SUPPORTING ASSESSMENT INFORMATION

CITY PLANNING COMMITTEE MEETING (OPEN PORTION OF THE MEETING)

MONDAY 18 APRIL 2016

AT 5.00 P.M.

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6. COMMITTEE ACTING AS PLANNING AUTHORITY

6.1 APPLICATIONS UNDER THE HOBART INTERIM PLANNING SCHEME 2015

6.1.5 28-32 ELIZABETH STREET AND ADJOINING ELIZABETH STREET AND TRAFALGAR PLACE ROAD RESERVES, HOBART - DEMOLITION AND NEW DEVELOPMENT FOR HOTEL, RESTAURANT, BARS, FUNCTION FACILITIES AND CAFE - PLN-15-01162-01 – FILE REF: 7162977 & P/28-32/470

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Attached are copies of reports and other additional information that support the content of the Officer's report contained in the agenda, referred at this item.

Attachment 1

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Elizabeth Tasmania Pty Ltd

The Palace Hotel
28 Elizabeth Street
Traffic Impact Assessment

September 2015

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1. Introduction

1.1 Background

Midson Traffic were engaged by Elizabeth Tasmania Pty Ltd to prepare a traffic impact assessment for the development of the proposed 'Palace Hotel' development at 28 Elizabeth Street, Hobart.

1.2 Traffic Impact Assessment (TIA)

A traffic impact assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

This TIA has been prepared in accordance with the Department of State Growth (DSG) publication, *A Framework for Undertaking Traffic Impact Assessments*, September 2007. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2009.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforseen congestion or other problems where the development connects to the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

The Hobart Interim Planning Scheme, 2015, states that a TIA is required if the increase in the number of vehicle movements per day is more than 40. It further states that the planning authority may require "*an assessment, by a suitably qualified person, of parking demand created by a use or development and the ability for such demand created by a use or development and the ability for such demand to be satisfied in the vicinity of a proposed use of development, if reliant on performance criteria to satisfy E6.6.1, E6.6.3 or E6.6.4*".

1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of The Department of State Growth's, *A Framework for Undertaking Traffic Impact Assessments*, September 2007, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 19 years professional experience in traffic engineering and transport planning.
- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004
- Bachelor of Civil Engineering, University of Tasmania, 1995

Keith is a Director of the traffic engineering, transport planning and road safety company, Midson Traffic Pty Ltd. He is also a Teaching Fellow at Monash University, where he teaches and coordinates the subject 'Road Safety Engineering' as part of Monash's postgraduate program in traffic and transport. Keith is also an Honorary Research Associate with the University of Tasmania, where he lectures the subject 'Transportation Engineering' in the undergraduate civil engineering program as well as supervising several honours projects each year.

1.4 Project Scope

The project scope of this TIA is outlined as follows:

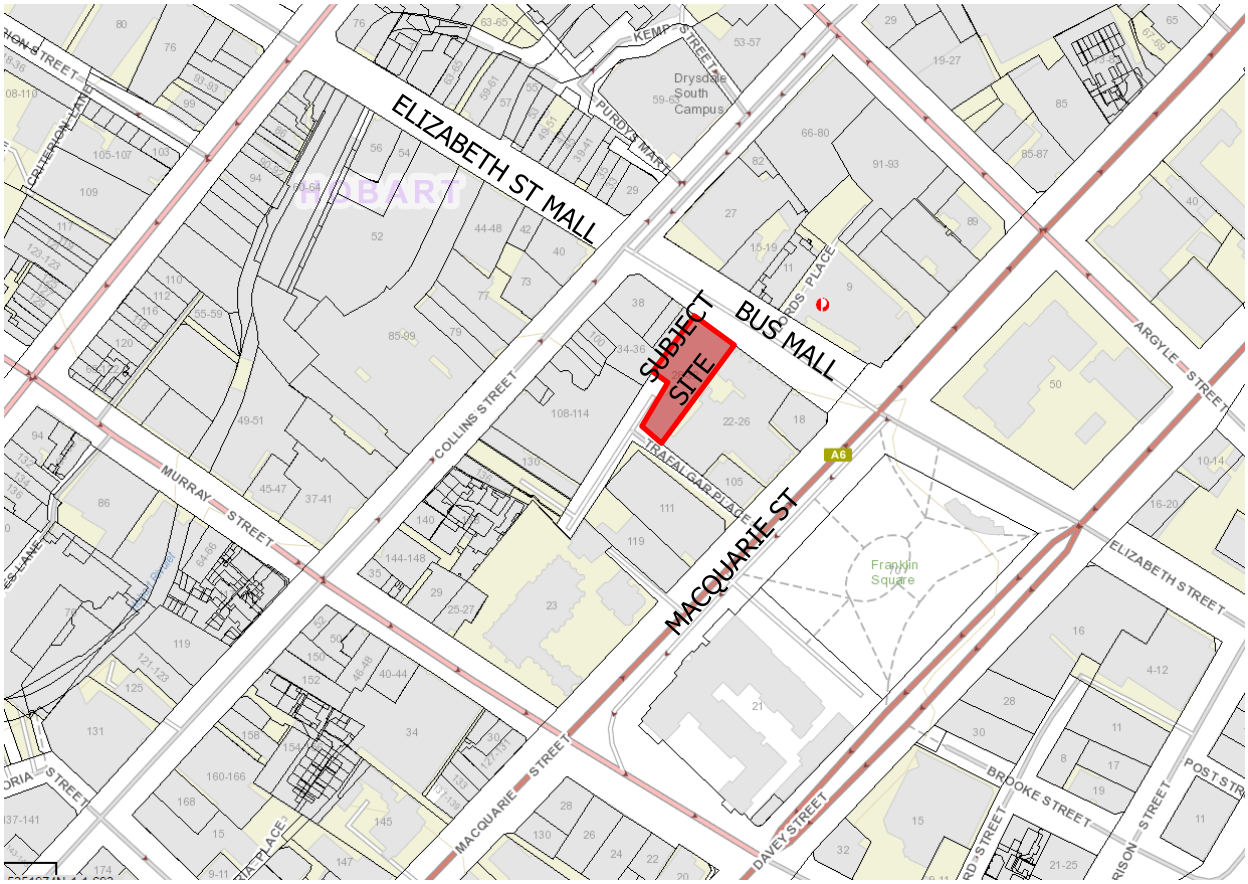
- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Review of the parking requirements of the proposed development. Assessment of this parking supply with Planning Scheme requirements.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

1.5 Subject Site

The subject site is located at 28 Elizabeth Street Hobart (within the Bus Mall). The rear of the site is accessed via Trafalgar Place.

The subject site and surrounding road network is shown in Figure 1.

Figure 1 Subject Site & Surrounding Road Network



Source: LIST Map, DPIPWE

1.6 Reference Resources

The following references were used in the preparation of this TIA:

- Hobart Interim Planning Scheme, 2015 (Planning Scheme)
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2009
- Austroads, Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2009
- DSG, *A Framework for Undertaking Traffic Impact Assessments*, 2007
- Institute of Transportation Engineers, Trip Generation Manual, 8th Edition, 2008 (ITE Manual)
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1:2004)
- Roads and Maritime Services NSW, *Guide to Traffic Generating Developments*, 2002 (RTA Guide)
- Roads and Maritime Services NSW, *Updated Traffic Surveys,* 2013 (Updated RTA Guide)

2. Existing Conditions

2.1 Transport Network

For the purpose of this report, the transport network consists of Elizabeth Street, Trafalgar Place, Macquarie Street and Collins Street. Other roads such as Argyle Street, Liverpool Street and Murray Street were considered in the context of the development, but not examined in detail.

These roads are outlined in the following sections.

2.1.1 Elizabeth Street

Elizabeth Street is a major collector road that provides accessibility to North Hobart to the west of Collins Street. The Mall is located between Collins Street and Liverpool Street, and the bus mall is located between Collins Street and Macquarie Street. To the east of Macquarie Street, Elizabeth Street provides an important link between Sullivans Cove and the Davey Street/ Macquarie Street couplet. At the Collins Street and Macquarie Street junctions, Elizabeth Street provides access for Metro bus services, as well as service vehicle access (including access to Lords Place) and taxi vehicle thoroughfare (to a much less extent).

The subject site's existing street frontage on the bus mall is shown in Figure 2.

Figure 2 Subject Site's Bus Mall Frontage

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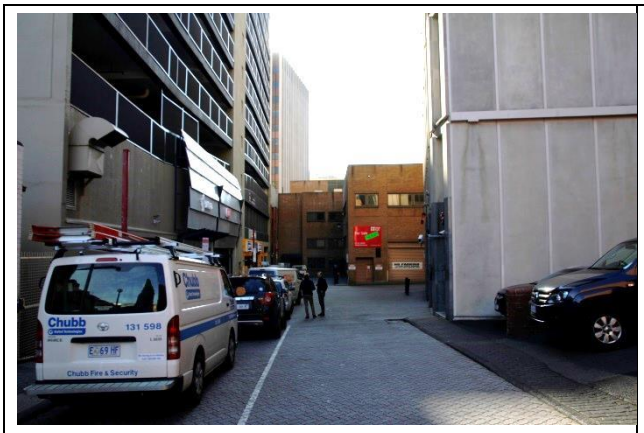
2.1.2 Trafalgar Place

Trafalgar Place is a short dead-end 'T' shaped road that provides access to the rear of several properties fronting the bus mall (including the subject site) and Collins Street. It also provides access to Trafalgar Car Park.

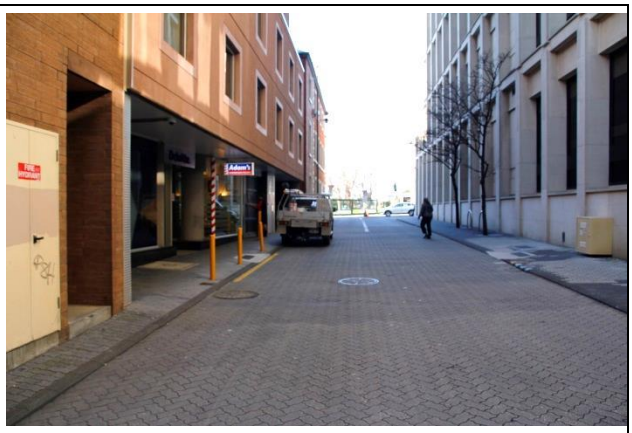
A footpath is provided on the southern side of Trafalgar Place. Only a narrow kerb edge is provided on the northern side of the road, with some localised widening for pedestrians at the access to the Deloittes Building adjacent to the subject site.

Trafalgar Place from various viewpoints is shown in Figure 3.

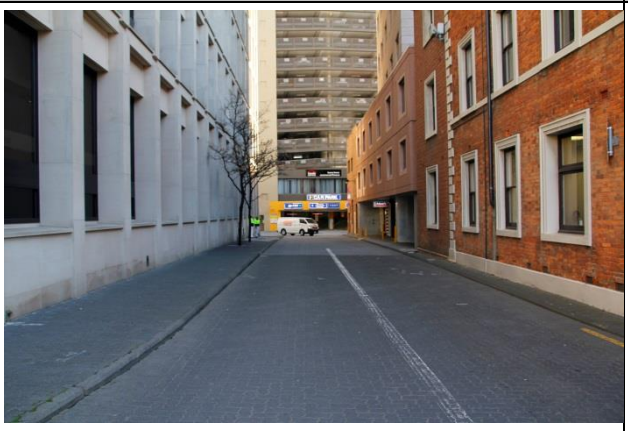
Figure 3 Trafalgar Place



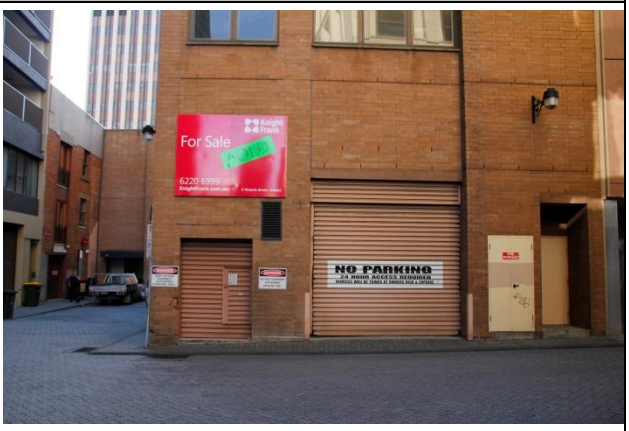
Southern end of Trafalgar Place towards subject site



From Subject site looking towards Macquarie Street



From Macquarie Street towards site



Existing site access

2.1.3 Macquarie Street

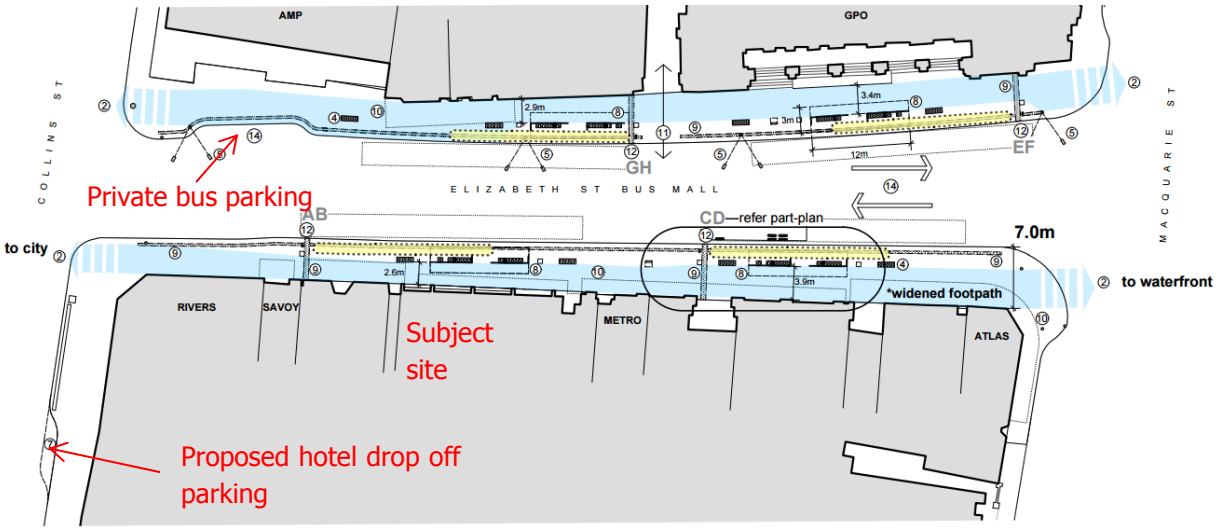
Macquarie Street is a major arterial road that forms the northbound component of the Davey Street/ Macquarie Street couplet through Hobart. It has three lanes near the bus mall and carries approximately 34,000 vehicles per day[1].

2.2 Bus Mall Upgrade

Plans are currently underway for the revitalisation of the Hobart Bus Mall in its current location in Elizabeth Street. The bus mall upgrade is a component of both the Inner City Action Plan and the Hobart Central Bus Interchange Planning Project, a joint project between the City of Hobart, the Department of State Growth, Metro Tasmania and TasBus. Construction is likely scheduled to commence in 2016.

A concept plan for the bus mall revitalisation is shown in Figure 4.

Figure 4 Bus Mall Upgrade



Source: www.hobartcity.com.au

2.3 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

Crash data was obtained from the Department of State Growth for a 5½ year period between 1 January 2010 and 30th June 2015 for Elizabeth Street between Davey Street and Collins Street, and the full length of Trafalgar Place.

[1] State Growth SCATS data, Macquarie Street/ Barrack Street junction, October 2014.

The findings of the crash data is summarised as follows:

- A total of three crashes were reported in Trafalgar Place during that time. Two of these crashes occurred in the section of Trafalgar Place between Macquarie Street and the subject site, the other occurred in the section to the south (towards the Collins Street laneway). No crashes were reported at the Macquarie Street junction.
- Two of the crashes that were reported in Trafalgar Place involved "other manoeuvring", and one involved "vehicle door". No crashes involved injury.
- A total of 40 crashes were reported in Elizabeth Street between Davey Street and Macquarie Street. Of these crashes, 4 involved pedestrians. Three of the pedestrian crashes involved heavy vehicles (most likely buses) and occurred within the Bus Mall (one at Collins St, one at Macquarie St, and one mid-block). One pedestrian crash was reported at the Davey Street junction.
- A total of 11 crashes were reported at the Macquarie Street junction. Five of these crashes involved minor injury and the remainder involved property damage only. The dominant crash trend was 'right through', accounting for a total of 8 crashes. No crashes at this location involved heavy vehicles (assumed therefore that buses were not involved).
- Three crashes were reported at the junction of Collins Street. One of these crashes involved a pedestrian (as noted above), and two crashes involved a heavy vehicle reversing.
- A total of 7 crashes occurred within the bus mall. Of these crashes, 5 involved a parked vehicle (parked vehicle run away and 'parked'), one involved a pedestrian, and one involved a reversing manoeuvre.
- One crash was reported in Elizabeth Street between Davey Street and Macquarie Street. This crash involved a reversing manoeuvre and resulted in property damage only.
- A total of 11 crashes were reported at the junction of Davey Street. Of these crashes, 3 involved minor injury, 1 involved first aid at the scene, and the balance involved property damage only. The dominant crash trends at this junction were 'rear-end' (5 crashes) and 'right turn side swipe' (3 crashes).

The crash data is relatively typical of a busy CBD road environment, with high levels of pedestrian and bus activity. The crash history does not indicate that there are any specific road safety issues that may be exacerbated by traffic generated by the proposed development.

3. Proposed Development

3.1 Development Proposal

The proposed development involves the demolition of the existing building (previously the Westpac Bank), and the construction of a new 196 room hotel. The Hotel also comprises of bar, restaurant, gymnasium and car parking.

The proposed development plans are shown in Figure 5, Figure 6, Figure 7, Figure 8 and Figure 9.

Figure 5 Proposed Development – Ground Floor

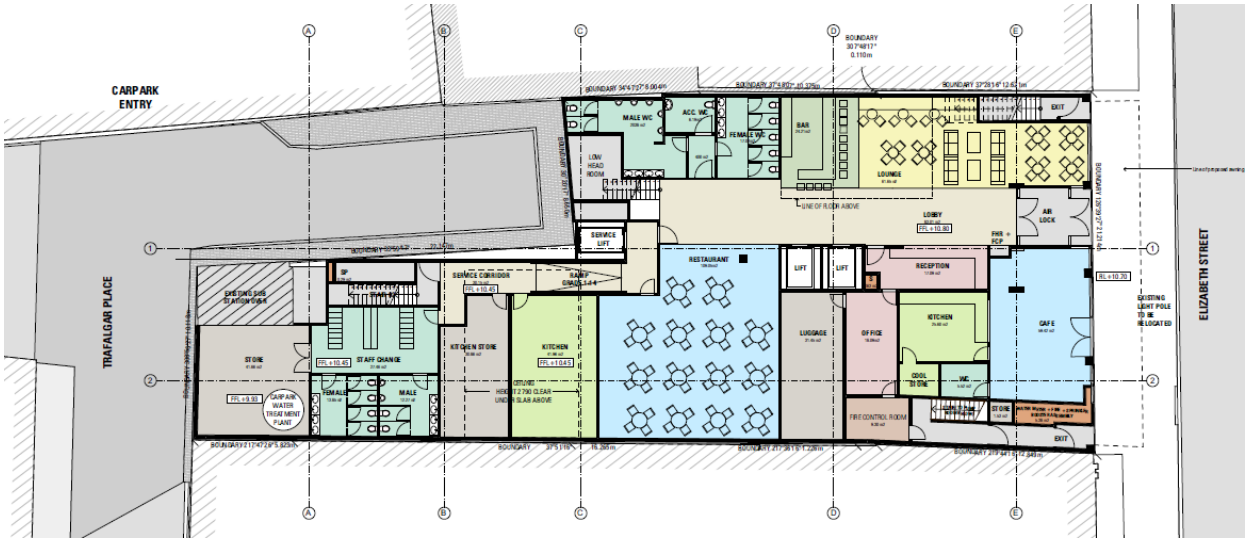


Figure 6 Proposed Development – Mezzanine Floor

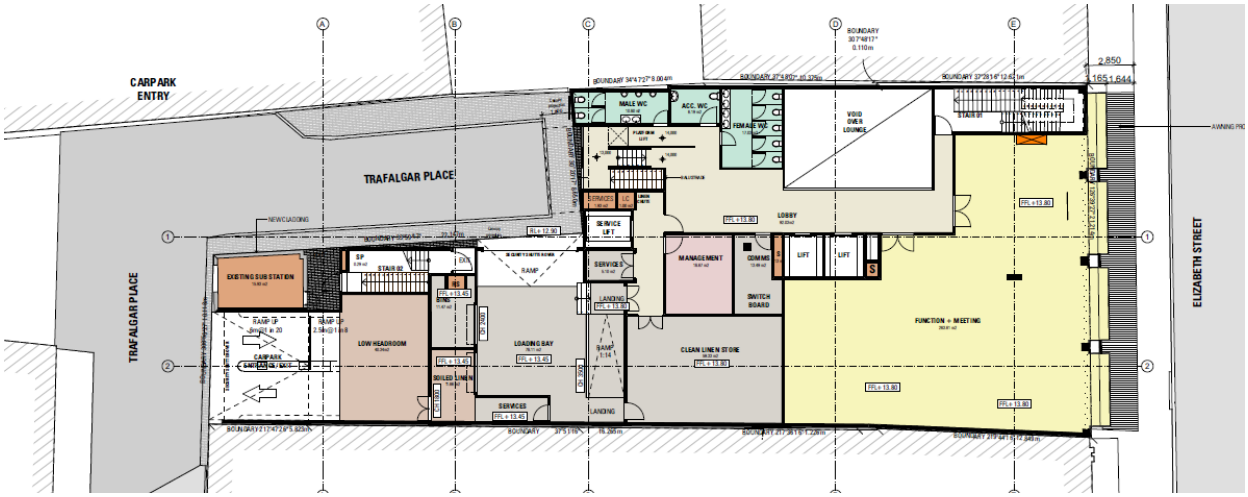


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Figure 7 Proposed Development – Level 1

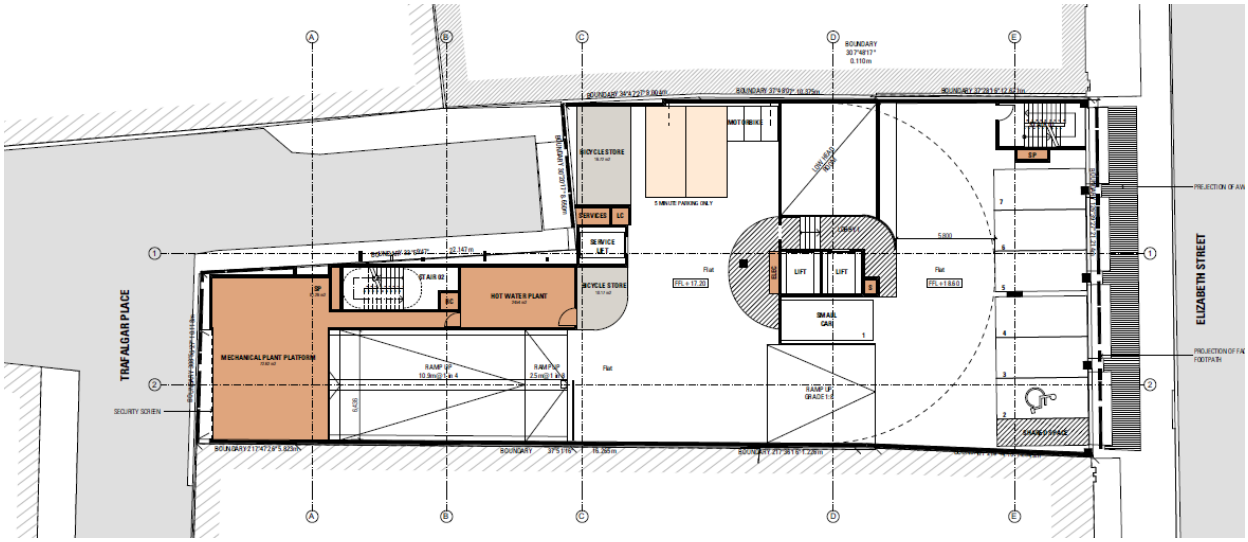


Figure 8 Proposed Development – Levels 2 & 3

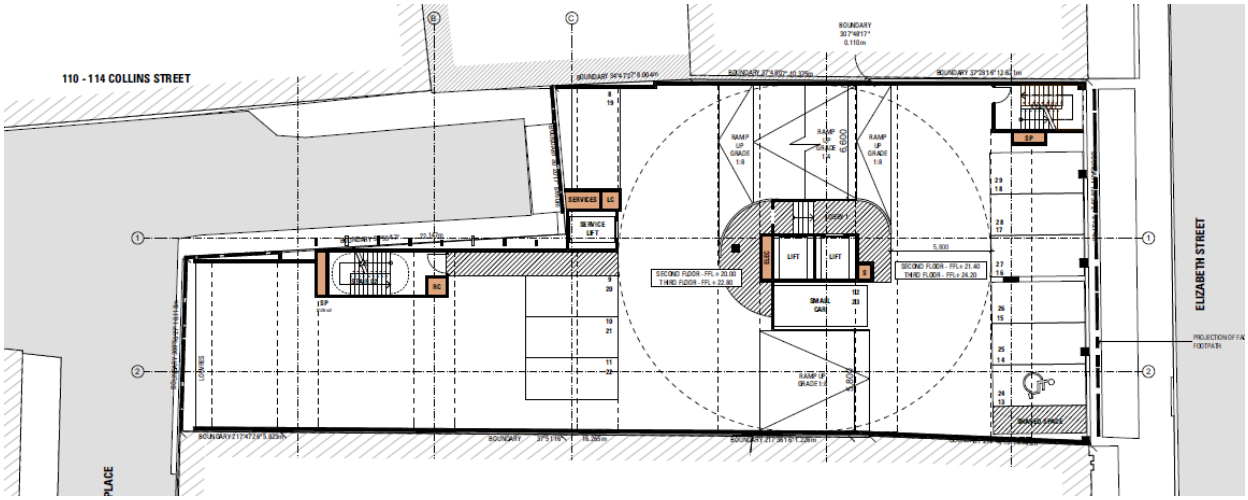
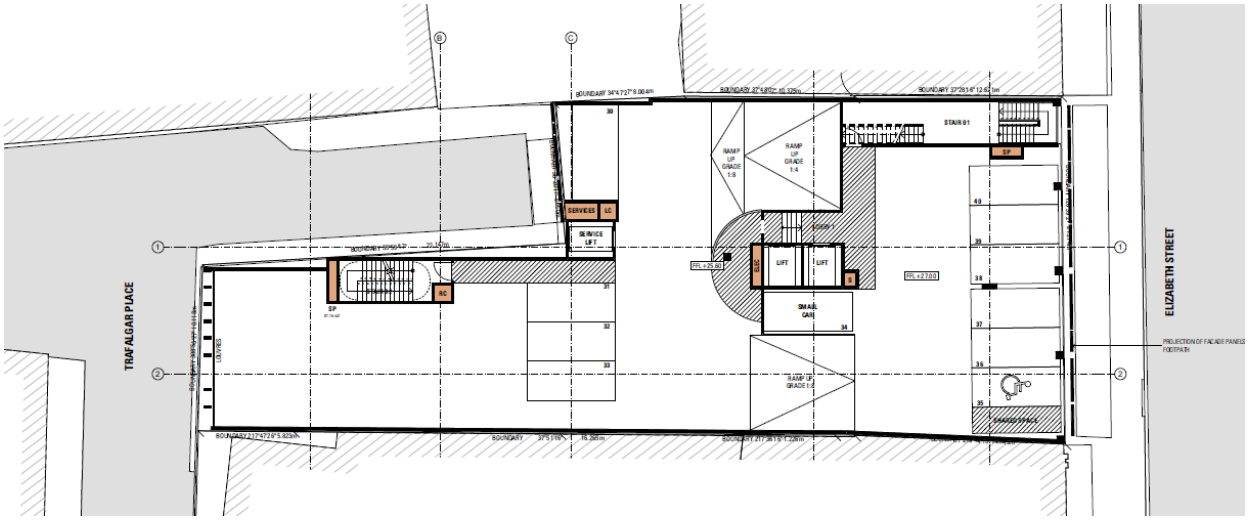


Figure 9 Proposed Development – Level 4



4. Traffic Impacts

4.1 Traffic Generation

The proposed development is an inner city hotel. It will be ideally suited to guests staying in city (such as business people, etc) who do not require a car. The site is very close to public transport (fronting bus mall) and is within close walking distance Sullivans Cove and CBD.

Traffic generation rates have been sourced from the ITE Manual (noting that the standard Australian traffic generation reference, RTA Guide, does not contain data for hotels of this type). The ITE Manual provides detailed trip generation rates for a hotel development as shown in Table 1.

Table 1 ITE Hotel Trip Generation Rates

Unit	Weekday	AM	PM	AM In	AM Out	PM In	PM Out
Rooms – Rate	8.17	0.56	0.59	61%	39%	53%	47%
Staff – Rate	14.34	0.69	0.80	60%	40%	54%	46%
Rooms – Total	1,569 trips	108 trips	113 trips	66 trips	42 trips	60 trips	53 trips
Staff - Total	215 trips	10 trips	12 trips	6 trips	4 trips	6 trips	6 trips
Total	**1,784 trips**	**118 trips**	**125 trips**	**72 trips**	**46 trips**	**67 trips**	**59 trips**

The trip generation rates provided in Table 1 relate to people trips, with mode share between car, pedestrian, bicycle, motorcycle and bus. Traffic generation at the site is restricted by the physical number of parking spaces provided (ie. it would not be possible for the car park to cater for 118 inward and 125 outward vehicle trips during the morning peak for example).

The proposed multi-level car park caters for a maximum occupancy of 40 spaces and 2 motorcycles. (Note that 2 spaces are located in the first level – these are not included in the total parking numbers as they are for short term check in prior to accessing a parking space elsewhere). The maximum traffic generation during the AM and PM peak periods is therefore likely to be in the order of 53 vehicles per hour when the hotel is at full capacity (with the inward and outward splits provided in Table 1).

All vehicle trips to the site will be via Trafalgar Place, which is accessible from Macquarie Street. All approaching traffic must therefore approach the site from Macquarie Street from the south. Vehicles

departing exit onto Macquarie Street and travel north, or can then utilise Elizabeth Street to access destinations to the south, or Sullivans Cove.

As stated earlier, being an inner city Hotel, it is expected that it will attract a high proportion of guests who do not arrive by vehicle.

4.2 Access Impacts

Access to the car park is via an existing building entrance in Trafalgar Place. The ramp is 6.4 metres wide and has been designed with kerb on both wall edges to reduce the risk of vehicle impact with the internal walls on the ramp.

A boom gate mechanism is proposed at both ends of the ramp to ensure that only authorised entry is permitted. This also prevents vehicles from entering the car park during times when it is at capacity. The boom gate is operated by a swipe card with an intercom for manual over-ride.

Sight distance is restricted by the walls of the building at the junction with Trafalgar Place for exiting vehicles. At a distance of 2.5 metres back from the kerb (as required by Figure 3.2 of AS2890.1:2004), the available SSD for vehicles approaching from the west is approximately 10 metres. This sight distance increases rapidly as the vehicle moves into Trafalgar Place as part of its exit manoeuvre. Full sight distance is available to the exit of Trafalgar Place car park when the driver's position is located approximately 1.5 metres from the kerb. It is this direction which is considered the most important as the traffic on this approach travels immediately adjacent to the building line.

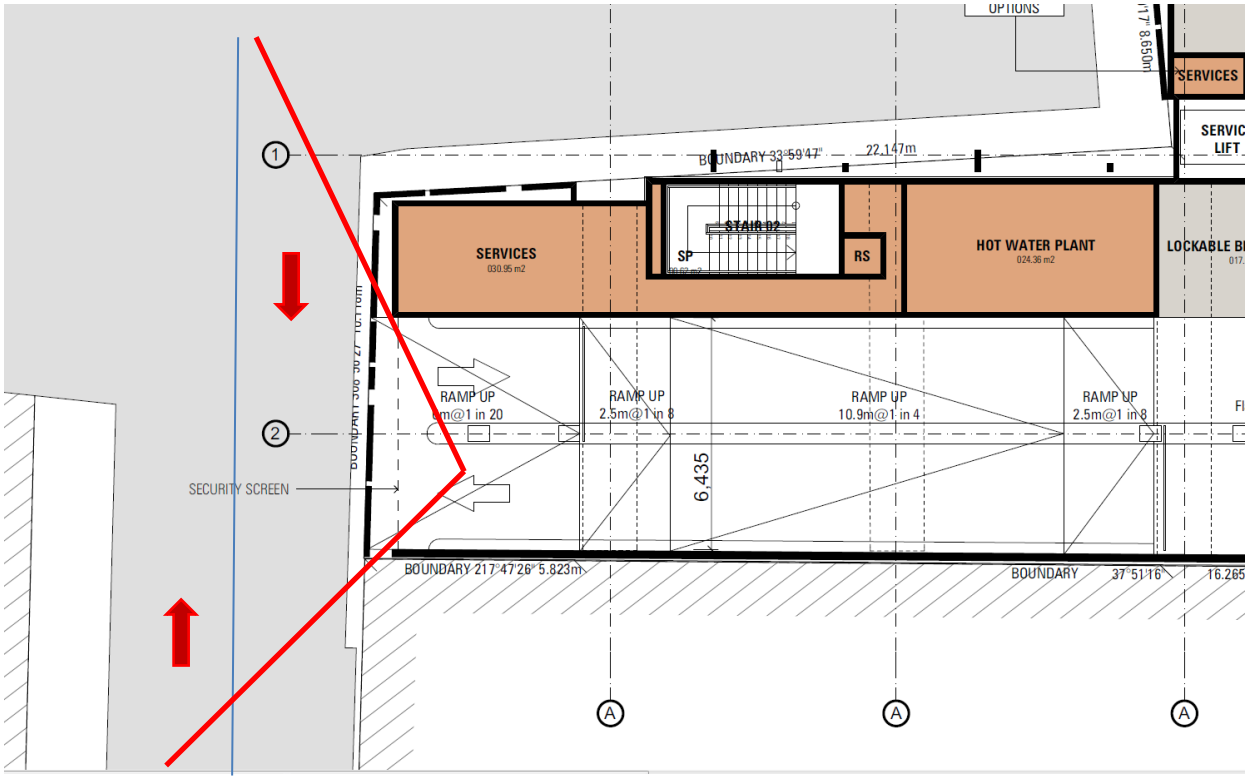
Sight lines to the west are lower, however traffic can move into Trafalgar Place without passing into the conflict area of vehicles in this approach. As with sight lines in to the east, as the vehicle moves into Trafalgar Place, sight distance increases rapidly.

Speeds were observed to be very low in Trafalgar Place. The short distance between the site's access and the 'T' end of Trafalgar Place (at the Trafalgar Car Park's access) is relatively short, thus vehicles do not have sufficient distance to reach reasonable speeds. The 85th percentile speed at the access is likely to be in the order of 30-km/h at the site's access.

Due to the identified sight distance restriction, it is important to ensure that measures are taken to maximise safety at this access location. The following measures are recommended:

- Provide a car park style speed hump at the exit of the car park to ensure vehicles leave the site at very low speed.
- Provide a warning system to alert motorists approaching the access on Trafalgar Place that a vehicle is exiting the site. This can be in the form of a flashing light above the access.

Figure 10 Access Sight Distance



4.3 Pedestrian Impacts

Pedestrian access is available at the Elizabeth Street and Trafalgar Place frontages. Access is available between both frontages, thus enabling guests and visitors to the hotel to access the bus mall and Trafalgar Place.

Within the car park, pedestrian access is available to the central elevator shaft. On the northern car parks on each level, access is via a level path. Access between northern car parks and the elevator access is level. Car parking spaces on the southern side of each level can access the elevator shaft via a small flight of stairs.

A service lift is located on the southern side of the car park on each level. The swept path of vehicles travels in very close proximity to the access to the lift. It is therefore recommended that a warning device be installed above the lift doors to alert approaching motorists that a person may be exiting the lift. Note that the service lift will have very infrequent usage within the car parking levels.

Pedestrian access is not permitted down the main access ramp to the car park to Trafalgar Place.

Pedestrian infrastructure is well provided on both roads connecting to the site. A formal pedestrian footpath is only available on the southern side of Trafalgar Place.

4.4 Road Safety Impacts

No significant adverse road safety impacts are foreseen for the proposed development, as the predicted future peak traffic generation of 53 vehicles per hour is not significant enough to generate any road safety deficiencies based on the following:

- Access to the site is via Trafalgar Place. This access is a low speed/ low volume environment with a positive road safety performance.
- Access to and from Trafalgar Place at Macquarie Street is via a T-junction. "Keep Clear" markings have been installed
- There is sufficient spare capacity in the surrounding road network to absorb the small predicted increase in peak hour traffic generated from the proposed development.
- The access is located in a commercial environment and as such, traffic movements into and out of the site will not be seen as an unusual event by other motorists.

4.5 Construction Traffic Management

The development is located in a busy central city location and as such, its construction will require careful planning to minimise traffic impacts of adjacent properties and the operation of the surrounding road network (including the bus mall).

The stages of construction of the Palace Hotel will consist of the following:

- Stage 1: Demolition of existing building
- Stage 2: Preliminary excavation works
- Stage 3: Construction

Prior to the commencement of works, a construction management plan (CMP) will be prepared by the contractor and submitted for approval Hobart City Council. This plan will contain a detailed traffic management for all construction stages that have a potential impact on traffic and pedestrian flow on the surrounding transport network.

Importantly, the construction activities should not impact on the normal operation of the bus mall. Consideration will also be required for loading areas in the loading areas located immediately adjacent to the site in Trafalgar Place, along with pedestrian paths and access to the Trafalgar Place Car Park.

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5. Parking Assessment

5.1 Parking Provision

The proposed development will provide a total of 40 on-site parking spaces. These spaces are accessed via a ramp connecting to Trafalgar Place. Parking is provided over four levels, with a central circulating ramp connecting the spaces to the access ramp.

Provision for loading is via a service access adjacent to the car park ramp in Trafalgar Place.

5.2 Planning Scheme Requirements

Acceptable Solution A1 of Schedule E6.6.5 of the Planning Scheme states that:

(a) No on-site parking is provided; or

(b) On-site parking is provided at a maximum rate of 1 space per 200m^2 of gross floor area for commercial uses; or

(c) On-site parking is provided at a maximum rate of 1 space per dwelling for residential uses; or

(d) On-site parking is required operationally for an essential public service, including, hospital, police or other emergency service.

Note that with a gross floor area of 8,117m^2, a maximum of 41 spaces is permitted under (b). In this case, the proposed development provides a total of 42 parking spaces. This parking provision fails to comply with (a) and (b) of Acceptable Solution A1 in E6.6.5 (noting that (c) and (d) are not relevant to this proposal).

The proposed development provides a total of 42 spaces, which is only 1 space greater than the Acceptable Solution E6.6.5(b).

The proposed development was therefore assessed against the Performance Criteria P1, which is as follows:

Car parking provision:

(a) Is in the form of a public car parking station provided as part of a development which utilises a major existing access; or

(b) Must not compromise any of the following:

i. Pedestrian safety, amenity or convenience;

ii. The enjoyment of 'al fresco' dining or other outdoor activity;

iii. Air quality and environmental health;

iv. Traffic safety

In this case, access to the parking area utilises an existing vehicular access to the site, located on Trafalgar Place. The access does not significantly interfere with pedestrian access as the primary footpath in Trafalgar Place is located on the opposite side of the road. There is no al fresco dining or other outdoor activity. Air quality and environmental health are not a concern arising from the proposed development. The site does not cause any significant road safety concern (refer to Section 4.4 for details).

It is therefore considered that the Performance Criteria, P1 is met for E6.6.5 of the Planning Scheme.

5.3 Car Parking Layout

The design of the car park has been carefully undertaken to comply with the requirements of the Australian Standards as much as possible.

5.3.1 Car Parking Dimensions

The design of the parking modules at the northern and southern ends of each parking levels have the following dimensions:

- Space width: 2.4 metres
- Space length: 5.4 metres
- Aisle width: 5.8 metres

These spaces therefore comply with the dimension requirements of User Class 1A in Australian Standards, AS2890.1:2004 (Residential, domestic and employee parking).

Spaces 10, 21 and 32 are located in the south-western corner of the 2nd, 3rd and 4th levels of the car park. These spaces require a relatively complex reversing manoeuvre, parallel to the circulating aisle. It is recommended that these spaces be reserved for staff to reduce the turnover of the spaces, and to ensure that some driver familiarity is maintained.

Spaces 3, 14, 25 and 36 are signed as "small car". The Australian Standards states that the minimum dimensions for a small car space are 2.3m x 5.0m. The spaces measure 2.4m x 5.4m, but have been designated as 'small car' due to the wall structure associated with the adjacent ramp, and the elevator structure.

5.3.2 Swept Path Assessment

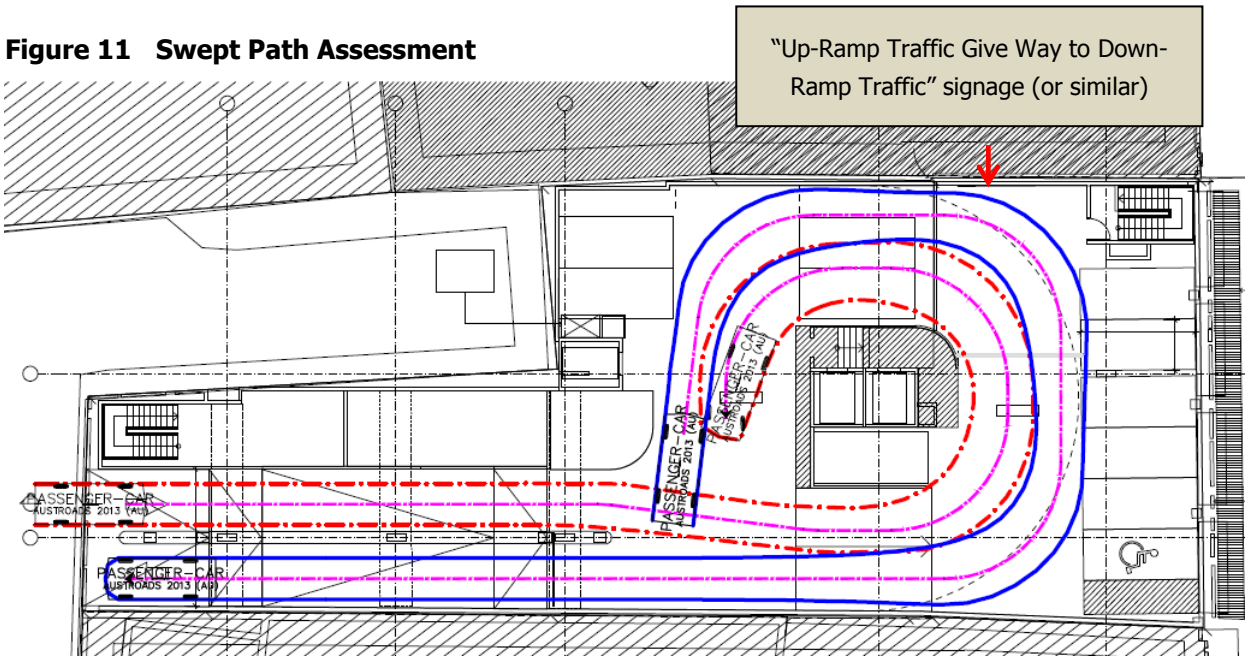
The relatively confined space within the building results in a car park design that has tight manoeuvring. Vehicles are required to circulate in an almost circular motion to navigate up or down the four car parking levels. The Australian Standards, AS2890.1:2004 states that the minimum radius of a curved circulation roadway is 11.8m for two-way flow, and 7.6m for one-way flow. In this case, the constrained site only enables approximately 9.5m radius. This is wider than the minimum for one-way flow, but less than the requirement of two-way flow.

A swept path assessment was undertaken to confirm vehicle manoeuvring within the car park. A swept path assessment of a B85 vehicle travelling up and down the ramps is shown in Figure 11. It can be seen that there is no margin for error when two vehicles are travelling in opposite directions. When a vehicle is travelling in one direction only, there is sufficient room to manoeuvre without concern.

To ensure that safety is maximised within the car park, the following measures are proposed:

- Warning signage: signage at the first internal ramp (adjacent to signage advising of the check in parking spaces) to advise of the narrow nature of the car park, with advisory speed (10-km/h).
- Centre line marking along all ramps and curves on ramp approaches.
- Signage on western walls of the car park (on northern side) advising that up-ramp traffic must give way to down-ramp traffic. This location will be more prominently visible for up-ramp traffic and will therefore have maximum impact (and will also not be obscured by parked vehicles or other potential obstructions). This location is shown indicatively in Figure 11.

Figure 11 Swept Path Assessment



5.3.3 Ramp grades

The car park is located across 4 levels. This requires ramps at the following locations:

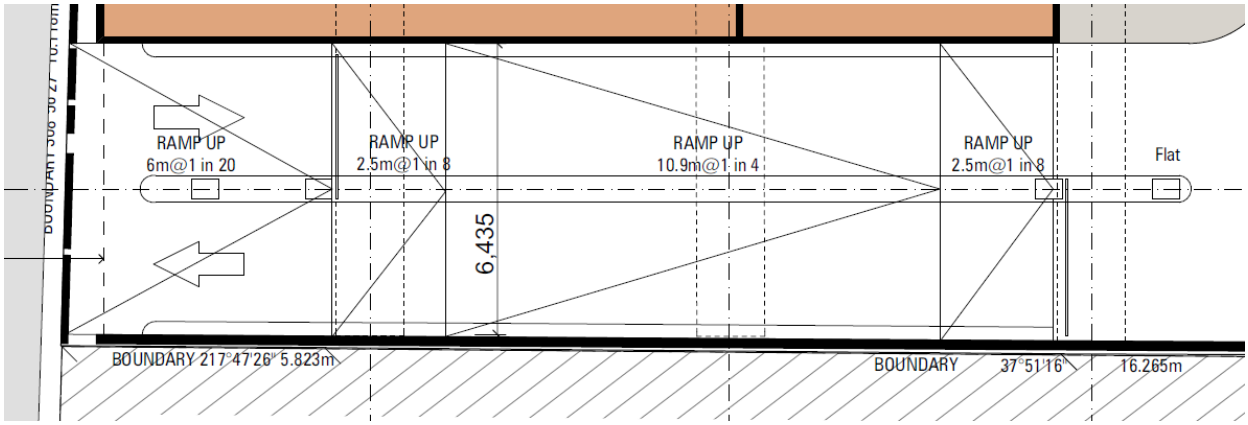
- Entry ramp from Trafalgar Place.
- Ramp either side of lift shaft on each level.

The ramp grades transition as follows:

- Entry: flat
- 6 metres: 1 in 20 (5% grade)
- 2.5 metres: 1 in 8 (12.5% grade)
- 10.9 metres: 1 in 4 (25% grade)
- 2.5 metres: 1 in 8 (12.5% grade)
- Car park level: flat

These grades conform to the requirements of the Australian Standards (AS2890.1:2004) in terms of maximum grade, as well as transitions. Specifically, the requirements of AS2890.1:2004, Section 2.5.3(b)(ii) specifies that the maximum permitted grade is 25% for accesses to car parks that are less than 20 metres in length. The requirements for change in grade are also met as per Section 2.5.3(d), which states that the maximum change in grade of a ramp is 12.5% algebraically. The entry ramp detail is shown in Figure 12.

Figure 12 Car Park Entry Ramp



The grades within the car park itself have two designs:

- The eastern ramp is a constant 1 in 8 grade (12.5%).
- The western ramp is 1 in 4 grade (25%) with transitions of 1 in 8 (12.5%) on each approach.

These grades conform to the requirements of the Australian Standards (AS2890.1:2004) in terms of maximum grade, as well as transitions. Specifically, the requirements of AS2890.1:2004, Section 2.5.3(b)(ii) specifies that the maximum permitted grade is 25% for accesses to car parks that are less than 20 metres in length.

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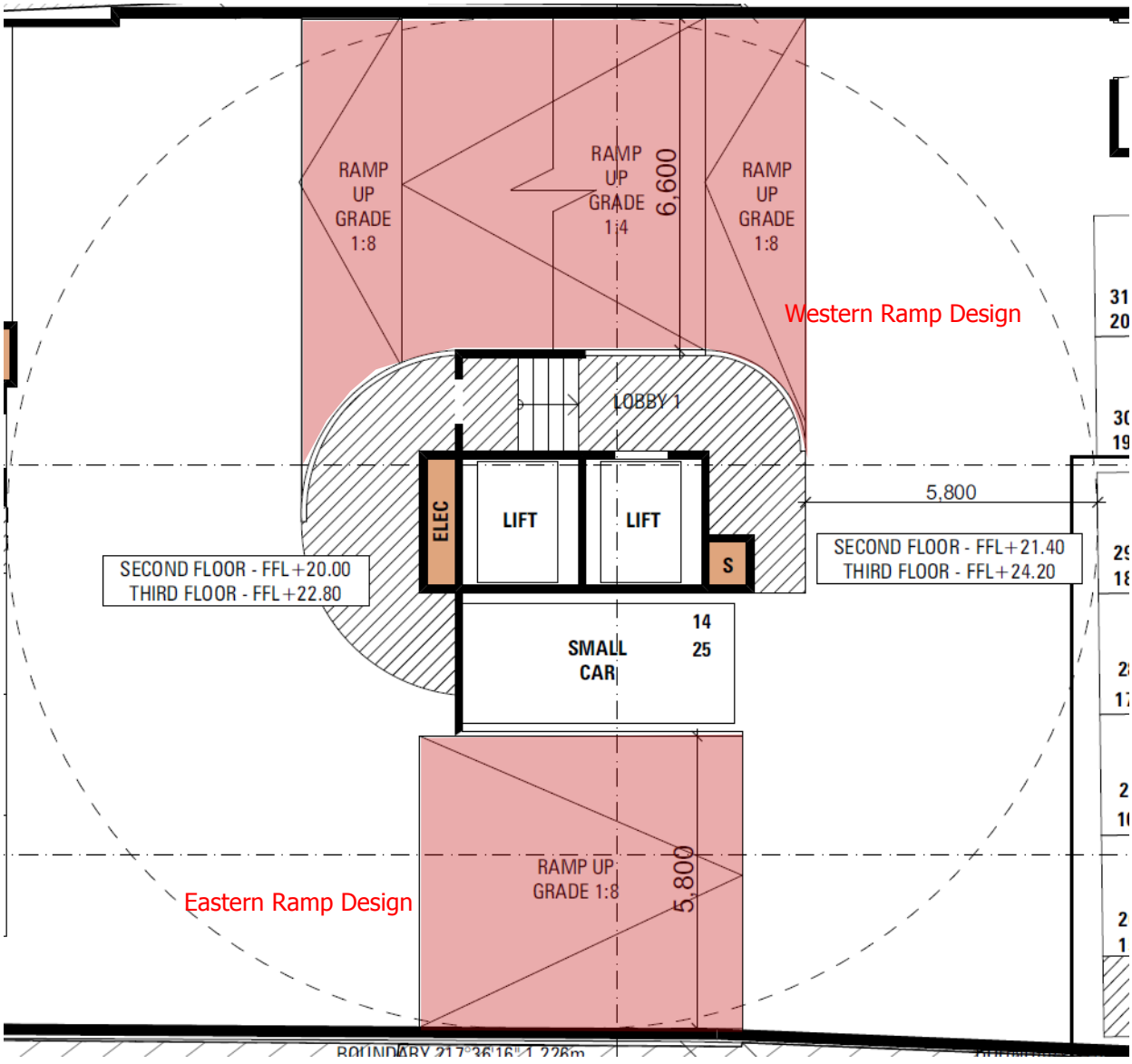
The requirements for change in grade are also met as per Section 2.5.3(d), which states that the maximum change in grade of a ramp is 12.5% algebraically. The ramp grade details are shown in Figure 13.

Figure 13 Car Park Internal Ramp Grades



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5.4 Hotel Check-In Parking

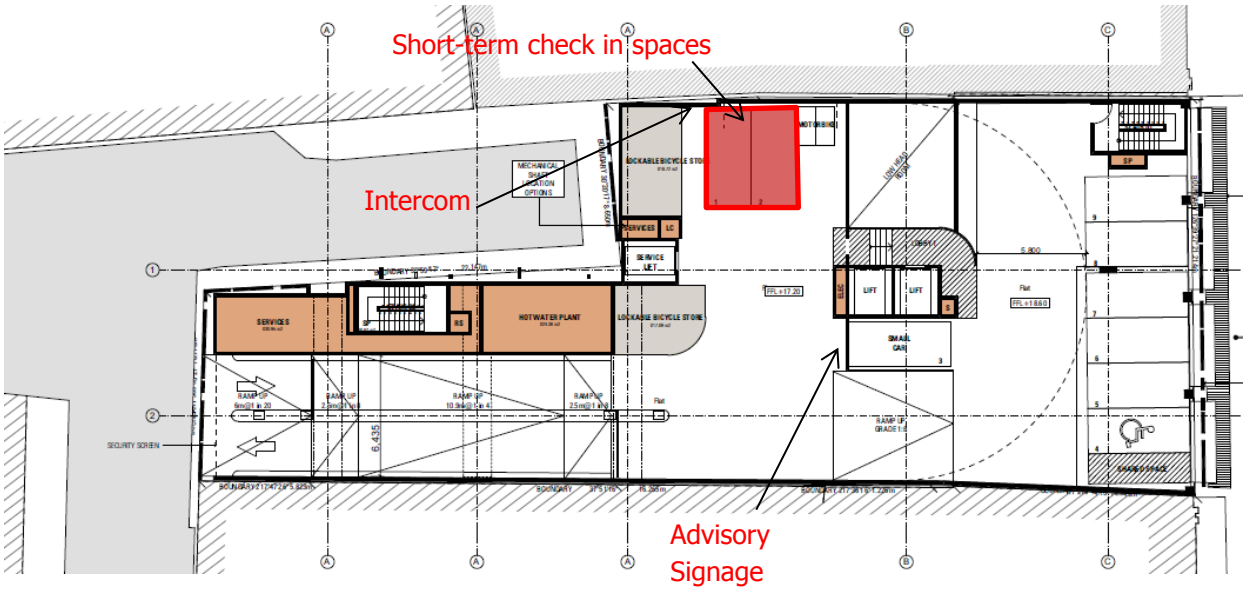
The location of the proposed Hotel is such that there is limited ability for guests to pull onto street to check in before accessing the car park. The Bus Mall does not permit access for Hotel traffic, and there are limited areas in Trafalgar Place for vehicles to stop a vehicle.

A five minute parking zone is proposed as part of the bus mall redevelopment in Collins Street, immediately south of the Elizabeth Street junction. This is proposed to replace the existing drop-off zone located within the bus mall for the Savoy Hotel. This is shown in Figure 4. The proposed five-minute zone would also service the proposed development due to its close proximity to the site (approximately 65 metres walking distance to the bus mall frontage of the site).

A system has therefore been developed, whereby a total of 2 spaces have been reserved on the first parking level for guests to stop and check in. Signage will be located to direct cars to these spaces within the car park ("Check In Spaces [left]/ Hotel Car Park [ahead]), and an intercom will be provided to assist customers with the process. They may then access the hotel to check in before moving their vehicle to the main car parking areas. This is shown in Figure 14. Signage is also proposed on the Macquarie Street/ Trafalgar Place junction to assist motorists.

As with most hotels, advice, internet and maps (standard leaflet style maps that can be written on) should be provided to assist guests to navigate through Hobart's streets if parked in an on-street location remote to the site.

Figure 14 Guest Check-In Parking Arrangements



It is typical of mainland inner city hotels to have limited on-street parking availability for check in. Normally hotels provide information regarding parking accessibility on their website (either through the check-in process or in general information), as well as via confirmation email when a room is booked. Similar Hotels in Hobart that provide parking information on their websites include Quest Savoy (no parking on-site), Hotel Grand Chancellor (limited parking), Hadleys (limited off-site parking), etc.

5.5 Taxi Parking

There is no provision for taxi parking for the proposed development. The nearest taxi rank for the site is in Collins Street.

Taxis are permitted to enter and travel through the Bus Mall, however parking is not formally available within the bus mall.

5.6 Bus Parking

A mini bus short-term parking area is proposed in Council's bus mall upgrade. This is proposed on the north-western corner of the bus mall and is suitable for use by the proposed hotel. Coordination with the Airport Shuttle bus may be required.

A (non-Metro) bus stop is also located in close proximity to the site in Macquarie Street, between Trafalgar Place and Elizabeth Street.

5.7 Service Vehicles

Service vehicles associated with the hotel will comprise mostly of smaller vans to collect and deliver laundry. Typically laundry services would operate early in the morning. Service vehicles associated with food delivery would also be done through the use of vans with a frequency of 2 to 3 times per day. General deliveries would also be undertaken using vans or utilities, with a frequency of up to 6 times per day.

Refuse management would be undertaken once or twice per week using an 8.8m service vehicle. This activity would be undertaken early during the morning.

Service vehicles have access to the site via the laneway running parallel to the car park ramp. A loading dock is provided beneath the car parking ramp for this purpose. A loading zone is also available in Trafalgar Place (south of the site). This loading zone is shared by nearby commercial properties.

The RTA Guide recommends the provision for commercial vehicles as set out as follows:

- Hotels and Motels (50% of spaces adequate for trucks). [applicable for hotels less than 200 rooms]
  - → 1 space per 50 bedrooms; plus
  - → 1 space per 1,000m^2 of public area set aside for bar, tavern, lounge and restaurant.

The total requirement would therefore be 4 + 1 = 5 spaces in accordance with the RTA Guide.

As well as the provision of a loading dock, the northern section of Trafalgar Place adjacent to the site is used as a loading area by adjacent businesses. The lack of through traffic and pedestrian movements makes this practice acceptable as a 'rear of shop' area.

In practice, the provision of the loading dock, as well as the northern section of Trafalgar Place and the existing loading dock is considered acceptable for the normal operation of the Hotel. It will be important to ensure that loading and unloading activities will not interfere with the normal traffic flow associated with the Trafalgar Place car park. It is therefore recommended that the Hotel adopt a management plan for deliveries to prevent impacts on the normal flow of traffic accessing Trafalgar Car Park.

5.8 Bicycle Parking

The Acceptable Solution, A1, or Schedule E6.6.4 of the Planning Scheme requires the provision of bicycle parking for developments. The requirements of the proposed development are set out in Table 2.

The employee bicycle spaces are classified as 'Class 1' or 'Class 2' spaces, which requires locked compounds with communal access using duplicate keys, or fully enclosed individual lockers.

Two separate bicycle parking areas are proposed on the first level of the car park, along with dedicated change rooms on the ground floor. These change room facilities are proposed to be used by staff (complying the requirements for Class 1 or Class 2 facilities). A total of approximately 40 bicycles can be stored in these lockable facilities, thus satisfying Acceptable Solution A1 of E6.6.4 of the Planning Scheme.

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Table 2 Bicycle Parking Requirements

Use	Employee/ Visitor Bicycle Parking Requirement	Class	Required
Community meeting and entertainment	Employee = 1 for each 500m^2 of floor area Visitor = 4 plus 2 for each 200m^2 floor area	1 or 2 3	Function room area = 263m2: total = 1 Total 4+ 2 = 6
Food services	Employee = 1 for each 100m2 of floor area available to public Visitor = 1 for each 200m^2 floor area after the first 200m^2 floor area (min 2)	1 or 2 3	Café area = 59m^2 Restaurant = 109m^2 Total = 2 Total = 2
Hotel Industry	Employee = 1 for each 25m^2 bar floor area plus 1 for each 100m^2 lounge/ beer garden area Visitor = 1 for each 25m^2 bar floor area plus 1 for each 100m^2 lounge, beer garden area	1 or 2 3	Bar and lounge area = 24m^2 bar and 61m^2 lounge, cocktail bar = 12m^2 and 141m^2 lounge Total = 2 + 2 = 4 Total = 4
Visitor Accommodation	Employee = 1 for each 40 accommodation rooms Visitor = 1 for each 30 accommodation rooms	1 or 2 3	Total rooms = 196 Total = 5 Total = 7
TOTAL	**Employee** **Visitor**	1 or 2 3	**12** **19**

5.9 Parking for People with Disabilities

Acceptable Solution A1, of Schedule E6.6.2 of the Planning Scheme requires that 1 satisfy the relevant provisions of the Building Code of Australia. This equates to the provision of 1 space for every 20 car parking spaces.

The provision of 2 parking spaces for persons with a disability is therefore required (rounded to nearest whole number from 2.1 spaces). A total of 4 disabled parking spaces are proposed; one on each level of the car park (located on the north-eastern corner of each level). A level path of travel is available from these spaces to the elevators.

Acceptable Solution A1 of E6.6.2 is therefore met.

5.10 Motorcycle Parking

Acceptable Solution A1, of Schedule E6.6.3 of the Planning Scheme requires that 1 motorcycle space be provided for every 20 car parking spaces.

The provision of 2 motorcycle spaces is therefore required (rounded to nearest whole number from 2.1 spaces). These motorcycle parking spaces are proposed on the bottom level of the car park, adjacent to the 'check-in' parking spaces.

Acceptable Solution A1 of E6.6.3 is therefore met.

6. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed hotel development at 28 Elizabeth Street, Hobart. The hotel provides a total of 42 parking spaces (including 4 disabled parking spaces), 40 bicycle spaces and two motorcycle spaces.

The hotel provides on-site parking in the form of four levels of multi-level parking accessed from Trafalgar Place. Access to the car park is via a ramp located at an existing access to the building. The ramp grades and dimensions conform to the requirements of the Australian Standards. Sight lines for vehicles exiting the car park are of concern however. The following recommendations have been made to ensure safe vehicular access at this location:

- A speed hump placed at the exit of the car park to ensure low vehicle speeds.
- A warning device be installed to alert approaching motorists of vehicles exiting the site.

The internal car park layout it very tight. The dimensions of the car parking spaces comply with Australian Standards requirements for Class 1A, the circulation roadway is less than the minimum radius for two-way flow. Swept paths confirm that vehicles can pass in opposing directions (B85 vehicles), however to improve circulation and safety within the car park, signage should be installed to require vehicles travelling up the car park to give way to motorists travelling down. Consideration should also be made for the installation of warning devices when vehicles are travelling in opposing directions within the car park. Note that the selected warning devices should not distract motorists from their driving task.

The proposed development provides sufficient bicycle, motorcycle and disabled parking in accordance with the requirements of the Planning Scheme. Disabled parking is provided on all four parking levels, and level access is available from the parking spaces to the elevator access.

Pedestrian access is available from both Elizabeth Street and Trafalgar Place frontages, with pedestrian connectivity available between the frontages. Bicycle parking in the form of separate lockable storage is available for staff, with appropriate change rooms located immediately adjacent.

A service lift accesses all parking levels, with the swept path of down-ramp traffic located immediately adjacent to the lift doors. Warning in the form of flashing lights should be installed to alert approaching motorists of the presence of a pedestrian exiting the lift. Note that the service lifts would be used very infrequently on the car parking levels.

Service vehicles can access the site in the dedicated loading dock accessed via Trafalgar Place, as well as the existing loading zone located to the south in Trafalgar Place. The northern end of Trafalgar Place is also currently utilised as a service area for adjacent businesses. The function of the road will remain the same for this activity and is considered adequate to service the service vehicle requirements of the development.

Based on the findings of this report and subject to the recommendations above, the proposed development is supported on traffic grounds.

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Elizabeth Tasmania Pty Ltd

The Palace Hotel
28 Elizabeth Street
Traffic Impact Assessment

November 2015

MIDSON traffic pty ltd

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1. Introduction

1.1 Background

Midson Traffic were engaged by Elizabeth Tasmania Pty Ltd to prepare a traffic impact assessment for the development of the proposed 'Palace Hotel' development at 28 Elizabeth Street, Hobart.

1.2 Traffic Impact Assessment (TIA)

A traffic impact assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

This TIA has been prepared in accordance with the Department of State Growth (DSG) publication, *A Framework for Undertaking Traffic Impact Assessments*, September 2007. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2009.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforseen congestion or other problems where the development connects to the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

The Hobart Interim Planning Scheme, 2015, states that a TIA is required if the increase in the number of vehicle movements per day is more than 40. It further states that the planning authority may require "*an assessment, by a suitably qualified person, of parking demand created by a use or development and the ability for such demand created by a use or development and the ability for such demand to be satisfied in the vicinity of a proposed use of development, if reliant on performance criteria to satisfy E6.6.1, E6.6.3 or E6.6.4*".

1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of The Department of State Growth's, *A Framework for Undertaking Traffic Impact Assessments*, September 2007, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 19 years professional experience in traffic engineering and transport planning.
- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004
- Bachelor of Civil Engineering, University of Tasmania, 1995

Keith is a Director of the traffic engineering, transport planning and road safety company, Midson Traffic Pty Ltd. He is also a Teaching Fellow at Monash University, where he teaches and coordinates the subject 'Road Safety Engineering' as part of Monash's postgraduate program in traffic and transport. Keith is also an Honorary Research Associate with the University of Tasmania, where he lectures the subject 'Transportation Engineering' in the undergraduate civil engineering program as well as supervising several honours projects each year.

1.4 Project Scope

The project scope of this TIA is outlined as follows:

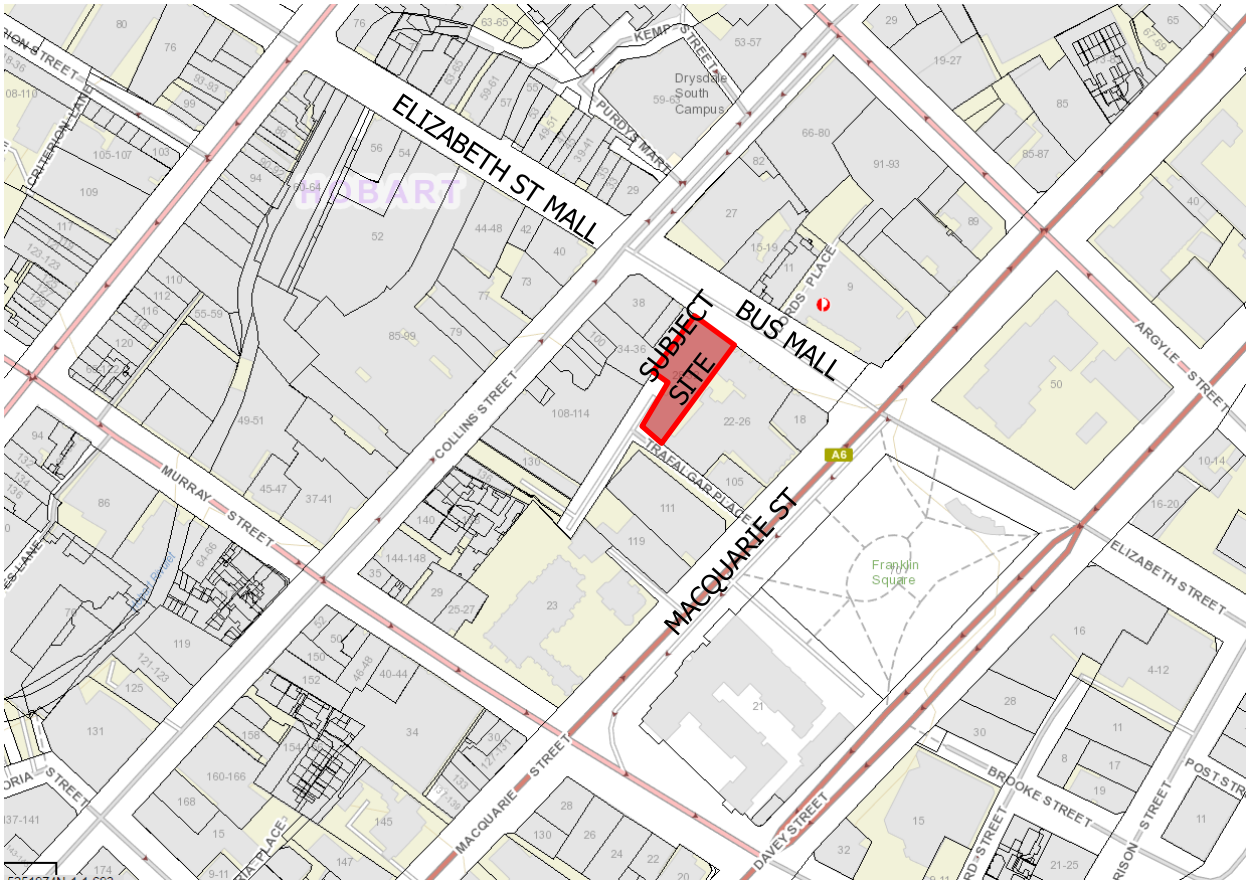
- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Review of the parking requirements of the proposed development. Assessment of this parking supply with Planning Scheme requirements.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

1.5 Subject Site

The subject site is located at 28 Elizabeth Street Hobart (within the Bus Mall). The rear of the site is accessed via Trafalgar Place.

The subject site and surrounding road network is shown in Figure 1.

Figure 1 Subject Site & Surrounding Road Network



Source: LIST Map, DPIPWE

1.6 Reference Resources

The following references were used in the preparation of this TIA:

- Hobart Interim Planning Scheme, 2015 (Planning Scheme)
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2009
- Austroads, Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2009
- DSG, *A Framework for Undertaking Traffic Impact Assessments*, 2007
- Institute of Transportation Engineers, Trip Generation Manual, 8th Edition, 2008 (ITE Manual)
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1:2004)
- Roads and Maritime Services NSW, *Guide to Traffic Generating Developments*, 2002 (RTA Guide)
- Roads and Maritime Services NSW, *Updated Traffic Surveys,* 2013 (Updated RTA Guide)

2. Existing Conditions

2.1 Transport Network

For the purpose of this report, the transport network consists of Elizabeth Street, Trafalgar Place, Macquarie Street and Collins Street. Other roads such as Argyle Street, Liverpool Street and Murray Street were considered in the context of the development, but not examined in detail.

These roads are outlined in the following sections.

2.1.1 Elizabeth Street

Elizabeth Street is a major collector road that provides accessibility to North Hobart to the west of Collins Street. The Mall is located between Collins Street and Liverpool Street, and the bus mall is located between Collins Street and Macquarie Street. To the east of Macquarie Street, Elizabeth Street provides an important link between Sullivans Cove and the Davey Street/ Macquarie Street couplet. At the Collins Street and Macquarie Street junctions, Elizabeth Street provides access for Metro bus services, as well as service vehicle access (including access to Lords Place) and taxi vehicle thoroughfare (to a much less extent).

The subject site's existing street frontage on the bus mall is shown in Figure 2.

Figure 2 Subject Site's Bus Mall Frontage

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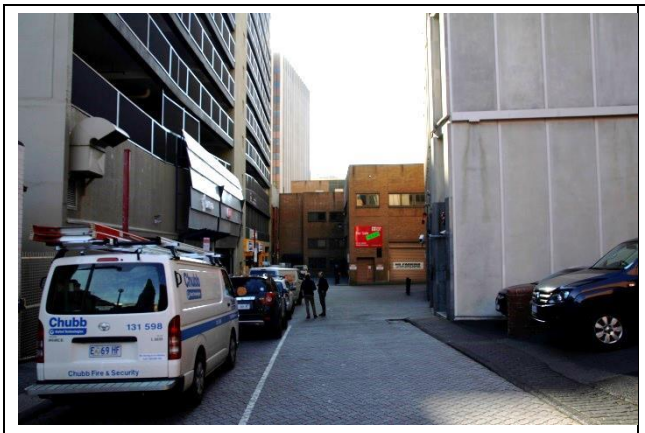
2.1.2 Trafalgar Place

Trafalgar Place is a short dead-end 'T' shaped road that provides access to the rear of several properties fronting the bus mall (including the subject site) and Collins Street. It also provides access to Trafalgar Car Park.

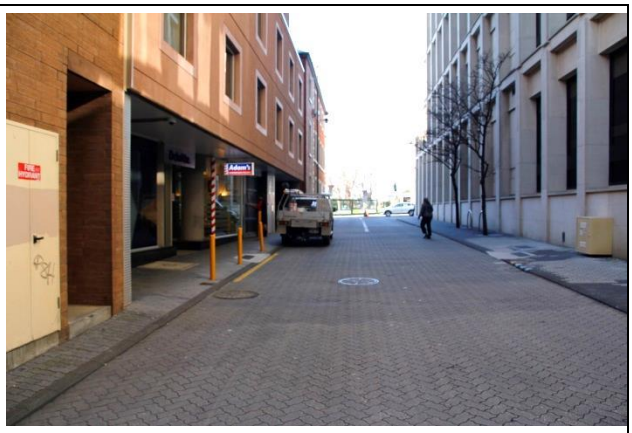
A footpath is provided on the southern side of Trafalgar Place. Only a narrow kerb edge is provided on the northern side of the road, with some localised widening for pedestrians at the access to the Deloittes Building adjacent to the subject site.

Trafalgar Place from various viewpoints is shown in Figure 3.

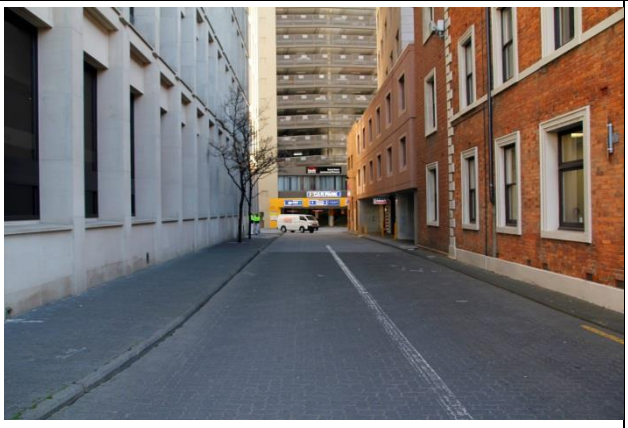
Figure 3 Trafalgar Place



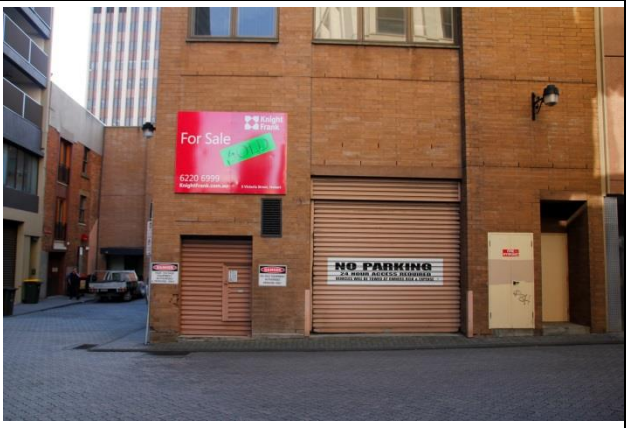
Southern end of Trafalgar Place towards subject site



From Subject site looking towards Macquarie Street



From Macquarie Street towards site



Existing site access

2.1.3 Macquarie Street

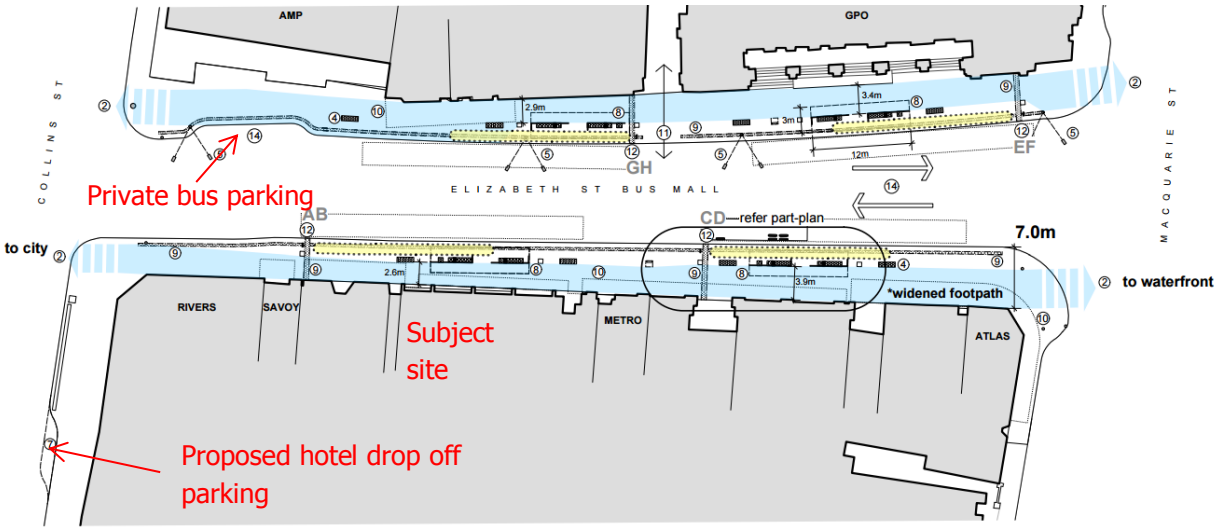
Macquarie Street is a major arterial road that forms the northbound component of the Davey Street/ Macquarie Street couplet through Hobart. It has three lanes near the bus mall and carries approximately 34,000 vehicles per day[1].

2.2 Bus Mall Upgrade

Plans are currently underway for the revitalisation of the Hobart Bus Mall in its current location in Elizabeth Street. The bus mall upgrade is a component of both the Inner City Action Plan and the Hobart Central Bus Interchange Planning Project, a joint project between the City of Hobart, the Department of State Growth, Metro Tasmania and TasBus. Construction is likely scheduled to commence in 2016.

A concept plan for the bus mall revitalisation is shown in Figure 4.

Figure 4 Bus Mall Upgrade



Source: www.hobartcity.com.au

2.3 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

Crash data was obtained from the Department of State Growth for a 5½ year period between 1 January 2010 and 30th June 2015 for Elizabeth Street between Davey Street and Collins Street, and the full length of Trafalgar Place.

[1] State Growth SCATS data, Macquarie Street/ Barrack Street junction, October 2014.

The findings of the crash data is summarised as follows:

- A total of three crashes were reported in Trafalgar Place during that time. Two of these crashes occurred in the section of Trafalgar Place between Macquarie Street and the subject site, the other occurred in the section to the south (towards the Collins Street laneway). No crashes were reported at the Macquarie Street junction.
- Two of the crashes that were reported in Trafalgar Place involved "other manoeuvring", and one involved "vehicle door". No crashes involved injury.
- A total of 40 crashes were reported in Elizabeth Street between Davey Street and Macquarie Street. Of these crashes, 4 involved pedestrians. Three of the pedestrian crashes involved heavy vehicles (most likely buses) and occurred within the Bus Mall (one at Collins St, one at Macquarie St, and one mid-block). One pedestrian crash was reported at the Davey Street junction.
- A total of 11 crashes were reported at the Macquarie Street junction. Five of these crashes involved minor injury and the remainder involved property damage only. The dominant crash trend was 'right through', accounting for a total of 8 crashes. No crashes at this location involved heavy vehicles (assumed therefore that buses were not involved).
- Three crashes were reported at the junction of Collins Street. One of these crashes involved a pedestrian (as noted above), and two crashes involved a heavy vehicle reversing.
- A total of 7 crashes occurred within the bus mall. Of these crashes, 5 involved a parked vehicle (parked vehicle run away and 'parked'), one involved a pedestrian, and one involved a reversing manoeuvre.
- One crash was reported in Elizabeth Street between Davey Street and Macquarie Street. This crash involved a reversing manoeuvre and resulted in property damage only.
- A total of 11 crashes were reported at the junction of Davey Street. Of these crashes, 3 involved minor injury, 1 involved first aid at the scene, and the balance involved property damage only. The dominant crash trends at this junction were 'rear-end' (5 crashes) and 'right turn side swipe' (3 crashes).

The crash data is relatively typical of a busy CBD road environment, with high levels of pedestrian and bus activity. The crash history does not indicate that there are any specific road safety issues that may be exacerbated by traffic generated by the proposed development.

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3. Proposed Development

3.1 Development Proposal

The proposed development involves the demolition of the existing building (previously the Westpac Bank), and the construction of a new 196 room hotel. The Hotel also comprises of bar, restaurant, gymnasium and car parking. Car parking is provided over 4 levels with capacity for 39 spaces.

The proposed development plans for each level are shown in Figure 5, Figure 6, Figure 7, Figure 8 and Figure 9.

Figure 5 Proposed Development – Ground Floor

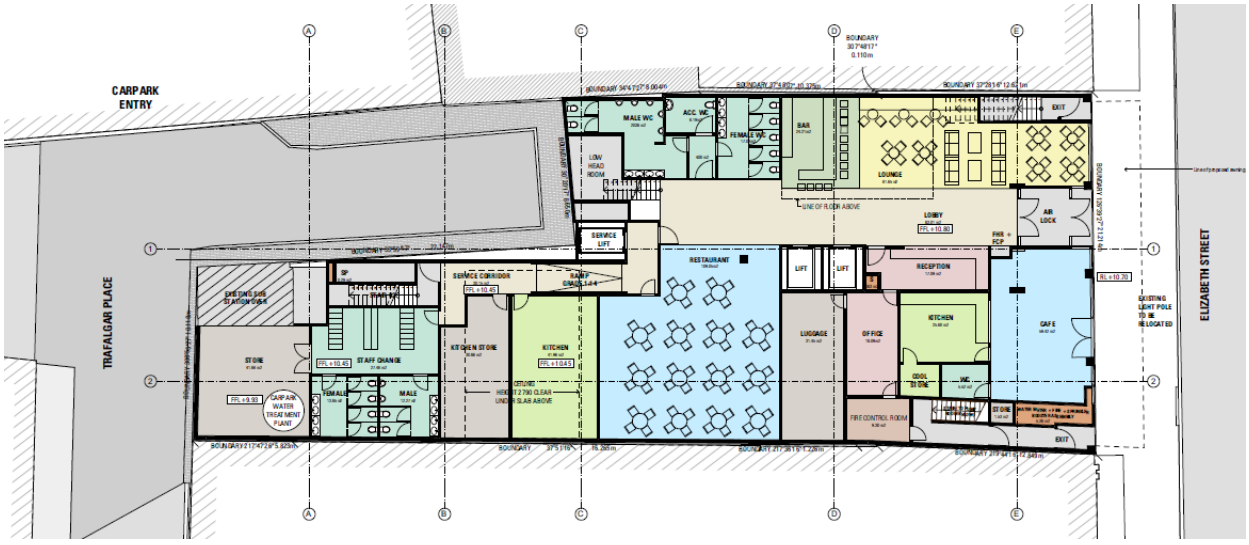

Figure 6 Proposed Development – Mezzanine Floor

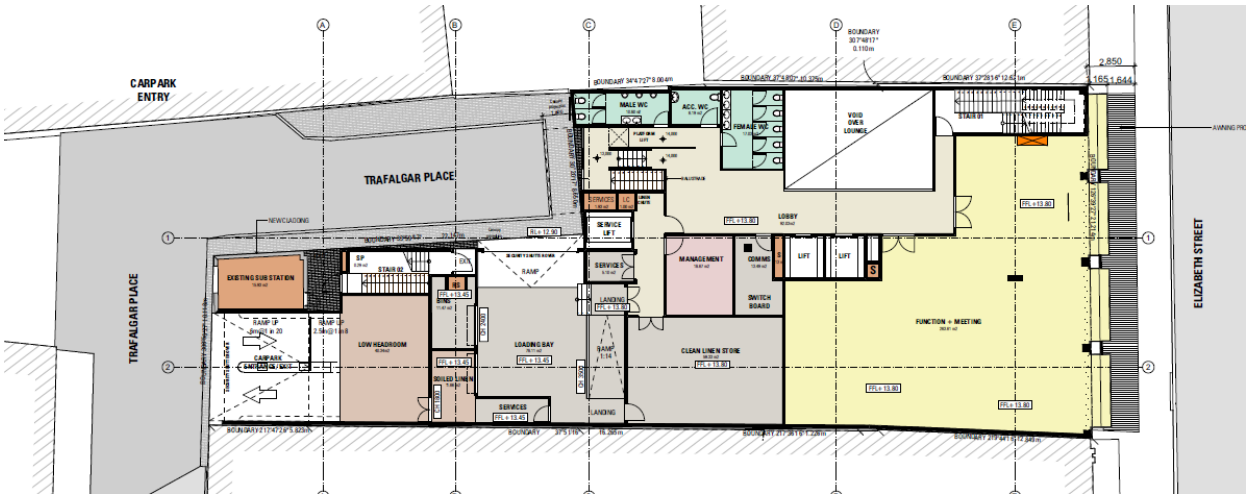

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Figure 7 Proposed Development – Level 1

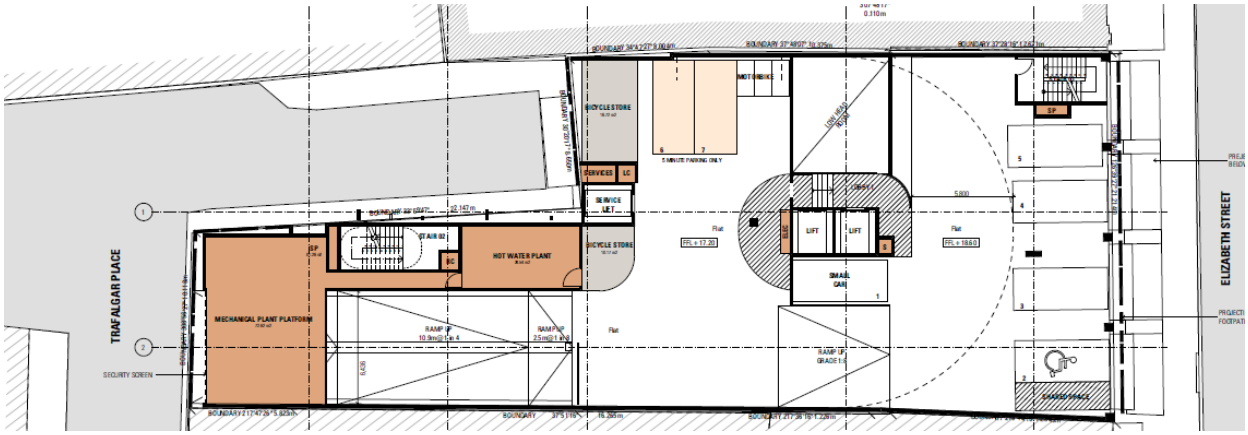


Figure 8 Proposed Development – Levels 2 & 3

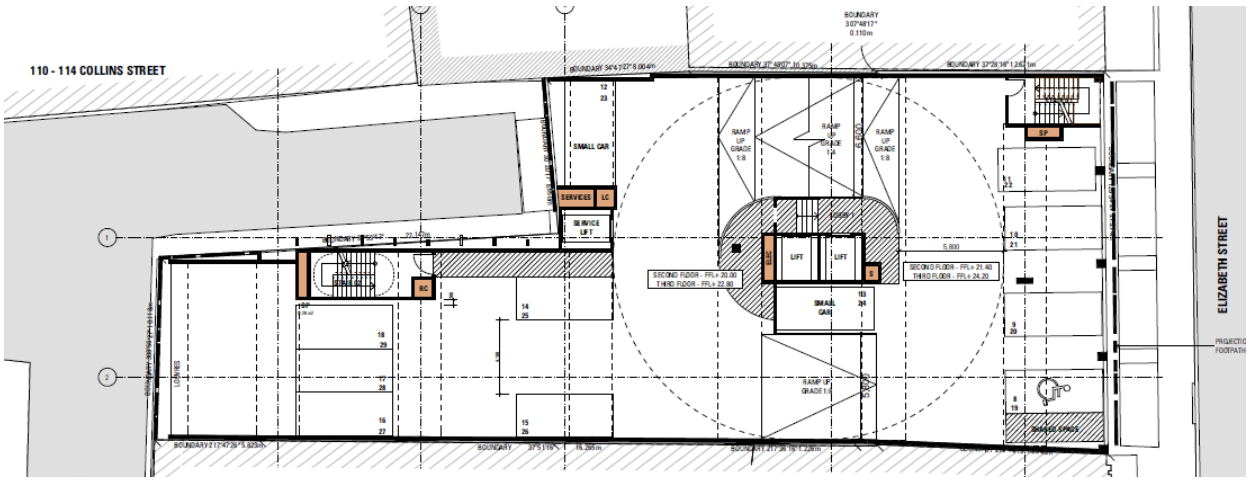
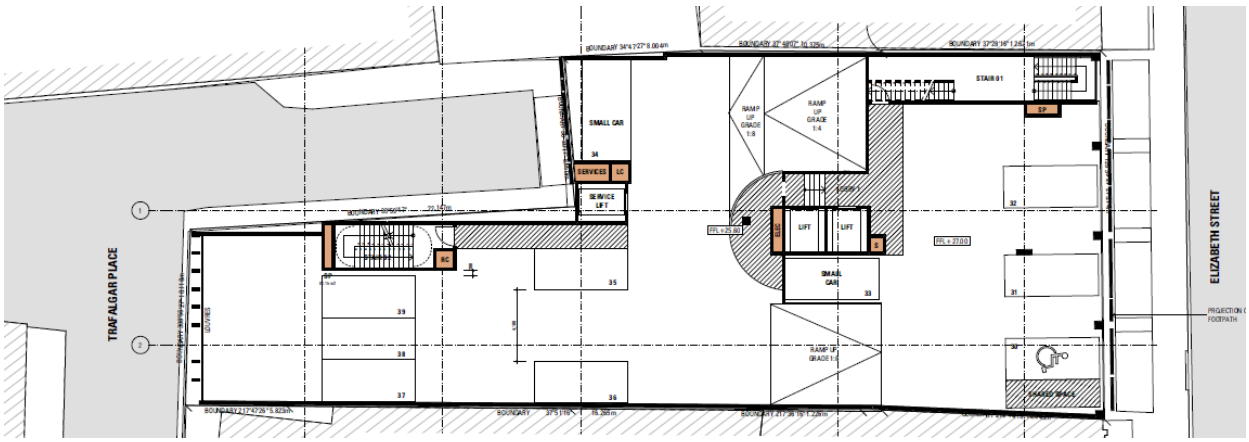


Figure 9 Proposed Development – Level 4



4. Traffic Impacts

4.1 Traffic Generation

The proposed development is an inner city hotel. It will be ideally suited to guests staying in city (such as business people, etc) who do not require a car. The site is very close to public transport (fronting bus mall) and is within close walking distance Sullivans Cove and CBD.

Traffic generation rates have been sourced from the ITE Manual (noting that the standard Australian traffic generation reference, RTA Guide, does not contain data for hotels of this type). The ITE Manual provides detailed trip generation rates for a hotel development as shown in Table 1.

Table 1 ITE Hotel Trip Generation Rates

Unit	Weekday	AM	PM	AM In	AM Out	PM In	PM Out
Rooms – Rate	8.17	0.56	0.59	61%	39%	53%	47%
Staff – Rate	14.34	0.69	0.80	60%	40%	54%	46%
Rooms – Total	1,569 trips	108 trips	113 trips	66 trips	42 trips	60 trips	53 trips
Staff - Total	215 trips	10 trips	12 trips	6 trips	4 trips	6 trips	6 trips
Total	**1,784 trips**	**118 trips**	**125 trips**	**72 trips**	**46 trips**	**67 trips**	**59 trips**

The trip generation rates provided in Table 1 relate to people trips, with mode share between car, pedestrian, bicycle, motorcycle and bus. Traffic generation at the site is restricted by the physical number of parking spaces provided (ie. it would not be possible for the car park to cater for 118 inward and 125 outward vehicle trips during the morning peak for example).

The proposed multi-level car park caters for a maximum occupancy of 39 spaces and 2 motorcycles. (Note that 2 spaces are located in the first level – these are not included in the total parking numbers as they are for short term check in prior to accessing a parking space elsewhere). The maximum traffic generation during the AM and PM peak periods is therefore likely to be in the order of 53 vehicles per hour when the hotel is at full capacity (with the inward and outward splits provided in Table 1).

All vehicle trips to the site will be via Trafalgar Place, which is accessible from Macquarie Street. All approaching traffic must therefore approach the site from Macquarie Street from the south. Vehicles

departing exit onto Macquarie Street and travel north, or can then utilise Elizabeth Street to access destinations to the south, or Sullivans Cove.

As stated earlier, being an inner city Hotel, it is expected that it will attract a high proportion of guests who do not arrive by vehicle.

4.2 Access Impacts

Access to the car park is via an existing building entrance in Trafalgar Place. The ramp is 6.4 metres wide and has been designed with kerb on both wall edges to reduce the risk of vehicle impact with the internal walls on the ramp.

A boom gate mechanism is proposed at both ends of the ramp to ensure that only authorised entry is permitted. This also prevents vehicles from entering the car park during times when it is at capacity. The boom gate is operated by a swipe card with an intercom for manual over-ride.

Sight distance is restricted by the walls of the building at the junction with Trafalgar Place for exiting vehicles. At a distance of 2.5 metres back from the kerb (as required by Figure 3.2 of AS2890.1:2004), the available SSD for vehicles approaching from the west is approximately 10 metres. This sight distance increases rapidly as the vehicle moves into Trafalgar Place as part of its exit manoeuvre. Full sight distance is available to the exit of Trafalgar Place car park when the driver's position is located approximately 1.5 metres from the kerb. It is this direction which is considered the most important as the traffic on this approach travels immediately adjacent to the building line.

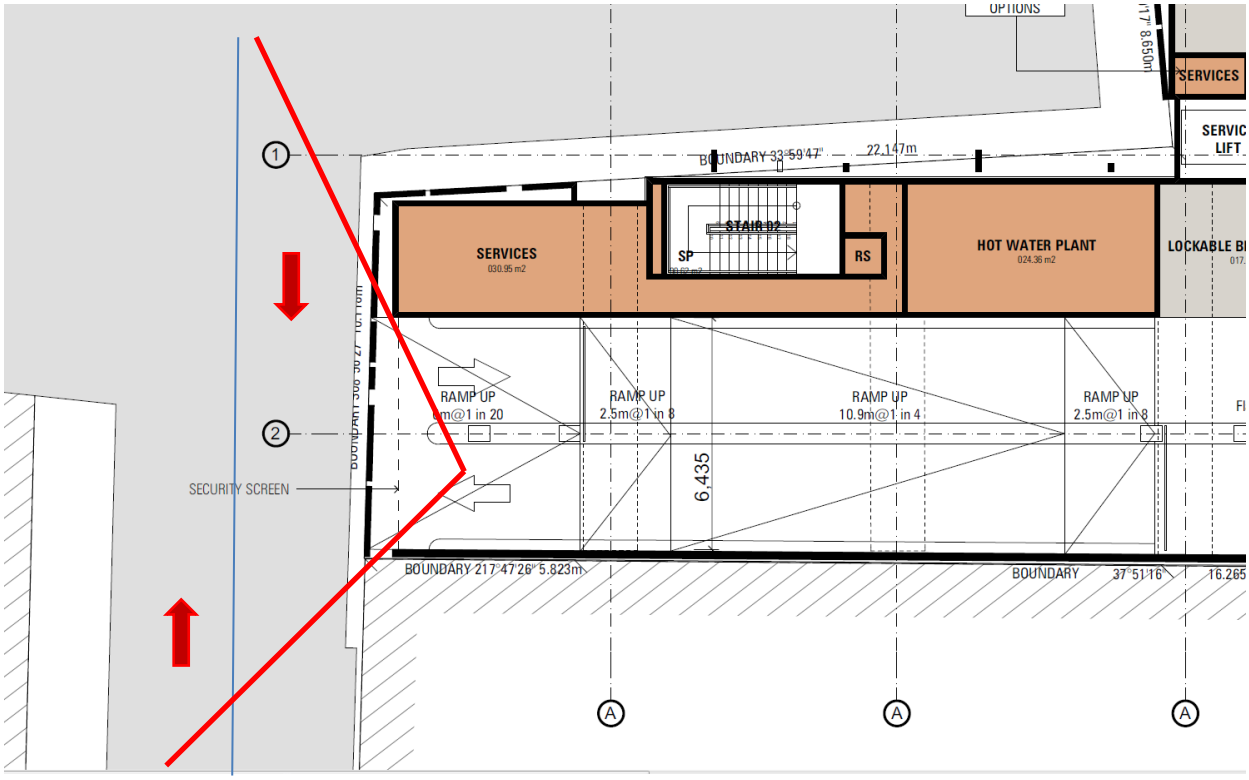
Sight lines to the west are lower, however traffic can move into Trafalgar Place without passing into the conflict area of vehicles in this approach. As with sight lines in to the east, as the vehicle moves into Trafalgar Place, sight distance increases rapidly.

Speeds were observed to be very low in Trafalgar Place. The short distance between the site's access and the 'T' end of Trafalgar Place (at the Trafalgar Car Park's access) is relatively short, thus vehicles do not have sufficient distance to reach reasonable speeds. The 85th percentile speed at the access is likely to be in the order of 30-km/h at the site's access.

Due to the identified sight distance restriction, it is important to ensure that measures are taken to maximise safety at this access location. The following measures are recommended:

- Provide a car park style speed hump at the exit of the car park to ensure vehicles leave the site at very low speed.
- Provide a warning system to alert motorists approaching the access on Trafalgar Place that a vehicle is exiting the site. This can be in the form of a flashing light above the access.
- Provide warning signage (static) on the building structure to advise motorists exiting from Trafalgar Place of exiting traffic from the proposed development's access.

Figure 10 Access Sight Distance



4.3 Pedestrian Impacts

Pedestrian access is available at the Elizabeth Street and Trafalgar Place frontages. Access is available between both frontages, thus enabling guests and visitors to the hotel to access the bus mall and Trafalgar Place.

Within the car park, pedestrian access is available to the central elevator shaft. On the northern car parks on each level, access is via a level path. Access between northern car parks and the elevator access is level. Car parking spaces on the southern side of each level can access the elevator shaft via a small flight of stairs.

A service lift is located on the southern side of the car park on each level. The swept path of vehicles travels in very close proximity to the access to the lift. It is therefore recommended that a warning device be installed above the lift doors to alert approaching motorists that a person may be exiting the lift. Note that the service lift will have very infrequent usage within the car parking levels.

Pedestrian access is not permitted down the main access ramp to the car park to Trafalgar Place.

Pedestrian infrastructure is well provided on both roads connecting to the site. A formal pedestrian footpath is only available on the southern side of Trafalgar Place.

It is noted that development in Collins Place is likely to have an impact on the function of Trafalgar Place in terms of increased pedestrian movements. With potential pedestrian through movements from the

Bus Mall through the subject site connecting to this area, some consideration should be made for future pedestrian planning of the area between Trafalgar Place and Collins Place. There are several potential options to address this, including:

- 10-km/h shared zone signage.
- Improved signage to define higher volume vehicular paths. This may include holding lines defining the short length of Trafalgar Place connecting to the through passage of the Trafalgar Place car park (with Trafalgar Car Park having priority).
- Changes in pavement colour or texture to define areas of higher pedestrian flow.
- Traffic calming measures.

These measures are considered outside the responsibility of the development, however it is in the interests of the development that pedestrian and vehicular conflicts are managed as safely as possible near the subject site.

4.4 Road Safety Impacts

No significant adverse road safety impacts are foreseen for the proposed development, as the predicted future peak traffic generation of 53 vehicles per hour is not significant enough to generate any road safety deficiencies based on the following:

- Access to the site is via Trafalgar Place. This access is a low speed/ low volume environment with a positive road safety performance.
- Access to and from Trafalgar Place at Macquarie Street is via a T-junction. "Keep Clear" markings have been installed
- There is sufficient spare capacity in the surrounding road network to absorb the small predicted increase in peak hour traffic generated from the proposed development.
- The access is located in a commercial environment and as such, traffic movements into and out of the site will not be seen as an unusual event by other motorists.

4.5 Construction Traffic Management

The development is located in a busy central city location and as such, its construction will require careful planning to minimise traffic impacts of adjacent properties and the operation of the surrounding road network (including the bus mall).

The stages of construction of the Palace Hotel will consist of the following:

- Stage 1: Demolition of existing building
- Stage 2: Preliminary excavation works
- Stage 3: Construction

Prior to the commencement of works, a construction management plan (CMP) will be prepared by the contractor and submitted for approval Hobart City Council. This plan will contain a detailed traffic management for all construction stages that have a potential impact on traffic and pedestrian flow on the surrounding transport network.

Importantly, the construction activities should not impact on the normal operation of the bus mall. Consideration will also be required for loading areas in the loading areas located immediately adjacent to the site in Trafalgar Place, along with pedestrian paths and access to the Trafalgar Place Car Park.

5. Parking Assessment

5.1 Parking Provision

The proposed development will provide a total of 39 on-site parking spaces. These spaces are accessed via a ramp connecting to Trafalgar Place. Parking is provided over four levels, with a central circulating ramp connecting the spaces to the access ramp.

Provision for loading is via a service access adjacent to the car park ramp in Trafalgar Place.

5.2 Planning Scheme Requirements

Acceptable Solution A1 of Schedule E6.6.5 of the Planning Scheme states that:

(a) No on-site parking is provided; or

(b) On-site parking is provided at a maximum rate of 1 space per 200m^2 of gross floor area for commercial uses; or

(c) On-site parking is provided at a maximum rate of 1 space per dwelling for residential uses; or

(d) On-site parking is required operationally for an essential public service, including, hospital, police or other emergency service.

Note that with a gross floor area of 8,117m^2, a maximum of up to 41 spaces is permitted under (b). In this case, the proposed development provides a total of 39 parking spaces. This parking therefore complies with (a) and (b) of Acceptable Solution A1 in E6.6.5 (noting that (c) and (d) are not relevant to this proposal).

5.3 Car Parking Layout

The design of the car park has been carefully undertaken to comply with the requirements of the Australian Standards as much as possible.

5.3.1 Car Parking Dimensions

The design of the parking modules at the northern and southern ends of each parking levels have the following dimensions:

- Space width: 2.4 metres
- Space length: 5.4 metres
- Aisle width: 5.8 metres

These spaces therefore comply with the dimension requirements of User Class 1A in Australian Standards, AS2890.1:2004 (Residential, domestic and employee parking).

5.3.2 Small Car Spaces

As the car park has several locations where the space is shorter than the minimum dimensions required under AS2890.1, or spaces are located in positions where it would be undesirable for a vehicle to protrude from the space and impede flow on the circulating ramps (due to structural elements, etc). To overcome this, several spaces are recommended to be signed "Small Car" spaces in accordance with AS2890.1 requirements. AS2890.1 states that *"under certain circumstances it may be appropriate to provide a space for smaller than specified above for small cars. It shall be designated as a space for small cars*". These spaces are typically dimensioned 2.3m wide x 5.0m long as a minimum.

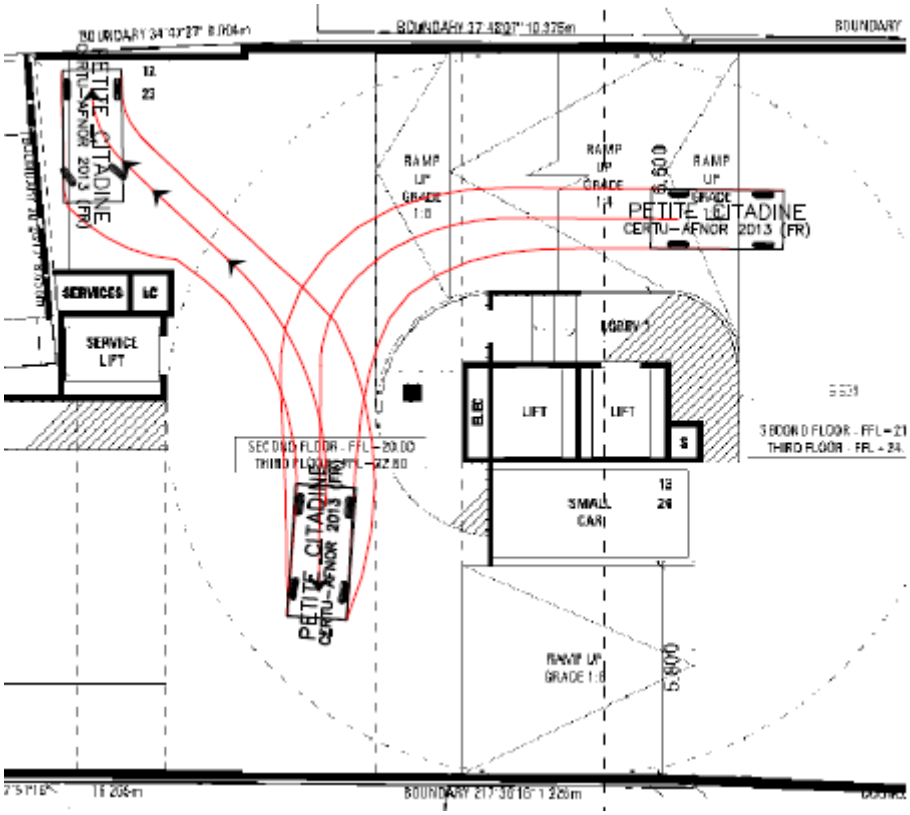
The proposed development requires 7 "Small Car" spaces at the following locations:

- Level 1 – space 1
- Level 2 – spaces 12 & 13
- Level 3 – spaces 23 & 24
- Level 4 – spaces 33 & 34

Spaces 1, 13, 24 and 34 measure 2.4m x 5.4m, but have been designated as 'small car' due to the wall structure associated with the adjacent ramp, and the elevator structure.

Spaces 12, 23 and 33 require a relatively complex reversing manoeuvre, parallel to the circulating aisle. It is recommended that these spaces be reserved for staff to reduce the turnover of the spaces, and to ensure that some driver familiarity is maintained. A swept path assessment was also performed for these spaces. It was noted that whilst a B85 vehicle can access these spaces, the manoeuvre is best performed by a smaller car. This is shown in Figure 11. For this reason, these spaces should be signed as "Small Car Spaces".

Figure 11 Corner Car Park Swept Path Assessment



5.3.3 Circulating Ramp Swept Path Assessment

The relatively confined space within the building results in a car park design that has tight manoeuvring. Vehicles are required to circulate in an almost circular motion to navigate up or down the four car parking levels. The Australian Standards, AS2890.1:2004 states that the minimum radius of a curved circulation roadway is 11.8m for two-way flow, and 7.6m for one-way flow. In this case, the constrained site only enables approximately 9.5m radius. This is wider than the minimum for one-way flow, but less than the requirement of two-way flow.

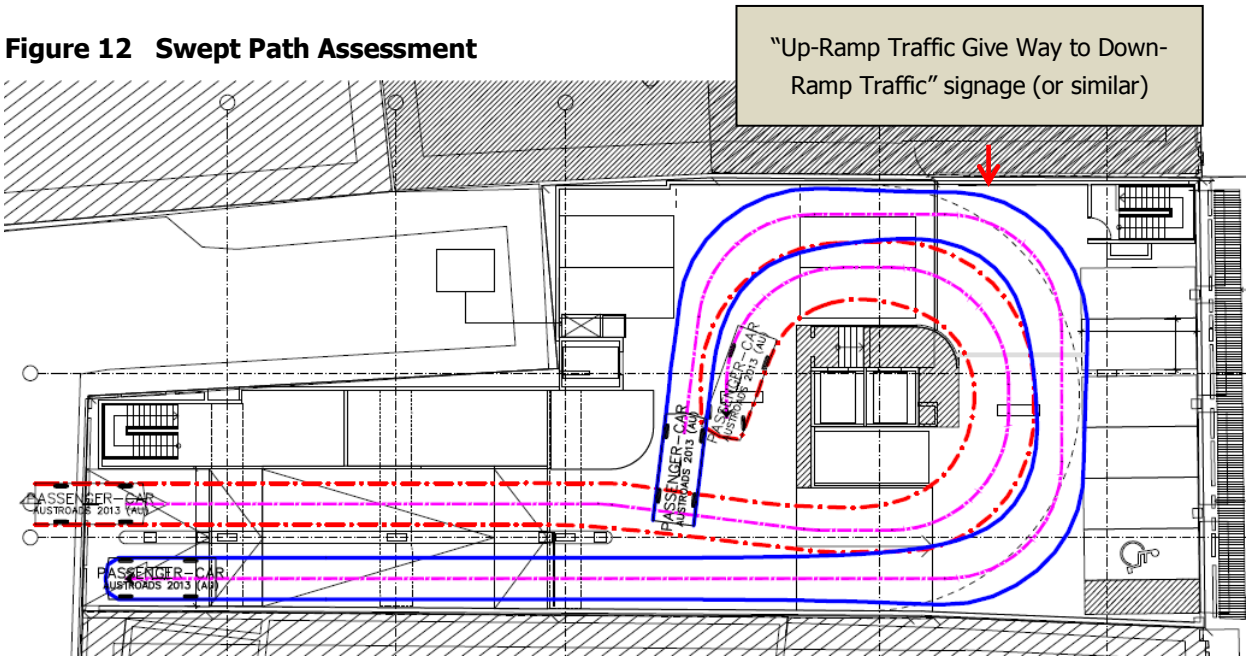
A swept path assessment was undertaken to confirm vehicle manoeuvring within the car park. A swept path assessment of a B85 vehicle travelling up and down the ramps is shown in Figure 12. It can be seen that there is no margin for error when two vehicles are travelling in opposite directions. When a vehicle is travelling in one direction only, there is sufficient room to manoeuvre without concern.

To ensure that safety is maximised within the car park, the following measures are proposed:

- Warning signage: signage at the first internal ramp (adjacent to signage advising of the check in parking spaces) to advise of the narrow nature of the car park, with advisory speed (10-km/h).
- Centre line marking along all ramps and curves on ramp approaches.

- Signage on western walls of the car park (on northern side) advising that up-ramp traffic must give way to down-ramp traffic. This location will be more prominently visible for up-ramp traffic and will therefore have maximum impact (and will also not be obscured by parked vehicles or other potential obstructions). This location is shown indicatively in Figure 12.

Figure 12 Swept Path Assessment



Note: car parking layout indicative only in this diagram

5.3.4 Ramp grades

The car park is located across 4 levels. This requires ramps at the following locations:

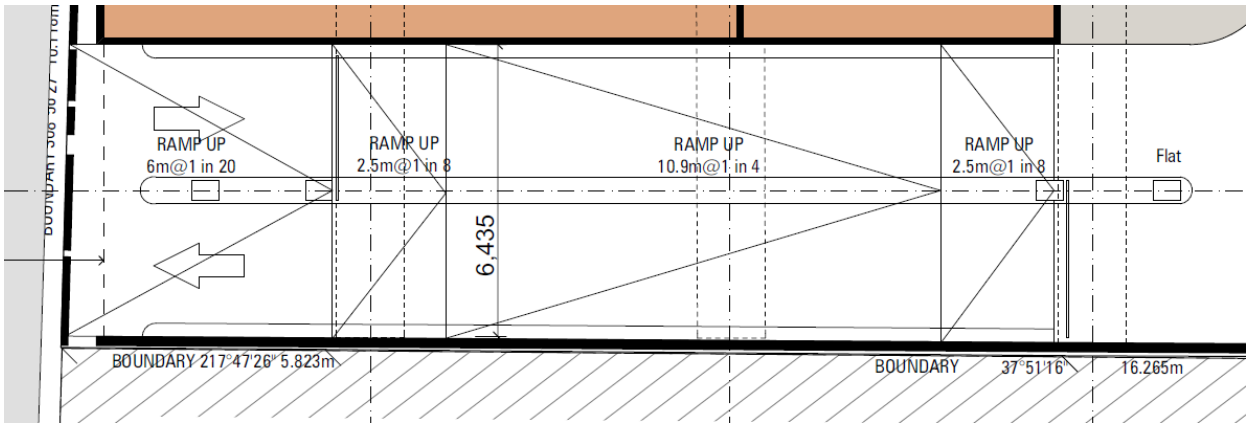
- Entry ramp from Trafalgar Place.
- Ramp either side of lift shaft on each level.

The ramp grades transition as follows:

- Entry: flat
- 6 metres: 1 in 20 (5% grade)
- 2.5 metres: 1 in 8 (12.5% grade)
- 10.9 metres: 1 in 4 (25% grade)
- 2.5 metres: 1 in 8 (12.5% grade)
- Car park level: flat

These grades conform to the requirements of the Australian Standards (AS2890.1:2004) in terms of maximum grade, as well as transitions. Specifically, the requirements of AS2890.1:2004, Section 2.5.3(b)(ii) specifies that the maximum permitted grade is 25% for accesses to car parks that are less than 20 metres in length. The requirements for change in grade are also met as per Section 2.5.3(d), which states that the maximum change in grade of a ramp is 12.5% algebraically. The entry ramp detail is shown in Figure 13.

Figure 13 Car Park Entry Ramp



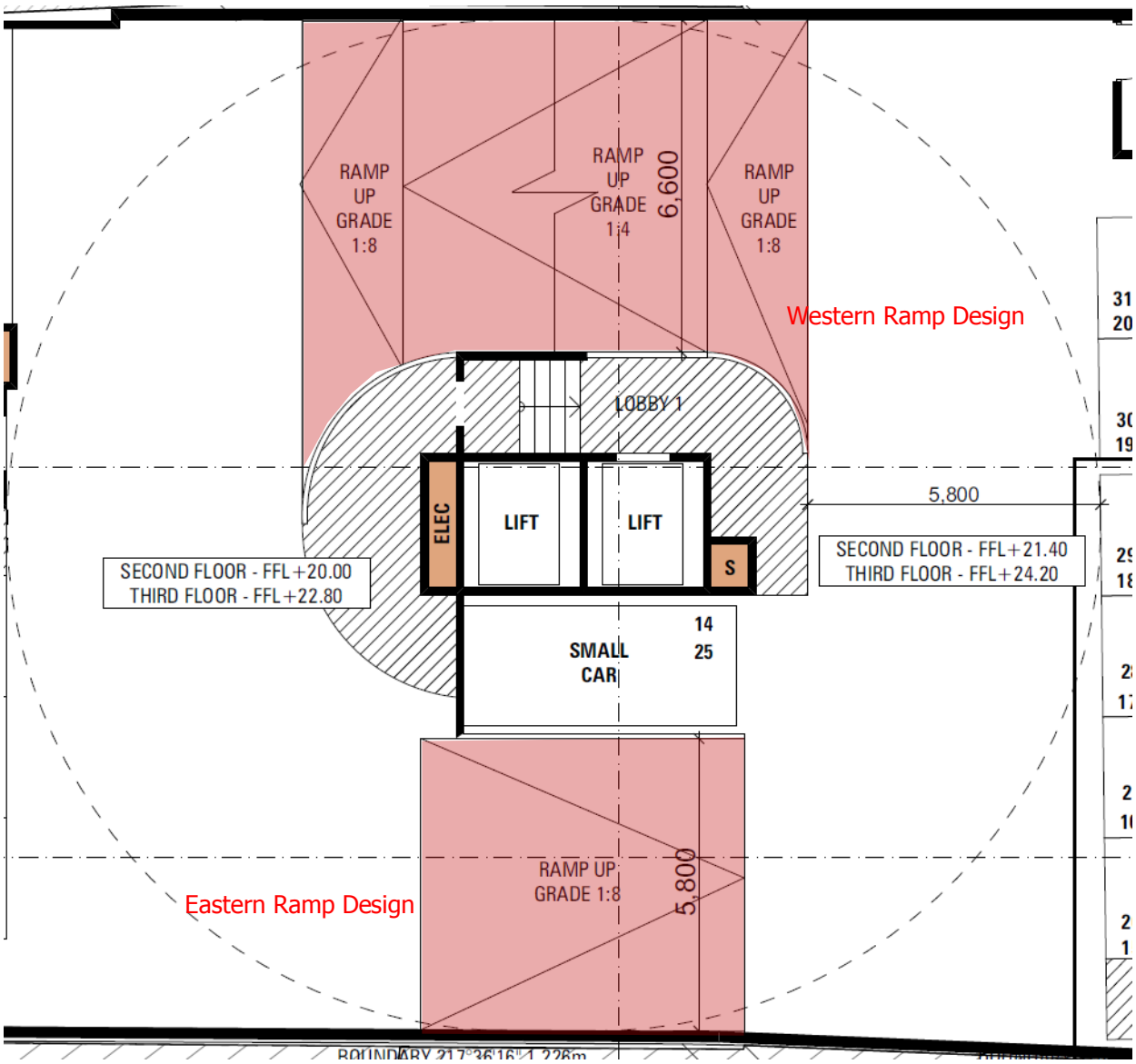
The grades within the car park itself have two designs:

- The eastern ramp is a constant 1 in 8 grade (12.5%).
- The western ramp is 1 in 4 grade (25%) with transitions of 1 in 8 (12.5%) on each approach.

These grades conform to the requirements of the Australian Standards (AS2890.1:2004) in terms of maximum grade, as well as transitions. Specifically, the requirements of AS2890.1:2004, Section 2.5.3(b)(ii) specifies that the maximum permitted grade is 25% for accesses to car parks that are less than 20 metres in length.

The requirements for change in grade are also met as per Section 2.5.3(d), which states that the maximum change in grade of a ramp is 12.5% algebraically. The ramp grade details are shown in Figure 14.

Figure 14 Car Park Internal Ramp Grades



5.4 Hotel Check-In Parking

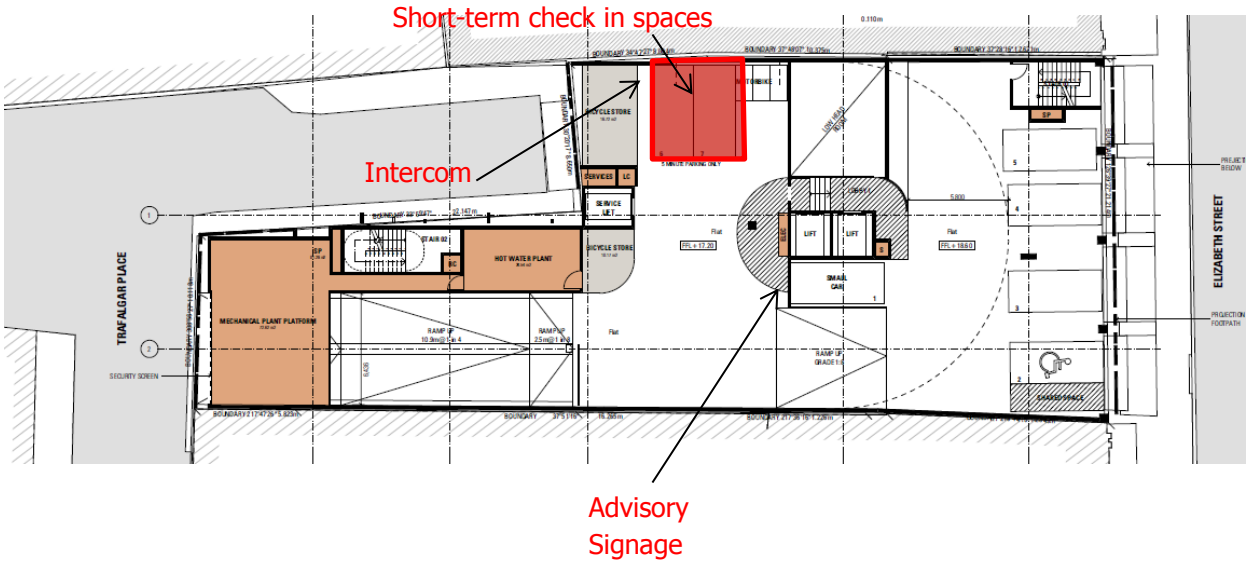
The location of the proposed Hotel is such that there is limited ability for guests to pull onto street to check in before accessing the car park. The Bus Mall does not permit access for Hotel traffic, and there are limited areas in Trafalgar Place for vehicles to stop a vehicle.

A five minute parking zone is proposed as part of the bus mall redevelopment in Collins Street, immediately south of the Elizabeth Street junction. This is proposed to replace the existing drop-off zone located within the bus mall for the Savoy Hotel. This is shown in Figure 4. The proposed five-minute zone would also service the proposed development due to its close proximity to the site (approximately 65 metres walking distance to the bus mall frontage of the site).

A system has therefore been developed, whereby a total of 2 spaces have been reserved on the first parking level for guests to stop and check in. Signage will be located to direct cars to these spaces within the car park ("Check In Spaces [left]/ Hotel Car Park [ahead]), and an intercom will be provided to assist customers with the process. They may then access the hotel to check in before moving their vehicle to the main car parking areas. This is shown in Figure 15. Signage is also proposed on the Macquarie Street/ Trafalgar Place junction to assist motorists.

As with most hotels, advice, internet and maps (standard leaflet style maps that can be written on) should be provided to assist guests to navigate through Hobart's streets if parked in an on-street location remote to the site.

Figure 15 Guest Check-In Parking Arrangements



It is typical of mainland inner city hotels to have limited on-street parking availability for check in. Normally hotels provide information regarding parking accessibility on their website (either through the check-in process or in general information), as well as via confirmation email when a room is booked.

Similar Hotels in Hobart that provide parking information on their websites include Quest Savoy (no parking on-site), Hotel Grand Chancellor (limited parking), Hadleys (limited off-site parking), etc.

5.5 Taxi Parking

There is no provision for taxi parking for the proposed development. The nearest taxi rank for the site is in Collins Street.

Taxis are permitted to enter and travel through the Bus Mall, however parking is not formally available within the bus mall.

5.6 Bus Parking

A mini bus short-term parking area is proposed in Council's bus mall upgrade. This is proposed on the north-western corner of the bus mall and is suitable for use by the proposed hotel. Coordination with the Airport Shuttle bus may be required.

A (non-Metro) bus stop is also located in close proximity to the site in Macquarie Street, between Trafalgar Place and Elizabeth Street.

5.7 Service Vehicles

Service vehicles associated with the hotel will comprise mostly of smaller vans to collect and deliver laundry. Typically laundry services would operate early in the morning. Service vehicles associated with food delivery would also be done through the use of vans with a frequency of 2 to 3 times per day. General deliveries would also be undertaken using vans or utilities, with a frequency of up to 6 times per day.

Refuse management would be undertaken once or twice per week using an 8.8m service vehicle. This activity would be undertaken early during the morning.

Service vehicles have access to the site via the laneway running parallel to the car park ramp. A loading dock is provided beneath the car parking ramp for this purpose. A loading zone is also available in Trafalgar Place (south of the site). This loading zone is shared by nearby commercial properties.

The RTA Guide recommends the provision for commercial vehicles as set out as follows:

- Hotels and Motels (50% of spaces adequate for trucks). [applicable for hotels less than 200 rooms]
  - → 1 space per 50 bedrooms; plus
  - → 1 space per 1,000m^2 of public area set aside for bar, tavern, lounge and restaurant.

The total requirement would therefore be 4 + 1 = 5 spaces in accordance with the RTA Guide.

As well as the provision of a loading dock, the northern section of Trafalgar Place adjacent to the site is used as a loading area by adjacent businesses. The lack of through traffic and pedestrian movements makes this practice acceptable as a 'rear of shop' area.

In practice, the provision of the loading dock, as well as the northern section of Trafalgar Place and the existing loading dock is considered acceptable for the normal operation of the Hotel. It will be important to ensure that loading and unloading activities will not interfere with the normal traffic flow associated with the Trafalgar Place car park. It is therefore recommended that the Hotel adopt a management plan for deliveries to prevent impacts on the normal flow of traffic accessing Trafalgar Car Park.

5.8 Bicycle Parking

The Acceptable Solution, A1, or Schedule E6.6.4 of the Planning Scheme requires the provision of bicycle parking for developments. The requirements of the proposed development are set out in Table 2.

The employee bicycle spaces are classified as 'Class 1' or 'Class 2' spaces, which requires locked compounds with communal access using duplicate keys, or fully enclosed individual lockers.

Two separate bicycle parking areas are proposed on the first level of the car park, along with dedicated change rooms on the ground floor. These change room facilities are proposed to be used by staff (complying the requirements for Class 1 or Class 2 facilities). A total of approximately 40 bicycles can be stored in these lockable facilities, thus satisfying Acceptable Solution A1 of E6.6.4 of the Planning Scheme.

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Table 2 Bicycle Parking Requirements

Use	Employee/ Visitor Bicycle Parking Requirement	Class	Required
Community meeting and entertainment	Employee = 1 for each 500m^2 of floor area Visitor = 4 plus 2 for each 200m^2 floor area	1 or 2 3	Function room area = 263m2: total = 1 Total 4+ 2 = 6
Food services	Employee = 1 for each 100m2 of floor area available to public Visitor = 1 for each 200m^2 floor area after the first 200m^2 floor area (min 2)	1 or 2 3	Café area = 59m^2 Restaurant = 109m^2 Total = 2 Total = 2
Hotel Industry	Employee = 1 for each 25m^2 bar floor area plus 1 for each 100m^2 lounge/ beer garden area Visitor = 1 for each 25m^2 bar floor area plus 1 for each 100m^2 lounge, beer garden area	1 or 2 3	Bar and lounge area = 24m^2 bar and 61m^2 lounge, cocktail bar = 12m^2 and 141m^2 lounge Total = 2 + 2 = 4 Total = 4
Visitor Accommodation	Employee = 1 for each 40 accommodation rooms Visitor = 1 for each 30 accommodation rooms	1 or 2 3	Total rooms = 196 Total = 5 Total = 7
TOTAL	**Employee** **Visitor**	1 or 2 3	**12** **19**

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5.9 Parking for People with Disabilities

Acceptable Solution A1, of Schedule E6.6.2 of the Planning Scheme requires that 1 satisfy the relevant provisions of the Building Code of Australia. This equates to the provision of 1 space for every 20 car parking spaces.

The provision of 2 parking spaces for persons with a disability is therefore required (rounded to nearest whole number from 2.1 spaces). A total of 4 disabled parking spaces are proposed; one on each level of the car park (located on the north-eastern corner of each level). A level path of travel is available from these spaces to the elevators.

Acceptable Solution A1 of E6.6.2 is therefore met.

5.10 Motorcycle Parking

Acceptable Solution A1, of Schedule E6.6.3 of the Planning Scheme requires that 1 motorcycle space be provided for every 20 car parking spaces.

The provision of 2 motorcycle spaces is therefore required (rounded to nearest whole number from 2.1 spaces). These motorcycle parking spaces are proposed on the bottom level of the car park, adjacent to the 'check-in' parking spaces.

Acceptable Solution A1 of E6.6.3 is therefore met.

6. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed hotel development at 28 Elizabeth Street, Hobart. The hotel provides a total of 39 parking spaces (including 4 disabled parking spaces), 40 bicycle spaces and two motorcycle spaces.

The hotel provides on-site parking in the form of four levels of multi-level parking accessed from Trafalgar Place. Access to the car park is via a ramp located at an existing access to the building. The ramp grades and dimensions conform to the requirements of the Australian Standards. Sight lines for vehicles exiting the car park are of concern however. The following recommendations have been made to ensure safe vehicular access at this location:

- A speed hump placed at the exit of the car park to ensure low vehicle speeds.
- A warning device be installed to alert approaching motorists of vehicles exiting the site.
- Provide warning signage (static) on the building structure to advise motorists exiting from Trafalgar Place of exiting traffic from the proposed development's access.

The internal car park layout it very tight. The dimensions of the car parking spaces generally comply with Australian Standards requirements for Class 1A, with some "Small Car" spaces required.

Two short-term spaces have been provided on the first car parking level for hotel check-in.

The circulation roadway is less than the minimum radius for two-way flow. Swept paths confirm that vehicles can pass in opposing directions (B85 vehicles), however to improve circulation and safety within the car park, signage should be installed to require vehicles travelling up the car park to give way to motorists travelling down. Consideration should also be made for the installation of warning devices when vehicles are travelling in opposing directions within the car park. Note that the selected warning devices should not distract motorists from their driving task.

The proposed development provides sufficient bicycle, motorcycle and disabled parking in accordance with the requirements of the Planning Scheme. Disabled parking is provided on all four parking levels, and level access is available from the parking spaces to the elevator access.

Pedestrian access is available from both Elizabeth Street and Trafalgar Place frontages, with pedestrian connectivity available between the frontages. Bicycle parking in the form of separate lockable storage is available for staff, with appropriate change rooms located immediately adjacent.

A service lift accesses all parking levels, with the swept path of down-ramp traffic located immediately adjacent to the lift doors. Warning in the form of flashing lights should be installed to alert approaching motorists of the presence of a pedestrian exiting the lift. Note that the service lifts would be used very infrequently on the car parking levels.

Service vehicles can access the site in the dedicated loading dock accessed via Trafalgar Place, as well as the existing loading zone located to the south in Trafalgar Place. The northern end of Trafalgar Place is

also currently utilised as a service area for adjacent businesses. The function of the road will remain the same for this activity and is considered adequate to service the service vehicle requirements of the development.

Based on the findings of this report and subject to the recommendations above, the proposed development is supported on traffic grounds.

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ENVIRONMENTAL WIND SPEED MEASUREMENTS ON A WIND TUNNEL MODEL OF THE 28 ELIZABETH STREET HOTEL DEVELOPMENT, HOBART

By

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and

M. Eaddy

SUMMARY

Wind tunnel tests have been conducted on 1/400 scale model of the proposed 28 Elizabeth Street Hotel, Hobart Development to provide data on environmental wind conditions at ground level. The model of the Development, within surrounding buildings, was tested in a simulated upstream boundary layer of the natural wind. The wind conditions measured have been related to the free stream mean wind speed at a reference height of 300m and compared with criteria developed for the Hobart region as a function of wind direction.

For the Basic Configuration, for which there were no street trees, the pedestrian level wind conditions on the ground level surrounding the proposed development have been shown to be either on or within the criterion for walking comfort for all wind directions or similar to those of the Existing Configuration. As such, the 28 Elizabeth Street development was shown to have little significant adverse effect on the existing pedestrian level wind conditions in the pedestrian realm around the site.

MEL **Consultants Report 135/15**

September 2015

ENVIRONMENTAL WIND SPEED MEASUREMENTS
28 ELIZABETH STREET HOTEL, HOBART

MEL CONSULTANTS REPORT NO: **135/15**

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CONTENTS

1. INTRODUCTION

The proposed 28 Elizabeth Street Development will comprise of a 28 level hotel building adjacent to the Deliottes building in the Hobart CBD. The Hotel tower will be set upon a 5 level podium, set back considerably from the Elizabeth Street site boundary.

A wind tunnel model study was commissioned by JAWS Architects on behalf of Elizabeth Tasmania Pty Ltd to undertake measurements of environmental wind conditions around the proposed development and, if necessary, develop wind amelioration features.

These tests were carried out in the MEL Consultants 400kW Boundary Layer Wind Tunnel during September 2015.

2. ENVIRONMENTAL WIND CRITERIA

The advancement of wind tunnel testing techniques, using large boundary layer flows to simulate the natural wind, has facilitated the prediction of wind speeds likely to be induced around a development. To assess whether the predicted wind conditions are likely to be acceptable or not, some form of criteria are required. A discussion of criteria for environmental wind conditions has been made in a paper by Melbourne, Reference 1. This paper notes that it is the forces caused by the peak gust wind speeds and associated gradients which people feel most and criteria have been stated in terms of gust wind speeds. The probabilistic inference of these criteria in relation to hourly mean wind speeds and frequency of occurrence is discussed. The basic criteria can be summarised as follows:

In main public access-ways wind conditions are considered

(a) unacceptable if the peak gust speed during the hourly mean with a probability of exceedence of 0.1% in any 22.5^{o} wind direction sector exceeds 23ms^{-1} (the gust wind speed at which people begin to get blown over);

(b) generally acceptable for walking in urban and suburban areas if the peak gust speed during the hourly mean with a probability of exceedence of 0.1% in any 22.5^{o} wind direction sector does not exceed 16 ms^{-1} (which results in half the wind pressure of a 23 ms^{-1} gust).

For more recreational activities wind conditions are considered

(c) generally acceptable for stationary short exposure activities (refers to activities where people remain in the same location between 5 and 15 minutes. For example: standing or sitting in parks, window shopping and building entrances) if the peak gust speed during the hourly mean with a probability of exceedence of 0.1% in any 22.5° wind direction sector does not exceed 13 ms^{-1};

(d) generally acceptable for stationary, long exposure activities (refers to activities where people remain in the same location a quarter of an hour or more. Examples of this are recreational playgrounds, outdoor dining areas and cafes) if the peak gust speed during the hourly mean with a probability of exceedence of 0.1% in any 22.5° wind direction sector does not exceed 10 ms^{-1}.

The probability of exceedence of 0.1% relates approximately to the annual maximum mean wind speed occurrence for each wind direction sector. These criteria can be developed in terms of hourly mean wind speed versus frequency of occurrence as shown in References 1 and 2.

For the purpose of comparison, or integrating with local wind data, it is necessary to be able to relate the local velocity measurement to a reference velocity well clear of the influence of buildings. Because the wind force is related to wind velocity squared, it is often more convenient to express criteria in terms of velocity ratio squared, or velocity pressure ratio as this becomes. To this end, two velocity pressure ratios referenced to conditions at 300m height in suburban terrain [terrain category 3] (as a convenient reference) are defined as,

mean velocity pressure ratio $\left|\frac{\overline{V}_{local}}{\overline{V}_{300m}}\right|^2$

and

peak velocity pressure ratio $\left|\frac{\hat{V}_{local}}{\overline{V}_{300m}}\right|^2$

where the peak velocity is the 3-second mean maximum gust wind speed in full scale conditions.

For wind conditions in Hobart these criteria can be expressed in terms of velocity pressure ratios, calculated from hourly mean wind speed data as per the methodology given in Reference 1. Corrections have been made where long distance approach terrain is different to Terrain Category 3.

The criteria in terms of peak velocity pressure ratios are illustrated in Figure 1 and appear in subsequent figures to enable immediate assessment of the wind conditions as measured on the model.

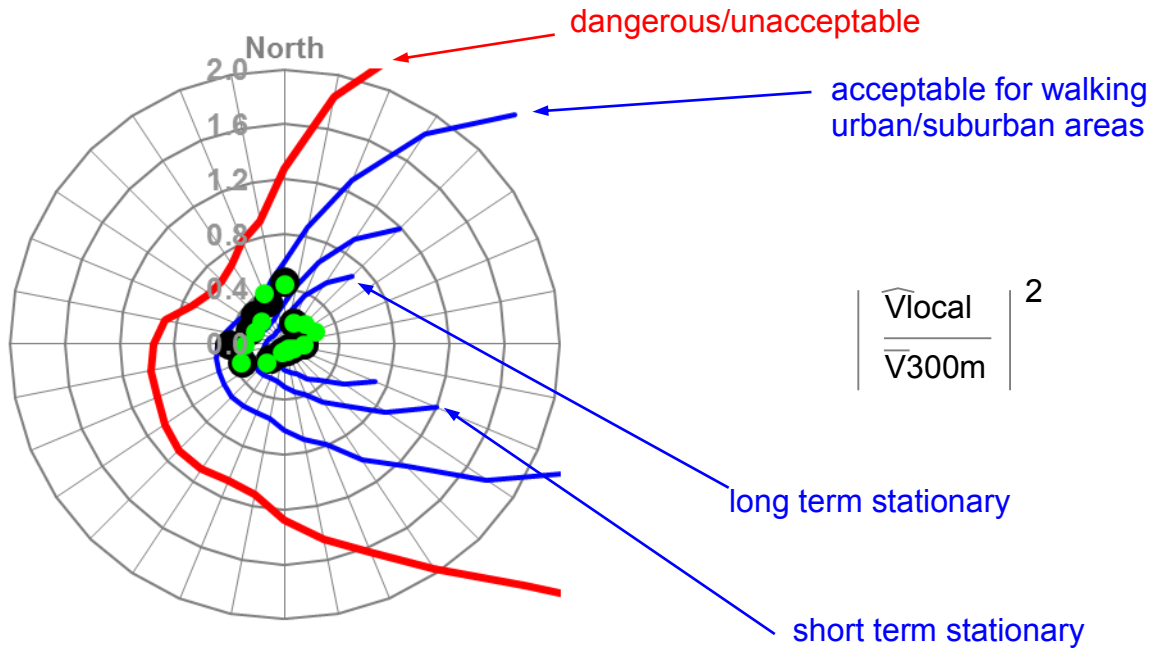

Figure 1 - Environmental wind criteria for the City of Hobart expressed in terms of peak velocity pressure ratios

The velocity pressure ratio values considered as unacceptable in Figure 1 are equivalent to conditions which have existed in some areas in Australian capital cities where people have been blown over by the wind. The velocity pressure ratios considered as acceptable for walking in urban and suburban areas are equivalent to conditions existing at corners in these areas before high rise development commenced.

3. MODEL AND EXPERIMENTAL TECHNIQUES

A 1/400 scale model of the 28 Elizabeth Street Hotel Development was inserted into a proximity model of surrounding buildings out to a minimum radius of 300m. The building model was tested in a model of the natural wind generated by flow over roughness elements augmented by vorticity generators at the beginning of the wind tunnel working section. The basic natural wind model was for flow over suburban terrain roughness, which had a mean velocity power law profile with an exponent of 0.2, i.e. $\overline{V}_z = f(z)^{0.2}$ and a turbulence intensity at a scaled height of 100m of $\sigma_v/\overline{V} = 0.17$, as shown in Figure 2. Photographs of the model building and proximity model are shown in Figures 3 and 4.

The techniques used to investigate the environmental wind conditions and the method of determining the local criteria are given in detail in Reference 2. The MEL Consultants hot-wire system is a custom wind engineering specific system that is calibrated in house using our own custom velocity and thermal calibration wind tunnel. Measurements were made at various locations in and around the development, for different wind directions at 22.5° intervals (16 wind directions). The data was acquired at a sampling frequency of 1250 Hz with a low-pass filter at the Nyquist frequency to avoid aliasing effects on the acquired data. Turbulent gusty wind flows, caused by separated flows, were generally observed with a combination of low and high mean wind speeds. To quantify this, peak gust wind speeds were measured, using the hot wire anemometer, and related to the environmental wind criteria via the calculated peak velocity squared ratios. Wind speed data were acquired and filtered to give an equivalent full scale 3 second peak gust wind speed and sampled for the equivalent of one hour in full scale. In summary, measurements were made of the peak gust wind velocity with a hot wire anemometer at various stations and expressed as a squared ratio with the mean wind velocity at a scaled reference height of 300m. This gives the peak velocity squared ratio

$$\left(\hat{V}_{local} / \overline{V}_{300m}\right)^2$$

as defined in Section 2. This peak velocity squared ratio can then be compared with the velocity squared ratio criteria for Hobart given in Figure 1.

4. DISCUSSION OF RESULTS

The Basic Configuration, for which there were no street trees, was for the proposed 28 Elizabeth Street Hotel Development as defined by JAWS Architects drawings dated to July 2015. The Level 1 canopy along the Elizabeth St frontage was included as part of the Basic Configuration. The following Sections detail the results for the various areas tested.

4.1. Summary of discussion (Figure 6)

To assist with the assessment of the wind conditions, summaries of the highest wind conditions for the Basic Configuration, at each Test Location for all wind directions at ground level public realm have been provided in Figure 6. Different colours have been used to represent the highest wind criteria achieved at each Test Location. Where the wind conditions at a Test Location were distributed across two criteria, the two criteria colours have been graduated.

4.2 Elizabeth Street (Figures 7, 8 and 9)

The wind conditions for the Basic Configuration along the south side of Elizabeth Street (Test Locations 1, 2, 3, 4 and 14) have been shown to be either on or within the criterion for walking comfort for all wind directions with the north-north-east through east to south-south-west wind directions achieving the stationary criteria. The presence of the development was shown to have little impact on the existing wind conditions at these Test Locations, as shown by the comparison with Existing wind conditions along Elizabeth Street.

For the Basic Configuration, wind conditions along the north side of Elizabeth Street (Test Locations 5, 6, 7, 8, 13 and 15) have been shown to be either within or on the criterion for walking comfort for all wind directions except for the southwest through west to north-north-west wind directions at Test Location 7 which were above the walking comfort criterion. However, the wind conditions at this Test Location were shown to be similar to Existing Conditions, therefore the proposed development did not appear to cause any significant adverse impact on the existing wind conditions at this location.

In summary, the wind conditions for the majority of the Test Locations along Elizabeth Street have been shown to be similar to Existing Conditions.

4.3 Trafalgar Place (Figure 10)

For the Basic Configuration, wind conditions along Trafalgar Place (Test Locations 9, 10, 11 and 12) have been shown to be either within or on the criterion for walking comfort for all wind directions except for the northwest, north-north-west and north wind directions at Test Location 9 which were above the walking comfort criterion. However, the wind conditions were shown to be similar to Existing Conditions and so the proposed development appears to be having little significant adverse effect on the wind conditions at this location.

5. CONCLUSIONS

Wind tunnel tests have been conducted on 1/400 scale model of the proposed 28 Elizabeth Street Hotel, Hobart Development to provide data on environmental wind conditions at ground level. The model of the Development, within surrounding buildings, was tested in a simulated upstream boundary layer of the natural wind. The wind conditions measured have been related to the free stream mean wind speed at a reference height of 300m and compared with criteria developed for the Hobart region as a function of wind direction.

For the Basic Configuration, for which there were no street trees, the pedestrian level wind conditions on the ground level surrounding the proposed development have been shown to be either on or within the criterion for walking comfort for all wind directions or similar to those of the Existing Configuration. As such, the 28 Elizabeth Street development was shown to have little significant adverse effect on the existing pedestrian level wind conditions in the pedestrian realm around the site.

J. Tan
MEL Consultants Pty Ltd
September 2015

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FIGURES

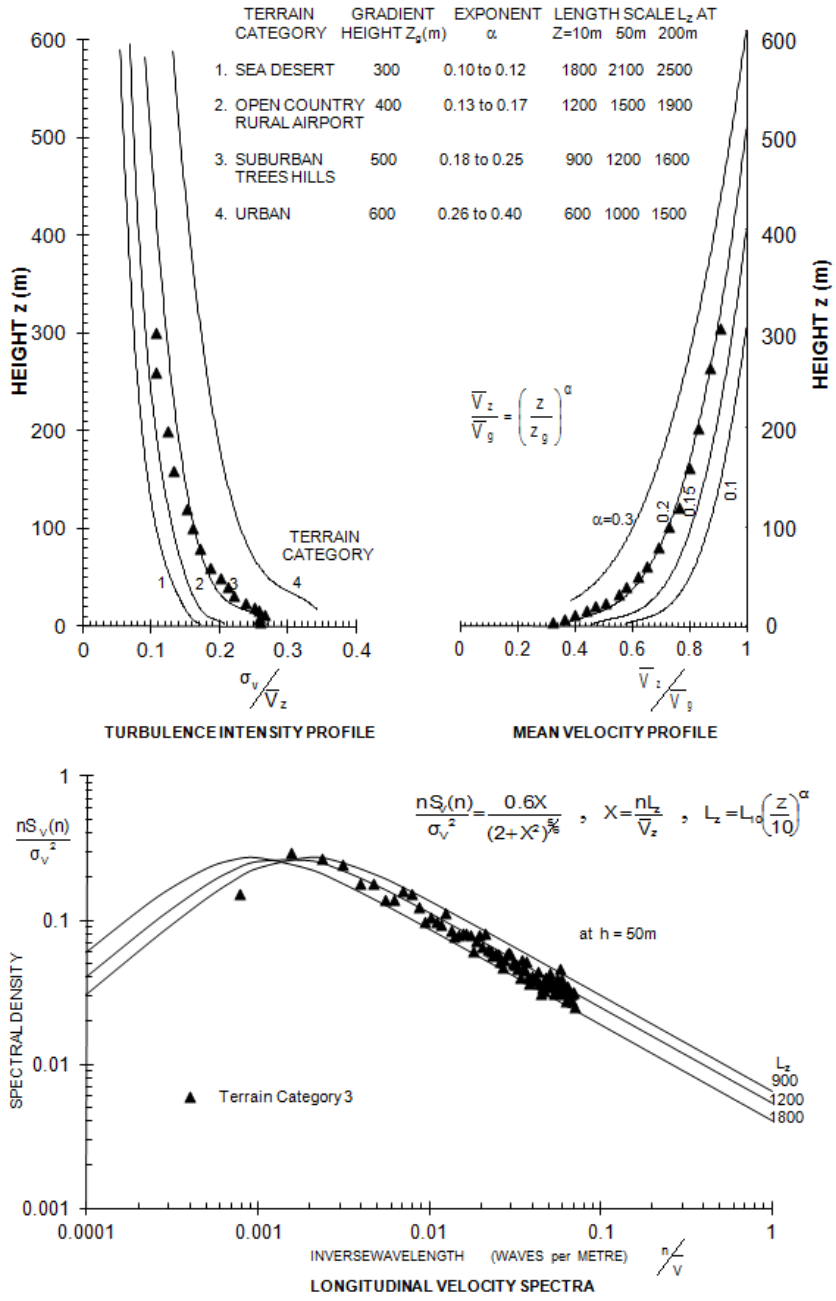


Figure 2 – 1/400 scale Terrain Category 3 boundary layer turbulence intensity and mean velocity profiles and spectra in the MEL Consultants Boundary Layer Wind Tunnel 4m x 2m working section, scaled to full scale dimensions

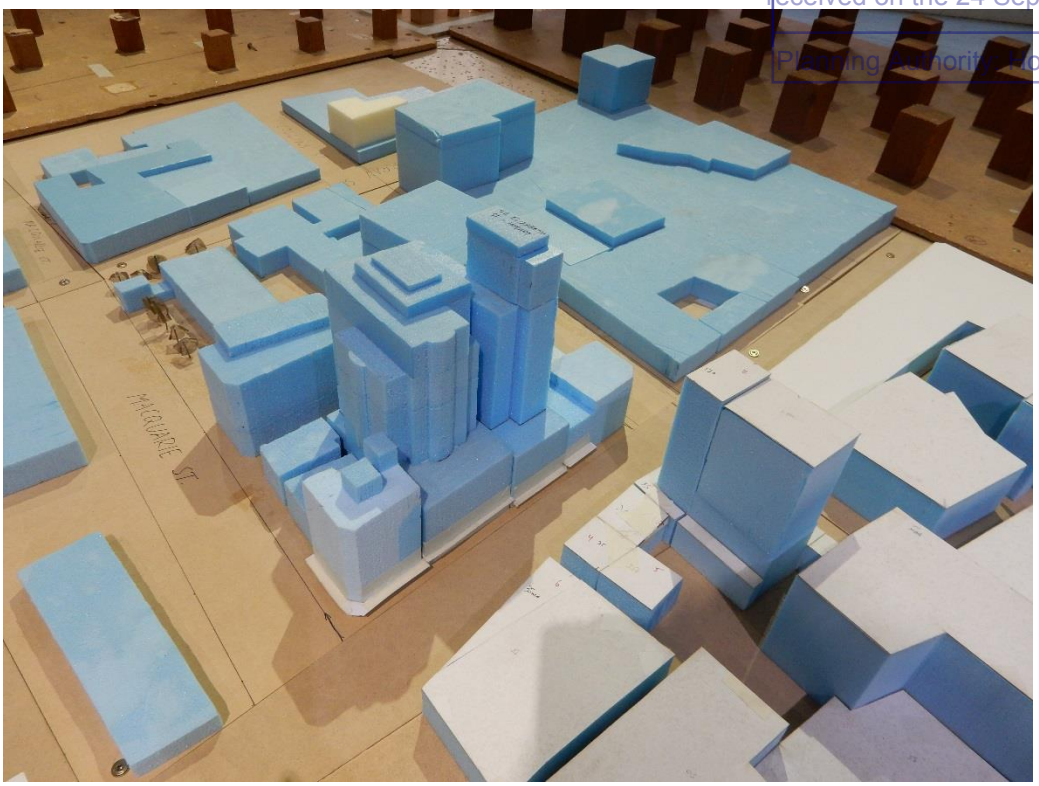


Figure 3 – 1/400 scale model of the 28 Elizabeth Street Hotel, Hobart Development viewed from the northeast direction.

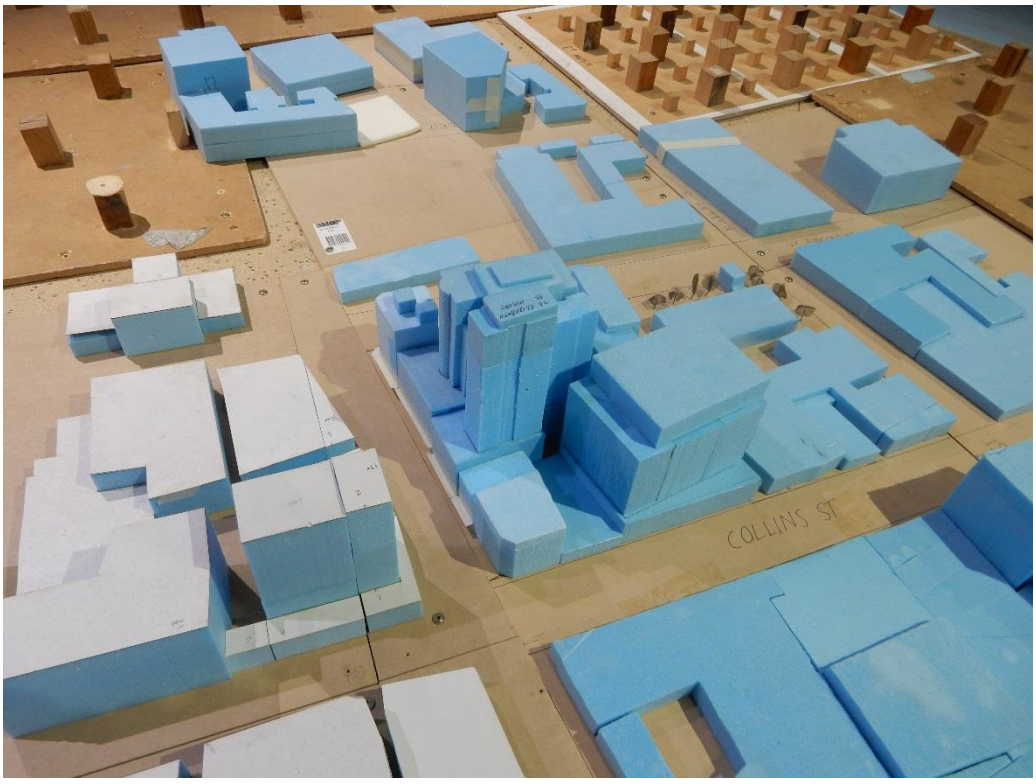


Figure 4 – 1/400 scale model of the 28 Elizabeth Street Hotel, Hobart Development viewed from the northwest direction

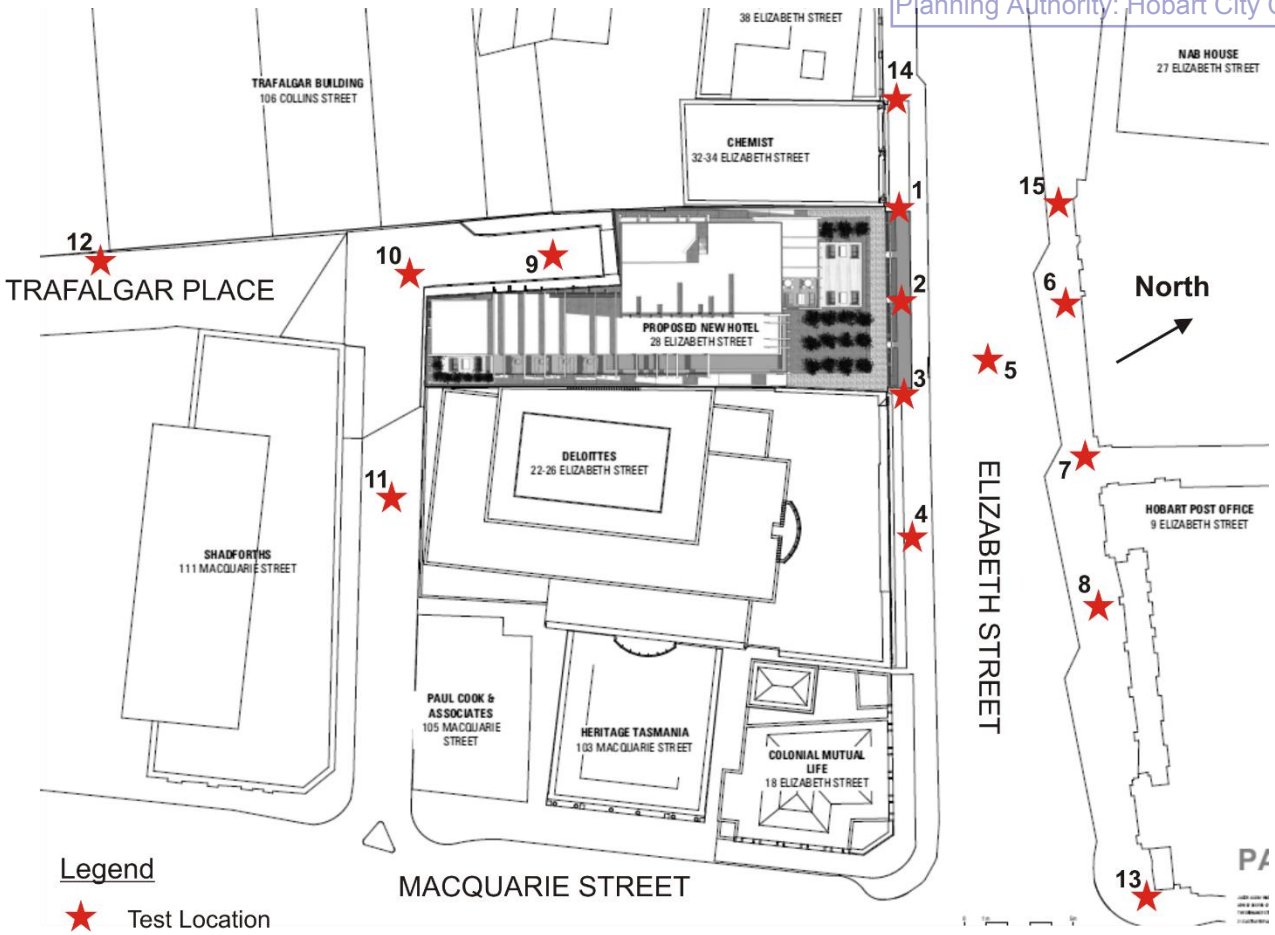


Figure 5 – Ground Level Test Locations

Figure 6 – Ground level Test Locations and corresponding highest wind conditions for 360° of wind direction in the Basic Configuration.

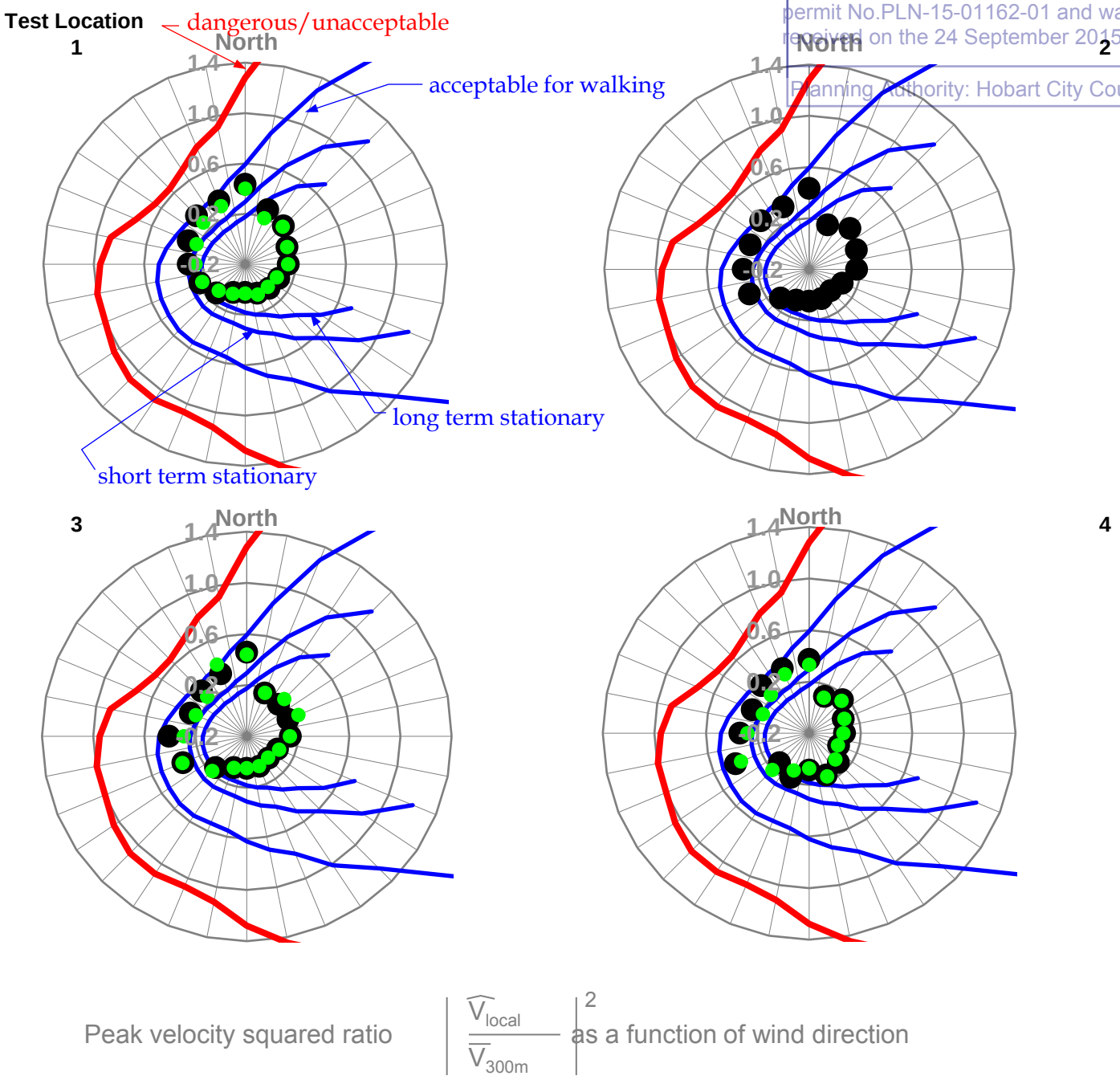
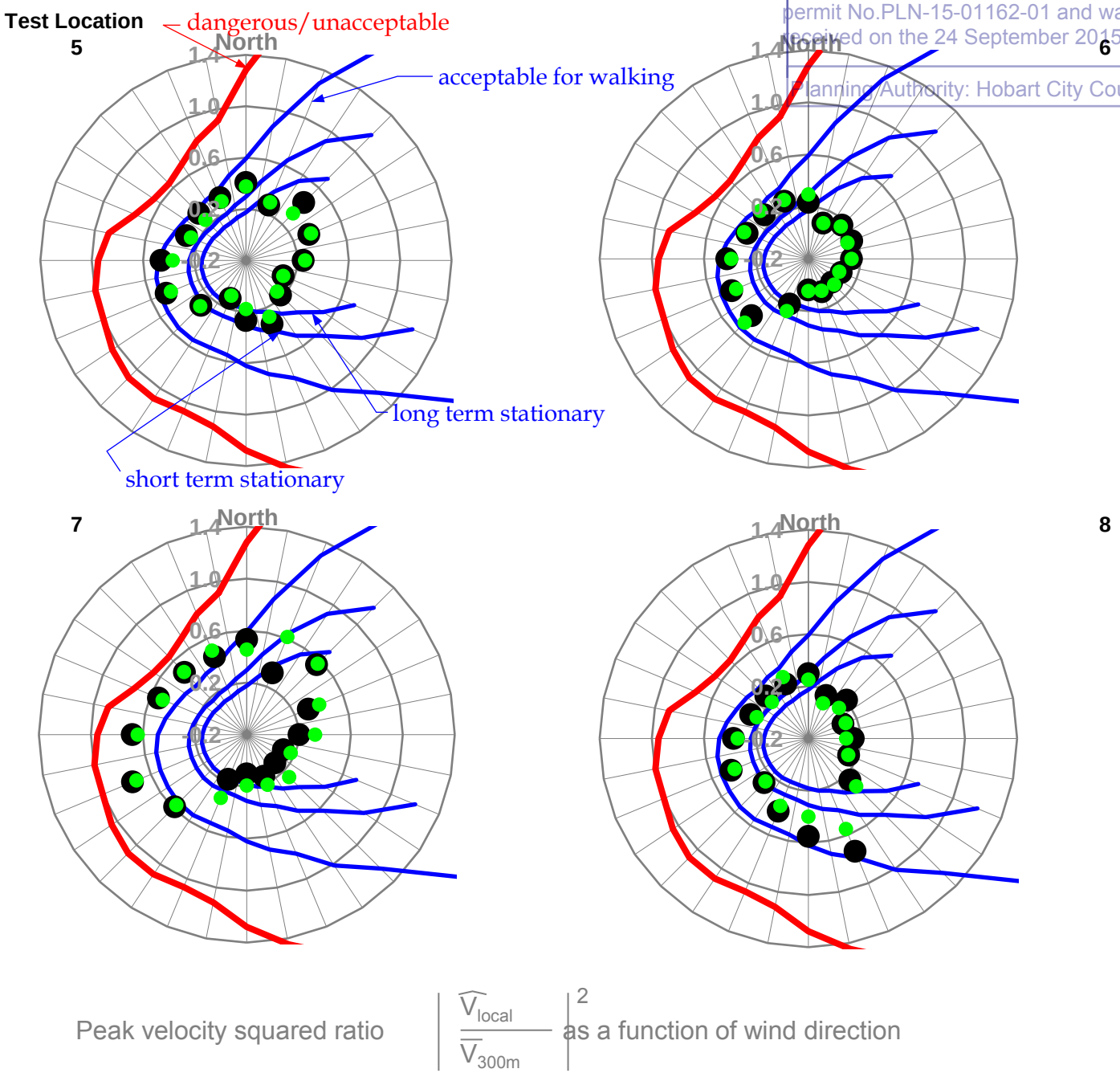


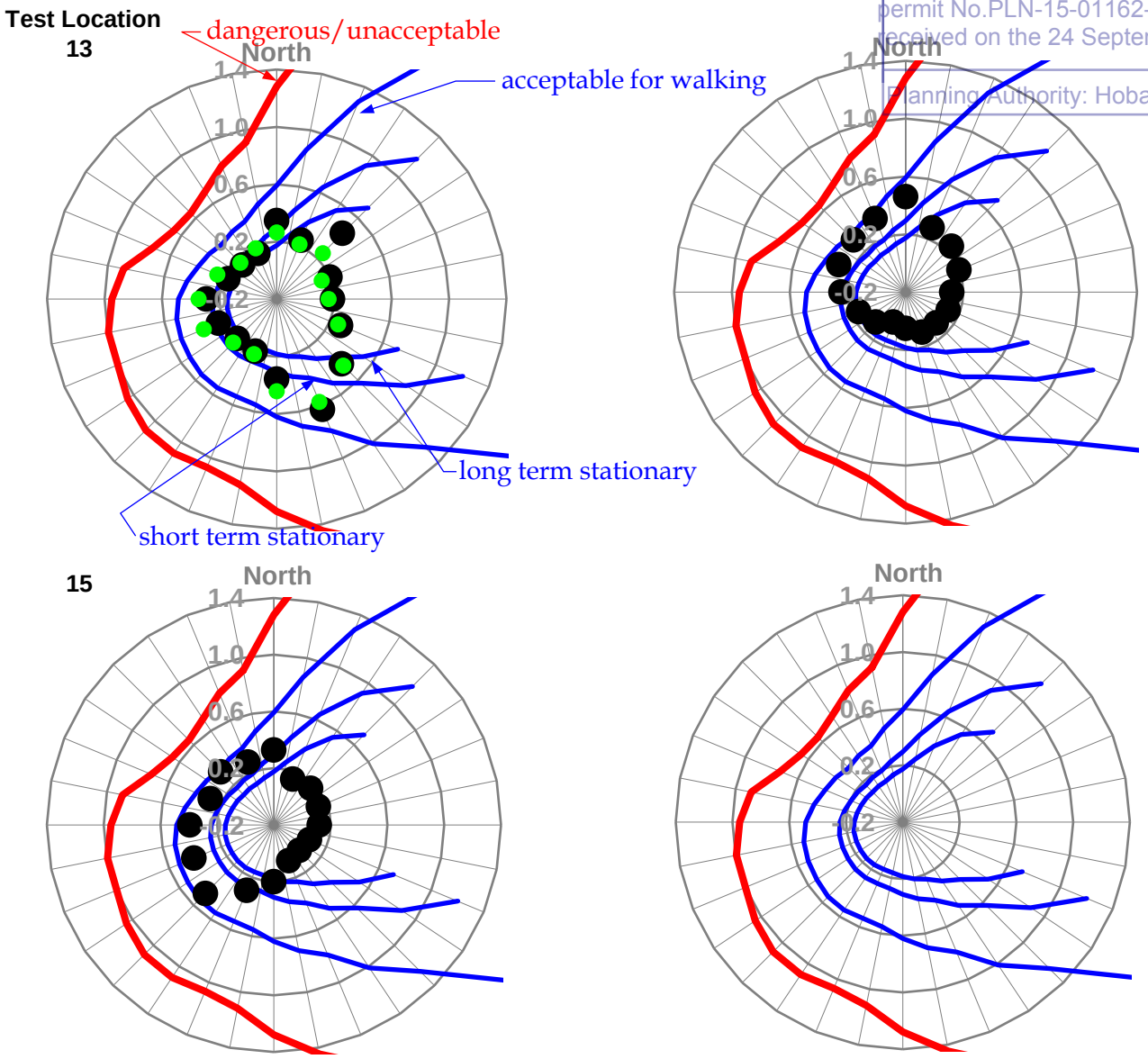
Figure 7 - Elizabeth Street



Peak velocity squared ratio $\left|\frac{\widehat{V}_{local}}{\overline{V}_{300m}}\right|^2$ as a function of wind direction

Basic Configuration
Existing Conditions

Figure 8 - Elizabeth Street (continued)



Peak velocity squared ratio $\left|\frac{\hat{V}_{local}}{\overline{V}_{300m}}\right|^2$ as a function of wind direction

Basic Configuration
Existing Conditions

Figure 9 - Elizabeth Street (continued)

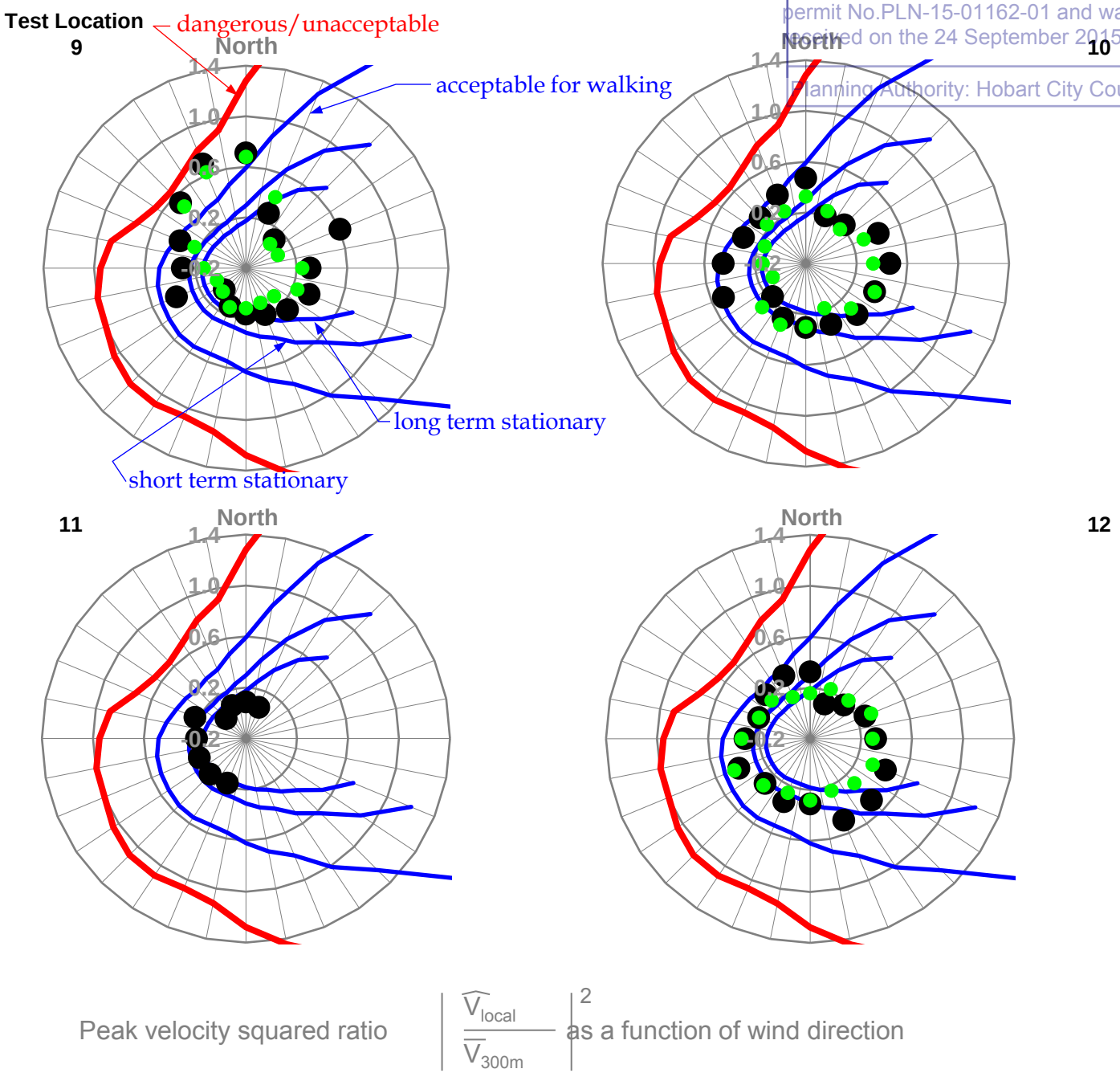


Figure 10 - Trafalgar Place

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Paper 12

CRITERIA FOR ENVIRONMENTAL WIND CONDITIONS

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(Received October 18, 1977)

Summary

Since 1971 a number of authors have published criteria for the acceptability of environmental wind conditions for human comfort for a range of activities.

This paper notes that it is the forces caused by peak gust wind speeds and associated gradients which people feel most and discusses the relation between peak gust and mean wind speeds. Melbourne's criteria, which have been stated in terms of maximum gust speeds per annum, are shown to define a range of wind-speed probabilities, in particular, the frequency of occurrence of mean wind speeds, which then facilitates comparison between the various published criteria.

It is shown that, in spite of the apparent numerical differences in published wind speed criteria and the various subjective assumptions used in their development, there is remarkably good agreement when they are compared on a proper probabilistic basis.

1. Introduction

In recent literature and at the 4th International Conference on Wind Effects on Buildings and Structures, London, 1975, there has been some debate as to the quantitative values of wind speed to be used in criteria for environmental conditions around new building developments. It was noted by several of the authors at the above-mentioned conference, that in spite of the seeming numerical differences in wind-speed criteria quoted by a number of authors, the differences were, in fact, relatively small [1]. The problem is that the phenomenon of wind and frequency of occurrence is very complex and the numerical values developed for these criteria depend on the statistical framework in which they are set.

It is the purpose of this paper to discuss the physical nature and effect of wind on people in respect of the relationship between mean wind speeds and peak gusts produced in turbulent conditions and the statistical inference of the various ways of expressing the frequency of occurrence of given wind speeds, and hence to permit a comparison of the various published environmental wind criteria.

2. The reason for needing environmental wind-speed criteria

Whilst involved in the technical argument about criteria, it is important to remember the reason for trying to establish environmental wind-speed criteria.

Briefly, the need has arisen because unacceptable wind speeds can be induced around building developments and one way of avoiding these problems is to conduct wind-tunnel tests from which wind speeds around a proposed development can be estimated. Having obtained the facility for predicting likely wind conditions in a given area, it becomes necessary to develop some criteria as to the frequency of occurrence of wind speeds which are acceptable and unacceptable for a variety of activities.

3. How people feel the effects of wind

There seems little doubt that wind speed and rate of change of wind speed are the primary parameters in any assessment of how wind affects people, Melbourne [2], Hunt et al. [3]. There are, of course, other factors such as temperature, humidity, degree of shade and mode of dress, which are also significant; however, these are factors which can be superimposed on or used to modify the effects of wind speed and as such will not be dealt with here.

Wind gustiness, or fluctuation of wind speed with time, is a random process and whilst the mean wind speed is a meaningful and simple parameter to obtain, the rate of change of wind speed is not. Fortunately, the effect of rate of change of wind speed can be covered generally by the parameter of turbulence intensity of wind speed, that is the standard deviation over the mean of wind speed. Further, in terms of what people feel, it is often convenient to talk in terms of a gust wind speed, that is a wind speed averaged over the smallest periods of time to which a person can respond, of the order of seconds. The mean 2- or 3-second-gust wind speed has become a useful reference in this respect, because it is roughly equivalent to the peak gust speed recorded by the Dines anemometer and the larger cup anemometers.

The wind force felt by a person is related to dynamic pressure. Hence, whilst it may be convenient in one sense to relate criteria directly to wind speed, it must be appreciated that the force felt by a person is proportional to wind speed squared. For this reason a more rational feel for the problem is gained if comparative data are presented in terms of velocity pressures rather than velocities. However, the referring of criteria to wind speed has gained popular acceptance and values of wind speed are more easily remembered than numbers based on the square of wind speed, hence, criteria will be discussed in terms of wind speed.

In concluding this section, it is worth re-casting the opening sentence by now saying that it is the peak gust wind speeds and associated gradients which people feel most.

4. Relationships between peak gust and the mean wind speeds

The peak gust wind speed $\hat{u}$ is dependent on turbulence intensity and can be given in terms of the mean $\overline{u}$ and standard deviation σ_u as

$$\hat{u} = \overline{u} + 3.5\,\sigma_u \qquad (1)$$

For example, for a turbulence intensity ($\sigma_u/\overline{u}$) of 15%, $\hat{u} = 1.5\,\overline{u}$, and for 30%, $\hat{u} = 2.0\,\overline{u}$, etc.

As noted, it is the peak gust wind speeds and associated gradients which people feel most and as such it is of interest to know under what conditions they occur. The observations of Melbourne and Joubert [4] indicated that the areas in full scale which have been classed as having unpleasant or unacceptably high wind speeds were all associated with high mean wind speeds. Later, model- and full-scale measurements by Isyumov and Davenport [5] and Melbourne [6] continued to show that the windiest areas were associated with high mean wind speeds, but that the turbulence intensity was important in determining the peak gust wind speeds. In the case of the former, the ratio of peak gust wind speed over mean wind speed $\hat{u}/\overline{u}$ for the three windiest conditions respectively were 1.5, 2.7 and 2.8 and for the latter 1.9, 1.9 and 2.4. For areas and wind directions with lower wind conditions, and obviously for much greater turbulence intensities, this ratio was typically as high as 5.0. This means that to get an accurate prediction of peak gust wind speeds from wind-tunnel model tests, it is essential that mean and rms or peak values for a given probability level be actually measured.

Although it is possible to have unpleasant areas with low mean wind speeds and high turbulence intensities, the evidence to date does seem to indicate that for areas likely to have unacceptably high wind conditions, such as near corners, in narrow alleys and in arcades, the turbulence intensity is relatively low and that in these areas it would be reasonable to assume that the peak gust wind speeds will be about twice the mean wind speed. This means that wind-tunnel investigations, in terms of exploring and improving likely areas of high wind conditions, can often be reasonably based on very simple and inexpensive model measurements of mean wind speed. However, this does not mean that the need to model the turbulence characteristics of the incident wind stream can be overlooked, as a low turbulence stream would produce quite different flow fields and erroneous information.

5. Melbourne's criteria for environmental wind speeds

Notwithstanding the usefulness of the above very simple tests, to maintain flexibility in the application of environmental wind-speed criteria to all levels of turbulence, the author believes it is necessary to frame the definition in terms of gust wind speeds related to some meaningful return period or frequency of occurrence. Criteria which are defined only by mean wind speeds need to be qualified with respect to turbulence to have any general application.

Melbourne's criteria [2, 7] were based on two levels of wind speed, an unacceptable level at which wind gusts would be strong enough to knock people over and a level generally acceptable in main public access-ways based on conditions which had existed in the main Australian cities during the first half of the 20th century, when building was dense but heights restricted to about 30 m. Temperatures are typically between 10° C and 30° C with people appropriately dressed for the outside temperature conditions. These criteria simply state that in main public access-ways wind conditions are

(a) completely unacceptable if the annual maximum gust exceeds 23 m/s (the gust speed at which people begin to get blown over),

(b) generally acceptable if the annual maximum gust does not exceed 16 m/s (which results in half the wind pressure of a 23 m/s gust). Along the lines of Davenport's [8, 9] suggestions for comfort for activities less than walking in a main public access-way, two additional comfort criteria have been added to the original criteria as follows:

(c) generally acceptable for stationary short-exposure activities (window shopping, standing or sitting in plazas), if the annual maximum gust does not exceed 13 m/s,

(d) generally acceptable for stationary, long-exposure activities (outdoor restaurants, theatres), if the annual maximum gust does not exceed 10 m/s.

From these basic criteria a probability distribution, or frequency of occurrence, can be developed to suit any turbulence conditions. An example of such a distribution is given in Fig.1, for a turbulence intensity of 30%, where the distributions of the maximum gust speeds per annum, of 23 m/s, 16 m/s, 13 m/s and 10 m/s are shown as normal distributions back to the maximum hourly mean wind speed per annum (i.e. $\hat{u} = 2.0\ \overline{u}$ for $\sigma_u = 0.3\ \overline{u}$, which as discussed in Section 4 is a very typical situation). The upper part of Fig.1 shows the distribution of hourly mean wind speeds for these conditions using a Rayleigh distribution, and the expected maximum wind speeds for periods of a day, week, month and year have been calculated using a method by Davenport [10].

Davenport showed that the number of storms, on occasions during which a wind speed $\overline{u}$ is exceeded, can be expressed as

$$N_u = \sqrt{2\pi}\,\nu T \left[\Gamma\left(1+\frac{2}{k}\right) - \Gamma^2\left(1+\frac{1}{k}\right)^{1/2} k\,\{-\ln P_{(>\overline{u})}\}\right]^{(k-1)/k} P_{(>\overline{u})} \qquad (2)$$

where $P_{(>\overline{u})}$ is the probability of exceeding the mean wind speed $\overline{u}$ (based on the Weibull distribution), k is one of the Weibull parameters, Γ is the Gamma function and νT is the number of independent events per annum. The value of k varies about 1.5 to 2 and νT varies between 500 and 1000, depending on the local wind climate. From an evaluation of Davenport's eq. (2) [5] the ranges given in Table 1 can be obtained which express the relation between probability of exceeding a certain hourly mean wind speed and the number of storms per annum during which that mean wind speed is exceeded. Apart from

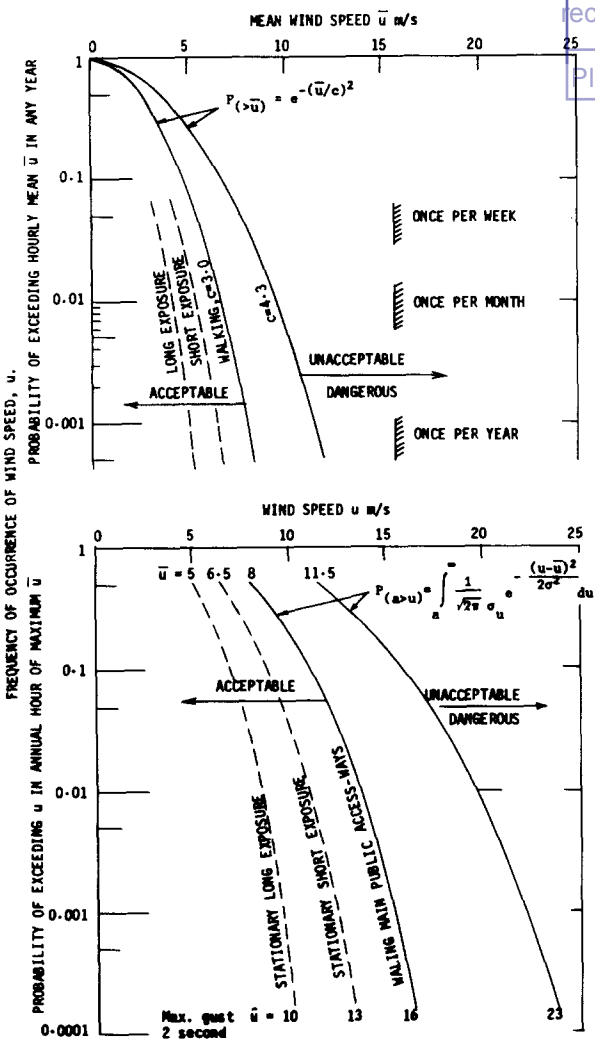


Fig. 1. Probability distributions of Melbourne's criteria for environmental wind conditions for daylight hours, for a turbulence intensity of 30%. $\sigma_u = 0.30\overline{u}$, $\hat{u} = 2.0\overline{u}$.

providing a very important link to give information about the maximum wind speeds likely to occur on average for various periods, such as once per year, once per month, etc., this also provides the necessary link to enable the various environmental wind speed criteria to be compared.

One other complication arises in respect of the number of storms per annum which are relevant to the assessment of environmental wind conditions for human comfort. It is obviously conservative to include winds which blow for all hours of the year, day and night, when most areas under consideration will only be occupied for half of the time or less. Although it does not make

TABLE 1

Relationship between probability of exceeding a mean wind speed and the average number of storms per annum during which that mean wind speed is exceeded

Number of storms per annum during which $\overline{u}$ is exceeded ($N_{\overline{u}}$)	Probability of exceeding an hourly mean wind speed $\overline{u}$ ($P_{(>\overline{u})}$)	
	All hours	Daylight hours
1, once per annum on average	0.00025—0.0005	0.0005—0.001
12, once per month on average	0.003—0.006	0.006—0.012
52, once per week on average	0.015—0.03	0.03—0.06

a great deal of difference, the author prefers to relate criteria and assessment to approximately half the total time, by relating the probability of exceedence to half the yearly cycling rate (i.e. 250—500 independent events per annum) and calling this procedure an assessment of environmental wind conditions relating to "daylight hours"; these ranges are also given in Table 1. Strictly speaking, the cycling rate and evaluation of the wind speed probability distributions should be related to the relevant occupancy times (i.e. daylight hours, afternoon hours, etc.), and in many parts of the world seasonal distributions are also significant. However, for the purposes of this comparison of criteria the simplistic assumptions above described as relating to "daylight hours" will be used in this paper.

6. Comparison of various criteria

Since 1971 several forms of criteria for environmental wind conditions have been published. The criteria developed by Wise [11], Penwarden [12, 13] Davenport [8, 9], Lawson [14] and one by Hunt, Poulton and Mumford [3] are given in terms of mean wind speed at some stated or implied level of turbulence intensity between 15% and 20%. Comparison of these criteria can be made in Fig. 2 with Melbourne's criteria which have been plotted for a turbulence intensity of 15%, i.e. for $\sigma_u/\overline{u} = 0.15$ and from eqn. (1) $\overline{u} = \hat{u}/1.5$.

Wise [11], in 1971, commented in relation to the Beaufort scale "that wind speeds much above about 5 m/s are likely to give unpleasant disturbance to clothing and hair" and "making reasonable assumptions about metabolic rate, and the thermal resistance of body layers and clothing, speeds of some 5 m/s appeared tolerable at 10° C in normal winter clothing". Penwarden [12] in 1973 and again in collaboration with Wise [13] in 1975 prepared a summary of wind effects on people based on a modified version of the Beaufort Scale from which the following three points can be extracted

discomfort begins $\overline{u}$ = 5 m/s
unpleasant $\overline{u}$ = 8—10 m/s
dangerous $\overline{u}$ = 15—20 m/s.

Penwarden and Wise [13] quoted a criterion which they had used at the Building Research Station, that conditions were regarded as acceptable, or no remedial action was required, if $\overline{u} < 5$ m/s for 80% or more of the time and vice versa, that remedial action would be taken if $\overline{u} > 5$ m/s for more than 20% of the time. In probability terms this criterion is interpreted as being acceptable if $P_{(\overline{u} > 5)} \leqslant 0.2$.

Davenport [8, 9] in 1972 amalgamated work by Wise, Melbourne and Joubert and suggested criteria for a range of activities; these were related to a Beaufort scale for open-country mean wind speeds at 10 m. These criteria also noted that the relative comfort level might be expected to be reduced by one Beaufort number for every 20° C reduction in temperature. In particular Davenport nominated the following hourly mean wind speeds (converted to 2 m) conditions as being tolerable if not exceeded more than once per week, which in probability terms are interpreted as being acceptable for

walking fast if $P_{(\overline{u} > 10)} \leqslant 0.05$
strolling, skating if $P_{(\overline{u} > 7\frac{1}{2})} \leqslant 0.05$
standing, sitting, short exposure if $P_{(\overline{u} > 5\frac{1}{2})} \leqslant 0.05$
standing, sitting, long exposure if $P_{(\overline{u} > 3\frac{1}{2})} \leqslant 0.05$

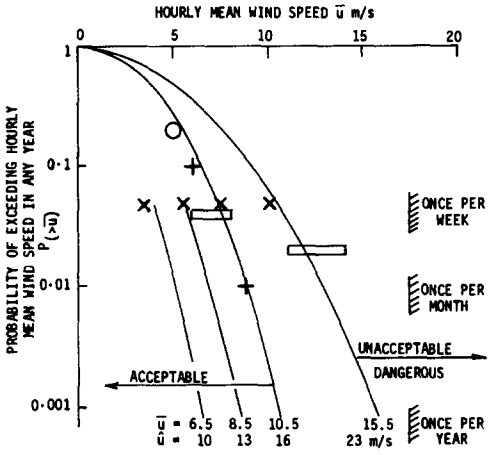
Lawson [14] in 1973 used the same Beaufort scale as Penwarden and developed a figure to take into account the effects of turbulence. A value of $\hat{u} = 1.7\,\overline{u}$ was used, which from eq. (1) implies a turbulence intensity of about 20%. Lawson quotes Beaufort 4 wind speeds (6—8 m/s) as being tolerable if not exceeded for more than 4% of the time; and Beaufort 6 wind speeds (11—14 m/s) as being unacceptable if exceeded for more than 2% of the time. In probability terms these criteria are interpreted as being

acceptable if $P_{(\overline{u} > 6-8)} \leqslant 0.04$
unacceptable if $P_{(\overline{u} > 11-14)} \geqslant 0.02$

Hunt, Poulten and Mumford [3] in 1976 described a range of wind-tunnel tests which were conducted to show how wind affects people's abilities to perform simple tasks, including a simulation of turbulence. Two criteria were developed, firstly that if wind conditions are to be tolerable and for most kinds of performance to be unaffected

$\overline{u} < 9/(1 + 3 \text{ turbulence intensity})$

for turbulence intensity of 15% this becomes $\overline{u} < 6.2$ m/s, and secondly, for safe and sure walking that there must be a low probability (say 1%) of a gust lasting over a few paces (say 5—10 m) exceeding 13 m/s. For a turbulence intensity of 15% the 13 m/s gust becomes a mean wind speed of 13/1.5 = 8.7 m/s. (Hunt used a conversion from Durst to give 9 m/s.) In probability terms



CRITERIA		SYMBOL
MELBOURNE AS NOTED ON LINES IN GRAPH		
PENWARDEN AND WISE		
ACCEPTABLE	IF $P_{(\bar{u} > 5)} \leq 0.2$	○
DAVENPORT		
ACCEPTABLE FOR WALKING FAST	IF $P_{(\bar{u} > 10)} \leq 0.05$	×
STROLLING	IF $P_{(\bar{u} > 7½)} \leq 0.05$	×
STANDING, SITTING SHORT EXPOSURE	IF $P_{(\bar{u} > 5½)} \leq 0.05$	×
STANDING, SITTING LONG EXPOSURE	IF $P_{(\bar{u} > 3½)} \leq 0.05$	×
LAWSON		
ACCEPTABLE	IF $P_{(\bar{u} > 6 \text{ to } 8)} \leq 0.04$	▭
UNACCEPTABLE	IF $P_{(\bar{u} > 11 \text{ to } 14)} \geq 0.02$	▭
HUNT, POULTON & MUMFORD		
ACCEPTABLE FOR STROLLING	IF $P_{(\bar{u} > 6)} \leq 0.1$	+
ACCEPTABLE FOR WALKING	IF $P_{(\bar{u} > 9)} \leq 0.01$	+

Fig. 2. Comparison of various criteria for environmental wind conditions for daylight hours for a turbulence intensity of 15%. $\sigma_u = 0.15\bar{u}$, $\hat{u} = 1.5\bar{u}$.

for 15% turbulence intensity, this is interpreted as being

acceptable for strolling if $P_{(\bar{u} > 6)} \leqslant 0.1$
acceptable for walking if $P_{(\bar{u} > 9)} \leqslant 0.01$

These criteria in probability terms have been compared in Fig.2 with Melbourne's criteria plotted for a turbulence intensity of 15%.

7. Conclusions

It remains to conclude that the degree of agreement between the criteria when presented in probabilistic terms is quite remarkable for a phenomenon which relies almost completely on subjective assessment. This is particularly so for the earlier attempts by Wise, Melbourne and Penwarden where the criteria were developed entirely independently and in quite different ways. The agreement of the later published criteria, whilst supportive, is not quite so remarkable as there has been a certain amount of influence from the earlier attempts. It seems reasonable to conclude that assessments based on any of these criteria could be said to be made with some consensus of international opinion. However, assessment of the viability of any area in terms of wind environment still relies heavily on the assessment of the use to which the area is to be put and the cost-effectiveness of providing protection from the wind.

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Paper 9

WIND ENVIRONMENT STUDIES IN AUSTRALIA

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Summary

The assessment of prospective environmental wind conditions about proposed building developments in Australia has been discussed. Assessment techniques, making use of wind tunnel studies, have been illustrated with examples from a study of two possible building configurations for a very exposed site on the north side of the City of Melbourne.

A method of predicting the probability of occurrence of a given wind speed at a particular location has been detailed, and examples have been given of the integration of model measurements of local velocities with the wind speed probability distribution for the geographic area. The comparisons of these probabilistic estimates with environmental wind speed criteria have been discussed and illustrated.

A method of measuring peak gust wind speeds at model scale in situations of high turbulence intensity has been given and a comparison is given with a full scale situation.

1. Introduction

An assessment of prospective environmental wind conditions is now carried out for virtually all major building developments in Australia; for several of the major cities it is a mandatory requirement of the licensing authority. Some of the proposed developments become the subject of wind tunnel studies because of their size and particular exposure to strong wind directions, or when the architect wants an evaluation of several possible schemes, or where the development of a particularly well protected recreational area or shopping precinct is required. Because of a steady build-up of experience in architects' offices of how to design to avoid undesirable environmental wind conditions, there has been a significant reduction in the number of wind tunnel studies required and most are now occasioned by an architect or client wanting to create configurations with better than average environmental wind conditions.

Feedback from developments which have been the subject of wind tunnel tests, and some full scale studies, have permitted the development of the criteria discussed by Melbourne [1]. Much of the techniques used in conducting these wind tunnel tests in Australia by Melbourne at Monash University and Vickery at the University of Sydney have been reported in the text Architectural Aerodynamics [2]. This text concentrated more on examples for archi-

tects, in particular how environmental wind problems are caused and how they can be avoided. Hence it would seem to be more appropriate in this paper to discuss the probabilistic techniques used in Australia to assess prospective environmental wind conditions about a proposed development from wind tunnel tests. To illustrate these techniques, examples will be drawn from an investigation carried out at Monash University on the relative merits of two possible configurations for a very exposed site on the north side of the City of Melbourne, one proposal was made up of rectangular building towers and the alternative proposal was based on towers with a circular planform.

2. Wind tunnel techniques

As discussed in both Refs. [1] and [2], it is the wind pressures caused by peak gust wind speeds and associated gradients which people feel most. Although it is possible to have unpleasant areas with low mean wind speeds and high turbulence intensities, the evidence to date does seem to indicate that in areas likely to have unacceptably high wind conditions, such as near corners, in narrow alleys and in arcades, the turbulence intensities are relatively low (20 to 30%) and that in these areas it is reasonable to assume that the peak gust wind speeds will be about twice the mean wind speed. In many cases these problems can be assessed adequately through measurements of local mean wind speeds referenced to a probability distribution of wind speeds for the area. Measurements of mean wind speeds can be simply made with either small pitot static tubes or hot wire anemometers. The exception can occur when assessment is required of an area, such as a recreational plaza for long exposure, which is surrounded by buildings. The turbulence intensity in these situations can be high and the criteria for comfort very strict and in these cases it is necessary to measure peak gust wind speed with a hot wire anemometer.

The measurement of mean velocity pressures with a pitot static tube and the measurement of mean wind speeds with a hot wire both have advantages and disadvantages. The hot wire technique has problems in that the measurement of mean and standard deviation in turbulence intensities above 20% become increasingly suspect and eventually meaningless. However, if only peak gust wind speeds without local directional information are required, then the hot wire technique is relatively satisfactory. The peak gust wind speeds can be obtained from an on line probability analysis of the signal from the hot wire equipment. If the equivalent to a 2 to 3 second gust, as measured by a cup or Dines anemometer in full scale is required, the signal must be appropriately filtered and the velocity with a probability of exceedance of about 2×10^{-4} (i.e. 3.5 standard deviations above the mean for a normally distributed process) taken as the equivalent gust wind speed.

For the majority of wind tunnel investigations the author prefers to use the technique of measuring mean velocity pressures with pitot static tubes as shown diagramatically in Fig.1. The mean velocity pressure can be simply

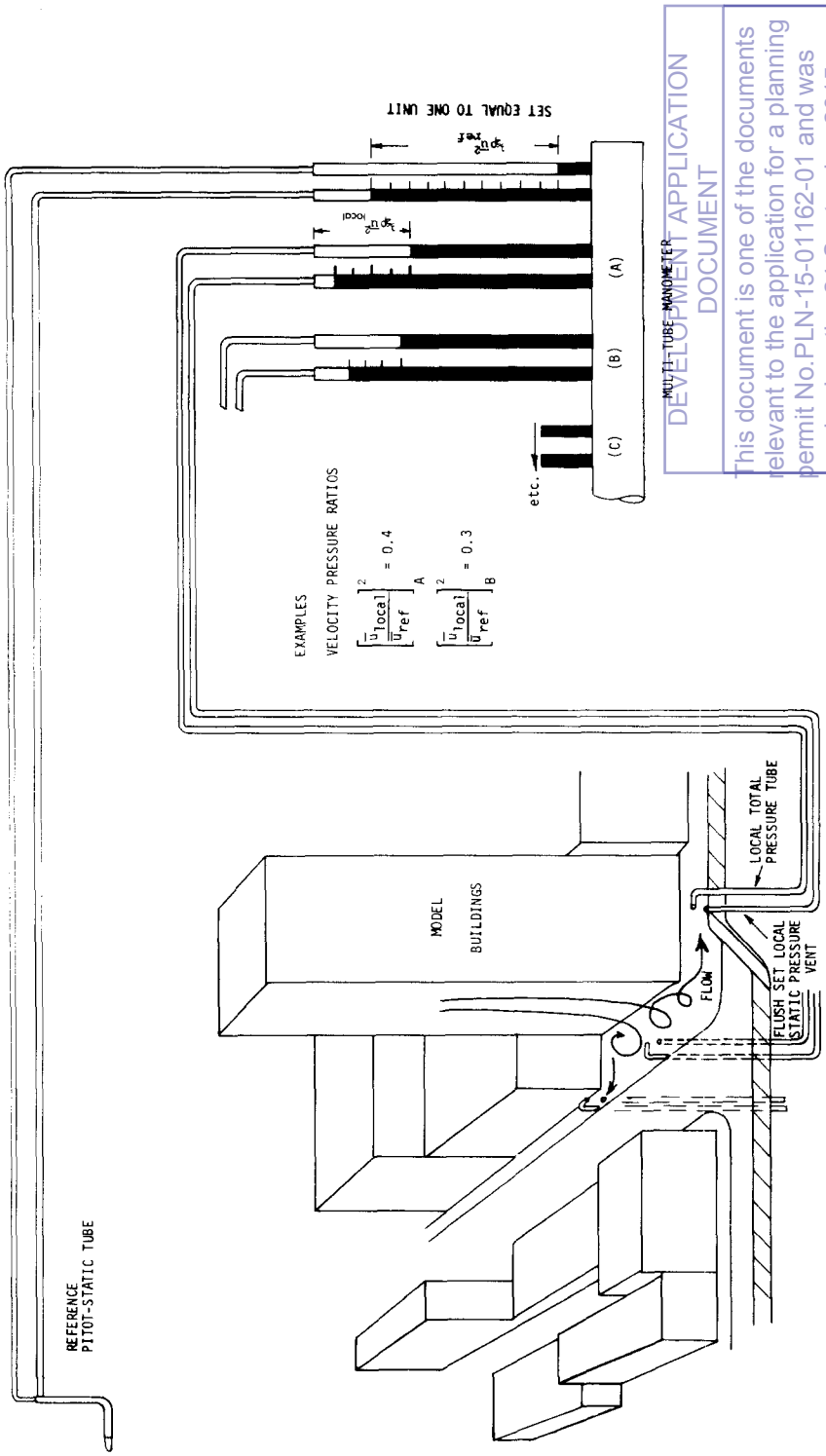

Fig. 1. Experimental arrangement for measuring mean velocity pressure ratios.

measured by using a length of small diameter tubing bent in the horizontal plane to measure total pressure in conjunction with a surface static vent. The mean velocity pressures at a number of stations can be measured at the same time by displaying the velocity pressure on a multitube manometer. The disadvantage of this technique is that the total pressure tubes have to be aligned to face directly into wind to get the maximum reading (which does have the benefit of indicating the local wind direction), and peak gust wind speed readings cannot be satisfactorily obtained even if a pressure transducer is used. It is more satisfactory to use a hot wire anemometer to measure peak gust wind speed.

Both techniques require that measured local velocity pressures or wind speeds be referred as a ratio to some reference velocity pressure or wind speed, such as at or near gradient height, which can in turn be related to a full probability distribution of wind speeds for the area. These techniques and probabilistic analysis will be illustrated in the following example.

3. Assessment of prospective environmental wind conditions

The assessment of prospective environmental wind conditions about a proposed development in Australia goes through a series of stages of which the following are typical:

(i) The client and architect discuss broad principles with a number of specialist consultants, one of whom is the wind enginner or aerodynamicist.

(ii) Several configurations or themes on one configuration are developed for the assessment of environmental wind conditions.

(iii) A probability distribution of wind speeds with direction, relative to the site, is compiled.

(iv) Wind tunnel tests are made on the various configurations and modifications developed at the time the models are in the wind tunnel.

(v) The wind tunnel data are integrated with the wind speed data to facilitate a final assessment of the environmental wind conditions.

In practice, the integration of the wind tunnel and wind speed data is done continuously throughout the wind tunnel test programme, to facilitate continuous assessment and decisions by the client and architect to dictate the direction of the test programme. The author will only conduct wind tunnel tests of this type when senior client and architect representation at the wind tunnel can be guaranteed. There are some very simple ways in which the wind tunnel data can be assessed with respect to the wind speed data and these will be illustrated in the following example.

3.1 Example of wind tunnel testing and initial assessment procedure

The example chosen is that of a major development proposal to be located on the northern edge of the Central Business District of the City of Melbourne. The architects were particularly aware of the fact that such a development would be exposed to the wind directions from which come the strongest and

most frequent winds. Similarly, they were aware that there was little likelihood of any significant shielding being developed for these directions in the foreseeable future. Accordingly, they developed two proposals for assessment of environmental wind conditions. The first was based on three rectangular tower buildings with extensive canopy arrangements near ground level and the second was based on three circular towers of similar size and arrangement with the ground level area left completely open. Photographs of these two models are shown in Fig. 2.

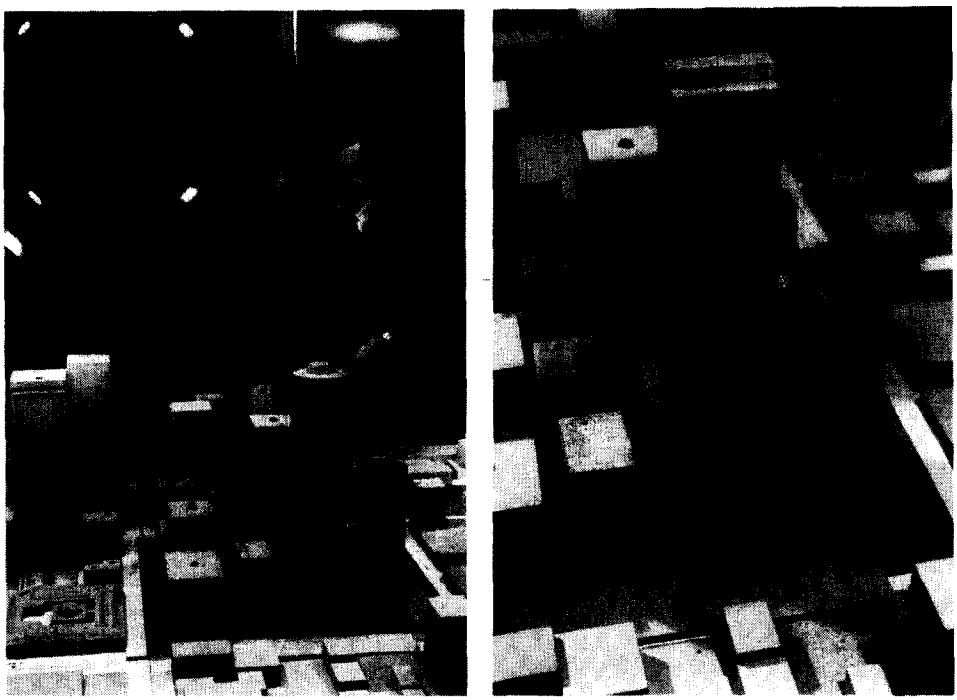

Fig. 2. 1/400 scale models of a development proposed for the City of Melbourne.

Before the commencement of the wind tunnel test, it is necessary to prepare a probability distribution of wind speeds. An example of such a distribution is given in the first part of Table 1 in the form of the raw data as were obtained from records of measurements made with a Dines anemometer located at a height of 10 m at Essendon Airport some 10 km north of the City of Melbourne. The cumulative probability distribution for each of the 16 wind directions (θ) can be fitted to a Weibull distribution, which takes the form,

$$P_{(>\overline{u})\theta} = A_\theta \exp -(\overline{u}/c_\theta)^{k_\theta} \quad (1)$$

which then can be presented in a polar plot with lines of constant probability

TABLE 1

Probability distribution of hourly mean wind speeds measured at 10 m height in open country terrain at Essendon Airport, Melbourne, Australia, 1959—71 for daylight hours 0730 to 1930, and environmental wind criteria per 22½° sector

	Band of wind speeds, $\bar{u}$ (m/s)					
$\bar{u}$ at 10 m over open country terrain	0.5 to 2.1	2.1 to 3.6	3.6 to 5.65	5.65 to 8.75	8.75 to 11.3	11.3 to 14.4
$\bar{u}$ at 300 m over suburban terrain *	0.8 to 3.2	3.2 to 5.5	5.5 to 8.6	8.6 to 13.4	13.4 to 17.3	17.3 to 22.0
Wind direction	Probability of being in band × 10^6					
N	11973	15323	37400	64368	31085	15543
NNE	3900	4340	8238	12468	4943	2800
NE	6535	3185	2855	1538	440	110
ENE	5218	1813	660	165	55	
E	7800	2800	1098	330		
ESE	4340	2690	2088	1318	330	
SE	9008	7745	9720	7635	1593	440
SSE	8733	11698	16423	12138	933	165
S	18948	32898	64753	68543	9063	933
SSW	9338	10490	18180	17630	3680	1043
SW	11080	12633	20485	18508	6205	2418
WSW	5823	6700	11588	14280	5548	2965
W	9555	11040	7963	21968	7690	2528
WNW	4558	5273	7963	7360	1703	715
NW	6480	7853	10215	12578	7223	1868
NNW	5878	8073	12633	17025	7280	2418
Calm	88788					
Total	1000000					

*$\bar{u}_{300,\ \text{suburban}} = \bar{u}_{10,\ \text{open country}} \left[\frac{400}{10}\right]^{0.15} \left[\frac{300}{500}\right]^{0.25} = 1.53\ \bar{u}_{10,\ \text{open country}}$.

**For a lower turbulence intensity of $\sigma_u = 0.15\bar{u}$, $\hat{u} = 1.5\bar{u}$, the numerical criteria become Unacceptable/dangerous, annual maximum $\bar{u} > 15.5$; Acceptable/walking, annual maximum $\bar{u} < 10.5$.

14.4 to 17.5	17.5 to 21.1	22.0 to 26.7	26.7 to 32.3	Average annual hourly maximum wind speed at 300 m for each sector from line with $P_{(>\bar{u})} = 0.001$ in Fig. 3	Environmental wind criteria based on Melbourne's criteria for $\sigma_u = 0.3\bar{u}$, $\hat{u} = 2.0\bar{u}$**			
					Unacceptable/ dangerous annual maximum $\bar{u} > 11.5$ m/s		Acceptable for walking annual maximum $\bar{u} < 8.0$ m/s	
					For $\bar{u}_{local} = 11.5$ $\frac{\bar{u}_{local}}{\bar{u}_{300}}$	$\left[\frac{\bar{u}_{local}}{\bar{u}_{300}}\right]^2$	For $\bar{u}_{local} = 8.0$ $\frac{\bar{u}_{local}}{\bar{u}_{300}}$	$\left[\frac{\bar{u}_{local}}{\bar{u}_{300}}\right]^2$
2910	275			24	0.48	0.23	0.33	0.11
330				20	0.58	0.33	0.40	0.16
				12	0.96	0.91	0.67	0.44
				6	1.9	3.7	1.3	1.8
				6	1.9	3.7	1.3	1.8
				10	1.2	1.3	0.8	0.64
				14	0.82	0.67	0.57	0.33
				14	0.82	0.67	0.57	0.33
55				18	0.64	0.41	0.44	0.20
110				17	0.68	0.46	0.47	0.22
165				19	0.61	0.37	0.42	0.18
605	55			20	0.58	0.33	0.40	0.16
440				20	0.58	0.33	0.40	0.16
165				18	0.64	0.41	0.44	0.20
165	55			19	0.61	0.37	0.42	0.18
330				20	0.58	0.33	0.40	0.16

level as shown in Fig. 3. In this particular plot the mean hourly wind speed has been factored to refer to a height of 300 m over suburban terrain by the relationship,

$$\bar{u}_{300,\,\text{suburban}} = \bar{u}_{10,\,\text{open country}} \left[\frac{400}{10}\right]^{0.15} \left[\frac{300}{500}\right]^{0.25}$$

$$= 1.53\,\bar{u}_{10,\,\text{open country}} \qquad (2)$$

In the wind tunnel model tests, the local velocity pressures, or local wind

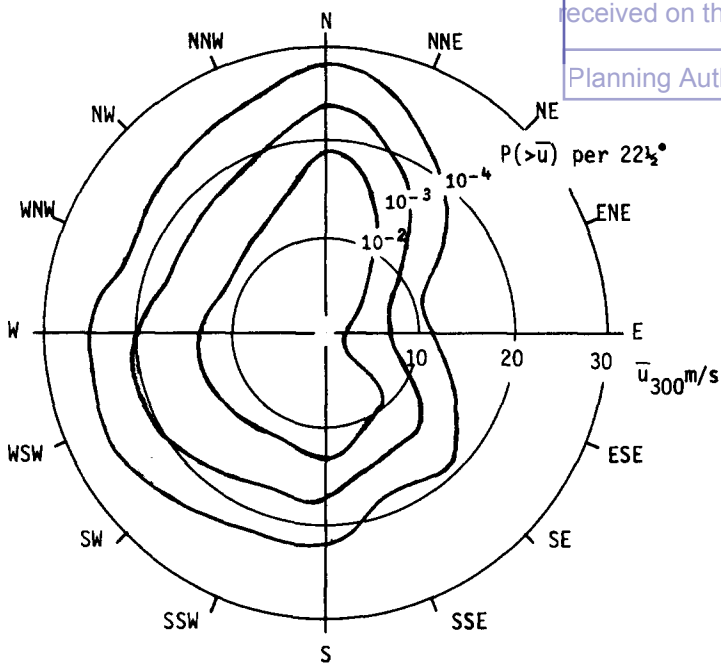

Fig. 3. Probability distribution of hourly mean wind speeds at 300 m over suburban roughness at Essendon Airport Melbourne for daylight hours 0730 to 1930.

speeds, will be measured as a ratio with the similar measurement at 300 m over the model suburban approaches. Hence, if the annual maximum hourly wind speeds at 300 m can be obtained for each wind direction sector, then Melbourne's criteria [1] can be expressed for each sector as a ratio against which any measurements can be directly compared at the time of measurement. The annual maximum hourly wind speed for each sector can be obtained using the probabilities given in [1] and in this case, where the distribution is for daylight hours, the average maximum hourly wind speed can be approximated by reading around the contour with a probability $P_{(>\overline{u})} = 10^{-3}$ in Fig.3 as tabulated in Table 1. With this information the criteria, in ratio form, can be calculated as shown in the last part of Table 1 for the most general case of the peak gust wind speed equal to twice the hourly mean wind speed ($\hat{u} = 2\overline{u}$) for two levels as defined in [1] as being

(a) unacceptable/dangerous if the annual maximum gust wind speed, $\hat{u} > 23$ m/s;

(b) acceptable/for walking if the annual maximum gust wind speed, $\hat{u} < 16$ m/s.

The curves of these two criteria can then be plotted as background information on the data sheets on which the wind tunnel measurements are directly recorded as shown in Fig.4. Obviously this information forms the background for any test series and once it has been obtained for an area, it serves for tests

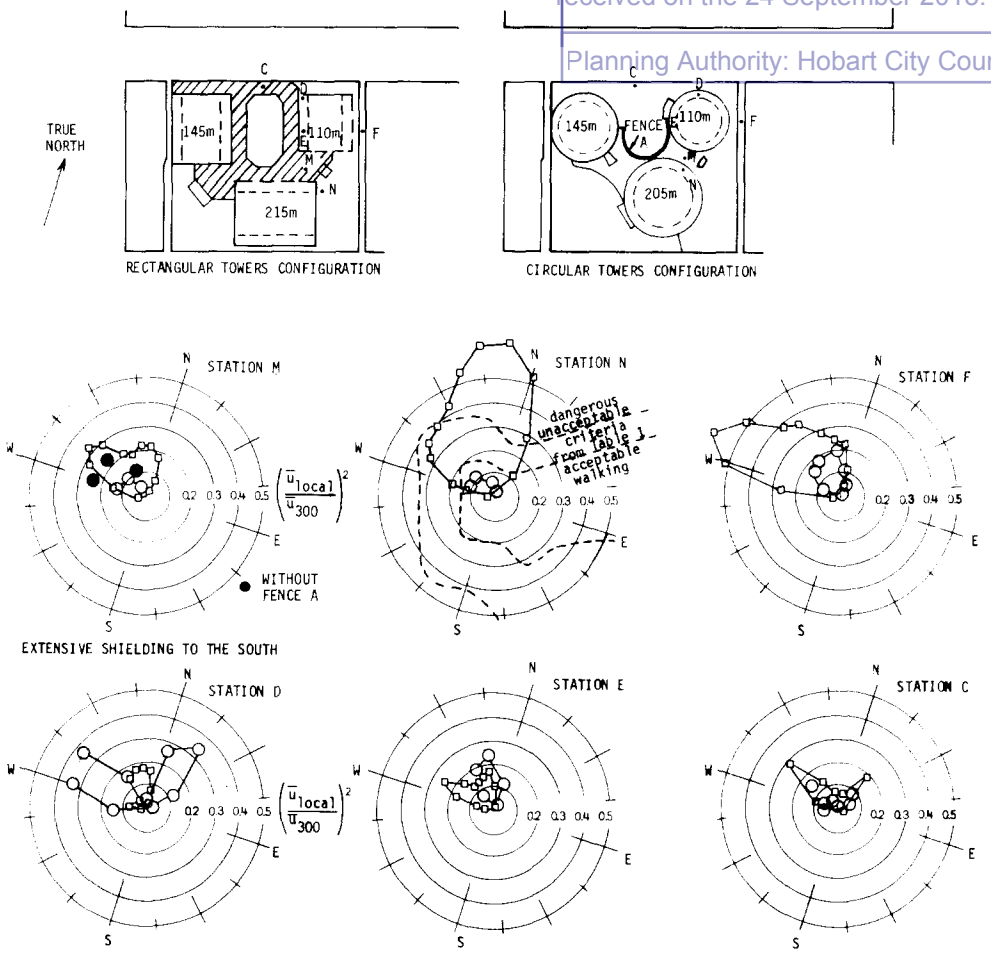

Fig. 4. Mean velocity pressure ratios from wind tunnel model tests.

on all projects in that area. In this particular case, some small modification has to be made to reduce the effect of topographical funnelling which peaks the distribution for northerly wind directions at Essendon Airport, but the effect of which reduces further south over the downtown area of the City of Melbourne and southern suburbs.

Examples of polar plots of velocity pressure ratio as a function of wind direction are given in Fig. 4, for 6 of about 30 stations, at which measurements were made to facilitate the assessment of environmental wind conditions for these two configurations. At Stations M, N and F, the very adverse effects of the rectangular buildings inducing flow down to ground level is shown to result in quite unacceptably high velocity pressure ratios (for this geographic region) in critical points of public access. These adverse effects can be offset to some extent by the use of local wind break fences or overcome completely by pro-

viding air locked connections under the canopy between the main towers at ground level. The circular tower configuration is shown to induce much less wind flow at ground level and to provide conditions within the "acceptable criterion" at Stations M and N. However, in the absence of surrounding buildings over 30 m height to the north and west, there is still a need for the local protection provided by the 50% porous Fence A shown in Fig.1 and 4. Similarly, wind conditions at Stations D, E and C, for the completely open circular tower configuration, are shown to border on unacceptable levels (and certainly are well in excess of acceptable levels). These very local conditions can be ameliorated with the use of porous wind breaks (planter boxes of shrubs and trees) or by the planned layout of architectural features and main access-ways which keep pedestrian traffic away from local regions where high wind speeds are likely to occur.

In concluding this example of how, during wind tunnel testing, a very quick assessment can be made of prospective environmental wind conditions for various configurations, a word of caution must be made in respect of interpreting the measurements.

First of all, the criteria shown in Fig.4 are for each 22½ degree sector; that is if the velocity pressure ratio (or wind speed ratio, whichever approach is being used) reaches, for example, the criterion for unacceptable/dangerous conditions for one sector, it means that once per annum, on average, the peak gust wind speed of 23 m/s will be exceeded. If the criterion is reached for two sectors, it means the probability of exceeding the criterion will double and so on. To make a proper assessment of the probability of exceeding certain wind speeds for all wind directions, a full analysis for all wind directions must be compiled, as shown in Section 3.2.

Secondly, an assessment has to be made by the experimenter as to when the local turbulence intensity reaches a level which invalidates the use of mean velocity pressures or mean wind speeds, whichever technique is being used. If this stage is reached, the simple technique of relying on mean measurements has to be abandoned and the more sophisticated technique of measuring peak gust wind speeds has to be used. A further word of warning here is that it is not sufficient to rely on mean and standard deviation readings from a hot wire anemometer to indicate when a turbulence level of say 25% is reached, because the errors inherent in the hot wire tend to increase the mean and reduce the standard deviation, hence lulling the unwary into thinking that the turbulence intensity is not all that high. A much safer way to determine whether high turbulence, low mean velocity conditions are present, is to observe the signal on a cathode ray oscilloscope and run out a probability distribution to check on the peak values. One consolation, in a sense, of relying on mean wind speeds measured with a hot wire anemometer to higher turbulence intensities is that the mean wind speeds measured are high, and in most cases excessively conservative decisions are more likely to be made on the basis of this incorrect information. An example of the measurement of peak gust wind speeds will be given in Section 3.3.

3.2 Probability distributions of wind speed for all wind directions

In the majority of situations, high wind speeds induced at a particular station are confined to a relatively narrow band of wind directions and an assessment can be made on the basis of criteria for a given sector as described in Section 3.1. For situations where either a more accurate assessment is required (perhaps for a marginal situation), or high wind speeds occur for a broad range of wind directions, it becomes necessary to prepare a full probability distribution of wind speeds which accounts for all, or all the significant, wind directions. Such a distribution can be prepared as follows:

(a) From a distribution such as given in Table 1, a cumulative probability distribution of wind speeds at the reference point (in this case 300 m over suburban terrain) can be prepared which expresses the probability of exceeding a given wind speed for a given wind direction sector, $P_{(>\overline{u})\theta,\text{ reference}}$. One convenient method of doing this is to use the Weibull distribution noted previously.

(b) For each station an average value of the wind speed ratio, $\overline{u}_{\text{local}}/\overline{u}_{\text{ref.}}$ can be obtained from the model tests for each wind direction sector. Using this wind speed ratio, the cumulative probability distribution can be prepared expressing the probability of exceeding a given wind speed for a given wind direction sector at the local station, $P_{(>\overline{u})\theta,\text{ local}}$.

(c) The value of $P_{(>\overline{u})\theta,\text{local}}$ must be obtained for all or all significant wind directions and integrated to give the total probability of exceeding a given mean wind speed for all directions, i.e.

$$P_{(>\overline{u})\text{ all directions, local}} = \int_0^{360} P_{(>\overline{u})\theta,\text{local}}\, d\theta \qquad (4)$$

(d) The whole process can be done conveniently with a digital computer, but it is not a particularly long task to do it manually for a few stations, simply because if the relatively coarse 22½° sectors are used, it is very unusual in practice to have to do the integration of more than three or four sectors. An example of the final stages of this process is given in Table 2 for Station M of the previous example.

(e) Finally, a graph of the probability of exceeding a given wind speed can be superimposed on criteria expressed in the same probabilistic form such as given in [1] and an example of which is given in Fig.5, for several of the stations from the previous example. Whilst such a presentation confirms just how unacceptable conditions would be at Stations M and N for the Rectangular Towers proposal, it is more useful in quantitatively indicating how acceptable the conditions at Station C are likely to be, which can only be very generally assessed from observing the information in Fig.4.

3.3. Measurement of peak gust wind speeds

If, as described in Section 3.1, it is deemed necessary to make an assessment of an area subjected to wind flows with high turbulence intensities, a

TABLE 2

Example of last part of the development of the probability distribution of mean wind speeds at Station M, Rectangular Towers Configuration (Fig.4)

Wind direction	$\overline{u}_{local}$ (m/s)	4	6	8	10	12
	$\frac{\overline{u}}{\overline{u}_{300}}$ frim Fig.4	Probability of being greater than $\overline{u}$ for 22½° sectors of wind direction $P_{(>\overline{u})\theta} \times 10^6$				
N	0.42	80,000	45,000	11,000	1,300	100
NNW	0.47	20,000	12,000	3,000	500	50
NW	0.47	20,000	12,000	3,000	500	50
WNW	0.57	13,000	6,000	2,000	600	150
W	0.40	18,000	7,000	1,000	50	
All other wind directions	< 0.2	Not significant				
Total $P_{(>\overline{u})}$ *		0.15	0.082	0.020	0.0029	0.00035

*These values are plotted in Fig.5.

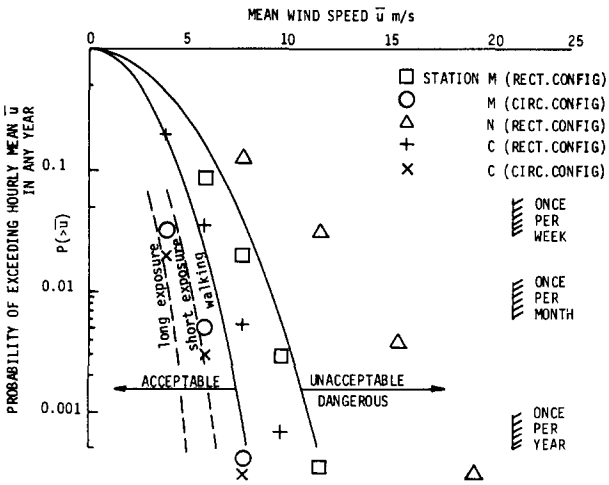

Fig.5. Probability distributions of mean wind speeds at several stations compared with Melbourne's criteria for environmental wind conditions (Daylight hours, $\sigma_u = 0.3\overline{u}$, $\hat{u} = 2\overline{u}$).

measurement of the peak gust wind speeds can be made using a hot wire anemometer as follows:

(a) If it is required to compare model scale peak wind speed measurements with criteria [1] based on peak gusts measured over two to three seconds in

full scale, it is first necessary to low-pass filter the hot wire anemometer linearised output, so that it looks like the scaled down version of the output from a typical cup or Dines anemometer.

(b) The next step in the process is to obtain a probability distribution of the filtered hot wire anemometer signal; this can be conveniently obtained using on-line digital analysis techniques.

(c) It is then necessary to determine the probability level equivalent to 2—3 second peak gust in full scale. Many observers of wind data collected from cup or Dines anemometers in open country situations have observed that the peak gust wind speeds are between 1.5 and 1.8 times the mean, and from a knowledge of the turbulence intensities in these situations, it is possible to deduce that the 2—3 second mean wind gust wind speed is approximately 3.5 standard deviations above the mean, i.e.

$$\hat{u}_{2-3\,\text{sec}} = \overline{u} + 3.5\,\sigma_u \qquad (4)$$

For a normally distributed process, the probability of exceeding 3.5 standard deviations above the mean is 2.3×10^{-4}. It is suggested that the value of the velocity with a probability of exceedance of 2.3×10^{-4} is an appropriate approximation to use as being equivalent to a 2—3 second mean maximum gust wind speed.

(d) The gust wind speed so obtained can then be expressed as a ratio with the reference mean wind speed and compared with the environmental wind criteria as previously outlined.

The measurement of peak gust wind speeds can be illustrated by the following comparison of a full scale measurement at a city corner, at an intersection near, but not directly adjacent, to tall buildings, and a model measurement for the same situation. The model measurements were made using a hot wire anemometer and the procedure as outlined above.

		Full scale	Model scale
local peak gust wind speed / local mean wind speed,	$\frac{\hat{u}}{\overline{u}}$	4.1	1.8
local mean wind speed / reference mean wind speed,	$\frac{\overline{u}}{\overline{u}_{300}}$	0.21	0.50
local peak gust wind speed / reference mean wind speed,	$\frac{\hat{u}}{\overline{u}_{300}}$	0.8	0.9

It can be seen that the model measurement of the mean wind speed is a very significant overestimate and on its own would be quite misleading. The reason is apparent when one observes that the ratio of local peak to mean wind speed is over four, indicating very high turbulence, and which the hot wire anemometer records at less than two. However, when only the peak gust wind speed is used from a hot wire anemometer in this situation, the comparison between peak and reference mean wind speed ratios compares relatively well.

4. Conclusions

The assessment of prospective environmental wind conditions about a typical proposed building development in Australia has been discussed. Measurement techniques have been described and illustrated with examples. In particular, examples of the probabilistic assessment of local wind speeds and comparison with environmental wind speed criteria have been given in detail. A method of measuring peak gust wind speeds in situations of high turbulence intensity has been given.

Acknowledgements

The author wishes to acknowledge the kind permission of Meldrum and Partners to include examples from studies on one of their projects. The author is indebted also to the Australian Bureau of Meteorology for the full scale wind data made available, not only for this report, but for countless studies of a similar kind in various Australian locations.

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Attachment 3

28-32 Elizabeth Street, Hobart

Statement of Archaeological Potential, Impact Assessment & Method Statement

Final Report prepared for Elizabeth Tasmania Pty Ltd

AT0190

6 August 2015

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EXECUTIVE SUMMARY

Introduction

This report presents the results of a desktop assessment of the historical archaeological potential of the property at 28-32 Elizabeth Street, Hobart. It has been prepared as part of the proposed redevelopment of the site by Elizabeth Tasmania Pty Ltd for a multi-storey hotel. The assessment and management of potential archaeological values is required by the *Hobart Interim Planning Scheme 2015* (*HIPS 2015*). This report has been prepared with regard to the application standards and definitions contained in the *HIPS 2015* and consists of three key components: a Statement of Archaeological Potential, an Archaeological Impact Assessment and an Archaeological Method Statement.

Site History

The property is located within Hobart's central business district and being in such a prime location, has been developed and redeveloped multiple times as part of the evolution of the city. Definitive evidence of European use and development began during the 1820s, and by the 1840s the property included substantial buildings used for commercial and mercantile purposes. Major redevelopments began during the early twentieth century, commencing with the construction of the Bank of New South Wales in 1912, followed in 1914 with the Palace Theatre, one of Hobart's early cinemas. At the time, both buildings were praised for their architectural merit. The buildings remained in place until the 1980s when they were demolished to make way for the current building, used by Westpac until 2014.

Archaeological Potential and Significance

Following an investigation of the site history, an analysis was made of the current site, and the sequential development and disturbance of the area was mapped. Preparatory ground works for the existing former bank building are highly likely to have removed or substantially affected all previous phases of development on the site. The likelihood of the place retaining substantial or meaningful archaeological evidence of earlier use and development is assessed as low.

Because of this low archaeological potential, the site is assessed as not having archaeological significance at either State or local levels. The site does have some historical interest and association with significant developments or individuals and for demonstrating the continued evolution of Hobart's central business district. However, these associations are considered to be of historical interest and not historical significance within formal assessment frameworks.

Archaeological Impact Assessment

Detailed information related to the proposed development is not currently available. However, sufficient information does exist to quantify the likely extent of ground works which will be required for the proposed hotel. Footings will generally be located approximately 2 m below the existing ground levels. Footings adjacent to existing buildings will need to be deeper, extending to depths of approximately 4 m. At this stage, it is anticipated that pad footings varying in size up to 3 x 3 m^2 and larger pads under stairs and lift cores will be required.

The extent of likely excavations required for this development will be substantial in both area and depth. They are likely to extend beyond the depths of excavation carried out for the c.1981 building. The footings within the interior of the building and its perimeter will require the area of new excavation to be significant. Excavations will also be required for lifts, stairs, pump room and a basement level on Elizabeth Street.

Despite the substantial nature of the proposed ground works, the likelihood of them impacting on archaeological features or deposits is assessed as being low. This conclusion is based on the low likelihood of significant archaeology having survived the construction of the c.1981 works. Some potential exists for the proposed hotel works to encounter archaeology associated with the 1912 and 1914 buildings along the Elizabeth Street frontage. However, such archaeology should it exist is likely to have already been highly compromised.

Archaeological Method Statement Recommendations

The disturbance history, assessment of archaeological potential, and the assessment of archaeological significance indicate that the place has been highly disturbed with a low potential of containing archaeological features or deposits, and as a result, does not have archaeological significance.

The following recommendations have been prepared in response to this assessment of low archaeological potential.

Recommendation 1: Statutory Compliance

This Statement of Archaeological Potential, Impact Assessment and Method Statement should form part of the Development Application to Hobart City Council for the proposed development.

Recommendation 2: Aboriginal Heritage

The Unanticipated Discovery Plan for managing Aboriginal heritage (Appendix 1) should form part of the project specifications.

Recommendation 3: Precautionary Approach to Excavations

For precautionary purposes, notification protocols should be included in the project specifications whereby archaeological advice is sought in the unlikely event that features or deposits of an archaeological nature[1] are uncovered during excavations as part of the proposed development or where doubt exists concerning the provenance of any strata revealed during excavations. In such instances, excavation should immediately cease pending attendance on site and receipt of advice from a qualified archaeologist, at which point, depending on the findings, it may also be necessary to involve Hobart City Council in discussions.

Recommendation 4: Managing Unanticipated Discoveries

Archaeological management will be required in the unlikely event that significant archaeological features or deposits are located during excavation works. Dependent on the nature and significance of the archaeological feature or deposit, consideration should be given as to whether the archaeological material can be conserved *in situ* as part of the development. Where this is not prudent and feasible, significant features or deposits should be archaeologically excavated, recorded and analysed in accordance with Parts 4 to 8 of the Tasmanian Heritage Council's Practice Note 2: *Managing Historical Archaeological Significance in the Works Application Process*. Archaeological management approaches should be endorsed by Hobart City Council.

Recommendation 5: Interpretation Opportunities

Consideration should be given to creative interpretation responses to present the history of the place as part of the proposed development.

[1] This may include but not be limited to the exposure of hand made clay bricks or sandstone blocks forming walls or surfaces, or artefacts such as fragments of ceramic, bottle glass, bone, shell or other items.

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1.0 INTRODUCTION

1.1 Client and project details

The Elizabeth Tasmania Pty Ltd proposes to construct a multi-storey hotel development at 28-32 Elizabeth Street, Hobart (Figure 1). The site currently contains the former Westpac Bank building, constructed during the 1980s.

Archaeological assessment and management of the site is required under the *Hobart Interim Planning Scheme 2015* (*HIPS 2015*). The *HIPS 2015* requires a desktop assessment analysis of the archaeological potential of a place prior to carrying out excavations.

This report consists of three key components:

1. A Statement of Archaeological Potential: which is an illustrated desktop investigation of the site's history, past disturbances and assesses its archaeological potential and significance;
2. An Archaeological Impact Assessment which describes the potential for impact to the archaeological sensitivity of the place from the proposed works; and
3. An Archaeological Method Statement which sets out, in practical terms the processes for archaeological management.

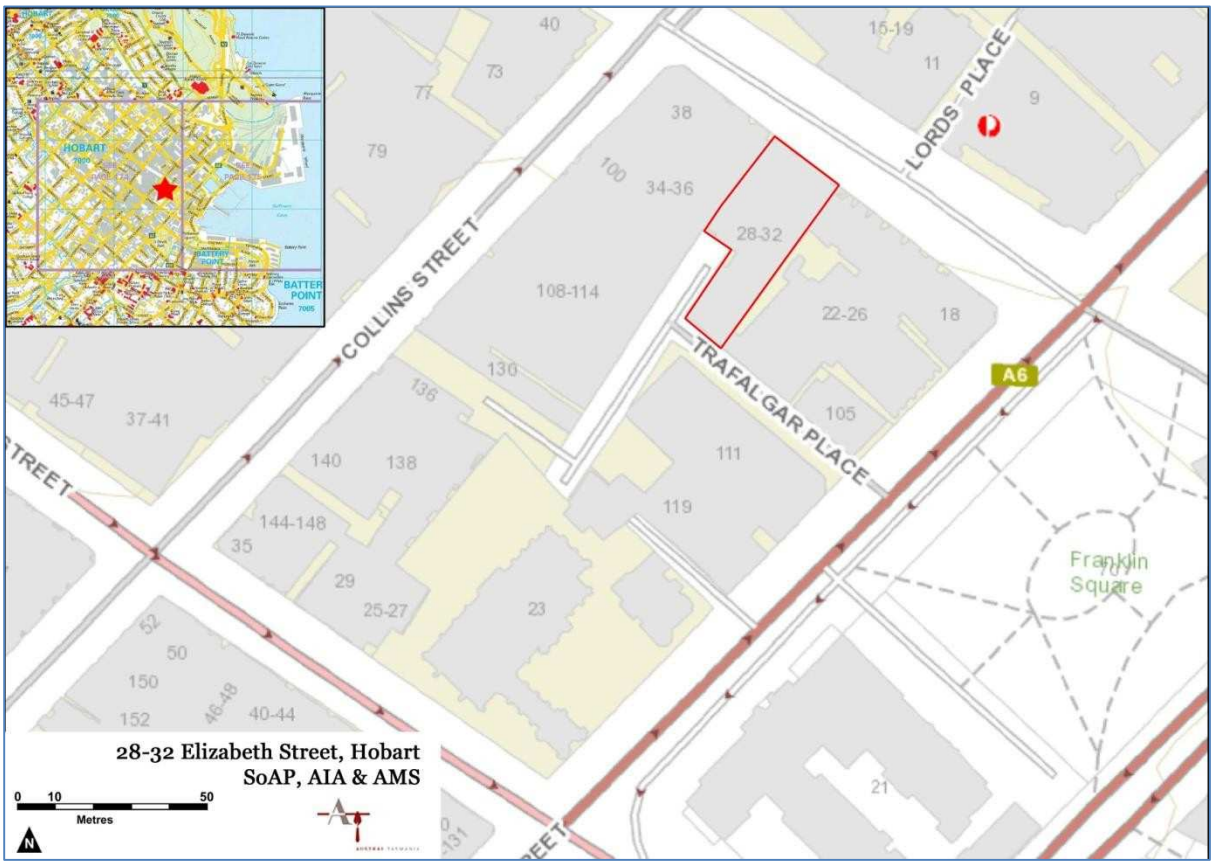

Figure 1: 28-32 Elizabeth Street, Hobart. Property boundaries shown in red (LIST Map, © State of Tasmania).

1.2 Authorship

This report was written by Justin McCarthy and James Puustinen.

1.3 Limitations and constraints

This assessment is limited to consideration of historical archaeological values within a scope defined by the *Hobart Interim Planning Scheme 2015*. The assessment of Aboriginal cultural values, built heritage and social values is beyond the scope of this study.

An Aboriginal heritage assessment has not been undertaken as part of this work, although preliminary enquiries were made to Aboriginal Heritage Tasmania (AHT), DPIPWE and the results incorporated into the recommendations made in this report.[2]

Detailed original research has been carried out for this project utilising both public and private collections. All sources cited in this report are included in the reference list.

The results and judgements contained in this report are constrained by the limitations inherent in overview type assessments, namely accessibility of historical information within a timely manner. Whilst every effort has been made to gain insight to the historic heritage profile of the subject study area, Austral Tasmania Pty Ltd cannot be held accountable for errors or omissions arising from such constraining factors.

All maps are oriented with North at the top of the page unless otherwise assigned.

1.4 Acknowledgements

The assistance of the following people and organisations is gratefully acknowledged:

- Ms Kris Ho, Elizabeth Tasmania Pty Ltd;
- Mr Neal Macintosh, JAWS Architects;
- Mr Richard Lawrence, Gandy and Roberts;
- Ms Kym Plischke, Heritage Tasmania, DPIPWE;
- Mr Samuel Dix, Aboriginal Heritage Tasmania, DPIPWE;
- Mr Graeme Harrington, Information and Land Services, DPIPWE;
- Ms Jo Huxley, Tasmanian Museum and Art Gallery;
- Ms Heather Excell, Library, University of Tasmania;
- Staff of the Tasmanian Archives and Heritage Office.

[2] Email, Samuel Dix (Aboriginal Heritage Tasmania) to James Puustinen (Austral Tasmania), 19 May 2015: AHTP2293 - Archaeological Potential, Impact & Method Statement - 28-32 Elizabeth Street, Hobart

2.0 REQUIREMENTS FOR HISTORICAL ARCHAEOLOGICAL MANAGEMENT

2.1 Desktop review of registered and listed heritage places

Both Commonwealth and State Acts of Parliament may have a bearing on the management of cultural heritage within or adjacent to the site. Key legislation is summarised below. The summary is intended as a guide only and should be confirmed with the administering agency and, where necessary, specialist legal opinion.

2.2 National Heritage Management Provisions

2.2.1 World/National/Commonwealth Heritage Lists

There is an established framework for the identification, protection and care of places of significance to the nation and/or Commonwealth. Entry in the National and/or Commonwealth Heritage Lists triggers statutory processes under the terms and provisions of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Actions which will or may have a significant impact upon the recognised values of a listed place are required to be referred to the Australian Government Minister for the Environment, after which a judgement will be made as to whether the proposed action will require formal assessment and approval. The Act also provides for consideration of actions that may occur outside of a listed place that may have significant impact upon national heritage values, or actions taken on Commonwealth land or by Commonwealth agencies that are likely to have a significant impact on the environment (anywhere). Listing occurs by nomination, which may be made by any one at any time. The Act also provides for emergency listing where National Heritage values are considered to be under threat.

As at June 2015, the property is not included or nominated to the World, National or Commonwealth Heritage Lists.

2.3 State Heritage Management

2.3.1 The *Historic Cultural Heritage Act 1995* and the Tasmanian Heritage Register

The *Historic Cultural Heritage Act 1995* (*HCHA 1995*) is the key piece of Tasmanian legislation for the identification, assessment and management of historic cultural heritage places.

The *HCHA 1995* establishes the Tasmanian Heritage Register (THR) as an inventory of places of State significance; to recognise the importance of these places to Tasmania; and to establish mechanisms for their protection. 'State historic cultural heritage significance' is not defined, however the amended Act allows for the production of Guidelines, which presumably will use the existing assessment guidelines for the purposes of defining State level significance.[3]

A place of historic cultural heritage significance may be entered in the THR where it meets one of eight criteria. The criteria recognise historical significance, rarity, research potential, important examples of certain types of places, creative and technical achievement, social significance, associations with important groups or people, and aesthetic importance.

Works to places included in the THR require approval, either through a Certificate of Exemption for works which will have no or negligible impact, or through a discretionary permit for those works which may impact on the significance of the place.

Discretionary permit applications are lodged with the relevant local planning authority. On receipt, the application is sent to the Heritage Council, which will firstly decide whether they have an interest in determining the application. If the Heritage Council has no interest in the matter, the local planning authority will determine the application.

If the Heritage Council has an interest in determining the application, a number of matters may be relevant to its decision. This includes the likely impact of the works on the significance of the place;

[3] *Assessing historic heritage significance for Application with the Historic Cultural Heritage Act 1995*

any representations; and any regulations and works guidelines issued under the *HCHA 1995*. The Heritage Council may also consult with the planning authority when making a decision.

In making a decision, the Heritage Council will exercise one of three options: consent to the discretionary permit being granted; consent to the discretionary permit being granted subject to certain conditions; or advise the planning authority that the discretionary permit should be refused.

The Heritage Council's decision is then forwarded to the planning authority, which will incorporate the decision into any planning permit.

As at June 2015, the property is not included or nominated to the THR.[4]

2.3.2 *Aboriginal Relics Act 1975*

The *Aboriginal Relics Act 1975* (*ARA 1975*) is the key Tasmanian Act providing for the preservation of Aboriginal 'relics'. The Act defines 'relic' to include:

(a) any artefact, painting, carving, engraving, arrangement of stones, midden, or other object made or created by any of the original inhabitants of Australia or the descendants of any such inhabitants;

(b) any object, site, or place that bears signs of the activities of any such original inhabitants or their descendants; or

(c) the remains of the body of such an original inhabitant or of a descendant of such an inhabitant who died before the year 1876 that are not interred in –

(i) any land that is or has been held, set aside, reserved, or used for the purposes of a burial-ground or cemetery pursuant to any Act, deed, or other instrument; or

(ii) a marked grave in any other land.[5]

All relics are protected under the provisions of the *ARA 1975*, including those found during works. Permits are required for a range of activities, including:

(a) destroy, damage, deface, conceal, or otherwise interfere with a relic;

(b) make a copy or replica of a carving or engraving that is a relic by rubbing, tracing, casting, or other means that involve direct contact with the carving or engraving;

(c) remove a relic from the place where it is found or abandoned;

(d) sell or offer or expose for sale, exchange, or otherwise dispose of a relic or any other object that so nearly resembles a relic as to be likely to deceive or be capable of being mistaken for a relic;

(e) take a relic, or cause or permit a relic to be taken, out of this State; or

(f) cause an excavation to be made or any other work to be carried out on Crown land for the purpose of searching for a relic.[6]

Preliminary consultation has taken place with Aboriginal Heritage Tasmania (AHT), DPIPWE, to determine if the property contains any previously recorded Aboriginal heritage sites, or if there is any potential for heritage sites to exist at the place. AHT has advised that there are no Aboriginal heritage sites recorded within the place. Due to the site being highly disturbed it is believed that the area has a low probability of Aboriginal heritage being present. On this basis, there were no requirements for an Aboriginal heritage investigation.[7]

AHT also advised that the provisions of the *Aboriginal Heritage Act 1975* will apply should Aboriginal heritage be discovered or suspected during works. An Unanticipated Discovery Plan should be implemented should Aboriginal Heritage be discovered or suspected during ground disturbance works.[8] This Unanticipated Discovery Plan is included at Appendix 1.

[4] Email, Kym Plischke (Heritage Tasmania) to James Puustinen (Austral Tasmania), 3 June 2015
[5] *Aboriginal Relics Act* 1975, s2(3)
[6] *Ibid*, s14
[7] Email, Samuel Dix (Aboriginal Heritage Tasmania) to James Puustinen (Austral Tasmania), 19 May 2015: AHTP2293 - Archaeological Potential, Impact & Method Statement - 28-32 Elizabeth Street, Hobart
[8] *Ibid*

2.4 Local Management Provisions

2.4.1 *Hobart Interim Planning Scheme 2015*

The property is located within the planning area of the *Hobart Interim Planning Scheme 2015* (*HIPS 2015*). The place is not included in Table E13.1 'Heritage Places', but is located within the Heritage Precinct 'H1 - City Centre'.

The specific archaeological provisions of the *HIPS 2015* are applicable to this project. The property is located within the Place of Archaeological Potential defined by Figure E13.4.1. The objective for the management of archaeological values as part of Building, Works and Demolition is to:

> To ensure that building, works and demolition at a place of archaeological potential is planned and implemented in a manner that seeks to understand, retain, protect, preserve and otherwise appropriately manage significant archaeological evidence.[9]

The relevant performance criteria are:

Acceptable Solutions	Performance Criteria
A1 Building and works do not involve excavation or ground disturbance.	**P1** Buildings, works and demolition must not unnecessarily impact on archaeological resources at places of archaeological potential, having regard to: (a) the nature of the archaeological evidence, either known or predicted; (b) measures proposed to investigate the archaeological evidence to confirm predictive statements of potential; (c) strategies to avoid, minimise and/or control impacts arising from building, works and demolition; (d) where it is demonstrated there is no prudent and feasible alternative to impacts arising from building, works and demolition, measures proposed to realise both the research potential in the archaeological evidence and a meaningful public benefit from any archaeological investigation; (e) measures proposed to preserve significant archaeological evidence 'in situ'.

Table 1: *HIPS 2015*: Development Standards for Places of Archaeological Potential - E13.10.1 Building, Works and Demolition

These Performance Criteria have been considered in the Archaeological Impact Assessment.

The *HIPS 2015* establishes a series of Application Requirement for Buildings and Works within the Place of Archaeological Potential. Three specific archaeological standards are set, which are:

statement of archaeological potential	Means a report prepared by a suitably qualified person that includes all of the following: (a.) a written and illustrated site history; (b.) overlay plans depicting the main historical phases of site development and land use on a modern base layer; (c.) a disturbance history; (d.) a written statement of archaeological significance and potential accompanied by an archaeological sensitivity overlay plan depicting the likely surviving extent of important archaeological evidence (taking into consideration key significant phases of site development and land use, and the impacts of disturbance).
archaeological impact	Means a report prepared by a suitably qualified person that includes a design review and describes the impact of proposed works upon archaeological sensitivity (as defined in a

[9] *HIPS 2015*, cl.13.10.1

assessment	statement of archaeological potential).
archaeological method statement	means a report prepared by a suitably qualified person that includes the following where relevant to the matter under consideration: (a.) strategies to identify, protect and/or mitigate impacts to known and/or potential archaeological values (typically as described in a Statement of Archaeological Potential); (b.) collections management specifications including proposed storage and curatorial arrangements; (c.) identification of measures aimed at achieving a public benefit; (d.) details of methods and procedures to be followed in implementing and achieving (a), (b) and (c) above; (e.) expertise to be employed in achieving (d) above; (f.) reporting standards including format/s and content, instructions for dissemination and archiving protocols.

This report has been prepared with regard to the application standards and definitions contained in the *HIPS 2015*.

2.5 Other Heritage Lists

2.5.1 Register of the National Estate

The Register of the National Estate (RNE) was established in 1976 as a list of natural, Indigenous and historic heritage places throughout Australia, with limited statutory mechanisms relating to actions taken by the Commonwealth. As of February 2007, the RNE ceased to be an active register, with places no longer able to added or removed and the expectation that the States and Territories would consider places included on the RNE for management under relevant State legislation. The RNE ceased to exist as a statutory register on 19 February 2012 and references to the RNE were removed from the *EPBC Act*. The RNE continues to exist as a non-statutory information source. Coincidence with other heritage lists and registers (including the THR and planning scheme heritage schedules) is not uncommon.

The property is not included on the RNE.

3.0 ILLUSTRATED SITE HISTORY

3.1 Introduction

The Planning Scheme requires a Statement of Archaeological Potential to include an illustrated site and disturbance history. This consists of a series of overlay plans that depict key periods or phases (as dictated by the availability of archival evidence), together with explanatory text and illustrations.

This historical overview begins with a brief introduction to the Aboriginal people of the Hobart area, followed by information related to the early European settlement and development of Hobart and the study area. Historical information has been sourced from key primary and secondary sources to inform archaeological judgments. The site history has been arranged chronologically addressing the following key phases of use and development:

- The Aboriginal People of the Hobart Area and Contact History;
- 1804-c.1830: the European Settlement of Hobart and the Study Area;
- 1830s-1912: Consolidation of Development in the Study Area;
- 1912-1981: Twentieth Century Redevelopment; and
- 1981-present: Demolition and Construction of the Current Building.

3.2 The Aboriginal People of the Hobart Area & Contact History

Before European settlement, Ryan has described Tasmanian Aboriginal society as consisting of nine tribes, each containing multiple social units or bands. Tribal boundaries could vary between well-defined borders based on geographical features, to broader transitional zones existing between two friendly tribes.[10]

The western shore of the Derwent formed part of the lands of the South East Tribe. Their territory covered an area of approximately 3,100km² to encompass the western shore of the Derwent north to New Norfolk, the D'Entrecasteaux Channel and Bruny Island, and south to South Cape, extending west to the Huon Valley. Ryan writes that prior to European contact, the area probably contained seven bands, each with about 70 to 80 people. The Hobart area was home to the Mouheneener band. They knew the area as Nibberloone or Linghe.

The coastal fringe provided rich food resources - both plants and animals. The coast provided a wide range of shellfish: large and small whelks, werreners, mussels, periwinkles, limpets, chitons, oysters, crayfish and crabs. Shellfish were gathered along the shoreline, but also from deeper water, with Aboriginal women noted for their diving skills.

In the hinterland, birds, possums, kangaroos and wallabies could be found, as too were edible plant and fungus species. Land management through regular burning encouraged 'green pick' (new growth and grasslands) that in turn, supported native game in numbers.

Unlike other groups, the South East Tribe did not move inland during Spring and Summer. Their lands provided sufficient food throughout the year, travelling up and down the coast with the seasons, and to outlying islands using bark catamarans. Seasonal changes would also bring new food such as seals, mutton birds and swan eggs.[11]

The Nuenonne band from Bruny Island was visiting the area when David Collins arrived in 1804. Woorady, of the Nuenonne later recalled how the people reacted and interpreted the events of early settlement, describing how:

> ...when the first people settled they cut down trees, built houses, dug the ground and planted; that by and by more ships came, then plenty of ships; that the natives went to the mountains [*Mount*

[10] Ryan, L, *The Aboriginal Tasmanians*, Allen & Unwin: St Leonards, 1996, p.12
[11] *Ibid*, pp.39-43; Officer, I, *Survey of Derwent River Aboriginal Midden and Quarry Sites*, unpublished dissertation to the Environmental Department of the Division of Teacher Education, October 1980, no page numbers; Maynard, L, *A Report on the Social, Cultural & Historical Connection of Aboriginal People to Hobart and it's Surrounds*, unpublished report for Housing Tasmania, TALSC, TAC, AHT, July 2010, pp.3-5

> *Wellington*], went and looked at what the white people did, went and told other natives and they came and looked also.[12]

Brief details of contact between the Aboriginal people and the British can be found in the diary of the Reverend Robert Knopwood. An entry in March 1804 records his observations on encountering 'a great many native hutts [*sic*] and the fires they made' on the western shore of the Derwent, north of Hobart. Two days later he noted many Aboriginal people were around the camp at Sullivans Cove, but could not be persuaded to enter. On numerous occasions, Knopwood wrote of the fires lit by the Aboriginal people for both land management and hunting.[13]

Initial contact between the Mouheneener and Europeans was positive. Although not visiting the settlement, the Aboriginal people were friendly with small groups of Europeans they met at more isolated areas. Such relations were not to last, as by 1806, violence had already began to emerge. Conflict over food resources was one of the triggers in the deteriorating relationship. By necessity, the European settlers sought to augment their meagre stores with fresh caught game, mainly kangaroos, thereby placing them in direct competition with the Aboriginal people. So insatiable was the European demand for kangaroos, that by late 1808 this food resource had largely been exhausted from the immediate surrounds of Hobart, with hunting parties having to venture further afield.[14]

This period saw a fundamental shift in colonial society with the relocation of Norfolk Islanders to Van Diemen's Land, beginning in 1805 and intensifying from 1807. Gradually, farms spread out along the shores of the Derwent as a burgeoning agricultural economy began to take shape. Over the coming years, more land was granted and brought into production, and the population grew, albeit slowly at first.

The period 1804 to 1824 has been described as one of 'uneasy coexistence' between Aboriginal people and Europeans. Certainly, there were outbreaks of hostilities, but by comparison with what occurred post-1824, the first two decades since the coming of the Europeans were relatively calm.[15] Notwithstanding the increase in conflict, groups of Aboriginal people continued to occasionally visit Hobart into the early 1820s. One such group was known by the Europeans as the 'Hobart-Town tribe', visiting the growing town for food and other items.[16]

Robinson wrote of groups of Aboriginal people visiting Hobart Town in November 1824 and October 1825. Of the latter, he described:

> At ½ 3 pm 64 black natives came into town. They were naked. Under the protection of the government. Went to see them. At 8 pm they were placed in the market house. They were formed into 3 circles with a fire in the middle of each. On one side of each circle elevated about 3 feet above the rest sat a person whom I supposed were their chief. One out of the 3 of these chiefs could speak broken English. They were all committed to the care of Mr Mansfield the Wesleyan missioner [*sic*]. One of them had a white feather stuck in his ear.[17]

Such relative peace was not to last. During the 1820s, the European population grew rapidly, accompanied by an explosion in the issuing of land grants over the most valuable grass plains. These actions created disputes over access to native game, hunting grounds and the connection of Aboriginal people with their traditional tribal lands. What followed was unprecedented violence.[18]

Attempts at using force to remove Aboriginal people from the areas settled by Europeans invariably failed. More success was had by George Augustus Robinson who led a series of expeditions aimed at enticing the remaining Aboriginal people to leave their country. In January 1832, Robinson arrived in Hobart Town in the company of 26 surviving members of the Big River Tribe. Apparently, the

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[12] *Ibid*, p.77
[13] Nicholls, Mary (ed.), *The Diary of the Reverend Robert Knopwood 1803-1808. First Chaplain of Tasmania*, Tasmanian Historical Research Association: Hobart, 1977, p.46; Brown, S, *Aboriginal Archaeological Resources in South East Tasmania. An Overview of the Nature and Management of Aboriginal Sites*, National Parks & Wildlife Service Tasmania, Occasional Paper No. 12, April 1986, pp. 171-172
[14] Ryan, *op. cit.*, pp.76-78
[15] Boyce, J, *Van Diemen's Land*, Black Inc.: Melbourne, 2008, pp. 67-68, 105-106; McFarlane, I, 'Frontier Conflict', in Alexander, A, (ed.), *The Companion to Tasmanian History*, Centre for Tasmanian Historical Studies, University of Tasmania: Hobart, 2005
[16] *The Hobart Town Courier*, Saturday 5 January 1828, p.2; TAHO, CSO1/1/323/7578, Evidence of Robert Jones to Thomas Anstey, 15 March 1830; *Hobart Town Gazette and Van Diemen's Land Advertiser*, Friday 5 November 1824, p.1
[17] Plomley, NJB, (ed.), *Friendly Mission. The Tasmanian Journals and Papers of George Augustus Robinson 1829-1834*, Tasmanian Historical Research Association: Kingsgrove, NSW, 1966, p.100, f.n. 3
[18] Boyce, *op. cit.*, pp.140-146

Aboriginal people were accommodated in the basement of Robinson's house until sent to establishments in the Furneaux Islands ten days later.[19]

In 1847, the 47 remaining Aboriginal people at the mission on Flinders Island were transported to the former convict station at Oyster Cove, south of Hobart. Back on the Tasmanian mainland, the people would often leave Oyster Cove for weeks at a time to hunt, camp and collect traditional foods, with occasional trips to Hobart.[20]

3.3 1804-c.1830: The European Settlement of Hobart and the Study Area

The first decade of European settlement in Hobart was marked by the close relationship between development and the waterfront. After the failure of the settlement at Risdon Cove and the relocation to Sullivans Cove on the western shore in February 1804, the early occupants of Hobart Town spent their first decade in a struggle for survival, building upon the camp clustered on the western boundary of the cove.[21]

On his first visit to Hobart in 1811, Governor Macquarie found that the settlement was being developed in a haphazard way without any proper plan. In response, he ordered a near regular grid to be prepared by Surveyor Meehan. Leading up from Sullivans Cove, Meehan's plan had some street alignments skewed to avoid wide scale demolition of buildings which were located within intended streets.[22] The study area is located on a block which was crossed by one of these early streets, roughly following an alignment to the east of what later became Collins Street (Figure 2). Meehan did not depict any built development along these early roads, but his survey notes do describe houses located along their alignments.[23] Given its central location, it is likely that some form of early land use and development occurred within the study area, but this is not documented in historical records.

[19] Ryan, *op. cit.*, pp.157-158; Bonwick, J, *The Last of the Tasmanians; or, the Black War of Van Diemen's Land*, Sampson Low, Son & Marston: London, 1870, pp.228-229; *The Tasmanian Mail*, 22 August 1896, p.17
[20] Gough, J, 'Oyster Cove', in Alexander, A, (ed.), *The Companion to Tasmanian History*, Centre for Tasmanian Historical Studies, University of Tasmania: Hobart, 2005, pp.261-262; *The Mercury*, Friday 20 December 1861, p.2; *The Mercury*, Friday 25 May 1866, p.4; *The Mercury*, Friday 18 February 1870, p.2
[21] Walker, JB, 'The English at the Derwent and the Risdon Settlement', *Early Tasmania: Papers Read before the Royal Society of Tasmania during the Years 1888 to 1899*, John Vail Government Printer, Hobart, p.59
[22] Solomon, R.J. *Urbanisation: the Evolution of an Australian Capital*, Angus and Robertson Publishers, Sydney, 1976, p.29
[23] TAHO, LSD355/1/7, Surveyor Meehan's Survey Notes, 1811, 1813

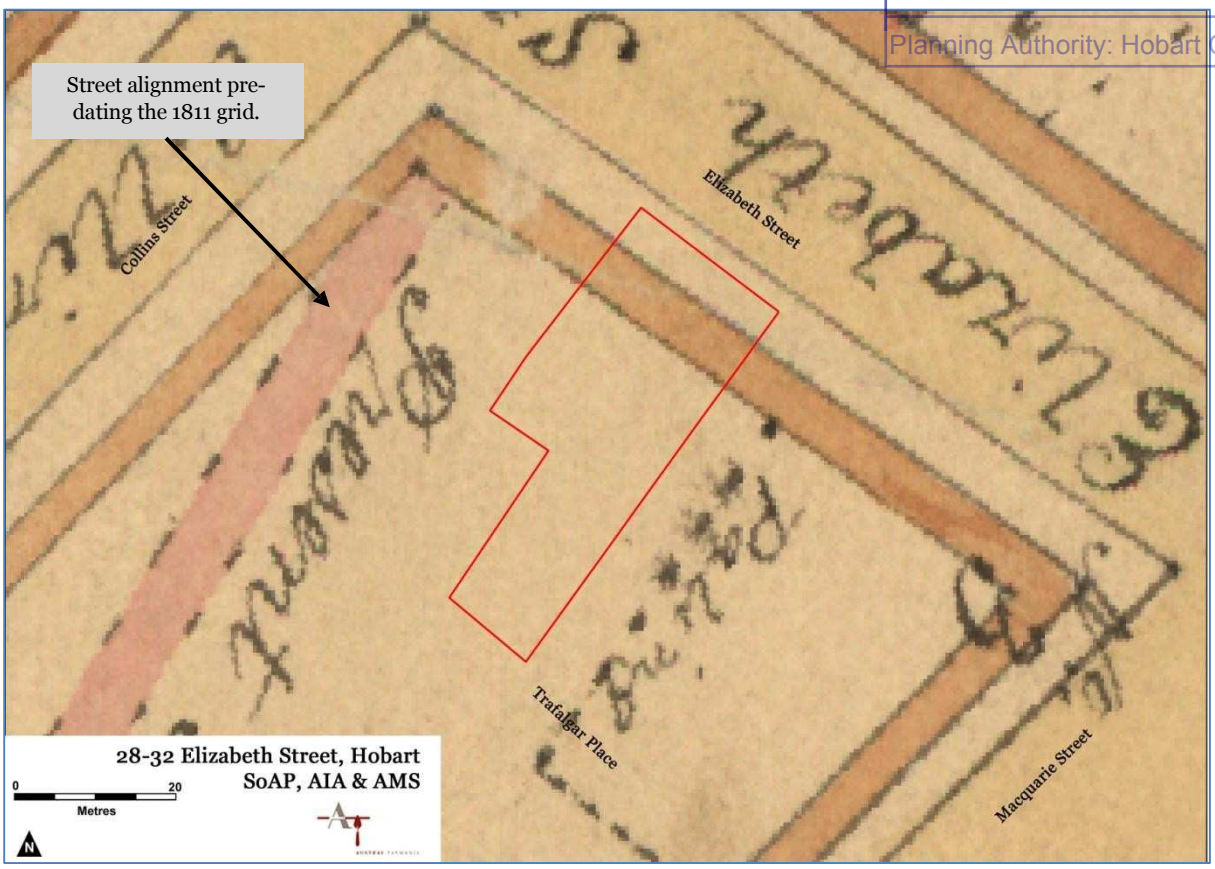

Figure 2: Detail from Meehan's 1811 plan with indicative study area overlay. Meehan's survey established Hobart's central street grid, including the alignment of Elizabeth Street (CPO, Hobart Plan 131. Reproduced with the permission of the Department of Primary Industries, Parks, Water and Environment, Land Tasmania © State of Tasmania).

Built development during the first few years of settlement was generally basic. When he arrived in Hobart in February 1817, new settler William Thornley observed that the town had:

> ...a straggling, irregular appearance; a pretty good house here and there, and the intervening spaces either unbuilt on or occupied by mean little dwellings, little better than rude huts.[24]

Another new settler, George Thomas Lloyd, similarly recorded that most of the buildings could only be '...classed as huts, being constructed of various materials, such as split palings, wicker-work bedaubed with clay, and log and turf cabins of all orders of low architecture.'[25]

With the opening up of the Hobart port to private vessels, the 1820s witnessed a boom in the population and development. Hobart emerged as a major port for the developing wool and whale oil trades. During the decade, the population grew from about 2,000 to 6,000 inhabitants, whilst the number of houses in Hobart increasing from 421 in 1821 to over 600 three years later. Elizabeth Street developed as the main commercial area of the town.[26] By the close of the decade Hobart's houses were described as being much improved, constructed:

> ...of wood with a small garden before them...Almost all new buildings are either of brick or stone; the former appear of good quality...many houses are built of a rough-hewn stone, and then cemented with stucco; when this is well done it makes a very handsome and durable building.[27]

3.3.1 Early Land Use and Development within the Study Area

Although it is likely that some form of use or development within the study area occurred in the early years following colonisation, documentary evidence of this use does not begin until the late 1810s, early 1820s. Land alienation and the establishment of property boundaries is the first suggestion of

[24] Thornley, W, *The Adventures of an Emigrant in Van Diemen's Land*, Rigby Ltd: Australia, 1842, republished 1973, p. 6
[25] Lloyd, GT, *Thirty-three years in Tasmania and Victoria*, Houlston and Wright: London, 1862, p. 8
[26] Alexander, A, Petrow, S, 'Hobart', in Alexander, A, (ed.), *The Companion to Tasmanian History*, Centre for Tasmanian Historical Studies, University of Tasmania: Hobart, 2005; Solomon, *op. cit.*, pp.29-31, 42, 45
[27] Widowson, H, *Present State of Van Diemen's Land*, S Robinson, W Joy, J Cross, J Birdsall: London, 1829, p. 22

development. The study area crosses two early properties first held by John Clarke and William Jemott (Figure 3).

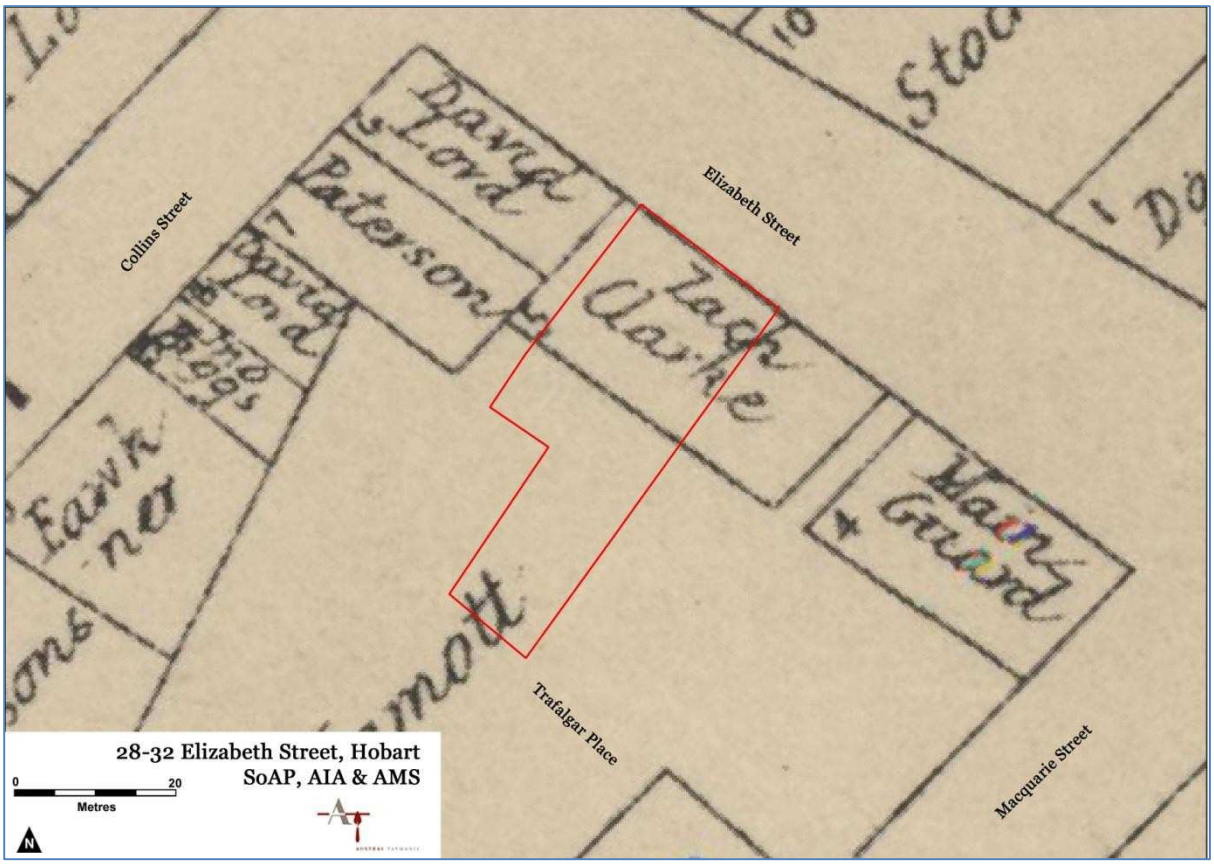

Figure 3: Detail from c.1826-28 plan of Hobart showing early parcel boundaries and lease or grant holders. Note that the notation of 'Zach Clarke' is incorrect and the Elizabeth Street property was held by John Clarke
(CPO, Hobart Plan 104. Reproduced with the permission of the Department of Primary Industries, Parks, Water and Environment, Land Tasmania © State of Tasmania).

John Clarke's property fronted Elizabeth Street and was rectangular in shape containing approximately 846m² (i.e., approximately 0.20 acres). The date at which Clarke acquired the land is not currently known, but an 1820s register noted that he held a 14 year lease over the property. Very little is known of how Clarke used his property although the 1831 Almanack records a baker called John Clarke operating from Elizabeth Street.[28]

To the rear of Clarke's property was a large lot of some 5,734 m² (i.e., approximately 1.41 acres) held by William Jemott.[29] This parcel was irregularly shaped and largely internal to the block formed by Macquarie, Elizabeth, Collins and Murray streets. Street frontage was provided on Macquarie Street and via a scringleway (narrow passage) connecting the site with Elizabeth Street. Again, the date at which Jemott acquired the property has not been established, although like his neighbour Clarke, Jemott also held a lease over the land, in this instance for 21 years. Given its internal location and irregular shape, it is likely that Jemott acquired the land after the lots directly fronting the streets had already been leased or granted.[30]

Jemott was an emancipated convict who had originally been sentenced to death by the Admiralty for stealing the cargo from a vessel he was responsible for and selling the proceeds in America. His death sentence was commuted to transportation for life, arriving in Hobart Town in 1812. He received a conditional pardon in 1816 and gained some wealth and success in the colony, acquiring land at

[28] TAHO, LSD417/1/19, Register of Lots in Hobart 1804-24, John Clarke. Note that various historic documents use both 'Clark' and 'Clarke'; Ross, J, *Van Diemen's Land Anniversary and Hobart Town Almanack for the Year 1831*, James Ross: Hobart-Town, Van Diemen's Land, 1829, p.64
[29] Note: a range of spellings of Jemott are found in historical documents.
[30] TAHO, LSD417/1/29, Register of Lots in Hobart 1804-24, John Clarke.

Kangaroo Point (Bellerive) and Richmond, supplying meat to the commissariat and later public appointments as a pound keeper and town surveyor in Campbell Town.[31]

The first definitive evidence of built development within the study area comes from a late 1820s, early 1830s map of Hobart, by which time both lots had passed from their original lease holders (Figure 4). Development in the towns at this time was governed by newly-formed regulations. These regulations applied to land divided into three classes: up to three acres (1st Class), ½ acre to one acre (2nd Class) and ¼ acre to ½ acre (3rd Class).[32]

The buildings within the study area demonstrate adherence to some – but not all - of these regulations. Clarke's former allotment was of the 3rd class, meaning the landowner had to agree to construct a footpath on the side of their lot and commence construction of a brick or stone building within twelve months of acquisition. This building was to be no less than 12 feet (i.e., approximately 3.7 metres) from the street.[33] Figure 4 shows a building as being set back from the Elizabeth Street frontage, but constructed from timber, which was contrary to the regulations. The lot is also shaded, indicating that the building was in the process of being constructed at the time the plan was being prepared. By this time the property had passed to Ann McCarthy. How McCarthy acquired the land has not been established. She did apply for the title to the property to be issued to her in 1837. However, unfortunately the application which may have established early ownership, transactions and development has not been retained in archival collections. It is known though that a counter-claim was made by William Orr acting as an executor for Clarke, and who also owned the neighbouring property. The matter was resolved in McCarthy's favour, who received the title in 1838.[34]

To the rear, Jemott's allotment had passed to Captain John Briggs, who traded between Hobart Town and Sydney and more distant ports in England, India and Mauritius. A large timber building was erected on Brigg's lot, with its north-western end partially entering the study area. Briggs applied for the title to his property in 1837, but unfortunately again no application has been located. As a 1st class property, the owner was required to construct a building with a frontage not less than 65 feet long (i.e., approximately 19.81 m).[35]

[31] Smith, B, *Australia's Birthstain: the Startling Legacy of the Convict Era*, Allen and Unwin, Crows Nest, NSW, 2008, p.219; *Hobart Town Gazette and Van Diemen's Land Advertiser*, Saturday 12 May 1821, p.1; *Hobart Town Gazette and Van Diemen's Land Advertiser*, Saturday 13 April 1822, p.1S; *Colonial Times*, Tuesday 7 October 1834, p.8; *The Hobart Town Courier*, Friday 1 May 1835, p.1; *The Hobart Town Courier and Van Diemen's Land Gazette*, Friday 29 May 1840, p.2

[32] Ross, *op. cit.*, 1829, pp. 118-123

[33] *Ibid*, p.119

[34] TAHO, SC309/1/343, Applications for Grants: Ann McCarthy. Note that Orr's counter-claim has also been removed from the archival file TAHO SC286/1/13, Application for the issue of Titles to Disputed Land

[35] TAHO, SC309/1/125, Applications for Grants: John Briggs. *The Hobart Town Gazette and Southern Reporter*, Saturday 10 July 1819, p.1; *The Hobart Town Gazette and Southern Reporter*, Saturday 19 June 1819, p.1S; *Hobart Town Gazette and Van Diemen's Land Advertiser*, Saturday 23 November 1822, p.1S; *Hobart Town Gazette*, Saturday 25 June 1825, p.4; *Hobart Town Gazette*, Saturday 22 October 1825, p.2; Ross, *op. cit.*, 1829, p.118

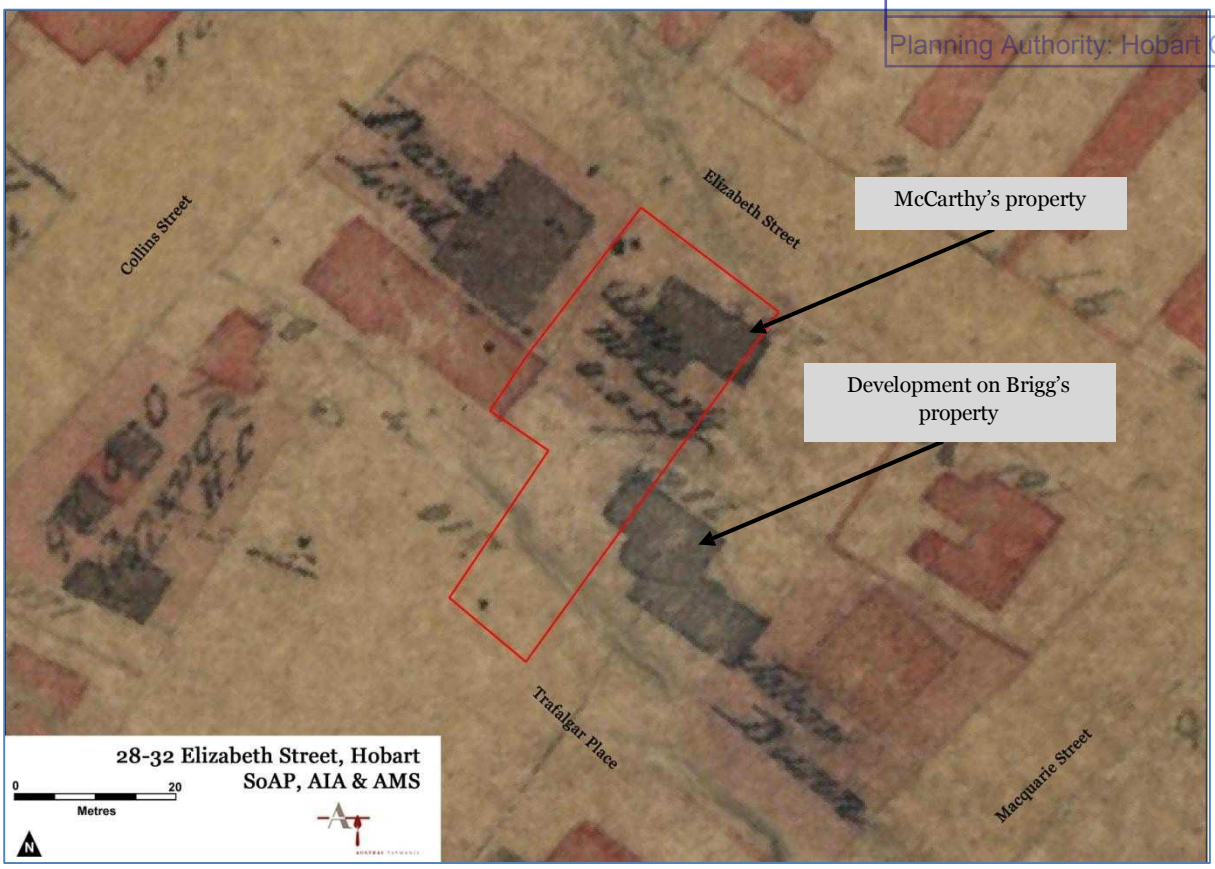

Figure 4: Detail from c.1828-30 plan of Hobart showing first definitive phase of built development within the study area. McCarthy's property is shaded, indicating that the building was under construction at the time the plan was being prepared. This plan also suggests the study area partially includes a property which fronted Collins Street, although this is most likely an error in the overlay and not confirmed through later, more accurate plans (CPO, Hobart Plan 5. Reproduced with the permission of the Department of Primary Industries, Parks, Water and Environment, Land Tasmania © State of Tasmania).

3.4 1830s-1912: Consolidation of Development within the Study Area

Being in such a prime location, the study area has been developed and redeveloped multiple times as part of the evolution of Hobart's central business district. McCarthy continued to own the property until the early 1840s at which time she subdivided the land into two lots, each containing 8.5 perches (i.e., approximately 214.98 m²). In 1841 she sold the north-western lot for £385 to David Lord who owned the neighbouring property on the corner of Elizabeth and Collins streets, whilst the following year the south-eastern lot was purchased by William Orr, also for £385. By this time, Orr had acquired Brigg's land, and the purchase provided him with greater frontage on Elizabeth Street.[36]

It is likely that redevelopment of the Elizabeth Street frontage followed this subdivision with the old timber building being replaced with more substantial masonry commercial premises. The first tenant of the north-western lot may have been John Charles Stracey. Formerly of the 11th Dragoons, Captain Stracey was an auctioneer with premises on Collins Street. In addition to the sale of land, cattle and household goods, he also published and printed a short-lived newspaper called the *Trumpeter General*. He advertised the March opening of his 'new sale rooms and offices' at 6 Elizabeth Street in 1845, and it would seem probable that the building shown on plans and later photographs dates to this period. During the late 1840s the premises were taken by Robert Worley who was also an auctioneer, land agent and merchant's broker.[37]

[36] Deed, 2/5150, Memorial of Indenture, Ann McCarthy, David Lord and George Frederick Read, 31 January and 1 February 1841; Deed, 2/5075(2), Memorial of Indenture, Ann McCarthy, William Morgan Orr, 31 January and 1 February 1842

[37] Chapman, P, 'Bethune, Walter Angus (1794–1885)', *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, http://adb.anu.edu.au/biography/bethune-walter-angus-1775/text1991, published first in hardcopy 1966; *Colonial Times*, Tuesday 11 June 1833, p.1; *The Hobart Town Courier*, Friday 3 January 1834, p.1; *Trumpeter General*, Friday 28 March 1834, p.4; *Colonial Times*, Saturday 15 February 1845, p.2; *Colonial Times*, Friday 12 January 1849, p.3

Redevelopment of the south-eastern end of the Elizabeth Street frontage is also likely to have occurred during this period. Orr only held the land for a number of months. In September 1842 he sold the property to William Hamilton. As part of this sale, Hamilton also acquired land to the rear, facing Trafalgar Place. The expanded lot covered 25 perches (i.e., approximately 632.32 m²) and was purchased for £700.[38]

Hamilton was a cabinet maker, upholsterer and undertaker. Previously operating from Argyle Street, he established his new business on Elizabeth Street, and was trading from the site by c.1846. In addition to importing furniture and household goods, he also made furniture on the premises, with workshops located in the rear yard.[39]

Sprent's highly accurate survey plan shows this 1840s redevelopment. It indicates the subdivision of McCarthy's original lot with the two new masonry buildings constructed hard against the street edge (Figure 5). A number of buildings are shown to the rear, some of which are likely to relate to redevelopment of the site by William Hamilton. Some of these Trafalgar Place boundaries survive to the present, defining the southern end of the study area, although the south-eastern boundary has slightly expanded beyond its original alignments, partially encroaching onto the neighbouring allotments and the footprints of other buildings.

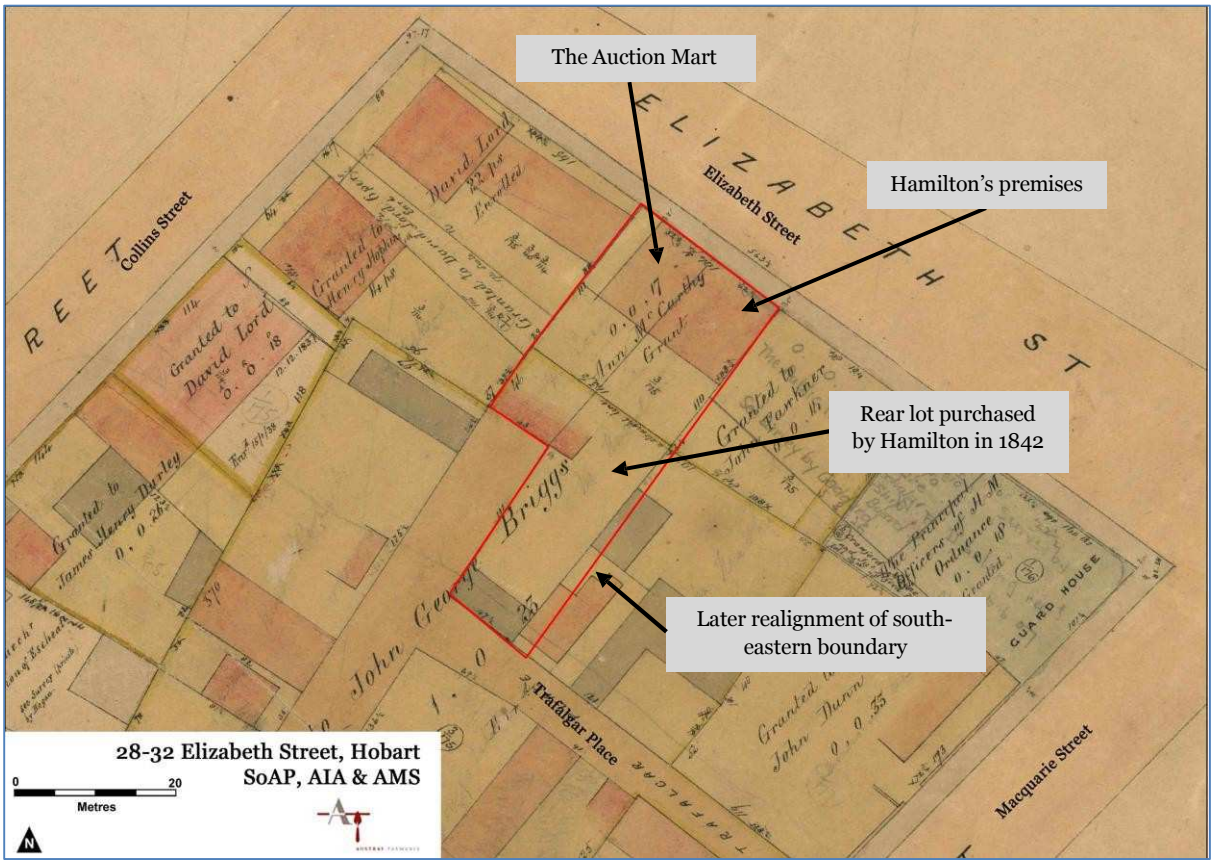

Figure 5: Detail from Sprent's survey diagram of the 1840s. These plans are spatially accurate allowing for effective overlay plans. Masonry buildings are shaded red, timber buildings are shown in grey. Sprent shows the subdivision of the McCarthy allotment and the formalisation of Trafalgar Place. Note the later expansion of the study area boundaries on its south-eastern alignment, encroaching into the neighbouring allotment
(CPO, Sprent's Book Page 63. Reproduced with the permission of the Department of Primary Industries, Parks, Water and Environment, Land Tasmania © State of Tasmania).

Stracey's, later Worley's auction mart is depicted in photographs from the latter part of the nineteenth century. They show a two-storey rendered building, four bays wide and constructed hard against the street edge. It included pilasters extending to the parapet (Figure 6).

[38] Deed, 2/5755, Memorial of Indenture, William Morgan Orr and William Hamilton, 1 & 2 September 1842
[39] *The Hobart Town Courier*, Friday 15 December 1837, p.1; *Colonial Times*, Friday 29 January 1847, p.2; *The Mercury*, Friday 9 December 1870, p.2

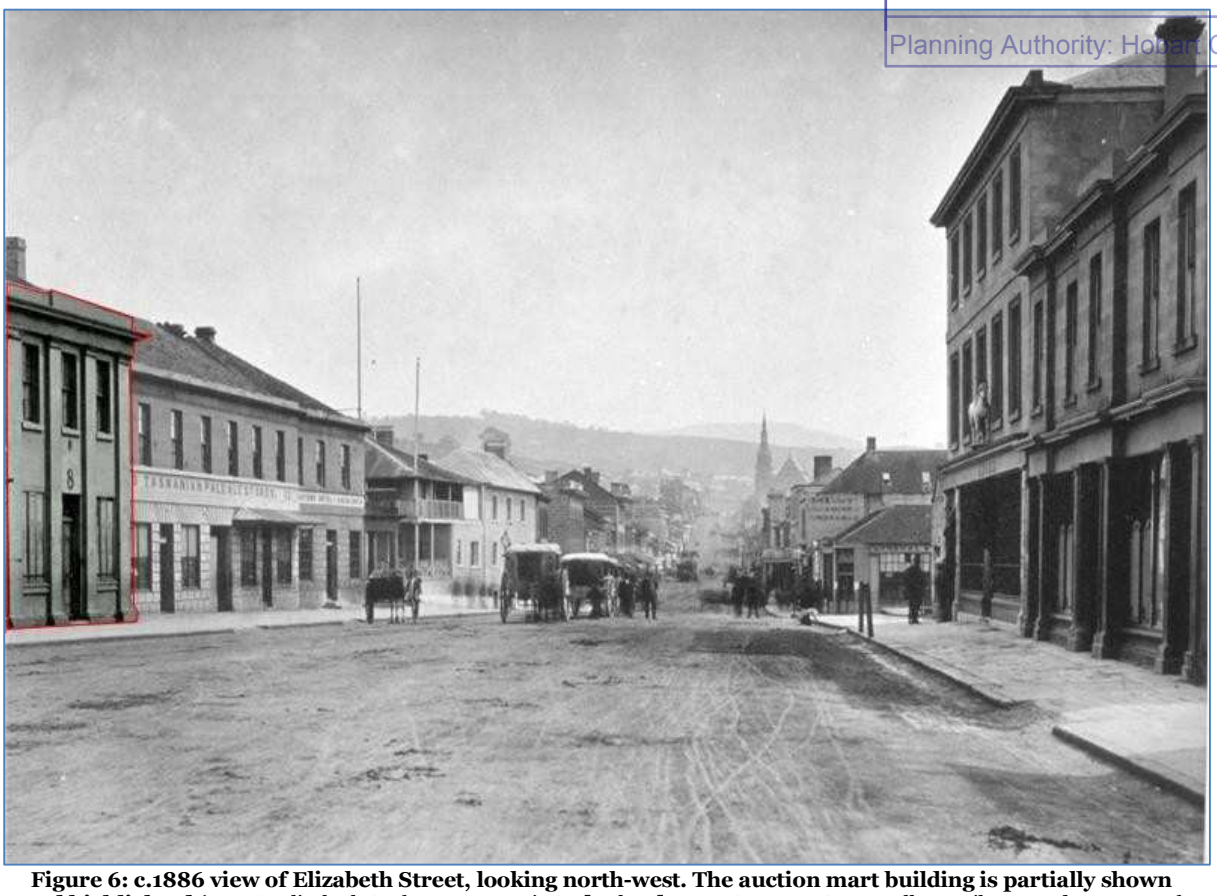

Figure 6: c.1886 view of Elizabeth Street, looking north-west. The auction mart building is partially shown and highlighted (TAHO, Elizabeth St. from Macquarie St. [Hobart], AUTAS001126183102, Allport Library and Museum of Fine Arts. Reproduced with permission).

The furniture business of William Hamilton continued to operate from the site until the 1870s. Although the property remained in the ownership of the Hamilton family, the nature of the enterprise changed in c.1878 with the establishment of the firm of John Hamilton and Co. who were merchants, importers and insurance agents.[40] Modifications to the premises were made in 1882, with *The Mercury* writing:

> Messrs. J Hamilton and Co. having during the past month had such alterations made to the front and interior of their establishment as to completely change the appearance of it. The work has been performed by Mr. Gregory, builder, who has lost no time in getting it through, a month only being occupied in doing so. The lower portion of the front of the building was pulled down and re-erected and the upper part was raised 4ft., [*i.e., approximately 1.21 m*] and the whole of the front has been cemented, the bottom portion, after the style architecturally called rustic, with mullion windows, and the upper part with raised quoins, mouldings round the windows and cornices. At the top of each storey is an entablature on which the name of the firm and nature of business are placed in raised cement letters. The outside of the building looks very neat, and is certainly a great improvement on the old front. The interior of the establishment has also undergone considerable alterations in the way of removal of partitions, laying new floors, setting up doors and office fittings, and so forth. The branches of the business have been separated, the insurance office being set apart from the general merchandise department. The offices have been made commodious, and look very complete.[41]

The building was photographed a few years later, showing the rendered front of the premises, expanded windows on the ground floor and the name of the business formed in raised text on both levels (Figure 7). Figure 8 shows both the Hamilton building and the former auction mart together in the same view.

[40] *The Mercury*, Friday 1 March 1878, p.1; *The Mercury*, Thursday 4 April 1878, p.2
[41] *The Mercury*, Tuesday 3 October 1882, p.2

Figure 7: c.1886 view of the J Hamilton & Co. building, Elizabeth Street. The photograph was taken after the 1882 modifications which substantially changed the appearance of the building. The pilaster of the adjacent former auction mart building can just be seen on the far right (TAHO, PH10/1B, Photographs (2) - Nickolls & Simmonds - 16 Elizabeth Street and John Hamilton & Co - Merchants & Importers, 6 Elizabeth Street. Reproduced with permission).

Figure 8: late nineteenth, early twentieth century view looking to the north-west, up Elizabeth Street. The buildings within the study area are highlighted. The Hamilton building is on the left, and the former auction mart on the right (TAHO, Hobart Streets Elizabeth collection of postcards, AUTAS0016125413211, Tasmaniana Library. Reproduced with permission).

Both buildings continued to be used as sole occupant commercial premises over the coming years, but during the 1890s Hamilton's building were subdivided into a number of individual offices and a similar process took place next door soon after. Numerous tenants occupied the offices within the two buildings, but perhaps most interesting is the number of prominent architects who ran their businesses from the site. This appears to have begun in the 1890s with Robert Flack Ricards whose office was located at was then registered as 14A Elizabeth Street. The firm was established by Ricards in 1887, going on to design numerous buildings including the Temperance Hall in Melville Street, works on the Treasury Chambers in Davey Street, St Mark's Church in Port Cygnet and bank buildings in Devonport and Burnie. In 1895 he was joined by Douglas Salier and working from their Elizabeth Street office, the partnership went on to design a number of buildings including St Stephen's Church in Sandy Bay, Fitzgerald and Co.'s premises in Collins Street and the Commercial Bank in Zeehan, as well as a large number of houses around Hobart.

From around 1905, Wilhelm Koch established his office in the same building. Koch was a founding member and president of the Tasmanian Institute of Architects, and helped to establish the Southern Tasmanian Town Planning Association in 1915. He was responsible for the design of a number of significant domestic, commercial and institutional buildings around Tasmania including works on the Richmond Town Hall, the children's hospital in Hobart, the Hobart Teacher's College (Philip Smith building), the AG Webster building in Liverpool Street and St James the Apostle Church in New Town.[42]

Buildings occupied nearly all of the two lots by the early twentieth century (Figure 9). The two buildings facing Elizabeth Street remained extant to this time, with secondary buildings to the rear. This included a large two-storey warehouse or store building to the rear of the Hamilton building and fronting onto Trafalgar Place. A construction date for this building has not been established with

[42] *Cyclopedia of Tasmania (illustrated) : an historical and commercial review: descriptive and biographical etc*, Maitland and Krone: Hobart, 1900, p.338; Koch, C, Winter, G, 'Koch, Wilhelm Rudolph Waldemar (1874–1952)', *Australian Dictionary of Biography, National Centre of Biography*, Australian National University, http://adb.anu.edu.au/biography/koch-wilhelm-rudolph-waldemar-13031/text23561, published first in hardcopy 2005

accuracy, but Assessment and Valuation Rolls begin to describe the site as an 'office and warehouse' from 1879 which could suggest it was built during this period.[43]

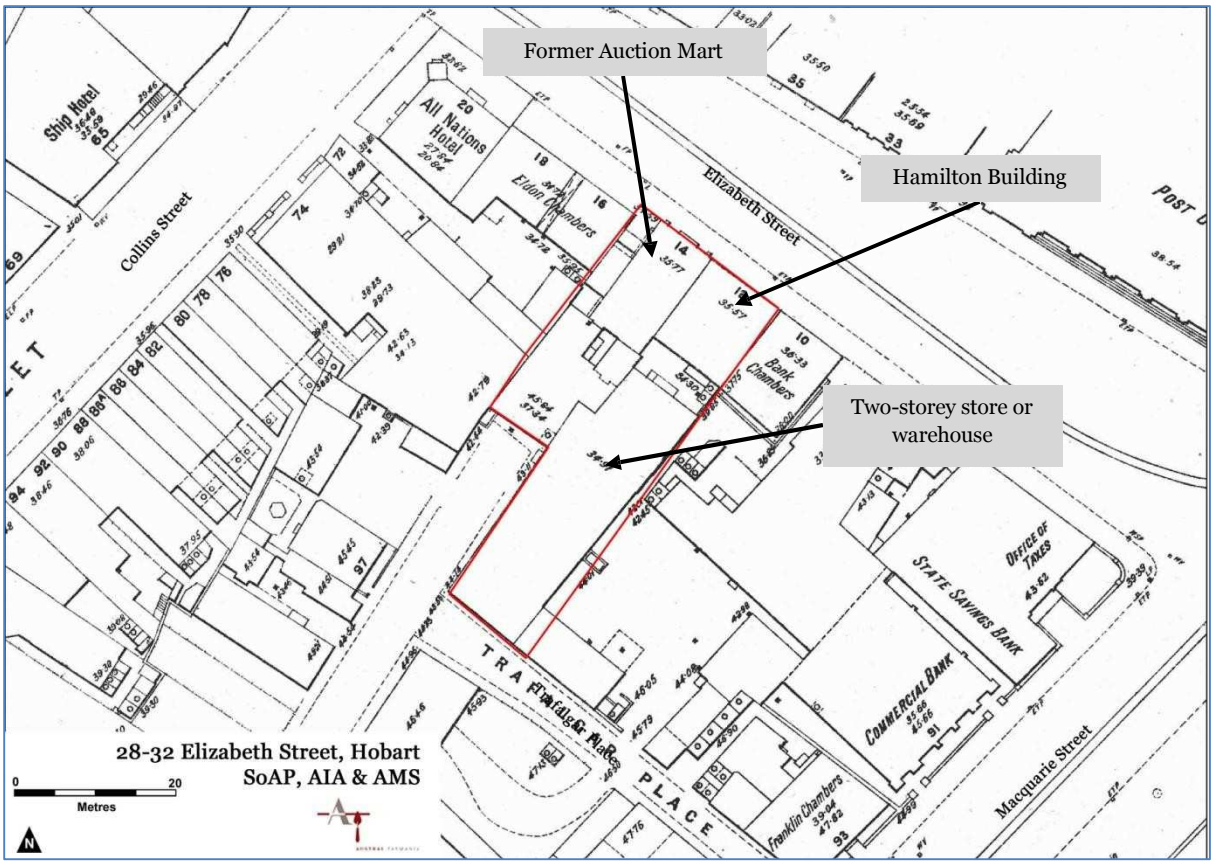

Figure 9: Detail from 1905 Drainage Board plan showing the study area, note the large store building to the rear of 12 Elizabeth Street (TAHO, Hobart City Council Metropolitan Drainage Board, Hobart Detail Plan No.04 (City Centre), 1905. Reproduced with permission).

3.5 1912-1981: Twentieth Century Redevelopment

The study area was subject to three phases of major twentieth century redevelopment, commencing during the 1910s. The following sections summarise this development, prior to the construction of the current building during the 1980s.

3.5.1 1912: The Establishment of the Bank of New South Wales (later Westpac) in Hobart

The Bank of New South Wales (now Westpac) is Australia's oldest banking institution. Branches were established throughout Australia and the Pacific during the nineteenth century, but Tasmania was the last State into which the bank expanded its operations. For many years it had operated through arrangements with its Tasmanian agent, the Commercial Bank. However, by the early twentieth century, growing business resulted in the establishment of its own specific branches. This began in Launceston, followed by Hobart in 1912.[44]

The Hobart site was the Hamilton building, occupying what was then 28-30 Elizabeth Street and purchased in 1911.[45] The old building fronting the street was rapidly demolished to be replaced with a new bank building which opened in 1912. The building was designed by Walker and Johnston which began a long association between this architecture firm and the bank. Although original plans have not been located, early photographs (Figure 10) and written descriptions provide some detailed information. On its opening it was reported:

[43] Assessment and Valuation Rolls, 1879
[44] *The Mercury*, Thursday 10 August 1911, p.5
[45] Certificate of Title 193/16, 2 May 1911

The outside is full American Romanesque, with rough walls, and carving in keeping with this particular style of work. It is extremely striking to the eye, and is the only building of its kind in Tasmania. The edifice is a two-storeyed one, and is very ornamental. The name of the bank is cut out of solid stone, and adds to the effect. Approach to the ground floor, which is given over entirely to the business of the bank, is gained through a heavy doorway or remarkably strong appearance. In the banking chamber all the fittings, counters, panels and dados are of Tasmanian blackwood, and in keeping with the Romanesque treatment of the building. The ceilings throughout are panelled in embossed zinc, and there is a deep dado all round, also in zinc. On the first floor there are four large living rooms for the staff, with bathroom and sanitary fittings. The roof is approached by a staircase leading from the main hall, and is reinforced malthoid. From here a magnificent view of the harbour is gained. The bank owns the whole of the property immediately behind its new building right through to Trafalgar-place, and it is understood extensions are to be made later on.[46]

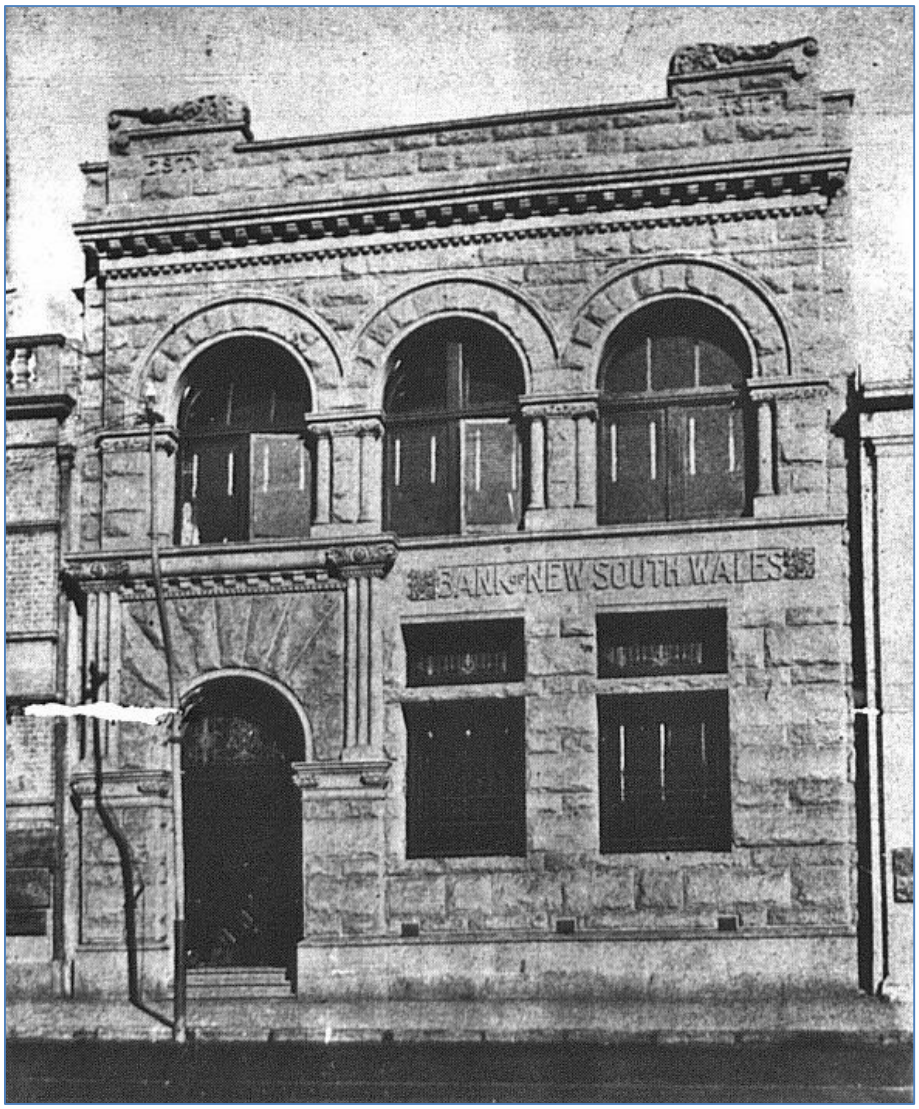

Figure 10: 1912 photograph showing the completed Bank of New South Wales. The pilaster of the adjacent former auction mart building can just be seen on the far right (TAHO, *Tasmanian Mail*, 15 August 1912, p.18. Reproduced with permission).

Common to many banks, accommodation was also provided on-site for the manager, with Mr JR Chapman taking up residence. The new building was located hard against the street edge but did not extend back the entire length of the lot. The large two-storey brick warehouse built during the previous phase of ownership was retained as part of the bank redevelopment (Figure 11).

[46] *The Mercury*, Saturday 23 March 1912, p.5

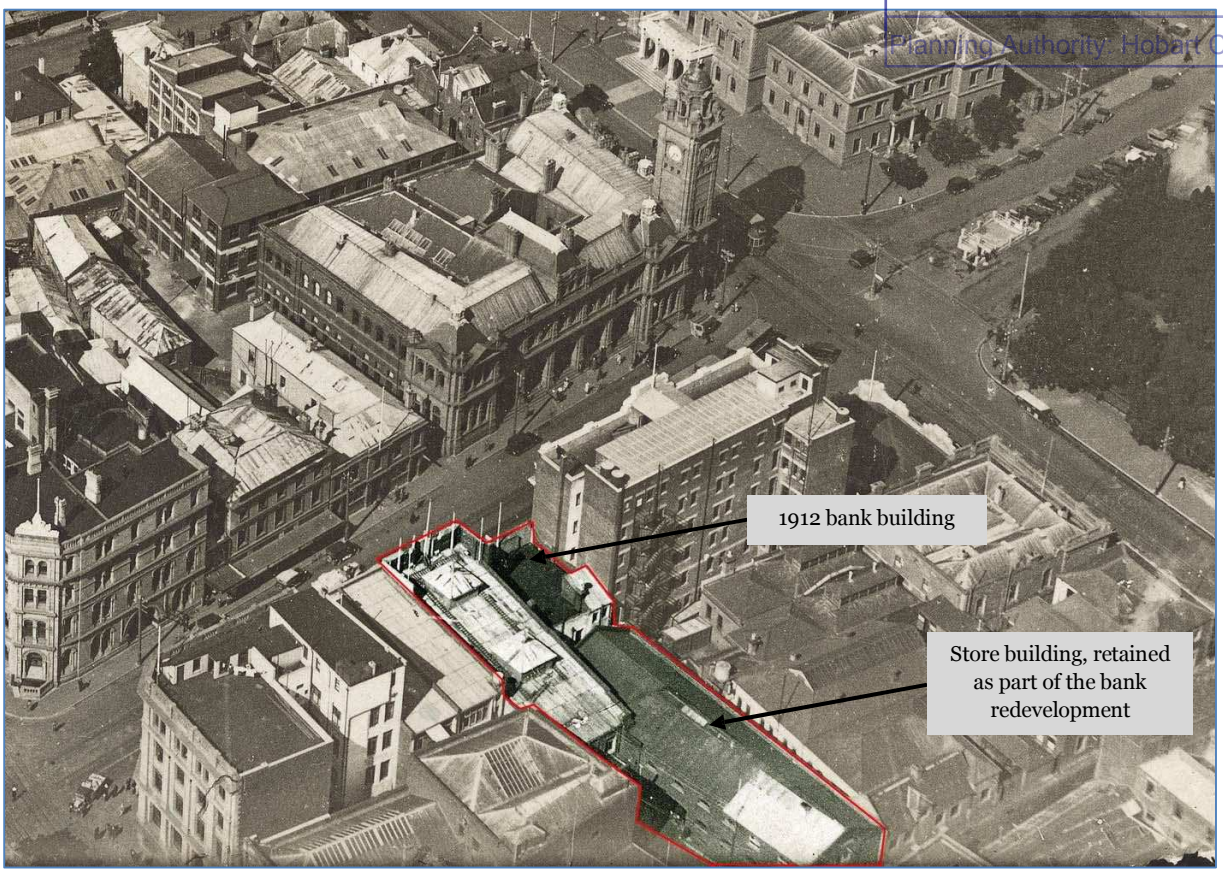

Figure 11: 1920s oblique aerial photograph with study area highlighted, looking towards the north (TAHO, NS892/1/64, Photograph - Hobart - aerial view over city bounded by Wharves, Domain, Elizabeth and Collins Street looking towards wharves from above intersection of Collins and Elizabeth Street. Reproduced with permission).

Although the bank had indicated its intent to develop the rear of the lot in 1912, it was to take several decades for this to occur, and this redevelopment allowed for the old store building to be partially retained. An application was made in 1936 to add an extension to the rear of the bank. These works required the removal of approximately half of the old store building, and excavations of about 3 feet (i.e., approximately 91 cm) to provide level access all the way through from Elizabeth Street. The site is likely to have already naturally risen towards the south-west, but these works resulted in the remaining section of the store building on Trafalgar Place being substantially elevated above the bank building (Figure 12).[47]

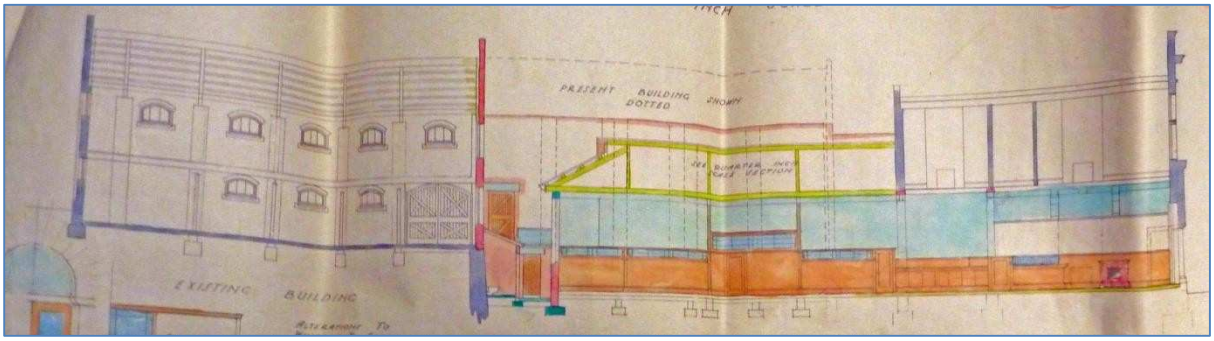

Figure 12: Sectional elevation from 1936 application for alterations to the bank. The 1912 bank premises are on the far right and the old store building on Trafalgar place is shown on the left. The dotted lines indicate the extent of the store building to be removed for the extension to the bank. Note also the height differential between the Elizabeth Street and Trafalgar Place levels (TAHO, AE417/1/1936, 28 Elizabeth Street (Bank), 6326: Alterations and Additions to Bank of New South Wales, Hobart - Long Section. Reproduced with permission).

[47] TAHO, AE417/1/1936, 28 Elizabeth Street (Bank), 6326

Further alterations were made over the coming decades; all was the work of the original architectural firm and its various incarnations. Most alterations were of a fairly minor scale.[48] The 1912 banking chamber and the remaining section of the old store building remained in place until their demolition in the 1980s.

3.5.2 1914: The Palace Theatre

During the early twentieth century a number of purposely built cinemas were erected in Tasmania for the presentation of silent newsreels and later films to the fascination of eager audiences. One such early cinema was the Palace Theatre. The Theatre was constructed on the site of the old Auction Mart building at 32 Elizabeth Street, and next door to the recently completed bank. The property was purchased in 1913 for £7,650 and little time was wasted on clearing the site for the new and grand building.[49]

The Palace was designed by the partnership of George Stanley Crisp and Julian Whyte. Crisp was one of the more notable Tasmanian architects of the period. He served his articles with Douglas Salier and also had direct contact with CFA Voysey in England, bringing knowledge of Arts and Crafts design back to Tasmania on his return. Significant public works included Heathorn's Motor Garage, the Huon Co-Operative Association building, and the Hobart Savings Bank branches in Moonah and Burnie. In addition to the Palace, he was also responsible for two other notable theatres including His Majesty's (1910-11) and the Strand, later Odeon (1914-15), both in Liverpool Street. Prominent examples of domestic architecture include the Arts and Crafts influenced Waimea (1909) and Greystanes (1914), both in Sandy Bay and extant.[50]

Unfortunately no original plans of the theatre have been located. The best understanding of the building comes from articles and advertisements, which are full of self promotion as to the splendour of the design and detailing, technology and safety precautions. As eminent theatre historian Ross Thorne notes, the majority of Tasmania's cinemas never matched the opulence and grandeur of the major picture palaces found in the mainland capital cities. Nonetheless, the Palace was one of the few Tasmanian cinemas featured in his nationwide survey.[51]

The Palace was nearing completion by April 1914, with a shareholders meeting being informed that every safety precaution was being taken to guard against fire and that special attention was being paid to the ventilation. The interior decoration had been designed by Mr Beiler of Melbourne and carried out by local contractors. The manager claimed that the theatre would be equal to any on the mainland and that full orchestras would play during each performance.[52]

The theatre was officially opened by the Mayor on 2 June, who described it as 'an addition to the architectural beauties of the city', with a 'daring distinctiveness' in design not seen before in Hobart (Figures 13-14). Hundreds were turned away on opening night. Located on such a narrow lot, the building was of three levels on its Elizabeth Street elevation. The facade was pure white, inset with green tiles and the name the 'Palace Theatre' picked out in gold. The full width of the street frontage was left open as the entrance to the cinema, with a marble staircase leading through arches to the ticket office, surmounted by a leadlight dome with ornamental metal work. The theatre had capacity for 700 people in gold plush chairs in the stalls and dress circle. The films were projected onto a white cement screen surrounded by gilded decoration. The orchestra was located on an elevated platform in front of the screen. To guard against fire, the projection room was constructed from concrete and lined with asbestos. A safety exit led from the theatre to Trafalgar Place behind. To distinguish itself from other cinemas, the Palace operated continuous picture shows from 11 a.m., allowing the public to come and go as they pleased. Opening at the start of the First World War, like other theatres, the

[48] See: TAHO AE417/1/6135, 28 Elizabeth Street (11032): 1948 works related to internal fit out and creation of new access to the former store building; AE417/3/2596, 28 Elizabeth Street, Alterations (18861): 1962 alterations to the ground floor; AE417/3/3450, 28 Elizabeth Street, Garage (19739): 1964 construction of a new garage off Trafalgar Place; AE417/4/52, 28 Elizabeth Street, Alterations (19828): 1964 alterations to the banking chamber; AE417/6/1446, 30 Elizabeth Street, Bank of New South Wales, Additions (76488): 1976 modifications to the facade of the bank building, extending the height of the windows.

[49] Deed, 13/1707, Memorial of Indenture Clyde Hamilton & Ors, Palace Theatres, 30 October 1913; Jacobson, A, 'Picture Theatres', in *The Companion to Tasmanian History*, Centre for Tasmanian Historical Studies, University of Tasmania: Hobart, 2005

[50] McNeill, B, Woolley, L, *Architecture from the Edge. The 20th Century in Tasmania*, Montpelier Press, North Hobart, 2002, pp.27-28; *The Mercury*, Monday 31 July 1933, p.6

[51] Thorne, R, *Cinemas of Australia: via USA*, Architecture Department, Sydney University, 1981, p.353

[52] *The Mercury*, Thursday 30 April 1914, p.3

Palace participated in the war effort, with special presentations to raise money for the Patriotic Fund, and later that year the Belgium relief fund.[53]

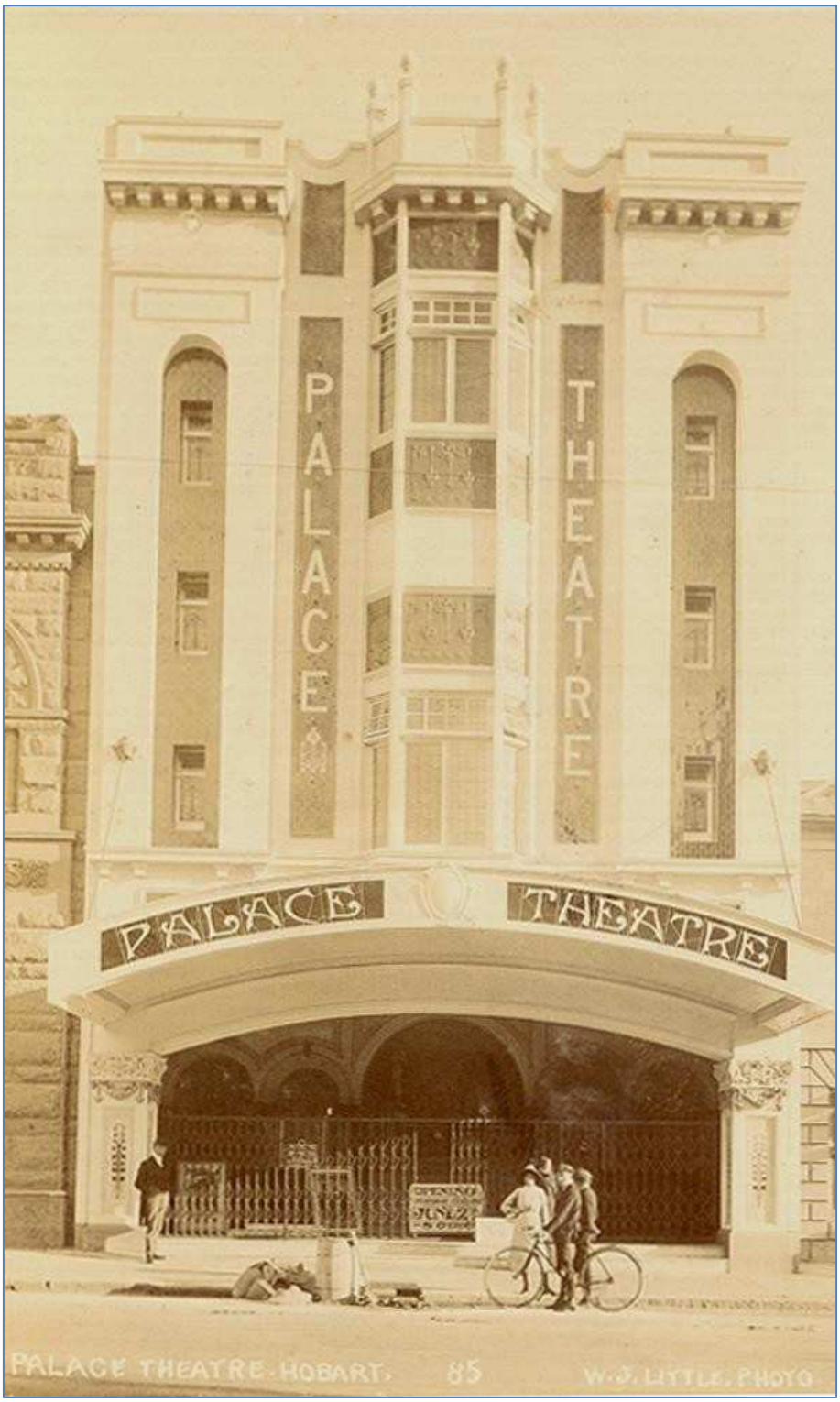

Figure 13: Facade of the Palace Theatre. Note the arched entrance behind the iron screens. The bank building can be seen on the far left (TAHO, Hobart buildings theatrical and recreational : collection of postcards, Tasmaniana Library, AUTAS0016125395681. Reproduced with permission).

[53] *The Mercury*, Monday 1 June 1914, p.3; *The Mercury*, Wednesday 3 June 1914, p.8; *The Examiner*, 3 June 1914, p.5; *Daily Telegraph*, Wednesday 3 June 1914, p.4; *Daily Telegraph*, Saturday 6 June 1914, p.8; *Daily Telegraph*, Friday 25 September 1914, p.8

Figure 14: Photograph of the ground floor of the Palace Theatre. The marble stair case, decorative tile work and Art Nouveau pressed metal gable infill can all be made out. The photograph was taken during the construction of the Commercial Bank on the corner of Elizabeth and Collins streets (TAHO, NS869/1/425, Photograph - Hobart - Palace Theatre - Elizabeth Street - c 1920s. Reproduced with permission).

The only plan that has been located for the building is a schematic showing the upper level seating arrangement (Figure 15), containing 212 seats. The remaining 488 seats would have been located in the stalls.

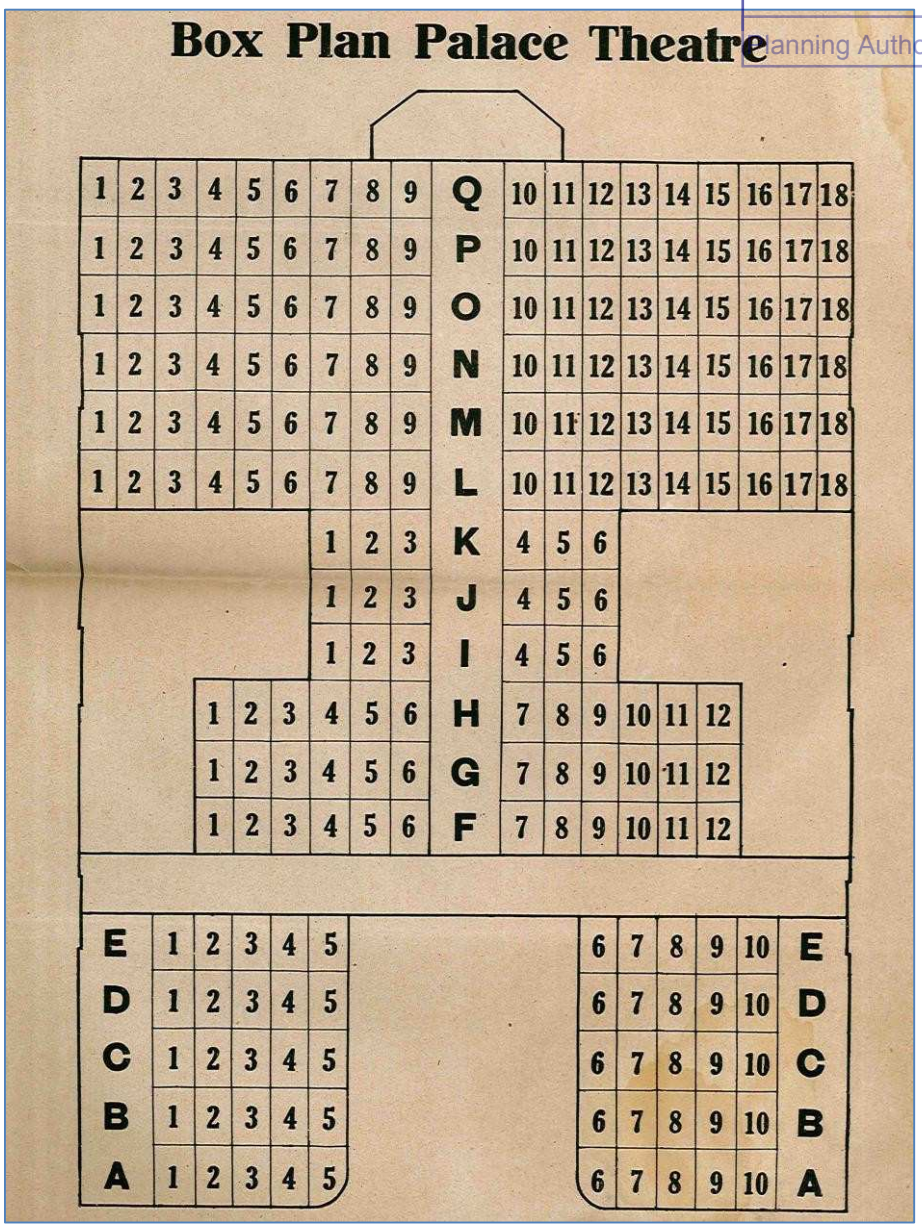

Figure 15: Undated schematic showing the upper level seating plan, providing seating for 212 patrons (Courtesy of The Royal Society Collection, University of Tasmania Special & Rare Collections – RS73).

Thorne's detailed work on the subject looked at the influences of American architecture on Australian cinemas. The Palace would appear to differ from these broader patterns, describing its design as 'very European, almost French', having a highly three dimensional tri-partite central bay extending through its upper levels. He also identified Art Nouveau influences, most notably through leadlight lettering over the awning.[54]

Despite opening to great acclaim and large crowds, the Palace was beset by problems, most notably a series of fires, a real danger for the emerging technology. The first such fire broke out in the projection room in January 1917. Some 400 to 500 people were in the cinema at the time, but the crowd kept calm, safely emerging from the building, whilst the orchestra continued to play. The fire brigade quickly attended, and although the cement and asbestos lined projection room prevented the destruction of the entire building, flames and smoke had spread into other areas. Approximately £1,250 worth of damage was done, most of which related to the loss of valuable film. More minor fires

[54] Thorne, *op. cit.*, p.355

broke out in 1920 and 1923. Investigations by the Fire Brigade into Hobart's theatres and cinemas also revealed some alarming finds, with exits being blocked or locked at the Palace.[55]

The Palace only operated for a few more years, closing at the beginning of 1924. At the time there were three cinemas operating in Hobart, but unlike its competitors, the narrow site of the Palace prevented expansion and the addition of more seating. The cinema closed on 5 January 1924, and was sold the following year. The building was completely remodelled to contain three shops and was purchased by Henry Round who ran a supermarket from the premises. So associated was he with the site, that the old cinema became known as Round's building. During the 1970s the building was taken over by the Bank of New South Wales who expanded operations from their premises next door, with the old cinema converted to become the offices for the travel agency division of the business.[56]

3.6 1981-present: Demolition and Construction of the Current Building

By the late twentieth century the existing two buildings were no longer adequate for banking purposes. In 1981 an application was lodged to expand the Hobart premises with the construction of a new bank on Elizabeth Street. The new building was to merge the separate properties which contained both the 1912 bank and the 1914 former cinema next door. The following year, the Bank of New South Wales and the Commercial Bank of Australia merged to form the Westpac Banking Corporation.[57]

Unfortunately the plans for the development have been removed from the archived building application file. These would have provided detailed information about the building, and from an archaeological perspective, important information related to the extent of excavations carried out. Some information however can be gleaned from written accounts and the building itself.

The new bank was designed by the Melbourne company of Von Schramek & Dawes working in collaboration with local architects Crawford, Cripps & Wegman, continuing the long tradition of this firm (and its predecessors) working for Westpac, a history which commenced with the design of the old building in 1912.

Geotechnical investigations were carried out in advance of the development. At the Trafalgar Place end of the site, the first 65 cm was fill, followed by 45 cm of sandy clay, 50 cm of clayey sand and 13.4 m of sandstone below. The stratigraphy on Elizabeth Street was simpler, with 1.4 m of fill, followed by moderately soft sandstone to a depth of 6.12 m.[58]

The application was to construct a new three storey brick and concrete framed building along the Elizabeth Street frontage, and a two storey 'mews-type' building at the rear off Trafalgar Place, which contained ground level parking, and other service and storage areas. Public banking and travel facilities were to be provided on the ground level, and offices, staff amenities and plant were located on the floors above. The structural system for the building was reinforced concrete using columns and perimeter beams with a flat slab floor system supported on spread footings. Although specifications for the earth works or depths of columns have not been located, the architect recalls that excavations within the middle of the building were substantial. The cost of the development was estimated at $1.7 million dollars.[59]

A level of criticism was expressed by Council officers and aldermen on the heritage impacts of the development. The assessment officer noted that the buildings were not listed by the National Trust, but were located within a conservation area and had been identified as unlisted elements of significance. Notes on the application suggest a particular concern for the 1912 bank building and the 'pleasant' former store building at the rear. There was less interest in the former cinema, described as being 'nondescript'. It was felt that scope existed to retain and modify the existing buildings, or that a

[55] *The Mercury*, Tuesday 9 January 1917, p.4; *The Mercury*, Monday 2 February 1920, p.6; *The Mercury*, Wednesday 23 March 1921, p.7; *The Mercury*, Monday 27 August 1923, p.7
[56] *The Mercury*, Saturday 5 January 1924, p.8; *The Mercury*, Saturday 30 May 1925, p.13; TAHO, AE417/8/499, 28-32 Elizabeth Street, Westpac Banking Corp, Alterations (84109): HCC, Application under Draft Planning Scheme, 28-30 Elizabeth Street, Hobart, File No. ET14/470, 12 February 1981; AE417/6/1446, 30 Elizabeth Street, Bank of New South Wales, Additions (76488): 1976
[57] http://www.westpac.com.au/about-westpac/westpac-group/company-overview/our-history/
[58] TAHO, AE417/8/499, 28-32 Elizabeth Street, Westpac Banking Corp, Alterations (84109): Report on New Hobart Office for Bank of New South Wales, No. 28-30 Elizabeth Street, Hobart
[59] TAHO, AE417/8/499, 28-32 Elizabeth Street, Westpac Banking Corp, Alterations (84109): HCC, Application under Draft Planning Scheme, 28-30 Elizabeth Street, Hobart, File No. ET14/470, 12 February 1981; notes on street plan; Report on New Hobart Office for Bank of New South Wales, No. 28-30 Elizabeth Street, Hobart; Email, N Mackintosh (JAWS Architects) to James Puustinen (Austral Tasmania), 26 May 2015

more sensitive infill development should be pursued, including providing a pedestrian arcade linking Elizabeth Street to Trafalgar Place. These concerns however were not sufficient to warrant refusal. Some aldermen also raised their doubts, noting that the buildings added to the character of Hobart's central city, with Ald Broadby stating 'places were too easily allowed to be knocked down, simply because they were not given the chance to get old enough'.[60]

The accompanying design report suggests that the architects had responded to the context of the site, in height, proportion and surface finish which would 'harmonise' with adjacent buildings and the streetscape of Elizabeth Street. External surfaces were to be reconstituted stone, which would be acid treated, and result in an appearance reminiscent of cut or sawn stone. The cornice would provide a contemporary interpretation of the classical feeling of important neighbouring buildings.[61]

The application was approved in March 1981 and the site was cleared for the new building (Figures 16-17). Westpac continued to trade from the site until 2014, when the bank relocated to new premises on Liverpool Street.

Figure 16: the existing site, with the three level banking building on Elizabeth Street, and the two-storey rear section on Trafalgar Place (LIST Map, © State of Tasmania).

[60] TAHO, AE417/8/499, 28-32 Elizabeth Street, Westpac Banking Corp, Alterations (84109): HCC, Application under Draft Planning Scheme, 28-30 Elizabeth Street, Hobart, File No. ET14/470, 12 February 1981; notes on street plan; *The Mercury*, Wednesday 25 March 1981, p.30; Report on New Hobart Office for Bank of New South Wales, No. 28-30 Elizabeth Street, Hobart

[61] TAHO, AE417/8/499, 28-32 Elizabeth Street, Westpac Banking Corp, Alterations (84109):; Report on New Hobart Office for Bank of New South Wales, No. 28-30 Elizabeth Street, Hobart

Figure 17: Elizabeth Street elevation of the former Westpac Bank building (Austral Tasmania, 2015).

4.0 ARCHAEOLOGICAL ASSESSMENT – DISTURBANCE HISTORY, SIGNIFICANCE AND SENSITIVITY ZONING

The management recommendations made in this report (see section 6.0) are predicated on three core factors: the archaeological potential of the area, the level of disturbance these features and deposits may have incurred, and the significance of the archaeological resource. The following section comprises a discussion of these three elements in the context of the site. It begins with an analysis of the current site; the sequential development and disturbance of the area; and an assessment of archaeological significance.

4.1 The site in 2015

The following section provides a description of the site as it currently exists and for the purposes of the archaeological assessment. It was informed by a site visit carried out on 23 April 2015 and should be read in conjunction with the detail plan which shows existing finished floor levels, and the outside street levels (Figure 24).

The site covers 874m² with buildings covering the entire lot. The main section of the former Bank is located on the Elizabeth Street frontage of the site. It consists of a three storey brick and concrete framed building constructed hard against the street edge, with a two-storey section at the rear of the site, off Trafalgar Place (Figures 18-19). The south-eastern end of the site contains the two-storey 'mews' section, with ground level undercover car parking beneath the building (Figure 20). The main access is off Elizabeth Street and extends as a single level back towards the rear of the building on Trafalgar Place (Figure 21). The former banking chamber occupies the majority of the ground floor.

The changes in ground levels between Elizabeth Street and Trafalgar Place are not readily apparent from the exterior of the building, but are substantial. Bulk excavation was carried out to achieve a single level of access from Elizabeth Street. The extent of this excavation is significant, particularly at the south-western end of the building with the finished floor level approximately 2.11 m below the Trafalgar Place ground level outside. A flight of stairs provides access descending from Trafalgar Place to the ground floor (Figure 22). This depth of excavations would not account for further areas of excavation associated with the lift wells, footings, services and so on. Excavations at the Elizabeth Street end could be expected to be less than those at Trafalgar Place, but were also likely to have been substantial.

Although occupying a smaller footprint and of a lower height, the rear two-storey section on Trafalgar Place has also been subject to substantial excavations. The lower ground floor is accessed via a short flight of stairs from the ground floor, descending by approximately a further 75 cm (Figure 23). Within this section of the building, the difference between the internal finished floor levels and Trafalgar Place above would be somewhere in the vicinity of 2.7 - 3.3 m.

Figure 18: Elizabeth Street elevation of the former Westpac bank building, 28-32 Elizabeth Street. Looking south-west.

Figure 19: Rear of the bank building, with the two-storey 'mews' section on the right. Looking north-east from Trafalgar Place.

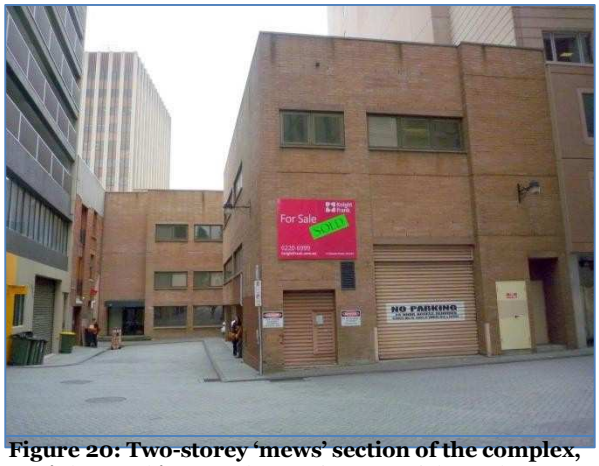

Figure 20: Two-storey 'mews' section of the complex, right. Looking north-east from Trafalgar Place.

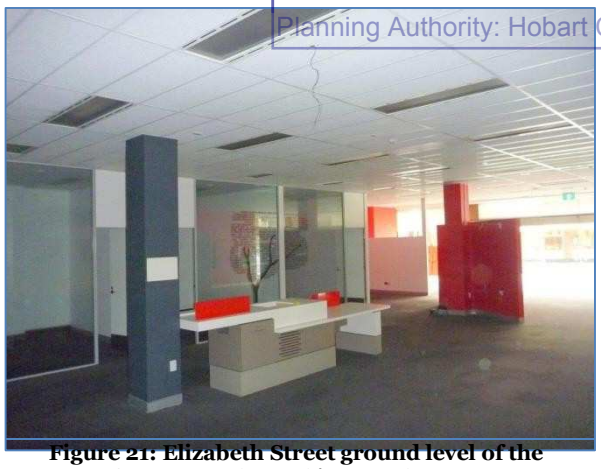

Figure 21: Elizabeth Street ground level of the former Bank. Looking north-east.

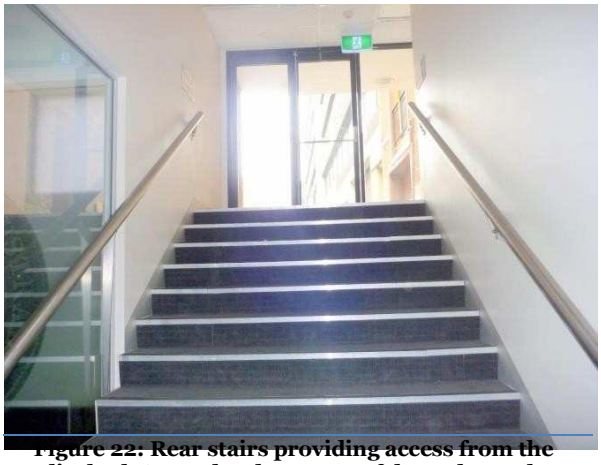

Figure 22: Rear stairs providing access from the Elizabeth Street level, up to Trafalgar Place. The finished floor level is approximately 2.11 m below the Trafalgar Place level at the south-western end of the site.

Figure 23: Lower ground level beneath the mews section. The finished floor level is approximately 75 cm below the Elizabeth Street ground level, as indicated by the stairs.

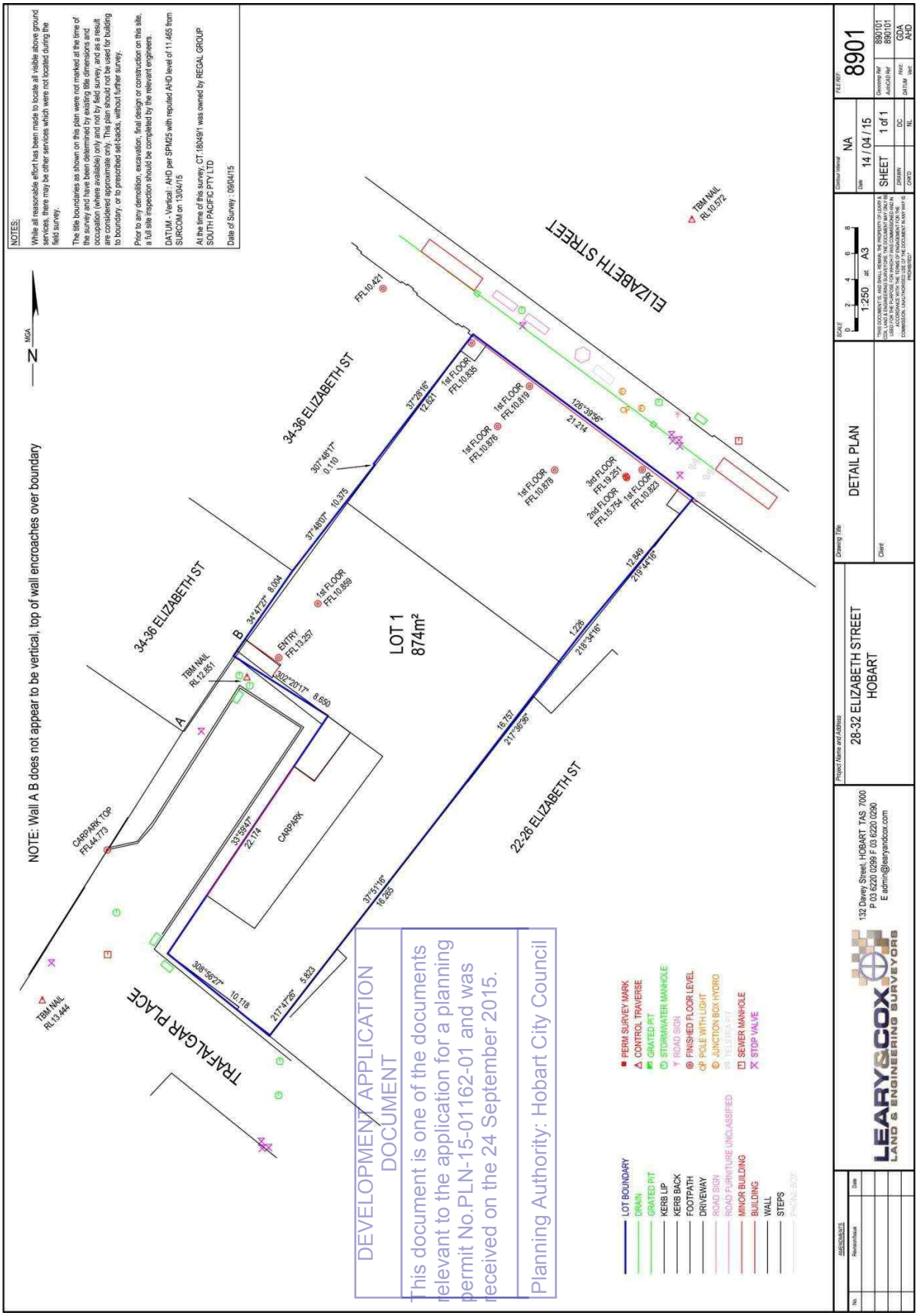

Figure 24: Detail plan of the existing site showing ground and floor levels.

4.2 Disturbance History

The following sections discuss the potential for survival of archaeological features and deposits within the study area from each key phase of development. In doing so, it takes into account the disturbance history as gleaned from documentary sources and inspection of the site in the present. It attempts to establish how one phase of development may have affected a previous phase.

The history identifies five key phases of site development, with definitive evidence of built development commencing by 1828-30, replaced by more substantial masonry buildings by the 1840s and substantial redevelopment during the early and late twentieth century.

For clarity, the built evolution has been divided into each key phase depicting site development to a particular point in time. In the following plans, each phase is provided a separate colour, with building sites allocated a number which cross-references with the explanatory tables. Most of the individual properties included multiple buildings. Secondary structures (where known) are identified by a letter suffix, e.g., '1a'.

Previous phases are also depicted (in grey) to show where one phase of development may have occurred on the same site. The result of these multiple phases is indeed complex. In addition, parts of the study area which do not directly contain buildings are likely to have been used or developed for domestic or commercial activity, such as associated yards, gardens, laneways and outdoor workspaces, or unmapped outbuildings.

The conclusion drawn from this analysis is that the site is highly disturbed with a low potential to contain significant archaeological deposits. The scale of previous developments, most notably the existing c.1981 building required substantial bulk excavation of the site to create level access off Elizabeth Street. Whilst cutting and levelling exercises had previously occurred, the scale of the 1980s works is likely to have removed the majority, if not all evidence of previous phases of development.

4.2.1 Phase 1: 1804-c.1828-30

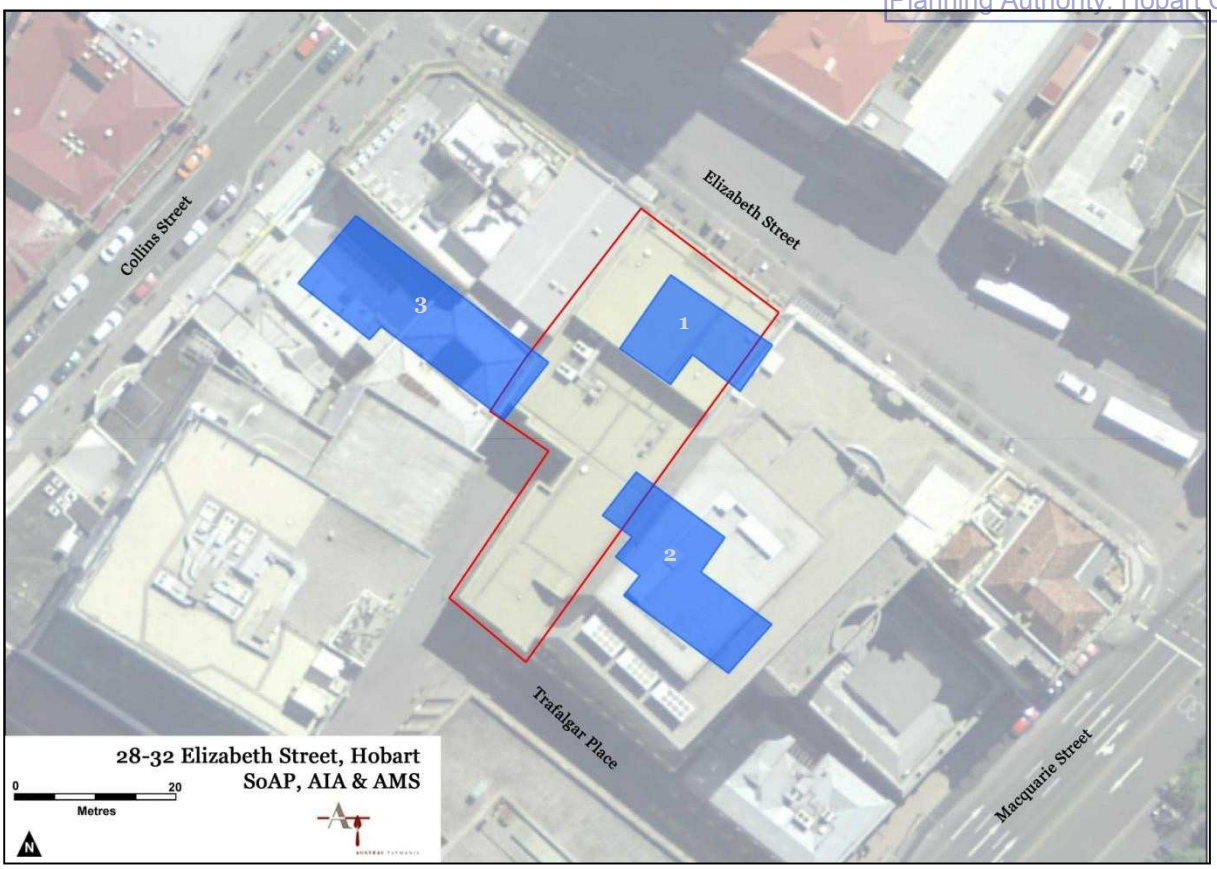

Figure 25: Overlay showing development in the study area from 1804-c.1828-30 (LIST Map, © State of Tasmania).

No.	Development/Phase	Disturbances on Previous Phases
1	Given the central location of the site, it is likely that some use or development of the property occurred in the years following European settlement. However, documentary evidence of such use has not been located. The first definitive phase of development occurred in 1828-30 with the construction of a timber building located on Elizabeth Street frontage [1]. The 1828-30 plan indicates that the building was being built at the time the plan was being prepared, providing precise information as to its period of construction. Its use has not been determined, although it may have been used as a bakery by John Clarke. By this time the property had been acquired by Ann McCarthy.	First phase of built development and no previous phases established.
2	Timber building [2]. The function of this building is not known but it may have combined both residential and commercial functions which would seem likely for this central location. The building had been completed by 1828-30.	First phase of built development and no previous phases established.
3	Masonry building [3]. The 1828-30 plan indicates that the south-eastern end of the building was located within the study area. However this is not confirmed by any other plans and it is probable that the inclusion of this building within the study area is	Building [3] is unlikely to have been located within the study area.

No.	Development/Phase	Disturbances on Previous Phases
	the likely result of scaling error.	

Table 2: Phase 1 Development

4.2.2 Phase 2: 1830-1840s

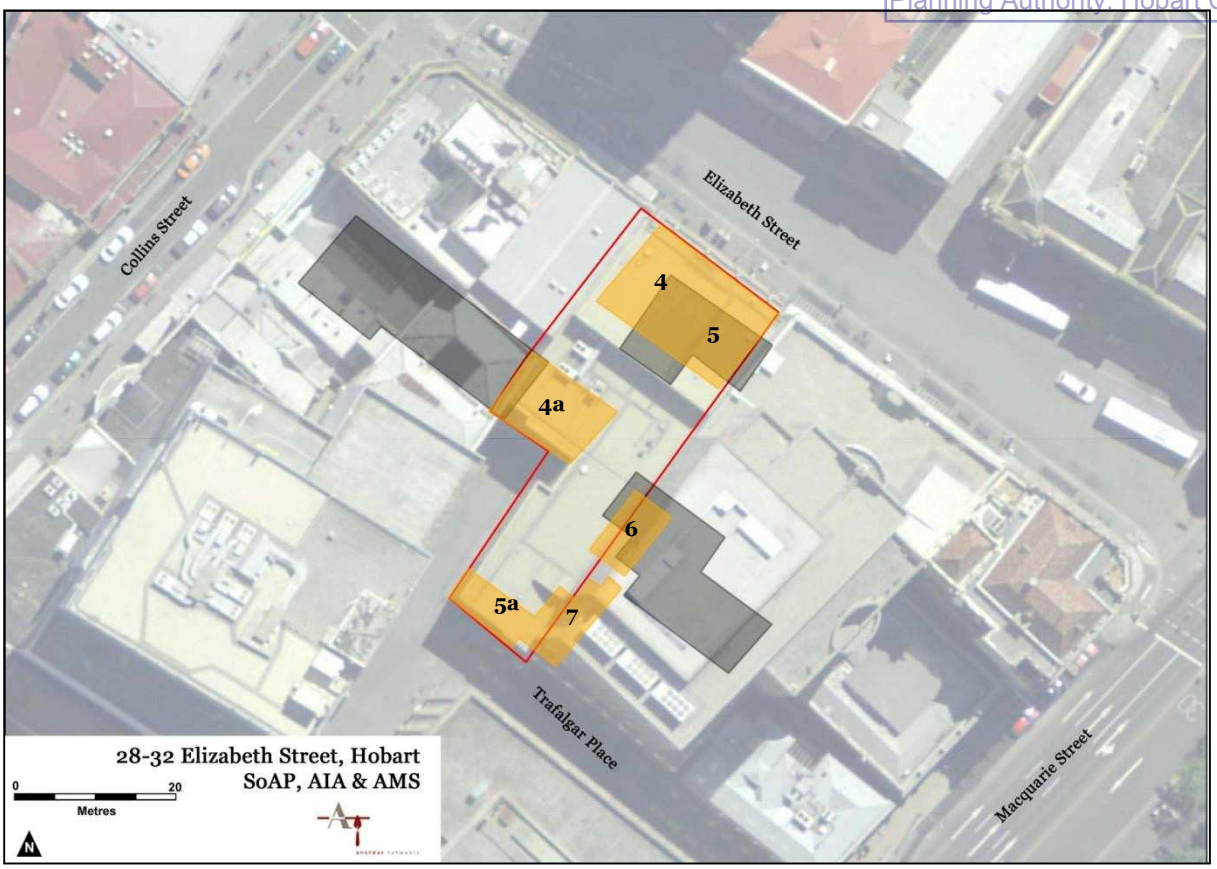

Figure 26: Overlay showing development in the study area from c.1828-30-1840s (LIST Map, © State of Tasmania).

No.	Development/Phase	Disturbances on Previous Phases
4, 4a	Auction Mart [4]. Sprent's survey plan is the first accurate depiction of the site depicting two buildings on the street frontage. [4] was a substantial two-storey masonry building which may have been constructed during the 1830s, but definitively appears on maps from the 1840s. [4a] is likely to have been an outbuilding associated with [4].	[4] is likely to have had a substantial impact on the timber building [1], with a high level of coincidence between the building footprints. The survival of archaeological evidence of timber buildings is variable and determined by a number of factors. Timber buildings that were erected on timber stumps usually leave little surviving evidence, save perhaps the stump holes. However, timber buildings supported on brick or stone footings are more likely to leave tangible remnants, if demolished prior to the 1940s when the use of earthmoving equipment for demolition became common.[62] The construction of [4] is unlikely to have substantially impacted on rear yard spaces or infrastructure, such as drains, cess or rubbish pits related to phase [1] development.
5, 5a	Hamilton's Business Premises [5]. Hamilton acquired the Elizabeth Street frontage and the rear Trafalgar Place lot in 1842. It is likely that he was trading from the site as a cabinet maker, upholsterer and undertaker by 1846.	[5] is likely to have had a substantial impact on the timber building [1], with a high level of coincidence between the building footprints. The survival of structural archaeological evidence of building [1] would be variable, and dependent

[62] Austral Archaeology, *Archaeological Investigation of the Hobart Magistrates' Court*, report prepared for the Tasmanian Department of Justice, Hobart, 1994, p.7

No.	Development/Phase	Disturbances on Previous Phases
	[5a] is likely to have been an outbuilding or workshop associated with [5].	upon its construction and footings material as discussed above. The construction of [5] is unlikely to have substantially impacted on rear yard spaces or infrastructure, such as drains, cess or rubbish pits related to phase [1] development.
6, 7	Timber Building [6] & Masonry Building [7]. These two buildings were historically located on the adjacent lot, but are now partially located within the study area because of boundary adjustments. The precise function of these buildings has not been established, although the 1853 Assessment and Valuation Rolls indicate a combined house and store and three houses located on Trafalgar Place by this time. Given their scale and the location of [6] setback from Trafalgar Place, it would seem probable that these were service or outbuildings associated with larger built development located nearby.	Building [6] was a timber building with a level of coincidence between its footprint and the previous building [2]. Given its small scale, it is unlikely that [6] destroyed all previous evidence of [2]. Building [7] was the first documented phase of built development in this location.

Table 3: Phase 2 Development

4.2.3 Phase 3: 1840s-1912

Figure 27: Overlay showing development in the study area from c.1840s-1912 (LIST Map, © State of Tasmania).

No.	Development/Phase	Disturbances on Previous Phases
4	Former Auction Mart [4]. The building remained extant during this period, although it was used for a variety of different commercial purposes. The footprint shown in Phase 2 largely remained the same, with the exception of an extension off its north-western elevation and lean-to additions to the rear. The likely outbuilding [4a] had been removed by this time, and its location remained largely undeveloped.	[4] is a continuation of the previous phase although the nature of the business carried out on the premises changed substantially during the latter part of the nineteenth century.
5, 8	Former Hamilton's .Business Premises [5]. The building remained extant during this period, but was substantially modified during the 1880s. The commercial uses of the place continued and the footprint of the building remained largely unchanged. Store Building [8]. The date of construction of this large building has not been established with certainty, although Assessment and Valuation Rolls do begin to describe the site as an 'office and warehouse' from 1879. Photographs and plans show that the rear building was a substantial two storey brick store or warehouse structure.	[5] is a continuation of the previous phase although the nature of the business carried out on the premises changed substantially during the latter part of the nineteenth century. [8] is a new phase of development, coinciding with the footprints of previous structures in the rear yard: [5a], [6] and [7]. The construction of [8] is likely to have had some impact on the previous structures as well as yard surfaces, infrastructure or artefact deposits. More extensive impacts however are likely to have resulted from preparatory ground works for the construction of [8]. The study area would have originally sloped towards the south-west and providing ground floor access to [8] from the rear

No.	Development/Phase	Disturbances on Previous Phases
		yard of [5] would have required cutting into the ground level.
9	Masonry Building [9]. Development off Trafalgar Place intensified during the late nineteenth and early twentieth centuries. Residential uses were supplanted by offices, stores and warehouses. Building [9] was a two-storey building fronting the street.	Building [9] may have had some impact on the previous building [7] in this location but is unlikely to have removed all archaeological evidence of previous phases of development.

Table 4: Phase 3 Development

4.2.4 Phase 4: 1912-c.1981

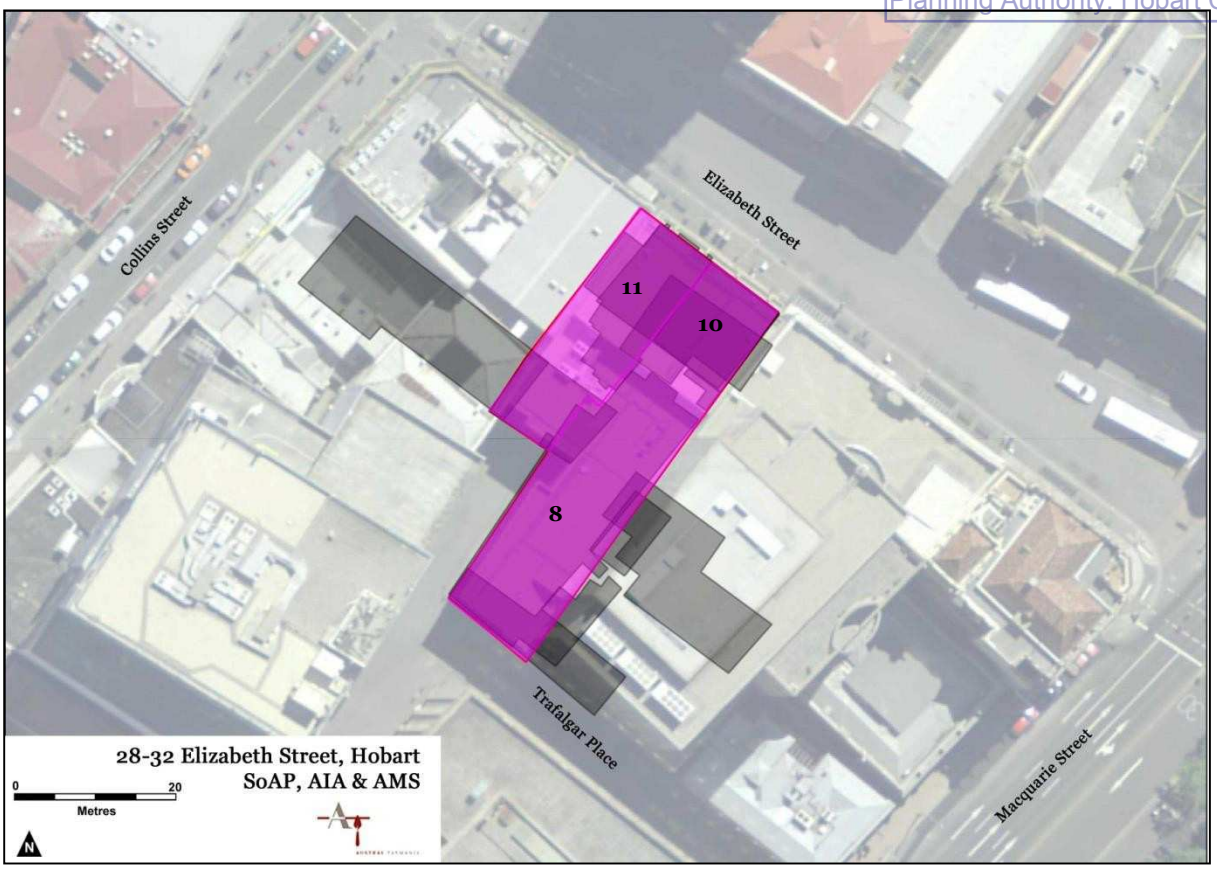

Figure 28: Overlay showing development in the study area from 1912-c.1981 (LIST Map, © State of Tasmania).

No.	Development/Phase	Disturbances on Previous Phases
10, 8	Bank of New South Wales [10]. The former Hamilton Building [5] was demolished and replaced by a two-storey masonry building in 1912 [10]. Former Store Building [8]. The Store Building was retained as part of the Bank development. Its northern end was removed in c.1936 to provide for extensions to the rear of the bank building [10]. These works resulted in built development covering the entire lot. The southern end of [8] was retained as part of these works, although it would appear that further ground works were carried out to provide level access off Elizabeth Street.	[10] was the second phase of substantial masonry development on the site. It is likely to have had a significant impact on archaeology related to the former Hamilton Building [5], and to have removed any evidence of the original timber building [1], had it survived to this date. Rear extensions (and associated preparatory ground works) to [10] in c.1936 are likely to have impacted yard surfaces and associated archaeological deposits from previous phases. The southern half of the store building [8] was retained in this period, although previous phases of archaeology in this location are likely to have already been compromised through preparatory works associated with the construction of [8].
11	Palace Theatre [11]. The old Auction Mart building [4] was demolished and replaced by a three-storey masonry cinema in 1914 [11]. Small single storey brick buildings were located at the rear of the Theatre.	[11] was the second phase of substantial masonry development on the site. The large scale of the building is likely to have had a significant impact on archaeology related to the former Auction Mart [4], and to have removed any evidence of the original timber building [1], had it survived to this date. [11] and associated lean-to structures covered the entire lot and are likely to have impacted yard surfaces and associated archaeological deposits

No.	Development/Phase	Disturbances on Previous Phases
		from previous phases.

Table 5: Phase 4 Development

4.2.5 Phase 5: c.1981-2015

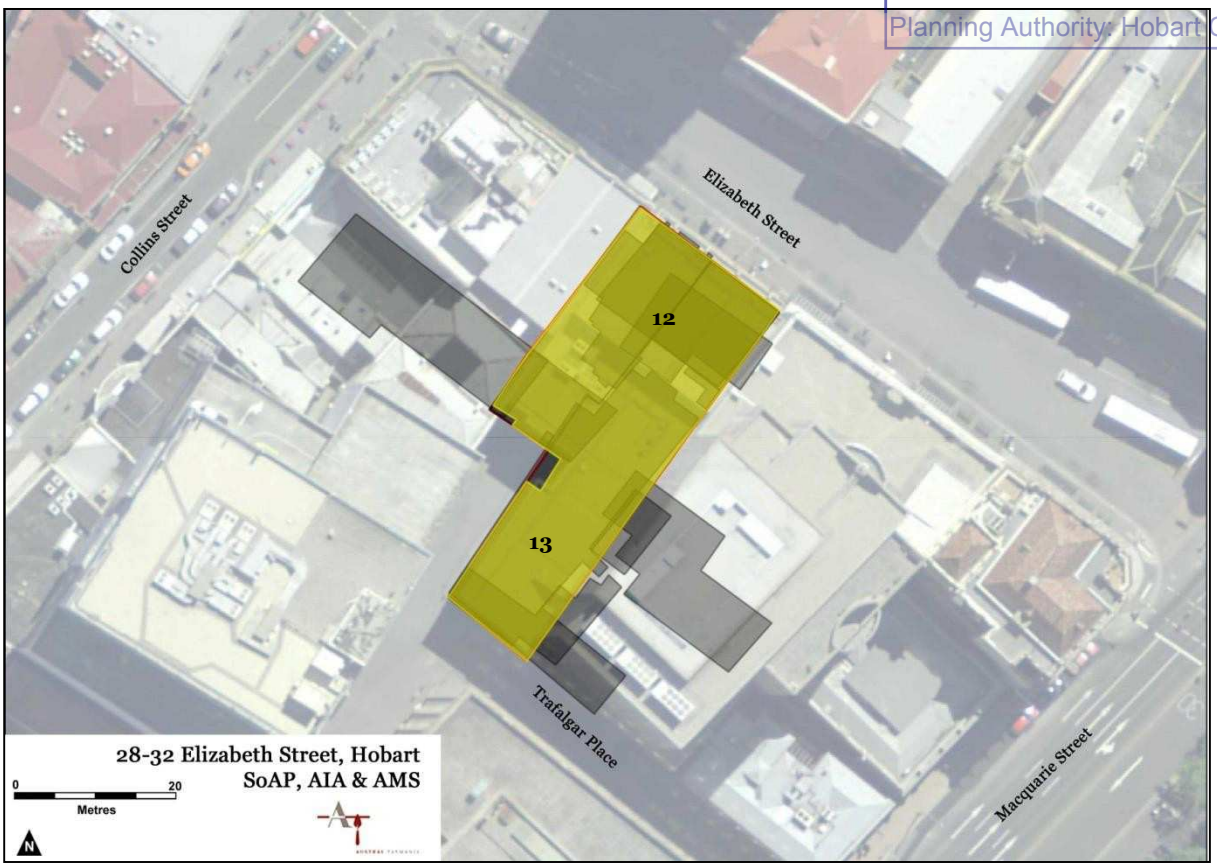

Figure 29: Overlay showing development in the study area from c.1981-2015 (LIST Map, © State of Tasmania).

No.	Development/Phase	Disturbances on Previous Phases
12, 13	Westpac Building [12]. The old bank [10] and former cinema [11] were demolished in the early 1980s and replaced by the current three-storey brick and concrete framed building [12]. A two-storey 'mews' type building at the rear of the site formed part of the development [13]. Building plans for the c.1981 bank have not been retained within archival collections and therefore detailed information regarding excavation depths for [12] and [13] are not known.	Although detailed plans or specifications have not been located, the construction of [12] and [13] are likely to have removed all substantial archaeological evidence of previous phases of use and development on the site. Some remnant structural evidence (e.g., footings) of the 1912 bank [10] and cinema [11] may have survived these works at the Elizabeth Street end of the site where less excavation was required. However evidence of [10] and [11] in this locality is likely to relatively minor and compromised. Differences between street and finished floor levels indicate the scale of excavation works carried out on the site in preparation for the construction of the current building [12] and [13]. The extent of excavations was substantial, particularly towards the south-western end of the site, where the finished ground floor level of [12] is approximately 2.11 m below the Trafalgar Place street level outside. This depth of excavations would not account for further areas of excavation associated with the lift wells, footings, services and so on. Deeper excavations occurred within [13], with the finished floor level approximately 75 cm deeper than the ground floor of [12].

Table 6: Phase 5 Development

4.3 Assessment of Archaeological Potential

An assessment of archaeological potential attempts to establish the likelihood of archaeological features or deposits to exist at a particular place, and provide a level of judgment as to their likely surviving integrity.

In this case it is a question of whether evidence of previous phases of development have survived the twentieth century redevelopment. The likelihood of the place retaining substantial or meaningful evidence of earlier use and development is assessed as low.

The 1912 bank building and 1914 cinema are likely to have disturbed or destroyed structural evidence of the two masonry buildings which existed on the site and fronted Elizabeth Street. However these works may not have removed all archaeological evidence towards the rear of the site which may have contained yard surfaces and deposits, infrastructure such as drains, and areas of excavation such as cess or rubbish pits.

Preparatory ground works for the existing c.1981 former bank building are highly likely to have removed or substantially impacted all previous phases of development on the site. This judgment has been based on the extent of cutting undertaken, particularly at the south-western end of the lot where cuttings in excess of 2.11 m are evident between the finished floor levels and the Trafalgar Place street level above. Excavations at the Elizabeth Street end of the site are likely to have been shallower, and remnant, albeit highly disturbed evidence of the 1912 bank and 1914 cinema may be located towards the street frontage. However, archaeology from these two buildings is likely to be highly compromised, nor would such evidence meaningfully contribute to the knowledge of the site and its history of banking and places of entertainment.

Given the scale of the 1980s works the only archaeological features which may have partially survived would have been very deep services or infrastructure, such as wells or deep cess pits. However there is no historical evidence to suggest that infrastructure such as wells existed on the site, whilst the 1981 geotechnical investigations found no evidence of groundwater in subsurface conditions, which also indicates a low probability of wells ever existing on the site.

The *Hobart Interim Planning Scheme 2015* (*HIPS 2015*) identifies that a Statement of Archaeological Potential should contain an archaeological sensitivity overlay plan depicting the extent of likely surviving important archaeological evidence. No important archaeological evidence is likely to survive at 28-32 Elizabeth Street and therefore an archaeological sensitivity plan is not warranted in this instance.

4.4 Archaeological Significance

The assessment of significance is a key part the historic heritage assessment process. Through the historical research it is possible to build up an understanding of the study area, plotting where buildings or activities may have once been (potential), understanding how they may have evolved across the course of the historic period, or to what specific people or events they may be related. Through this process of contextualisation it is possible to gauge the importance of a site or place, thereby forming judgements about its significance (including its research potential), which provides the basis for determining management actions.

The *HIPS 2015* defines 'historic cultural heritage significance' as having the same meaning as provided in *Historic Cultural Heritage Act 1995* (*HCHA 1995*), which defines significance in terms of eight registration criteria.[63] These criteria relate to places of 'State' heritage significance, but can equally be used for the purposes of assessing places of 'local' heritage significance. Threshold levels for distinguishing between places of State and local level significance are defined by way of assessment guidelines.[64]

Criterion (c.), is the most commonly used criterion for assessing archaeological values, requiring an evaluation of the research potential of the place to yield information that will contribute to an understanding of Tasmania's history. However, archaeological sites will commonly also have significance against a range of other criteria.

[63] *HIPS 2015*, cl.E13.3; *HCHA 1995*, s.3
[64] Tasmanian Heritage Council, *Assessing historic heritage significance for Application with the Historic Cultural Heritage Act 1995*

4.4.1 Statement of Archaeological Significance

The site is assessed as not having archaeological significance at either State or local levels. Late twentieth century redevelopment of the property is likely to have destroyed or substantially impacted on previous phases of historic use and development. The place has low potential to provide new and important information related to Tasmania's history, and in particular the continued evolution of Hobart's central business district for commercial purposes.

The site has some historical interest and association with significant developments or individuals. This includes important commercial enterprises (the Auction Mart, Hamilton building, 1912 Bank of New South Wales), places of entertainment (the short-lived Palace Theatre), and associations with prominent architects who either worked from buildings located on the site, or were responsible for the design of such buildings.

The nature of these associations are only evident through the historical record and are not demonstrated by, or are highly unlikely to be demonstrated by any significant fabric which has been removed by subsequent developments. These associations are considered to be of historical interest and not historical significance within formal assessment frameworks.

5.0 ARCHAEOLOGICAL IMPACT ASSESSMENT

5.1 Planning Scheme Requirements

In addition to any other application requirements, the planning authority may require the applicant to provide an archaeological impact assessment to determine compliance with the performance criteria. An 'archaeological impact assessment' is defined by the *HIPS 2015* to mean:

> A report prepared by a suitably qualified person that includes a design review and describes the impact of proposed works upon archaeological sensitivity (as defined in a statement of archaeological potential).[65]

These requirements are considered below.

5.2 Design Review and Assessment of Archaeological Impacts

A Design Review is a means of quantifying the extent of impacts to areas of archaeological potential which assists in determining an archaeological strategy and management techniques.

At the time of reporting, detailed information related to the proposed development is not available. However sufficient information does exist to quantify the likely extent of ground works which will be required for the proposed hotel.

Based on knowledge of geotechnical conditions, footings will generally be founded approximately 2 m below the existing ground levels. Footings on the side property boundaries adjacent to existing buildings will need to be deeper, extending to depths of approximately 4 m. At this stage, it is anticipated that pad footings varying in size up to 3 x 3 m² and larger pads under stairs and lift cores will be required.[66]

The extent of these footings is shown in the preliminary plan below (Figure 30). It indicates strip footings located around the perimeter of the site, pad footing sites located within the interior of the space and areas of excavation required for the three lifts and stair network. Excavations will also be required for an underground pump room to be located along the south-eastern boundary of the lot, and a basement level on Elizabeth Street (Figure 31).

The proposed finished ground floor level will be between 10.45 - 10.80 m, which is similar to the floor level for the existing building and will maintain the largely level access off Elizabeth Street.

The extent of likely excavations required for this development will be substantial in both area and depth. They are likely to extend beyond the depths of excavation carried out for the c.1981 building. The footings within the interior of the building and its perimeter will require the area of new excavation to be significant.

Despite the substantial nature of the proposed ground works, the likelihood of them impacting on archaeological features or deposits is assessed as being low. This conclusion is based on the low likelihood of significant archaeology having survived the construction of the c.1981 works. Some potential exists for the proposed hotel works to encounter archaeology associated with the 1912 and 1914 buildings along the Elizabeth Street frontage. However, such archaeology should it exist is likely to have already been highly compromised.

[65] *HIPS 2015*, cl.E13.3
[66] Email, Richard Lawrence (Gandy and Roberts) to James Puustinen (Austral Tasmania) 12 July 2015; Email, Richard Lawrence (Gandy and Roberts) to James Puustinen (Austral Tasmania) 29 2015

Figure 30: Ground Floor Plan (Jaws Architects).

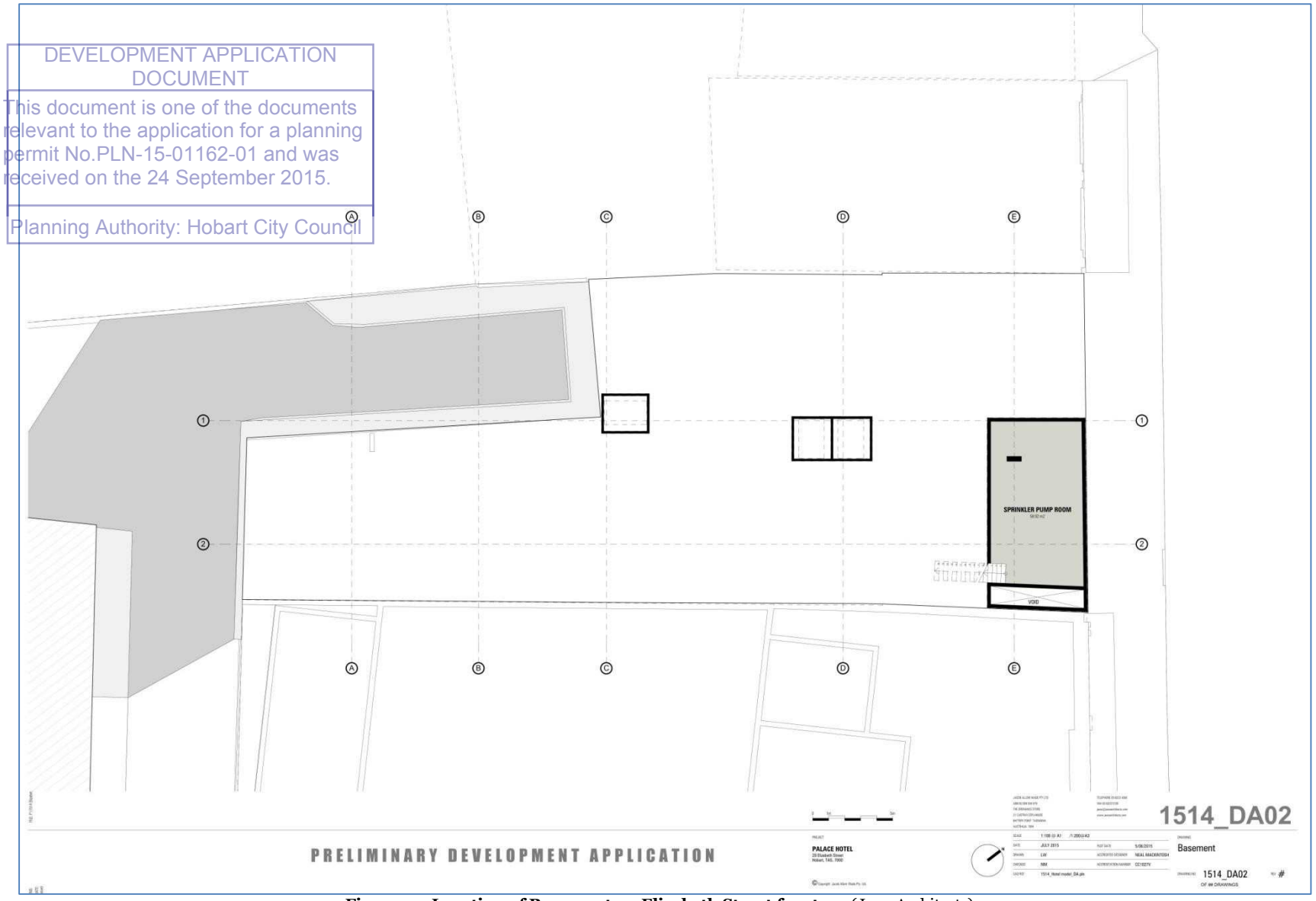

Figure 31: Location of Basement on Elizabeth Street frontage (Jaws Architects).

5.3 Assessment against the Performance Criteria

The proposal does not satisfy the acceptable solution of the development standards for 'Building, Works and Demolition'.[67] It must therefore be assessed against the performance criteria provided in clause E13.10.1. The standards emphasise the importance of protecting or managing places of archaeological potential. Each criterion is assessed in Table 7 below.

Performance Criteria	Response
Buildings, works and demolition must not unnecessarily impact on archaeological resources at places of archaeological potential, having regard to:	
(a) the nature of the archaeological evidence, either known or predicted;	• The assessment of archaeological potential for 28-32 Elizabeth Street is a predictive statement that has not been confirmed through physical investigations. • The assessment concludes that the place has a low likelihood of significant archaeological evidence surviving at the place, a result of the ground disturbances carried out in c.1981 for the construction of the current building which would have had substantial impacts on the archaeological resource of the place.
(b) measures proposed to investigate the archaeological evidence to confirm predictive statements of potential;	• No measures are proposed to investigate the predictive statements of potential as the place has been assessed as having low archaeological potential. • Management responses have been proposed in the Archaeological Method Statement (section 6.0), commensurate to this low level of potential and the unlikely scenario that significant archaeological features or deposits are located during works.
(c) strategies to avoid, minimise and/or control impacts arising from building, works and demolition;	• The Archaeological Method Statement recommends notification protocols to control potential impacts should archaeological features or deposits be located during works.
(d) where it is demonstrated there is no prudent and feasible alternative to impacts arising from building, works and demolition, measures proposed to realise both the research potential in the archaeological evidence and a meaningful public benefit from any archaeological investigation;	• Archaeological impacts arising from the proposed building are unlikely and therefore it is not necessary to define measures to realise research potential and derive a public benefit. • Management measures are considered appropriate for the low level of archaeological potential at the site.
(e) measures proposed to preserve significant archaeological evidence 'in situ'.	• Significant archaeological evidence is unlikely to exist at the site and therefore *in situ* preservation is not applicable.

Table 7: Assessment against the Performance Criteria of E13.10.1

[67] *HIPS 2015*, cl.E13.3

6.0 ARCHAEOLOGICAL METHOD STATEMENT

6.1 Planning Scheme Requirements

In addition to any other application requirements, the planning authority may require the applicant to provide an archaeological method statement to determine compliance with the performance criteria. An 'archaeological method statement' is defined by the *HIPS 2015* to mean:

> a report prepared by a suitably qualified person that includes the following where relevant to the matter under consideration:
>
> a) strategies to identify, protect and/or mitigate impacts to known and/or potential archaeological values (typically as described in a Statement of Archaeological Potential);
> b) collections management specifications including proposed storage and curatorial arrangements;
> c) identification of measures aimed at achieving a public benefit;
> d) details of methods and procedures to be followed in implementing and achieving (a), (b) and (c) above;
> e) expertise to be employed in achieving (d) above;

The disturbance history (section 4.2), assessment of archaeological potential (section 4.3), and the assessment of archaeological significance (section 4.4) indicate that the place has been highly disturbed with a low potential of containing archaeological features or deposits, and as a result, does not have archaeological significance.

The recommendations made in this Method Statement have been prepared in response to this assessment of low archaeological potential. They address the *HIPS 2015* definition requirements as relevant.

6.2 Management Recommendations

Recommendation 1: Statutory Compliance

This Statement of Archaeological Potential, Impact Assessment and Method Statement should form part of the Development Application to Hobart City Council for the proposed development.

Reason for Recommendation

The property at 28-32 Elizabeth Street is located within the Place of Archaeological Potential defined by Figure E13.4.1 of the *HIPS 2015*. The proposed development does not satisfy the acceptable solution of the development standards for 'Building, Works and Demolition'. It must therefore be assessed against the performance criteria provided in clause E13.10.1.

Recommendation 2: Aboriginal Heritage

The Unanticipated Discovery Plan for managing Aboriginal heritage (Appendix 1) should form part of the project specifications.

Reason for Recommendation

Aboriginal Heritage Tasmania, DPIPWE have recommended that the Unanticipated Discovery Plan should be implemented should Aboriginal heritage be discovered or suspected during ground disturbance works.

Recommendation 3: Precautionary Approach to Excavations

For precautionary purposes, notification protocols should be included in the project specifications whereby archaeological advice is sought in the unlikely event that features or deposits of an archaeological nature[68] are uncovered during excavations as part of the proposed development or where doubt exists concerning the provenance of any strata revealed during excavations. In such instances, excavation should immediately cease pending attendance on site and receipt of advice from a qualified archaeologist, at which point, depending on the findings, it may also be necessary to involve Hobart City Council in discussions.

[68] This may include but not be limited to the exposure of hand made clay bricks or sandstone blocks forming walls or surfaces, or artefacts such as fragments of ceramic, bottle glass, bone, shell or other items.

Reason for Recommendation

The site is assessed as having low archaeological potential because of previous impacts. Some caution should however be exercised during excavations and appropriate archaeological expertise employed to appropriately identify, assess and propose management techniques as required.

Recommendation 4: Managing Unanticipated Discoveries

Archaeological management will be required in the unlikely event that significant archaeological features or deposits are located during excavation works. Dependent on the nature and significance of the archaeological feature or deposit, consideration should be given as to whether the archaeological material can be conserved *in situ* as part of the development. Where this is not prudent and feasible, significant features or deposits should be archaeologically excavated, recorded and analysed in accordance with Parts 4 to 8 of the Tasmanian Heritage Council's Practice Note 2: *Managing Historical Archaeological Significance in the Works Application Process*. Archaeological management approaches should be endorsed by Hobart City Council.

Reason for Recommendation

To ensure that significant archaeological features or deposits are appropriately managed as part of the development, and are subject to approval from Hobart City Council. The Heritage Council's Practice Note 2 establishes the broadly accepted standards and framework for archaeological excavation, recording and analysis in Tasmania.

Recommendation 5: Interpretation Opportunities

Consideration should be given to creative interpretation responses to present the history of the place as part of the proposed development.

Reason for Recommendation

The place is not assessed as having archaeological or historical significance within a formal assessment framework. However the history of the site is of some historical interest as a demonstration of the continued evolution of Hobart's central business district. Opportunities to creatively present this history to users and visitors should be considered.

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APPENDIX 1: UNANTICIPATED DISCOVERY PLAN

Unanticipated Discovery Plan

For proponents and consultants dealing with Aboriginal Heritage in Tasmania

This paper provides a Plan that should be followed when dealing with unanticipated discoveries of Aboriginal Cultural Heritage such as sites and objects. The plan provides guidance to project personnel so that they may meet their obligations with respect to Aboriginal heritage in accordance with the *Aboriginal Relics Act 1975* and the *Coroners Act 1995*.

The Unanticipated Discovery Plan is in two sections. The first section primarily explains mitigation strategies that should be employed when any Aboriginal Cultural Heritage sites or items are discovered excluding skeletal remains (burials), while the second process deals specifically with skeletal remains (burials).

Discovery of Cultural Heritage Items

Step 1: Any person who believes they have uncovered Aboriginal Cultural Heritage material should notify all employees or contractors that are working in the immediate area that all earth disturbance works must cease immediately.

Step 2: A temporary 'no-go' or buffer zone of at least 10m x 10m should be implemented to protect the suspected Aboriginal Cultural Heritage site or relics. No unauthorised entry or works will be allowed within this 'no-go' zone until the suspected Aboriginal Cultural Heritage relics have been assessed by a recognised Aboriginal Heritage Practitioner.

Step 3: Aboriginal Heritage Tasmania (AHT) in Hobart (ph 6165 3152) needs to be notified and consulted as soon as possible and informed of the discovery. AHT will then provide further advice in accordance with the *Aboriginal Relics Act 1975*.

Discovery of Skeletal Material

Step 1: Call the Police immediately. Under no circumstances should the suspected skeletal remains be touched or disturbed. The area must now be considered a crime scene. It is a criminal offence to interfere with a crime scene.

Step 2: Any person who believes they have uncovered skeletal material should notify all employees or contractors that are working in the immediate area that all earth disturbance works must cease immediately.

Step 3: A temporary 'no-go' or buffer zone of at least 50m x 50m should be implemented to protect the suspected skeletal remains. No unauthorised entry or works will be allowed within this no-go' zone until the suspected skeletal remains have been assessed by the Police and or Coroner.

Step 4: Should the skeletal remains be determined to be of Aboriginal origin, the Coroner will contact an Aboriginal organisation approved by the Attorney-General, as per the *Coroners Act 1995*.

Aboriginal Heritage Tasmania
Natural and Cultural Heritage Division
Department of Primary Industries, Parks, Water and Environment

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Unanticipated Discovery Plan

Guide to the most common sites types in Tasmania.

Stone Artefact Scatters

A stone artefact is any stone or rock which has been modified by Aboriginal people. Often this is the result of fracturing or 'flaking' fine grained rocks to produce sharp cutting or scrapping implements. The most common stone types utilised by Tasmanian Aboriginal people are silcrete and chert, on account of their availability and excellent tool making properties. However we also find hornfels, chalcedony, spongelite, quartzite and other stone types where locally available.

In Tasmania, stone artefacts are typically recorded as being 'isolated' (i.e. only one) or in a 'scatter' (i.e. two or more within a 50m radius). Stone artefacts are found all over Tasmania, in all landscapes and situations, and are the most basic indicator of Aboriginal occupation.

Shell Middens

Middens are occupational deposits created through an accumulation of debris from human activity. Midden sites can range in size from large mounds to small scatters of shell. The most common shellfish species found in middens in Tasmania are abalone, oyster, mussel, warrener and limpet, however they can also contain other debris such as animal bone, charcoal from campfires and discarded tools made from stone, shell or bone These sites are usually found near waterways and coastal areas.

Rockshelters

Caves and rock overhangs which bear signs of human activity are, for the purpose of the Aboriginal Heritage Register (AHR), collectively called occupied rock shelters. Aboriginal people utilised these places for shelter, ceremony and other cultural practices, leaving behind occupational deposits such as middens and hearths, tools, or in some cases, rock markings. Rock shelters are usually found where the geology is conducive to the formation of caves and rock overhangs.

Quarries or Stone Procurement Sites

A quarry is a place where material has been extracted from a natural outcrop by Aboriginal people. The two types of quarry recorded on the AHR are stone and ochre; each typically being located wherever suitable ochre for painting and decoration, or stone for tool-making appear. Quarries can be recognised by evidence of human manipulation, and by the debris left behind from processing the material. Quarries can be extensive or discrete, depending on the size and quality of the outcrop, and how often it was utilised and visited.

Rock Marking

Rock marking is the term used in Tasmania to define markings on rocks, which are the result of Aboriginal practices. Rock markings come in two forms; engraving and painting. Engravings are made by removing the surface of a rock through pecking, abrading or grinding, whilst paintings are made by adding pigment or ochre to the surface of a rock.

Burials

Burial sites are highly sensitive places. They can occur anywhere, and have previously been recorded in sand dunes, shell middens and rock shelters.

Aboriginal Heritage Tasmania
Natural and Cultural Heritage Division
Department of Primary Industries, Parks, Water and Environment

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APPENDIX 2: ASSESSMENT AND VALUATION ROLLS (SELECT)

(Original spellings reproduced)

1853					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
Elizabeth Street	Shop	W Hamilton	W Hamilton	£157	-
Elizabeth Street	Auction Mart	Robert Worley	J Solomon	£100	-
1855					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
Elizabeth Street	House and stores	William Casper and Henry Wolff	-	£200	-
Elizabeth Street	Auction Mart	Robert Worley & Thomas Frodsham	-	£140	-
1860					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
6 Elizabeth Street	House and shop	William Hamilton	William Hamilton	£80	-
8 Elizabeth Street	Auction Mart	Robert Worley	Joseph Solomon	£130	-
1865					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
6 Elizabeth Street	House and shop	William Hamilton	William Hamilton	£90	-
8 Elizabeth Street	Auction Mart	Robert Worley	Joseph Solomon	£85	-
1869					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
6 Elizabeth Street	Dwelling house and shop	William Hamilton	William Hamilton	£82	-
8 Elizabeth Street	Dwelling house and shop	Alfred Perry	Joseph Solomon, Liverpool Street	£15	-
8 Elizabeth Street	Auction Mart and Office	Thomas Alfred Dossitor	As Above	£52	
1875					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
6 Elizabeth Street	Dwelling house and shop	William Hamilton	William Hamilton	£82	-
8 Elizabeth Street	Dwelling house and shop	Thomas A Dossetor	Joseph Solomon, Liverpool Street	£15	-
8A Elizabeth Street	Auction Mart and Office	Thomas A Dossetor	As Above	£52	
1879					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
4 Elizabeth Street	Office and warehouse	John Hamilton	William Hamilton, New Town	£100	-
6 Elizabeth Street	Office and warehouse	Empty	Joseph Solomon, Liverpool Street	£80	-

1884					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
4 Elizabeth Street	Office and warehouse	John Hamilton	William Hamilton, Colville Road, E	£150	-
6 Elizabeth Street	Office and warehouse	Edward Chancellor	Joseph Solomon, Liverpool Street	£90	-
1889					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
12 Elizabeth Street	Office and warehouse	Clyde Hamilton & Albert EL McGregor	Mrs Hamilton, Colville Road	£140	-
14 Elizabeth Street	Office and warehouse	Edward Chancellor	Joseph Solomon, Argyle Street	£90	-
1895					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
12 Elizabeth Street	Office and warehouse	L McGregor & Alex. McGregor jun.	John G McGregor	£100	-
	Office	Horatio F Bourne	As above	£40	
	Office	Empty	As above	£13	
	Office	Empty	As above	£13	
	Office	Empty	As above	£26	
	Office	David T Brownlie	As above	£26	
	Office	George F Lovett	As above	£15	
14A Elizabeth Street	Office	R Flack Ricards	Joseph Solomon's estate	£30	-
14 Elizabeth Street	Office and warehouse	John Hamilton	As Above	£90	
1898					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
12 Elizabeth Street	Office and warehouse	Albert E McGregor & Alex. McGregor jun.	John G McGregor, Runnymede Street	£120	-
	Office	Horatio F Bourne	As above	£40	
	Office	Perceval Newton	As above	£13	
	Office	Thomas A Okines	As above	£13	
	Office	Thomas A Okines	As above	£26	
	Office	David T Brownlie	As above	£21	
	Office	Empty	As above	£13	
14A Elizabeth Street	Office	R Flack Ricards and Douglas G Salier	Joseph Solomon's estate	£30	-
	Office	John Hamilton, Secretary Grand Lodge of Tasmania	As Above	£12	
14 Elizabeth Street	Office and warehouse	Clyde Hamilton	As Above	£90	
1901					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
12 Elizabeth Street	Office and warehouse	Albert E McGregor & Alex. McGregor jun.	John G McGregor, Runnymede Street	£150	£5,000
	Office	Thomas A Okines	As above	£45	

	Office	Empty	As above	£13	
	Office	Empty	As above	£10	
	Office	Major L Hood	As above	£20	
	Office	Horatio F Bourne	As above	£21	
	Office	Empty	As above	£13	
14A Elizabeth Street	Office	Empty	Joseph Solomon's estate	£40	
	Office	John Hamilton, Secretary Grand Lodge of Tasmania	As Above	£10	£2,200
14 Elizabeth Street	Office and warehouse	John & Clyde. William Dickenson & Samuel Scollick	As Above	£90	

1905

Address	Description	Occupier	Owner	Ratable Value	Capital Value
12 Elizabeth Street	Office and warehouse	Albert E McGregor & Alex. McGregor	John G McGregor's estate; Albert EL and Alex. McGregor & Ronald Gunn, trustees	£150	
	Office	Thomas A Okines	As above	£45	
	Office	Empty	As above	£13	£5,500
	Office	Empty	As above	£10	
	Office	Rudolph Koch	As above	£20	
	Office	Frederick L Langford	As above	£21	
	Office	Major L Hood	As above	£20	
14A Elizabeth Street	Office	R Flack Ricards	Joseph Solomon's estate	£40	
	Office	John Hamilton, Secretary Grand Lodge of Tasmania	As Above	£10	£2,600
16 Elizabeth Street	Office and warehouse	John & Clyde. William Dickenson & Samuel Scollick	As Above	£90	

1910

Address	Description	Occupier	Owner	Ratable Value	Capital Value
28 Elizabeth Street	Office	Thomas A Okines	John G McGregor's estate; Albert EL and Alex. McGregor & Ronald Gunn, trustees	£45	
	Office	Empty	As above	£10	
	Office	Rudolph Koch	As above	£28	£7,000
	Office	Frederick L Langford	As above	£21	
	Office	T.A. Okines	As above	£10	
30 Elizabeth Street	Office and warehouse	Albert E McGregor & Alex. McGregor	As above	£150	
32 Elizabeth Street	Office and warehouse	John and Clyde Hamilton	Clyde Hamilton	£70	
	Office	Samuel Scollick	As Above	£50	£4,000
	Office	R Flack Ricards and Frank J Heyward	As Above	£40	
	Office	John Hamilton,	As Above	£10	

		Secretary Grand Lodge of Tasmania			
1915					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	James R Chapman	Bank of New South Wales	£335	-
	Part used as dwelling	As above	As Above	£25	
32 Elizabeth Street	Palace Theatre	-	Palace Pictures Ltd	£658	-
1920					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	James R Chapman	Bank of New South Wales	£350	-
	Part used as dwelling	As above	As Above	£25	
32 Elizabeth Street	Palace Theatre	-	Palace Pictures Ltd	£658	-
1924					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	GA Greenwood	Bank of New South Wales	£525	-
	Part used as dwelling	-	As Above	£25	
32 Elizabeth Street	Palace Theatre	-	Palace Pictures Ltd	£658	-
1930					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	G.A Whitehouse	Bank of New South Wales	£550	-
	Part used as dwelling	-	As Above	£25	
30 Elizabeth Street	Shop	Tasmanian Motor Tours and Eva Rust	Barnett Bros., Collins Street; CR Barnett, public officer	£278	-
32 Elizabeth Street	Shop	Henry E Round	As Above	£370	
	Shop	Mrs E Woolley	As Above	£175	
1934					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	G.H Whitehouse	Bank of New South Wales	£550	-
	Part used as dwelling	-	As Above	£25	
30 Elizabeth Street	Shop	Tasmanian Motor Tours and Eva Rust	Barnett Bros., Collins Street; CR Barnett, public officer	£278	-
32 Elizabeth Street	Shop	Henry E Round	As Above	£370	
	Shop	Mrs E Woolley	As Above	£175	
1939					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	GA Whitehouse	Bank of New South Wales	£675	-
	Part used as dwelling	MD Jeffrey	As Above	£25	

30 Elizabeth Street	Shop	Tasmanian Motor Tours and Eva Rust	Rita Dobson, c/o Perpetual Trustees	£281	-
32 Elizabeth Street	Shop	Henry E Round	As Above	£370	
	Shop	Miss E Woolley	As Above	£188	
1946					
Address	**Description**	**Occupier**	**Owner**	**Ratable Value**	**Capital Value**
28 Elizabeth Street	Bank of New South Wales	Bank of New South Wales	Bank of New South Wales	£675	-
	Part used as dwelling	MD Jeffrey	As Above	£25	
30 Elizabeth Street	Shop	Henry E Round	Rita Dobson, c/o Perpetual Trustees	£188	-
32A Elizabeth Street	Shop	Miss E Woolley	As Above	£166	
32 Elizabeth Street	Shop	Henry E Round	As Above	£437	

APPENDIX 3: TASMANIAN POST OFFICE DIRECTORIES 1890-1949 (SELECT)

1890-91		
Address	**Occupier**	**Business/Description**
12 Elizabeth Street	Hamilton, McGregor & Co. (Clyde Hamilton & Albert McGregor)	Merchants
12 Elizabeth Street	John Hamilton, MHA	Agent for London & Lancashire Insurance Co.; Union Fire & Marine Insurance Co.; Mutual Life Association of Australia; also manger of Cascade Brewery & Hobart Gas Co.
14 Elizabeth Street	Robert F Ricards	Architect
14 Elizabeth Street	Edward Chancellor	Wine & Spirit merchant
1894-95		
Address	**Occupier**	**Business/Description**
12 Elizabeth Street	DT Brownlie	Share broker
12 Elizabeth Street	HF Bourne	Share broker
12 Elizabeth Street	GF Lovett	Surveyor
12 Elizabeth Street	McGregor Brothers	Merchants
14 Elizabeth Street	Hamilton & Co (John)	Insurance Agents
14 Elizabeth Street	R Flack Ricards	Architect
1900		
Address	**Occupier**	**Business/Description**
12 Elizabeth Street	DT Brownlie	Share broker
12 Elizabeth Street	Thomas A Okines	Solicitor
12 Elizabeth Street	HF Bourne	Share broker, Norwich Union Fire Office
12 Elizabeth Street	McGregor Brothers	Merchants &c. (& at Trafalgar Place). Victoria Insurance Co., McGregor Bros. agents
14 Elizabeth Street	Hamilton & Co (John)	Merchants & Insurance Agents. Agents for: London & Lancashire Insurance Co.; Manchester Fire Assurance Co.; Alliance Mutual & General Assurance Co.; Mutual Life Association of Australia; Ocean Accident & Guarantee Co.
14 Elizabeth Street	John Hamilton, Secretary	Grand Lodge of Tasmania (Freemasons)
14 Elizabeth Street	Douglas G Salier	Architect
1905		
Address	**Occupier**	**Business/Description**
12 Elizabeth Street	R Koch	Architect (late Ulverstone)
12 Elizabeth Street	Thomas A Okines	Solicitor
12 Elizabeth Street	Major L Hood	Estate & commercial agent, Norwich Union Fire Insurance Society (F Leslie Langford, agent)
12 Elizabeth Street	McGregor Brothers	Merchants
12 Elizabeth Street	AEL McGregor	Consul for Belgium
14 Elizabeth Street	Hamilton & Co (John)	Merchants & Insurance Agents. Agents for: London & Lancashire Insurance Co.; Manchester Assurance Co.; Alliance

		Mutual & General Assurance Co.; Mutual Life Association of Australia; Ocean Accident & Guarantee Co.
14 Elizabeth Street	John Hamilton, Secretary	Grand Lodge of Tasmania (Freemasons)
14 Elizabeth Street	Hobart Fire Brigade	
14 Elizabeth Street	Richard R Flack	Architect
1910		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	Rudolph W Koch	Architect, FRVIA
28 Elizabeth Street	Thomas A Okines	Solicitor
28 Elizabeth Street	Leslie F Langford	Share broker
28 Elizabeth Street	Norwich Union Fire Insurance Society	F Leslie Langford, agent
28-30 Elizabeth Street	McGregor Brothers	Merchants
30 Elizabeth Street	AEL McGregor	Consul for Belgium
32 Elizabeth Street	EG Tempest Warman	Optician
32 Elizabeth Street	Hamilton & Co. (Jno)	Merchants & Insurance Agents. London & Lancashire Insurance Co.; Manchester Assurance Co
32 Elizabeth Street	John Hamilton, Secretary	Grand Lodge of Tasmania (Freemasons)
32 Elizabeth Street	Samuel Sollick	Manufacturers' Agent
32 Elizabeth Street	Richard R Flack	Architect
32 Elizabeth Street	Ricards & Heyward	Architects
32 Elizabeth Street	FJ Heywood [*sic*]	Tasmanian Association of Architects
1915		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	James R Chapman, Manager	Bank of New South Wales
32 Elizabeth Street	-	Hobart Picture Palace
1921		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	James R Chapman, Manager	Bank of New South Wales
32 Elizabeth Street	-	Hobart Picture Palace
1925		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	George A Greenwood, Manager	Bank of New South Wales
32 Elizabeth Street	-	Palace Picture Theatre
1930		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	George A Greenwood, Manager	Bank of New South Wales
30 Elizabeth Street	Webster, Rometch, Astor Motors Pty Ld	Booking Office
30 Elizabeth Street	-	Astor Motor Service
32 Elizabeth Street	Mrs ER Watts	Confectioner
32 Elizabeth Street	Annears Sedans	Booking Office
32 Elizabeth Street	New Norfolk Motor Service	Booking Office
32a Elizabeth Street	HE Round Pty Ltd	Grocers

1935		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	George A Whitehouse, Manager	Bank of New South Wales
30 Elizabeth Street	-	Tasmanian Motor Tours
30 Elizabeth Street	-	Blue Bird Luncheon Rooms
32 Elizabeth Street	Mrs E Woolley	Confectioner
32 Elizabeth Street	HE Round Pty Ltd	Grocers
1939		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	-	Bank of New South Wales
30 Elizabeth Street	-	Blue Bird Luncheon Rooms
32 Elizabeth Street	Miss E Woolley	Fruiterer & Confectioner
32 Elizabeth Street	HE Round Pty Ltd	Grocers
1945		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	G.E Hale, Manager	Bank of New South Wales
30-32 Elizabeth Street	HE Round Pty Ltd	Grocers
32 Elizabeth Street	Miss E Woolley	Fruiterer & Confectioner
1948		
Address	**Occupier**	**Business/Description**
28 Elizabeth Street	G.E Hale, Manager	Bank of New South Wales
30-32 Elizabeth Street	HE Round Pty Ltd	Grocers
32 Elizabeth Street	Miss E Woolley	Fruiterer & Confectioner
32 Elizabeth Street	Cook's Sedans	Motor Hire Service

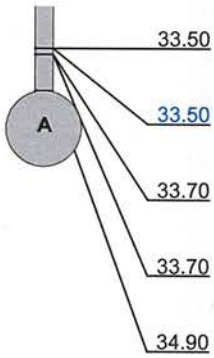
Attachment 4

City :

NU-JET
Bathurst Street
City : HOBART
Tel: 0438120552
www.nujet.com.au
Email: admin@nujet.com.au

Inspection Report / Inspection: 1

Date :	Job number :	Weather :	Operator :	Counter :	Pipe Asset Id :
26/08/2015		No	Stu Knight	1	
Present :	Vehicle :	Camera :	Preset :	Cleaned :	Rate :
				cleaned	



1:252 Position	Code	Observation	MPEG	Photo	Str Rate
33.50	JDA	Joint displaced angular , at 12 o'clock	00:13:38		
33.50	JDL	Joint displaced longitudinaly, longitudinal displacement 21-30mm	00:13:40	1_17A	2
33.70	CNPO	Connection, poor workmanship, connection appears to be open , height 100mm , PVC / PVC	00:14:04		
33.70	CI	Intruding connection, magnitude of intrusion: <5% , at 11 o'clock	00:14:07	1_19A, b	
34.90	FHMH	Finish node, maintenance hole, Nodename: A , at Bus Mall / at Bus Mall	00:14:40	1_20A, b	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
12	20	1.68	58.5	3	1	5	0.14	5	2

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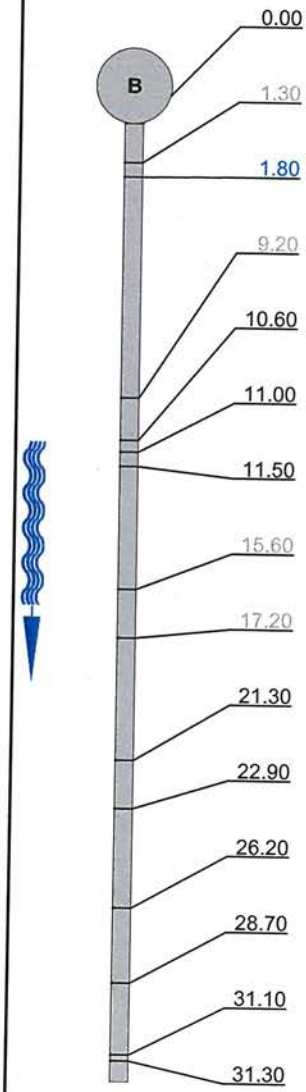
WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		Gandy & Roberts	Stu Knight	1	1
Time of inspection: hh:mm:ss	Cleaning: cleaned	Standard: WSA 05-2008 2.2	LRP: Inside Face of the Wall	Conduit Unit Length	Method of Inspection: Television Camera

Town:		Catchment:		US MH:	B
Suburb:	Hobart	Asset Owner:	Gandy & Roberts	Survey Dir:	downstream
Street:	Trafalgar Lane	Precipitation.:	No	DS MH:	A
Asset Location	Footpath or verge	Flow control	No measures	Inspect Lenght :	34.90 m

Purpose of inspection :	Structural Condition Inspection	Shape :	Circular
Use of Conduit:	Drain	Dia/Height:	375.00 mm
Type of Conduit:	Storm water drain	Lining:	
Lining Method:		Pipe Material:	Reinforced concrete

Remarks :



1:252 Position	Code	Observation	MPEG	Photo	Str Rate
0.00	STMH	Start node, maintenance hole, Nodename: B , rnd gatic lid (at Red Jelly entrance) / rnd gatic lid (at Red Jelly entrance)	00:00:00		
1.30	FC	Circumferential fracture , width 3mm , from 12 to 12 o'clock	00:02:45	1_2A	8
1.80	JDL	Joint displaced longitudinaly, longitudinal displacement 21-30mm	00:03:28		2
9.20	FC	Circumferential fracture, at joint, width 4mm , from 7 to 9 o'clock	00:05:41	1_4A	8
10.60	CNGO	Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock	00:06:23	1_5A, b	
11.00	CNGO	Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock	00:06:56	1_6A, b	
11.50	JDL	Joint displaced longitudinaly, longitudinal displacement 10-20mm	00:07:30		0.5
15.60	FC	Circumferential fracture , width 3mm , from 12 to 12 o'clock	00:08:20		8
17.20	FC	Circumferential fracture , width 5mm , from 12 to 12 o'clock	00:08:58	1_9A	8
21.30	JDL	Joint displaced longitudinaly, longitudinal displacement 10-20mm	00:10:05		0.5
22.90	SS	Spalling of the conduit fabric, localized chipping of one or more of each , Obstruction: <5% , from 12 to 2 o'clock	00:10:27	1_11A, b	20
26.20	JDL	Joint displaced longitudinaly, longitudinal displacement 10-20mm	00:11:32		0.5
28.70	JDL	Joint displaced longitudinaly, longitudinal displacement 10-20mm	00:12:07		0.5
31.10	JDL	Joint displaced longitudinaly, longitudinal displacement 10-20mm	00:12:36		0.5
31.30	RPH	Point repair, hole repaired , length: 300mm , from 1 to 5 o'clock	00:12:52	1_15A, b	

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HOBART
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Email: admin@nujet.com.au

Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_2A, MPEG #: 260815_1, 00:02:45
1.3m, Circumferential fracture , width 3mm , from 12 to 12 o'clock

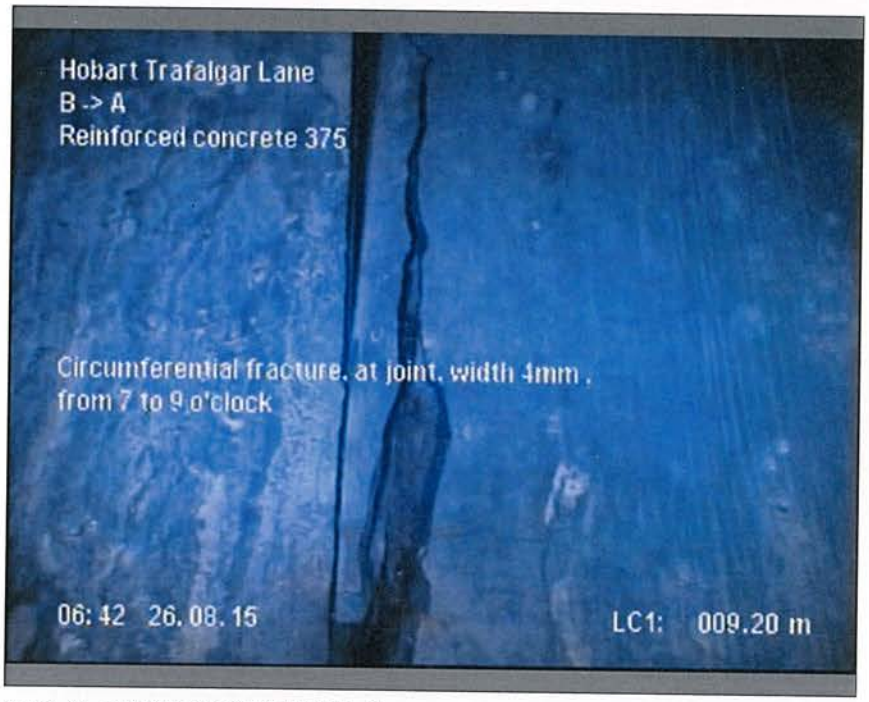

Photo: 1_4A, MPEG #: 260815_1, 00:05:41
9.2m, Circumferential fracture, at joint, width 4mm , from 7 to 9 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_5A, MPEG #: 260815_1, 00:06:23
10.6m, Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock

Photo: 1_5B, MPEG #: 260815_1, 00:06:23
10.6m, Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

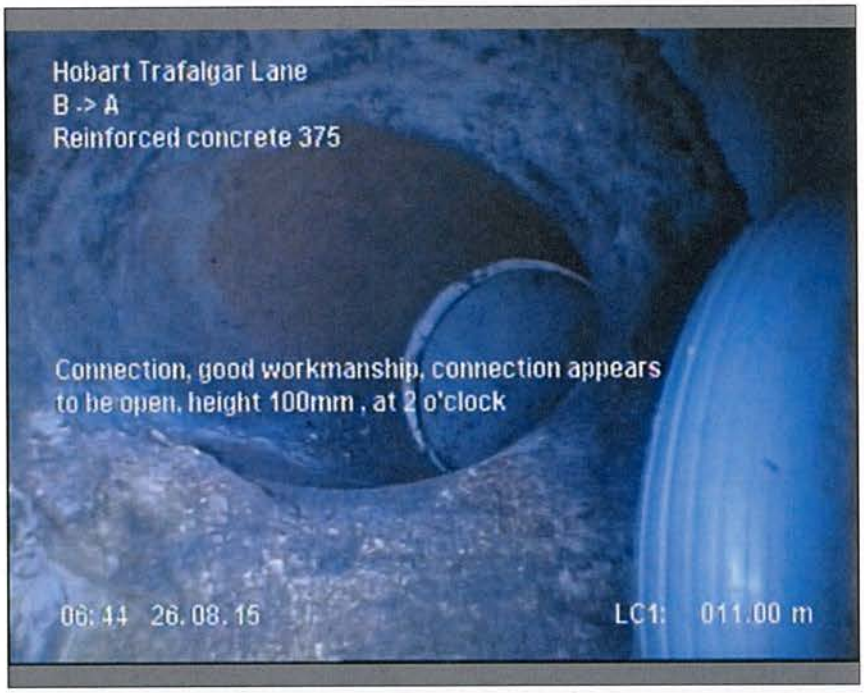

Photo: 1_6A, MPEG #: 260815_1, 00:06:56
11m, Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock

Photo: 1_6B, MPEG #: 260815_1, 00:06:56
11m, Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_9A, MPEG #: 260815_1, 00:08:58
17.2m, Circumferential fracture , width 5mm , from 12 to 12 o'clock

Photo: 1_11A, MPEG #: 260815_1, 00:10:27
22.9m, Spalling of the conduit fabric, localized chipping of one or more of each , Obstruction: <5% , from 12 to 2 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_11B, MPEG #: 260815_1, 00:10:27
22.9m, Spalling of the conduit fabric, localized chipping of one or more of each , Obstruction: <5% , from 12 to 2 o'clock

Photo: 1_15A, MPEG #: 260815_1, 00:12:52
31.3m, Point repair, hole repaired , length: 300mm , from 1 to 5 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_15B, MPEG #: 260815_1, 00:12:52
31.3m, Point repair, hole repaired , length: 300mm , from 1 to 5 o'clock

Photo: 1_17A, MPEG #: 260815_1, 00:13:40
33.5m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_19A, MPEG #: 260815_1, 00:14:07
33.7m, Intruding connection, magnitude of intrusion: <5% , at 11 o'clock

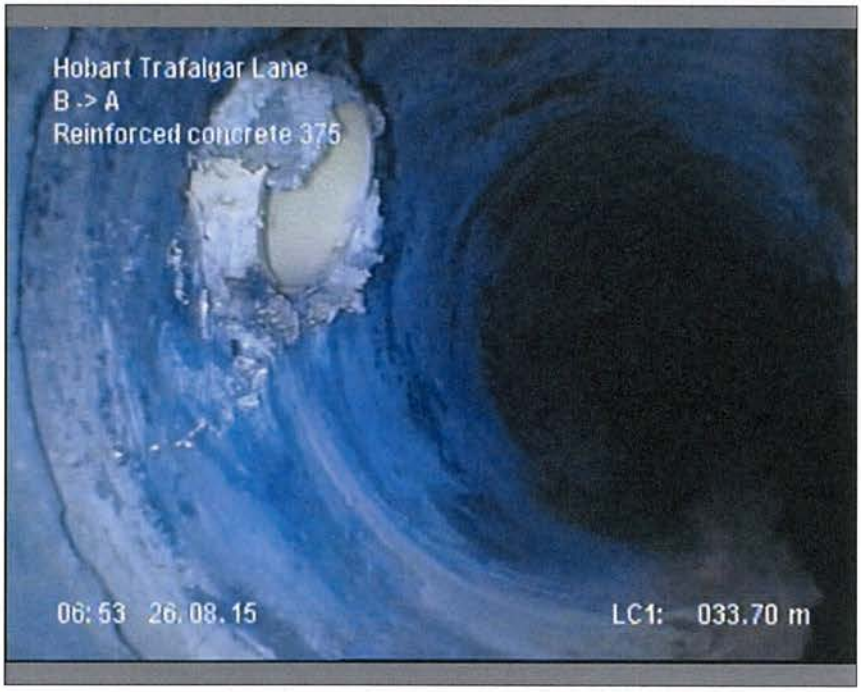

Photo: 1_19B, MPEG #: 260815_1, 00:14:07
33.7m, Intruding connection, magnitude of intrusion: <5% , at 11 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**1**	**1**

Photo: 1_20A, MPEG #: 260815_1, 00:14:40
34.9m, Finish node, maintenance hole, Nodename: A , at Bus Mall

Photo: 1_20B, MPEG #: 260815_1, 00:14:40
34.9m, Finish node, maintenance hole, Nodename: A , at Bus Mall

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WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		Gandy & Roberts	Stu Knight	2	2
Time of inspection:	Cleaning:	Standard:	LRP	Conduit Unit Length	Method of Inspection
hh:mm:ss	cleaned	WSA 05-2008 2.2	Ins		Television Camera

Town:		Catchment:		US MH:	C
Suburb:	Hobart	Asset Owner:	Gandy & Roberts	Survey Dir:	downstream
Street:	Trafalgar Lane	Precipitation.:	No	DS MH:	B
Asset Location	Footpath or verge	Flow control	No measures	Inspect Lenght :	1.20 m

Purpose of inspection :	Structural Condition Inspection	Shape :	Circular
Use of Conduit:	Drain	Dia/Height:	300.00 mm
Type of Conduit:	Storm water drain	Lining:	
Lining Method:		Pipe Material:	Reinforced concrete

Remarks :

1:50	Position	Code	Observation	MPEG	Photo	Str Rate
C	0.00	STMH	Start node, maintenance hole, Nodename: C , Rnd gatic lid (at Red Jelly entrance) / Rnd gatic lid (at Red Jelly entrance)	00:00:00		
	1.20	FHMH	Finish node, maintenance hole, Nodename: B	00:02:00	2_2A	
B						

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**2**	**2**

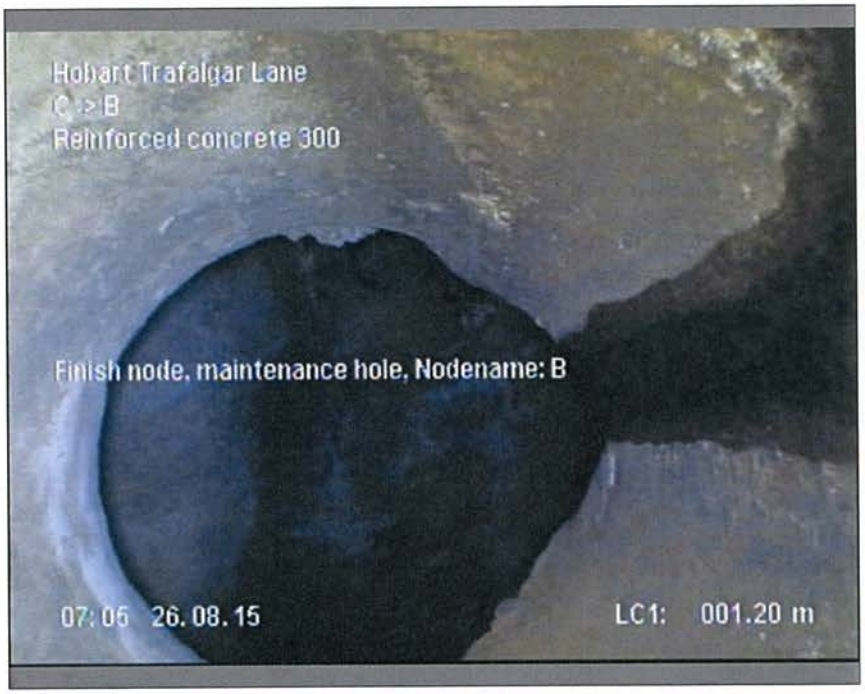

Photo: 2_2A, MPEG #: 260815_1, 00:02:00
1.2m, Finish node, maintenance hole, Nodename: B

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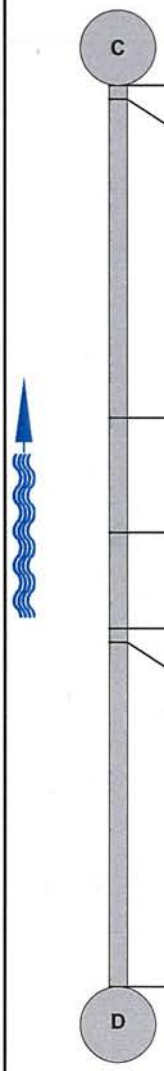
WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		Gandy & Roberts	Stu Knight	3	3
Time of inspection:	Cleaning:	Standard:	LRP	Conduit Unit Length	Method of Inspection
hh:mm:ss	cleaned	WSA 05-2008 2.2	Ins		Television Camera

Town:		Catchment:		US MH:	D
Suburb:	Hobart	Asset Owner:	Gandy & Roberts	Survey Dir:	upstream
Street:	Trafalgar Lane	Precipitation.:		DS MH:	C
Asset Location	Footpath or verge	Flow control	No measures	Inspect Lenght :	19.70 m

Purpose of inspection :	Structural Condition Inspection	Shape :	Circular
Use of Conduit:	Drain	Dia/Height:	300.00 mm
Type of Conduit:	Storm water drain	Lining:	
Lining Method:		Pipe Material:	Reinforced concrete

Remarks :



1:165 Position	Code	Observation	MPEG	Photo	Str Rate
0.00	STMH	Start node, maintenance hole, Nodename: C , rnd gatic lidc (at entrance Red Jelly) / rnd gatic lidc (at entrance Red Jelly)	00:00:00		
0.30	FC	Circumferential fracture , width 2mm , from 12 to 12 o'clock	00:02:08		8
7.30	CCW	Circumferential wall crack, at joint, width 1mm , from 7 to 8 o'clock	00:04:19		1
9.80	CLS	Longitudinal surface crack, at joint, width 1mm , at 8 o'clock	00:05:16		0.1
11.90	CNPO	Connection, poor workmanship, connection appears to be open , height 100mm , PVC / PVC	00:06:08	3_5A, b	
12.20	SS	Spalling of the conduit fabric, localized chipping of one or more of each, at joint, Obstruction: <5% , from 8 to 9 o'clock	00:06:54		20
19.70	FHMH	Finish node, maintenance hole, Nodename: D	00:10:01	3_7A, b	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
4	20	1.48	29.1	3	0	0	0	0	1

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**3**	**3**

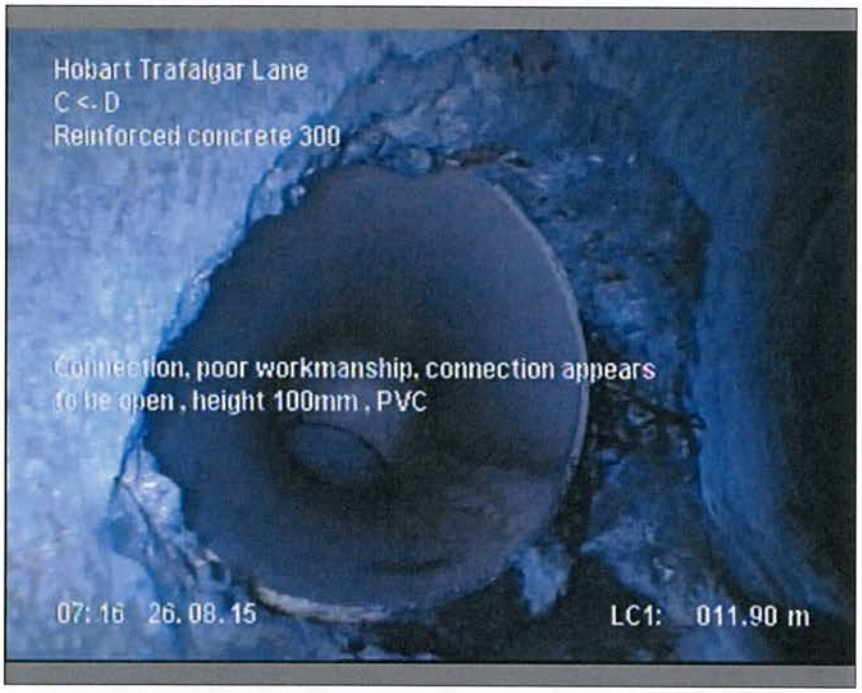

Photo: 3_5A, MPEG #: 260815_1, 00:06:08
11.9m, Connection, poor workmanship, connection appears to be open , height 100mm , PVC

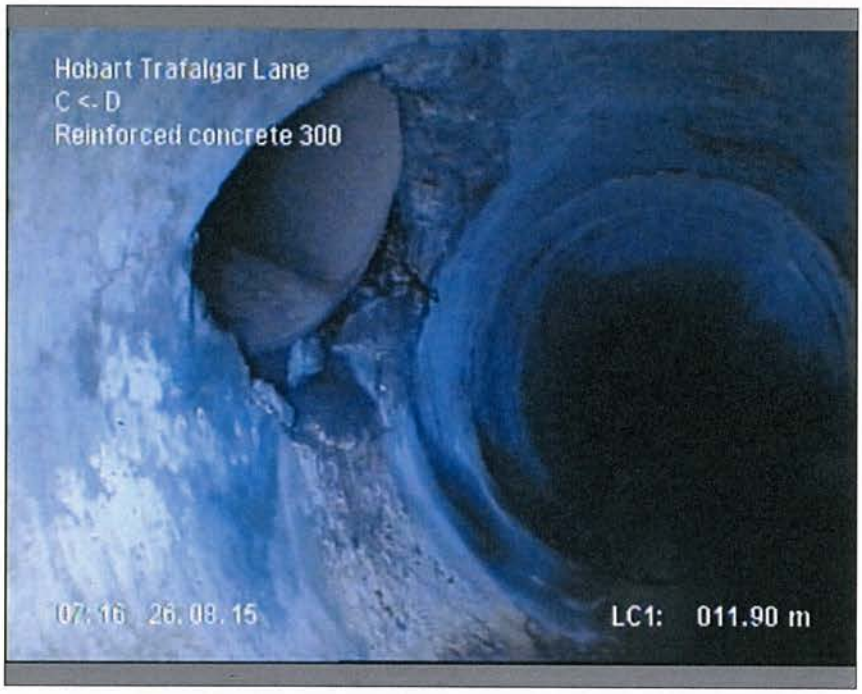

Photo: 3_5B, MPEG #: 260815_1, 00:06:08
11.9m, Connection, poor workmanship, connection appears to be open , height 100mm , PVC

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Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**3**	**3**

Photo: 3_7A, MPEG #: 260815_1, 00:10:01
19.7m, Finish node, maintenance hole, Nodename: D

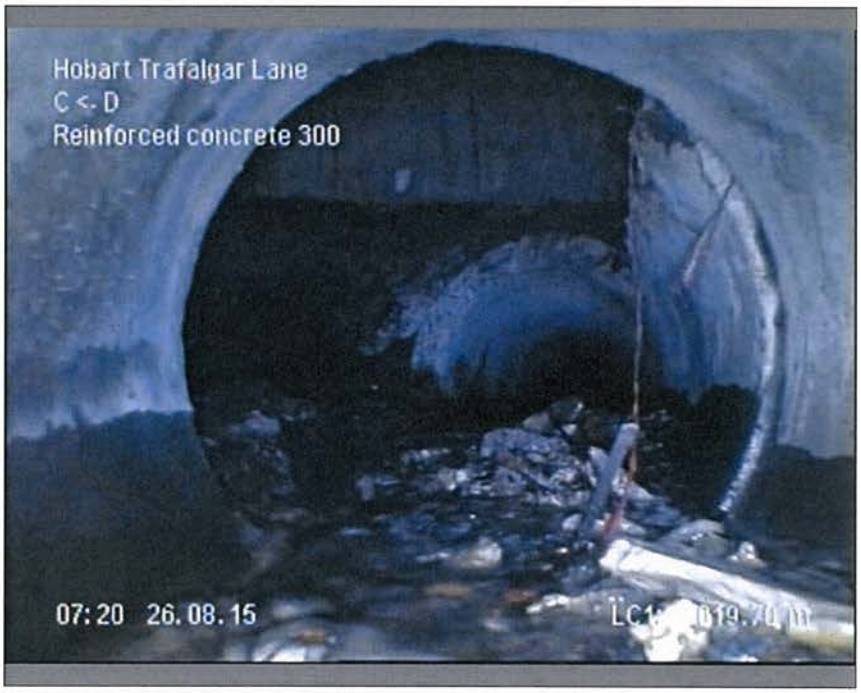

Photo: 3_7B, MPEG #: 260815_1, 00:10:01
19.7m, Finish node, maintenance hole, Nodename: D

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WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		**Gandy & Roberts**	**Stu Knight**	**4**	**4**
Time of inspection:	Cleaning:	Standard:	LRP	Conduit Unit Length	Method of Inspection
hh:mm:ss	**cleaned**	**WSA 05-2008 2.2**	**Ins**		**Television Camera**

Town:		Catchment:		US MH:	**C1**
Suburb:	**Hobart**	Asset Owner:	**Gandy & Roberts**	Survey Dir:	**upstream**
Street:	**Trafalgar Lane**	Precipitation.:	**No**	DS MH:	**C**
Asset Location	**Footpath or verge**	Flow control	**No measures**	Inspect Lenght :	**4.50 m**

Purpose of inspection :	**Structural Condition Inspection**	Shape :	**Circular**
Use of Conduit:	**Drain**	Dia/Height:	**225.00 mm**
Type of Conduit:	**Storm water drain**	Lining:	
Lining Method:		Pipe Material:	**PVC-Plasticised**

Remarks :

1:50	Position	Code	Observation	MPEG	Photo	Str Rate
C	0.00	STMH	Start node, maintenance hole, Nodename: C , Rnd gatic lid (entrance of Red Jelly) / Rnd gatic lid (entrance of Red Jelly)	00:00:00		
	0.60	CNPO	Connection, poor workmanship, connection appears to be open , height 100mm , PVC / PVC	00:01:49	4_2A	
C1	4.50	FHDE	Finish node, dead end, Nodename: C1 %	00:03:10	4_3A	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**4**	**4**

Photo: 4_2A, MPEG #: 260815_1, 00:01:49
0.6m, Connection, poor workmanship, connection appears to be open , height 100mm , PVC

Photo: 4_3A, MPEG #: 260815_1, 00:03:10
4.5m, Finish node, dead end, Nodename: C1 %

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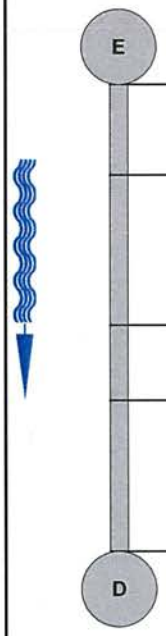
WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		**Gandy & Roberts**	**Stu Knight**	**5**	**5**
Time of inspection:	Cleaning:	Standard:	LRP	Conduit Unit Length	Method of Inspection
hh:mm:ss	**cleaned**	**WSA 05-2008 2.2**	**Ins**		**Television Camera**

Town:		Catchment:		US MH:	**E**
Suburb:	**Hobart**	Asset Owner:	**Gandy & Roberts**	Survey Dir:	**downstream**
Street:	**Trafalgar Lane**	Precipitation.:	**No**	DS MH:	**D**
Asset Location	**Footpath or verge**	Flow control	**No measures**	Inspect Lenght :	**3.10 m**

Purpose of inspection :	**Structural Condition Inspection**	Shape :	**Circular**
Use of Conduit:	**Drain**	Dia/Height:	**300.00 mm**
Type of Conduit:	**Storm water drain**	Lining:	
Lining Method:		Pipe Material:	**PVC-Plasticised**

Remarks :



1:50 Position	Code	Observation	MPEG	Photo	Str Rate
0.00	STGP	Start node, grated inlet pit, Nodename: E , at corner / at corner	00:00:00		
0.60	JDA	Joint displaced angular , at 12 o'clock	00:02:48		
1.60	FC	Circumferential fracture , width 2mm , from 8 to 4 o'clock	00:03:19		80
2.10	FC	Circumferential fracture , width 2mm , from 9 to 3 o'clock	00:03:47		80
3.10	FHMH	Finish node, maintenance hole, Nodename: D , in front of car park entrance / in front of car park entrance	00:04:55	5_5A, b	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	160	51.61	160	5	0	0	0	0	1

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**5**	**5**

Photo: 5_5A, MPEG #: 260815_1, 00:04:55
3.1m, Finish node, maintenance hole, Nodename: D , in front of car park entrance

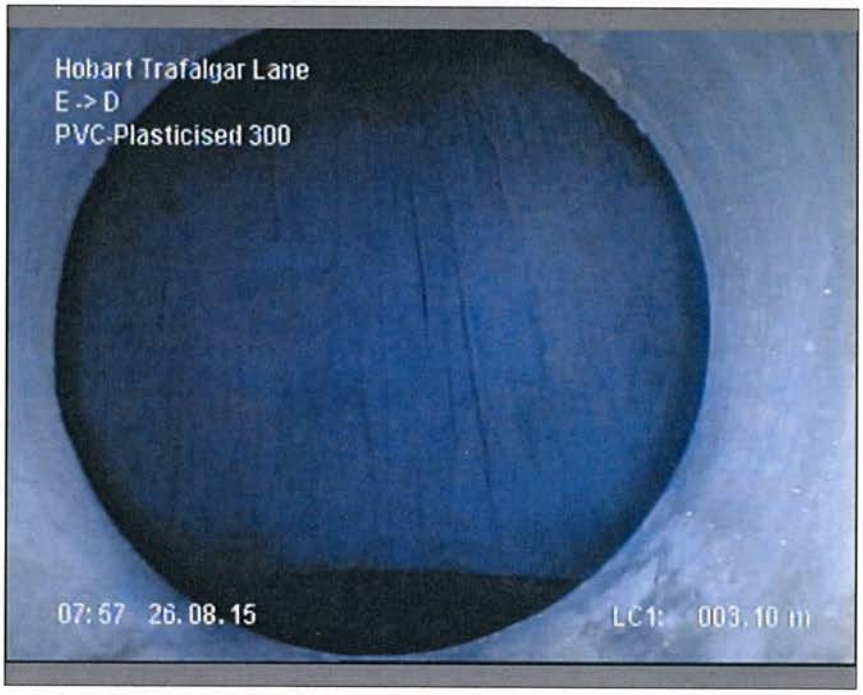

Photo: 5_5B, MPEG #: 260815_1, 00:04:55
3.1m, Finish node, maintenance hole, Nodename: D , in front of car park entrance

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WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		Gandy & Roberts	Stu Knight	6	6
Time of inspection:	**Cleaning:**	**Standard:**	**LRP**	**Conduit Unit Length**	**Method of Inspection**
hh:mm:ss	cleaned	WSA 05-2008 2.2	Ins		Television Camera

Town:		Catchment:		US MH:	G
Suburb:	Hobart	Asset Owner:	Gandy & Roberts	Survey Dir:	upstream
Street:	Trafalgar Lane	Precipitation.:	No	DS MH:	F
Asset Location	Footpath or verge	Flow control	No measures	Inspect Lenght :	11.10 m

Purpose of inspection :	Structural Condition Inspection	Shape :	Circular
Use of Conduit:	Drain	Dia/Height:	225.00 mm
Type of Conduit:	Storm water drain	Lining:	
Lining Method:		Pipe Material:	Concrete pipe

Remarks :

1:90 Position	Code	Observation	MPEG	Photo	Str Rate
0.00	STGP	Start node, grated inlet pit, Nodename: G , at cnr / at cnr	00:00:00	6_1A	
0.10	FC	Circumferential fracture , width 2mm , from 11 to 5 o'clock	00:02:38		8
8.40	CNGO	Connection, good workmanship, connection appears to be open, height 100mm , at 10 o'clock, PVC / PVC	00:10:29	6_3A, b	
9.00	CNGO	Connection, good workmanship, connection appears to be open, height 100mm , at 10 o'clock, PVC (connecting line may be damaged) / PVC (connecting line may be damaged)	00:12:02	6_4A, b	
9.00	CNGO	Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock, PVC / PVC	00:12:54	6_5A, b	
10.50	FM	Multiple or complex fracturing, width 4mm , from 8 to 4 o'clock	00:13:55	6_6A	40
11.00	CNGO	Connection, good workmanship, connection appears to be open, height 150mm , at 10 o'clock	00:14:52	6_7A, b	
11.10	FHJ	Finish node, junction or connection with another conduit, Nodename: G , M/H at surface, invert not exposed (Deloitte entrance) / M/H at surface, invert not exposed (Deloitte entrance)	00:00:00	6_8A, b	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	40	4.32	48	4	0	0	0	0	1

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**6**	**6**

Photo: 6_1A, MPEG #: 260815_1, 00:00:00
0m, Start node, grated inlet pit, Nodename: G , at cnr

Photo: 6_3A, MPEG #: 260815_1, 00:10:29
8.4m, Connection, good workmanship, connection appears to be open, height 100mm , at 10 o'clock, PVC

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**6**	**6**

Photo: 6_3B, MPEG #: 260815_1, 00:10:29
8.4m, Connection, good workmanship, connection appears to be open, height 100mm , at 10 o'clock, PVC

Photo: 6_4A, MPEG #: 260815_1, 00:12:02
9m, Connection, good workmanship, connection appears to be open, height 100mm , at 10 o'clock, PVC (connecting line may be damaged)

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Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**6**	**6**

Photo: 6_4B, MPEG #: 260815_1, 00:12:02
9m, Connection, good workmanship, connection appears to be open, height 100mm , at 10 o'clock, PVC (connecting line may be damaged)

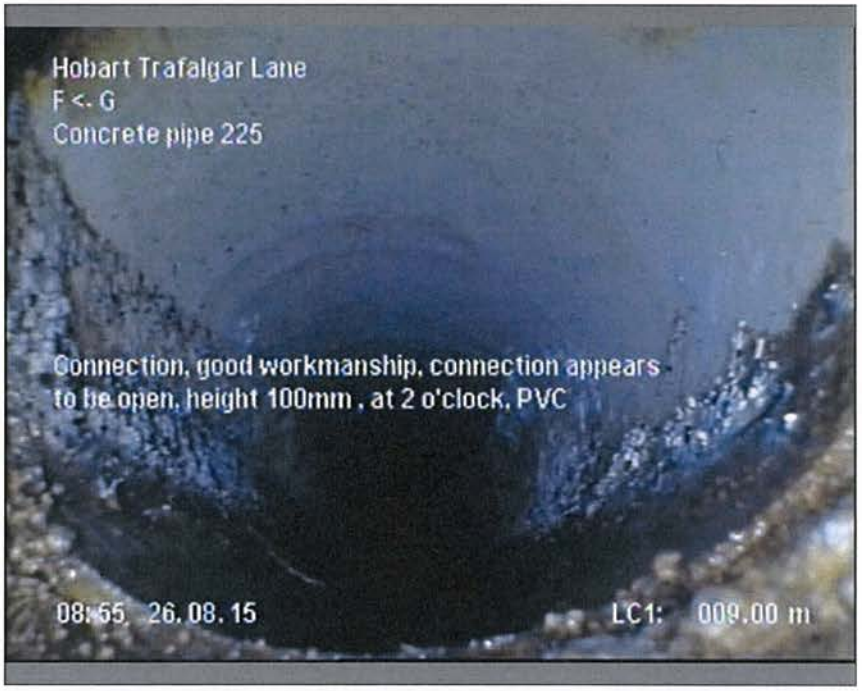

Photo: 6_5A, MPEG #: 260815_1, 00:12:54
9m, Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock, PVC

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**6**	**6**

Photo: 6_5B, MPEG #: 260815_1, 00:12:54
9m, Connection, good workmanship, connection appears to be open, height 100mm , at 2 o'clock, PVC

Photo: 6_6A, MPEG #: 260815_1, 00:13:55
10.5m, Multiple or complex fracturing, width 4mm , from 8 to 4 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**6**	**6**

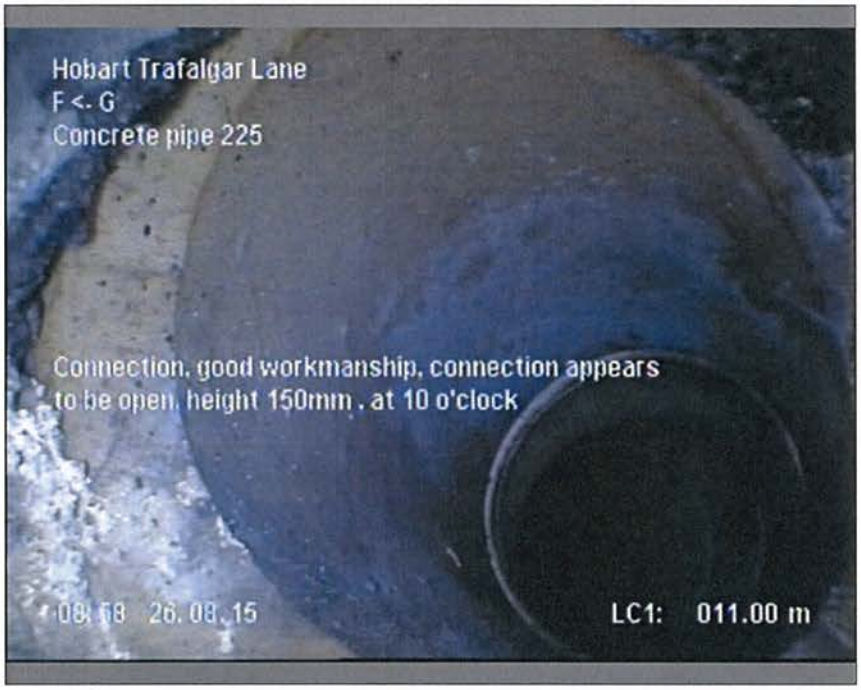

Photo: 6_7A, MPEG #: 260815_1, 00:14:52
11m, Connection, good workmanship, connection appears to be open, height 150mm , at 10 o'clock

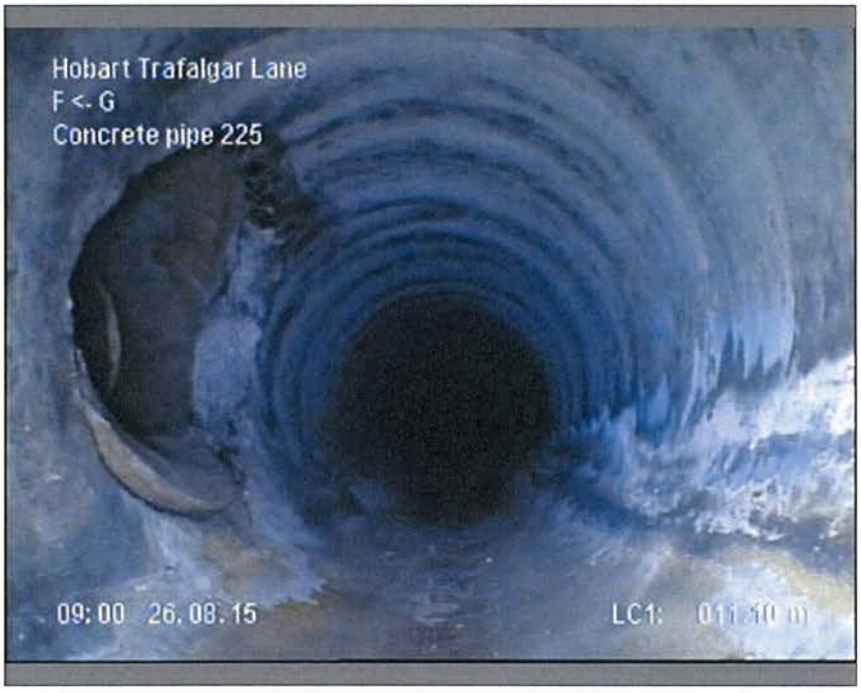

Photo: 6_7B, MPEG #: 260815_1, 00:14:52
11m, Connection, good workmanship, connection appears to be open, height 150mm , at 10 o'clock

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Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**6**	**6**

Photo: 6_8A, MPEG #: 260815_1, 00:00:00
11.1m, Finish node, junction or connection with another conduit, Nodename: G , M/H at surface, invert not exposed (Deloitte entrance)

Photo: 6_8B, MPEG #: 260815_1, 00:00:00
11.1m, Finish node, junction or connection with another conduit, Nodename: G , M/H at surface, invert not exposed (Deloitte entrance)

NU-JET
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WSA assessment / Inspection: 1

Date:	Asset owner's job ref.:	Asset Owner:	Operator :	Section number:	Pipe Asset Id:
26/08/2015		Gandy & Roberts	Stu Knight	7	7
Time of inspection:	Cleaning:	Standard:	LRP	Conduit Unit Length	Method of Inspection
hh:mm:ss	cleaned	WSA 05-2008 2.2	Ins		Television Camera

Town:		Catchment:		US MH:	F
Suburb:	Hobart	Asset Owner:	Gandy & Roberts	Survey Dir:	downstream
Street:	Trafalgar Lane	Precipitation.:	No	DS MH:	D
Asset Location	Footpath or verge	Flow control	No measures	Inspect Lenght :	5.10 m

Purpose of inspection :	Structural Condition Inspection	Shape :	Circular
Use of Conduit:	Drain	Dia/Height:	300.00 mm
Type of Conduit:	Storm water drain	Lining:	
Lining Method:		Pipe Material:	Concrete pipe

Remarks :

1:50 Position	Code	Observation	MPEG	Photo	Str Rate
F					
0.00	STGP	Start node, grated inlet pit, Nodename: F , at corner / at corner	00:00:00		
0.20	FC	Circumferential fracture , width 2mm , from 8 to 4 o'clock	00:02:34		8
1.70	FC	Circumferential fracture , width 3mm , from 12 to 12 o'clock	00:03:19		8
1.70	DEC	Hard or compacted material in the invert , Obstruction: <5% , from 5 to 7 o'clock	00:03:30		
4.40	FC	Circumferential fracture , width 2mm , from 12 to 12 o'clock	00:04:38		8
5.10	FHMH	Finish node, maintenance hole, Nodename: D , gatic lid in front of car park / gatic lid in front of car park	00:05:08	7_6A, b	
D					

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
3	8	4.71	24	4	1	5	0.98	5	2

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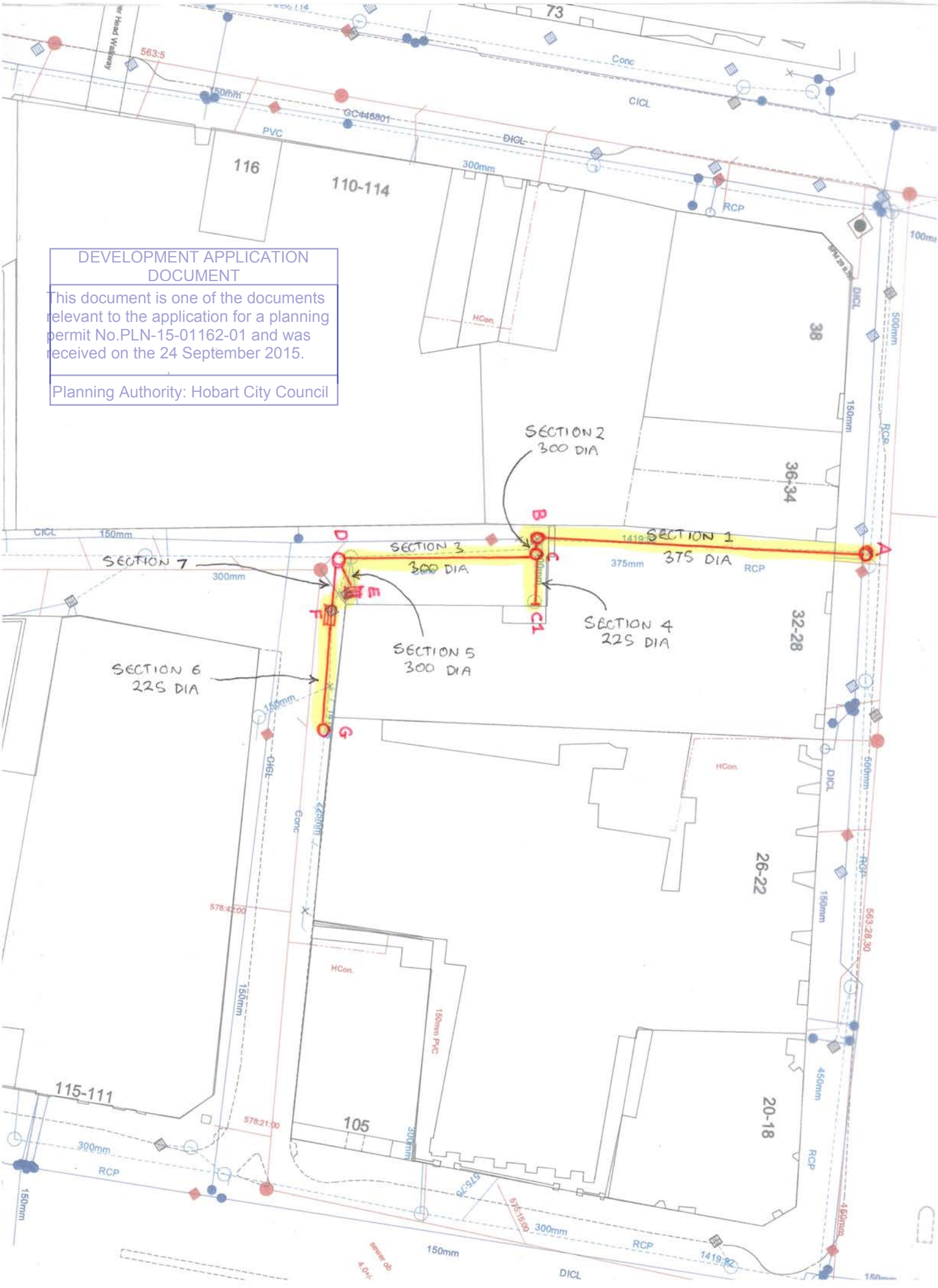
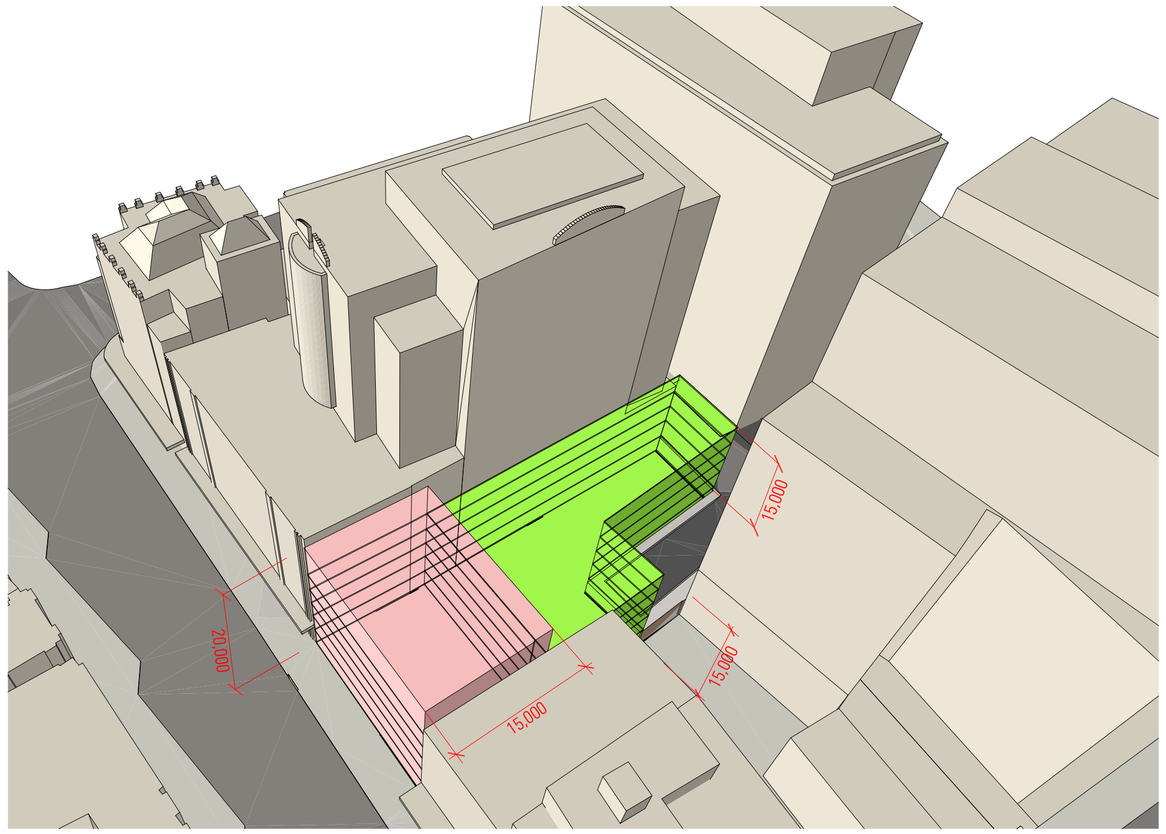
Inspection Pictures / Inspection: 1

Location/Street	Town or suburb:	Date :	Section number:	Sewer Ref.:
Trafalgar Lane		**26/08/2015**	**7**	**7**

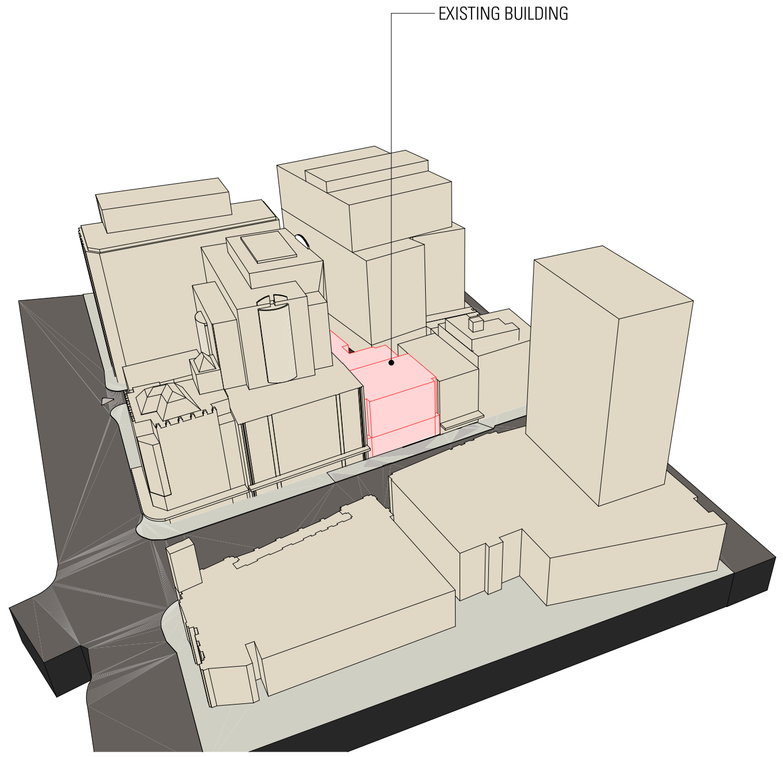
Photo: 7_6A, MPEG #: 260815_1, 00:05:08
5.1m, Finish node, maintenance hole, Nodename: D , gatic lid in front of car park

Photo: 7_6B, MPEG #: 260815_1, 00:05:08
5.1m, Finish node, maintenance hole, Nodename: D , gatic lid in front of car park

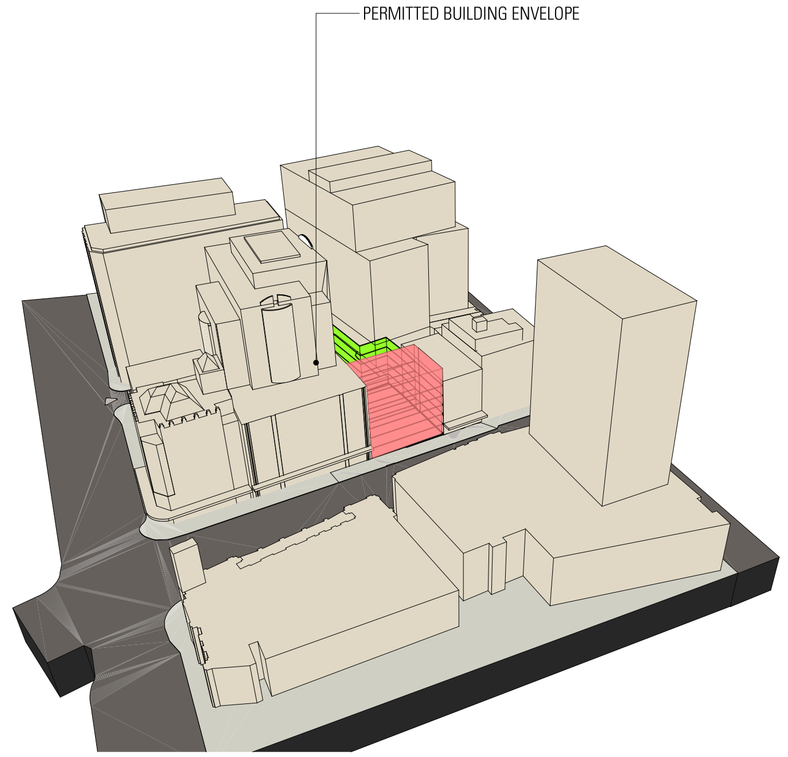

DEVELOPMENT APPLICATION DOCUMENT
This document is one of the documents relevant to the application for a planning permit No.PLN-15-01162-01 and was received on the 24 September 2015.
Planning Authority: Hobart City Council
SECTION 1
375 DIA
SECTION 2
300 DIA
SECTION 3
300 DIA
SECTION 4
225 DIA
SECTION 5
300 DIA
SECTION 6
225 DIA
SECTION 7
A
B
C
C1
D
E
F
G
73
116
110-114
38
36-34
32-28
26-22
20-18
115-111
105
Conc
CICL
DICL
PVC
RCP
HCon.
150mm
300mm
375mm
225mm
563:5
578:42:00
578:21:00
575:15:00
575:7.9
1419:82



3D Views | Permitted Building Height Model
N.T.S



3D Views | Existing Condition Model
N.T.S



3D Views | Permitted Building Height Model
N.T.S

FLOOR PLAN | Permitted Building Height Model
N.T.S

BUILDING PART A
(MAXIMUM HEIGHT - 20M)

GROUND FLOOR GFA :	311.82 m^2
LEVEL 1 GFA :	311.82 m^2
LEVEL 2 GFA :	311.82 m^2
LEVEL 3 GFA :	311.82 m^2
LEVEL 4 GFA :	311.82 m^2
LEVEL 5 GFA :	311.82 m^2
TOTAL :	**1870 .92m^2**

BUILDING PART B
(MAXIMUM HEIGHT - 15M)

GROUND FLOOR GFA :	560.64 m^2
LEVEL 1 GFA :	560.64 m^2
LEVEL 2 GFA :	560.64 m^2
LEVEL 3 GFA :	560.64 m^2
LEVEL 4 GFA :	560.64 m^2
TOTAL :	**2830.2m^2**

TOTAL GFA FOR A PERMITTED HEIGHT BUILDING IS APPROX. 4700m^2

FILE: P:\1514 Elizabeth St Hotel\11.0 DRAWINGS\1514_Hotel model_DA_diagrams.pln

REVISIONS:
REVM DATE:
Description

DEVELOPMENT APPLICATION

JACOB ALLOM WADE PTY LTD
ABN 92 009 559 479
THE ORDNANCE STORE
21 CASTRAY ESPLANADE
BATTERY POINT TASMANIA
AUSTRALIA 7004

TELEPHONE 03 6223 4366
FAX 03 6223 5726
jaws@jawsarchitects.com
www.jawsarchitects.com

PROJECT
PALACE HOTEL
28 Elizabeth Street
Hobart, TAS, 7000

1514_DA21

SCALE			
DATE	SEPTEMBER 2015	PLOT DATE	15/10/2015
DRAWN	LW	ACCREDITED DESIGNER	NEAL MACKINTOSH
CHECKED	NM	ACCREDITATION NUMBER	CC1027V
CAD REF	1514_Hotel model_DA_diagrams.pln		

DRAWING
Permitted Building Envelope Diagrams

DRAWING NO 1514_DA21 REV

Attachment 6

DEVELOPMENT APPLICATION DOCUMENT

This document is one of the documents relevant to the application for a planning permit No.PLN-15-01162-01 and was received on the 18 November 2015.

Planning Authority: Hobart City Council

ireneinc
smithstreetstudio
PLANNING & URBAN DESIGN

18 November 2015

Hobart City Council
GPO Box 503
HOBART TAS 7001

Email: rfi-information@hobartcity.com.au

Dear Mr Probert

FURTHER INFORMATION - 28-32 ELIZABETH STREET, HOBART

I am writing in response to your letter of the 17 November requiring further information in relation to the proposed development at 28-32 Elizabeth Street, Hobart (application no: PLN-15-01162-01).

Attached is a statement from Gandy and Roberts in relation to the proposed stormwater management system for the site.

TRAFFIC

Attached is a revised Traffic Impact Assessment which addresses concerns raised in discussions with Council's officers and replaces the report originally lodged with the application. The changes have resulted in a reduction in the number of car parking spaces to 39; as such the proposal now complies with the Acceptable Solution for E6.6.5 (as discussed on page 23 of the original planning report).

HEIGHT DISCRETION

The development is intended to operate as an international hotel with room capacity and facilities, which will cater for international tour operators. The development will therefore add significantly to the availability of this type of accommodation within Hobart.

Please find accompanying this letter a diagram illustrating the development potential that would be possible within the Permitted Building Envelope as per 22.4.1.A1. As can be seen the Permitted Envelope has a volume that is only slightly greater than what already exists on the site. The actual developable floor area would be further reduced for hotel rooms to have access to natural light, views and ventilation.

As can be seen in the diagrams the permitted envelope is substantially smaller than the height and volume of other existing buildings on the city block in which it is located. The development potential of the Amenity Building Envelope (as specified in 22.4.1.P1(b)) would provide marginally more developable floor area but given the shape of the allotment would not create a realistically developable volume and would result in a form which would not be consistent with the form of surrounding buildings.

A reduction in floor area to the extent required to comply with the envelopes would not be able to support the same development given the rooms required for this type of accommodation and required ancillary facilities or the additional features proposed including walk throughs, restaurants, function space and rooftop bar that as publically accessible spaces all contribute to the civic amenity of the Hobart.

smithstreetstudio | ireneinc
49 Tasma St, North Hobart, TAS 7000
Tel (03) 6234 9281
Fax (03) 6231 4727
Mob 0418 346 283
Email planning@ireneinc.com.au
ABN 78 114 905 074

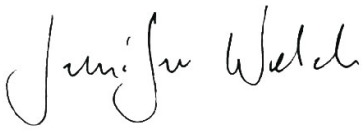
The number of rooms that could be accommodated within the floor area of the permitted or Amenity Building Envelope would not be appropriate to provide the services necessary for an international hotel.

The SGS Economic Impact Assessment identifies that the development would generate significant economic activity during construction and in its ongoing operation. Economic activity would be generated both through direct employment and more broadly through the benefit to Hobart and the wider region, through the increase in tourism accommodation, and the marketing specifically aimed at the international market. A building form within the specified envelopes would not be feasible as it would not meet the needs of an international hotel operation, consequently the identified economic benefits would not occur.

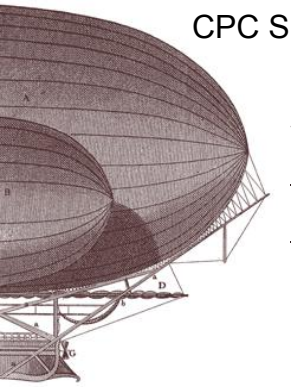
Therefore it is considered that the proposal meets the applicable Performance Criteria relating to development beyond the Amenity Building Envelope including providing an overriding economic benefit, .

If you have any further queries in relation to any of the above please contact me on 6234 9281.

Yours sincerely



Jen Welch
IRENEINC PLANNING



Attachment 7

GANDY + ROBERTS
159 DAVEY ST
HOBART TASMANIA
AUSTRALIA 7000
CONSULTING ENGINEERS

TO Jen Welch DATE 17

PROJECT 28 – 32 Elizabeth Street PROJECT № 15.0197

SUBJECT Stormwater Treatment MADE BY Adam Kohl

☐ FILE NOTE ☐ MEETING ☐ PHONE CALL ☒ MEMO

Based on State Stormwater Strategy 2010, Table E7.1 we need (in theory)

- 80% reduction in the average annual load of total suspended solids (TSS) based on typical urban stormwater TSS concentrations.
- 45% reduction in the average annual load of total phosphorus (TP) based on typical urban stormwater TP concentrations.
- 45% reduction in the average annual load of total nitrogen (TN) based on typical urban stormwater TN concentrations.

The selected Humeceptor provides

- 80% reduction in the average annual load of total suspended solids (TSS) based on typical urban stormwater TSS concentrations.
- 37% reduction in the average annual load of total phosphorus (TP) based on typical urban stormwater TP concentrations.
- 53% reduction in the average annual load of total nitrogen (TN) based on typical urban stormwater TN concentrations.

Given the carpark is undercover and runoff is 100% from an inner city roof, we consider this product to be fit for purpose.