Sydney Opera House

Vehicle Access & Pedestrian Safety Project

Environmental Assessment

Traffic Report

20 July 2010

Prepared for

Sydney Opera House Trust

Halcrow

Sydney Opera House
Vehicle Access & Pedestrian Safety Project
Environmental Assessment
Traffic and Vehicular Access Report

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This report has been issued and amended as follows:

Rev	Description	Date	Approved by
V01	Draft for internal review	07/06/2010	JR
V02	Draft for internal review	21/06/2010	JR
V03	Final Draft for SOH Review	14 July 2010	JR
V04	Final for Submission	20 July 2010	JR

Halcrow
Suite 20, 809 Pacific Highway, Chatswood, NSW 2067 Australia
Tel +61 2 9410 4100 Fax +61 2 9410 4199
www.halcrow.com/australasia

Contents

- Construction of new lift services and underground corridors to link the new underground loading dock with the performance areas of the Sydney Opera House; and
- Relocation of existing at grade loading docks (Forecourt) to the new underground loading dock facility.

The VAPS Project has the potential to deliver significant pedestrian safety and operational benefits to the Sydney Opera House through the separation of delivery / service vehicle and pedestrian access and the provision of a dedicated, purpose built loading dock facility.

1.2 Environmental Assessment Requirements

Director General's Requirements (DGRs) for an Environmental Assessment (EA) of the proposed VAPS project have been issued by the Department of Planning (DoP).

With regard to traffic and transport, the DGRs require the following issues to be addressed as part of the EA:

- Operational traffic impacts on the local road network;
- Proportion of vehicles accessing the Sydney Opera House that the proposal will address;
- Restrictions on access to the Sydney Opera House, adjoining properties and the public domain; and
- Construction traffic impacts on the local road network.

1.3 Purpose of this Report

The purpose of this report is to present the findings of a traffic and transport assessment of the proposed VAPS project with regards to the DGRs described above.

In undertaking the assessment, both the requirements of the DGRs and the Sydney Opera House's User Functional Brief[2] have been taken into consideration.

[2] Sydney Opera House Vehicle Access and Pedestrian Safety – User Functional Brief (issue 5.0, 16 March 2010)

2 Existing Conditions

This section of the report provides an overview of the traffic and pedestrian related aspects of the existing operations of the Sydney Opera House that will be potentially impacted by the proposed VAPS Project.

2.1 Pedestrian Access

Pedestrian access to the Sydney Opera House is provided via the Forecourt whether it be from:

- Circular Quay foreshore walk;
- Macquarie Street; or
- Royal Botanic Gardens

While there are some strong pedestrian "desire lines" and pedestrian travel paths across the Forecourt, the Forecourt is publicly accessible space and pedestrians can be observed walking in each and every direction within the Forecourt.

The extent of the pedestrian accessible Forecourt is indicated in Figure 1.

Pedestrian flows over the Forecourt are associated with the various activities of the Sydney Opera House, namely as a tourist destination and centre of performing arts.

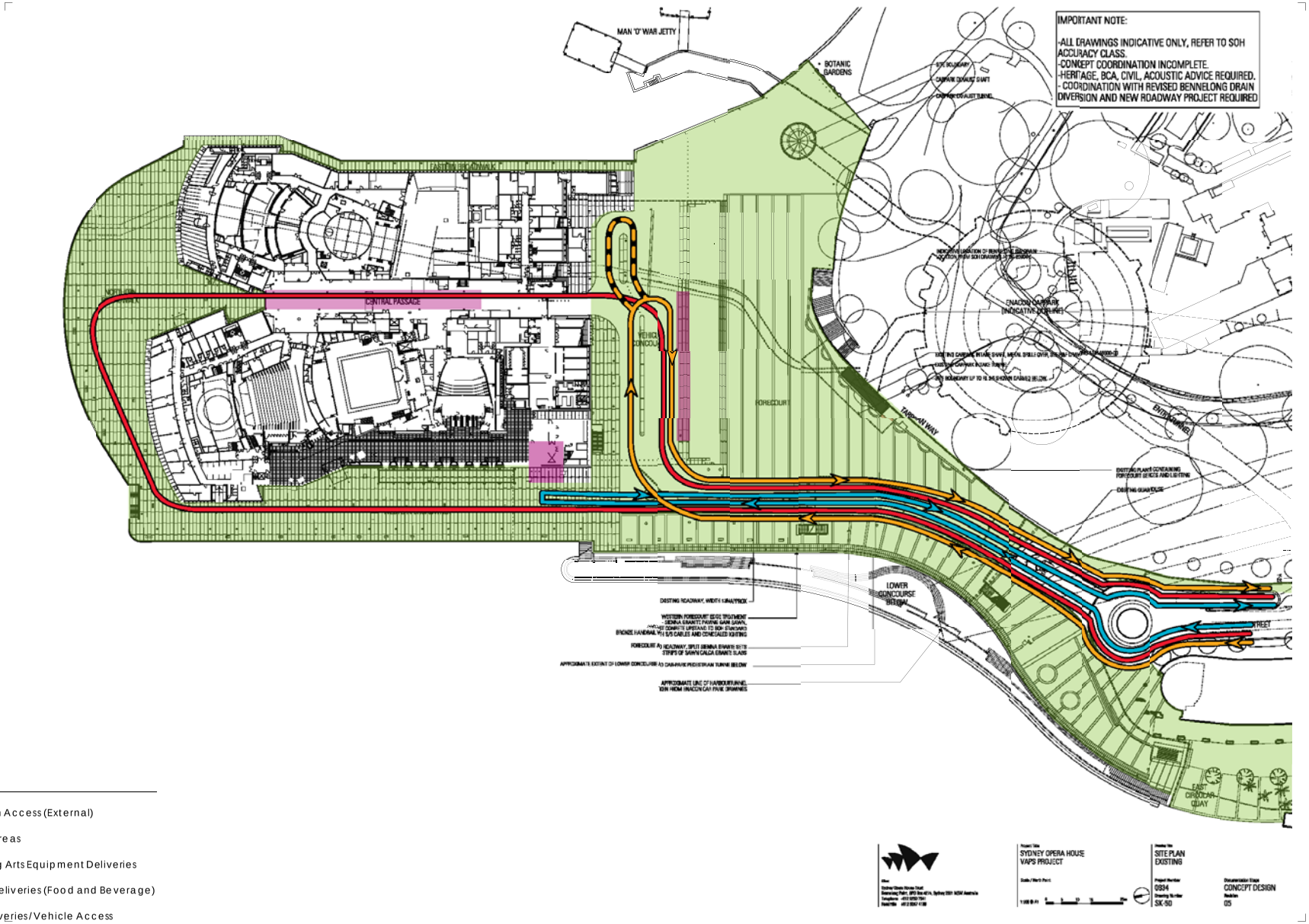
The ad hoc nature of pedestrian flows across the Forecourt exacerbates the extent and significance of the pedestrian / vehicle conflicts as the location of the potential conflict is not limited to a few isolated locations but across the entire Forecourt wherever there are vehicle movements.

2.2 Overview of Sydney Opera House Delivery and Service Vehicle Activity

There are generally three main types of delivery and service vehicle activities which generate delivery vehicle movements to, form and within the Sydney Opera House site.

EXISTING SERVICE/DELIVERY VEHICLE ACCESS

SOH VAPS PROJECT



Key

- Pedestrian Access (External)
- Loading Areas
- Performing Arts Equipment Deliveries
- General Deliveries (Food and Beverage)
- Other Deliveries/Vehicle Access

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Figure 1

These are:

- Performing Arts deliveries such as Opera Australia, Australian Ballet and Sydney Symphony (ie. production sets, costumes etc);
- General deliveries for the Sydney Opera House typically food and beverages; and
- Other deliveries and service vehicles (couriers, waste removal and maintenance).

Each of these types of activities has different traffic generation characteristics, vehicle sizes and loading / unloading requirements.

Below is a summary of the general activities. Further details and assessment are provided in subsequent sections of this report.

2.2.1 Performance Arts

Typically the performance arts deliveries are characterised by "bump in" and "bump out" peak periods where stage sets, costumes and materials used in a particular production are trucked in at the start and end of a production series.

These "bump in" and "bump out" typically occur at the start and end of the seasons for the Australian Opera, Australian Ballet and Sydney Symphony.

"Bump in" and " bump out" periods typically occur over a continuous two to three day period (subject to curfews).

While a "bump in" or "bump out" is a relatively infrequent event, it is an intense period of delivery vehicle movements to and from the Sydney Opera House.

A range of vehicles are used during "bump in" and "bump out" periods but are typically large trucks, including articulated vehicles (semi-trailers) and heavy rigid trucks.

While there are plans to increase the use of shipping containers for the delivery of performance arts materials, currently materials arrive and depart the Sydney Opera House site in relatively small packing cases or individual pieces etc all of which are either

1 Introduction

1.1 Project Overview

The Sydney Opera House is a State, National and World Heritage listed national icon and Australia's premier tourist destination attracting around 7.4 million visitors each year.

In addition Sydney Opera House has become one of the world's busiest performing arts centres with the various venues hosting 1,677 performances in 2008 / 2009 which were enjoyed by over 1.2 million patrons[1].

However, one of the most critical issues presently facing the Sydney Opera House is the increasing conflict between pedestrians and delivery vehicles which share the same space on the Sydney Opera House Forecourt (Forecourt).

The conflict is generated by the need for all service and delivery vehicles to traverse the forecourt through pedestrian flows to access the Sydney Opera House's loading dock facilities.

The Vehicle and Pedestrian Safety (VAPS) Project has been proposed to address the longstanding issues of pedestrian safety arising from pedestrian and vehicle conflict on the Forecourt by minimising intrusion of delivery vehicles into the forecourt through construction of a new underground loading dock.

The VAPS Project includes:

- Construction of an underground loading dock to be located below the Sydney Opera House building and Forecourt;
- Construction of a new vehicle access ramp providing service vehicle access from the existing Macquarie Street roundabout down to the new underground loading dock;

[1] Source: Sydney Oepra House Trust – User Functional Brief (March 2010)

individually loaded / unloaded by hand or fork lift. This results in an extended loading / unloading time per truck which is generally in excess of 1 hour.

2.2.2 Food, Beverage and Operational Goods

These deliveries occur on a daily basis and are associated with the delivery of fresh products and beverages for the various Sydney Opera House restaurants and bars. Other goods are also included for the general operation of the House.

Deliveries occur each day of the week between the hours of 6am and 5pm (subject to curfew). Deliveries are relatively evenly spread across the day.

Deliveries are typically undertaken with small delivery vans and medium rigid vehicles.

2.2.3 Other Deliveries and Service Vehicles

Other deliveries include couriers and office supplies and service vehicles such as maintenance vehicles.

These deliveries are received either at the western boardwalk loading dock with the food and beverage deliveries or at the Stage Door reception.

Waste collection currently occurs from the western boardwalk loading dock and from the vehicular concourse near the stage door.

2.2.4 General Vehicle Access to the Forecourt.

All taxi's and hire vehicles are allowed to drop off people at the vehicle concourse bollard point using the existing forecourt road. No vehicles are permitted entry onto the vehicle concourse area proper (under the Monumental Stairs) except for fire brigade, ambulance and pre-booked special delivery vehicles.

2.3 Macquarie Street Vehicle Access Arrangements

2.3.1 Macquarie Street Access to Forecourt

Vehicle access to the Sydney Opera House is provided via the northern end of Macquarie Street.

The northern end of Macquarie Street is effectively a dead end street serving the uses along the Bennelong Point, namely the Sydney Opera House and the Macquarie Street residential and commercial uses.

Kerbside on street bus parking areas are designated along the eastern side of Macquarie Street and operate as tour coach drop off storage areas for visitors to the Sydney Opera House.

All vehicles accessing the Forecourt do so via a driveway from the Macquarie Street roundabout. The access driveway is controlled via a security gatehouse.

The Macquarie Street Forecourt access therefore provides access for the following:

- Deliveries to the performing arts uses such as Opera Australia, Australian Ballet and Sydney Symphony (ie. production sets, costumes etc);
- General deliveries for the Sydney Opera House typically food and beverages;
- Other deliveries (couriers etc) ;
- Coach, mini bus and patron drop off (accessible); and
- Major Forecourt event production vehicles (ie. New Years Eve and Forecourt concerts).

Vehicles undertaking deliveries to the vehicular forecourt and for the performing arts (ie. bump in / bump out vehicles) are typically booked in advance. Food and beverage deliveries are not typically booked in advance but have appropriate delivery documentation. Vehicles which are not booked or without appropriate documents are not permitted to enter the Forecourt.

Vehicles which are denied access at the guardhouse need to reverse back into the roundabout and leave via Macquarie Street. It is noted that the existing level of incidents requiring vehicles to be turned around at the gatehouse is negligible.

2.3.2 Opera House Car Park Access

Vehicle access to the Sydney Opera House underground car park is also provided via the northern end of Macquarie Street. It is noted that access to the car parking for adjacent residential buildings is also provided via the public car park access.

Separate entry and exit ramps to and from the car park are located within the southbound carriageway of Macquarie Street. Entry movements require vehicles to traverse the Macquarie Street roundabout past the Forecourt driveway.

During the periods prior to and immediately following major performances at the Sydney Opera House, the traffic flows along Macquarie Street are relatively high due to patrons entering the car park. Queuing is often observed extending from car park entry gates prior to performances.

Outside of these periods, traffic flows along the northern end of Macquarie Street are relatively low.

2.3.3 Taxi Drop Off / Pick Up

Designated kerb side taxi zones are located along the eastern side of Macquarie Street between the car park entry and exit ramps. The taxi zone operates between 8pm and 7am.

Notwithstanding the designated area, taxis typically drop off passengers within the Macquarie Street roundabout within the "No stopping" sign posted area.

While this behaviour is contrary to the street sign posting, the available circulating area allows taxis to stop at the kerb and other cars to circulate around the roundabout. However buses and other large vehicles would be restricted from circulating while a taxi has stopped.

2.4 On Site Loading Facilities

2.4.1 Location of On Site Loading Facilities and Vehicle Access Routes

The Sydney Opera House has two designated loading areas, namely:

- Performance Arts Deliveries – loading occurs within the central passage between the Opera Theatre and the Concert Hall.
- Food, Beverage and Operational Goods – loading occurs from the general dock located on the western side of the Opera House (ie. western boardwalk).

In addition, general office deliveries such as couriers etc also occur from the vehicular concourse located at the Stage Door. Parking occurs in the designated spaces under the Monumental Stairs.

The location of these loading dock and delivery areas and the vehicle access arrangements to each of these docks are shown in **Figure 1**.

The vehicle access routes shown in Figure 1 clearly indicate the path of delivery vehicle movements across the publicly accessible Forecourt and hence the potential conflicts with pedestrian movements.

Photos of loading docks activities are shown in **Photos 1 – 8.**

2.4.2 Central Passage

The Central Passage is utilised by the Performing Arts activities for the "bump in" and "bump out" of production equipment and materials.

Vehicle access to the Central Passage is typically undertaken via a one way loop. During "bump in" and "bump out" periods this is typically undertaken by vehicles driving across the Forecourt and around the western boardwalk to enter the roller door between the Opera Theatre and Concert Hall buildings at the northern end and then entering the Central Passage to be loaded or unloaded. Vehicles then exit the Central Passage by driving out to the vehicle concourse near the Stage Door and then back across the Forecourt to the Macquarie Street access.

VEHICLE ACCESS & PEDESTRIAN SAFETY PROJECT

SYDNEY OPERA HOUSE

Macquarie Street Roundabout 01

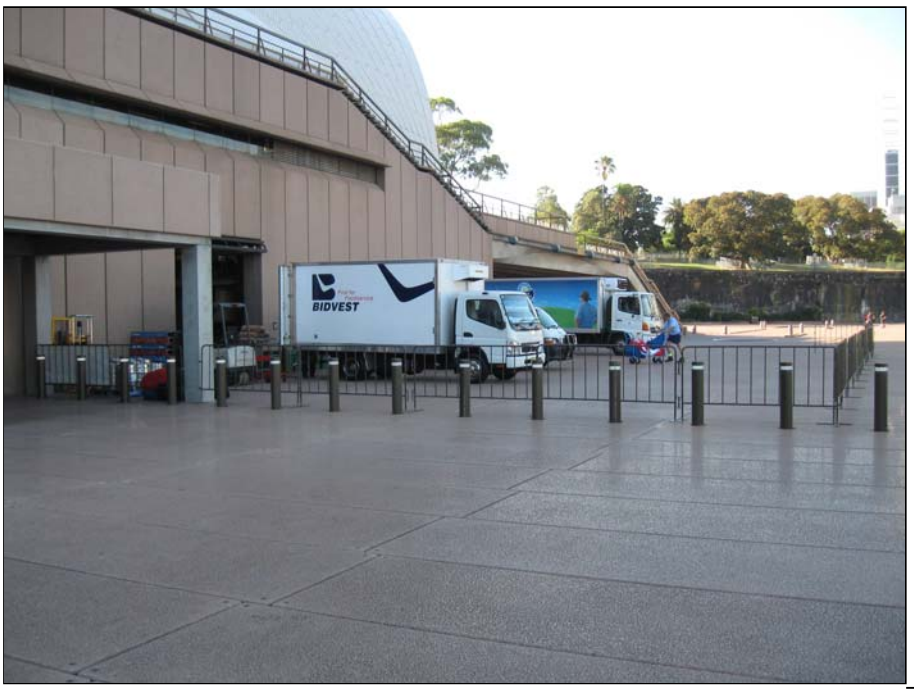
Macquarie Street Access + Guard House 02

Macquarie Street -Sydney Opera House Car Park Access 03

Vehicle Path across Forecourt 04

Opera Australia Trucks Driving on Western Boardwalk 05

Western Boardwalk Loading Dock 06



Western Boardwalk Loading Dock 07

Vehicle Concourse at Stage Door 08

Some vehicles undertake this loop in the reverse direction and some vehicles enter and exit from the southern Central Passage door having turned around on site.

The Central Passage is an at grade area which requires all equipment to be unloaded to the floor level via fork lifts, truck mounted hydraulic lifts or be hand for being loaded onto trolleys for distribution to the appropriate storage location.

Within the dock area there is effectively space to park and unload (subject to available dock handlers) two trucks.

2.4.3 Western Boardwalk Loading Dock

The western boardwalk loading dock is utilised by the food, beverage and other deliveries.

This dock is also an at grade dock (ie. no loading platform) and goods are unloaded to the ground level and loaded onto to trolleys / fork lifts for distribution to the appropriate on site storage area.

Truck parking for the purpose of unloading occurs on the Forecourt and the western boardwalk with an area barricaded off with temporary fencing to provide some separation between the loading dock and the pedestrian area.

2.4.4 Existing Curfew Restrictions

It is understood that curfew restrictions are placed on delivery vehicles during major performances. Particularly, the use of the Central Passage for trucks is not permitted during performances due to fire egress requirements from the Sydney Opera House.

Given the number of performances that occurs at the Sydney Opera House, this significantly restricts the loading and unloading operations within the Central Passage.

2.5 Delivery Vehicle Traffic Generation

Details of the existing traffic generation rates of the various delivery and service vehicles have been provided by the Sydney Opera House and verified by observations made by Halcrow of current activities. These details are provided in Appendix A.

A summary of the delivery vehicle data (Appendix A) and loading dock observations is provided below:

- Central Passage
  - The volume of trucks generated during a "bump in" and "bump out" vary significantly depending upon the number of productions being brought in or taken out simultaneously and the materials for each production.
  - Opera Australia typically has the largest volume of trucks associated with their bump in and bump out periods. Opera Australia typically runs 2 seasons a year with multiple operas occurring simultaneously.
  - Largest trucks are typically semi trailers and tautliners.
  - Typical end of season peak of up to 20 delivery vehicles over a two day period.
  - The timing of delivery vehicles arrival to the site is managed such that there is a steady arrival rate rather than all vehicles arriving at once.
  - Scheduling generally occurs to ensure that Opera Australia, Australian Ballet and Sydney Symphony "bump in" and "bump out" periods do not occur simultaneously.

- Western Boardwalk Loading Dock
  - The average of about 90 delivery vehicles trucks per day is generally standard except for peak events at the Sydney opera House ie. New Years Eve etc.
  - For peak events the volume of deliveries is generally double that of typical periods.
  - Truck deliveries relatively evenly spread across the day (6am – 5pm)
  - Generally no more than 4 trucks at the dock at one time.
  - Largest truck is typically the keg truck which is an 8 tonne (medium rigid vehicle – 8.8 m).

- The keg truck is currently side loaded onto pallets using the fork lift and stored temporarily at the dock.
- Vehicle sizes vary from keg truck to small vans.
- Dock doesn't have a lot of control over arrival times. Dock works with security to hold trucks back if dock full.
- Deliveries generally take 5 minutes to occur. Keg truck can be 20 minutes
- Keg truck – 2 per week (average).
- Waste truck – typically 1 -2 per day.

- Stage Door – Vehicle Concourse
  - Approximately 40-50 service and courier vehicles access the Stage Door vehicle concourse. The majority of these movements are couriers (vans / motorbikes) and occur outside of the loading dock operating hours.

In summary with the above loading dock operation and other deliveries, approximately some 150 delivery and service vehicles arrive at the Sydney Opera House on a typical day.

This generates some 300 vehicle movements per day across the Forecourt and through the pedestrian flows.

3 Assessment of Development Proposal

3.1 Description of Vehicle Access & Pedestrian Safety Project Proposal

With regard to traffic and pedestrians the Vehicle Access and Pedestrian Safety Project seeks to create separation of delivery vehicle traffic flows and pedestrians access on the Sydney Opera House site.

Currently delivery vehicles drive across the Sydney Opera House Forecourt through pedestrian flows accessing the House.

Separation of delivery vehicles and pedestrian flows across the Forecourt is proposed to be achieved by:

- Constructing an underground loading dock to be located below the Sydney Opera House building and Forecourt.;
- Constructing a new vehicle access ramp providing service vehicle access from the existing Macquarie Street roundabout down to the new underground loading dock;
- Construction of new lift services and underground corridors to link the new underground loading dock with the performance areas of the Sydney Opera House; and
- Relocation of existing at grade loading and unloading areas to the new underground loading dock facility.

Each of the above elements is shown in the architectural plan (Appendix B) and described below.

3.1.1 Vehicle Access Ramp to New Loading Dock

A new vehicle access ramp is proposed to be constructed connecting the Macquarie Street vehicle access with the new underground loading dock.

The proposed ramp has been developed with the following design principles:

- Ramp alignment to maximise the width of the forecourt area available to pedestrians approaching the Sydney Opera House from Circular Quay by pushing the ramp as close as possible to the Tarpeian Wall;
- To minimise visual impact on the Forecourt;
- Ramp excavation to avoid:
    - Sydney Harbour Tunnel
    - Sydney Opera House car park site and infrastructure
    - Bennelong Drain (diverted – refer drawing at Attachment 1)
    - Other services located within the area;
- Ramp to accommodate two way vehicle flow for design vehicle (ie. articulated vehicle); and
- Ramp design to comply with AS2890.2 with regard to ramp gradients, headroom clearances etc.

3.1.2 New Underground Loading Dock

A new underground loading dock will be constructed to house the relocated Western Forecourt loading dock and the existing Central Passage loading dock.

The new dock will include:

- Capacity to unload / load 2 x semi trailers and 2 x Medium Rigid Vehicles simultaneously (4 truck bays);
- Raised loading platform with rear and side loading capacity;
- Overhead gantry system;
- Temporary parking for outside broadcast vehicles for major events;
- Separate waste handling facilities; and
- Vehicle manoeuvring area.

The new underground loading dock area has been designed in consultation with the various Sydney Opera House stakeholders which has been reflected in the design requirements documented in the *User Functional Brief*[3].

3.2 Operational Impact Assessment

3.2.1 Traffic Generation

The proposed VAPS Project will not generate additional traffic flows to and from the Sydney Opera House as the existing uses at the site will remain unchanged.

The vast majority of vehicles (including delivery vehicles ie. trucks) which currently access the Sydney Opera House site will be removed from the Forecourt and relocated to the new underground loading dock via the new vehicle tunnel.

Therefore it is estimated that some 150 vehicles per typical day (300 movements per day) would be removed from the Forecourt and redirected to the new underground loading dock facility.

Vehicle access to the Forecourt would be limited to taxis and hire cars, ad hoc Sydney Opera House vehicles including the mini bus and emergency vehicles.

3.2.2 External Road Network Impacts

As all vehicles will continue to access the site via the Macquarie Street roundabout, there will be no change to the daily volume of traffic utilising Macquarie Street and the surrounding road network as a result of the VAPS Project.

As such there will be no material adverse impact of the VAPS Project on the operation of the surrounding road network.

However, the VAPS Project will remove the existing curfew on delivery vehicles during performance periods. This will provide greater flexibility in the management of delivery vehicle access.

[3] Sydney Opera House – Vehicle Access and Pedestrian Safety User Functional Brief (16 March 2010)

This is particularly relevant to the "bump in" and "bump out" periods for the performing arts uses whom will be able to load and unload over a greater period of time, load more efficiently and thereby reduce the number of vehicles generated in any one peak period.

Deliveries associated with the food and beverage uses on the site are expected to continue with the same operational hours.

3.2.3 Impact on Macquarie Street Access Arrangements

As detailed in Section 2 there are a number of land uses within the vicinity of the Sydney Opera House vehicle access which use Macquarie Street to access car park and service areas, namely the Sydney Opera House Car Park and Macquarie Street residential properties.

Access to existing car park entrances and exits will not be affected by the operational of the VAPS Project.

Furthermore, the existing on street bus stop and parking arrangements will not be modified or affected by the VAPS Project.

3.2.4 Sydney Opera House Site Access Arrangements

The VAPS Project includes proposed modifications to the existing geometry and set out of the Sydney Opera House vehicle access at Macquarie Street.

(a) Guardhouse Location

These modifications have been proposed to align the driveway with the proposed new vehicle tunnel / ramp such that vehicle access by the design vehicle (articulated vehicle) can be maintained, while maximising the pedestrian forecourt area.

To accommodate compliant (AS2890.2-2002[4]) access grades between the Macquarie Street access and the proposed new underground loading dock, the location of the security guardhouse has been moved closer to the Macquarie Street access. This will allow vehicles to stop at the guardhouse on a flat grade before driving down the ramp.

The ramp gradients have been designed to minimise the length of the ramp within the constraints of compliance with AS2890.2-2002. This combined with the level of the underground loading dock determine the point where the ramp needs to commence descending. The location of the proposed new guard house reflects these geometric constraints.

The location of the proposed guardhouse will enable a heavy rigid vehicle (12.5 metre long) to stop and stand at the guard house with the body of the vehicle completely off the external road, namely the Macquarie Street roundabout.

It is noted that the existing guardhouse location can not accommodate 2 heavy rigid vehicles stopped at the guard house without the second vehicle extending into the Macquarie Street roundabout.

Under the proposed arrangements an articulated vehicle as used during the "bump in" and "bump out" periods for the performing arts uses would need to stop just beyond the guard house to avoid the tail of the vehicle extending into the Macquarie Street roundabout.

The proposed guardhouse location and associated on site queuing area is considered to be satisfactory on the basis that:

- Deliveries to the Sydney Opera House are booked in advance or come with appropriate delivery documentation and hence there is minimal to no delay in vehicles being permitted access to the site. This arrangement will continue to occur with the VAPS Project;
- Articulated vehicle deliveries are limited to the performing arts "bump in" and "bump out" periods and are not typical daily occurrences. It is also proposed that for articulated vehicles the procedure will be for the guard to walk out of

[4] Australian Standard (AS290.2-2002) Parking Facilities – Commercial Off Street Parking Facilities

the guard house to stop the vehicle at the point where the vehicle is clear of the Macquarie Street roundabout;

- General traffic flows around the Macquarie Street roundabout are relatively low in frequency and in vehicle speed;
- Sight lines on the approach to Sydney Opera House access are good and hence there wouldn't be adverse safety implications associated with vehicle queuing; and
- The proposed access arrangements are generally consistent with the existing arrangements.

(b) Vehicle Rejection Implications

As per existing arrangements, rejected vehicles will be required to reverse from the driveway back onto the Macquarie Street roundabout. It is noted that the level of incidence of a vehicle being rejected is very low.

As the existing arrangements will continue to occur as part of the VAPS Project it is considered that there will be no material impact on the existing operation of the Macquarie Street roundabout.

3.2.5 Loading Dock Layout and Functionality

The loading dock layout has been specifically designed to meet the user requirements as *User Functional Brief.*

The dock layout will facilitate simultaneous two way movements along the vehicle ramp, with sufficient vehicle manoeuvring area within the dock to allow forward entry and forward exit movements from the site at Macquarie Street.

The dock has the capacity to unload / load up to 4 delivery vehicle at the dock platform and a waste vehicle simultaneously.

The truck turning bay will allow for a number of vehicles to stand and wait to be unloaded / loaded. This area will also be used for Outside Broadcast vehicles to park

during major events on the Sydney Opera House Forecourt, removing the need for such vehicles to park on the Forecourt as per the existing situation.

The loading dock area will be controlled by a dock manager. The dock manager will be responsible for communication with the guardhouse, allocation of vehicle parking at the dock and movement of vehicles generally.

3.2.6 Pedestrian Access

Pedestrian access to and from the Sydney Opera House Forecourt will be significantly improved by the VAPS Project.

The removal of delivery vehicle movements from the Forecourt area will significantly reduce the existing vehicle / pedestrian conflict that occurs.

Pedestrian access to and from the Forecourt will be retained and enhanced via Macquarie Street and via the Circular Quay foreshore.

3.3 Construction Traffic Implications

Final construction details regarding the construction methodology for the VAPS Project are yet to be determined. The construction methodology will be developed by the successful contractor in conjunction with the Sydney Opera House.

Notwithstanding the above, it is anticipated that construction vehicle access to and from the site will generally be limited to Macquarie Street.

A detailed Construction Traffic Management Plans will be prepared for each stage of construction activity on the proposed development site. Such plans will need to detail traffic generation, site access arrangements, implications on the operation and safety of the surrounding road network and maintaining access to an operational Sydney Opera House.

This section of the report outlines the potential impacts of construction traffic and principles of construction traffic management to be implemented with regard to construction activities associated with the VAPS Project.

3.3.1 Potential Construction Traffic Impacts

The potential impacts of construction activities and construction traffic with regard to traffic and parking include:

- Construction vehicle access arrangements:
  - Impact on adjacent properties and land uses:
  - Access to the Sydney Opera House;
- Degradation of amenity via construction traffic noise;
- Road network operation – loss of intersection capacity with additional construction vehicles;
- Safety implications for all road users as a result of additional heavy vehicle flows and new construction vehicle access arrangements; and
- Potential loss of available on street parking:
  - Additional parking demand by construction workers;
  - Loss of on street parking to accommodate construction vehicle access.

3.3.2 Detailed Construction Traffic Management Plan

A detailed construction traffic management plan (CTMP) will need to be prepared and approved prior to construction works to address the potential impacts identified above. Essentially the CTMP sets out a plan to manage construction activities such that the potential implications are mitigated or appropriately managed.

This CTMP will need to include:

- Details of proposed works;
- Timing of proposed works;
- Hours of construction activities;
- Number of construction vehicles, particularly heavy vehicles to be used;

- Mitigation and management measures including use of construction vehicle on site management system, construction vehicle access arrangements and circulation; and
- Contact details for on site construction personnel.

The CTMP shall be prepared in accordance with RTA guidelines.

3.3.3 Construction Vehicle Routes

Vehicle access to and from the site will be generally restricted to the existing access routes to and from the site, namely Macquarie Street.

3.3.4 Amenity Impacts

The amenity impacts associated with construction traffic are principally associated with noise, vibration and safety issues.

It is proposed that construction hours for all external works will be during standard daytime construction hours, Monday to Saturday as follows:

- Monday – Friday: 7am to 6pm
- Saturday: 8am to 1pm

However due to the very large volumes of pedestrians accessing the Forecourt, and in order to minimise the adverse visual, heritage, amenity and safety impacts caused by the disruption to the Forecourt during the construction process, it is essential that the duration of the construction phase be minimised.

As such it is proposed that once the loading dock is at a stage where it is enclosed, construction work to all internal areas of the proposal will be carried out throughout the day and night.

It is also proposed to carry out some limited external construction works outside of standard hours, including:

- The portion of the entry tunnel works which is over the pedestrian link.. For safety reasons it is preferred to undertake these works outside the car park operating hours.
- Works in the vehicle concourse. These works are more then 180 metres from the nearest residences and are naturally screened by the Monumental Stairs.

In principal it is recommended that the hours for the delivery of building materials or spoil removal be managed so as not to unreasonably impact on the amenity of the patrons of the Sydney Opera House and surrounding neighbours.

The ability to carry out internal works and some limited external works outside of usual construction hours is expected to considerably reduce the total construction timeframe which represents a significant benefit in terms of heritage, safety and visual impacts on the site, without any unacceptable amenity impacts to surrounding premises.

3.3.5 On Street Parking Impacts

To further mitigate on street parking implications, where practical dedicated parking spaces should be provided off street for construction workers vehicles. This could include arrangements with the operators of the Sydney Opera House Car Park.

3.3.6 Site Access and Construction Vehicle Manoeuvring

Construction vehicle access arrangements should be designed such that all construction vehicles can enter and exit the site in a forward direction.

This will require the provision of sufficient on site manoeuvring area to accommodate the large vehicle expected to access the site during the construction period.

4 Summary

One of the most critical issues presently facing the Sydney Opera House is the increasing conflict between pedestrians and delivery vehicles which share the same space on the Sydney Opera House Forecourt (Forecourt).

The conflict is generated by the need for all service and delivery vehicles to traverse the forecourt through pedestrian flows to access the Sydney Opera House's loading dock facilities.

The VAPS Project has been proposed to address the longstanding issues of pedestrian safety arising from pedestrian and vehicle conflict on the Forecourt by minimising intrusion of delivery vehicles into the forecourt through construction of a new underground loading dock.

The VAPS Project will not lead to any significant change to the operational traffic generation of the Sydney Opera House site.

The VAPS Project will however removal approximately 300 delivery vehicle movements per day from the Forecourt and hence significantly reduce the pedestrian / vehicle conflicts.

The design elements of the VAPS Project have taken into account the demands and spatial requirements of the various key stakeholders of the Sydney Opera House to deliver a facility which will allow efficient and safe delivery of goods and materials to and from the Sydney Opera House.

As the VAPS Project is essentially a site based design solution (ie. little to no change to the external road network) the benefits to pedestrian safety and amenity are delivered without significant impacts to the operation of the external road network.

Detailed construction traffic management plans will need to be developed and implemented in accordance with the principles set out in this document.

Appendix A Delivery Vehicle Traffic Generation

Source: Vehicle Access & Pedestrian Safety Project – User functional Brief (Issue 5) 16 March 2010.

Delivery of Food, Beverage and Operational Goods for normal operations (based on usage of current south west delivery dock):

In-House Caterers – Weekly Take (Pallets deliveries)

(please note in summer pallets and kegs totals tend to double in peak times)*

The following pallet deliveries reflect average weekly deliveries other than in peak times in summer and for special events when quantities tend to double

	Food (meat, seafood, fruit, vegetables)	Beverage (beer, sprits, wine, soft drinks)	Kegs / ea
Opera Bar	3	20	80 = 9 pallets
Bennelong Rest	4	4	
Dolce Vita	4	7	
Sidewalk Café	4	8	
Opera Point Events	3	3	

In-House Contractors – Weekly Take (Pallets deliveries)

	Hardware	Electrical	Air Con
United Group	2	-	-
Network Electrical	-	3	-
Hasties	-	-	3
State Automation	-	1	-

In-House Departments - Weekly Take (Pallets deliveries)

	Hardware / Electrical	Sound Av/Lighting	Flyers / Brochures / Promotional	Stationery / Couriers
Facilities	1	-	-	-
TTS	-	2	-	-
Marketing	-	-	4	-
General	-	-	-	8

(Please note number of vehicles may increase due to special events)

Vehicle Movements for normal operations:

In-House Caterers – Weekly number of Vehicles

	Food	Beverages
Opera Bar	70	35
Bennelong Restaurant	70	15
Dolce Vita	25	4
Sidewalk Café	65	9
Opera Point Events	60	3

In-House Contractors – Weekly number of Vehicles

	Hardware	Electrical
United Group	10	-
Network Electrical	-	10
Hasties	5	-
State Automation	-	3

In-House Departments - Weekly number of Vehicles

	Hardware / Electrical	Sound Av / Lighting	Flyers / Brochures / Promotional	Stationery /Couriers
Facilities	7	-	-	-
TTS	-	5	-	-
Marketing	-	-	12	-
General	-	-	-	53

OPERA AUSTRALIA DELIVERY SCHEDULE (SAMPLE)

Day	date	Time	From	To	Load	Vehicles		Notes
Fri	17-Jul	0730	SOH	Depot	Manon	2 x Tautliners	A & B	
Mon	20-Jul	0800	SOH	Store	Acis/Dido	OA		Acid/Dido Season bum out
Tue	21-Jul	2330	SOH	Depot	Aida	1 x Tautliner	C	
Wed	22-Jul	1100	Depot	SOH	Manon	2 x Tautliners	A & B	
Wed	22-Jul	2330	SOH	Depot	Manon	2 x Tautliners	A & B	
Sat	25-Jul	0800	Depot	SOH	Aida	1 x Tautliner	C	
Sat	25-Jul	1030	Depot	SOH	Manon	2 x Tautliners	A & B	
Sat	25-Jul	1700	SOH	Depot	Aida	1 x Tautliner	C	
Sat	25-Jul	1700	Store	SOH	Acis	OA		Portals for Helpmann awards
Tue	28-Jul	0800	SOH	Store	Acis	OA		Portals from Helpmann awards
Tue	28-Jul	2330	SOH	Depot	Manon	2 x Tautliners	A & B	
Wed	29-Jul	1400	Depot	SOH	Aida	1 x Tautliner	C	
Wed	29-Jul	2330	SOH	Depot	Aida	1 x Tautliner	C	
Fri	31-Jul	0800	Store	SOH	Capuleti	OA		Flown Items only
Fri	31-Jul	1300	Depot	SOH	Manon	2 x Tautliners	A & B	
Fri	31-Jul	1730	TOC2	Store	Capuleti	OA		Rehearsal room items remain in truck
Fri	31-Jul	2330	SOH	Depot	Manon	2 x Tautliners	A & B	
Sat	1-Aug	1130	Depot	SOH	Aida	1 x Tautliner	C	
Sat	1-Aug	2330	SOH	Depot	Aida	1 x Tautliner	C	
Sun	2-Aug	0800	Store	SOH	Capuleti	OA		Set and rehearsal roor items
Wed	5-Aug	0800	Depot	SOH	Aida	1 x Tautliner	C	
Wed	5-Aug	2330	SOH	Depot	Aida	1 x Tautliner	C	
Thu	6-Aug	0800	Depot	SOH	Manon	2 x Tautliners	A & B	
Thu	6-Aug	2330	SOH	Depot	Manon	2 x Tautliners	A & B	
Sat	8-Aug	0800	Depot	SOH	Aida	1 x Tautliner	C	
Mon	10-Aug	1500	SOH	Depot	Aida	1 x Tautliner	C	
Mon	10-Aug	1600	Depot	SOH	Manon	2 x Tautliners	A & B	
Mon	10-Aug	2330	SOH	Depot	Manon	2 x Tautliners	A & B	
Thu	13-Aug	1500	Depot	SOH	Manon	2 x Tautliners	A & B	
Thu	13-Aug	2330	SOH	Depot	Manon	2 x Tautliners	A & B	To store 0800 Fri 14 A
Fri	14-Aug	0800	SOH	Store	Manon	OA		Manon Lescaut Seaso bump out

Prepared by SOH

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