

Appendix N

Traffic impact assessment

ARUP

Ausgrid / Investa

**City East Zone Substation and
Integrated Commercial
Development**

**33 Bligh Street - Traffic and Parking
Study**

222054

Rev A | September 2011

Arup
Arup Pty Ltd ABN 18 000 966 165



Arup
Level 10
201 Kent Street
Sydney
NSW 2000
Australia
arup.com.au

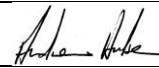
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1 Introduction

Arup was commissioned to undertake the traffic impact assessment for the proposed redevelopment at 33 Bligh Street, Sydney. The proposed building at 33 Bligh Street includes the new City East Zone Substation and integrated commercial office tower (to be referred to as the “project”). The City East Substation is to be located in the basement and the podium of the building. The commercial office is located above the podium in a tower form. The basement also includes two levels of parking for the use of the commercial office building and the substation and a loading dock.

This traffic and parking report supports the Stage 2A (ii) Project Application under Part 3A of the EP & A Act. It provides a detailed description of the site access, as well as the forecast traffic impact on the local road network resulting from the project during construction and operation.

1.1 Scope of Works

The scope of this study includes:

- An estimation of the critical peak hour traffic volumes generated by the project;
- Calculation of the number and distribution of trips (on the surrounding road network) likely to be generated by the project during the critical peak hour period/s;
- Traffic counts for the AM and PM peak periods at the intersections of O’Connell Street with Bent Street and with Hunter Street;
- An analysis of the impacts of the project on the surrounding road network and public transport networks during the critical peak period/s;
- Identification of any traffic related safety implications and treatments associated with the project including pedestrian interaction at the driveways; and
- Identification of any external road works or contributions expected as a result of the project.

2 Existing Conditions

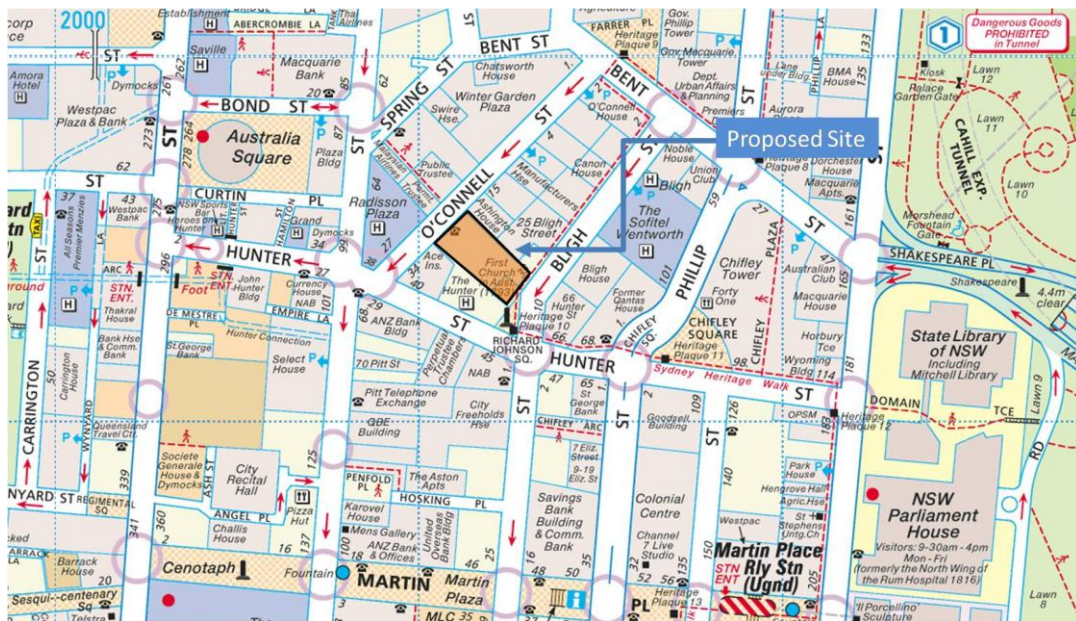
2.1 Site Location

The site is located on Bligh Street, in the northern part of the Sydney CBD. The site has frontage to both Bligh Street and O'Connell Street with existing basement access for vehicles available from O'Connell Street via a right of way over the adjacent properties driveway.

The existing commercial building on the site has basement level parking for 43 parking spaces which includes a number of tandem spaces. There are also 2 loading spaces and 1 courier space.

The location of the site is shown in Figure 1.

Figure 1 Site Location



2.2 Road Network

One way roads are the dominant feature of the local road network surrounding the site. Both Bligh and O'Connell Streets provide one way access in the southbound direction. Further, Pitt Street is one way southbound.

Bent Street to the north of the site provides two lanes in either direction, and is a major access road for vehicles entering the CBD via the Eastern Distributor.

2.3 Public Transport Access

The site is located conveniently to various modes of public transport. Wynyard railway station is approximately 600m or a five minute walk from the site.

Express inbound bus services from the Eastern Suburbs stop at the corner of Bent Street and Phillip Street, approximately 200m from the site. These services run at high frequencies and provide convenient access for people travelling to the site by bus.

There are outbound city bus stops located on Pitt Street, Elizabeth Street and Spring Street. These services travel south through the city and provide access to various suburban areas.

The site is well located for commuters arriving via ferry services at Circular Quay. People would experience a 600m or just over five minute walk from the ferry terminal to the site.

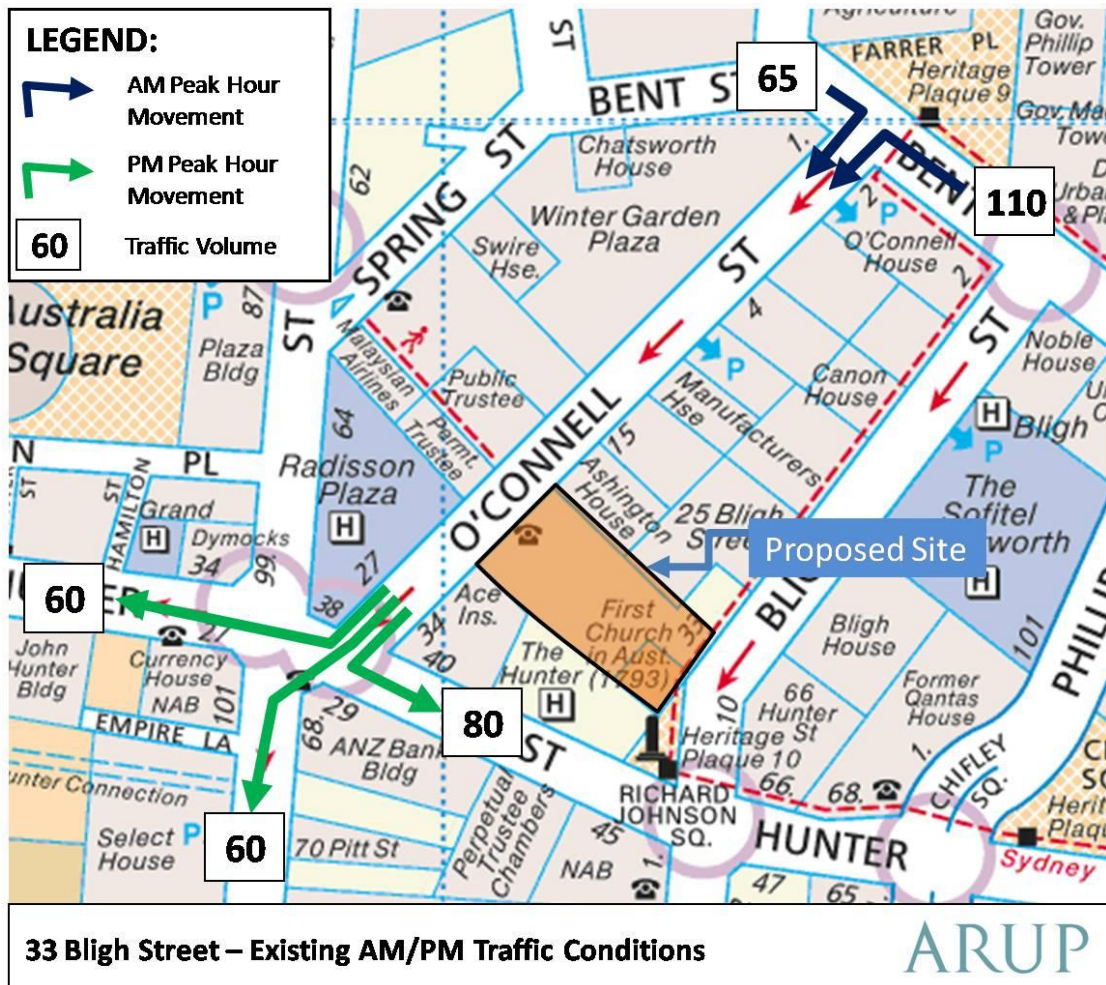
2.4 Traffic Conditions

Traffic surveys were conducted on O'Connell Street during both the AM and PM commuter peaks on a typical weekday. As O'Connell Street is one way in the southbound direction, surveys were conducted at the Bent Street intersection in the AM peak, and at the Hunter Street/Pitt Street intersection in the PM peak.

The existing basement car park on the site is currently vacant and hence is not contributing to the existing traffic flows.

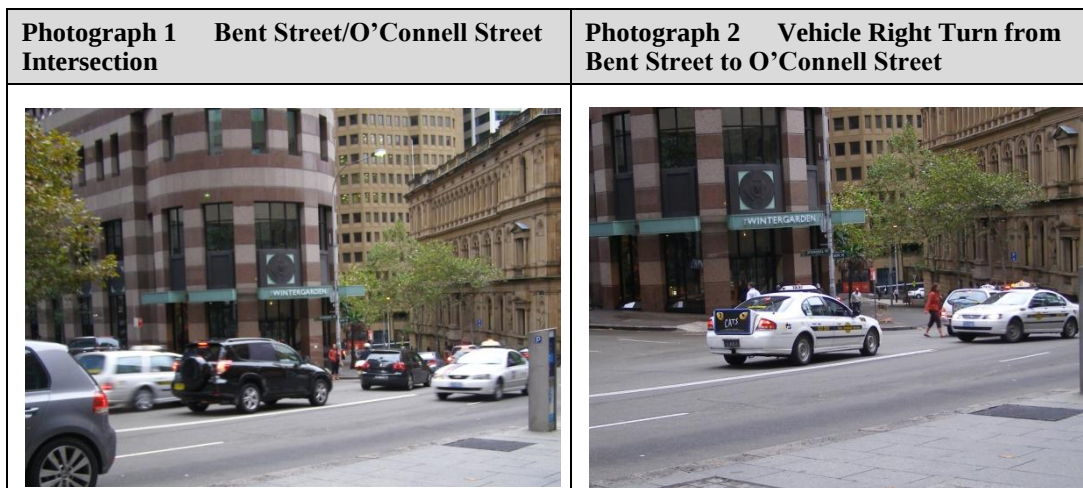
Results of the surveys for the peak hour AM and PM traffic is presented in Figure 2.

Figure 2 Existing Traffic Volumes



On-site observations indicated that traffic flowed acceptably during both the morning and evening peak periods. Queues at the Hunter Street/Pitt Street intersection in the PM peak were 6-7 cars in length, with all vehicles passing through the intersection in one signal cycle.

The intersection at Bent Street allows for controlled left and right turns into O'Connell Street, with passing vehicles utilising the adjacent traffic lane to manoeuvre around the turning vehicle (see Photograph 1). Westbound through vehicles on Bent Street leave sufficient room for eastbound vehicles to turn right onto O'Connell Street (see Photograph 2).



3 Development Proposal

3.1 Description of the Project

The project comprises the following components:

Commercial FSA – 28,050m²

Substation Nil contribution to FSA

3.2 Commercial Car Park and Loading Dock Configuration

3.2.1 Car Parking

The amount of parking permissible is based on Sydney City Council's LEP 1996 consolidated in 2000. The new floor space will be commercial.

Maximum number of car spaces permitted for the commercial component of the site

$$= \text{Site Area} / 50 = 2,040 / 50 = 40 \text{ spaces}$$

3.2.2 Parking for people with Mobility Impairment

1-2% of the permissible parking spaces need to be allocated for mobility impaired drivers, which is 1 space. There will be 1 space allocated at Basement Level 3 with an adjacent manoeuvring width of at least 2.4m and accessible to the lift core.

3.2.3 Bicycle Parking and Facilities

The current DCP requires 1 car space equivalent per 100 car spaces. It is proposed to provide 184 bicycle racks at Basement Level 4 in the car park and provide shower and change facilities on Level 13, one level below the Sky Lobby. This allows the facilities to be associated with the entry level to the commercial component of the building to assist with sustainable transport initiatives as part of the Green Star rating scheme.

3.2.4 Motorcycle Parking

The DCP requires dedicated motorcycle space at a rate of 1 car space equivalent per 100 car spaces which is 2 motorcycle spaces. One space each has been provided on both Basement Levels 3 and 4.

3.2.5 Driveway Configuration

It is proposed to locate all vehicle access on O'Connell Street. There will be an access driveway ramping down to Basement Level 4 for access to the loading dock and first level of car parking. The proposed entrance and ramp has a width of approximately 4.0m which widens to 6.0m some 20.0m into the site. The entrance is located towards the northern end of the site on O'Connell Street. This ramp will be managed by traffic signals for two way traffic, allowing priority to vehicles entering the car park.

3.2.6 Internal Car Park Ramp grades

The maximum grade permitted for private car parking by AS/NZS 2890.1:2004 is 1:4 (25%) with transitions. The initial entry ramp to Basement Level 4 has a 1 in 8 grade to allow truck access to the loading dock.

A single lane ramp is proposed between Basement Levels 3 and 4 with ramp grades and widths to comply with the AS/NZS 2890.1:2004. This ramp will also be managed by traffic signals for two way traffic, allowing priority to vehicles entering the car park

3.2.7 Access Control

A barrier will provide security access control at the property boundary for access to the car park and loading dock out of hours. During normal business access hours (6.30am – 6.30pm) the barrier will remain open.

3.2.8 Loading Dock Arrangement

The Central Sydney DCP recommends 1 space/3300m² of commercial floor space area (FSA). For the proposed 28,050 m² commercial FSA, 8 delivery/service spaces are recommended. Usually a large proportion of these are car sized spaces suitable for van delivery vehicles and courier vehicles.

A loading dock for 1 Medium Rigid Vehicle (MRV) and 1 Small Rigid Vehicle (SRV) will be provided at Basement Level 4. Due to the restricted manoeuvring room available, a turntable is proposed to be installed to allow the MRV to reverse into the dock. A series of dedicated loading bays where service and delivery vans can park are located on this same level. Access to this level is gained through the main ramp leading to the basement car park. The goods lift is located directly opposite the loading bays, which allows access to all levels.

3.2.9 Car Park Arrangements

The car park is configured over 2 basement levels. The car park complies with the Class 1 or 2 car park classification in accordance with AS/NZS 2890.1:2004. Parking bays are 2.5m wide by 5.4m long and generally arranged at 90 degrees to the aisle. An aisle width of 6.0m is generally achieved adjacent to car parking spaces. Some parallel parking is also envisaged. As part of the Green Star initiative, 11 small car spaces have been provided.

It is proposed that parking be provided as follows:

- Commercial up to 40 spaces
- Couriers, loading and Ausgrid service vehicles 8 spaces

3.2.10 Pedestrian Configuration

Primary pedestrian access to the commercial building will be from Bligh Street. In addition there is an access via escalators to the commercial lobby from O'Connell Street via the through site link.

3.3 Basement Level Plans

The general access, ramp and car parking arrangements are indicated in the following figures:

Figure 3: Level 5 - O'Connell Street;

Figure 4: Level 4 – Loading, Service Vehicle and Ausgrid Parking; and

Figure 5: Level 3 - Commercial Car Parking.

3.4 Ausgrid Substation

3.4.1 Driveway Configuration

It is proposed to locate all vehicle access on O'Connell Street.

A second driveway crossing and entrance is required for exclusive use of the Ausgrid Substation. This will be used infrequently for maintenance purposes and is located towards the southern end of the site on O'Connell Street. The driveway crossover to O'Connell Street will be 11.0m to permit wide and long vehicle access at infrequent times.

For delivery of the transformers at installation and later change over on a 10 to 20 year frequency, a special delivery platform will be used. The type of transport vehicle shall be a "Platform carrying an 85 tonne transformer." The turning path for this activity is shown in Figure 6. During this operation the road would be closed and parking removed as part of the delivery process requiring a special event traffic management plan.

3.4.2 Access Control

A door will provide security access control at the property boundary for access to the Ausgrid Substation. This will be closed 24 hours with security access control required by swipe card or similar.

3.4.3 Car Park Arrangements

The five service vehicle spaces at Basement Level 4 are available for use by Ausgrid service vehicles.

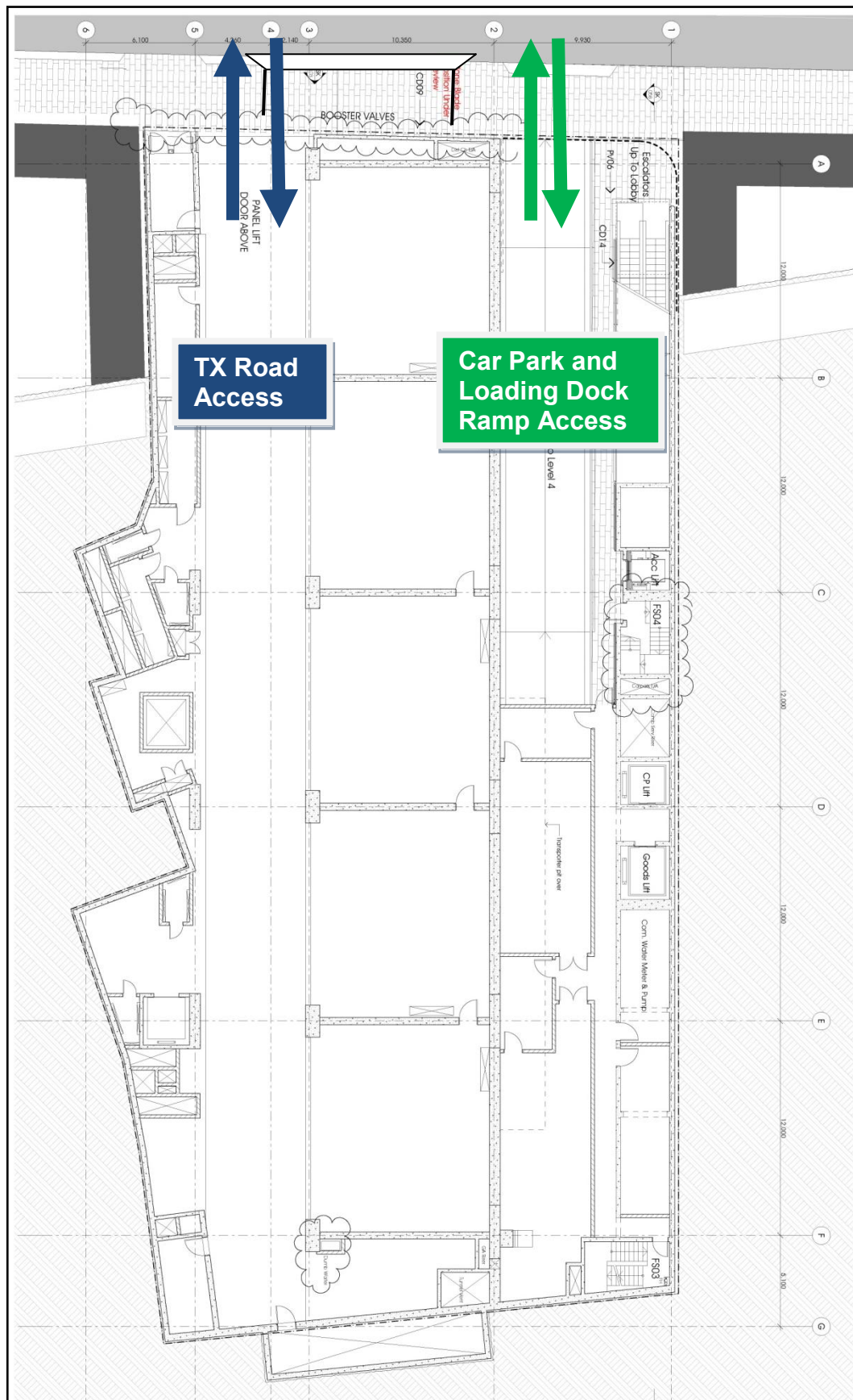
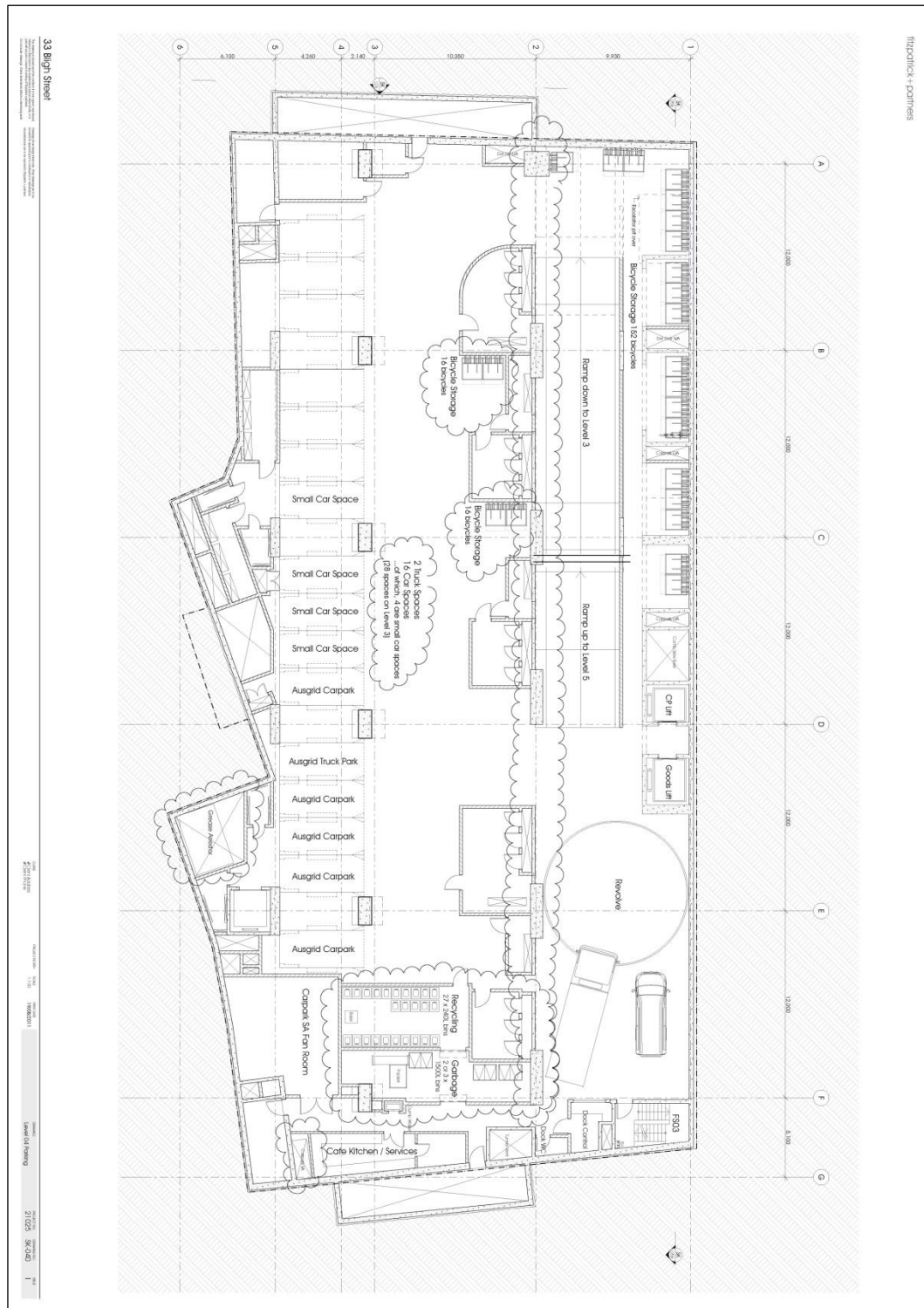
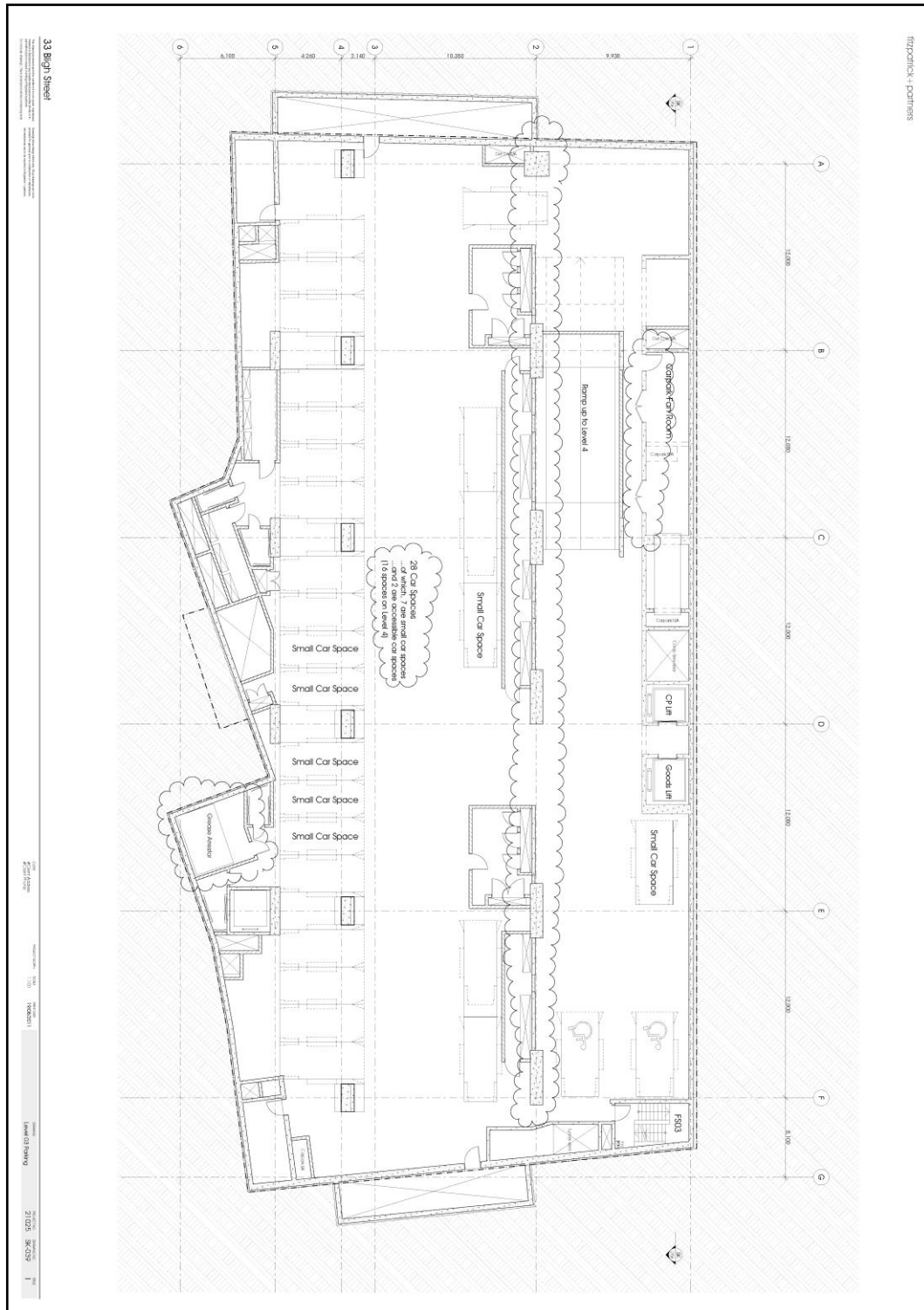


Figure 3: Level 5 - O'Connell Street Vehicle Entry Level





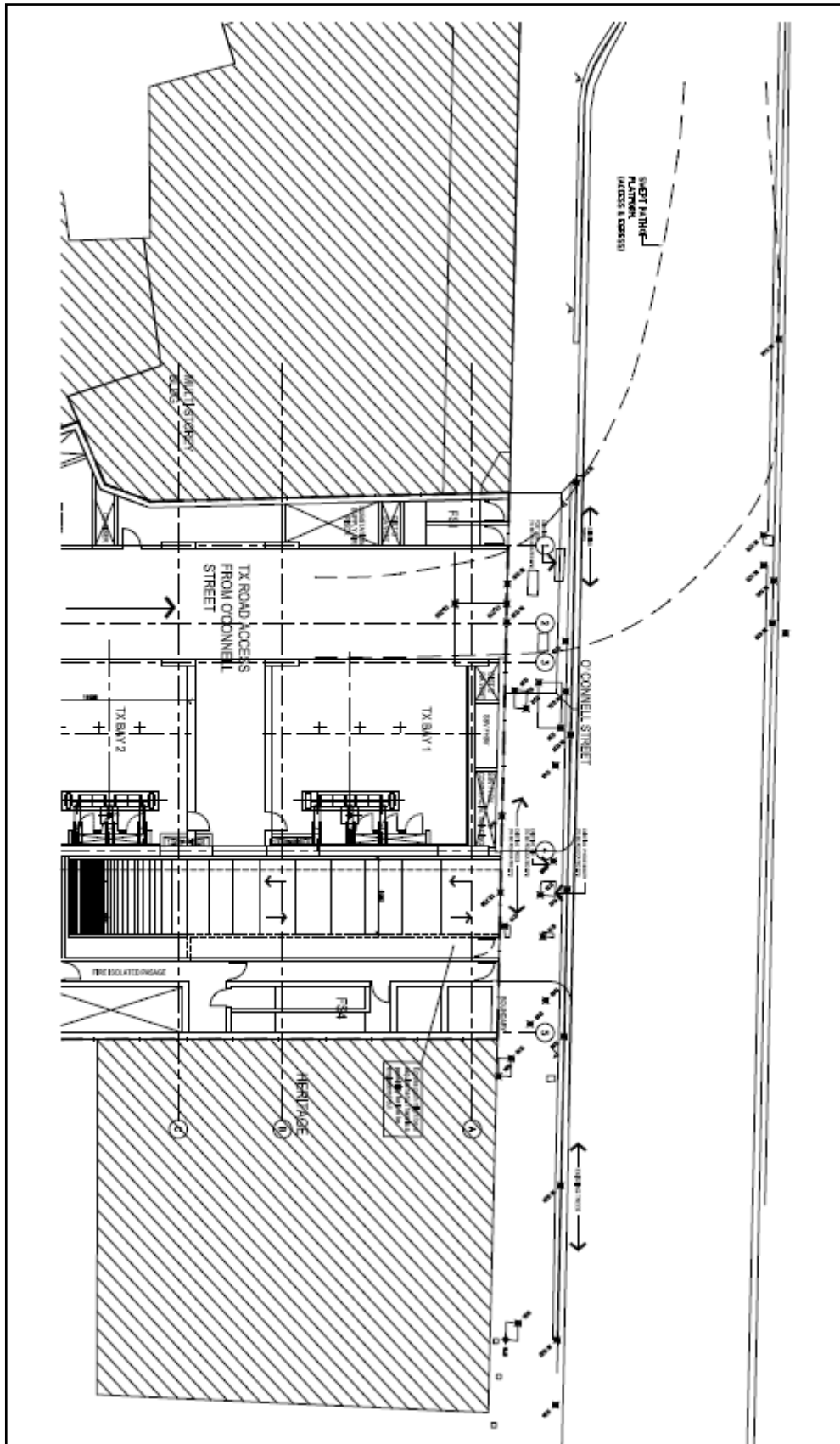


Figure 6: Turning Path for platform carrying Ausgrid Transformer

4 Traffic Assessment

4.1 Traffic Impact

4.1.1 Traffic Generation of the Project

Based on surveys of four similar commercial sites in the Sydney CBD, vehicle movements from the commercial tenant parking spaces in the building have been estimated for the morning peak hour, midday hour and evening peak hour. Table 1 below summarises the traffic generation for these periods.

Table 1: Peak Hour Traffic Generation of the Proposed 40 Commercial Parking Spaces

Time \ Direction	Inbound	Outbound	2-Way Total
Morning Peak Hour	15	1	16
Midday Hour	2	2	4
Evening Peak Hour	2	15	17

Table 2 below provides the peak period service vehicle flows, excluding bicycles and motorbikes.

Table 2: Peak Hour Traffic Generation of the Proposed Loading Dock

Time \ Direction	Inbound	Outbound	2-Way Total
Morning Peak Hour	6	6	12
Midday Hour	7	6	13
Evening Peak Hour	2	2	4

4.1.2 Traffic Assignment

The arrival and departure traffic routes are dictated by the left turn in and left turn out arrangements at the O'Connell Street driveway and by assuming the distribution pattern of the potential users of the project's car park and choosing the most direct routes from all directions to the site.

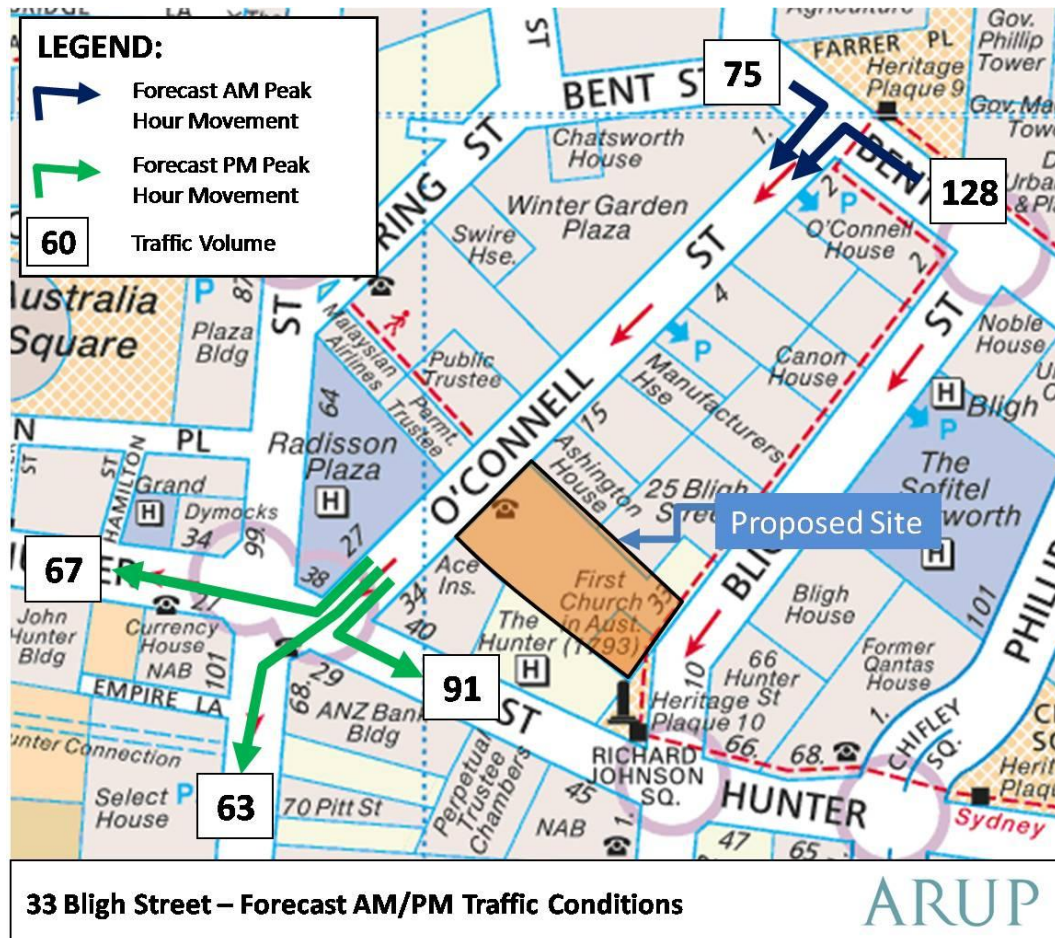
For approaching routes, it is assumed that 40% will be from the western suburbs on the Western Distributor via King Street then Elizabeth Street and Bent Street, 35% come from northern suburbs on the Harbour Bridge and use either Grosvenor Street or the Cahill Expressway to access Bridge Street and then Loftus Street to Bent Street, 15% from eastern suburbs on William Street then Elizabeth Street and 10% from southern suburbs on Elizabeth Street or the Eastern Distributor.

For departure routes, it is assumed that 40% will access the Western Distributor via Market Street from Castlereagh Street and 35% will use Hunter Street, George Street and Grosvenor Street to access the Sydney Harbour Bridge. The remainder will travel south on Elizabeth Street (10%) to access Park Street/William Street in the east (15%).

4.1.3 Forecast Traffic Flows

Based on the forecast site traffic generation as described in section 4.1.1, and the assignment of traffic as described in section 4.1.2, forecast traffic flows have been identified for the AM and PM peak. These are presented in Figure 7.

Figure 7: Forecast Traffic Flows



4.1.4 Assessment

A comparison of the existing and forecast vehicle movements at both intersections is shown in Table 3.

Table 3 Comparison of Existing and Forecast Traffic Volumes

Intersection	Vehicle Movement	Existing Peak Hour Traffic Movements	Forecast Peak Hour Traffic Movements	Increase
Bent St	Left onto O'Connell	110	128	16%
	Right onto O'Connell	65	75	15%
Hunter/Pitt St	Left onto Hunter	80	91	14%
	Through to Pitt	60	63	5%
	Right onto Hunter	60	67	12%

The analysis indicates that the project is forecast to have a minor impact on the surrounding road network in the morning and evening peak periods. Movements at both intersections are forecast to experience at most an additional vehicle every four minutes (on average) in the peak hour. On site observations indicate that both intersections operate with significant spare capacity, with minimal vehicle delays. Queues at the Hunter Street/Pitt Street intersection are a manageable 6-7 cars in length, with this figure not expected to increase dramatically as a result of the project.

The existing building utilised 43 car parking spaces and contained a loading dock which would have generated very similar traffic movements to the project. It is concluded that there will be no additional impact as a result of the project compared to traffic conditions when the building was previously fully tenanted.

4.2 O'Connell Street Driveway Crossover

4.2.1 Pedestrian and Vehicle Interaction

The numbers of vehicle movements across the footpath have been identified in Section 4.1.1 for the combined tenant vehicle and service vehicle activity. During the morning and afternoon peak periods when pedestrian traffic is at its busiest, up to 28 vehicles per hour are expected. This is equivalent to a vehicle movement every 2 minutes. There are many similar driveway arrangements at other locations along O'Connell Street and pedestrians expect to interact with vehicles at each of these locations.

4.2.2 Driveway operations

O'Connell Street is configured for southbound one-way travel with parking on both sides of the road and two travel lanes. Vehicles are restricted to left turn in and left turn out movements at the site driveway.

4.2.3 Traffic Management Plan for Access

The site is very constrained and access for cars and trucks has been confined to a single 4.0m wide opening. A traffic light control system is required to control the two-way movement of vehicles on the single lane basement car park ramp. Priority will be given to vehicles entering the site so that vehicle queuing on O'Connell Street does not occur on entry. Vehicles exiting the car park will be held on a red light at the base of the ramp until the ramp is clear for exit.

A Traffic Management Plan will be implemented to provide a safe environment for pedestrian and vehicle movements at the O'Connell Street driveway. The aspects of the plan will include the provision of:

- Flashing warning lights for pedestrians as vehicles depart the site
- CCTV surveillance of the access with connection to the security office. An audible device may also be appropriate
- Mirrors to assist exiting drivers to view pedestrians on the footpath
- Warning signage on each side of the crossover for pedestrians and signage for drivers leaving the driveway

5 Construction Traffic Management

The substation forms the basement and the podium for the commercial building and will be constructed as the first component of the development. The construction of the commercial tower would follow. The impacts of construction traffic for the project on the traffic network are assessed in the construction traffic impact assessment prepared by GHD (2011). A detailed construction traffic management plan would be required prior to construction activities commencing on site.

6 Conclusions

The report has described the traffic and parking conditions arising from the proposed City East Zone Substation and Integrated Commercial Development at 33 Bligh Street, Sydney. Key findings and recommendations of the study include:

- The site is well connected to Public Transport for all modes including railway, bus and ferry.
- On-site observations indicate traffic flowed acceptably on O'Connell Street at both Bent Street and Pitt/Hunter Street during the AM and PM peak hours.
- Vehicle access to the site will be via O'Connell Street, providing access for service, loading and tenant vehicles. A traffic management plan will be implemented for vehicle access to the site to ensure suitable driveway operations occur.
- Provision of loading dock and service spaces on site will comply with the City of Sydney's requirements and mean that all site deliveries can be accommodated on site, including courier activity.
- It is proposed that the design of the car parking layout, loading dock layout, ramping system and vehicle circulation will be in accordance with the Sydney City Council Local Environmental Plan (LEP), Development Control Plan (DCP) and Code for Waste Handling in Buildings and the Australian Standard for Off-Street Car Parking AS 2890 Part 1 and 2. Accordingly, parking and space provision is to be made for people with mobility impairment, adequate delivery and servicing, bicycles and motorcycles.
- The traffic impact of the project has been considered on the basis of the number of parking spaces provided and the level of loading and service vehicle activity anticipated. The additional affect of these vehicles is minimal on the nearest intersections to the site after which vehicles disperse.
- The existing building utilised 43 car parking spaces in the basement with access from O'Connell Street and contained a loading dock which would have generated very similar traffic movements to the project. It is concluded that there will be no additional impact as a result of this development compared to traffic conditions when the building was previously fully tenanted.