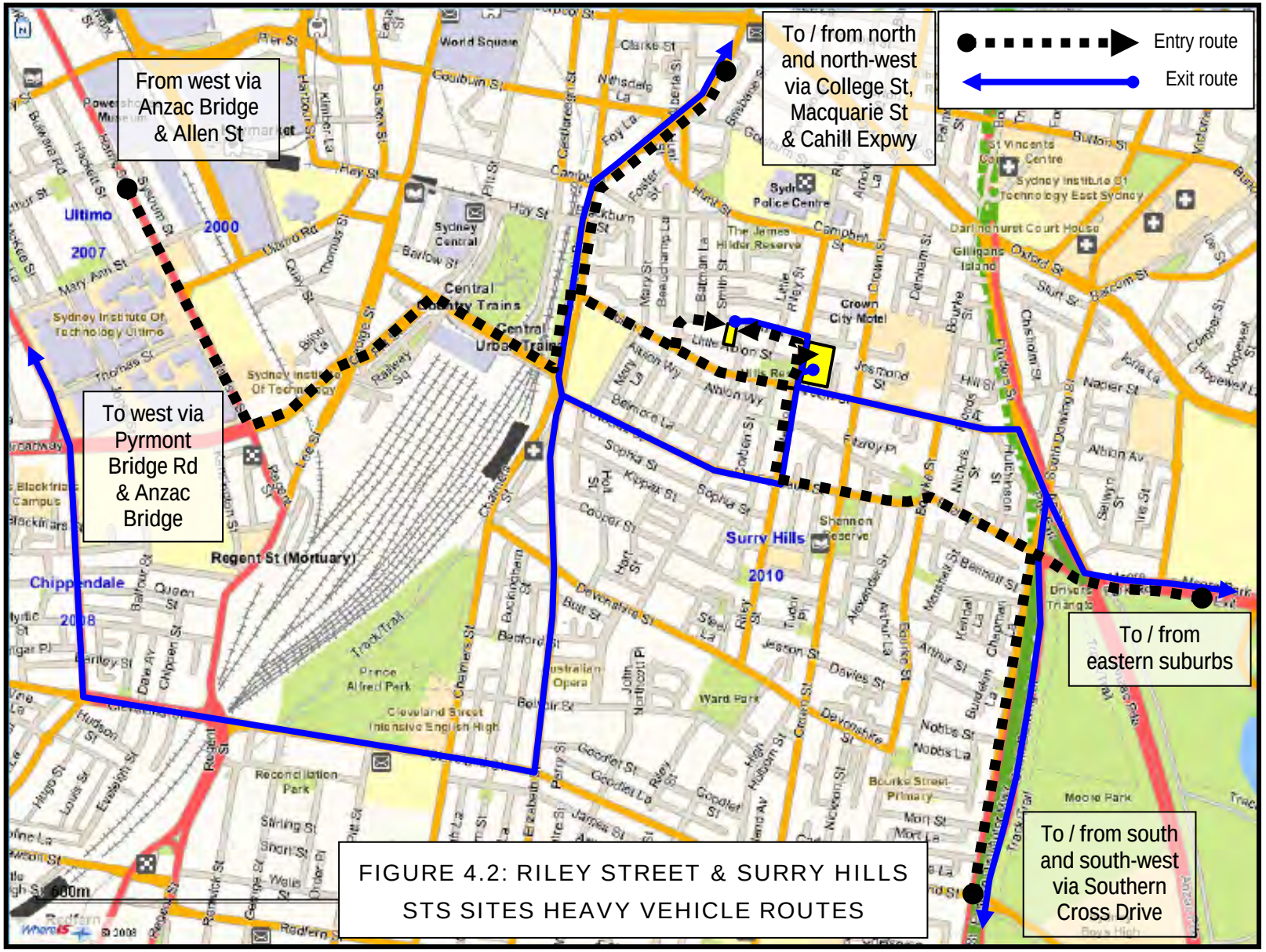

FIGURE 4.2: RILEY STREET & SURRY HILLS STS SITES HEAVY VEHICLE ROUTES

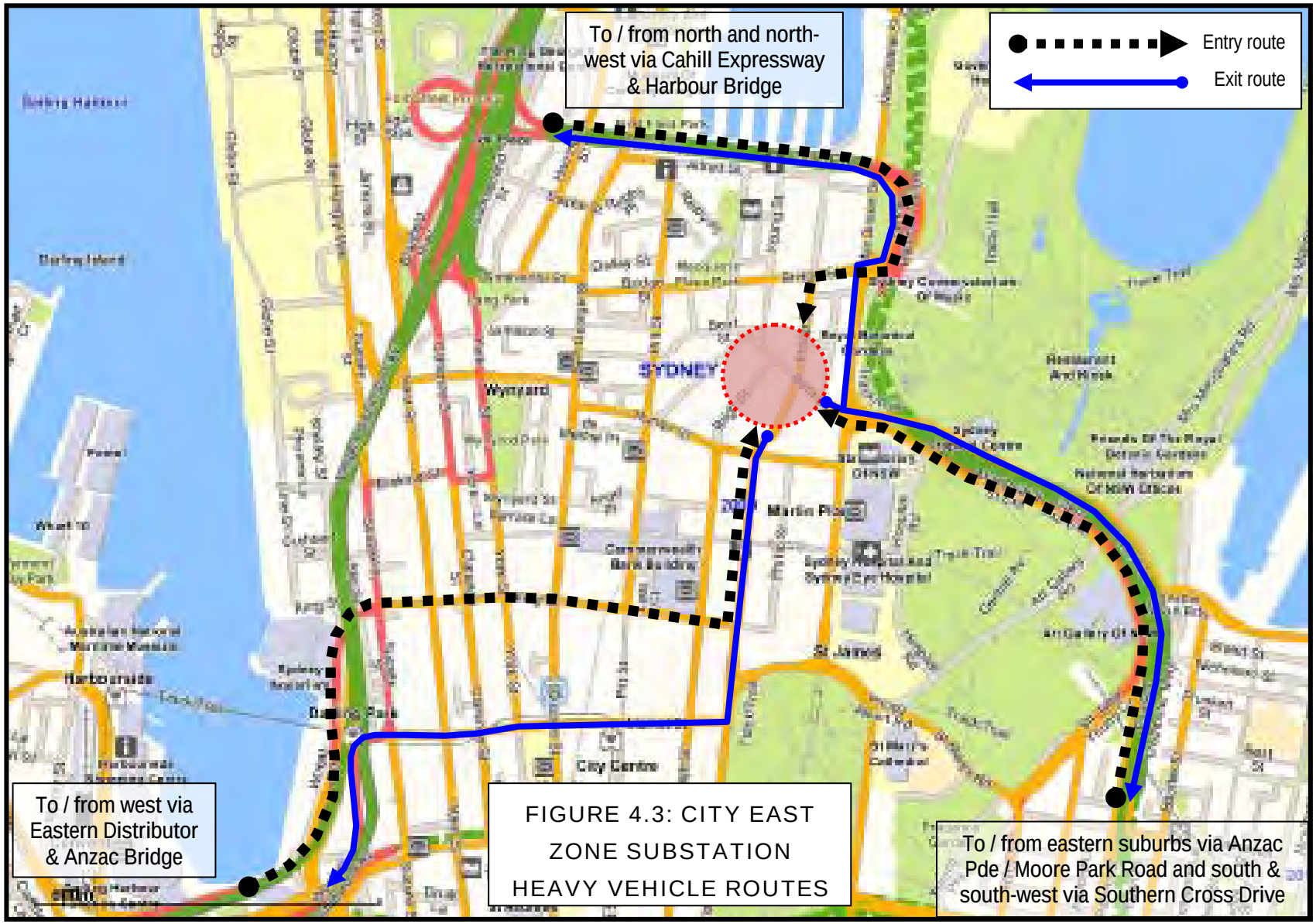

FIGURE 4.3: CITY EAST ZONE SUBSTATION HEAVY VEHICLE ROUTES

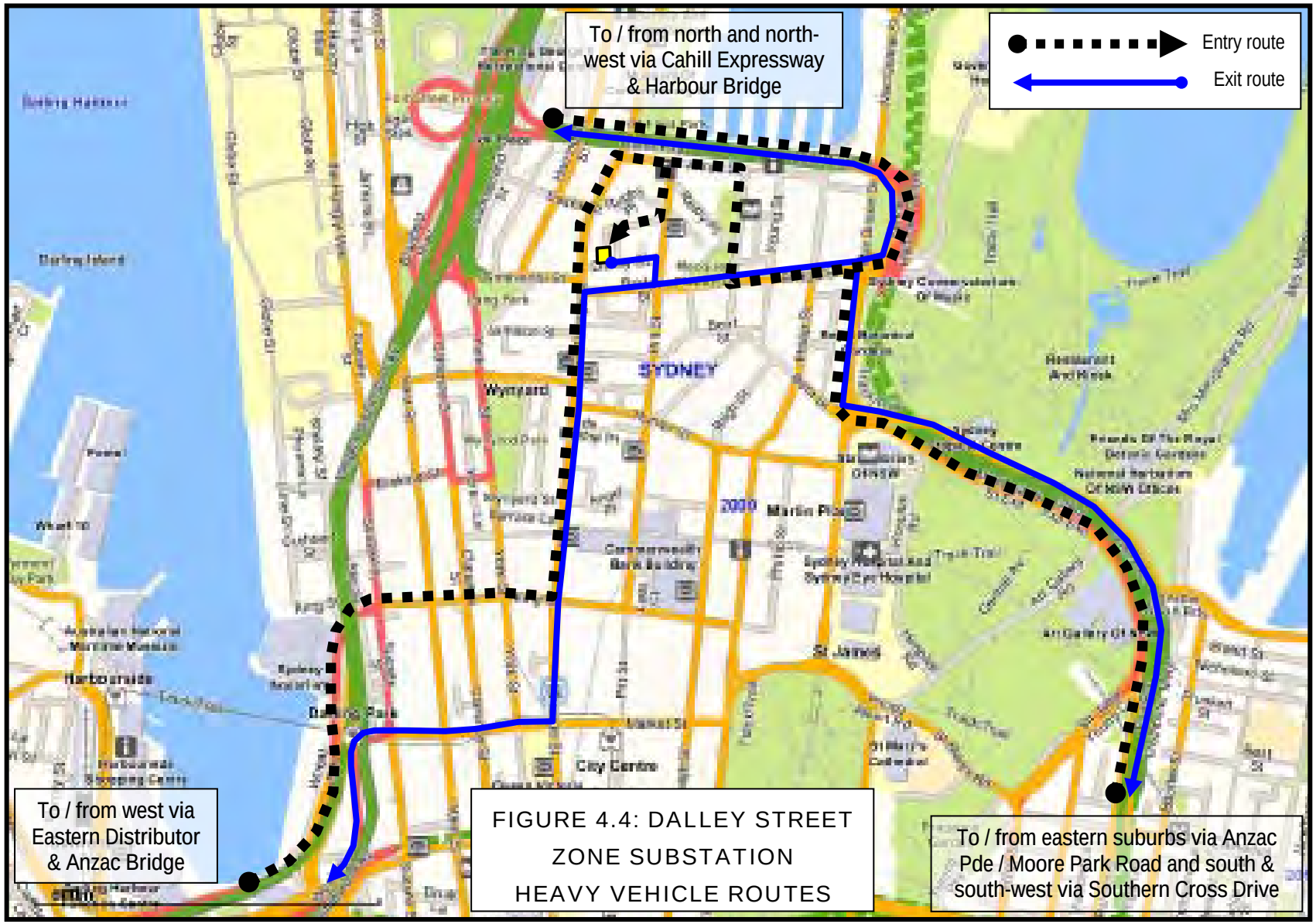

FIGURE 4.4: DALLEY STREET ZONE SUBSTATION HEAVY VEHICLE ROUTES

4.4 Construction Traffic Generation

Construction-related traffic would be generated by a number of construction activities and sources. This includes site establishment, site demobilisation, spoil removal, materials delivery and staff transport. Of these activities, spoil removal is anticipated to generate the bulk of heavy vehicle traffic.

4.4.1 Spoil Removal

Most spoil generated by tunnelling activities would be removed from the Riley Street construction site. During peak spoil removal, this would necessitate the transport of approximately 42,000 m^3 over an approximate 5-month period from November 2010 to March 2011, and another 57,000 m^3 over an approximate 17-month period from December 2011 to April 2013. Smaller volumes generated by excavation of the other shafts and stub tunnels would be removed directly from the respective sites.

The other significant spoil removal activities would be from the Belmore Park Zone Substation and City East Zone Substation construction sites. Both of these sites would necessitate the removal of approximately 47,250 m^3 over an approximate 12-month and 9-month period respectively.

Estimated spoil quantities for the various construction activities are shown in *Table 4.1* following.

Table 4.1: Spoil Quantities

Construction Activity	Location of Spoil Removal	Estimated Spoil Quantity (m^3)*
Riley Street Site	Bulk excavation of approximately half the site	42,000
CECT Launch Cavern	Riley Street Site	3,000
CSST	Riley Street Site	3,543
City East Cable Tunnel	Riley Street Site	57,000
Belmore Park Site	Belmore Park Zone Substation Site	47,250
Stub Tunnel to CSCT	Campbell Street Site	963
Potential Stub Tunnels (x3)	From shaft locations	5,670
Potential Underwood Street Shaft	Underwood Street (or potentially Gresham Street)	1,620
Potential Services Control Room Shaft	Cook & Phillip Park vicinity	3,240
City East Zone Substation	City East Zone Substation Site	47,250
Potential City East Shaft	City East Zone Substation location (TBC)	3,240
Surface Works (General)	Around Dalley, Bent, Bridge and Gresham Streets	3,480
Contingency	Various	3,606
	Total	221,862

* *estimated spoil quantities have been calculated using bulking factor of approximately 50%*

The estimates above are conservative and aimed to cover the worst-case, eg. there may not be a need to construct shafts at Yurong Street or the City East Zone Substation (subject to further design).

4.4.2 Heavy Vehicle Traffic Generation

Heavy vehicle traffic would be generated by a number of construction activities such as spoil removal, materials delivery (eg. concrete pours, cable delivery, pre-cast concrete segments, etc.), site establishment and project demobilisation.

An estimate of the number of heavy vehicles that would be generated during each construction activity is shown in *Table 4.2* following. Each 'truck' equates to a movement in and out (ie. two movements).

Table 4.2: Estimated Heavy Vehicle Traffic Generation

Construction Activity	Approximate Timing[2]	Estimated Heavy Vehicle Traffic
Bulk excavation of Belmore Park Site	May 2009 – April 2010	1 to 2 deliveries per day plus peak of 20 spoil truck movements per day
Construct Belmore Park Zone Substation	April 2010 – Mar 2012	1 to 2 deliveries per day
Construct commercial development at Belmore Park Site	2012 – 2014	3 to 4 deliveries per day plus peak of 20 spoil truck movements per day
Establishment of Riley Street Site and preliminary construction activities	Aug 2010 – Nov 2010	General deliveries, say 1 per day
Bulk excavation of Riley Street Site[1]	Nov 2010 – Mar 2011	1 to 2 deliveries per day plus peak of 20 spoil truck movements per day
Excavate launch chamber and CSCT Extension	Mar 2011 – Oct 2011	1 to 2 deliveries per day plus 4 to 5 spoil trucks per day
Construct lining for CSCT Extension and tunnel fit-out	Oct 2011 – Mar 2012	1 to 2 concrete deliveries per day during November 2011
Mobilise and assemble CECT TBM	Oct 2011 – Dec 2011	Included above
Excavate TBM tunnel between Riley Street Site and City North Zone Substation	Dec 2011 – April 2013	Segment delivery of 5 trucks per day for approximately 200 days plus spoil removal of 10 to 15 trucks per day
Remove TBM backup assembly and demobilise	May 2013	General construction traffic only
CECT tunnel fitout	May 2013 – July 2014	1 to 2 trucks every three days
Services Control Room (if required at Cook & Phillip Park)	Mar 2012 – Aug 2012	2 to 3 trucks per day for spoil removal plus general deliveries
Dalley Street Zone Substation shaft and stub tunnel	Apr 2013 – Sep 2013	2 to 3 trucks per day for spoil removal plus general deliveries
General surface works (cable trenching around Dalley, Gresham, Bent Streets)	Sep 2013 – April 2014	1 to 2 trucks per day
Bulk Excavation for City East Zone Substation	April 2012 – Nov 2012	1 to 2 deliveries per day plus peak of 20 spoil truck movements per day
City East Zone Substation shaft and stub tunnel	Sep 2012 – Oct 2013	2 to 3 trucks per day for spoil removal plus general deliveries

Construction Activity	Approximate Timing[2]	Estimated Heavy Vehicle Traffic
Construct City East Zone Substation	Oct 2013 – Dec 2015	1 to 2 deliveries per day for substation 3 to 4 deliveries per day plus peaking during concrete pours for commercial development
Fitout Riley Street services control room	Aug 2014 – Apr 2015	1 to 2 vehicles per day: general deliveries only
Reinstate Riley Street Site and demobilise	April 2015 – Jun 2015	1 truck per day
132kV cable installation – Belmore Park	Nov 2012 – Mar 2014	Semi-trailer and crane (cable delivery) – once every 3 weeks plus general deliveries over the period
132kV cable installation – Riley Street	April 2015 – Nov 2016	Semi-trailer and crane (cable delivery) – once every 3 weeks plus general deliveries over the period
132kV cable installation – City East	Jun 2015 – May 2016	Semi-trailer and crane (cable delivery) – once every 3 weeks plus general deliveries over the period
132kV cable installation – Dalley Street	Oct 2016 – Mar 2018	Semi-trailer and crane (cable delivery) – once every 3 weeks plus general deliveries over the period

1 Note that the Riley Street Site has already been demolished to previous basement levels and a hoarding is currently installed around the perimeter of the site.

2 The dates shown are based on a preliminary program and may change during detailed design and project development

From the above table, the peak heavy vehicle traffic generation would occur when the CECT is being excavated in conjunction with either the Belmore Park Zone Substation or City East Zone Substation construction activities, as well as construction of the ventilation shafts (and Services Control Room) and stub tunnel, City East shaft and stub tunnel or Dalley Street shaft and stub tunnel. It is estimated that this combination of activities would generate a maximum of approximately 45 heavy vehicles per day, or some 90 heavy vehicle movements per day. These heavy vehicles would not all travel along the same routes to access the different construction sites, however as a worst case for traffic assessment, the total traffic generation will be used to determine traffic impacts on the road network.

4.4.3 Other Traffic Generation

The majority of other traffic generation would be associated with project and construction staff movements to and from construction sites as well as any visitors to construction sites. This traffic generation has been assumed to be all light vehicles.

Staff at each work-site would comprise project management, various trades, and general construction staff. The estimated maximum number of staff required at each site would be as follows:

- Belmore Park Site (for construction of the zone substation and the commercial development): approximately 100 staff during peak construction activity periods.
- Riley Street Site (for construction of the CSCT Extension and the CECT): approximately 30 staff during peak construction activity periods.
- City East Zone Substation: approximately 100 staff during peak construction activity periods.

Traffic generation attributable to staff would be largely governed by the availability of parking, which is limited in the southern CBD, northern CBD and Surry Hills precincts. This, in combination with plentiful nearby public transport services, would encourage the use of public transport by construction staff and reduce traffic generation.

It is assumed that traffic generation would be influenced by the number of on-site parking spaces at each construction site, ie. staff and visitor vehicle numbers would equate to available parking space numbers. Therefore, based on on-site parking spaces, light vehicle traffic generation would be approximately 10 cars (or 20 trips per day) to-from the Belmore Park Zone Substation site, approximately 10 cars (or 20 trips per day) to-from the Riley Street Site, and approximately 10 cars (or 20 trips per day) to-from the City East Zone Substation site.

4.5 Road Closures

It is not expected that road closures would be required at the Belmore Park Zone Substation or Riley Street sites. At the Surry Hills STS, new City East Zone Substation, and Dalley Street Zone Substation interface sites, it is anticipated that road closures may be required in order to excavate shafts, joint bays and other interface structures.

Roads identified, to date, that may need to be closed during construction include:

- Little Albion Street (for the CSCT Extension works);
- Dalley and Underwood Streets (for the Dalley Street Zone Substation works); and
- Other roads yet to be identified in relation to the chosen site for the City East Zone Substation.

Road closures will cause temporary impacts on travel routes. This would be mitigated by a suitable vehicle detour and traffic management plan with appropriate warning and detour signage provided to guide vehicles around the road closure and continue to their destinations.

4.6 Parking Impacts

Belmore Park Zone Substation

The number of construction and project staff at the Belmore Park Zone Substation construction site is anticipated to be approximately 100 during peak construction periods. It is envisaged only a limited 5 to 10 on-site parking spaces will be provided to accommodate construction staff, works vehicles and visitor parking within the site compound. This would cater for some staff on-site during peak periods with some additional spaces for visitors.

Because the surrounding southern CBD precinct has limited available long-term on-street parking and nearby public transport is readily accessible, it is considered that the majority of staff would not travel by private vehicle. Moreover, construction staff would be instructed to avoid using on-street parking in the vicinity of the proposed development site, to minimise the potential to affect existing on-street parking resources in the area.

To provide suitable site access off Campbell and Hay Streets, the construction site would require the temporary possession of approximately three kerbside parking spaces on each street.

Designated heavy vehicle marshalling areas are not proposed as there are unlikely to be delays to heavy vehicles given the low number of movements on a daily basis during peak periods.

Riley Street Site

The number of construction and project staff at the Riley Street construction site is anticipated to be approximately 30 during peak construction periods. It is envisaged only a limited 5 to 10 on-site parking spaces will be provided to accommodate construction staff, works vehicles and visitor parking

within the site compound. This would cater for some staff on-site during peak periods with some additional spaces for visitors.

Because the surrounding Surry Hills precinct has limited available long-term on-street parking for non residents and nearby public transport is readily accessible, it is considered that the majority of staff would not travel by private vehicle. Moreover, construction staff would be instructed to avoid using on-street parking in the vicinity of the proposed development site, to minimise the potential to affect existing on-street parking resources in the area.

To provide suitable site access off Riley Street, the construction site would require the temporary possession of approximately five kerbside parking spaces on the eastern side of the street.

Designated heavy vehicle marshalling areas are not proposed as there are unlikely to be delays to heavy vehicles given the low number of movements on a daily basis during peak periods.

City East Zone Substation

The number of construction and project staff at the City East Zone Substation construction site is anticipated to be approximately 100 during peak construction periods. It is envisaged only a limited 5 to 10 on-site parking spaces will be provided to accommodate construction staff, works vehicles and visitor parking within the site compound. This would cater for some staff on-site during peak periods with some additional spaces for visitors.

Because the surrounding northern CBD precinct has limited available long-term on-street parking and nearby public transport is readily accessible, it is considered that the majority of staff would not travel by private vehicle. Moreover, construction staff would be instructed to avoid using on-street parking in the vicinity of the proposed development site, to minimise the potential to affect existing on-street parking resources in the area.

To provide suitable site access into a construction site within the northern CBD precinct, temporary possession of approximately three kerbside parking spaces at each access location on each street would be required.

Designated heavy vehicle marshalling areas are not proposed as there are unlikely to be delays to heavy vehicles given the low number of movements on a daily basis during peak periods.

4.7 Public Transport Impacts

Belmore Park Zone Substation

Public transport in the vicinity of the Belmore Park Zone Substation site is plentiful with both non-road and road-based services. Non-road services such as heavy and light rail operate from nearby Central Station and would not be affected by the proposed development.

In the immediate vicinity of the site, the only bus stop is on the southern side of Hay Street, between Pitt and Castlereagh Streets. This bus stop would not need to be relocated and would operate normally.

Riley Street Site

Public transport in the vicinity of the Riley Street site includes local bus services. In the immediate vicinity of the site, the only bus stop is on the northern side of Albion Street, west of Bourke Street and east of Riley Street. This bus stop would not need to be relocated and would operate normally.

City East Zone Substation

Public transport in the vicinity of the City East Zone Substation site is plentiful with both rail and bus services. Rail services operate from nearby Circular Quay and Martin Place Stations and would not be affected by the proposed development.

In the immediate vicinity of the site, there is a bus stop on Bent Street near Phillip Street. It is not expected that this or other nearby bus stops would need to be relocated, although if temporary relocation is necessary, it would be undertaken in consultation with and to the satisfaction of Sydney Buses. This would ensure bus services would not be adversely affected and bus passengers would not be inconvenienced.

The potential closure of streets in the northern CBD area, as part of the City East Zone Substation works, may affect bus services and bus stops. The potential impacts and consequent mitigation measures would need to be investigated in detail during the future Project Application stage for the City East Zone Substation works.

4.8 Pedestrian and Cyclist Impacts

Belmore Park Zone Substation

Pedestrian use is relatively high along footpaths surrounding the construction site, particularly along Pitt Street. The creation of construction site accesses off Campbell and Hay Streets would require controlled and managed construction vehicle access across adjacent footpaths.

Additional impacts on cyclists, over and above existing impacts from CBD traffic, would be negligible. There are no formal cycle routes in the immediate vicinity of the proposed development site.

Riley Street Site

Pedestrian use is moderate along footpaths surrounding the construction site. The creation of construction site access off Riley Street would require controlled and managed construction vehicle access across the adjacent footpath on the eastern side of the road.

Similarly, the on-road cycleway of 'moderate difficulty' along Riley Street, passing the proposed development site, would require controlled and managed access for construction vehicles entering and exiting the construction site to ensure suitable separation of travel conflicts.

City East Zone Substation

Pedestrian use along footpaths in the northern CBD area is generally high, surrounding any future construction site. The creation of a construction site access into a construction site would require controlled and managed construction vehicle access across adjacent footpaths.

Additional impacts on cyclists, over and above existing impacts from CBD traffic, would be negligible. There are no formal cycle routes in the immediate vicinity of the proposed development site.

The potential closure of streets in the northern CBD area, as part of the City East Zone Substation works, would affect pedestrian and cyclist movements in the immediate area. The potential impacts and consequent mitigation measures (which would include suitable detours and pedestrian management plan) would need to be investigated in detail during the future Project Application stage for the City East Zone Substation works.

4.9 Emergency Vehicle Access

Access for emergency vehicles will be unaffected as all existing lanes or streets surrounding the proposed Belmore Park Zone Substation and Riley Street development sites will remain open. If any road closures are required for the City East Zone Substation site, they would be undertaken in consultation with and to the satisfaction of NSW Police and the Emergency Services. Furthermore, liaison with Emergency Services will be undertaken to ensure that emergency response plans are not compromised.

4.10 Impacts During Operations

Operational traffic movements for the substations would be minor and limited to regular maintenance inspections and activities. There would be negligible traffic impact on the surrounding road network by maintenance staff and their vehicles.

City of Sydney Council does not have any guidelines or minimum requirement for car parking to serve substations and has a general policy of discouraging car parking in the CBD and surrounding areas. The substations would be unmanned and would not require any permanent parking except for the infrequent visits by staff undertaking routine maintenance activities. Surrounding on-street parking is considered to be adequate to cater for these circumstances.

The commercial/retail developments of the Belmore Park Zone Substation and City East Zone Substation sites would generate traffic movements from the use of the proposed basement car parking spaces and deliveries and maintenance activities. Depending upon projected market requirements for the commercial/retail development, the construction of these components may need to be staged. If required, short term land use options would be developed for the surplus site areas.

5. Impact Assessment & Mitigation Measures

5.1 Road Network Performance

Belmore Park Zone Substation Site

The southern CBD precinct is heavily used by motor vehicles, public transport and pedestrians. Site observations and traffic flows indicate that the road sections around the proposed development site, namely Hay Street, Pitt Street and Campbell Street, currently operate close to capacity during morning and evening peak periods as well as during the midday business peak period. This is generally caused by the high traffic flows circulating around the general southern CBD precinct and travelling between the Railway Square area to and from the main Sydney CBD area to the north. During peak periods there is little spare capacity with significant congestion and queuing evident.

The assessment of construction traffic effects on the road network performance was based on a worst-case traffic generation of 44 heavy vehicle trips per day with another 20 light vehicle trips per day attributable to construction staff. The heavy vehicle traffic generation was assigned to the proposed heavy vehicle routes discussed in *Section 4.3* previously, while the light vehicle traffic generation was assigned to all routes to provide a worst-case scenario.

Riley Street Site

The Surry Hills precinct is moderately used by motor vehicles, buses, pedestrians and some on-road cyclists. Site observations and traffic flows indicate that the road sections around the proposed development site, namely Riley Street and Albion Street, currently operate with little spare capacity during peak traffic periods. There is some congestion evident, which is generally caused by traffic circulating the area as well as generation from nearby commercial and retail land uses. During peak periods there is generally some spare capacity with minimal intersection queuing evident.

The assessment of construction traffic effects on the road network performance was based on a worst-case traffic generation of 40 heavy vehicle trips per day with another 20 light vehicle trips per day attributable to construction staff. The heavy vehicle traffic generation was assigned to the proposed heavy vehicle routes discussed in *Section 4.3* previously, while the light vehicle traffic generation was assigned to all routes to provide a worst-case scenario.

City East Zone Substation Site

The northern CBD precinct is heavily used by motor vehicles, public transport and pedestrians. Site observations and traffic flows indicate that the road network in the area currently operates close to capacity during morning and evening peak periods as well as during the midday business peak period. This is generally caused by the high traffic flows circulating around the northern CBD precinct. During peak periods there is little spare capacity with some congestion and queuing evident.

The assessment of construction traffic effects on the road network performance was based on a worst-case traffic generation of 44 heavy vehicle trips per day with another 20 light vehicle trips per day attributable to construction staff. The heavy vehicle traffic generation was assigned to the proposed heavy vehicle routes discussed in *Section 4.3* previously, while the light vehicle traffic generation was assigned to all routes to provide a worst-case scenario.

A comparison of traffic generation from the proposed major development sites with existing traffic flows along key road sections and intersections in the surrounding areas is shown in *Table 5.1* following.

The maximum daily traffic generation is a combination from all three of the major development sites, namely Belmore Park Zone Substation, City East Zone Substation and Riley Street Sites. Where a heavy vehicle route is shared by two or three of the sites, traffic generation from the sites has been assigned to that route and/or intersection. Also, to determine a worst-case scenario, it has been assumed that all heavy vehicle traffic generated from the constructions sites would travel to spoil destination and materials delivery sites along a single travel route, rather than be dispersed to a number of travel routes and locations around the Sydney area.

The total volumes of traffic travelling through the various road sections and intersections varies between just over 7,000 vehicles per day (vpd) at the Hay Street - Castlereagh Street intersection to over 128,000 vpd on Anzac Bridge. The addition of traffic generation from a worst-case combination of the proposed development sites, only constitutes a maximum increase of approximately 0.7% in traffic movements at a couple of locations. This minor level of increase is well within any expected traffic flow variations that are likely to occur on the background road network over a daily period.

Therefore, the addition of a relatively minor amount of construction traffic from the proposed developments will have an insignificant affect on the road sections and intersections in the surrounding areas. The existing road network and intersections are controlled by existing background traffic flows.

Table 5.1: Traffic Volume Comparisons

Location	Existing Daily Traffic	Max Daily Traffic Generation *	% of Existing Daily Traffic
Road Sections			
Albion Street (east of Bourke Street)	16,500	46	0.3%
Fitzroy Street	17,100	88	0.5%
Flinders Street (south of Albion Street)	31,224	46	0.1%
Foveaux Street (east of Riley Street)	17,800	88	0.5%
Foveaux Street (east of Elizabeth Street)	14,250	68	0.5%
Elizabeth Street (between Campbell & Hay)	40,700	136	0.3%
Elizabeth Street (between Albion & Hay)	42,800	136	0.3%
Elizabeth Street (south of Dawson Street)	17,500	88	0.5%
Cleveland Street (west of Pitt Street)	41,104	88	0.2%
Cleveland Street (west of South Dowling St)	37,412	88	0.2%
Cleveland Street (west of Regent Street)	60,063	88	0.1%
Cleveland Street (west of Anzac Parade)	31,655	68	0.2%
South Dowling Street (north of Mort Street)	32,150	172	0.5%
South Dowling Street (north of Crescent St)	35,900	172	0.5%

Location	Existing Daily Traffic	Max Daily Traffic Generation *	% of Existing Daily Traffic
Moore Park Road (east of Driver Avenue)	33,750	152	0.5%
College Street (between Oxford and William)	25,500	130	0.5%
Cahill Expressway (at Circular Quay)	42,792	194	0.5%
Eddy Avenue	32,000	46	0.1%
Broadway (east of Harris Street)	49,791	88	0.2%
Harris Street (north of May Ann Street)	26,143	130	0.5%
Abercrombie Street (north of Cleveland St)	18,029	130	0.7%
Wattle Street (south of Fig Street)	26,139	130	0.5%
Wattle Street (south of Pyrmont Bridge Rd)	18,729	130	0.7%
Pyrmont Bridge Road (east of Wattle Street)	29,239	130	0.4%
Anzac Bridge	128,097	194	0.2%
Western Distributor (on-ramp from Market St)	23,162	38	0.2%
Western Distributor (off-ramp to King Street)	30,320	38	0.1%
Intersections			
Riley – Albion	19,800	76	0.4%
Riley – Foveaux	23,550	98	0.4%
Albion – Bourke	18,700	46	0.2%
Albion – Flinders	33,750	46	0.1%
Albion – Elizabeth	49,750	130	0.3%
Fitzroy – Foveaux – Bourke	22,500	68	0.3%
Foveaux – Elizabeth	49,650	110	0.2%
Pitt – Hay	7,590	48	0.6%
Pitt – Campbell	14,950	48	0.3%
Hay – Elizabeth	44,800	130	0.3%
Hay – Castlereagh	7,095	38	0.5%
Pitt – Eddy – Rawson	44,100	114	0.3%
Campbell – Elizabeth – Wentworth	45,300	130	0.3%
Wentworth – Oxford – College – Liverpool	64,200	130	0.2%
College – William – Park	66,100	130	0.2%
Macquarie – Prince Albert – St James	49,000	130	0.3%
Bent – Phillip	16,200	70	0.4%
King – Castlereagh	28,145	38	0.1%

Location	Existing Daily Traffic	Max Daily Traffic Generation *	% of Existing Daily Traffic
King – Pitt	21,074	38	0.2%
Market – Castlereagh	19,541	38	0.2%
Elizabeth – Cleveland	54,200	68	0.1%
Fitzroy – South Dowling	42,250	108	0.3%

* *total of light and heavy vehicle construction-related movements per day*

5.2 Cumulative Impacts

The construction and operation of other major developments in the Sydney CBD and surrounding areas may overlap with this Project and consequently, may result in cumulative impacts relating to traffic and transport. Preliminary assessment of other known projects suggests that this Project would not result in any significant adverse traffic and transport impacts on the environment.

In general, the development and implementation of the construction and operational environmental management plans (CEMP and OEMP), in response to the proposed *Statement of Commitments* and *Conditions of Consent*, would mitigate and manage the various impacts associated with the Project to avoid potential cumulative impacts with any unknown proposals that overlap the Project.

5.3 Mitigation Measures

5.3.1 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) would be prepared prior to the commencement of construction works and incorporated into the construction programme. The CTMP would be prepared in consultation with relevant stakeholders and as part of the Construction Environmental Management Plan (CEMP).

The CEMP identifies all potential environmental impacts, performance criteria, mitigation strategies, relevant monitoring, reporting, and procedures for effective corrective action. The CEMP and its sub-plans (eg. CTMP) would be prepared in accordance with the requirements of the Environmental Assessment, project application, relevant guidelines, existing operational plans and procedures, and the design and contract documentation. The plan would be endorsed by the environmental management representative prior to approval by the Director-General of Planning NSW and/or relevant road authorities.

The CTMP sub-plan would detail how impacts of the construction activities would be managed or minimised. It would be consistent with EnergyAustralia's environmental policy, specifications and procedures to ensure compliance with any specific conditions of approval, licence conditions, and any other permits and approvals. The CTMP would include the following elements, consistent with the overall Environmental Management Plan framework:

- Copies of approvals, road occupancy licences and permits to meet statutory requirements.
- Details of other voluntary requirements such as codes of practice.

- Details of potential environmental impacts and the operational control measures that are to be implemented to comply with statutory requirements and provide environmental protection.
- Assignment of responsibilities for planning, approving, implementing, maintaining, assessing and monitoring environmental controls.
- Monitoring required to determine the effectiveness of controls implemented.

Specifically, a detailed CTMP would be developed and incorporated into the construction programme for the proposed Project. The CTMP would include detailed consideration of the following issues:

- Identification of designated heavy vehicle routes including the likely number of heavy vehicle movements during the construction period.
- Identification of other vehicle access routes, signage and site access arrangements.
- Measures to ensure that road network performance would not be affected.
- Spoil movement would occur, where practicable, outside background peak traffic periods in order to minimise traffic conflicts.
- Measures to address queuing and heavy vehicle site access, including the management and control of construction vehicles to ensure that the impact on traffic flows along adjacent streets is minimised.
- During construction activities, general public access would not be precluded to surrounding land uses including nearby retail, commercial and residential areas. All sites would maintain either existing access or provide suitable alternative temporary access.
- All loading and unloading associated with the construction would occur within the site where possible, or within designated construction zones. If required, an approved construction zone(s) for activities that cannot be accommodated within the site (eg. special loading and unloading during construction or the approved use of cranes in the street) would be established. This would be subject to a separate application and approval by Council / RTA.
- The site would be suitably fenced including the accesses, which would be secured against unauthorised entry.
- Measures to protect pedestrians, cyclists and other motorists in the vicinity of the construction sites.

The CTMP would cover any road and site access civil works, warning and guidance signage, linemarking and management of traffic generating activities. The following assumptions would be incorporated into the Traffic Management Plan:

- All proposed traffic control measures would be installed and removed in accordance with standard procedures outlined in RTA's "*Traffic Control at Work Sites*" manual and specified in "*AS 1742.3: 2002, Traffic Control Devices for Works on Roads*".
- In addition to relevant Australian Standards and RTA guidelines, all traffic management would also conform to Workcover NSW "*Code of Practice for Working Near Traffic and Mobile Plant*".
- Barriers approved by the RTA and/or City of Sydney Council would be provided between the construction sites and trafficable areas. Pedestrian and cycle diversions would be required during the works.
- When working on RTA and/or Council controlled roads, obtaining approval from RTA and/or Council before commencing work.
- Site access points would be covered in the CTMP, particularly with respect to the interaction and conflict between construction vehicles and pedestrians / cyclists at site accesses.

- Road dilapidation reports would be prepared, prior to commencement of construction and after construction is complete, for all local roads nominated in the CTMP and likely to be used by construction traffic. Road and footpath damage that may be attributable to construction traffic would be reinstated to a standard at least equivalent to that existing prior to the damage.

Specific details of mitigation measures to be included in the CTMP are described in the following sections.

5.3.2 Belmore Park Zone Substation Site

The following specific measures are proposed to manage traffic and transport impacts at the Belmore Park Zone Substation construction site.

- Construction traffic would be restricted to separate entry and exit accesses with a one-way flow through the site. Entry would be off Campbell Street and exit to Hay Street. This would mitigate and reduce congestion and manoeuvring, particularly by heavy vehicles.
- Advance warning signage to identify the construction site, and warn of construction traffic and changed traffic conditions would be provided on all approaches to the construction site area, eg. Pitt Street (north of Campbell Street and south of Hay Street), Hay Street (west of Castlereagh Street), Campbell Street (west of Castlereagh Street).
- Suitable traffic management and controls (to be detailed by the contractor prior to commencing works) would be maintained at all times during construction to aid heavy vehicles turning into and out from the site on Campbell Street and Hay Street.
- Provide warning and guidance signage and detours for pedestrians along the southern side of Campbell Street and the northern side of Hay Street in the vicinity of site vehicle accesses. In conjunction with this, provide pedestrian management while vehicles are entering and leaving the site.

5.3.3 Riley Street Site

The following specific measures are proposed to manage traffic and transport impacts at the Riley Street construction site.

- Construction traffic would be restricted to separate entry and exit accesses with a one-way flow through the site. Entry would be off Riley Street towards the northern end of the site and exit to Riley Street towards the southern end of the site. This would mitigate and reduce congestion and manoeuvring, particularly by heavy vehicles.
- Obtain from Council and/or RTA, a temporary vehicle weight restriction exemption to allow the Project's heavy vehicles to travel between the site access (north of Albion Street) and Foveaux Street.
- Advance warning signage to identify the construction site, and warn of construction traffic and changed traffic conditions would be provided on all approaches to the construction site area, eg. Riley Street (north of Ann Street and south of Albion Street), Albion Street (west of Riley Street).
- Suitable traffic management and controls (to be detailed by the contractor prior to commencing works) would be maintained at all times during construction to aid heavy vehicles turning into and out from the site on Riley Street.
- Maintain the existing on-road cycleway along Riley Street and provide warning and guidance signage for cyclists, eg. cyclists may be advised to detour or dismount and use the footpath for the duration of the works.

- Provide warning and guidance signage and detours for pedestrians along the eastern side of Riley Street in the vicinity of both entry and exit site vehicle accesses. In conjunction with this, provide pedestrian management while vehicles are entering and leaving the site.
- As detailed in this assessment report, the Riley Street construction site is envisaged to have significant impacts in the immediate area. The potential impacts and consequent mitigation measures for road network operations, public transport, parking, access, cyclists and pedestrians would need to be investigated in detail during the future Project Application stage for the Riley Street site works. This would include, but not be limited to, the following:
  - Assessment of site access and potential spoil disposal routes for heavy vehicles to/from the work site during construction.
  - Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of the work site during both construction and operation phases.
  - Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes during construction.
  - Assessment of traffic generation impacts on the surrounding road network's traffic flows during both construction and operation phases.
  - Development of possible traffic and transport mitigation measures for both construction and operation phases, including the impacts of any road closures.

5.3.4 City East Zone Substation Site

The following specific measures are proposed to manage traffic and transport impacts at the City East Zone Substation construction site.

- Construction traffic would be restricted to separate entry and exit accesses with a one-way flow through the site. Entry and exit points would preferably be separated onto different streets. This would mitigate and reduce congestion and manoeuvring, particularly by heavy vehicles.
- Advance warning signage to identify the construction site, and warn of construction traffic and changed traffic conditions would be provided on all approaches to the construction site area.
- Suitable traffic management and controls (to be detailed by the contractor prior to commencing works) would be maintained at all times during construction to aid heavy vehicles turning into and out from the site.
- Develop a suitable vehicle detour and traffic management plan with appropriate warning and detour signage provided at appropriate locations to warn vehicles of any street closures and to guide vehicles around the road closure(s) and continue to their destinations.
- Provide warning and guidance signage and detours for pedestrians at appropriate locations in the vicinity of site vehicle accesses. In conjunction with this, provide pedestrian management while vehicles are entering and leaving the site.
- The City East Zone Substation development site (location to be confirmed), including the potential closure of streets in the vicinity, as part of the City East Zone Substation works, is envisaged to have significant impacts in the immediate area. The potential impacts and consequent mitigation measures for road network operations, public transport, parking, access, cyclists and pedestrians would need to be investigated in detail during the future Project Application stage for the City East Zone Substation works. This would include, but not be limited to, the following:

- Assessment of site access and potential spoil disposal routes for heavy vehicles to/from the work site during construction.
- Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of the work site during both construction and operation phases.
- Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes during construction.
- Assessment of traffic generation impacts on the surrounding road network's traffic flows during both construction and operation phases.
- Development of possible traffic and transport mitigation measures for both construction and operation phases, including the impacts of any road closures.

5.3.5 Surry Hills STS Site

The following specific measures are proposed to manage traffic and transport impacts at the Surry Hills STS construction site.

- Develop a suitable vehicle detour and traffic management plan with appropriate warning and detour signage provided at Commonwealth Street and Crawford Place (off Albion Street) to warn vehicles of the Little Albion Street closure and guide vehicles around the road closure and continue to their destinations.
- Provide warning and guidance signage and detours for pedestrians along Wade Place and Little Albion Street in the vicinity of the work-site and vehicle access location. In conjunction with this, provide pedestrian management while vehicles are entering and leaving the site.
- The Surry Hills STS site is envisaged to have significant impacts in the immediate area. The potential impacts and consequent mitigation measures for road network operations, public transport, parking, access, cyclists and pedestrians would need to be investigated in detail during the future Project Application stage for the Surry Hills STS works. This would include, but not be limited to, the following:
  - Assessment of site access and potential spoil disposal routes for heavy vehicles to/from the work site during construction.
  - Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of the work site during both construction and operation phases.
  - Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes during construction.
  - Assessment of traffic generation impacts on the surrounding road network's traffic flows during both construction and operation phases.
  - Development of possible traffic and transport mitigation measures for both construction and operation phases, including the impacts of any road closures.

5.3.6 Dalley Street Zone Substation Site

The following specific measures are proposed to manage traffic and transport impacts at the Dalley Street Zone Substation construction site.

- Develop a suitable vehicle detour and traffic management plan with appropriate warning and detour signage provided at either end of Dalley Street (off George and Pitt Streets) as well as

at Underwood Street (off Pitt Street) to warn vehicles of the Dalley Street closure and guide vehicles around the road closure and continue to their destinations.

- Provide warning and guidance signage and detours for pedestrians along Dalley Street and Underwood Street in the vicinity of the work-site and vehicle access location. In conjunction with this, provide pedestrian management while vehicles are entering and leaving the site.
- The Dalley Street Zone Substation development site (location to be confirmed), including the potential closure of Dalley Street as part of the works, is envisaged to have significant impacts in the immediate area. The potential impacts and consequent mitigation measures for road network operations, public transport, parking, access, cyclists and pedestrians would need to be investigated in detail during the future Project Application stage for the Dalley Street Zone Substation works. This would include, but not be limited to, the following:
  - Assessment of site access and potential spoil disposal routes for heavy vehicles to/from the work site during construction.
  - Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of the work site during both construction and operation phases.
  - Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes during construction.
  - Assessment of traffic generation impacts on the surrounding road network's traffic flows during both construction and operation phases.
  - Development of possible traffic and transport mitigation measures for both construction and operation phases, including the impacts of any road closures.

5.3.7 Potential Services Control Room

The following specific measures are proposed to manage traffic and transport impacts at the Potential Services Control Room construction site.

- The Potential Services Control Room development site near Cook & Phillip Park is envisaged to have significant impacts in the immediate area. The potential impacts and consequent mitigation measures for road network operations, public transport, parking, access, cyclists and pedestrians would need to be investigated in detail during the future Project Application stage for the Potential Services Control Room site development. This would include, but not be limited to, the following:
  - Assessment of site access and potential spoil disposal routes for heavy vehicles to/from the work site during construction.
  - Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of the work site during both construction and operation phases.
  - Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes during construction.
  - Assessment of traffic generation impacts on the surrounding road network's traffic flows during both construction and operation phases.
  - Development of possible traffic and transport mitigation measures for both construction and operation phases, including the impacts of any road closures.

5.3.8 Construction Site Parking

Provision would be made within the CTMP for adequate parking of construction and project staff vehicles so that surrounding on-street parking is not adversely affected. Apart from short-stay vehicles (eg. concrete truck, materials delivery), public on-street parking areas would not be blocked without prior approval from Council and only under the supervision of the contractor.

5.3.9 Emergency Vehicle Access

Access for emergency vehicles will be unaffected as all existing lanes or streets surrounding the proposed Belmore Park Zone Substation and Riley Street development sites will remain open. If any road closures are required for the City East Zone Substation site, they would be undertaken in consultation with and to the satisfaction of NSW Police and the Emergency Services. Furthermore, liaison with Emergency Services will be undertaken to ensure that emergency response plans are not compromised.

5.3.10 Other Mitigation Measures

Contractors would be required to monitor and report any road dilapidation, and to maintain roads to the standards required to provide a satisfactory motoring and cycling surface.

6. Summary & Conclusions

EnergyAustralia is proposing the construction of new and/or upgraded zone substations in the Sydney CBD and replacement of high voltage cables supplying the CBD zone substations. The Project includes the following components.

Sydney CityGrid Project Concept Application

New and/or refurbished substations in the Sydney CBD and a tunnel network for 132 kV cables, comprising the following components.

1. Extension to the existing City South Cable Tunnel (CSCT) from Wade Place to Riley Street, Surry Hills (approximately 150 m).
2. Stub tunnel connection from the existing City South Cable Tunnel (nominally 20 m below Campbell Street) to Belmore Park Zone Substation.
3. Belmore Park Zone Substation, encompassing commercial/retail development (at the corner of Pitt, Hay and Campbell Streets).
4. City East Cable Tunnel (approximately 3.2 km) from Riley Street, Surry Hills to Erskine Street, at the northern end of the CBD, inclusive of potential ventilation shaft and Services Control Room at an intermediate location along the alignment.
5. City East Zone Substation, potentially encompassing commercial/retail development (at a site yet to be determined).
6. New Sub-Transmission Switching Station (STSS) at Riley Street, Surry Hills, and potentially a tunnel services control and access to the City East Cable Tunnel (as an alternative the control and access would be located at a location midway along the tunnel alignment).
7. Potential refurbishment or replacement of the existing Dalley Street Zone Substation or building at a nearby site.

Belmore Park Zone Substation Project Application

A new substation located at the corner of Pitt, Hay and Campbell Streets and 132 kV cables via a tunnel connection, comprising the following components.

1. Belmore Park Zone Substation, encompassing commercial/retail development (at the corner of Pitt, Hay and Campbell Streets).
2. Stub tunnel connection from the existing City South Cable Tunnel (nominally 20 m below Campbell Street) to Belmore Park Zone Substation.

The most pertinent issues arising from the transport assessment are as follows:

- Traffic and transport issues relate almost entirely to the construction phase, particularly, potential impacts along spoil disposal and material delivery routes.
- Construction activities would be concentrated at the Riley Street construction site in Surry Hills as well as the Belmore Park Zone Substation site in the Sydney CBD. There would also be some limited construction activities associated with works at the Surry Hills STS site at Wade Place, the proposed City East Zone Substation site (location yet to be confirmed), Dalley Street Zone Substation site, and the Potential Services Control Room site.

- All work sites are within the Sydney CBD area and located as follows:
  - Belmore Park Zone Substation site is located between Campbell and Hay Streets, east of Pitt Street, with access from Hay Street and Campbell Street.
  - Riley Street construction site is located on the north-east corner of Riley and Albion Streets, with access from Albion Street.
  - Precise location of the City East Zone Substation site has not yet been determined although a site in the vicinity of Phillip, Bent, Bligh and O'Connell Streets is considered favourable.
  - Surry Hills STS site is located off Wade Place, north of Little Albion Street and south of Ann Street, with access via Little Albion Street.
  - Dalley Street Zone Substation site is located on the northern side of Dalley Street, at Underwood Street, with access from Underwood and Dalley Streets.
  - Potential Services Control Room site is tentatively located immediately opposite the existing Domain Car Park, and on the southern side of St Marys Road near Yurong Parkway.
- The major heavy vehicle generation would be from the Belmore Park Zone Substation, Riley Street and City East Zone Substation construction sites. The other sites would only generate minimal traffic.
- Some plant and equipment required for the Project may be oversized and subject to relevant RTA road restrictions, requiring occasional night-time deliveries.
- Traffic impacts of spoil disposal and materials delivery would be managed via a Construction Traffic Management Plan (CTMP), which would identify routes from each site to access the major road network. Designated heavy vehicle routes have been identified from each major construction site and are detailed in *Section 4.3* and shown in *Figures 4.1*, *4.2*, *4.3* and *4.4*.
- Most spoil generated by tunnelling activities would be removed from the Riley Street construction site. During peak spoil removal, this would necessitate the transport of approximately 42,000 m^3 over an approximate 5-month period from November 2010 to March 2011, and another 57,000 m^3 over an approximate 17-month period from December 2011 to April 2013.
- The other significant spoil removal activities would be from the Belmore Park Zone Substation and City East Zone Substation construction sites. Both of these sites would necessitate the removal of approximately 47,250 m^3 over an approximate 12-month and 9-month period respectively.
- Peak heavy vehicle traffic generation would occur when the Riley Street to City North tunnel is being excavated in conjunction with either the Belmore Park Zone Substation or City East Zone Substation construction activities as well as construction at one of either the Services shaft and stub tunnel, City East shaft and stub tunnel or Dalley Street shaft and stub tunnel. It is estimated that this combination of activities would generate a maximum of approximately 45 heavy vehicles per day, or some 90 heavy vehicle movements per day.
- The majority of other traffic generation would be associated with project and construction staff movements to and from construction sites as well as any visitors to construction sites. Traffic generation attributable to staff would be largely governed by the availability of parking and the current availability of plentiful nearby public transport services, which would tend to reduce traffic generation.

- Light vehicle traffic generation would be influenced by the number of on-site parking spaces at each construction site. Light vehicle traffic generation would be approximately 10 cars each of the major construction sites.
- Any road closures that may be required would be mitigated by a suitable vehicle detour and traffic management plan. Possible road closure locations include:
  - Little Albion Street (for the Surry Hills STS works);
  - Dalley and Underwood Streets (for the Dalley Street Zone Substation works); and
  - Other roads yet to be identified in relation to the chosen site for the City East Zone Substation.
- Because the surrounding CBD precinct has limited available long-term on-street parking and nearby public transport is readily accessible to all sites, it is considered that the majority of staff would not travel by private vehicle and thus parking impacts would be minimal.
- Access to the Belmore Park Zone Substation, Riley Street and City East Zone Substation construction sites would require the temporary possession of approximately three kerbside parking spaces at each site access location.
- There would be no significant impacts to public transport.
- Pedestrian use is relatively high along footpaths surrounding the construction sites so construction site accesses would require controlled and managed vehicle access across adjacent footpaths.
- Operational traffic movements for the substations would be minor with negligible traffic impact on the surrounding road network by maintenance staff and their vehicles.
- Access for emergency vehicles will be unaffected as all existing lanes or streets surrounding the proposed development sites will remain open.
- Around the proposed development sites, the CBD precinct is heavily used by motor vehicles, public transport and pedestrians. Site observations and traffic flows indicate that the road network currently operates close to capacity.
- A comparison of traffic generation from the proposed major development sites with existing traffic flows along key road sections and intersections shows that the addition of traffic generation from a worst-case combination of the proposed development sites, only constitutes a maximum increase of approximately 0.7% in traffic movements at a couple of locations. This minor level of increase is well within any expected traffic flow variations that are likely to occur on the background road network over a daily period. Therefore, the addition of a relatively minor amount of construction traffic from the proposed developments will have an insignificant affect on the road sections and intersections in the surrounding areas.
- The construction and operation of other major developments in the Sydney CBD and surrounding areas may result in cumulative traffic and transport impacts.
- A Construction Traffic Management Plan (CTMP) would be prepared prior to the commencement of construction works. The CTMP would be prepared in consultation with relevant stakeholders and as part of the Construction Environmental Management Plan (CEMP). It would detail how impacts of the construction activities would be managed or minimised and would generally cover the following elements:
  - Approvals, road occupancy licences and permits.
  - Voluntary requirements, such as codes of practice.
  - Potential environmental impacts and operational control measures.

- Responsibilities for planning, approving, implementing, maintaining, assessing and monitoring environmental controls.
- Monitoring the effectiveness of controls implemented.
- Identification of designated heavy vehicle routes and movements.
- Identification of other vehicle access routes, signage and site access arrangements.
- Measures to ensure that road network performance would not be affected.
- Spoil movement management.
- Queuing and heavy vehicle site access.
- Maintaining existing access or provide suitable alternative temporary access.
- Loading and unloading management.
- Site security.
- Measures to protect pedestrians, cyclists and other motorists in the vicinity of the construction sites.
- Road and site access civil works, warning and guidance signage, linemarking and management of traffic generating activities.
- Road dilapidation reports and reinstatement to a standard at least equivalent to existing.

- Provision would be made within the CTMP for adequate parking of construction and project staff vehicles so that surrounding on-street parking is not adversely affected.
- Contractors would be required to monitor and report any road dilapidation, and to maintain roads to the standards required to provide a satisfactory motoring and cycling surface.
- For the sites Concept Application stage sites (all sites except Belmore Park Zone Substation), the potential impacts and consequent mitigation measures for road network operations, public transport, parking, access, cyclists and pedestrians would need to be investigated in detail during the future Project Application stage. This would include, but not be limited to:
  - Assessment of site access and potential spoil disposal routes for heavy vehicles to/from the work site during construction.
  - Assessment of impacts on parking, public transport, pedestrian and cyclist access in the vicinity of the work site during both construction and operation phases.
  - Obtaining traffic flow data along key sections of the road network in the vicinity of each of the construction work sites and along surrounding spoil and delivery routes during construction.
  - Assessment of traffic generation impacts on the surrounding road network's traffic flows during both construction and operation phases.
  - Development of possible traffic and transport mitigation measures for both construction and operation phases, including the impacts of any road closures.
- Site-specific mitigation measures include the following:

  Belmore Park Zone Substation Site

  - Construction traffic would be restricted to separate entry and exit accesses with a one-way flow through the site.
  - Advance warning signage to identify the construction site, and warn of construction traffic and changed traffic conditions on all approaches to the construction site area.
  - Suitable traffic management and controls to aid heavy vehicles turning into and out from the site on Campbell Street and Hay Street.

- Provide warning and guidance signage and detours for pedestrians in the vicinity of site vehicle accesses, and pedestrian management while vehicles are accessing the site.

Riley Street Site

- Construction traffic would be restricted to separate entry and exit accesses with a one-way flow through the site.
- Obtain a temporary vehicle weight restriction exemption to allow the Project's heavy vehicles to travel between the site access (north of Albion Street) and Foveaux Street.
- Advance warning signage to identify the construction site, and warn of construction traffic and changed traffic conditions on all approaches to the construction site area.
- Suitable traffic management and controls to aid heavy vehicles turning into and out from the site on Riley Street.
- Maintain the existing on-road cycleway along Riley Street and provide warning and guidance signage for cyclists.
- Provide warning and guidance signage and detours for pedestrians in the vicinity of the Riley Street site access, and pedestrian management while vehicles are accessing the site.

City East Zone Substation Site

- Construction traffic would be restricted to separate entry and exit accesses with a one-way flow through the site.
- Advance warning signage to identify the construction site, and warn of construction traffic and changed traffic conditions on all approaches to the construction site area.
- Suitable traffic management and controls to aid heavy vehicles turning into and out from the site from the surrounding northern CBD road network.
- Develop a suitable vehicle detour and traffic management plan to warn vehicles of possible street closures and guide vehicles to their destinations.
- Provide warning and guidance signage and detours for pedestrians in the vicinity of site vehicle accesses, and pedestrian management while vehicles are accessing the site.

Surry Hills STS Site

- Develop a suitable vehicle detour and traffic management plan to warn vehicles of the Little Albion Street closure and guide vehicles to their destinations.
- Provide warning and guidance signage and detours for pedestrians along Wade Place and Little Albion Street in the vicinity of site vehicle accesses, and pedestrian management while vehicles are accessing the site.

Dalley Street Zone Substation Site

- Develop a suitable vehicle detour and traffic management plan with appropriate warning and detour signage to warn vehicles of the Dalley Street closure and guide vehicles around the road closure and continue to their destinations.
- Provide warning and guidance signage and detours for pedestrians along Dalley Street and Underwood Street in the vicinity of site vehicle accesses, and pedestrian management while vehicles are accessing the site.

In conclusion, the proposed developments would have minimal impacts on access, transport and traffic. Construction traffic and access requirements can be suitably managed according to the CEMP and CTMP sub-plans.