traffic impact assessment

for a proposed commercial development EA zone substation at 430-450 pitt street, sydney cbd

prepared on behalf of energy australia by **traffix** traffic & transport planners
ref: 08 026v8 19 september 2008

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contents

1. introduction

T R A F F I X has been commissioned by Kann Finch Architects acting on behalf of Energy Australia to undertake a traffic impact assessment in support of a Project Application relating to the construction of a commercial development on a site at 430-450 Pitt Street, Sydney. The site extends between Campbell Street in the north and Hay Street in the south, with an existing commercial development known as Central Square to the east.

This report documents the findings of our investigations and should be read in the context of the Environmental Assessment prepared separately. The proposed development comprises a site area of approximately 3,428.9m^2 with a floor space of approximately 22,525m^2 and parking for 62 cars with additional loading space. Hence, for the purpose of application of State Environmental Planning Policy (Infrastructure) 2007 the development requires referral to the RTA's Sydney Regional development Advisory Committee (SRDAC).

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the proposed development
- Section 5: Assesses the parking requirements
- Section 6: Assesses the traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Provides of an overview of construction traffic impacts
- Section 9: Presents the overall study conclusions.

As a Part 3A Project Application, the consent authority is the Department of Planning.

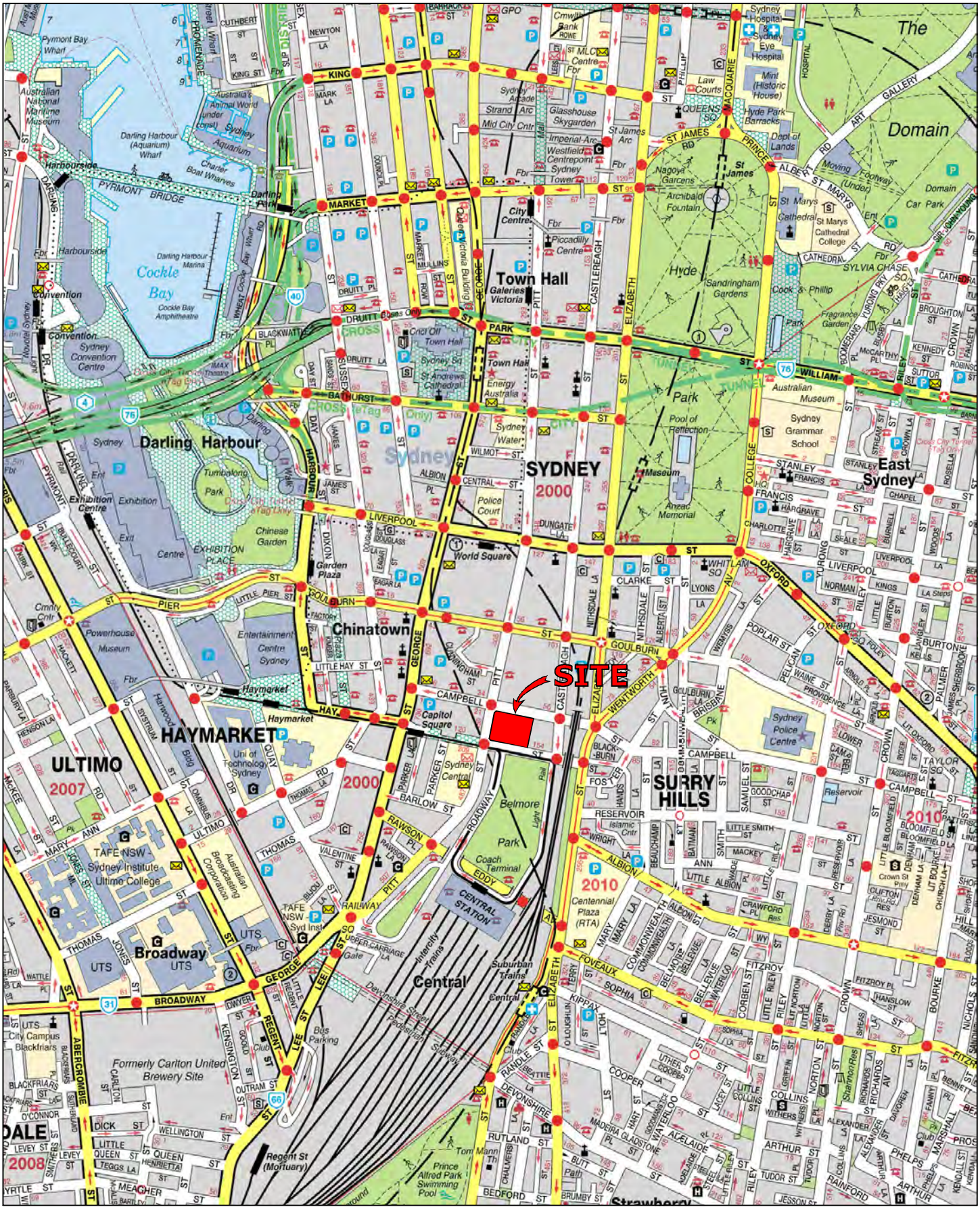
2. location and site

The site is bounded by Pitt Street on its western side, Campbell Street on its northern side, Hay Street on its southern side and a large commercial office building known as Central Square on its eastern side. Belmore Park lies generally opposite the site on its southern side.

The site has a frontage to Pitt Street of about 54 metres and a frontage to both Campbell Street and Hay Street of about 70 metres. It is presently used as a public car park, with capacity for about 100 cars, all at-grade.

Vehicular access is presently available directly onto Hay Street via a driveway access that serves the subject site as well as the adjoining site known as Central Square.

A location plan is presented in **figure 1**, with a site plan presented in **figure 2**. Reference should also be made to the Photographic Record presented in **appendix a**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.



Source: UBD 2006

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0 500m

impact assessment: commercial office block

430-450 pitt street, sydney cbd

figure 1

location

prepared on behalf of energy australia

by **traffix traffic & transport planners**

date of aerial photography: January 2007

N

0 1km

impact assessment: commercial office block
430-450 pitt street, sydney cbd

figure 2
site

prepared on behalf of energy australia
by **traffix traffic & transport planners**

3. existing traffic conditions

3.1 road hierarchy

The road hierarchy in the vicinity of the site is shown in **figure 3.** It can be seen that the site lies to the immediate north of Central Station and is within the established southern CBD precinct. The Capitol Theatre is directly opposite the subject site on the western side of Pitt Street, with commercial buildings to the north and east and with Belmore Park to the south, with Central Station beyond.

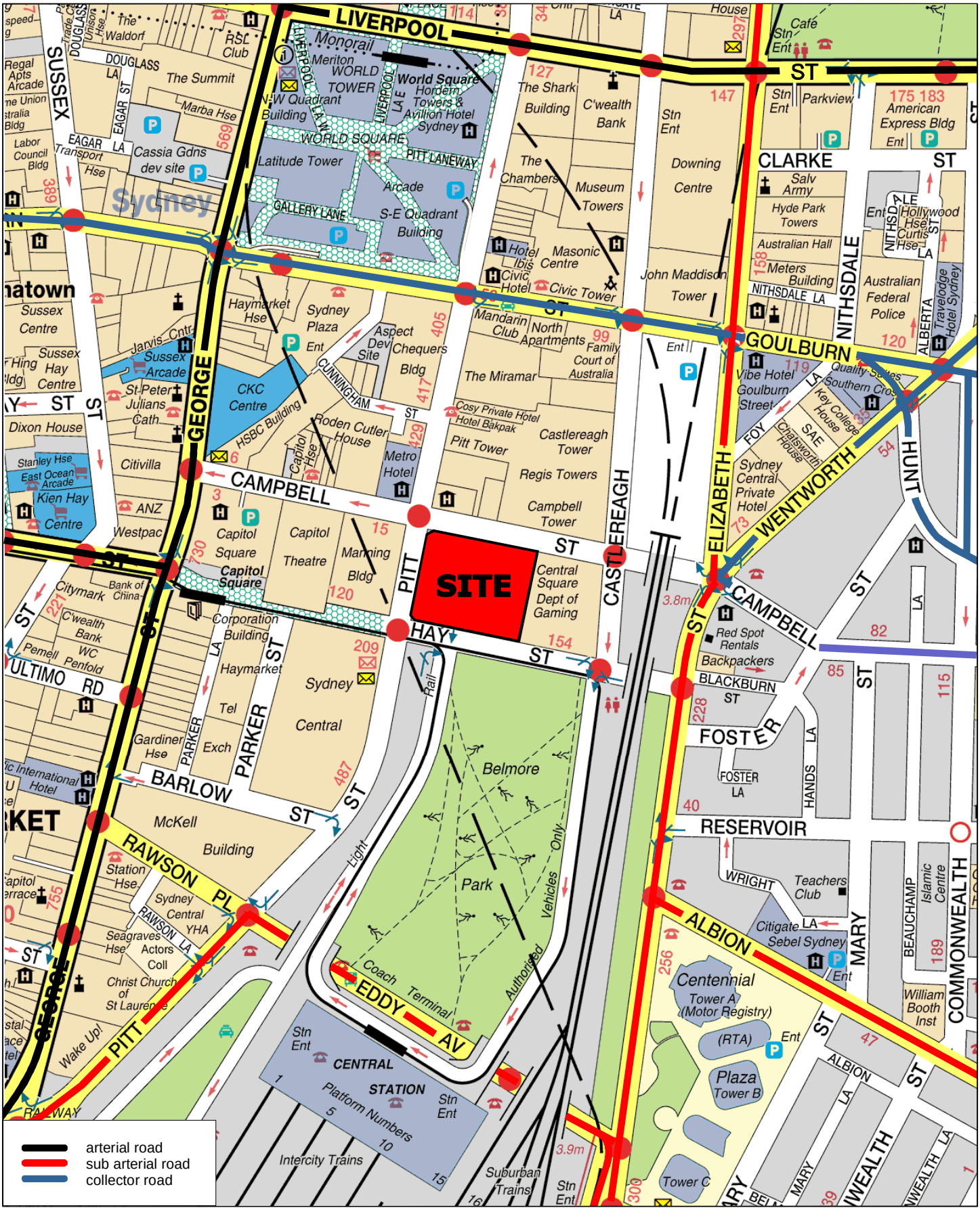
Pitt Street, Campbell Street, Hay Street and Castlereagh Street are all local roads under the care and control of Sydney City Council. The site is bounded by these roads, which provide access to George Street in the west and Elizabeth Street in the east, with Campbell Street and Hay Street both providing underpasses to the main suburban rail line.

These routes ensure good overall accessibility to the site from both the local and regional road network. The site is also within a very comfortable walking distance to excellent public transport services. These include Central Station which is 250 metres south of the site, the Light Rail system that traverses immediately adjacent to the site along Hay Street and trunk bus services along George Street and Elizabeth Street.

It can be seen from **figure 3** that the site is conveniently located with respect to the arterial and local road systems serving the region. It is therefore able to effectively distribute traffic onto the wider road network, minimising traffic impacts.

3.2 general description of road environment

Pitt Street is constructed with two traffic lanes in each direction adjacent to the site, with two way flow. Adjacent to the site, the western side of Pitt Street permits 4 hour period parking, while No Parking restrictions apply along the eastern side. Pitt Street carries one-way northbound flow, north of Goulburn Street. The intersections of Pitt Street with both Campbell Street and Hay Street are both under traffic signal control.



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impact assessment: commercial office block
430-450 pitt street, sydney cbd

figure 3
road hierarchy

prepared on behalf of energy australia
by **traffix traffic & transport planners**

Campbell Street is also constructed with two traffic lanes in each direction east of Pitt Street, though with one-way westbound flow between Pitt Street and George Street. Adjacent to the site, Campbell Street has generally 4 hour period parking restrictions along both sides, with some sections of Loading Zones on both sides.

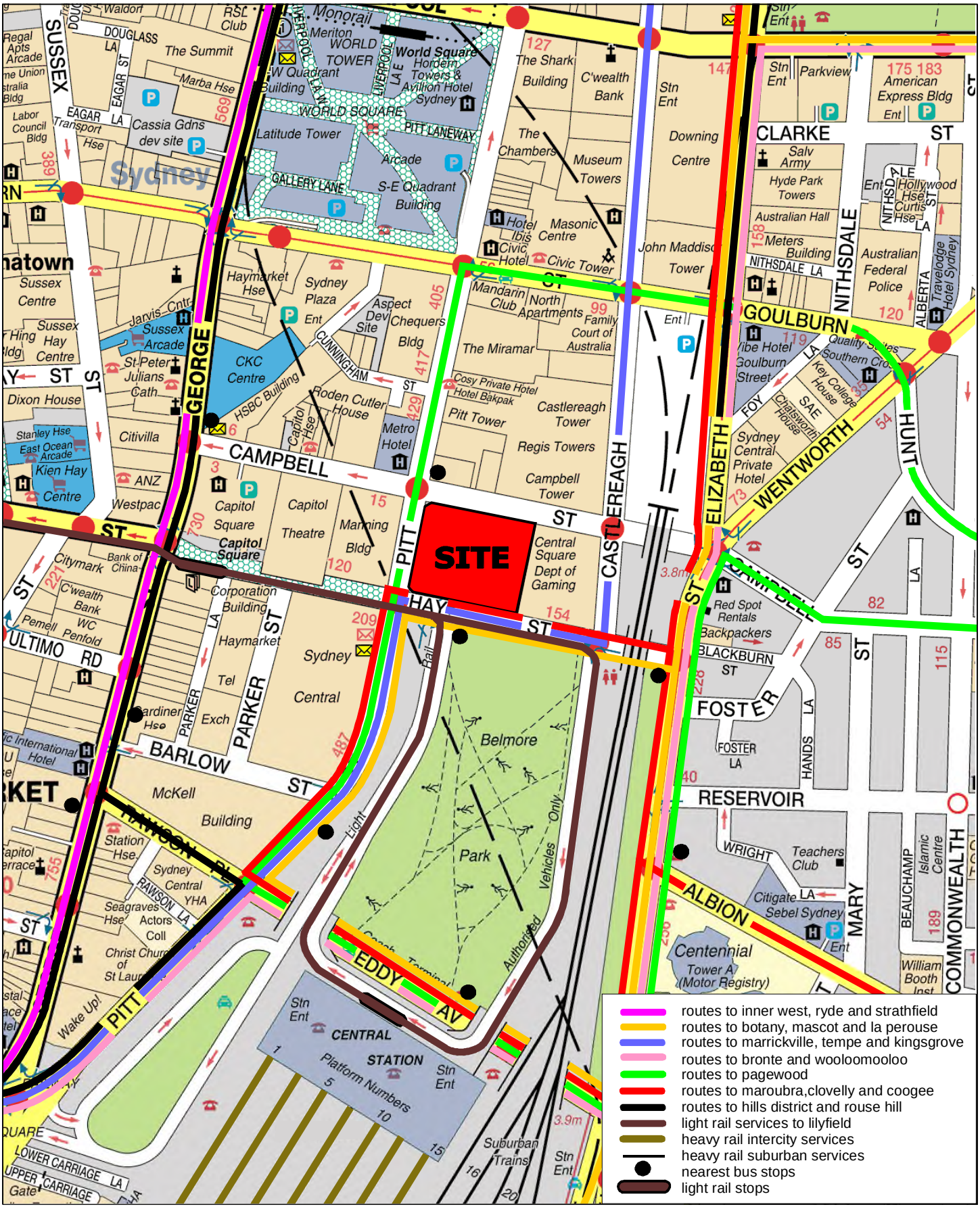
Hay Street is constructed with two traffic lanes in each direction between Pitt Street and Elizabeth Street. Period parking is permitted along the northern side, comprising 2 hour parking during business hours and 4 hour parking at other times. Hay Street is closed to traffic west of Pitt Street, where it becomes a pedestrian mall that extends through to Parker Lane immediately adjacent to George Street. The Light Rail system operates within this closed section of Hay Street, with two-way rail movement. A one-way clockwise loop then traverses Hay Street adjacent to the site (in an easterly direction); to then make use of the ramps to/from Central Station on either side of Belmore Park. The intersection of Hay Street with Castlereagh Street is under traffic signal control,

Castlereagh Street is constructed with three traffic lanes between Campbell Street and Hay Street. It operates with one-way southbound flow, terminating at Hay Street.

As mentioned, the site is accessed via a single driveway crossing onto Hay Street, at the western end of the site. This driveway is a common driveway that serves the subject site (with public parking for 100 cars) as well as the basement car park for the site to the immediate east (Central Square). The proposal will result in the construction of two driveway crossings onto Campbell Street. This includes the main western driveway serving basement parking and a secondary driveway required for access to the sub-station located further to the east. The latter is required as a dedicated service driveway for occasional large vehicles servicing the sub-station on a very infrequent basis. This separate driveway is essential for Energy Australia's operational requirements and cannot be shared with the main car park/service vehicle access. These two driveways will result in the loss of two on-street parking spaces and this is an unavoidable consequence of providing safe site access.

3.3 public transport

The existing bus services and rail services that operate in the locality are shown in **figure 4**. It is evident that the site benefits from excellent access to the public transport system.



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0 100m

impact assessment: commercial office block

430-450 pitt street, sydney cbd

figure 4

transport routes

prepared on behalf of energy australia
by **traffix traffic & transport planners**

3.4 existing site generation

The existing site (with 100 public parking spaces) was surveyed between 7am and 9am on a typical weekday morning peak period, to establish its level of traffic generation. The subject site generated a peak flow of 30 vehicle trips per hour between 8am and 9am, and 35 veh/hr between 4.30pm and 5.30pm. The adjoining site (which shares the driveway access) generated an additional 22 vehicle trips per hour over the same period. These trips would be dispersed into both directions on Hay Street, connecting to Pitt Street to the west and Elizabeth Street to the east.

3.5 existing intersection performances

It will be evident that the performance of the road system is dictated by the operation of critical intersections within the adjoining road network. In this regard, as the site access is onto Campbell Street the key intersection that will potentially be under increased pressure from the proposed development and requires assessment is the intersections of Pitt Street with Campbell Street, which is adjacent to the site access.

This intersection was surveyed in 2008 during both on-street peak periods on a typical weekday. The results of the survey were analysed using the SIDRA computer program to determine their performance under these existing traffic conditions.

The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DS approaches 1, it is usual to attempt to keep DS to less than 0.9. When DS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LOS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown below:

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

The results of the modelling are shown in Table 1 and outputs are provided in **appendix d**. It will be noted in this regard that conditions at all other times will be improved, with lower delays.

table 1: existing intersection performance: am and pm peak hour

Intersection Description	Control Type	Period	Degree of Saturation	Intersection Delay	Level of Service
Pitt Street / Campbell Street	Signals	AM	0.585	12.8	A
		PM	0.680	14.1	A

It can be seen from Table 1 that this intersection operates satisfactorily during both peak periods, with level of service A and with moderate average delays. Level of service B is provided for the most disadvantaged movements during both peak periods. However, the most relevant use of this analysis is to compare the relative change in these performance parameters as a result of the proposed development. This is discussed further in Section 5.

4. description of proposed development

A detailed description of the proposed development is provided in the Environmental Assessment prepared separately by Kann Finch Group. In summary, the development for which approval is now sought comprises the following components:

- Removal of the existing 100 public parking spaces;
- Construction of a 13 level commercial building comprising approximately 22,525m^2 of Floor Space Area (20,575m^2 of Net Lettable Area). The development is intended for use as a Zone Substation and Office by Energy Australia and is a stand-alone, purpose-built facility. The sub-station occupies the eastern portion of the subject site and comprises 7 levels with two being below street level;
- Removal of the existing site access onto Hay Street and construction of three new accesses (driveway crossings) including two onto Campbell Street (one for the commercial building and one for the sub-station) plus one onto Hay Street for the substation;
- Provision of 62 parking spaces for use by tenants and an additional 2 courier spaces within a 3 level basement car park;
- Provision of on separate on-site servicing for the commercial building and the sub-station for their respective design trucks; and
- Provision for disabled parking.

The traffic and parking impacts arising from the development are discussed in Sections 5 and 6. Reference should be made to the plans submitted separately to Council prepared by Kann Finch Group which are presented at reduced scale in **appendix b**.

5. parking requirements

5.1 council's LEP 2005

The development site has an area of 3,428.9m^2 with a total commercial floor area of approximately 22,525m^2. This excludes the sub-station area, which is plant and therefore excluded from the floor area calculations. On this basis, Sydney City Council's LEP 2005 requires a maximum of the ratio of Site Area/50 which equates to 68.6 (69) spaces.

In response, 62 spaces are proposed which is in full compliance and this excludes 2 additional courier spaces which are discussed below. Accordingly, the objectives of Council's LEP have been met.

5.2 disabled parking

The development provides two disabled spaces on Basement Level 2. These are adjacent to the lift.

5.3 bicycle and motorcycle parking

No express provision is made for motorcycles or bicycles. However, it is considered that the area adjacent to spaces 16 on Basement Levels 2, 3 and 4 would all be able to accommodate one motorcycle or a bicycle rack (refer to drawings EA05, EA06. EA07 in **appendix b**).

5.4 servicing

Garbage collection will occur only on an average of twice per week and this will occur from within Basement Level 1. Collection is proposed by a private contractor and a separate Waste Management Plan has been prepared in support of this collection method. An additional 2 courier parking spaces

are provided which will accommodate cars, station wagons and vans. Any deliveries by larger trucks will occur on street and this is expected to be very infrequent.

The sub-station will require servicing via the 6 metre wide central internal aisle between the rows of transformers. This driveway will be used on a very infrequent basis for regular servicing, which will typically involve a 9.8 metres long rigid truck, as shown in appendix c. This will be able to reverse into the site under supervision by EA staff, with no impacts on on-street parking.

Visits by a special 23 metre long transformer transporter vehicle also occurs about every 10-20 years, which is not therefore a normal 'design' consideration and as necessary, special arrangements will be made for this vehicle to parallel park along the site frontage. However, a plan is included within **appendix b** which shows the required turning path of this vehicle.

6. traffic impacts

6.1 trip generation

The site is predicted to generate a maximum of 48 veh/hr during peak periods, based on application of the RTA's Guideline trip rate for tenant parking of 0.8 trips/space/hr during both the morning and afternoon peak periods. This will result in:

- 38 in, 10 out trips in the AM peak; and
- 10 in, 38 out trips in the PM peak.

Trips at all other times will be less. This compares with 30-35 veh/hr for the existing 100 space public car park as surveyed and reported upon in Section 3. Accordingly, the development will generate a net additional 18 veh/hr in the AM peak and 13 veh/hr in the PM peak period. This equates to a maximum of only one additional vehicle every 3 to 4 minutes. These movements will also be split into both directions along Campbell Street so that an additional vehicle every 6 to 8 minutes will occur at any one intersection.

Having regard for this, the additional traffic can be readily accommodated with no change expected in existing levels of service at any intersection.

7. access & internal design aspects

7.1 access design

The access driveway serves 62 parking spaces and is to a local road. Accordingly AS 2890.1 requires a Category 1 driveway of width 3.0 to 5.5 metres. In response, a combined driveway of width 7.4 metres is provided (at the property boundary) which is more than satisfactory. The driveway narrows to 6.2 metres at a distance of 2.5 metres within the site which also exceeds the requirements of the standard. Due to the offset created by the internal stairs, the driveway also has an effective visual splay of 1.9 metres along the site frontage and 2.5 metres internally which essentially complies with the requirements of Figure 3.3 of AS 2890.1.

The Energy Authority service driveway is able to be safely accessed by a 9.8 metre rigid truck as shown in **appendix c**.

7.2 internal design

Council's LEP 2005 embodies the RTA's Guideline in relation to internal design aspects. The RTA's Guideline similarly endorses the use of AS 2890.1 and AS 2890.2. The design complies with these standards and accordingly, Council's requirements are met. The following factors are noteworthy:

- The internal ramp is at a maximum gradient of 1 in 20 (5%) for a distance of 6 metres within the property boundary;
- The internal ramp has a maximum gradient of 1 in 6 (16.7%) with additional 4 metre long transitions at gradient 1 in 12 (8.3%), which is satisfactory for the private waste collection vehicle and is more than satisfactory for cars, vans and station wagons;
- The car parking bays and aisles comply with AS 2890.1 having regard for the low level of traffic activity. The threshold of 30 veh/hr above which two-way flow is required only occurs on Basement Level 2 and the ramps are nevertheless designed for two-way flow, with numerous

passing opportunities. However, as a vehicle turning at the northern 'U' turn manoeuvre at the top of the ramp needs to use the entire area locally, the use of convex safety mirrors will be required at cc stage;

- A swept path analysis is provided in **appendix c** which demonstrates satisfactory manoeuvrability.

The proposed access and internal design is shown on the EA plans prepared by Kann Finch Group as reproduced in **appendix b**. In summary, the internal design arrangements will operate safely and efficiently.

8. construction aspects

8.1 construction overview

Consideration has been given to the likely construction program to give an indication of the relative impacts associated with this stage of the development. It is expected that a detailed traffic management plan (TMP) would be required as a condition of approval of the subject development prior to the commencement of construction activities. As such, the following is provided for indicative purposes only and will be subject to further assessment at a later date. This relates to the construction of the commercial component of the overall Belmore Park site and the works related to the other components including earthworks and retaining structures for the entire site are included within the substation documentation.

The construction of the commercial component is expected to occur between May 2011 to mid November 2012 which is a total period of 18.5 months. It will incorporate the following key stages of completion:

- Structural works 9.5 months;
- Façade 12.5 months;
- Roofing 13.0 months;
- Fitout 18.0 months; and
- Full Completion 18.5 months;

It is expected that construction would occur between 7am – 5pm Monday to Friday with reduced activity on weekends.

The development occupies the full extent of the site and, as such, a work zone will be required along the Campbell Street frontage for the deliveries. This is the most appropriate location due to the

reduced traffic volumes compared to other frontages and in particular the lack of light rail. A class "B" hoarding is to be constructed along all site frontages to ensure that the impact on pedestrian travel is minimised over the construction period. Minor disruption may occur during construction of the hoarding, however this is expected to occur over a relatively short period.

The main site access is proposed from Campbell Street for similar reason to that of the work zone, namely reduced traffic volumes and lack of light rail along this frontage. Additional access locations may be required on other frontages to gain access to particular areas by workers and small deliveries however the majority of activity will be focused around the main site access to Campbell Street.

Some short term road closures may be required for particular events such as the erection and dismantling of the tower crane and certain large deliveries. Traffic management protocols will be developed for each of these events once the exact nature and duration are fully understood. In the event of these tasks requiring an extended duration, it is expected that traffic would be diverted to Hay Street.

It is estimated that between 10 and 15 trucks arrivals would be required per day. This results in a total of up to 30 truck movements per day (15in, 15out). Assuming that these are evenly distributed throughout the day, to minimise congestion at the work zone, results in 3 movements per hour over a 10 hour work period.

A crane and materials hoist are to be located within the site along the Campbell Street frontage to make use of the proposed work zone.

Worker numbers will vary during the course of the construction. An average of 46 workers are expected over the entire construction period with an estimated maximum of 124 workers (average of 91) over any one month.

8.2 impacts of construction

The majority of workers are expected to use public transport to attend the site given the relative lack of parking availability in the area and the close proximity of the site to Central train station and bus services. Indeed this should be encouraged and all contractors should be advised to seek alternative travel arrangements where available. The length of the work zone should be sufficient to accommodate both deliveries by trucks and contractor parking required. It is expected that workers would be able to use the basement level carpark upon its completion which will reduce the length of the work zone for the remainder of the construction period.

The development will result in a total of approximately 30 truck movements per day which will occur evenly throughout the day. Trucks will access the site from Elizabeth Street and exit the site via Pitt Street. This effectively results in 15 movements per day at any one intersection which is equivalent to 2 truck movements per hour. This will have a negligible impact on the performance of the surrounding road network.

The potential road closures will obviously result in altered traffic conditions in the vicinity of the site. The impact of these events will depend on their duration, however they are expected to be manageable. Traffic management protocols would be developed within future documentation as a condition of approval. Consideration of peak on-street traffic conditions should be considered in the planning of these events such that the relative impact will be reduced.

In summary, the traffic impacts associated with construction of the development will generally be moderate. The full nature of the construction activities will be confirmed as part of construction approval and when the nature of these activities is fully developed.

9. conclusions

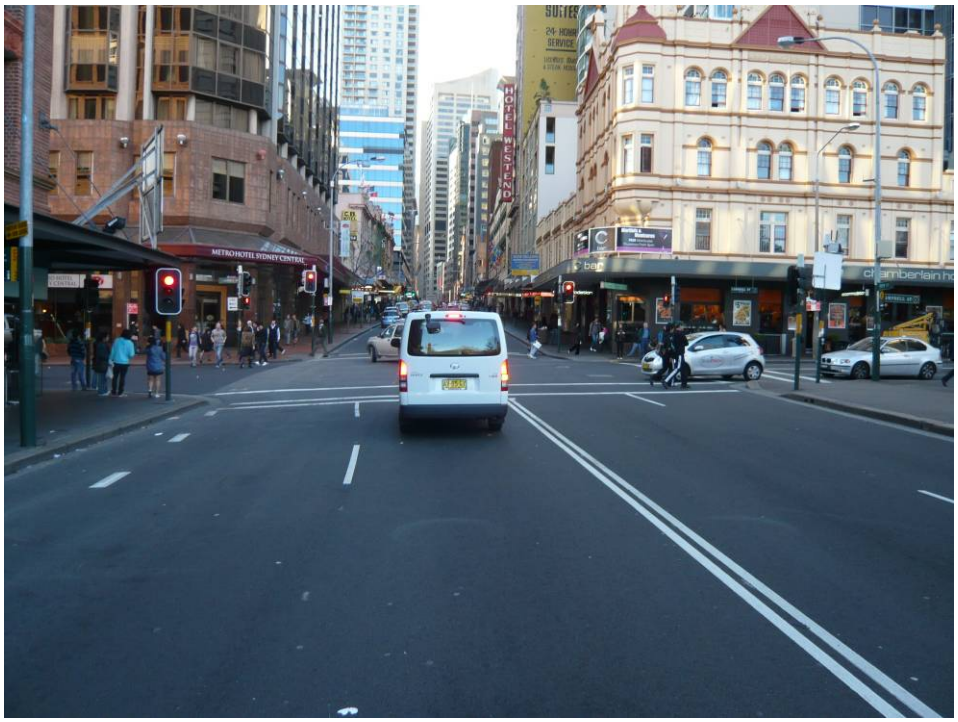
The following points are noteworthy:

- The site enjoys excellent access to and from the road network and is very well served by public transport;
- Full compliance is achieved with Council's LEP 2005, with 62 car spaces proposed compared with a maximum of 69 spaces permitted. The provision of 2 courier spaces is additional and has not been included as general parking;
- The expected peak generation (48 veh/hr) is not significantly more than occurs with the existing use of the site as a 100 space public car park, so that external traffic conditions will be essentially unchanged;
- The proposed access arrangements are considered very satisfactory and comply with AS 2890.1 (2004);
- Provision is made for disabled parking;
- Provision is made for bicycle and motorcycle parking as discussed;
- Provision is made for entry to the site by a private waste collection and this will be under supervision as part of a Waste management Plan;
- Separate provision is made for the infrequent servicing requirements of the sub-station via a second access driveway; and
- The internal design arrangements comply with AS 2890.1 (2004).

The proposed development is therefore supported in terms of its traffic and parking impacts.

appendix a

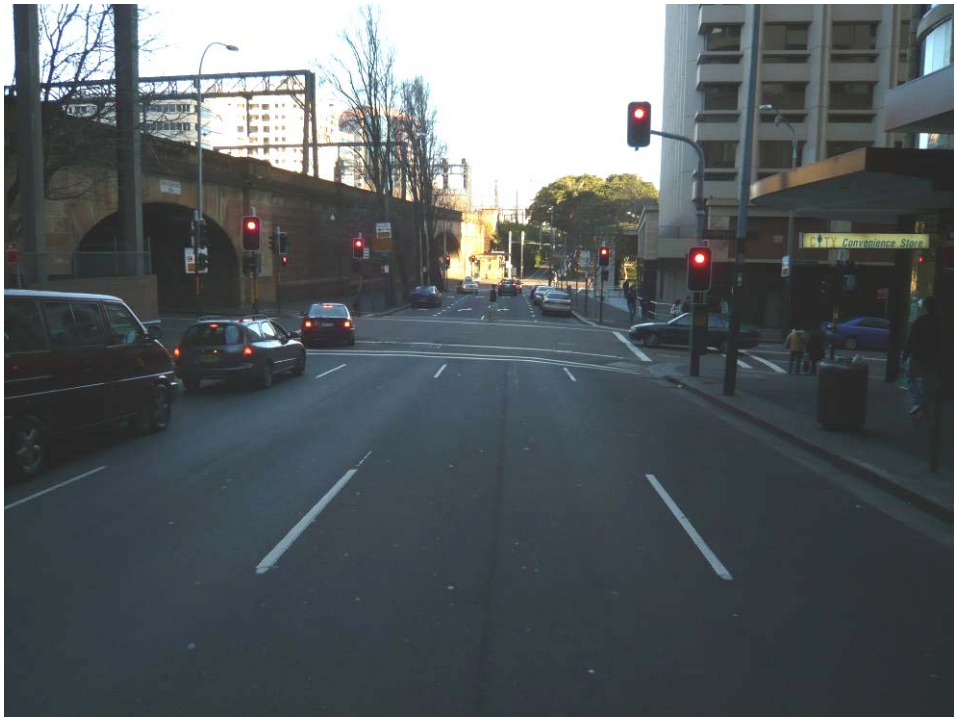
photographic record



View looking north along Pitt Street at its intersection with Campbell Street adjacent to the site on the right.

View looking west along Campbell Street at its intersection with Pitt Street. The proposed site access is on the left of the photo.

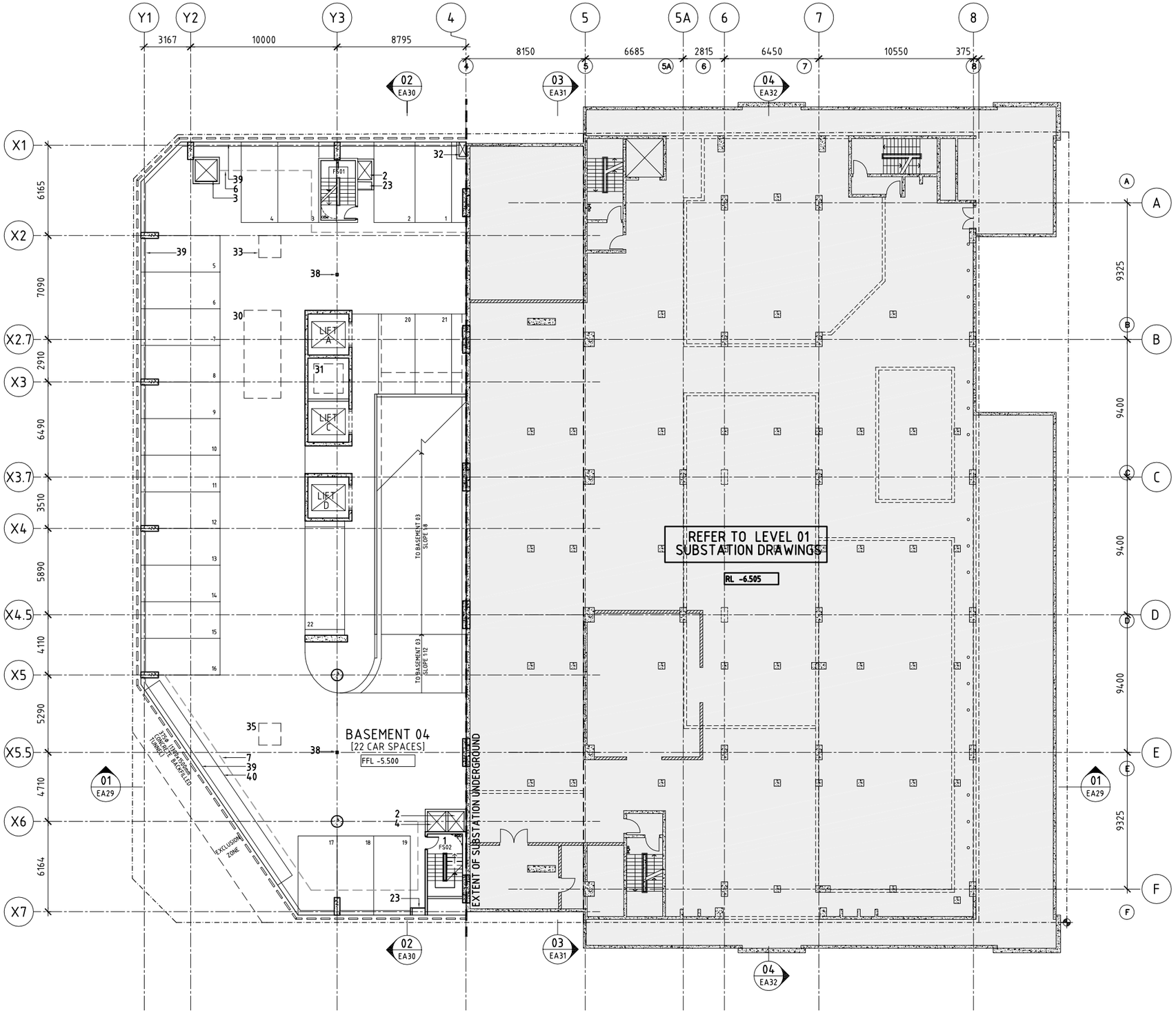
View looking east along Campbell Street at its intersection with Castlereagh Street.



View looking south at the intersection of Castlereagh Street with Campbell Street and with Hay Street in the distance.

appendix b

reduced plans



LEGEND:

1 - FIRE STAIR
2 - STAIR PRESSURIZATION
3 - CARPARK EXHAUST RISER
4 - CARPARK SUPPLY RISER
5 - STORM WATER HARVEST TANK BELOW DRIVEWAY
6 - CARPARK EXHAUST PLENUM
7 - CARPARK SUPPLY PLENUM
8 - LV BOARD
9 - TRANSFORMER AREA
10 - SWITCHROOM
11 - MDF ROOM
12 - GREASE ARRESTOR
13 - A - RECYCLABLE WASTE STORAGE
B - GENERAL WASTE STORAGE
14 - TRANSFORMER HATCH
15 - WATER & GAS METERS / REGULATOR ENCLOSURE
16 - STAIR PRESSURIZATION PLANT ROOM
17 - CARPARK SUPPLY PLANT ROOM
18 - FIRE CONTROL ROOM
19 - TEA BENCH
20 - DISABLED TOILET
21 - FEMALE TOILETS
22 - MALE TOILETS
23 - FIRE HOSE REEL
24 - COLD WATER PUMP ROOM
25 - SPRINKLER PUMP ROOM
26 - BOOSTER ASSEMBLY
27 - FIP/EWIS/FFCP
28 - SECURITY BMS ROOM
29 - PLANT ROOM TOILET & SHOWER
30 - DIESEL FUEL STORAGE TANK, DIRECTLY BURIED UNDER
31 - PUMP ROOM FOR FUEL STORAGE TANK
32 - PIPE WORK FOR FUEL STORAGE TANK
33 - SUB SOIL PUMP PIT IN GROUND
34 - WASTE BIN WASHING AREA
35 - STORMWATER PIT
36 - PROPOSED FUTURE FIXED CRANE LOCATION
37 - CARPARK EXHAUST PLANT ROOM
38 - FLOOR WASTE GRATE
39 - SPOON DRAIN
40 - BICYCLE & MOTORCYCLE PARKING [TO FUTURE DETAIL]

FLOOR PLAN - BASEMENT 04

REVISIONS IN PROGRESS 16-09-2008

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ENVIRONMENTAL ASSESSMENT REPORT - SEPTEMBER 2008

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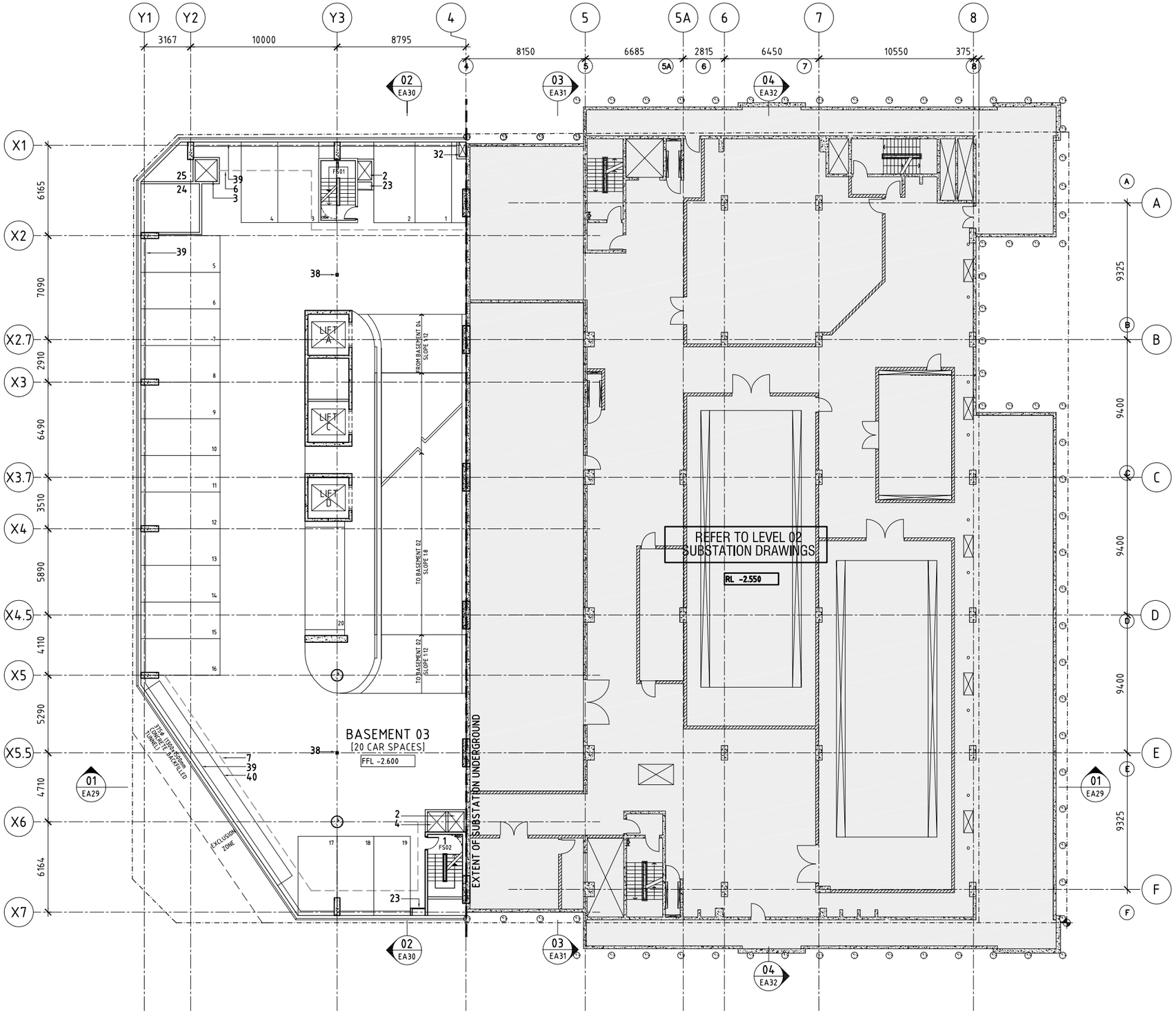
CLIENT:
EnergyAustralia®

PROJECT:
BELMORE PARK ZONE SUBSTATION
430-450 PITT STREET, SYDNEY NSW
INTEGRATED COMMERCIAL BUILDING

DRAWING:	PROJECT NUMBER:	DRAWING NUMBER:	ISSUE & DATE:
FLOOR PLAN - BASEMENT 04	5749	EA05	ISSUE 02



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FLOOR PLAN - BASEMENT 03

REVISIONS IN PROGRESS 16-09-2008

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ENVIRONMENTAL ASSESSMENT REPORT - SEPTEMBER 2008

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CLIENT:
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PROJECT:
BELMORE PARK ZONE SUBSTATION
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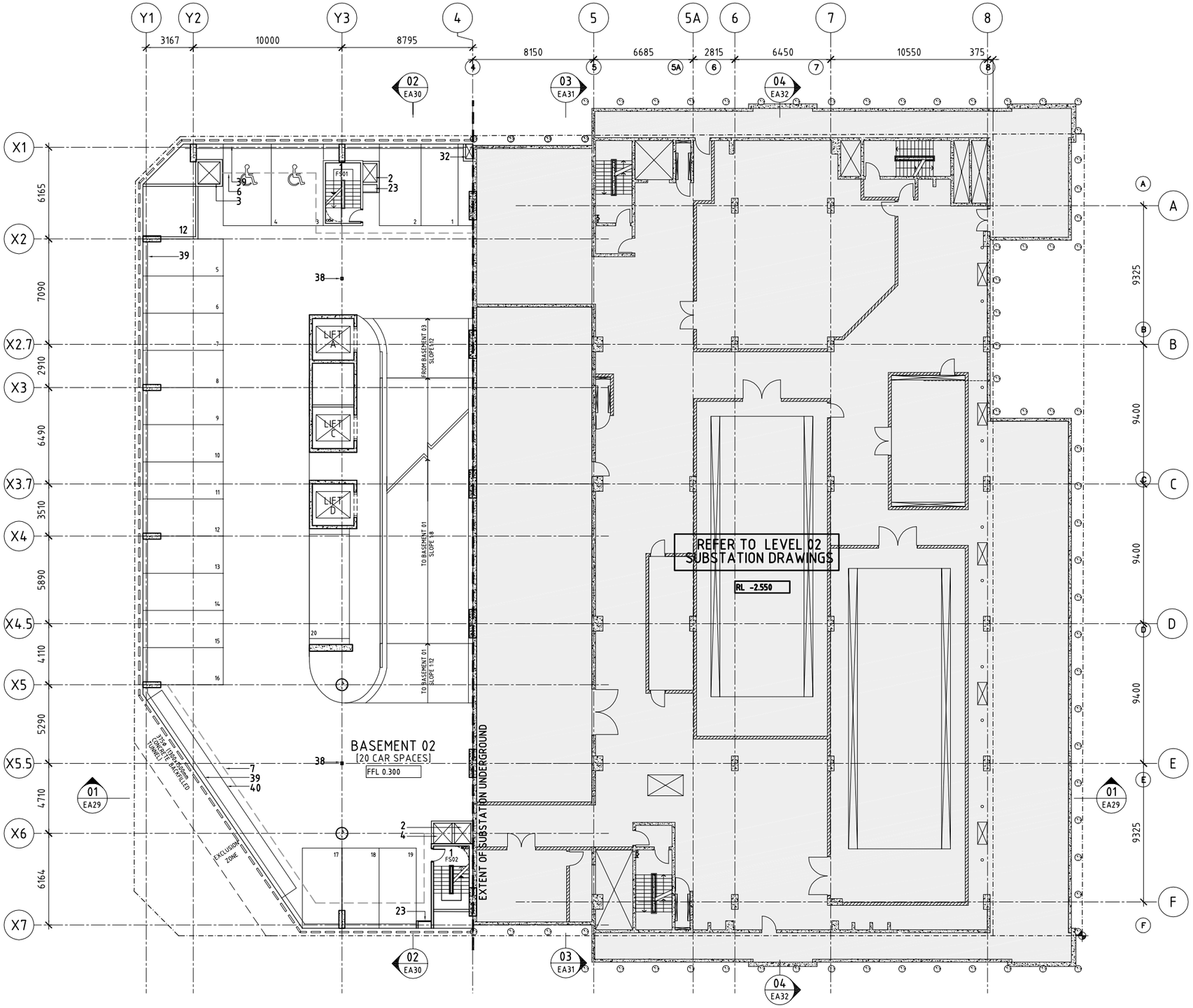
DRAWING:	PROJECT NUMBER:	DRAWING NUMBER:	ISSUE & DATE:
FLOOR PLAN - BASEMENT 03	5749	EA06	ISSUE 02



LEGEND:

1 - FIRE STAIR
2 - STAIR PRESSURIZATION
3 - CARPARK EXHAUST RISER
4 - CARPARK SUPPLY RISER
5 - STORM WATER HARVEST TANK BELOW DRIVEWAY
6 - CARPARK EXHAUST PLENUM
7 - CARPARK SUPPLY PLENUM
8 - LV BOARD
9 - TRANSFORMER AREA
10 - SWITCHROOM
11 - MDF ROOM
12 - GREASE ARRESTOR
13 - A - RECYCLABLE WASTE STORAGE
B - GENERAL WASTE STORAGE
14 - TRANSFORMER HATCH
15 - WATER & GAS METERS / REGULATOR ENCLOSURE
16 - STAIR PRESSURIZATION PLANT ROOM
17 - CARPARK SUPPLY PLANT ROOM
18 - FIRE CONTROL ROOM
19 - TEA BENCH
20 - DISABLED TOILET
21 - FEMALE TOILETS
22 - MALE TOILETS
23 - FIRE HOSE REEL
24 - COLD WATER PUMP ROOM
25 - SPRINKLER PUMP ROOM
26 - BOOSTER ASSEMBLY
27 - FIP/EWIS/FFCP
28 - SECURITY BMS ROOM
29 - PLANT ROOM TOILET & SHOWER
30 - DIESEL FUEL STORAGE TANK, DIRECTLY BURIED UNDER
31 - PUMP ROOM FOR FUEL STORAGE TANK
32 - PIPE WORK FOR FUEL STORAGE TANK
33 - SUB SOIL PUMP PIT IN GROUND
34 - WASTE BIN WASHING AREA
35 - STORMWATER PIT
36 - PROPOSED FUTURE FIXED CRANE LOCATION
37 - CARPARK EXHAUST PLANT ROOM
38 - FLOOR WASTE GRATE
39 - SPOON DRAIN
40 - BICYCLE & MOTORCYCLE PARKING [TO FUTURE DETAIL]

FLOOR PLAN - BASEMENT 02

REVISIONS IN PROGRESS 16-09-2008

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1:200@A2

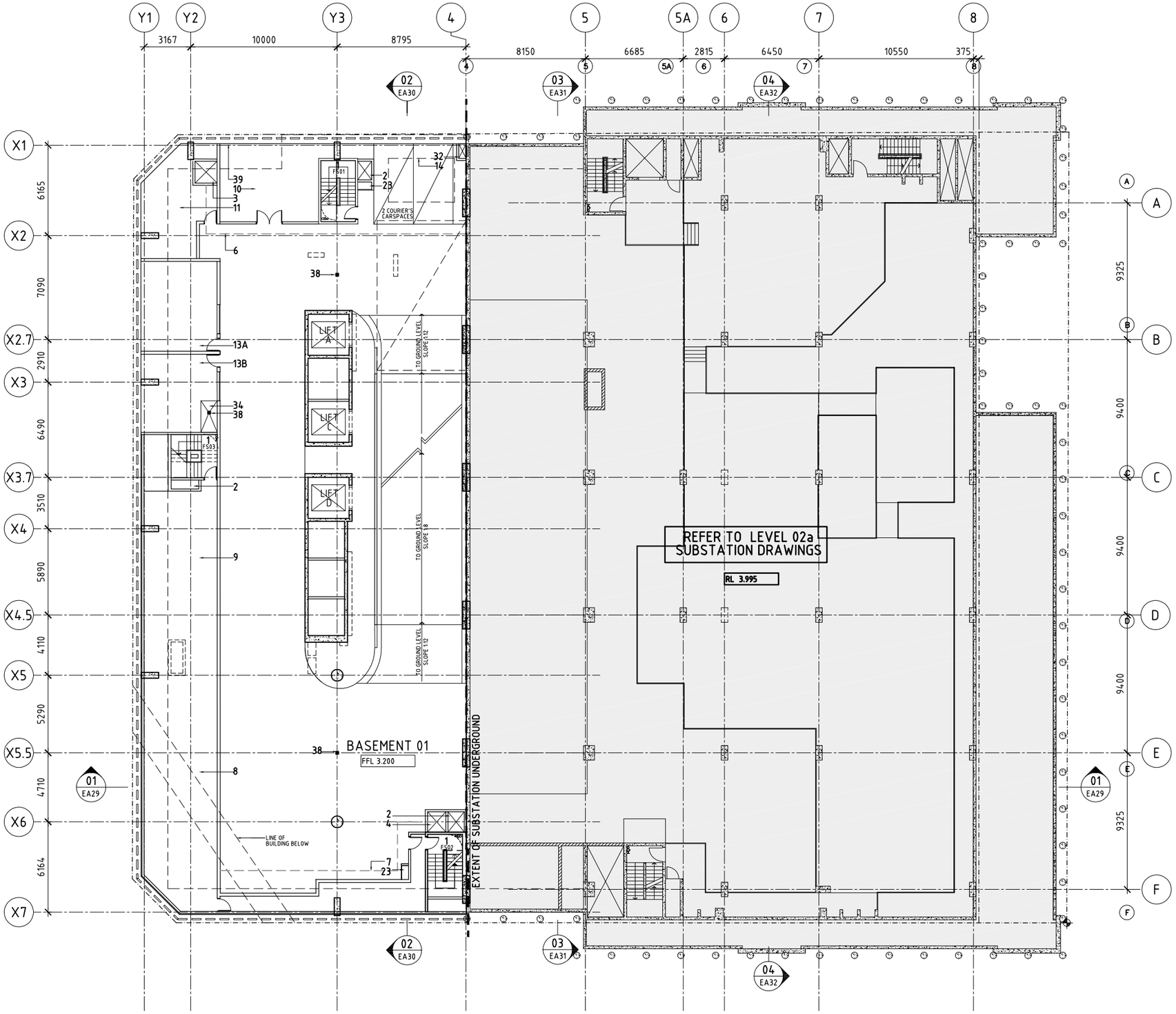
ENVIRONMENTAL ASSESSMENT REPORT - SEPTEMBER 2008

ARCHITECT:
Kann Finch Group
Architecture
Facility Planning
Interior Design
Urban Planning
Kann Finch Pty Limited A.C.N. 002 170 747
50 Carrington Street, Sydney NSW Australia
Tel 02 9299 4111 Fax 02 9290 1481

CLIENT:
EnergyAustralia®

PROJECT:
BELMORE PARK ZONE SUBSTATION
430-450 PITT STREET, SYDNEY NSW
INTEGRATED COMMERCIAL BUILDING

DRAWING:	PROJECT NUMBER:	DRAWING NUMBER:	ISSUE & DATE:
FLOOR PLAN - BASEMENT 02	5749	EA07	ISSUE 02



LEGEND:

1 - FIRE STAIR
2 - STAIR PRESSURIZATION
3 - CARPARK EXHAUST RISER
4 - CARPARK SUPPLY RISER
5 - STORM WATER HARVEST TANK BELOW DRIVEWAY
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38 - FLOOR WASTE GRATE
39 - SPOON DRAIN
40 - BICYCLE & MOTORCYCLE PARKING [TO FUTURE DETAIL]

FLOOR PLAN - BASEMENT 01

REVISIONS IN PROGRESS 16-09-2008

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ENVIRONMENTAL ASSESSMENT REPORT - SEPTEMBER 2008

ARCHITECT:
Kann Finch Group
Architecture
Facility Planning
Interior Design
Urban Planning
Kann Finch Pty Limited A.C.N. 002 170 747
50 Carrington Street, Sydney NSW Australia
Tel 02 9299 4111 Fax 02 9290 1481

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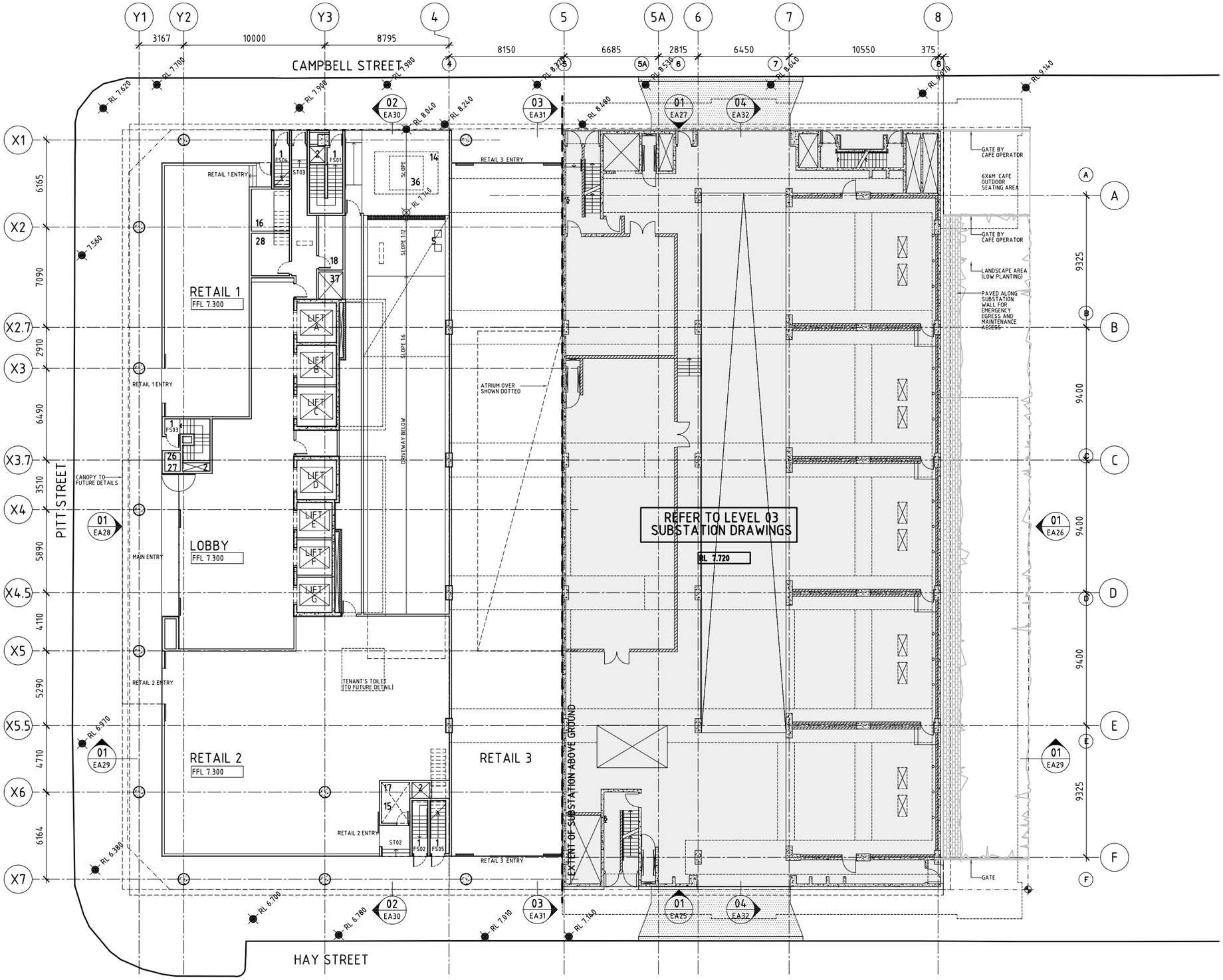
EnergyAustralia®

PROJECT:
BELMORE PARK ZONE SUBSTATION
430-450 PITT STREET, SYDNEY NSW
INTEGRATED COMMERCIAL BUILDING

DRAWING:	PROJECT NUMBER:	DRAWING NUMBER:	ISSUE & DATE:
FLOOR PLAN - BASEMENT 01	5749	EA08	ISSUE 02



FLOOR PLAN - GROUND LEVEL

LEGEND:

1 - FIRE STAIR
2 - STAIR PRESSURIZATION
3 - CARPARK EXHAUST RISER
4 - CARPARK SUPPLY RISER
5 - STORM WATER HARVEST TANK BELOW DRIVEWAY
6 - CARPARK EXHAUST PLENUM
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38 - FLOOR WASTE GRATE
39 - SPOON DRAIN
40 - BICYCLE & MOTORCYCLE PARKING (TO FUTURE DETAIL)

REVISIONS IN PROGRESS 16-09-2008

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ENVIRONMENTAL ASSESSMENT REPORT - SEPTEMBER 2008

ARCHITECT:
Kann Finch Group
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50 Carrington Street, Sydney NSW Australia
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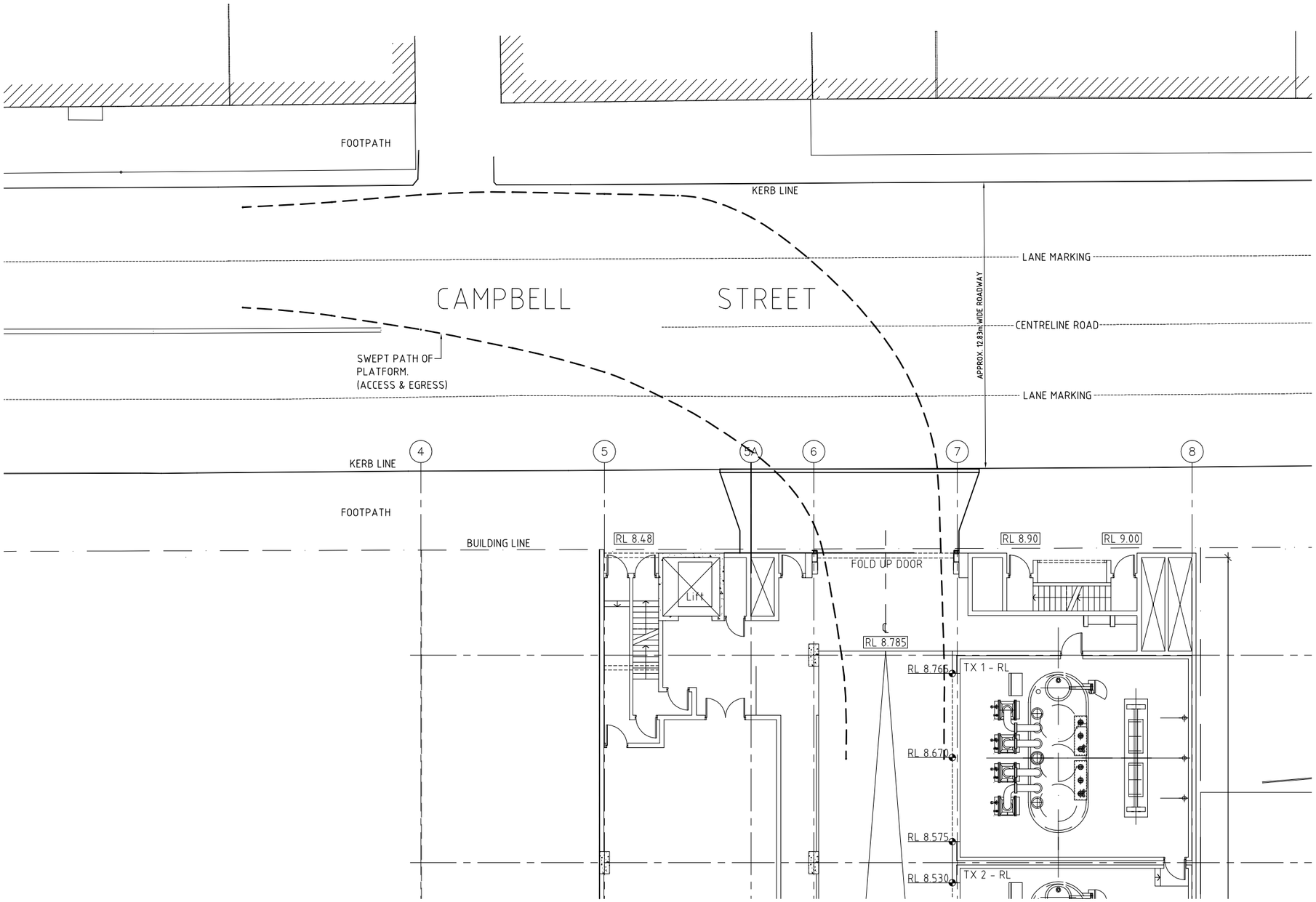
BELMORE PARK ZONE SUBSTATION
430-450 PITT STREET, SYDNEY NSW
INTEGRATED COMMERCIAL BUILDING

DRAWING:	PROJECT NUMBER:	DRAWING NUMBER:	ISSUE & DATE:
FLOOR PLAN - GROUND LEVEL	5749	EA09	ISSUE 02



PART SITE PLAN

INFORMATION

CAD DRAWING
DO NOT MANUALLY AMEND

AMENDMENTS

0 1 2 3 4 5 6 7 8 9 10 m
METRES ON ORIGINAL DRAWING AT SCALE 1:100

EnergyAustralia®
DESIGN SERVICES
24 CAMPBELL ST SYDNEY, NSW 2000
TEL: 9272 3807 FAX: 9272 6267

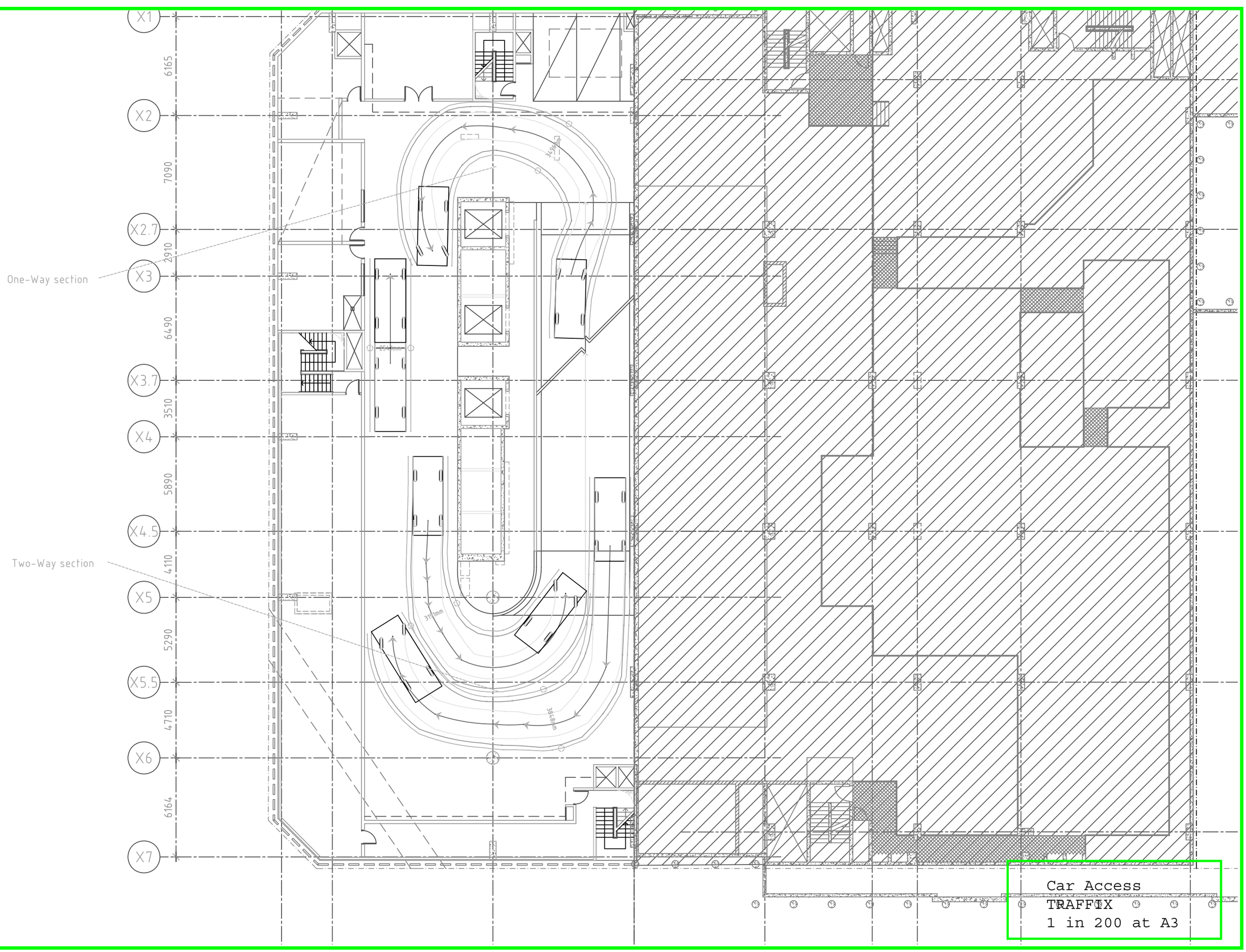
SCALE	1:100
DESIGNED	COLIN SAWDY
DRAWN	COLIN SAWDY
CHECKED	PHIL HUDSON
APPROVED	PHIL HUDSON
DATE	4.07.2008
PRJTRK No.	–
PROJECT NUMBER	ES208-14-5-4

ZN 5959 BELMORE PARK
CAMPBELL ST HAYMARKET
85T TRANSFORMER DELIVERY USING PLATFORM
EXTENT OF COMBINED ACCESS
AND EGRESS PATH

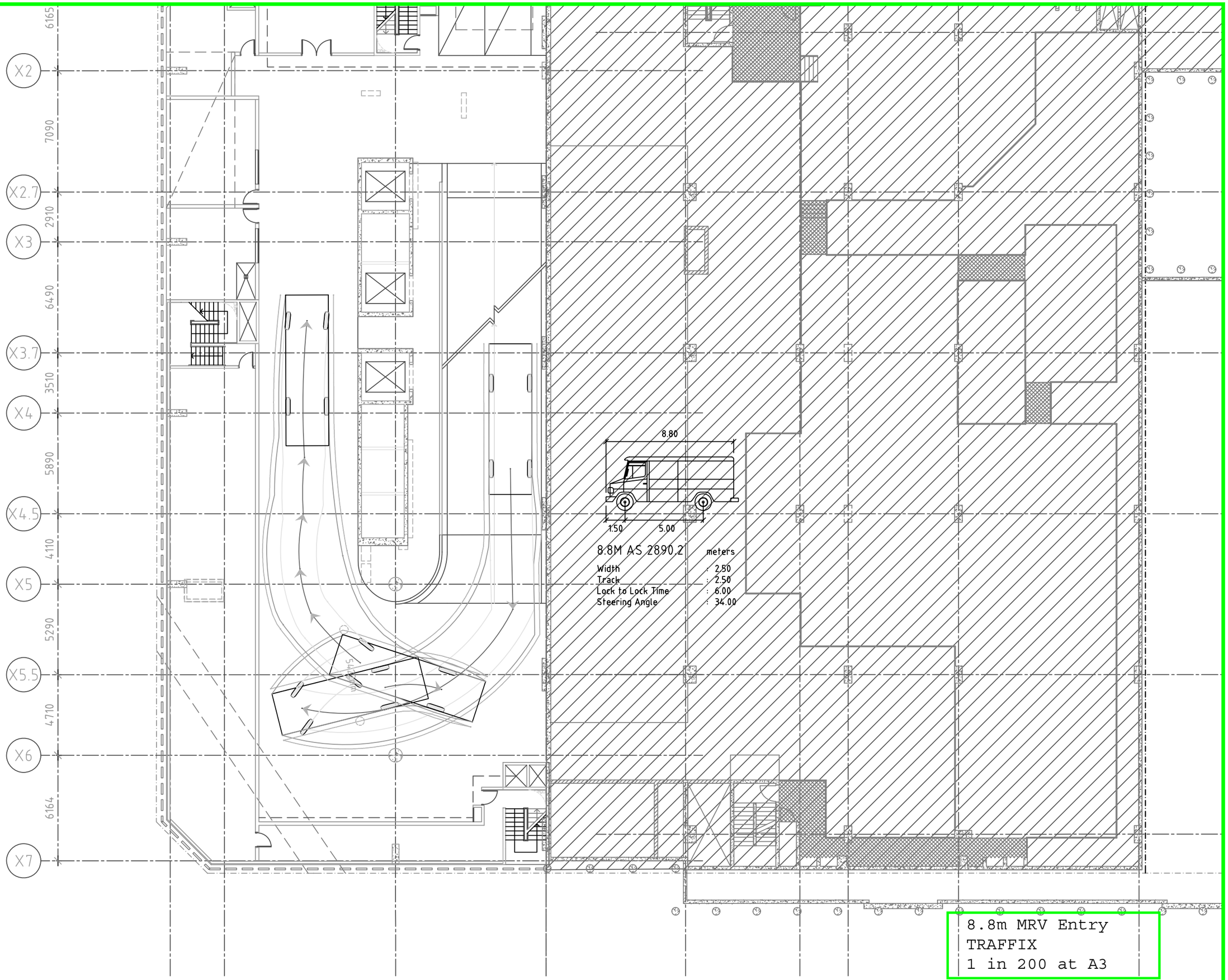
DRAWING No SK1002 | SHEET 1 | AMD A | SIZE A1

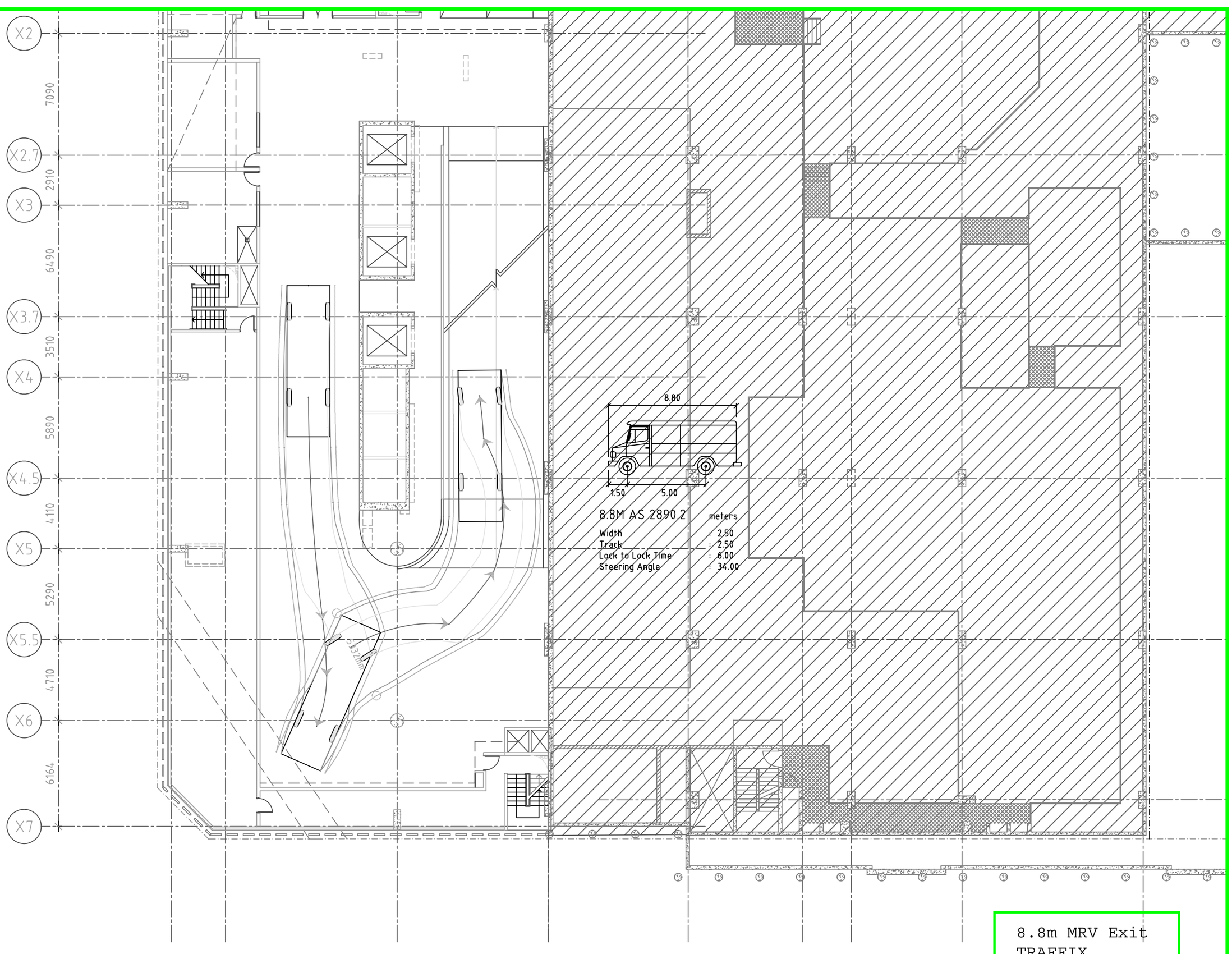
appendix c

swept path analysis

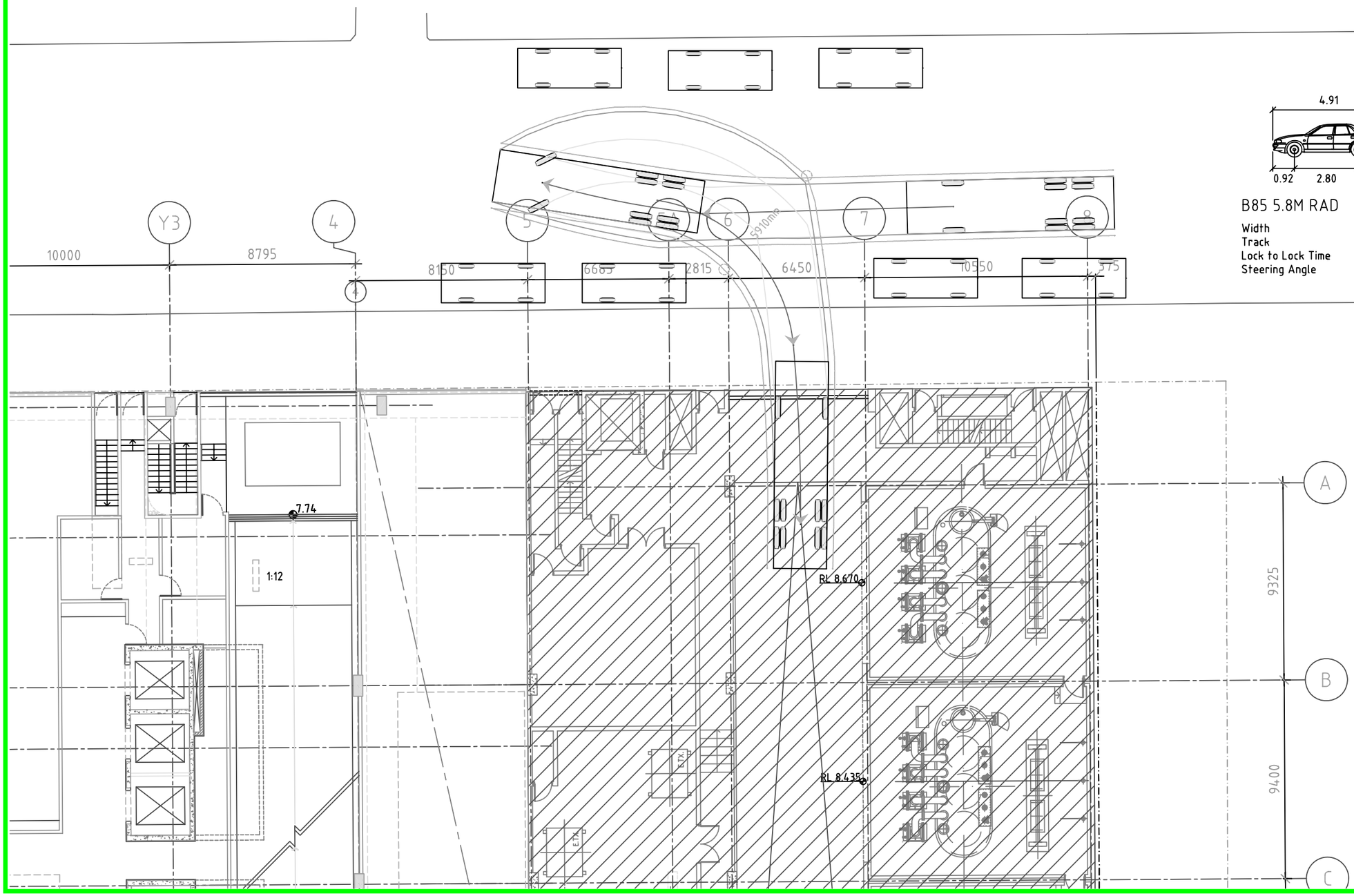


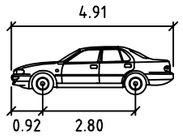
Car Access
TRAFFIX
1 in 200 at A3


X2
X2.7
X3
X3.7
X4
X4.5
X5
X5.5
X6
X7
6165
7090
2910
6490
3510
5890
4110
5290
4710
6164
8.80
1.50
5.00
8.8M AS 2890.2
meters
Width : 2.50
Track : 2.50
Lock to Lock Time : 6.00
Steering Angle : 34.00
8.8m MRV Entry
TRAFFIX
1 in 200 at A3



8.8m MRV Exit
TRAFFIX
1 in 200 at A3





B85 5.8M RAD meters

Width	:	1.87
Track	:	1.77
Lock to Lock Time	:	6.00
Steering Angle	:	38.50

EA 9.8m Service Truck
TRAFFIX
1 in 200 at A3

appendix d

sidra modelling outputs

SIDRA INTERSECTION

Movement Summary

Campbell St Pitt St

AM Existing

Signalised - Fixed time **Cycle Time = 50 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Pitt St (south)										
1	L	58	1.7	0.167	14.4	LOS A	22	0.60	0.73	37.1
2	T	427	0.9	0.585	10.4	LOS A	68	0.75	0.64	39.9
3	R	92	1.1	0.585	17.5	LOS B	68	0.79	0.82	35.2
Approach		**577**	**1.0**	**0.585**	**11.9**	**LOS A**	**68**	**0.74**	**0.68**	**38.8**
Campbell St (east)										
4	L	59	1.7	0.243	21.3	LOS B	12	0.78	0.72	33.1
5	T	121	0.8	0.315	15.8	LOS B	33	0.83	0.67	36.1
6	R	46	2.1	0.314	22.3	LOS B	33	0.83	0.78	32.5
Approach		**227**	**1.3**	**0.315**	**18.6**	**LOS B**	**33**	**0.82**	**0.71**	**34.5**
Pitt St (north)										
7	L	111	0.9	0.397	14.7	LOS B	29	0.61	0.74	36.9
8	T	354	1.1	0.397	9.4	LOS A	47	0.68	0.57	40.7
9	R	41	0.0	0.398	16.5	LOS B	47	0.70	0.79	35.7
Approach		**505**	**1.0**	**0.397**	**11.2**	**LOS A**	**47**	**0.67**	**0.63**	**39.4**
All Vehicles		**1309**	**1.1**	**0.585**	**12.8**	**LOS A**	**68**	**0.72**	**0.66**	**38.2**

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	105	19.4	LOS B	0	0.88	0.88
P3	105	11.6	LOS B	0	0.68	0.68
P5	105	19.4	LOS B	0	0.88	0.88
P7	105	11.6	LOS B	0	0.68	0.68
All Peds	**420**	**15.5**	**LOS B**	**0**	**0.78**	**0.78**

Symbols which may appear in this table:

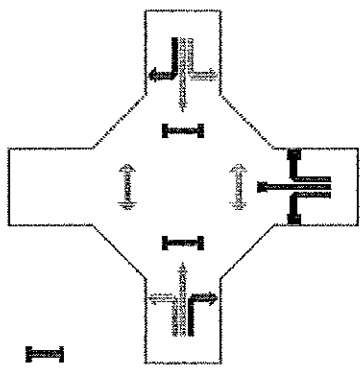
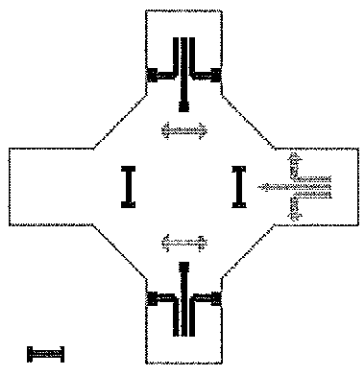
SIDRA INTERSECTION

Phasing Summary

Campbell St Pitt St

AM Existing

C = **50** seconds
Cycle Time Option: **Program calculated cycle time**
Phase times determined by the program.

Phase A	Phase B
	
Green Time = **24** seconds Phase Time = **30** seconds Phase Split = **60** %	Green Time = **14** seconds Phase Time = **20** seconds Phase Split = **40** %

Normal Movement	Permitted/Opposed
Slip-Lane	Opposed Slip-Lane
Stopped Movement	Continuous
Turn On Red	

SIDRA SOLUTIONS

Site: Campbell/Pitt - AM - Existing
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Processed Jun 30, 2008 04:08:54PM

A1835, Traffix, Small Office
Produced by SIDRA Intersection 3.2.0.1455

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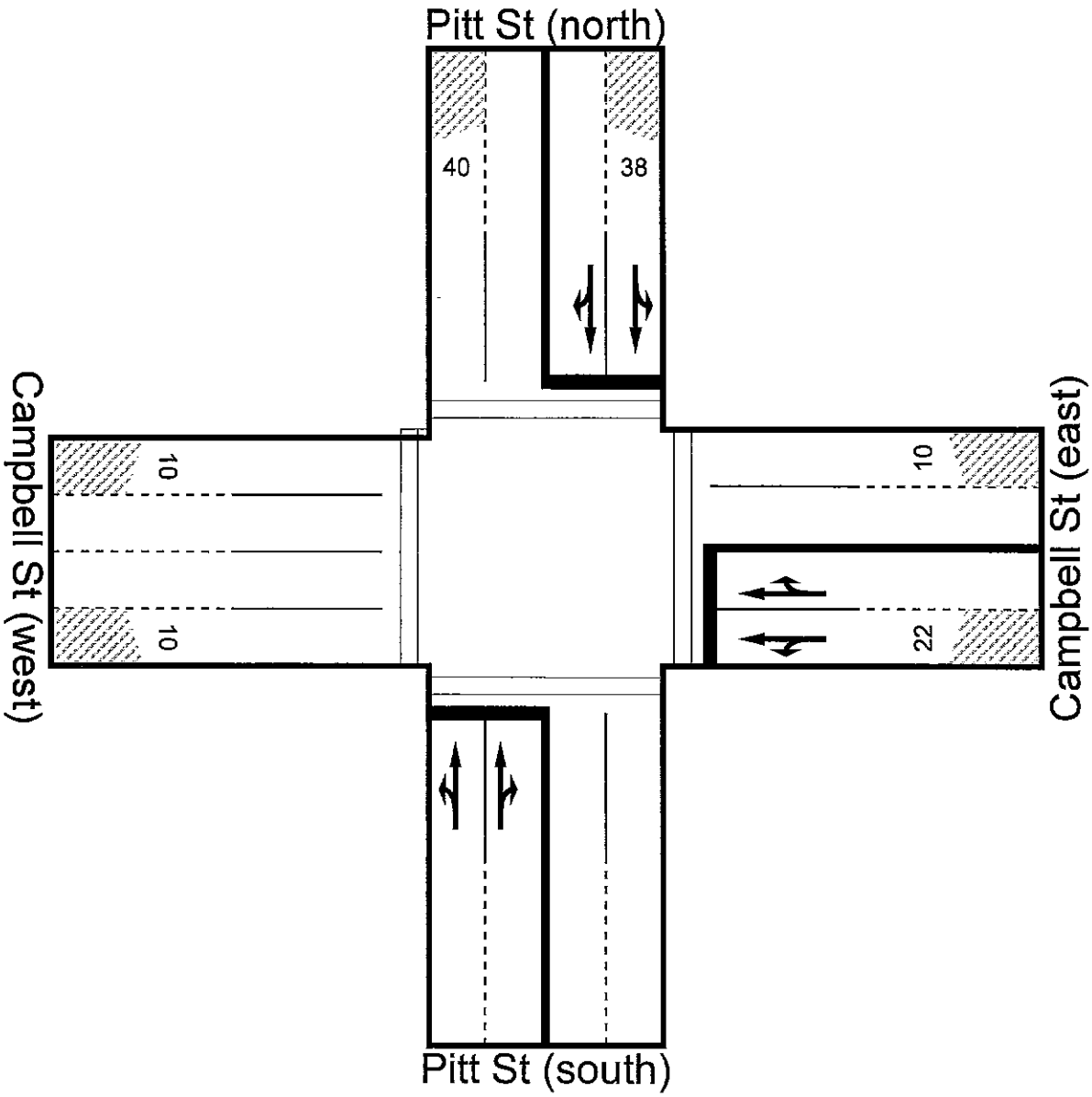
Pitt St (north)
40
38
Campbell St (west)
10
10
Campbell St (east)
10
22
Pitt St (south)

SIDRA INTERSECTION

Movement Summary

Campbell St Pitt St

PM Existing

Signalised - Fixed time **Cycle Time = 50 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Pitt St (south)										
1	L	121	0.8	0.195	14.6	LOS B	25	0.61	0.74	37.0
2	T	422	0.9	0.680	12.0	LOS A	82	0.81	0.73	38.8
3	R	119	0.8	0.679	19.0	LOS B	82	0.84	0.86	34.3
Approach		**662**	**0.9**	**0.680**	**13.7**	**LOS A**	**82**	**0.78**	**0.76**	**37.6**
Campbell St (east)										
4	L	76	1.3	0.312	21.4	LOS B	15	0.78	0.73	33.0
5	T	111	0.9	0.306	15.8	LOS B	32	0.83	0.67	36.2
6	R	53	1.9	0.306	22.3	LOS B	32	0.83	0.77	32.6
Approach		**239**	**1.3**	**0.312**	**19.0**	**LOS B**	**32**	**0.81**	**0.71**	**34.3**
Pitt St (north)										
7	L	89	1.1	0.375	14.6	LOS B	27	0.61	0.74	37.0
8	T	283	1.1	0.375	10.1	LOS A	40	0.69	0.57	40.2
9	R	58	0.0	0.375	17.8	LOS B	40	0.73	0.79	35.0
Approach		**431**	**0.9**	**0.375**	**12.1**	**LOS A**	**40**	**0.68**	**0.64**	**38.7**
All Vehicles		**1332**	**1.0**	**0.680**	**14.1**	**LOS A**	**82**	**0.75**	**0.71**	**37.3**

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	105	19.4	LOS B	0	0.88	0.88
P3	105	11.6	LOS B	0	0.68	0.68
P5	105	19.4	LOS B	0	0.88	0.88
P7	105	11.6	LOS B	0	0.68	0.68
All Peds	**420**	**15.5**	**LOS B**	**0**	**0.78**	**0.78**

Symbols which may appear in this table:

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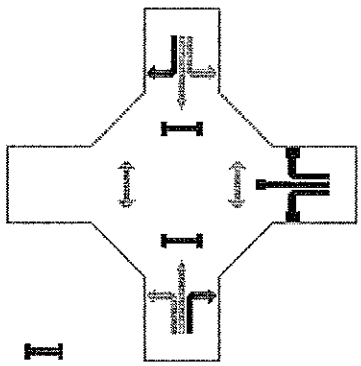
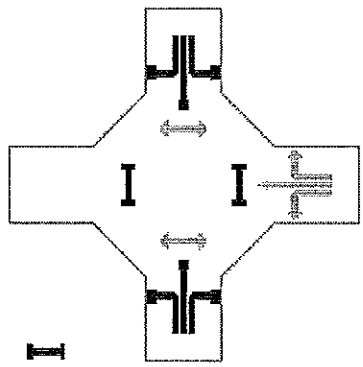
Phasing Summary

Campbell St Pitt St

PM Existing

C = **50** seconds
Cycle Time Option: **Program calculated cycle time**
Phase times determined by the program.

Phase A	Phase B
	
Green Time = **24** seconds Phase Time = **30** seconds Phase Split = **60** %	Green Time = **14** seconds Phase Time = **20** seconds Phase Split = **40** %

Normal Movement	Permitted/Opposed
Slip-Lane	Opposed Slip-Lane
Stopped Movement	Continuous
Turn On Red	

SIDRA SOLUTIONS

Site: Copy of Campbell/Pitt - PM - Existing
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