Prepared for

MACKY CORP ON BEHALF OF TSOP PTY LTD

Traffic Impact Assessment

Proposed Mixed-Use Development
9-23 Scott St & 275-277 Bigge St, Liverpool

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1 Introduction

1.1 Background

Ason Group has been commissioned by Macky Corp to conduct a Transport Impact Assessment (TIA) to support a Development Application for a 23 storey commercial tower with associated redevelopment of the locally heritage listed Commercial Hotel (the Proposal) on the subject site at 277 Bigge Street, 11 Scott Street, 13-15 Scott Street, 17 Scott Street, 23 Scott Street, 21 Scott Street and 23 Scott Street, Liverpool (the Site).

The proposed development would create around 27,792.2m^2 of office floorspace. A range of other suitable land uses are currently permitted in the B3 Commercial Core land zone which could support alternative uses of commercial floorspace within the finished tower should potential tenants desire to be located at the Site.

It is envisaged that the Site would primarily cater to office premises type land uses and this is the key strategic land use driver of the proposed development. However, this DA does not seek consent for any specific tenancy fit-out and use of the site. It is understood that in the future, DAs or Code Complying Development Certificates would be sought to facilitate more specific commercial land uses at the site.

1.2 Policy Context

1.2.1 State and Regional Strategic Planning Policies

Table 1: NSW State Priorities	
Organisation	NSW Government
Date	14 July 2017
Purpose	Improving outcomes for the people of NSW – with clear goals and accountability
Content	**Building infrastructure** Improving road travel reliability – to ensure consistency of journey times on key roads continues to improve, we are working to make better use of existing road infrastructure, build extra road capacity and encourage commuters to use public transport and to undertake off-peak travel more often. This will enable business and the community to move around the city with greater ease, reducing travel times, boosting productivity and reducing business costs. **Ensure on-time running for public transport** Maintain or improve reliability of public transport services over the next four years. Public transport services in Sydney are crucial in getting customers to their destinations. Although Sydney is undergoing a large amount of infrastructure construction, we are working to ensure that public transport services continue to run on time. The government is also improving integration across public transport services, updating timetables and providing clear information to get people to their destinations on time.

Table 1: NSW State Priorities	
Relevance to the Proposal	The Proposal will encourage commuters to use public transport and to undertake off-peak travel more often. This will enable business and the community to move around the city with greater ease, reducing travel times, boosting productivity and reducing business costs.

Table 2: Towards our Greater Sydney 2056	
Organisation	Great Sydney Commission
Date	November 2016
Purpose	Outlines a draft amendment to A Plan for Growing Sydney which aligns with the vision established in the draft District Plans.
Content	This amendment reconceptualises Greater Sydney as a metropolis of three cities: • Established Eastern City • Developing Central City • Emerging Western City A productive Sydney A liveable Sydney A sustainable Sydney
Relevance to the Proposal	The principles within the Towards our Greater Sydney 2056 align with intent of the Proposal and in particular the development of the Central City as an economic corridor providing employment in proximity to critical services.

1.2.2 Local Planning Context

Table 3: Liverpool Local Environmental Plan 2008	
Organisation	Liverpool City Council
Date	31 August 2018
Purpose	Liverpool Local Environmental Plan (LEP) 2008 – a comprehensive plan for Liverpool together with the Liverpool Development Control Plan (LDCP) 2008 provides the necessary framework for how the Liverpool City will advance. It also balances the needs of residents, businesses and investors today with those of future generations.
Content	Section 1.2 of the Plan identifies two aims as follows: (e) to concentrate intensive land uses and trip-generating activities in locations most accessible to transport and centres, (f) to promote the efficient and equitable provision of public services, infrastructure and amenities,
Relevance to the Proposal	As a Transit Oriented Development, the Proposal seeks to provide office and retail land uses in close proximity to multiple forms of highly accessible public transport services, infrastructure and amenities.

Table 4: Liverpool Development Control Plan 2008	
Organisation	City of Liverpool Council
Date	23 August 2017

Table 4: Liverpool Development Control Plan 2008	
Purpose	The LDCP 2008 provides guidelines, objectives and controls for people who wish to carry out development in the Liverpool City Council LGA. Provide highly connected and vibrant City, with a strong City Centre supported by a hierarchy of neighbourhood and local centres. Identified as one of five Regional Cities for Sydney, Liverpool will experience rapid population and employment growth. LDCP 2008 will guide this growth to ensure high quality and sympathetic urban development outcomes are achieved.
Content	Liverpool Development Control Plan 2008 Part 1 General Controls for all Development
Relevance to the Proposal	The Site is located This plan applies to the Proposal as the Site is located within Liverpool Local Government Area (LGA).

1.3 Report Structure

This report is structured to provide an assessment of the traffic impact and transport accessibility issues relating to the proposed development as follows:

- Section 1 provides the background and policy context for the proposed development.
- Section 2 describes the existing land uses, road network, accessibility to alternative transport modes and the existing traffic conditions.
- Section 3 provides details about the Proposal as it performs as a Transit Oriented Development.
- Section 4 details the project, background information and proposed access arrangements.
- Section 5 describes the transport impacts of the Proposal.
- Section 6 proposes potential impact mitigation strategies for the Proposal.
- Section 7 describes the access, internal configuration of the proposed car parking and servicing facilities of the development.
- Section 8 provides a conclusion of the key traffic and parking impacts.

2 Existing Conditions

2.1 Existing Land Use and Zoning

The Site is located in the centre of Liverpool's CBD, approximately 40km south-west of the Sydney CBD. It is bound by Bigge Street to the east, Scott Street to the south, commercial development and the Railway Serviceway to the north (269 Bigge Street), and a commercial tower to the west (at 25, 29 and 33 Scott Street). The Site is currently zoned B3 – Commercial Core under Liverpool Local Environmental Plan 2008.

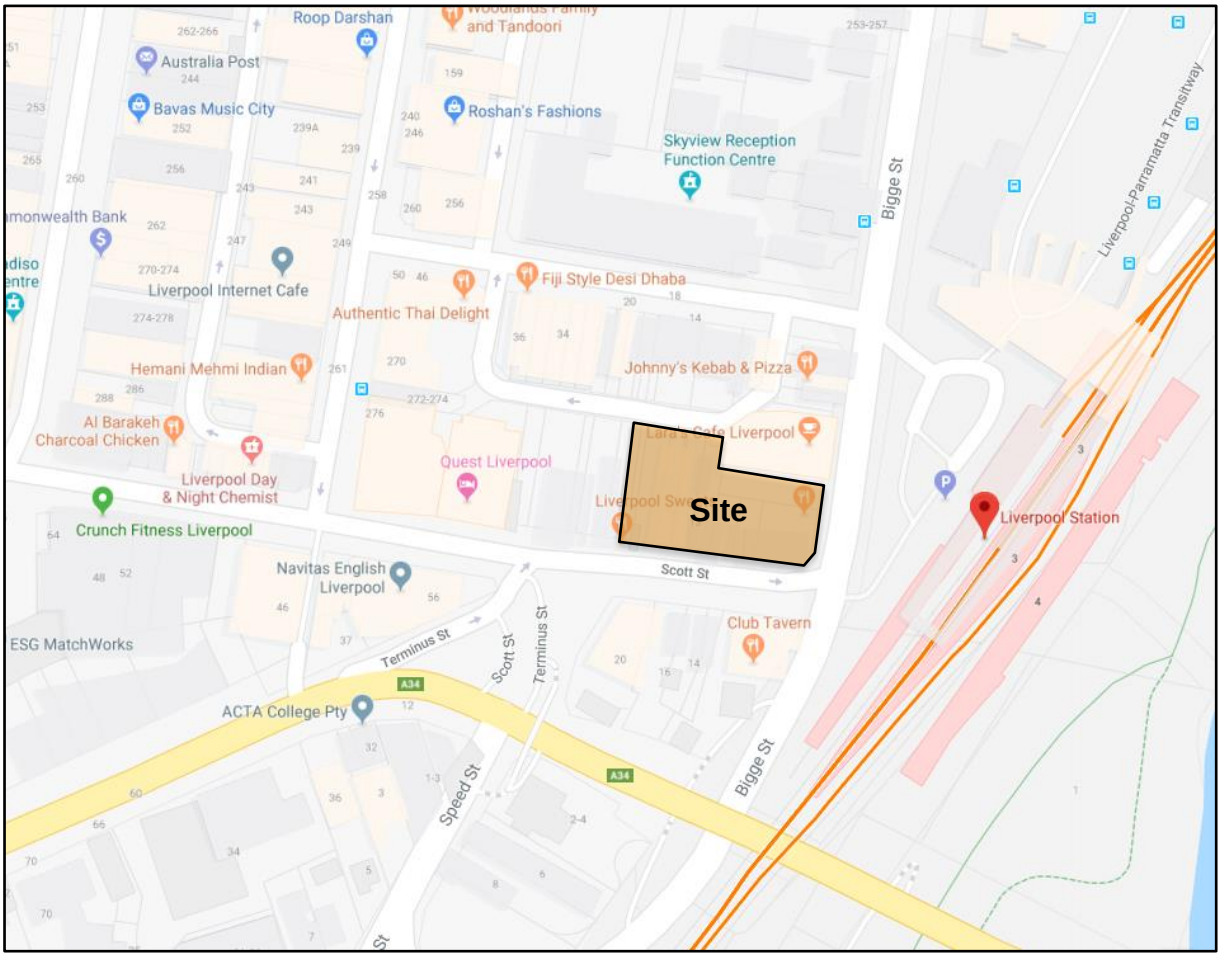

Figure 1: Site Location

2.2 Surrounding Road Network Details

Scott Street

Scott Street functions as a collector road connecting Memorial Avenue through to Bigge Street and is aligned in an east-west direction. It is a two-way, two lane road within a 12-metre wide carriageway west

of Terminus Street and one-way between Terminus Street and Bigge Street. Scott Street has a sign-posted speed limit of 50 km/hr with restricted parallel parking spaces on the northern side and restricted angled parking on the southern side in the vicinity of the Site.

Bigge Street

Bigge Street functions as a collector road connecting Hume Highway through to 50m south of Newbridge Road and is aligned in a north-south direction. It is a two-way, two lane road for most of its length. Bigge Street has a sign-posted speed limit of 50 km/hr with 40km/hr school zones and restricted kerbside parking spaces on both sides. Bigge Street carries around 5,000 vehicles per day.

Terminus Street

Terminus Street is a classified Roads and Maritime State Road and near the site is a two-way, two lane road within a 13-metre carriageway. Terminus Street has a sign posted speed limit of 60 km/hr and kerbside parking is not permitted near the site. Terminus Street carries around 22,000 vehicles per day.

Macquarie Street

Macquarie Street near the site functions as a collector road connecting the State Road section of Macquarie Street through to Scott Street. The road is a two-way, two to three lane road within a 17 to18-metre carriageway. Macquarie Street has a sign posted speed limit of 50 km/h and kerbside parking is permitted near the site during off-peak periods.

Railway Street

Railway Street to the north of the Site functions as a collector road connecting George Street to Bigge Street. The road is a two-way, two lane road within a 19 metre carriageway and has a sign-posted speed limit of 50 km/hr with 40km/hr school zones and restricted kerbside parking spaces on both sides..

2.3 Existing Site Access

Access to the Site's multiple properties is currently provided directly from Scott Street and Railway Serviceway. Access to The New Commercial Hotel is via Bigge Street. Bigge Street, Scott Street and the Railway Serviceway are all local roads under the control of Liverpool City Council.

2.4 Public Transport

A review of the public transport available near the Site shows that it is located approximately 80m from Liverpool Station and has excellent, convenient access to it. Liverpool Station has four platforms servicing the lines shown in **Table 5**.

Table 5: Liverpool Train Station Services

Line	Route
T2	to Central, the City Circle via Granville and Leppington
T5	to Schofields, Richmond and Leppington
T3	terminating services returning to the City Circle via Bankstown

The Site is also located around 140m from the Liverpool-Parramatta Transitway, which provides a significant amount of bus connections throughout the Liverpool and Parramatta LGAs as well as further afield throughout Greater Sydney. Specifically, the Liverpool-Parramatta Transitway provides direct connections to the services and locations identified in **Table 6**.

Table 6: Liverpool-Parramatta Transitway Services

Service	Route
801	to Badgerys Creek
802	to Parramatta via Green Valley
803	to Miller
804	to Parramatta via Hinchinbrook
805	to Cabramatta via Bonnyrigg Heights
806	to Parramatta via Abbotsbury
808	to Fairfield via Abbotsbury
819	to Prairiewood
823	to Warwick Farm
827	to Carnes Hill Marketplace via Bonnyrigg Heights
851	to Carnes Hill Marketplace via Cowpasture Road
852	to Carnes Hill Marketplace via Greenway Drive and Cowpasture Road
853	to Carnes Hill via Hoxton Park Road
854	to Carnes Hill via Greenway Drive and Hoxton Park Road
855	to Rutleigh Park via Austral and Leppington Station
856	to Bringelly
857	to Narellan
865	to Casula via Lurnea Shops
866	to Casula
869	to Ingleburn via Edmondson Park and Prestons
870	to Campbelltown
871	to Campbelltown via Glenfield
872	to Campbelltown via Macquarie Fields
901	to Holsworthy via Wattle Grove
902	Holsworthy via Moorebank
903	Chipping Norton
904	to Fairfield
M90	to Burwood
N30	from Macarthur to City Town Hall
N50	to City Hall
1043	Webster Road and Hoxton Park Road to Unity Grammar College
T80	to Parramatta via T-way

2.5 Active Transport

2.5.1 Walking

Pedestrian paths near the Site are well developed and located on both sides of the surrounding roads as follows:

- Scott Street and Bigge Street, providing access to Liverpool station
- George Street, providing access to the CBD and Westfield Shopping Centre
- Macquarie Street, providing access to Westfield Liverpool

A safe walking environment is provided for pedestrians. During the Site visit it was noted that pedestrians generally observed road rules and utilised safe crossing points.

2.5.2 Cycling

Figure 2 identifies the network that forms part of the Liverpool City Councils bike plan. Key initiatives of this plan include connecting the Liverpool city centre with surrounding suburban areas as well as suburban shopping centres. This includes the future provision of an off-road bike path along Terminus Street, connecting with further off-road bike paths leading north towards Cabramatta or east towards Bankstown.

There is a mixture of recreational routes, regional routes, sub-regional routes and local routes within the Liverpool LGA. An on-going effort is made to complete routes by filling in missing links. With the assistance of private developers and government agencies, such as the RMS, many new routes have been completed (or largely completed) in Liverpool since the first bike plan was implemented in 1985. This includes a number of important regional and subregional routes which run partially or wholly through Liverpool. Liverpool has a number of important recreational routes, such as:

- The Wattle Grove Route,
- The Chipping Norton Lakes Scheme,
- The Shale Hills Loop (Western Sydney Parklands),
- The Cecil Hills Scheme, and
- The Middleton Grange to Canley Vale Trail.

There are also various local routes, particularly within the Suburbs of Cartwright, West Hoxton and Cecil Hills which provide access from suburban areas into the strategic network.

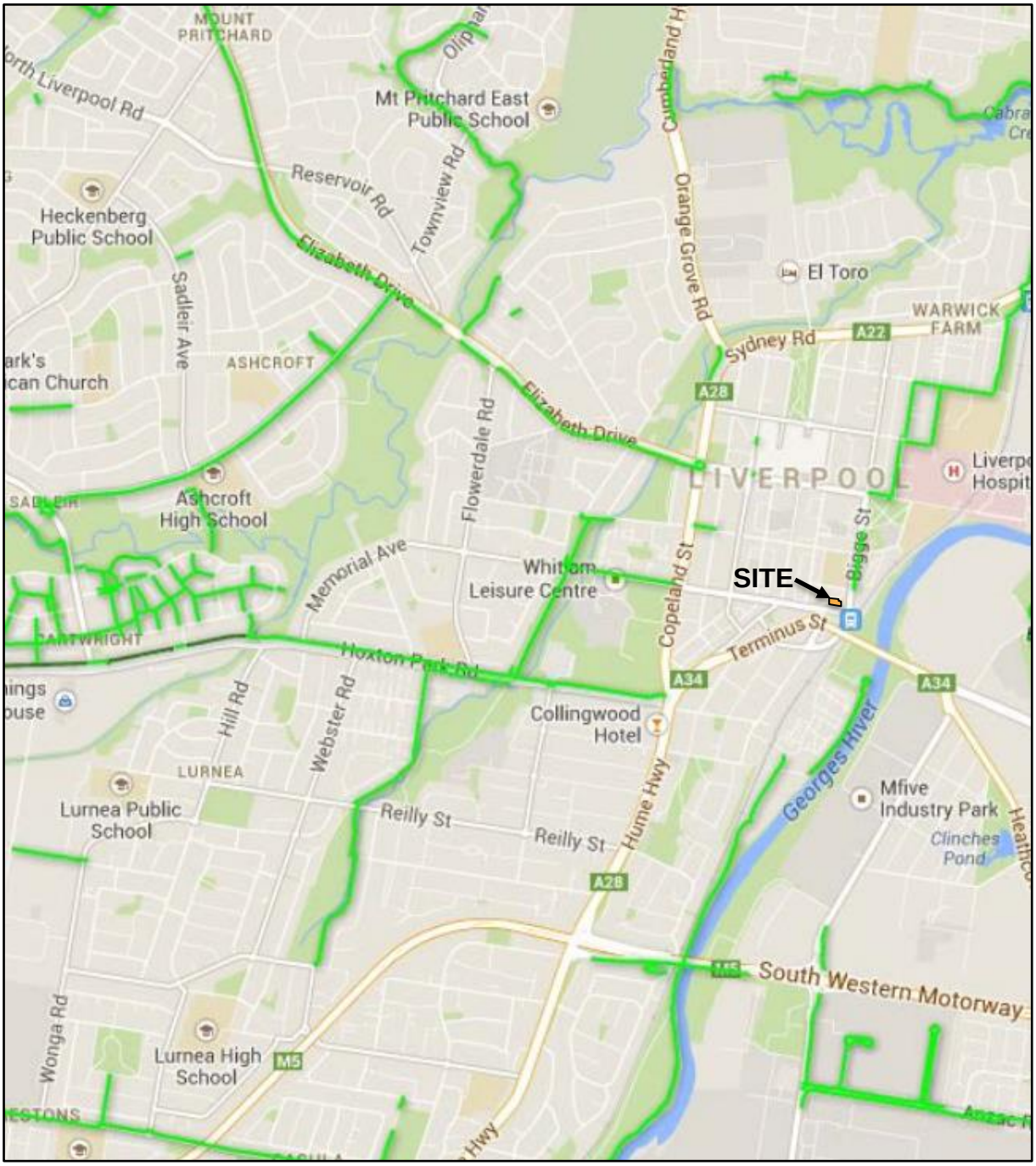

Figure 2: Existing Bicycle Network

2.6 Parking Conditions

Surrounding the Site, on-street parking is generally paid and subject to a one hour time restriction. A 90% occupancy rate of all available on-street parking along the Site's boundaries was observed during the weekday PM peak site inspection. It was noted that the western side of Macquarie Street has around

four kerbside spaces. The northern side of Scott Street, adjacent to the Site has around ten kerbside spaces, including 3 accessible parking, and the southern side has 16, 45 degree angled parking spaces.

2.7 Existing Site Traffic Generation

There are currently several existing businesses located on the Site. It is expected that these businesses were in operation during the traffic surveys. There are around 20 car parking spaces on Site that these businesses utilise. Site observations during the afternoon indicate that the existing car parking is almost fully occupied. Assuming that 100% of these vehicles arrived in the AM peak and departed in the PM peak, the existing contribution of traffic onto the surrounding road network in 20 vehicles per hour

2.8 Intersection and Network Performance

Table 7: Existing Intersection Performance

Intersection	Peak	Degree of Saturation (DOS)	Average Delay (sec)	Queue (m)	Level of service (LOS)
Macquarie Street/ Scott Street/ Memorial Avenue	AM	0.58	25	60	B
	PM	0.47	16	41	B
George Street / Scott Street	AM	0.41	21	38	B
	PM	0.64	20	46	C
Terminus Street / Scott Street	AM	0.14	4	3	A
	PM	0.03	5	1	A

Based on the above assessment, the key intersections near the Site operate satisfactorily with spare capacity. Site observations identified queue lengths are generally shorter than those shown in the SIDRA outputs. In addition, the following observations were made during the PM peak site inspection:

- the second southbound right turn bay from George Street was not utilised when adjacent travel lanes were reaching/at capacity.
- Newbridge Road southbound bus only lane was, on occasion, used by general traffic who subsequently travelled through a red-light
- on occasion, Pirie street would reach capacity and cause vehicles turning right across traffic from Terminus street to queue across the intersection.

2.9 Prevailing Traffic Safety Issues

Recorded road crash history was provided by Roads and Maritime for a five-year period (January 2013 to December 2017) within the Site study area. The data was analysed to identify any potential road safety deficiencies, particularly pedestrian-related incidents. There were no fatalities recorded within the study area over the five-year period and only two pedestrian related crashes occurred on roads bordering the Site, reaffirming the safe positioning of the proposed access points.

3 Transit Oriented Development

The Proposal offers a unique opportunity to achieve a Transit Oriented Development (TOD) within a precinct that has access to high frequency rail and bus networks, employment and educational facilities and critical services including the nearby Westfield Shopping Centre. The development is informed by TOD principles as it seeks to achieve transport and land integration, improved connectivity to the stations and throughout Liverpool and access to open space.

3.1 Transit Oriented Development Principles

While there are various definitions in use around the world, there is common agreement that a TOD is characterised by:

- a rapid and frequent transit service;
- high accessibility to the transit station;
- high quality public spaces and streets, which are pedestrian and cyclist friendly;
- medium to high density development within 800 metres of the railway station; and
- reduced rates of private car parking.

The Transit Oriented Development Guide states that, in addition to these principles, transit-supportive land uses, and activities are those which:

- generate high volumes of pedestrians and transit passengers;
- generate high employment numbers or population density;
- contribute to reverse-flow movement in the transit network;
- encourage walking and cycling; and
- include activities that operate 18 or 24 hours per day throughout the week.

The Proposal is consistent with recognised TOD principles as it would provide the following:

- Development within 2 minutes' walk of Liverpool Train Station, Liverpool-Parramatta Transitway and other bus stops, supported by appropriate infrastructure;
- integration with retail, commercial, recreational and community uses therefore stimulating activity around the precinct;

- prioritisation of pedestrian and cycle activity and proximity to high quality bus and rail facilities and services;
- a high level of pedestrian and bicycle connectivity;
- reduced levels of private vehicle parking combined with potential provision for car share schemes and other transport alternatives to reduce car dependency;
- liveable and active public domain spaces for the community that integrate with proposed land uses and the stations, and
- high quality open space that is within walking distance.

3.2 Sustainability Targets

The State Government's NSW 2021 10-year plan contains targets for improving transport services and shifting trips away from the use of private vehicles toward public transport, walking and cycling. The plan also provides target mode shares for public transport for major centres in NSW. While no specific target is given for Liverpool, a target of increasing the proportion of total journeys to work by public transport in the Sydney Metropolitan Region to 28% is given.

Increasing the use of walking and cycling for trips is also advocated, with the specific targets of more than doubling the mode share of bicycle trips and increasing the mode share of walking trips to 25%. The plan also aims to create planning policy that encourages job growth in centres close to where people live and to provide access by public transport.

These goals apply to the Sydney Metropolitan Region in general. The proposed development aspires to be a TOD, hence it's transport targets should aim to achieve even higher shifts in travel behaviour away from car use than those stated in NSW 2021.

Therefore, the proposed set of transport targets for the development upon completion are:

- journey to work mode share of 30% by car (taxi, Uber, car share, passenger) or less;
- bicycle mode share of 3%, compared to current value for the area of less than 1%;
- walking to increase to 23% of daily travel;
- low provision of car parking;
- 40% non-car mode share for journeys to / from work, and
- 20% walking trips for all trip purposes.

3.3 Achieving the Principles

The TOD principles have been implemented in the Proposal as follows:

Purpose-built concept

The urban design framework will enhance the existing character of the site by:

- Creating significant uplift for the locality, particularly given the Site's strategic location with the Scott Street Key Site and the Bigge Park Conservation Area;
- Activate the streetscapes along Bigge Street and Scott Street;
- Meet key outcomes for a Transit Oriented Development due to the Site's strategic location as well as the further creation of through-site linkages connecting to surrounding street blocks;
- Make use of a site which is highly walkable in terms of access to the remainder of the Liverpool CBD, including other government, business, commercial and educational land users; and
- Create employment supporting floorspace near to where a range of new residential land release areas are located, thereby supporting the Greater Sydney's Commission's ideal of the 30-Minute City.

Mix of land uses

The Proposal seeks to contain a mix of land uses, including retail and commercial. By providing a mix of uses near the station, people would be encourage to use public transport. Similarly, people would be encouraged to use local shops and services while accessing public transport. This practice supports both local economic development and public transport use.

People travelling between transit and their place of employment are also expected to walk either directly or from a linked public transport trip.

Access to public spaces and streets, which are pedestrian and cyclist friendly

Within a TOD, non-car trips increase when the uses are easily accessible and arranged in a way that emphasises travel on foot rather than car. The transport hierarchy will promote movement of people firstly as pedestrians, secondly as cyclists, thirdly through public transport and lastly using private cars.

The creation of through-site linkages provides a strong and identifiable pedestrian connection between the major elements of the Site and the circulation network around the Site reinforces vehicle speeds, making the road network more cycle and pedestrian friendly providing direct, safe, convenient, continuous and legible cycling and walking networks. The network radiates from the Site and into

networks in the surrounding areas providing excellent permeability for all modes of transport, thereby providing direct routes and reducing trip lengths for all.

High density and close to a transit station

Employment development near transit stations provides a ready market for transit trips. Consequently, higher densities strengthen the demand for transit. The proposed TOD is at higher density in relation to the existing surrounding development pattern and would locate the highest passenger generating land uses in close proximity (within 2 minutes' walk) to Liverpool Station, the Liverpool-Parramatta Transitway and several bus stops. This close proximity matches employee expectations of a short walk to/from their work location.

Reduced parking

Parking is one of the most challenging aspects of any TOD. Over provision of parking discourages public transport use and would undermine the principles set above. A small amount of short stay parking would be needed to support visitor and retail activity. The limited amount of parking provided would be made available for shared use, where possible, to maximise efficiency and reduce the total amount of parking required.

Regarding the principles and measures above, the aim of the project in terms of transport and movement related activities is to provide a development that prioritises non car travel modes and minimises vehicle and pedestrian conflicts.

4 Proposed Development Details

4.1 Site Plan

The intention is to develop the Site for a 23 storey commercial tower with associated redevelopment of the locally heritage listed Commercial Hotel. These land uses are most appropriately characterised as being for Commercial Premises. Overall, the proposed development would create around 27,792.2m^2 of commercial and retail floorspace. A range of other suitable land uses are currently permitted in the B3 Commercial Core land zone) which could support alternative uses of commercial floorspace within the finished tower should potential tenants desire to be located at the site. Such suitable land uses as are currently permitted in the B3 Commercial Core land zone under the LLEP 2008 include:

- Commercial premises; ▪ Community facilities; ▪ Educational establishments; ▪ Entertainment facilities;
- Function centres;
- Medical centres; and
- Public administration buildings.

It is envisaged that the Site would primarily cater to Office Premises type land uses, and this is indeed the key strategic land use driver off the proposed development. However, this DA does not seek consent for any specific tenancy fit-out and use of the site. It is understood that in the future, DAs or Code Complying Development Certificates would be sought to facilitate more specific commercial land uses at the Site.

The Site is located in the centre of Liverpool's CBD, approximately 40km south-west of the Sydney CBD. It is and approximately 80m from Liverpool Station and around 140m from the Liverpool-Parramatta Transitway.

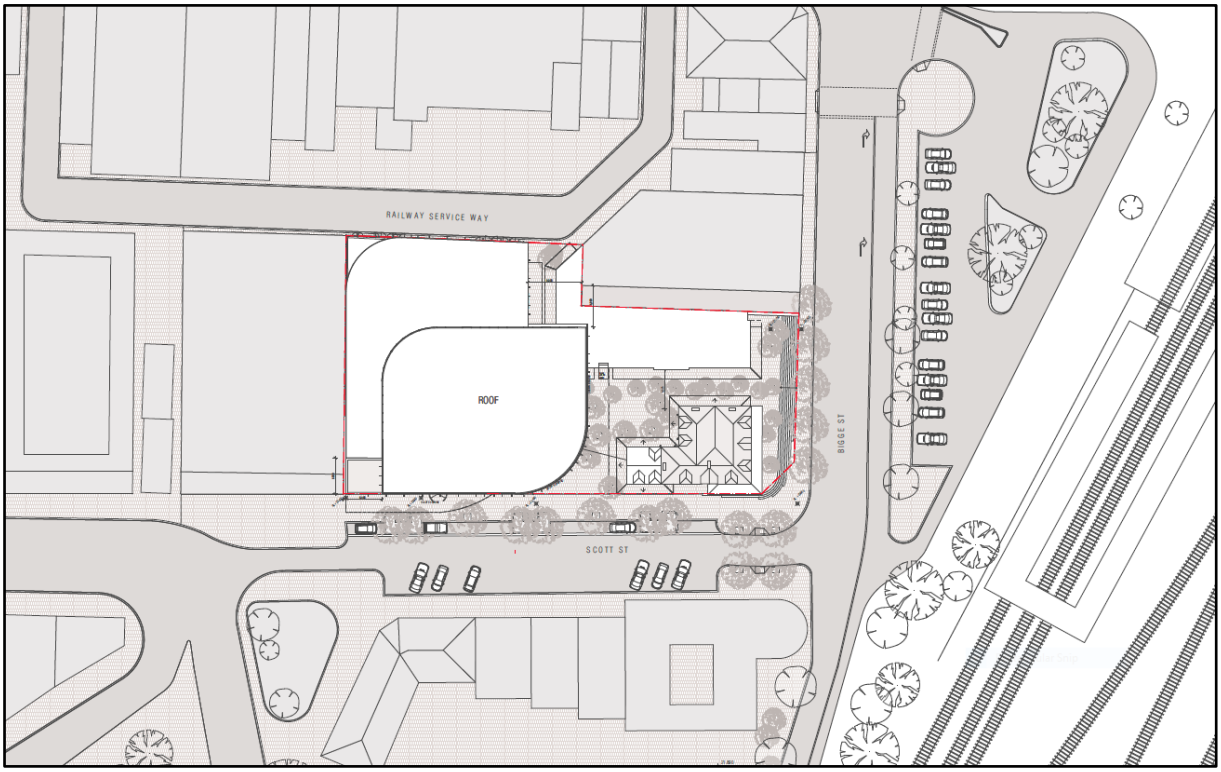

Figure 3: Site Plan

4.2 Operational Details

It is envisaged that the Site would primarily cater to Office Premises type land uses, and this is indeed the key strategic land use driver off the proposed development. However, this DA does not seek consent for any specific tenancy fit-out and use of the site. It is understood that in the future, DAs or Code Complying Development Certificates would be sought to facilitate more specific commercial land uses at the site.

The architectural plans for the proposed development are contained in **Appendix A** and elements of the Proposal are summarised in **Table 8**.

Table 8: Proposed Land Use Schedule

Level	Retail	Commercial
Basement 2	-	-
Basement 1	-	141.6
Ground Floor	641.4	832.9
Level 1 - Substation	-	421.7
Level 2 - Plant/Eot	-	506.6
Level 3 - Typical Lowrise	-	1,315.7
Level 4 - Typical Lowrise	-	1,315.7
Level 5 - Typical Lowrise	-	1,315.7

Level	Retail	Commercial
Level 6 - Typical Lowrise	-	1,315.7
Level 7 - Typical Lowrise	-	1,315.7
Level 8 - Typical Lowrise	-	1,315.7
Level 9 - Typical Lowrise	-	1,315.7
Level 10 - Typical Lowrise	-	1,315.7
Level 11 - Oasis	-	877.6
Level 12 - Typical Highrise Lor	-	1,297.4
Level 13 - Typical Highrise Lmr	-	1,297.4
Level 14 - Typical Highrise	-	1,297.4
Level 15 - Typical Highrise	-	1,327.0
Level 16 - Typical Highrise	-	1,327.0
Level 17 - Typical Highrise	-	1,327.0
Level 18 - Typical Highrise	-	1,327.0
Level 19 - Typical Highrise	-	1,327.0
Level 20 - Typical Highrise	-	1,327.0
Level 21 - Typical Highrise	-	1,327.0
Level 22 - Typical Highrise	-	1,327.0
Totals	**641.4**	**27,792.2**

4.3 Access and Parking

Access to the Site for car parking, service and loading vehicles is proposed via one entry/exit driveway to be constructed off Railway Serviceway. Two levels of basement car parking with a total of 69 car parking spaces (including four accessible spaces) are proposed, as well as combined End of Trip Facilities with provision for 129 bicycles. A separate End of Trip washroom area would be provided on Level 2 of the proposed Podium.

Four of the proposed 69 car parking spaces are designed as accessible car parking spaces. This equates to 5.8% of the total car parking spaces provided, and complies with the requirements of LDCP 2018.

As shown in **Figure 3** and **Appendix A**, the ground floor of the Podium would include the car parking and loading dock entry from Railway Serviceway, as well as areas for security, high voltage switchroom, waste bin storage, and courier loading areas, as well as the general lobby with a supporting commercial/retail area and access to the elevator lobby.

Table 9 shows the calculated parking requirement under LDCP 2008.

Table 9: Parking Requirement

Use	Area	Liverpool DCP (2008) Parking Rate	Liverpool DCP (2008) Parking Requirement
Commercial	832.9m^2 GFA (ground floor) 26,959.3m^2 GFA (all other levels)	1 space per 200m^2 (ground floor) + 1 space per 150m^2 (all other levels)	184
Retail	641.4m^2 GFA (ground floor) 0m^2 GFA (all other levels)	1 space per 200m^2 (ground floor) + 1 space per 100m^2 (all other levels)	3
Total			**187**

Table 10 show the proposed parking provision in response.

Table 10: Parking Provision

Level	Type	Quantity
Basement 2	AusStd 90 Degree	34
Basement 2	Accessible Parking Spaces	2
Basement 1	AusStd 90 Degree	31
Basement 1	Accessible Parking Spaces	2
Ground Floor	AusStd 90 Degree (Loading)	2
Total		**69**

The application seeks approval for a reduced parking rate that is deemed appropriate due to the high accessibility of the Site to public transport. Furthermore, the suppression of employee/visitor parking will reduce the availability and therefore utilisation of spare parking capacity, supressing/reducing car trips.

Therefore, parking requirements should be restrained to account for the availability of other travel options, as well as accessibility to local services. This will lead to reduced car dependence and encourage uptake of other transport modes.

Given the Site's strategic location 80m from Liverpool Station and 140m from the Liverpool-Paramatta Transitway, it is likely that the majority of staff and visitors would access the proposed development by walking from either of those key public transport nodes.

Under Clause 7.3 of LLEP 2008, the proposed development is required to provide a minimum of 187 car parking spaces. However, this requirement is considered unreasonable/excessive and should be waived under Subclause 7.3(3), given that:

- Above ground car parking was previously considered as an option for the Site. However, this received negative feedback from the Design Excellence Panel and Liverpool City Council;

- Compliant carparking rates would necessitate additional levels of basement car parking. However, the underlying geological conditions of the Site are not favourable for an additional level of basement carparking. Additional levels of underground car parking would incur significant expense due to those geological constraints as such unnecessary costs would be borne by the eventual tenants of the Site;
- The proposed development would meet key outcomes for Transit Oriented Development due to its strategic location within 80m of Liverpool Station as well as the further creation of through site linkages connecting to surrounding street blocks. This would reduce the dependency on car travel to access to the Site; and
- The proposed development would provide End of Trip Facilities, further encouraging active transport modes to and from the Site. Liverpool Station also provides secure bike locking facilities.

5 Traffic and Transport Assessment

5.1 Traffic Generation

For this assessment it has been assumed that traffic generation would be 80% of the number of car parking spaces proposed during the AM and PM peak hours. This would equate to around 56 vehicles per hour during the peak periods.

5.2 Traffic Distribution

Distribution of traffic onto the network would be via Railway Serviceway onto Railway Street and assuming that 50% of vehicles travel west to George Street and 50% of vehicles travel east to Bigge Street, only 28 vehicles per hour would be added to these intersections or approximately 1 vehicle every 2 minutes.

With consideration of the existing Site generation of 30 vehicles per hour during the peaks, the Proposal would only generate 13 additional vehicles per hour at the intersections of Railway Street with George Street and Railway Street with Bigge Street respectively.

5.3 Traffic Impact Assessment

The Proposal will include an increase in floor area for the Site. However, it is not expected that this increase would result in significantly more additional vehicle trips. It is proposed to provide reduced on-site car parking to discourage private vehicle use. As such, the traffic generation of the Proposal would likely remain similar to existing conditions and not uptake the spare capacity on the surrounding road network.

The limited availability of parking off-site further discourages the use of travel by car, with nearby on-street parking imposed with time restrictions, resident parking restrictions and parking fees. Also, an additional 26 vehicles per hour added to the road network during the peak periods would not take up the existing capacity at nearby intersections and significantly affect the existing Levels of Service. As such, the proposed development would not create any adverse traffic impacts to the surrounding road network.

6 Impact Mitigation

6.1 Potential Traffic Impact Mitigation Initiatives

The aim of the Proposal in terms of transport and movement related activities is to provide a development that prioritises non car travel modes and minimises vehicle and pedestrian conflicts.

The measures support delivery of the high level transport and travel demand management objectives and support the wider principles discussed. This is how a sustainable proposal will be delivered, in which travel by car is not the only option for staffs and visitors to make the journeys they wish to make.

The measures include a range of different types of initiatives which together reinforce the principles and objectives of the sustainable travel strategy. These measures include:

- Travel behaviour measures – Initiatives to encourage sustainable travel.
- Service measures – Service delivery standards to maximise potential uptake of sustainable modes.
- Infrastructure measures – Provision of infrastructure designed to facilitate sustainable travel.

6.1.1 Travel Behaviour Measures

1) Employee Information Packs for each staff member of the proposed development.

Each employee would be provided with an employee information pack which would include a sustainable travel kit. This would be provided to each new staff member during induction to set out the sustainable travel options available to them and the specific local initiatives available to encourage sustainable travel.

This would incorporate public transport leaflets, route maps and timetables, pedestrian and cycle network maps, information on sustainable community initiatives such as Bicycle User Groups, Car Sharing Schemes, the Sydney Connect Scheme, and other local community projects to reduce travel or encourage uptake of sustainable modes.

This personalised journey planning approach is a proven, effective methodology to encourage sustainable travel and reduce private car travel.

6.1.2 Public Transport Measures

2) Integration of public transport services – bus and rail connectivity and interchange

The bus route network surrounding the Site has been designed to maximise integration with train and bus services provided at Liverpool station. The Site has a bus-rail interchange within two minutes' walk, designed to minimise interchange disruption and encourage onward travel by public transport. Bus services also provide onward connections to regional centres of employment, retail and commerce.

Bus timetables should also have input from the Site to ensure that they are designed to coordinate with the rail timetables to minimise transfer time and overall journey time for residents and employees.

3) Bus service coverage

The proposed bus routes to service the Site have been designed to maximise coverage and to provide connections for employees and visitors to major services.

According to the Bus Service Planning Guidelines, bus services should cover 90% of the proposed development that is within 400m of a bus route. The proposed bus network should be designed to maximise the coverage of the Site. However, circuitous routes should be avoided that provide inefficient and indirect bus service to passengers.

4) Bus service frequencies to Service Planning Guidelines

The public transport network is designed to meet or exceed the criteria for service levels based on the Transport NSW bus planning guidelines.

5) Good quality bus stops with coverage throughout Liverpool

Bus stops are provided on bus routes at regular intervals, at approximately 400 metres between stops, throughout Liverpool, to provide good access to public transport networks. Stops are also strategically placed adjacent to major trip attractors at schools and leisure facilities, and the dedicated bus-rail interchange facility provided at Liverpool Station.

6.1.3 Bicycle Measures

6) Bicycle facilities

To maximise bicycle usage for the Site and the wider precinct, the provision of sufficient End of Trip facilities, such as bicycle parking, is essential. Bicycle parking is therefore proposed to be provided on site as well as in close proximity to the schools and sports facilities, at the Liverpool Station and will also be encouraged as part of the development of employment and other commercial uses. Other areas of key open space will also have bicycle parking for leisure and recreational use.

7) Promotion of bicycle initiatives – NSW bicycle week, cycle to work day

In addition to a local BUG to promote and encourage cycling in the precinct, local schools, businesses and councils should actively participate in recognised NSW government bicycle initiatives such as bicycle week and cycle to work day.

6.1.4 Pedestrian Measures

8) A highly permeable and safe pedestrian network

A permeable pedestrian network is provided through the Site and continuous pedestrian footpaths and pedestrian crossing facilities at key locations in Liverpool CBD. The design of a high quality, highly permeable pedestrian network with limited delays to walk trips and which is pleasant, convenient, direct and integrated with land uses encourages and facilitates pedestrian accessibility.

In addition, the pedestrian network considers safety in design and provides well-lit pedestrian links which can be observed from local land uses and as such provide pedestrians with a perception of safety and ambience which can encourage pedestrian travel.

6.1.5 Travel Planning Measures

9) 'Voluntary' workplace travel plans

Workplace travel plans should be encouraged for new businesses within the Site which could be implemented through the provision of shared area-based initiatives and facilities wherever possible.

6.1.6 Parking Restraint Measures

10) Restrained parking rates

The Site will have very good access by public transport, as well as good quality pedestrian and cycle networks, and a good range of local shops, services and facilities in close proximity, thereby reducing the need for a car.

Therefore, parking requirements for this type of development should be restrained to account for the availability of other travel options, as well as accessibility to local services. This will lead to reduced car dependence and encourage uptake of other modes.

11) Co-sharing parking provision

The provision of parking for the Site should be co-ordinated and where possible managed and shared across multiple land uses or shared between retail and commuter parking that do not have similar peak

parking demands. This will create a more walkable development which is not car dominated and ensure balanced access across all modes.

Parking provision should encourage short stay trips, with some limited long stay parking for commuters. Any on-street parking should be limited to short term, disabled and taxi parking.

6.1.7 Travel Demand Management Measures

12) Car sharing scheme

Council should consider extending the provision of established car share schemes using an established provider to set up a car sharing network accessible by the Site, preferably on Scott Street. This would reduce the need to own and operate their own vehicle, safe in the knowledge that they can get access to a vehicle if they require one.

7 Design Commentary

7.1 Relevant Design Standards

The Site access, car park and loading areas have been designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.6 for accessible (disabled) parking.

A detailed review of the car park and related areas has been undertaken and the following characteristics are noteworthy:

- The main car park aisle has been designed with a minimum clear width of 5.5m. This is considered supportable having regard to the low traffic volumes expected during peak periods.
- All parking spaces are designed in accordance with a User Class 1A and are to be provided with a minimum space length of 5.4m, a minimum width of 2.4m.
- Dead-end aisles are provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1.
- All disabled and adaptable parking spaces are to be provided in accordance with AS2890.6, which requires a space with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or site access would comply with these Standards. Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

7.2 Service Vehicle Access

The service vehicle facilities of the development have been designed having regard for the operational requirements of the future tenant and the requirements of AS2890.2. In this regard the following is considered noteworthy:

- The internal design of the service area has been undertaken in accordance with the requirements of AS28090.2 for the maximum length vehicle accessing the site being a Small Rigid Vehicle of 6.4m in length.

- A minimum clear head height of 4m is provided within all areas traversed by service vehicles.
- A minimum bay width of 3.5m is provided, and
- All service vehicles can enter and exit the site in a forward direction.

A swept path analysis also demonstrate compliance with relevant sections of AS2890.2.

7.3 Servicing Arrangements

The Proposal would establish new through-site linkages to promote pedestrian permeability and legibility throughout the site and within the Liverpool CBD more generally. The proposed development would include an End of Trip facility with provision for bicycles to encourage cyclist patronage of the Site. Level one of the Podium would include back of house areas adjacent to the Railway Serviceway allowing convenient access for servicing and maintenance. This would include provision for electrical, mechanical, gas and water, switch room and substation.

The Tower ground floor would include car parking and loading dock entry off the Railway Serviceway, as well as areas for security, HV, waste bin storage, loading docks and courier loading areas, as well as the general lobby with a supporting commercial/retail area and access to the elevator lobby.

8 Conclusion and Recommendations

The key findings of this Traffic Impact Assessment are:

- Ason Group has been commissioned by Macky Corp to conduct a Transport Impact Assessment (TIA) to support a Development Application for a 23 storey commercial tower with associated redevelopment of the locally heritage listed Commercial Hotel (the Proposal) on the subject site at 277 Bigge Street, 11 Scott Street, 13-15 Scott Street, 17 Scott Street, 23 Scott Street, 21 Scott Street and 23 Scott Street, Liverpool (the Site).
- The proposed development would create around 27,792.2m^2 of office floorspace. It is envisaged that the Site would primarily cater to Office Premises type land uses and this is the key strategic land use driver off the Proposal.
- The Site is favourably located to public transport facilities – Liverpool Station and the Liverpool-Paramatta Transitway are within 2 minutes' walk – which will encourage staff and visitors to use alternative transport modes other than private vehicles to travel to and from the Site. The pedestrian and bicycle facilities provide convenient, safe access to these public transport nodes.
- The key intersections in the vicinity of the Site currently operate with a good level of service that demonstrates spare capacity.
- Regarding the principles and measures of a Transit Oriented Development, the aim of the project in terms of transport and movement related activities is to provide a development that prioritises non car travel modes and minimises vehicle and pedestrian conflicts.
- Reduced parking rates are proposed and deemed appropriate due to the high accessibility of the Site to public and active transport. Parking has been restrained to account for the availability of other travel options, as well as accessibility to local services. This will lead to reduced car dependence and encourage uptake of other transport modes.
- It is proposed to provide reduced on-site car parking to discourage private vehicle use. As such, the forecast traffic generation of an additional 26 vehicles per hour added to the road network during the peak periods would not take up the existing capacity at nearby intersections and significantly affect the existing Levels of Service.
- The access and basement have been designed having regard for relevant Australian Standards (AS2890 series). A standard condition of consent requiring compliance with AS2890 would be considered sufficient to ensure that any minor changes to the plans required, if any, could be undertaken as part of detailed Construction Certificate documentation.

In summary, the Proposal is supportable on traffic planning grounds and will not result in any adverse impacts on the surrounding road network or the availability of on-street parking.

Appendix A

Reduced Plans

RAILWAY SERVICE WAY

BRICK WC

CONCRETE SLAB

15 DP 262442

METAL SHED

BITUMEN CARPARK

B DP 358314

METAL SHED

AWNING

18 DP 979379

RL+ 20.420

BRICK BUILDING "FIJI CURRY HUT" 17 SCOTT STREET

BRICK BUILDING "IDEAL BATHROOMS" 15 SCOTT STREET

COMPLETE REMOVAL OF ADDITION

23 DP 700728

24 DP 700728

1 DP 77180

RIGHT OF WAY 0.915 WIDE

2 DP 1023072

B DP 350234

15 DP 1050799

16 DP 1050799

PROPOSED NEW PENETRATION IN FLOOR FOR LIFT PIT

BIGR BUILDING 21 SCOTT STREET VACANT

BRICK BUILDING "XXX ADULT SHOP"

BRICK BUILDING VACANT SHOP

RENDERED BRICK BUILDING "THE GOLDEN FORTUNE LOUNGE"

RL+ 21.890

RL+ 21.000

AWNING

RL+ 21.000

AWNING

BIGGE ST

SCOTT ST

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01	DEVELOPMENT APPLICATION	BB	28.06.2018	
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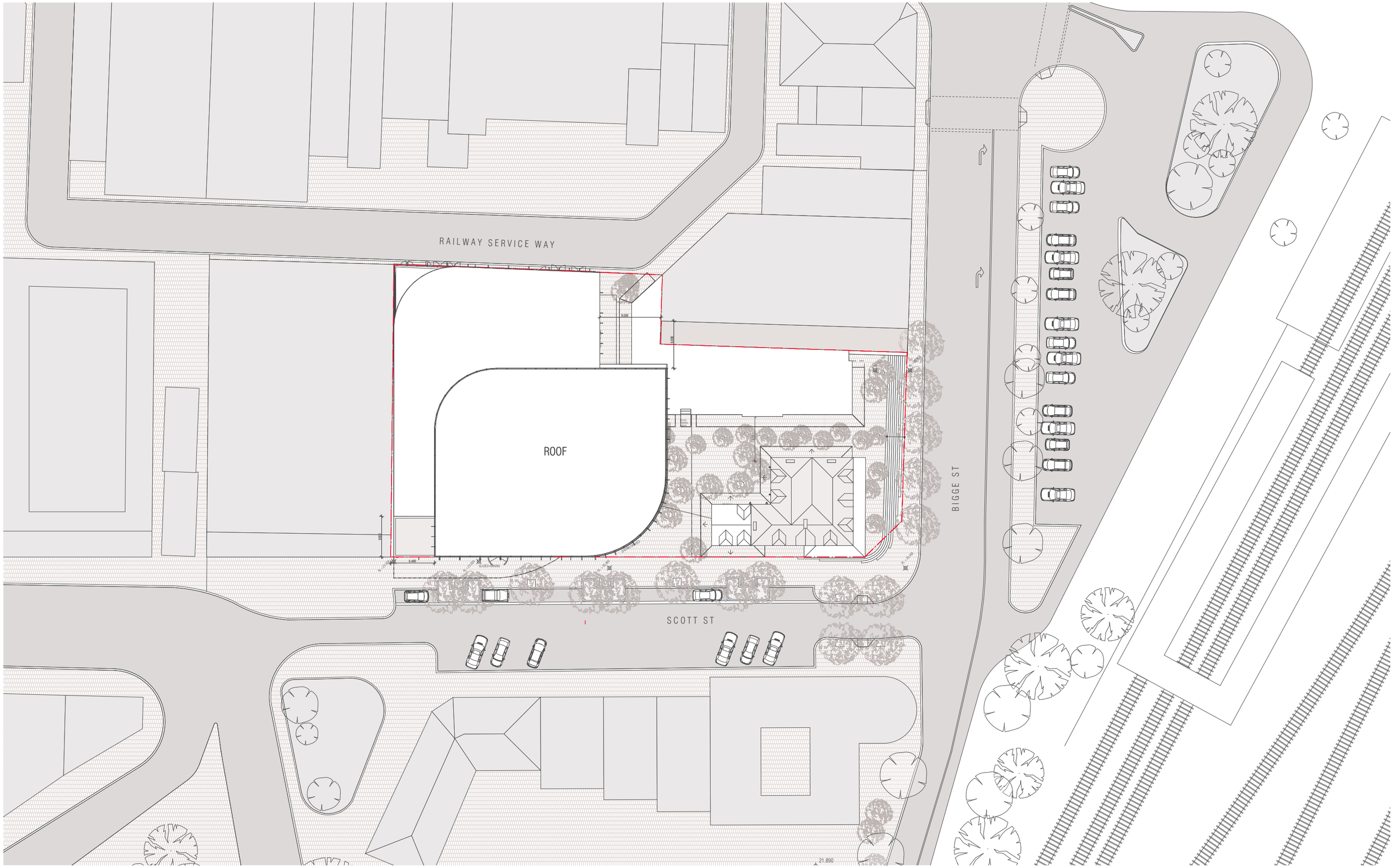
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	DEMOLITION PLAN	DEVELOPMENT APPLICATION	03	DA020



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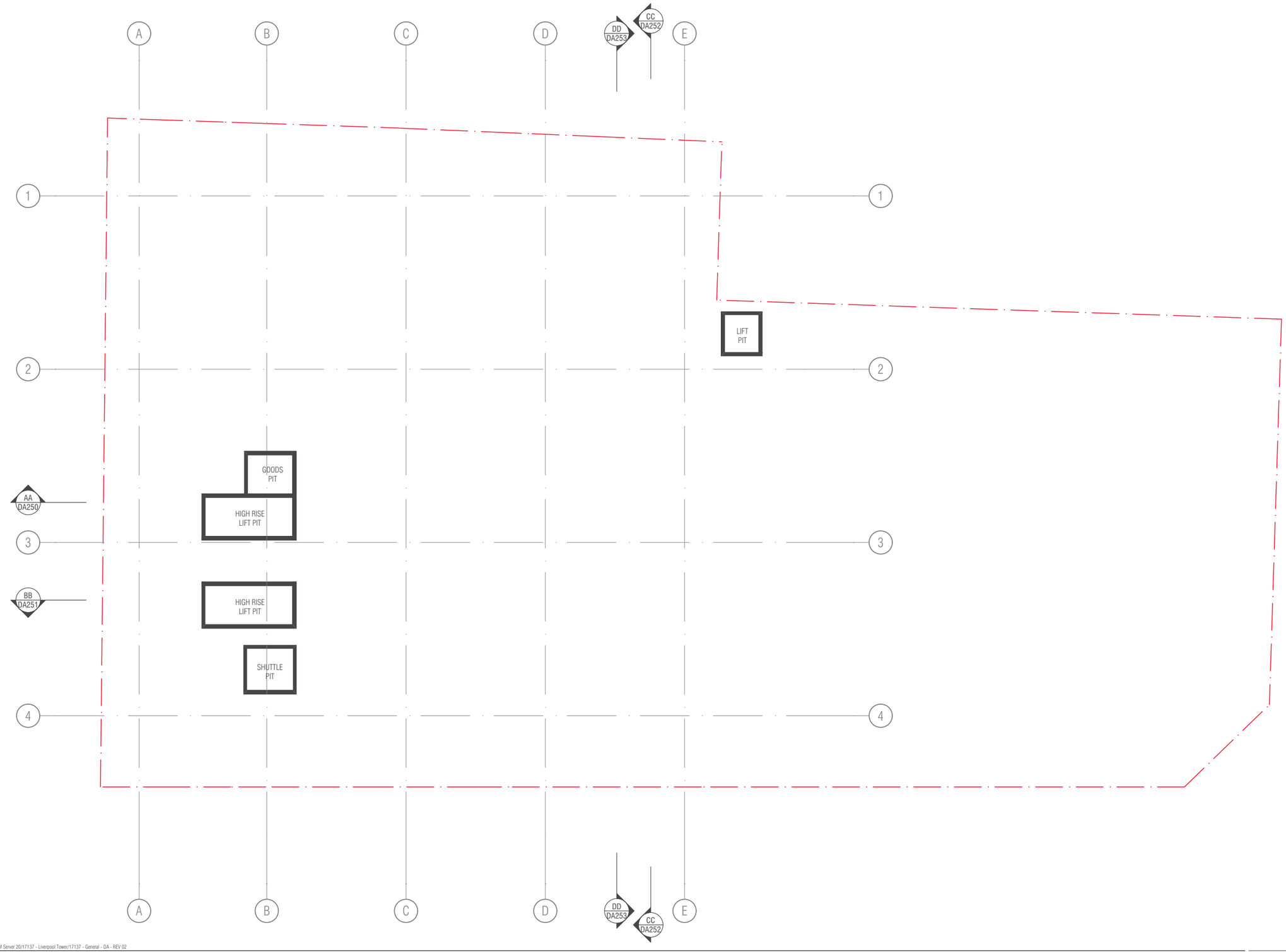

GENERAL LEGEND

- GA1 TOWER CURTAIN WALL WITH DARK BRONZE ANODISED MULLION/FRAME
- GA2 PODIUM FRAMELESS GLAZING
- GA3 LIGHT TIMBER LOOK GHOST SPANDREL
- GA4 DARK TIMBER LOOK GHOST SPANDREL
- GA5 GHOST SPANDREL TIMBER BATTEN BACK PAN
- GA6 BALUSTRADE FRAMELESS TOP EDGE, GLASS TO MATCH GA1
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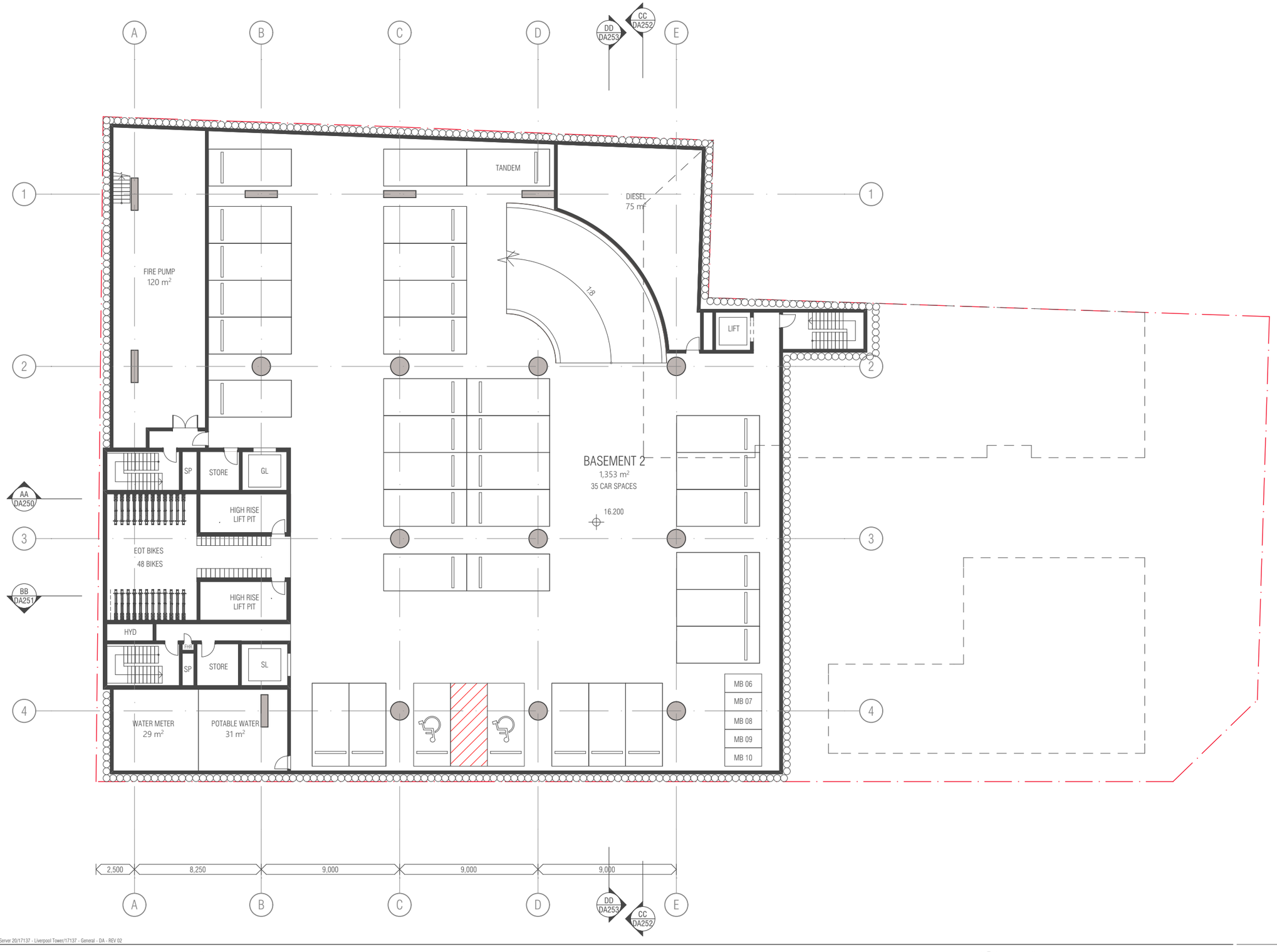

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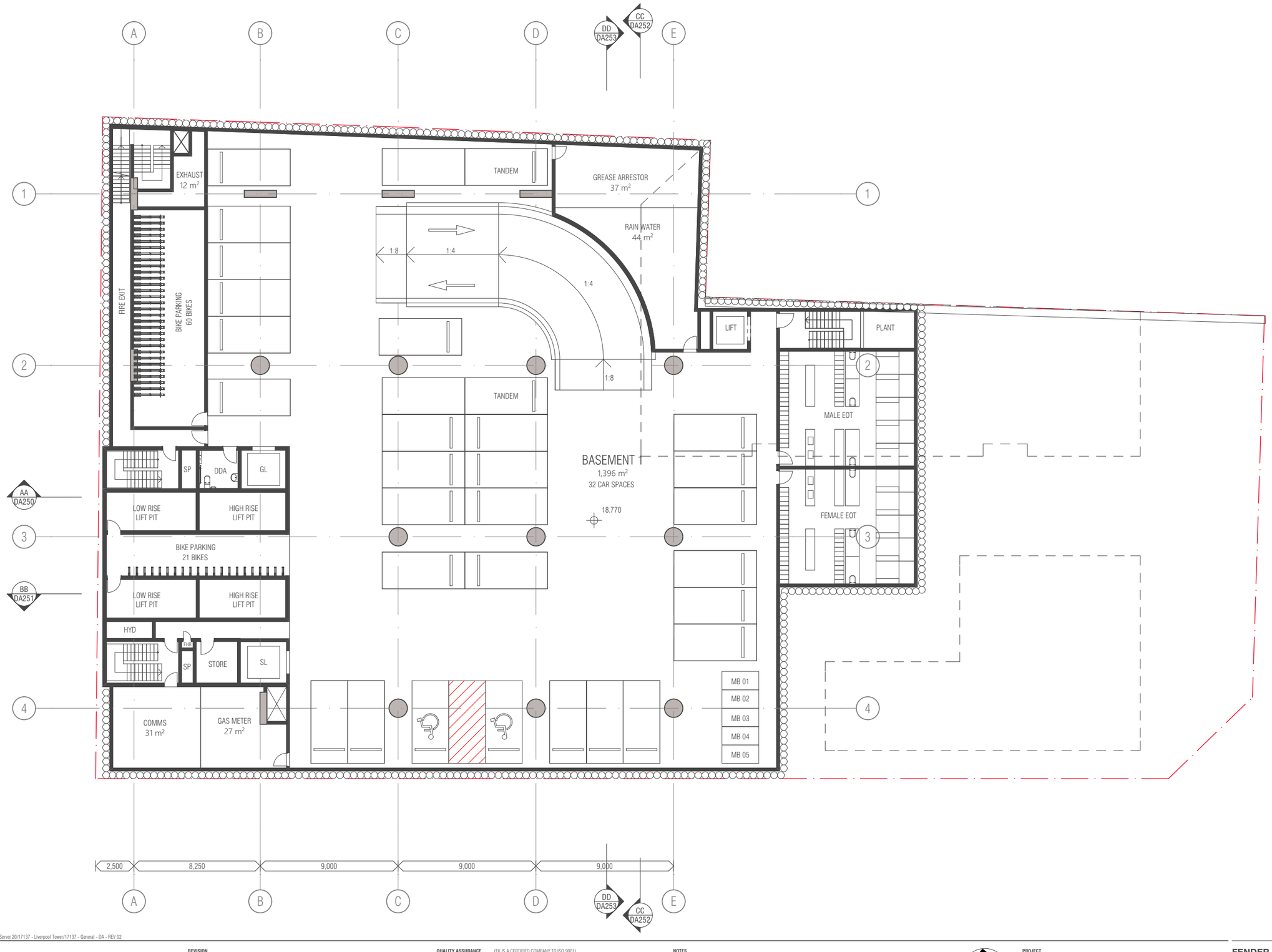
ISSUE PURPOSE	REV.	DRAWING NO.
DEVELOPMENT APPLICATION	03	DA098



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PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

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FENDER KATSALIDIS (AUST) PTY LTD ACN 092 943 032

DRAWN	DATE	CHECKED	PLOT DATE	JOB NO.	SCALE	DRAWING TITLE
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	BASEMENT 1

ISSUE PURPOSE	REV.	DRAWING NO.
DEVELOPMENT APPLICATION	03	DA099

RAILWAY SERVICE WAY

SCOTT ST

BIGGE ST

BOOSTER
FCR 14 m²
CARPARK/ LOADINGDOCK ENTRY 1:20
HV SWITCH 27 m²
RAMP TO CARPARK
LOADING DOCK
DIESEL FILL POINT
BIN ROOM 34 m²
BIKE PARKING
SLAB ABOVE SHOWN DASHED
DOCK HOLD
HYD
SP
COURIER LOADING
COURIER LOADING
SECURITY 20 m²
STORE 38 m²
STORE
GL
LR
LR
HR
HR
RECEPTION
LOBBY
ENTRY
LIFT LOBBY
23.000
CAFE
RETAIL 6 116 m²
SL
DDA
FIRE EXIT
RETAIL 6 62 m²
AWNING ABOVE SHOWN DASHED
RETAIL 5 35 m²
LIFT
RETAIL 4 26 m²
RETAIL 3 42 m²
RETAIL 2 73 m²
RETAIL 1 52 m²
GLASS AWNING ABOVE
TOWER ABOVE SHOWN DASHED
PUB GFA 170 m²
CO-WORKING ENTRY
WC
BAR
KITCHEN
RL+ 21.890
RL+ 21.750
RL+ 20.320
RL+ 20.460
RL+ 23.000

N DA203
S DA201
E DA200
AA DA250
BB DA251
CC DA252
DD DA253

BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

REVISION

01	DEVELOPMENT APPLICATION	BB	28.06.2018
02	DEVELOPMENT APPLICATION FOR COUNCIL	JC	28.06.2018
> 03	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

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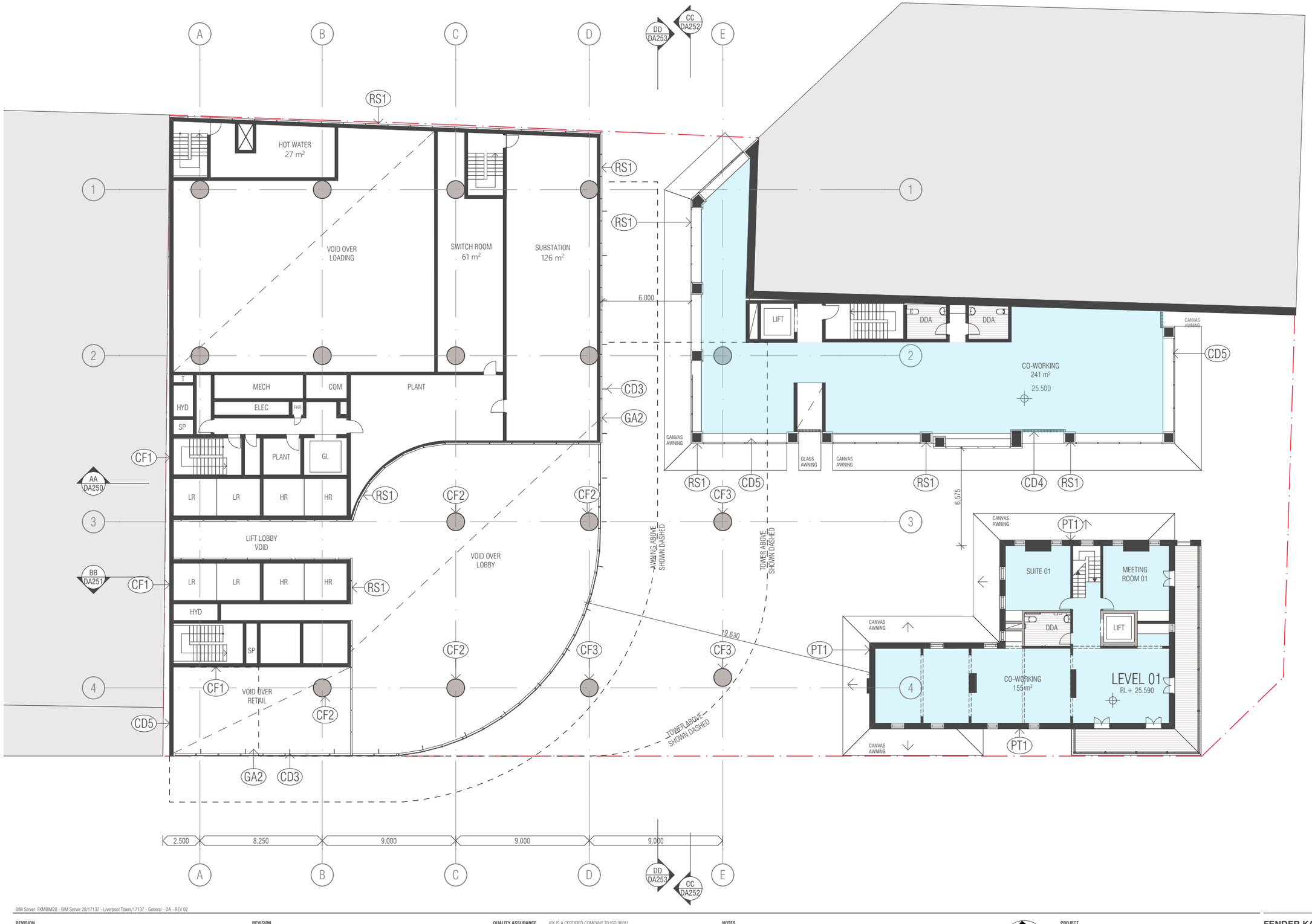
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	GROUND FLOOR PLAN	DEVELOPMENT APPLICATION	03	**DA100**



GENERAL LEGEND

- GA1 TOWER CURTAIN WALL WITH DARK BRONZE ANODISED MULLION/FRAME
- GA2 PODIUM FRAMELESS GLAZING
- GA3 LIGHT TIMBER LOOK GHOST SPANDREL
- GA4 DARK TIMBER LOOK GHOST SPANDREL
- GA5 GHOST SPANDREL TIMBER BATTEN BACK PAN
- GA6 BALUSTRADE FRAMELESS TOP EDGE, GLASS TO MATCH GA1
- GA7 GLASS VAIL TO MATCH GA1
- GA8 STRIP WINDOW TO MATCH GA1 WITH TIMBER LOOK SPANDREL
- GA9 FRAMELESS HORIZONTAL BIFOLD DOORS
- CD1 TERRACOTTA HORIZONTAL SUN SHADE
- CD2 TERRACOTTA VERTICAL SUN SHADE
- CD3 DARK BRONZE EXTRUDED ALUMINIUM VERTICAL FIN PODIUM
- CD4 DARK BRONZE EXTRUDED ALUMINIUM VERTICAL BATTEN
- CD5 DARK BRONZE ALUMINIUM CLADDING
- RS1 TERRACOTTA RAIN SCREEN TYPE 1
- RS2 TERRACOTTA RAIN SCREEN TYPE 2
- CF1 OFF FORM CONCRETE FINISH JUMPFORM CLASS 2 WITH ASPIRATION OF CLASS 1
- CF2 OFF FORM CONCRETE FINISH INSITU (INTERNAL AND EXTERNAL)
- CF3 OFF FORM CONCRETE WITH ANTI GRAFFITI SEALER
- CF4 PAINTED CONCRETE TO MATCH LIGHT TIMBER SPANDREL
- CF5 PAINTED CONCRETE TO MATCH DARK TIMBER SPANDREL
- PN1 RENDERED WALL PAINT FINISH
- BR1 RECYCLED BRICKS FROM SITE
- BR2 BRICK
- GW1 GREEN WALL
- PT1 LIGHT CREAM PAINT TO REFERENCE HERITAGE COLOURS

BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

REVISION				REVISION
01	DEVELOPMENT APPLICATION	BB	28.06.2018	
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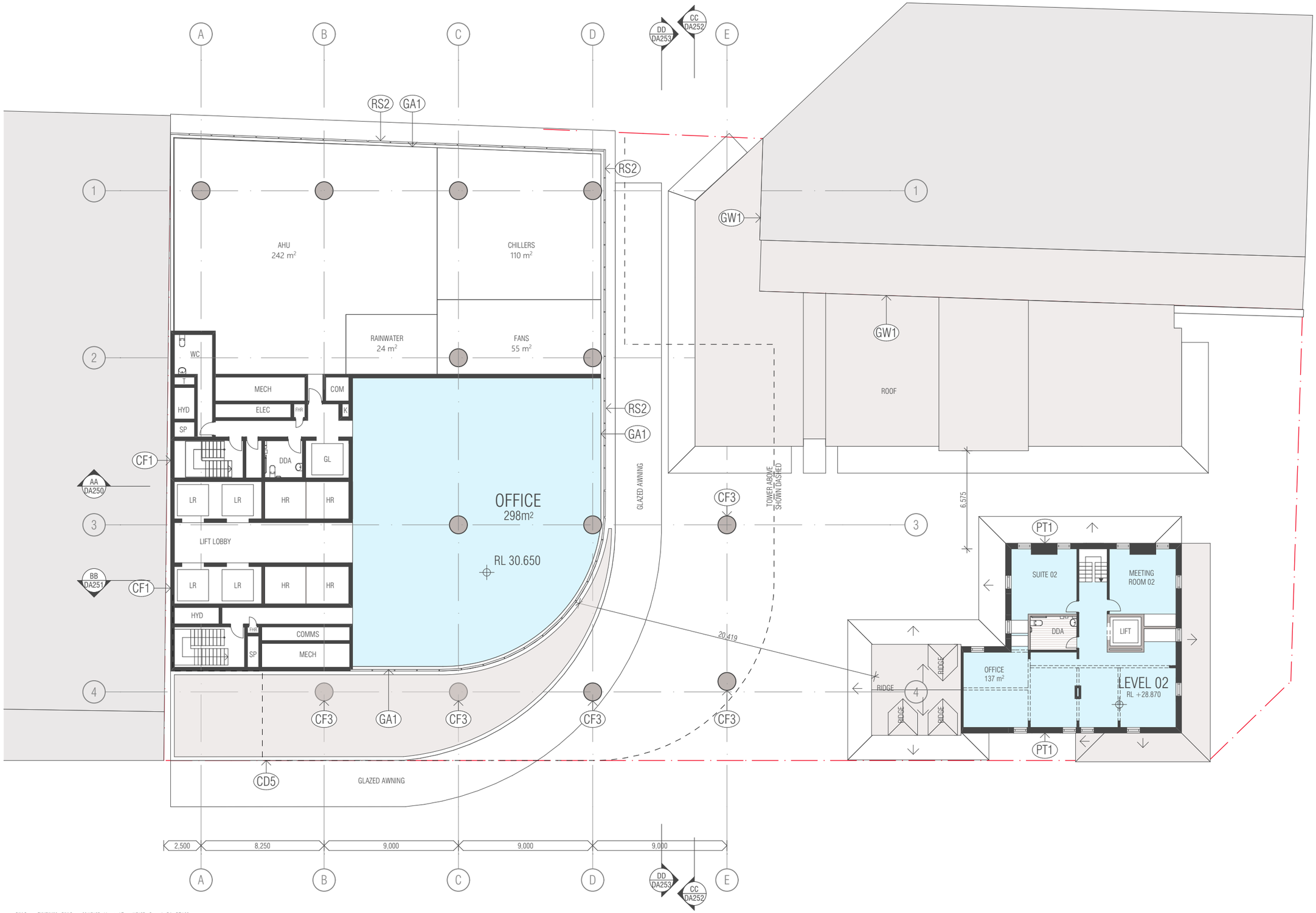
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 01 - B.O.H	DEVELOPMENT APPLICATION	03	DA101



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- GA5 GHOST SPANDREL TIMBER BATTEN BACK PAN
- GA6 BALUSTRADE FRAMELESS TOP EDGE, GLASS TO MATCH GA1
- GA7 GLASS VAIL TO MATCH GA1
- GA8 STRIP WINDOW TO MATCH GA1 WITH TIMBER LOOK SPANDREL
- GA9 FRAMELESS HORIZONTAL BIFOLD DOORS
- CD1 TERRACOTTA HORIZONTAL SUN SHADE
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REVISION

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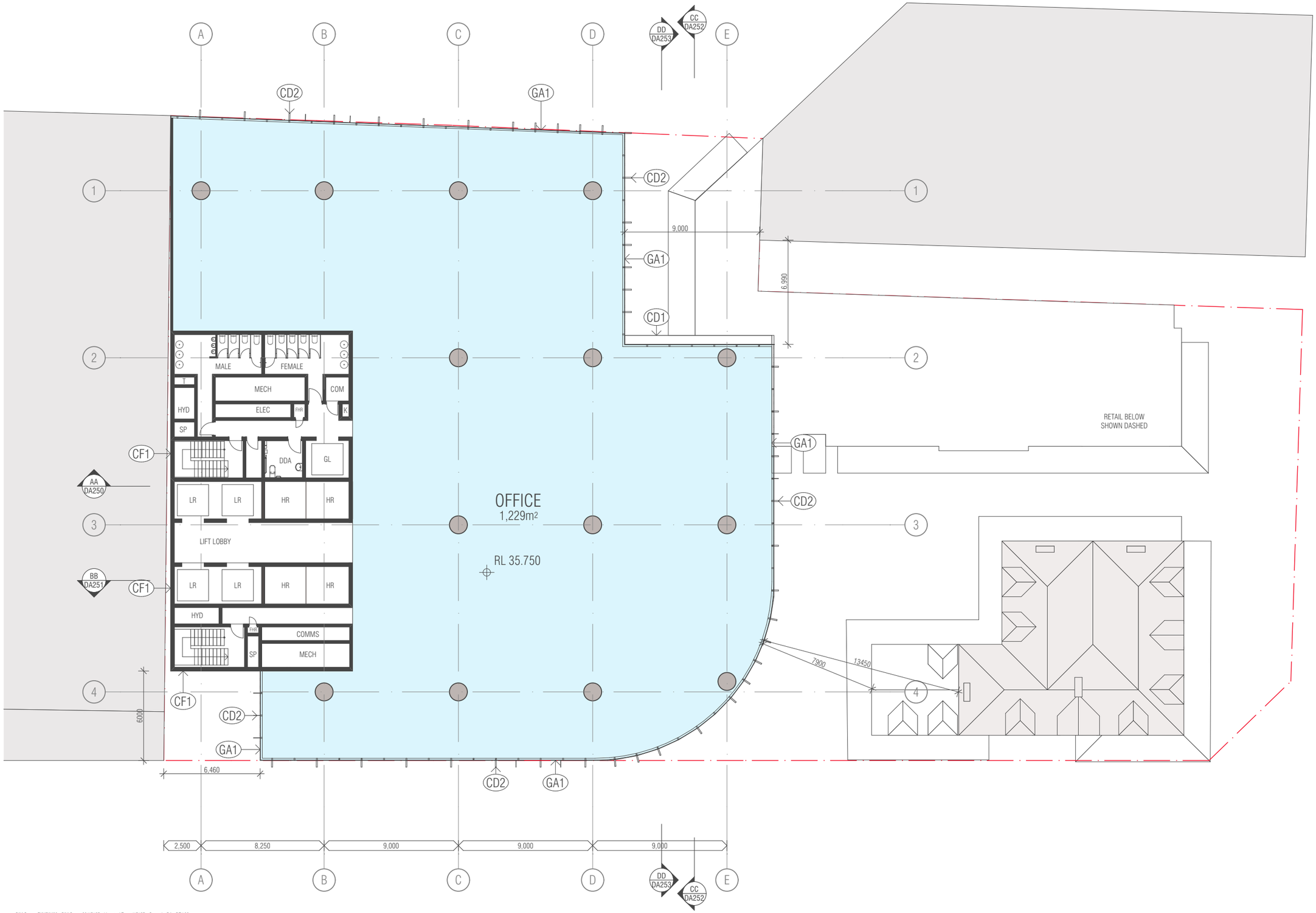
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 02 - PLANT

ISSUE PURPOSE	REV.	DRAWING NO.
DEVELOPMENT APPLICATION	03	DA102



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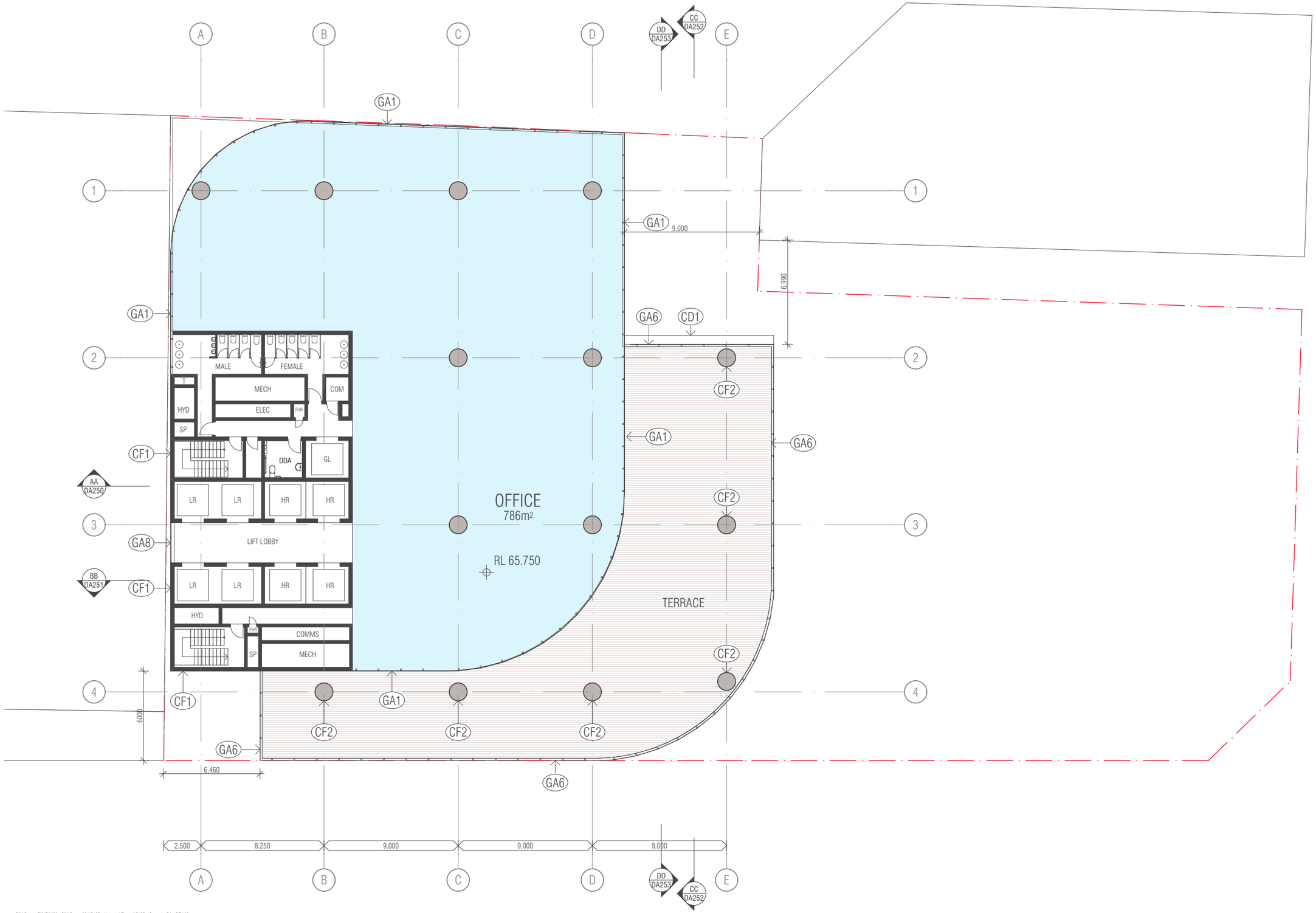
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 03-10 - TYPICAL LOW RISE	DEVELOPMENT APPLICATION	03	DA103



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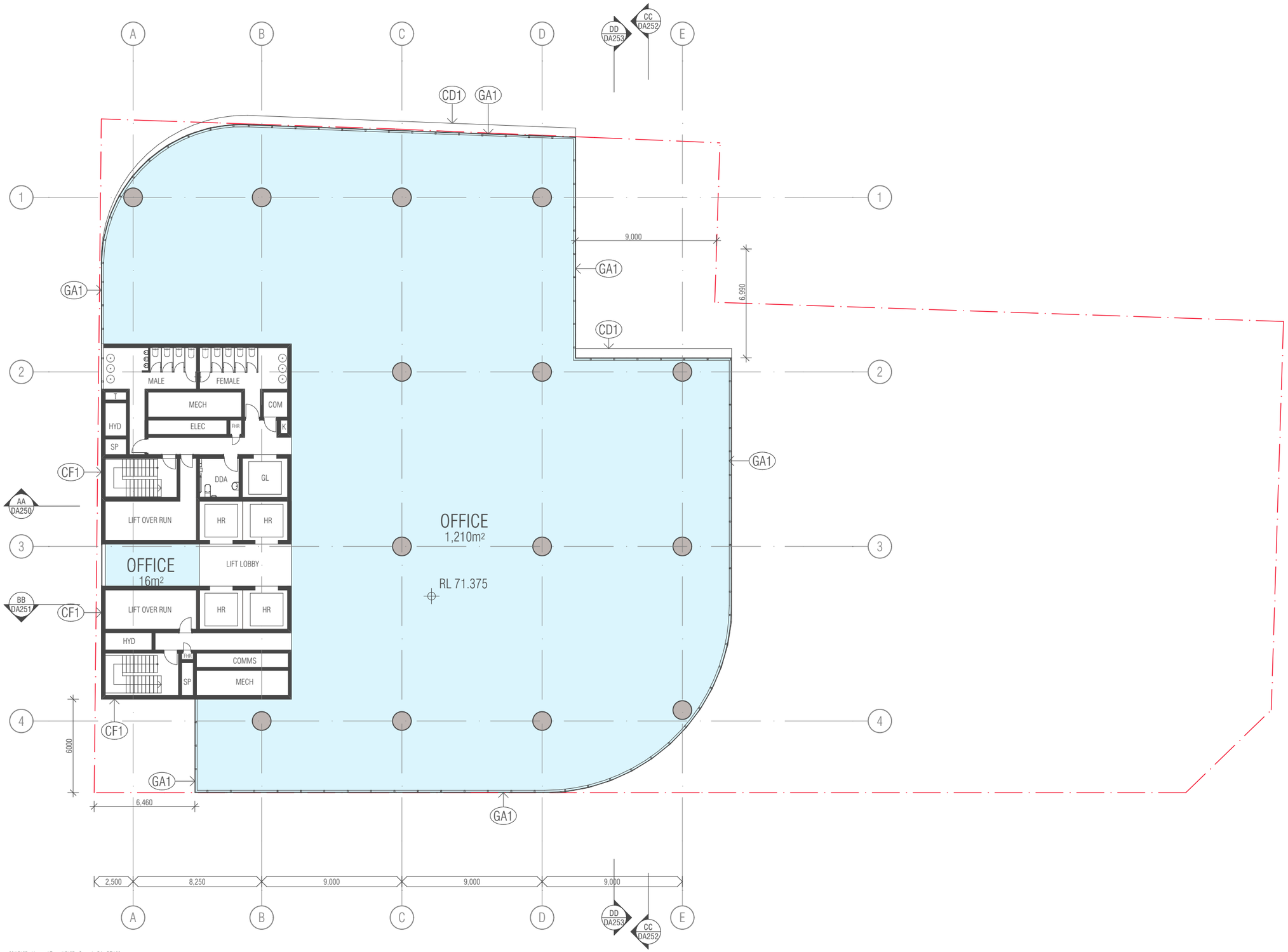

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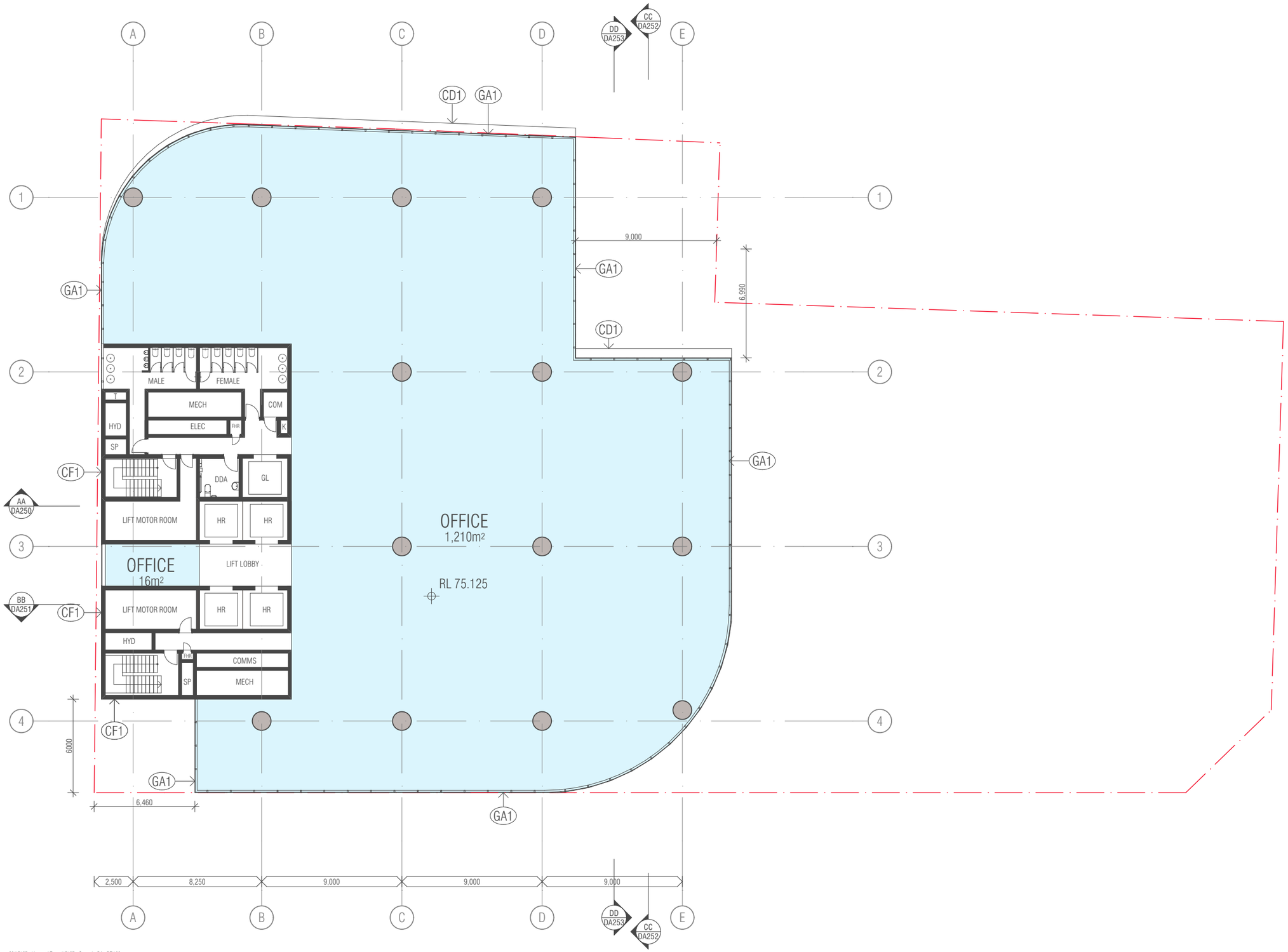

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- CD3 DARK BRONZE EXTRUDED ALUMINIUM VERTICAL FIN PODIUM
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- CD5 DARK BRONZE ALUMINIUM CLADDING
- RS1 TERRACOTTA RAIN SCREEN TYPE 1
- RS2 TERRACOTTA RAIN SCREEN TYPE 2
- CF1 OFF FORM CONCRETE FINISH JUMPFORM CLASS 2 WITH ASPIRATION OF CLASS 1
- CF2 OFF FORM CONCRETE FINISH INSITU (INTERNAL AND EXTERNAL)
- CF3 OFF FORM CONCRETE WITH ANTI GRAFFITI SEALER
- CF4 PAINTED CONCRETE TO MATCH LIGHT TIMBER SPANDREL
- CF5 PAINTED CONCRETE TO MATCH DARK TIMBER SPANDREL
- RN1 RENDERED WALL PAINT FINISH
- BR1 RECYCLED BRICKS FROM SITE
- BR2 BRICK
- GW1 GREEN WALL
- PT1 LIGHT CREAM PAINT TO REFERENCE HERITAGE COLOURS

BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

REVISION

01	DEVELOPMENT APPLICATION	BB	28.06.2018
02	DEVELOPMENT APPLICATION FOR COUNCIL	JC	28.06.2018
> 03	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

REVISION

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PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
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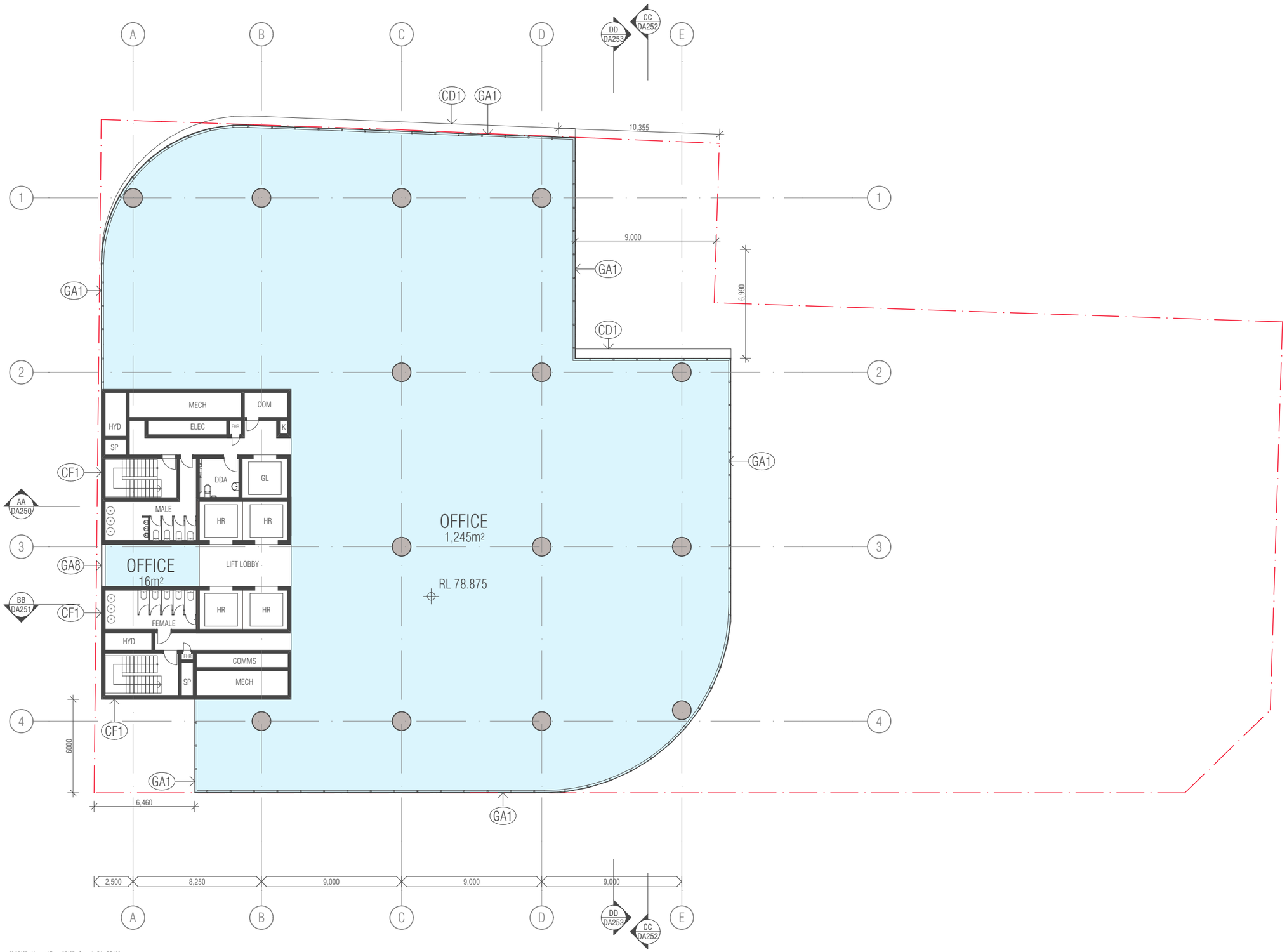
TELEPHONE: +61 3 8696 3888
FENDER KATSALIDIS (AUST) PTY LTD ACN 092 943 032

DRAWN	DATE	CHECKED	PLOT DATE	JOB NO.	SCALE	DRAWING TITLE	ISSUE PURPOSE	REV.	DRAWING NO.
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 13 - L.M.R	DEVELOPMENT APPLICATION	03	**DA113**



GENERAL LEGEND

- GA1 TOWER CURTAIN WALL WITH DARK BRONZE ANODISED MULLION/FRAME
- GA2 PODIUM FRAMELESS GLAZING
- GA3 LIGHT TIMBER LOOK GHOST SPANDREL
- GA4 DARK TIMBER LOOK GHOST SPANDREL
- GA5 GHOST SPANDREL TIMBER BATTEN BACK PAN
- GA6 BALUSTRADE FRAMELESS TOP EDGE, GLASS TO MATCH GA1
- GA7 GLASS VAIL TO MATCH GA1
- GA8 STRIP WINDOW TO MATCH GA1 WITH TIMBER LOOK SPANDREL
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BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

REVISION

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01	DEVELOPMENT APPLICATION	BB	28.06.2018	
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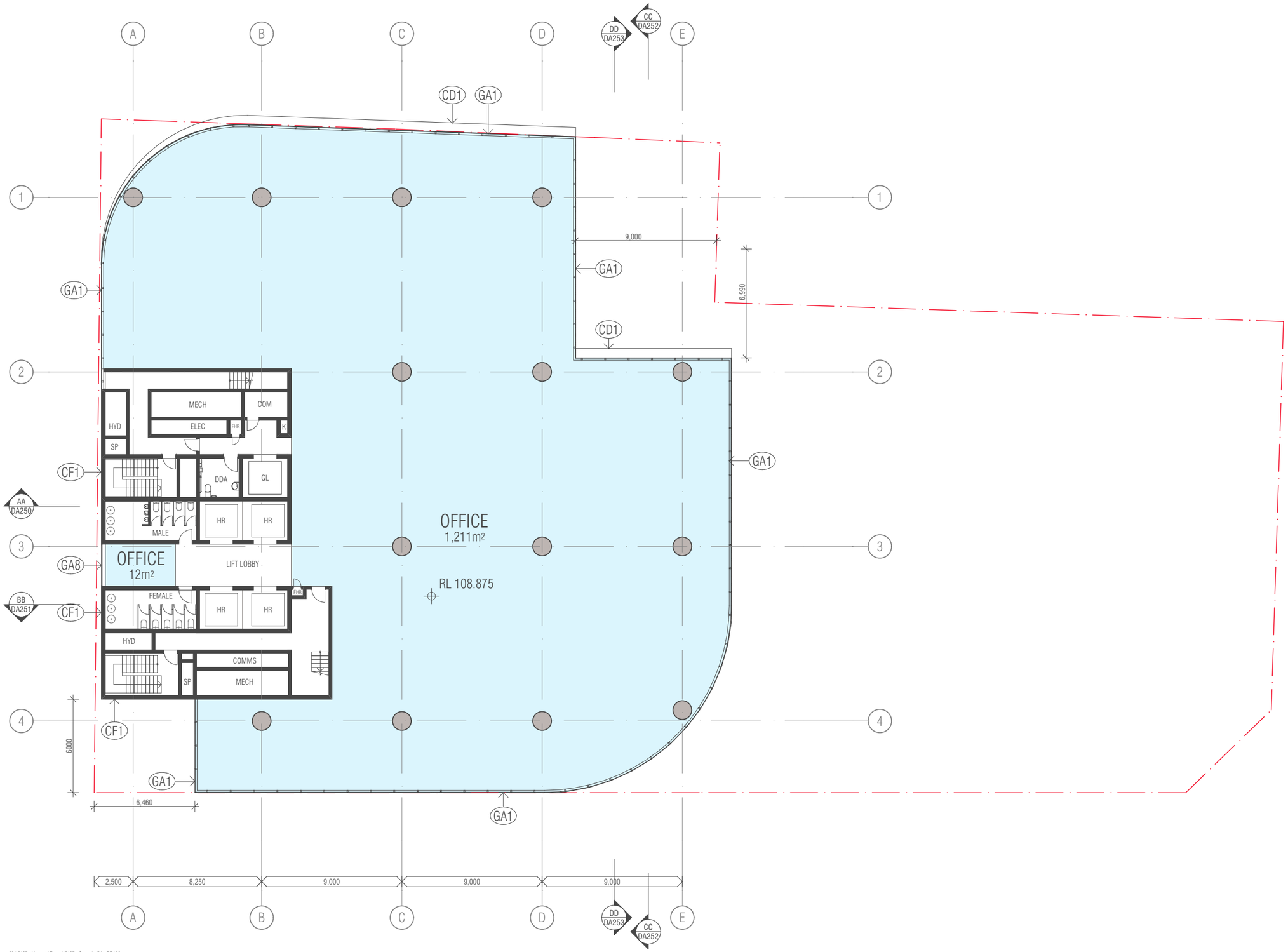
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 14-22 - TYPICAL HIGH RISE	DEVELOPMENT APPLICATION	03	DA114



GENERAL LEGEND

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BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

REVISION			REVISION
01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

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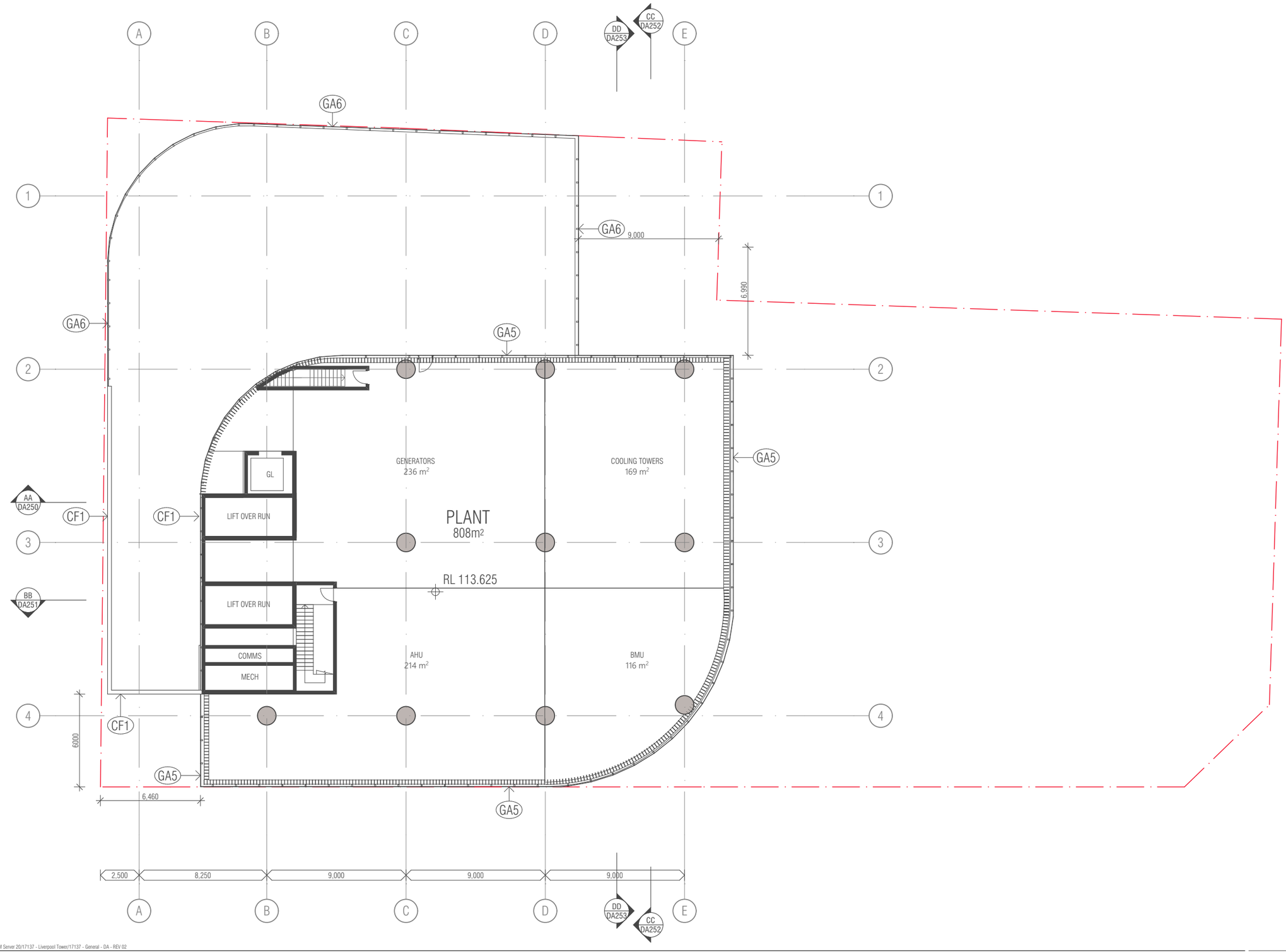
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 22 - HIGH RISE	DEVELOPMENT APPLICATION	01	DA122



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BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

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01	DEVELOPMENT APPLICATION	BB	28.06.2018	
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> 03	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018	

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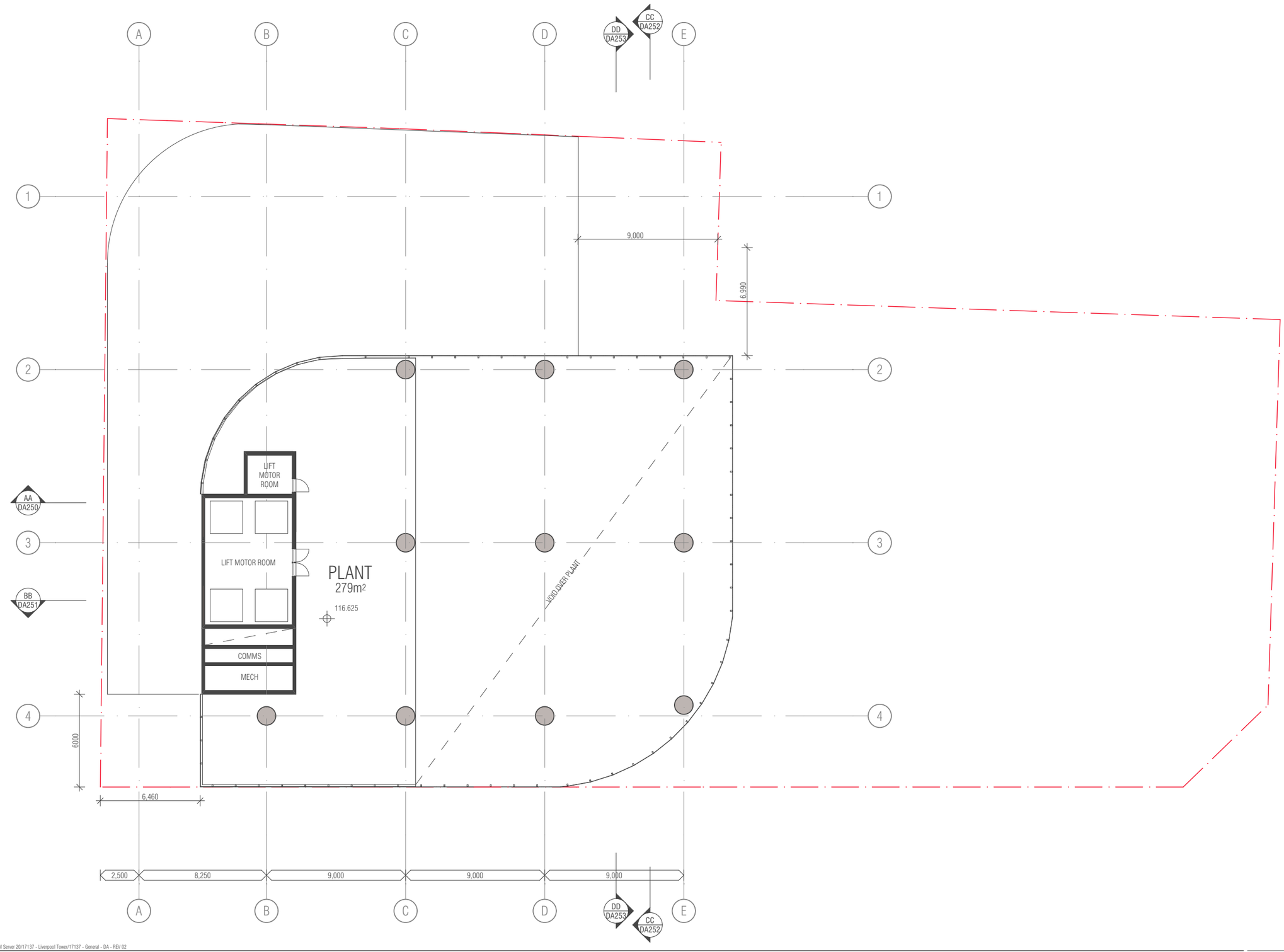
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A1	LEVEL 23 - PLANT	DEVELOPMENT APPLICATION	03	DA123



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BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

REVISION		REVISION	
01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

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9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

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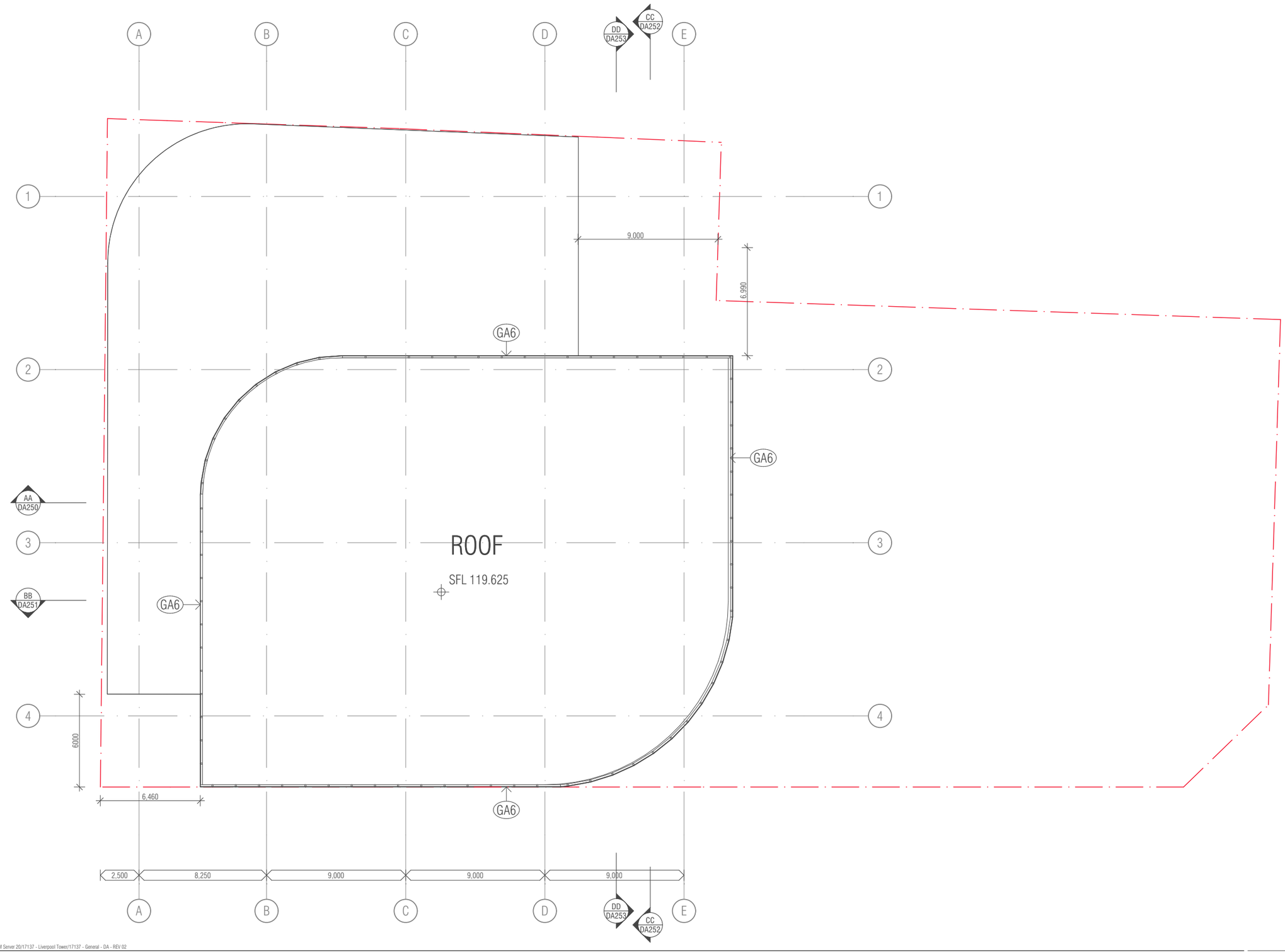
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	LEVEL 23 - PLANT MEZZANINE	DEVELOPMENT APPLICATION	01	**DA123m**



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BIM Server: FKMBIM20 - BIM Server 20/17137 - Liverpool Tower/17137 - General - DA - REV 02

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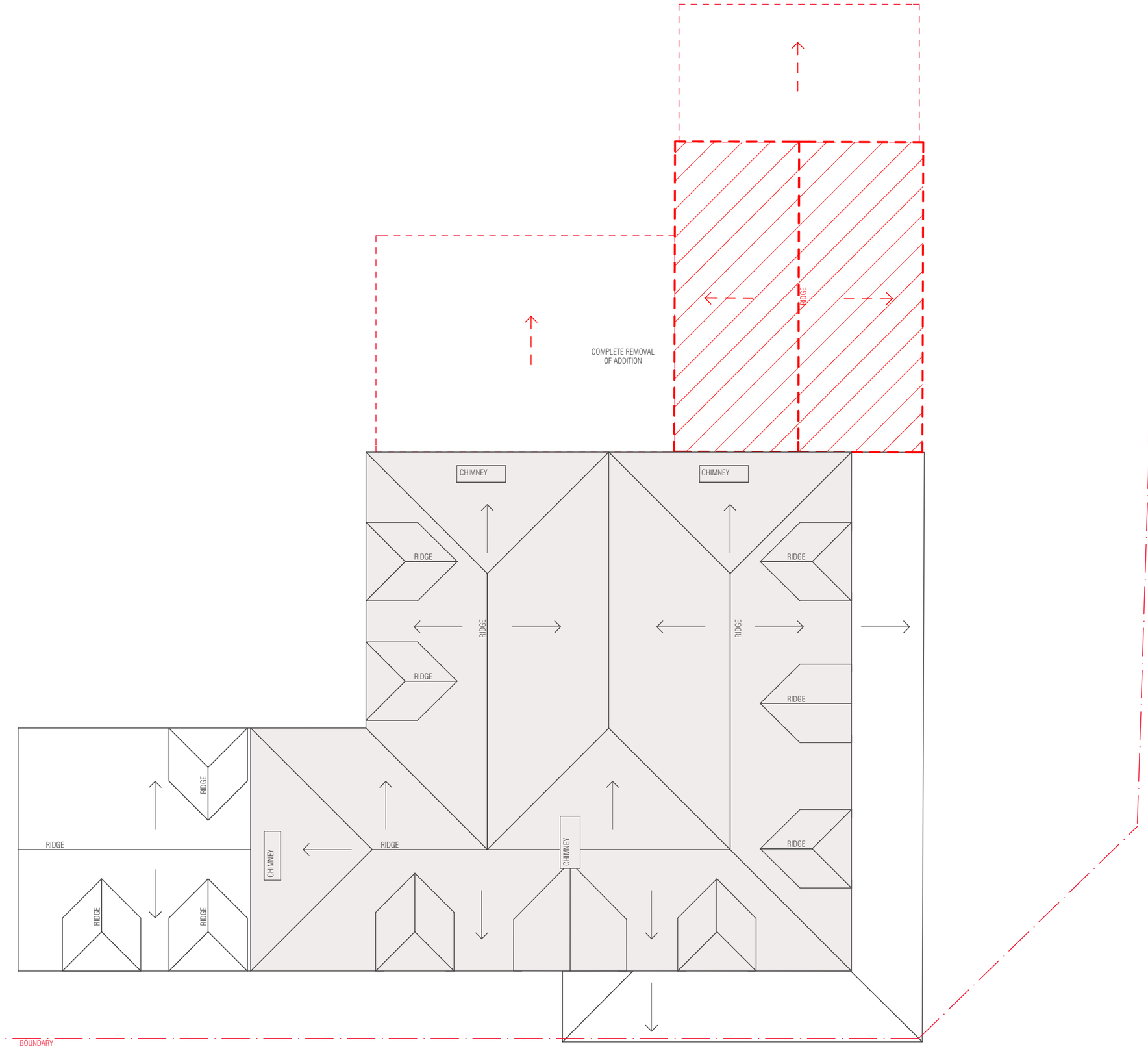
L.SACCO B.BERARDUCCI D.MANDROVSKI A.MCCORMACK	17.09.2018	M.CURZON	19.09.2018	17137	1:250@A3	ROOF PLAN	DEVELOPMENT APPLICATION	03	DA124



BIGGE STREET

REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EXISTING WINDOW
- EXISTING DOOR
- EXISTING OPENING
- PROPOSED WINDOW
- PROPOSED DOOR
- PROPOSED OPENING
- REUSABLE/REUSED WINDOW

DEMOLITION LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED BUILDING FABRIC TO BE DEMOLISHED
- NEW OPENING IN EXTERNAL WALL, REFER TO ELEVATION FOR SIZE OF PENOTRATION

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DRAWN	DATE	CHECKED	PLOT DATE	JOB NO.
AM	17.09.2018	MC	18.09.2018	17137

PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

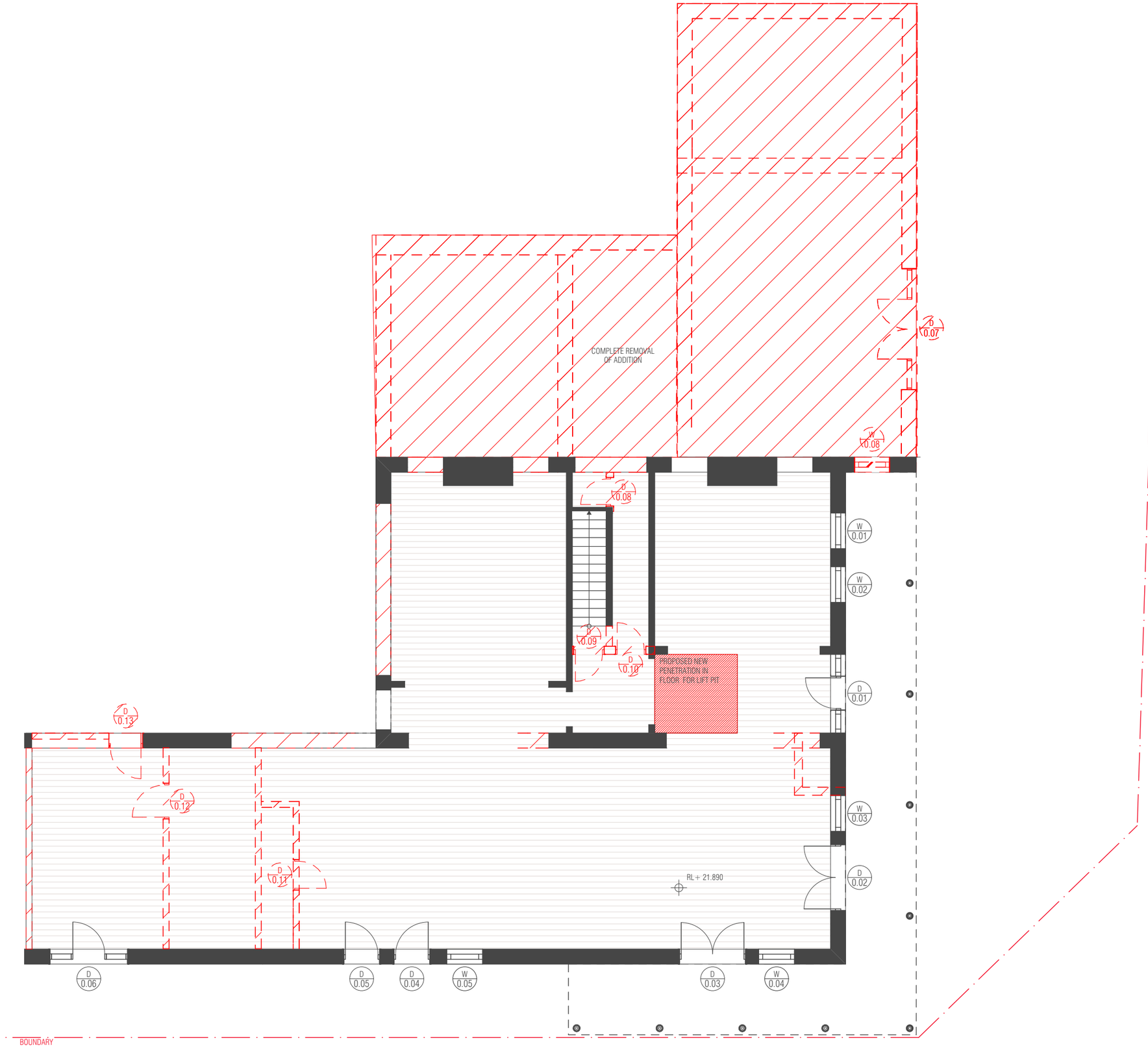
DRAWING TITLE
HERITAGE PUB - DEMOLITION - ROOF PLAN

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA150



REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EXISTING WINDOW
- EXISTING DOOR
- EXISTING OPENING
- PROPOSED WINDOW
- PROPOSED DOOR
- PROPOSED OPENING
- REUSABLE/REUSED WINDOW

DEMOLITION LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED BUILDING FABRIC TO BE DEMOLISHED
- NEW OPENING IN EXTERNAL WALL, REFER TO ELEVATION FOR SIZE OF PENOTRATION

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DRAWN	DATE	CHECKED	PLOT DATE	JOB NO.
AM	17.09.2018	MC	18.09.2018	17137

PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

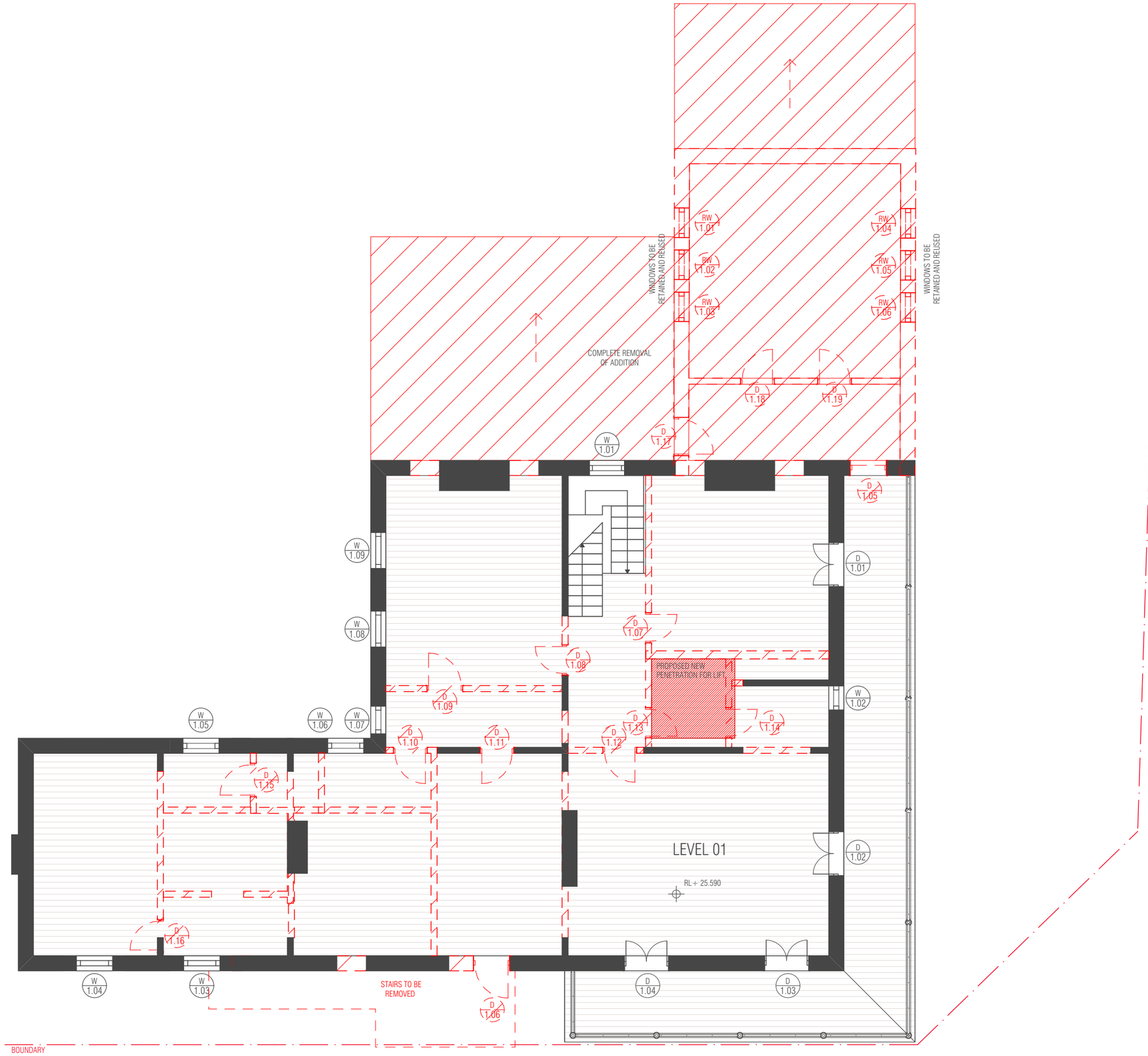
DRAWING TITLE
HERITAGE PUB - DEMOLITION - GROUND FLOOR

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA151



REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EXISTING WINDOW
- EXISTING DOOR
- EXISTING OPENING
- PROPOSED WINDOW
- PROPOSED DOOR
- PROPOSED OPENING
- REUSABLE/REUSED WINDOW

DEMOLITION LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED BUILDING FABRIC TO BE DEMOLISHED
- NEW OPENING IN EXTERNAL WALL, REFER TO ELEVATION FOR SIZE OF PENOTRATION

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AM	17.09.2018	MC	19.09.2018	17137

PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

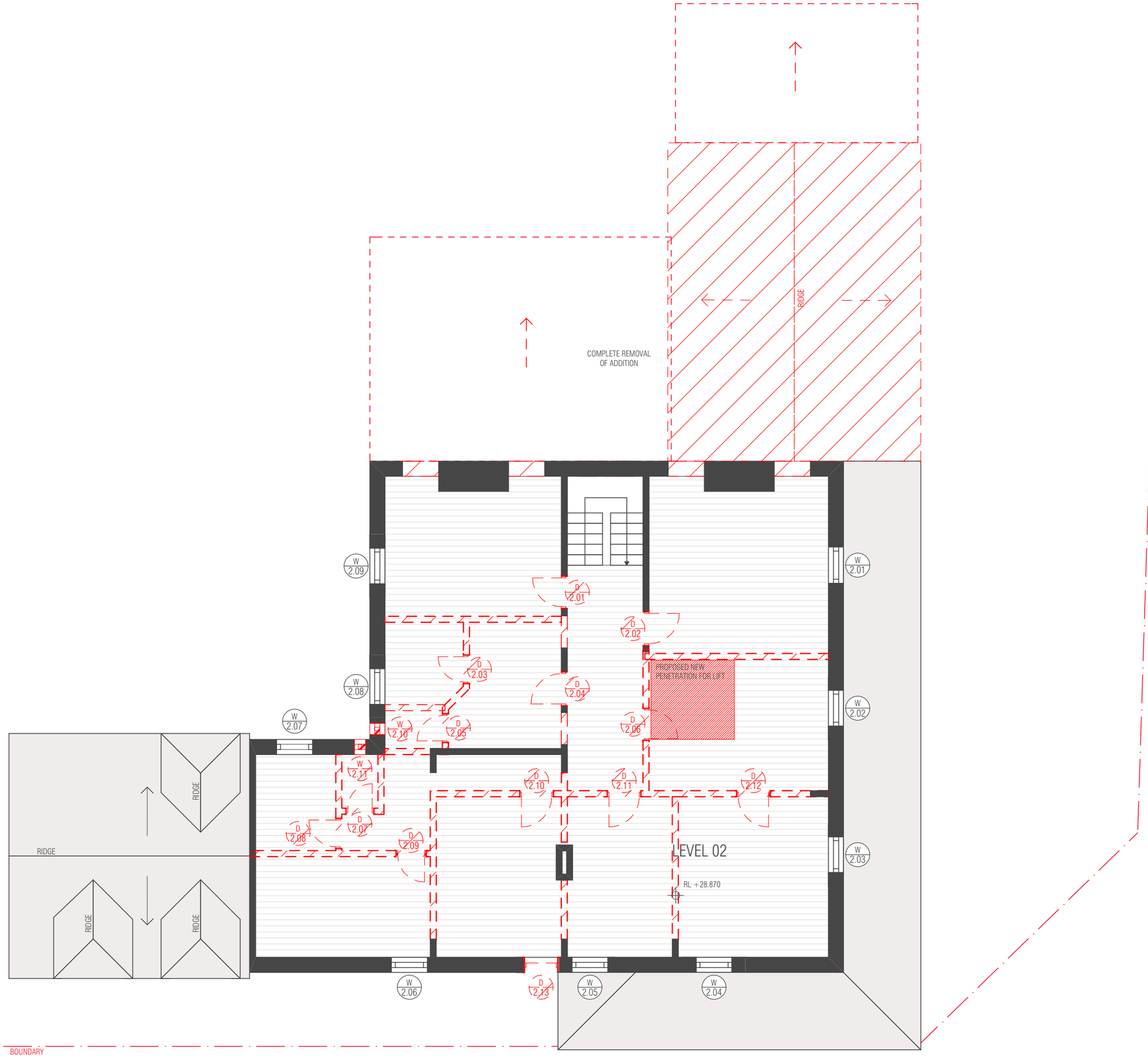
DRAWING TITLE
HERITAGE PUB - DEMOLITION - LEVEL 01

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA152



REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EXISTING WINDOW
- EXISTING DOOR
- EXISTING OPENING
- PROPOSED WINDOW
- PROPOSED DOOR
- PROPOSED OPENING
- REUSABLE/REUSED WINDOW

DEMOLITION LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED BUILDING FABRIC TO BE DEMOLISHED
- NEW OPENING IN EXTERNAL WALL, REFER TO ELEVATION FOR SIZE OF PENOTRATION

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PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

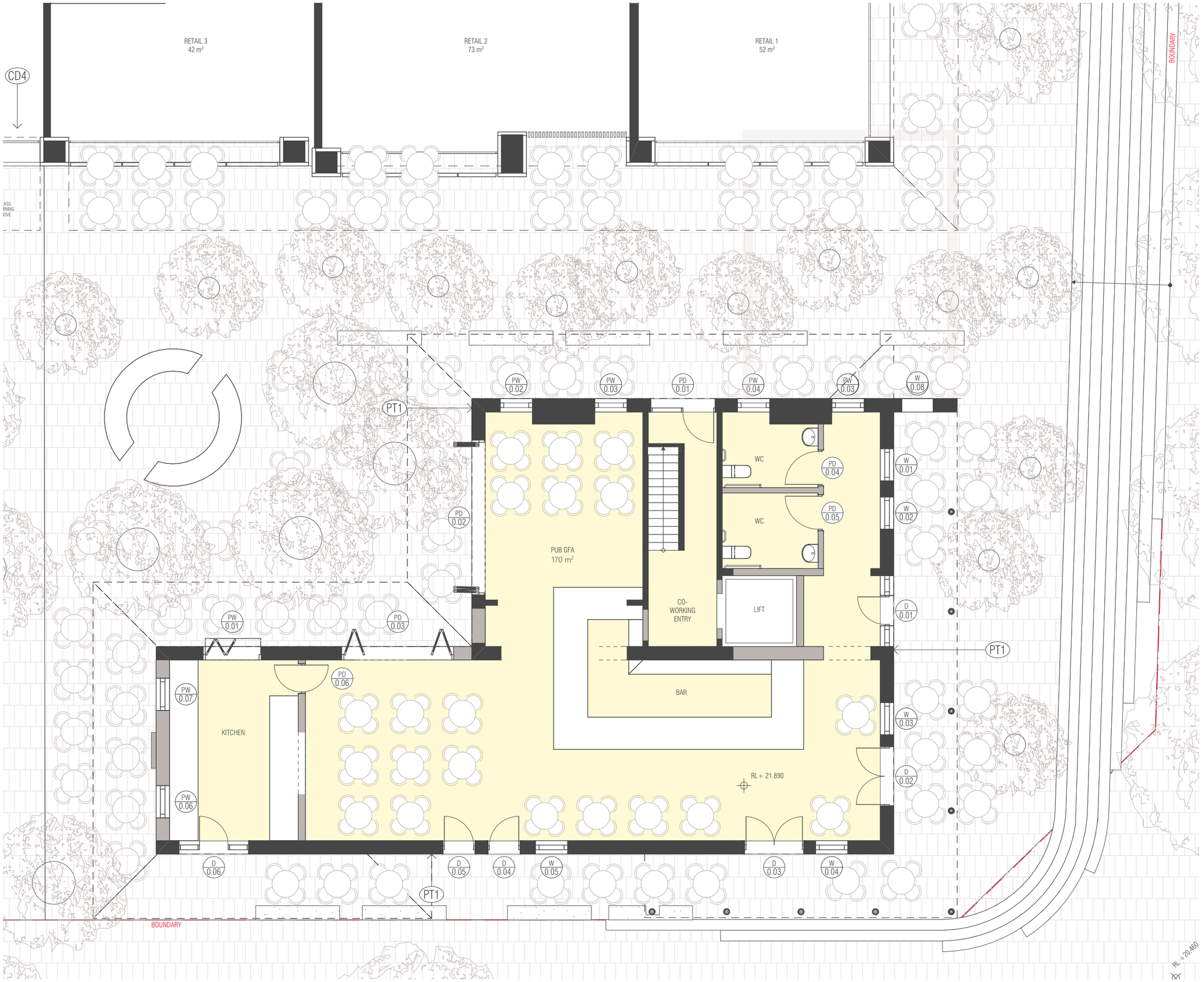
DRAWING TITLE
HERITAGEPUB - DEMOLITION - LEVEL 02

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA153



REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EW — EXISTING WINDOW
- ED — EXISTING DOOR
- EO — EXISTING OPENING
- PW — PROPOSED WINDOW
- PD — PROPOSED DOOR
- PO — PROPOSED OPENING
- RW — REUSABLE/REUSED WINDOW

GENERAL LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED NEW BUILDING FABRIC

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AM	17.09.2018	MC	19.09.2018	17137

PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

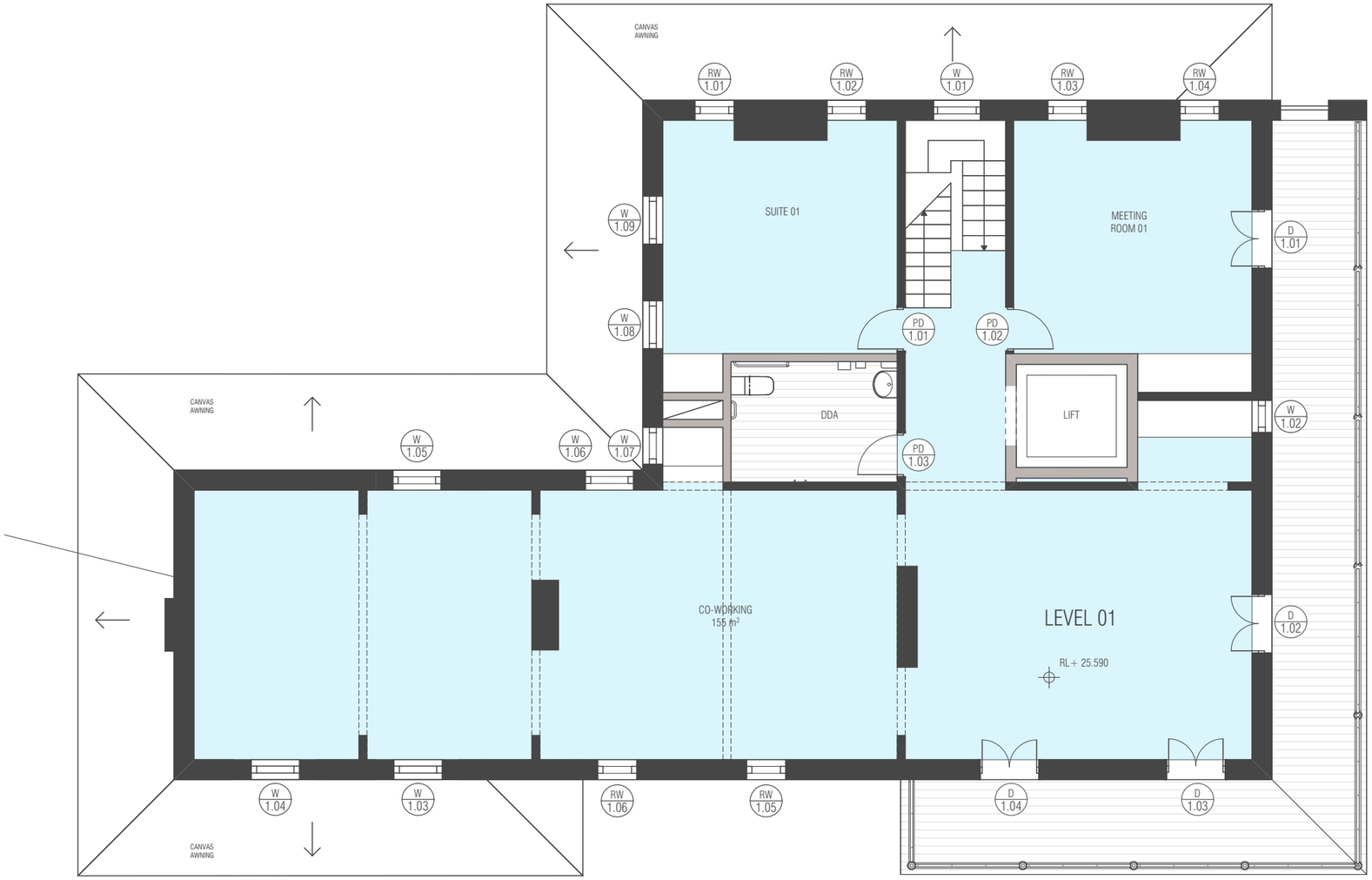
DRAWING TITLE
HERITAGE PUB - PROPOSED - GROUND FLOOR

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA154



BIGGE STREET

REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EXISTING WINDOW
- EXISTING DOOR
- EXISTING OPENING
- PROPOSED WINDOW
- PROPOSED DOOR
- PROPOSED OPENING
- REUSABLE/REUSED WINDOW

GENERAL LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED NEW BUILDING FABRIC

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PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

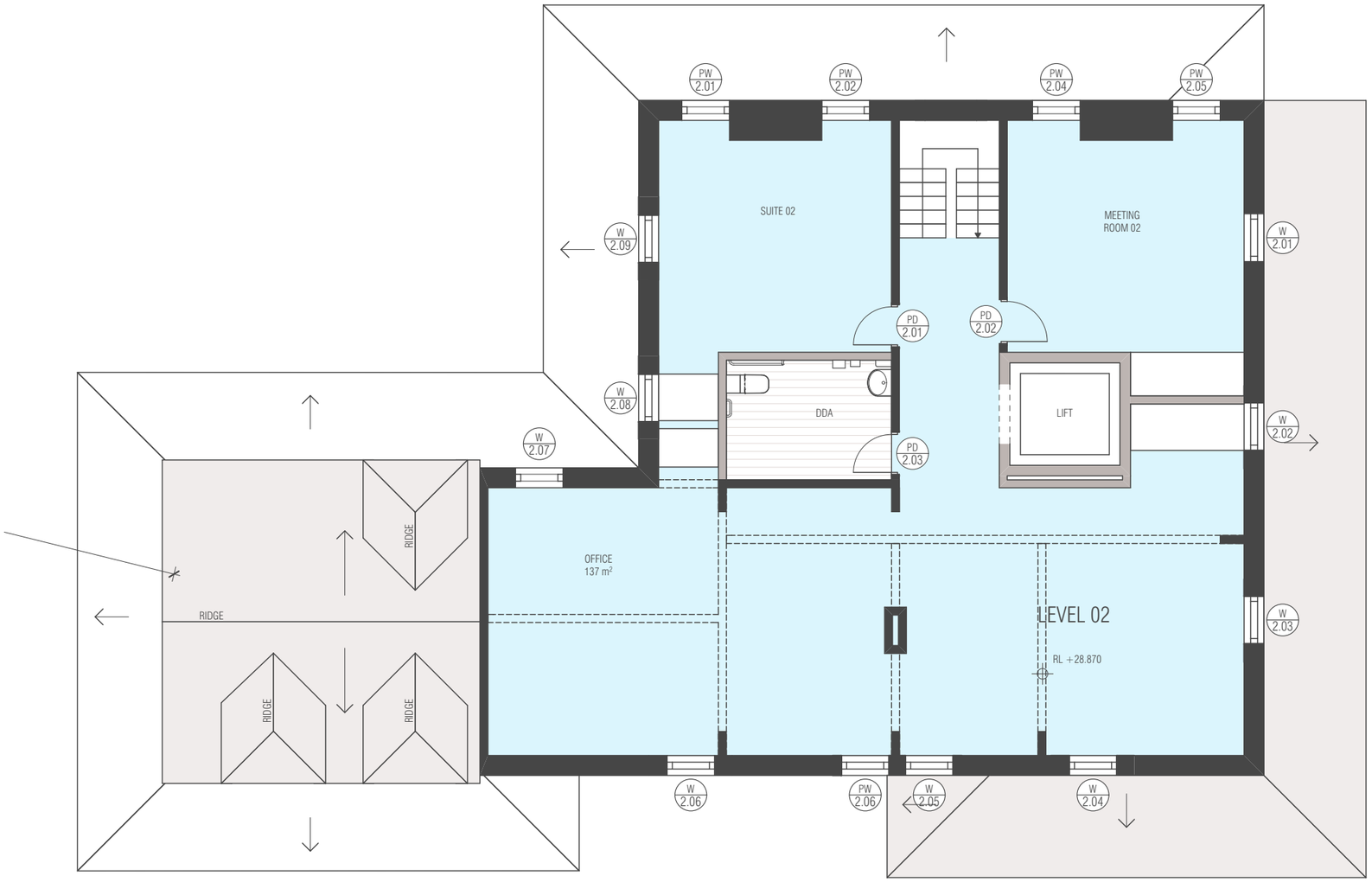
DRAWING TITLE
HERITAGE PUB - PROPOSED - LEVEL 01

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA155



BIGGE STREET

REVISION

> 01	DEVELOPMENT APPLICATION - REVISION 02	BB	17.09.2018

DOOR & WINDOW LEGEND

- EW — EXISTING WINDOW
- ED — EXISTING DOOR
- EO — EXISTING OPENING
- PW — PROPOSED WINDOW
- PD — PROPOSED DOOR
- PO — PROPOSED OPENING
- RW — REUSABLE/REUSED WINDOW

GENERAL LEGEND

- EXISTING BUIDLING FABRIC
- PROPOSED NEW BUILDING FABRIC

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AM	17.09.2018	MC	19.09.2018	17137

PROJECT
LIVERPOOL TOWER
9-23 SCOTT ST & 275-277 BIGGE ST
LIVERPOOL NSW 2170

DRAWING TITLE
HERITAGE PUB - PROPOSED - LEVEL 02

ISSUE PURPOSE
PRELIMINARY

SCALE
1:100@A3

REV.
01

DRAWING NO.
DA156

Appendix B

SIDRA Outputs

MOVEMENT SUMMARY

Site: George & Scott - AM Existing

New Site
Signals - Fixed Time Isolated Cycle Time = 64 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
5	T1	28	3.7	0.030	19.7	LOS B	0.3	2.4	0.78	0.55	45.3
Approach		28	3.7	0.030	19.7	LOS B	0.3	2.4	0.78	0.55	45.3
North: George St (N)											
7	L2	14	100.0	0.032	19.2	LOS B	0.3	3.5	0.64	0.67	44.7
9	R2	346	2.4	0.243	20.0	LOS B	3.7	26.3	0.71	0.77	43.6
Approach		360	6.1	0.243	20.0	LOS B	3.7	26.3	0.71	0.76	43.7
West: Scott St (W)											
11	T1	201	0.0	0.412	22.2	LOS B	5.4	37.8	0.88	0.72	43.9
Approach		201	0.0	0.412	22.2	LOS B	5.4	37.8	0.88	0.72	43.9
All Vehicles		589	3.9	0.412	20.8	LOS B	5.4	37.8	0.77	0.74	43.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	26.3	LOS C	0.1	0.1	0.91	0.91
P3	North Full Crossing	53	15.2	LOS B	0.1	0.1	0.69	0.69
P4	West Full Crossing	53	26.3	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		158	22.6	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: George & Scott - PM Existing

New Site
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
5	T1	39	2.7	0.090	35.5	LOS C	0.7	5.1	0.93	0.65	37.9
Approach		39	2.7	0.090	35.5	LOS C	0.7	5.1	0.93	0.65	37.9
North: George St (N)											
7	L2	18	100.0	0.029	13.9	LOS A	0.3	3.9	0.45	0.65	47.8
9	R2	647	1.3	0.306	15.1	LOS B	6.5	45.8	0.55	0.76	46.4
Approach		665	4.0	0.306	15.1	LOS B	6.5	45.8	0.55	0.76	46.4
West: Scott St (W)											
11	T1	140	0.0	0.638	39.2	LOS C	5.6	39.2	1.00	0.83	36.5
Approach		140	0.0	0.638	39.2	LOS C	5.6	39.2	1.00	0.83	36.5
All Vehicles		844	3.2	0.638	20.0	LOS B	6.5	45.8	0.64	0.76	44.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	26.5	LOS C	0.1	0.1	0.81	0.81
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		158	31.7	LOS D			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Terminus & Pirie - Existing AM

New Site
Signals - Fixed Time Isolated Cycle Time = 135 seconds (User-Given Phase Times)Variable Sequence
Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pirie St (S)											
1	L2	142	0.7	0.238	53.0	LOS D	9.3	65.3	0.89	0.80	31.8
2	T1	93	0.0	0.238	53.2	LOS D	9.3	65.3	0.92	0.73	31.8
Approach		235	0.4	0.238	53.1	LOS D	9.3	65.3	0.90	0.77	31.8
East: Terminus St (E)											
4	L2	121	0.0	0.244	23.3	LOS B	8.3	60.4	0.57	0.62	43.9
5	T1	360	8.5	0.244	17.8	LOS B	8.3	60.4	0.57	0.53	45.9
6	R2	585	2.3	0.801	67.8	LOS E	17.8	126.9	1.00	1.00	28.2
Approach		1066	4.1	0.801	45.9	LOS D	17.8	126.9	0.81	0.80	34.0
North: Pirie St (N)											
7	L2	356	3.0	0.224	30.7	LOS C	7.2	51.6	0.66	0.75	39.1
8	T1	49	2.1	0.174	54.5	LOS D	2.9	20.5	0.91	0.69	31.8
9	R2	6	0.0	0.045	66.5	LOS E	0.4	2.7	0.93	0.66	28.4
Approach		412	2.8	0.224	34.1	LOS C	7.2	51.6	0.70	0.74	37.9
West: Terminus St (W)											
10	L2	9	0.0	0.566	32.6	LOS C	23.5	172.8	0.77	0.69	40.8
11	T1	917	6.0	0.566	26.4	LOS B	23.5	172.8	0.75	0.67	41.9
12	R2	199	1.1	0.583	60.3	LOS E	12.1	85.6	0.97	0.82	29.7
Approach		1125	5.1	0.583	32.4	LOS C	23.5	172.8	0.79	0.70	39.1
All Vehicles		2838	4.0	0.801	39.4	LOS C	23.5	172.8	0.79	0.75	36.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	18.2	LOS B	0.1	0.1	0.52	0.52
P3	North Full Crossing	53	28.1	LOS C	0.1	0.1	0.65	0.65
P4	West Full Crossing	53	60.8	LOS F	0.2	0.2	0.95	0.95
All Pedestrians		158	35.7	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Terminus & Pirie - Existing PM

New Site
Signals - Fixed Time Isolated Cycle Time = 111 seconds (User-Given Phase Times)Variable Sequence
Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pirie St (S)											
1	L2	161	0.7	0.227	34.8	LOS C	6.9	48.6	0.78	0.77	37.7
2	T1	97	0.0	0.227	39.8	LOS C	6.9	48.6	0.87	0.70	36.1
Approach		258	0.4	0.227	36.6	LOS C	6.9	48.6	0.81	0.74	37.1
East: Terminus St (E)											
4	L2	29	0.0	0.295	24.3	LOS B	8.7	62.4	0.65	0.58	44.7
5	T1	507	3.1	0.295	18.7	LOS B	8.7	62.8	0.65	0.57	45.8
6	R2	529	3.4	0.401	14.2	LOS A	5.1	37.0	0.61	0.74	47.9
Approach		1066	3.2	0.401	16.6	LOS B	8.7	62.8	0.63	0.65	46.8
North: Pirie St (N)											
7	L2	691	0.6	0.409	25.4	LOS B	12.6	88.4	0.69	0.78	41.5
8	T1	101	0.0	0.274	41.9	LOS C	4.7	33.1	0.90	0.71	35.7
9	R2	27	0.0	0.148	52.7	LOS D	1.4	9.5	0.92	0.72	31.8
Approach		819	0.5	0.409	28.3	LOS B	12.6	88.4	0.72	0.77	40.3
West: Terminus St (W)											
10	L2	18	5.9	0.383	29.8	LOS C	11.4	81.2	0.74	0.65	41.9
11	T1	592	2.1	0.383	24.1	LOS B	11.4	81.4	0.74	0.64	43.0
12	R2	95	0.0	0.151	15.1	LOS B	2.0	13.9	0.56	0.70	47.0
Approach		704	1.9	0.383	23.1	LOS B	11.4	81.4	0.72	0.65	43.5
All Vehicles		2847	1.8	0.409	23.4	LOS B	12.6	88.4	0.69	0.69	43.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	19.1	LOS B	0.1	0.1	0.59	0.59
P3	North Full Crossing	53	29.6	LOS C	0.1	0.1	0.73	0.73
P4	West Full Crossing	53	47.9	LOS E	0.2	0.2	0.93	0.93
All Pedestrians		158	32.2	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie Memorial Scott - AM Existing

New Site
Signals - Fixed Time Isolated Cycle Time = 74 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
4a	L1	221	2.4	0.237	14.2	LOS A	4.6	32.8	0.56	0.69	47.8
5	T1	136	3.1	0.237	17.8	LOS B	4.6	32.8	0.73	0.65	45.6
6	R2	23	0.0	0.237	24.8	LOS B	3.7	26.1	0.76	0.64	44.1
Approach		380	2.5	0.237	16.1	LOS B	4.6	32.8	0.63	0.67	46.8
North: Macquarie St (N)											
7	L2	17	0.0	0.323	36.6	LOS C	2.7	20.0	0.90	0.69	36.9
9a	R1	48	4.3	0.323	36.9	LOS C	2.7	20.0	0.94	0.76	37.1
9	R2	31	6.9	0.323	38.3	LOS C	2.7	20.0	0.94	0.76	36.4
Approach		96	4.4	0.323	37.3	LOS C	2.7	20.0	0.94	0.74	36.9
West: Memorial Ave (W)											
10	L2	49	8.5	0.051	13.7	LOS A	0.8	6.1	0.48	0.67	47.7
11	T1	67	0.0	0.149	19.3	LOS B	2.1	14.9	0.74	0.62	44.9
12b	R3	15	0.0	0.149	25.7	LOS B	2.1	14.9	0.74	0.62	44.1
Approach		132	3.2	0.149	17.9	LOS B	2.1	14.9	0.65	0.64	45.8
SouthWest: Macquarie St (SW)											
30b	L3	268	0.4	0.584	31.7	LOS C	8.6	60.2	0.91	0.82	39.1
30a	L1	205	0.5	0.380	27.8	LOS B	6.1	42.6	0.85	0.78	40.6
32a	R1	118	0.0	0.217	26.6	LOS B	3.3	23.0	0.80	0.75	40.9
Approach		592	0.4	0.584	29.3	LOS C	8.6	60.2	0.87	0.79	39.9
All Vehicles		1199	1.7	0.584	24.5	LOS B	8.6	60.2	0.77	0.73	42.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	31.3	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	21.2	LOS C	0.1	0.1	0.76	0.76
P4	West Full Crossing	53	26.9	LOS C	0.1	0.1	0.85	0.85
P8	SouthWest Full Crossing	53	26.0	LOS C	0.1	0.1	0.84	0.84
All Pedestrians		211	26.4	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie Memorial Scott - PM Existing

New Site
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
4a	L1	474	0.2	0.466	10.5	LOS A	5.8	40.6	0.65	0.75	50.1
5	T1	158	1.3	0.466	15.2	LOS B	5.8	40.6	0.90	0.75	47.4
6	R2	27	3.8	0.466	21.1	LOS B	3.3	23.2	0.91	0.74	46.2
Approach		659	0.6	0.466	12.1	LOS A	5.8	40.6	0.72	0.75	49.2
North: Macquarie St (N)											
7	L2	17	0.0	0.060	22.2	LOS B	0.3	2.1	0.88	0.68	43.1
9a	R1	76	0.0	0.457	22.4	LOS B	2.5	17.6	0.95	0.77	43.6
9	R2	54	0.0	0.457	23.7	LOS B	2.5	17.6	0.95	0.77	42.6
Approach		146	0.0	0.457	22.8	LOS B	2.5	17.6	0.95	0.76	43.2
West: Memorial Ave (W)											
10	L2	46	6.8	0.050	10.7	LOS A	0.4	3.3	0.51	0.67	49.7
11	T1	48	0.0	0.241	16.5	LOS B	1.2	8.7	0.90	0.70	46.1
12b	R3	20	0.0	0.241	22.9	LOS B	1.2	8.7	0.90	0.70	45.2
Approach		115	2.8	0.241	15.3	LOS B	1.2	8.7	0.74	0.69	47.3
SouthWest: Macquarie St (SW)											
30b	L3	133	0.8	0.469	23.9	LOS B	2.5	17.9	0.94	0.78	42.6
30a	L1	93	1.1	0.279	21.0	LOS B	1.7	11.9	0.91	0.75	43.9
32a	R1	77	0.0	0.230	20.9	LOS B	1.4	9.6	0.90	0.74	43.7
Approach		302	0.7	0.469	22.2	LOS B	2.5	17.9	0.92	0.76	43.2
All Vehicles		1222	0.8	0.469	16.2	LOS B	5.8	40.6	0.80	0.75	46.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P3	North Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P4	West Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P8	SouthWest Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
All Pedestrians		211	14.5	LOS B			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie & Pirie - AM Existing

New Site
Signals - Fixed Time Isolated Cycle Time = 67 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pirie St (SE)											
21	L2	463	3.0	0.185	9.6	LOS A	2.7	19.3	0.38	0.68	50.5
23	R2	197	0.0	0.395	27.7	LOS B	5.4	37.8	0.86	0.79	40.6
Approach		660	2.1	0.395	15.0	LOS B	5.4	37.8	0.53	0.71	47.1
NorthEast: Macquarie St (NE)											
24	L2	121	2.6	0.135	15.5	LOS B	2.1	15.4	0.57	0.71	46.7
25	T1	134	2.4	0.259	29.4	LOS C	2.1	14.6	0.93	0.71	40.5
Approach		255	2.5	0.259	22.8	LOS B	2.1	15.4	0.76	0.71	43.2
SouthWest: Macquarie St (SW)											
31	T1	414	0.8	0.409	11.3	LOS A	7.8	55.2	0.65	0.57	50.3
32	R2	285	3.3	0.409	23.8	LOS B	7.8	55.2	0.80	0.76	42.9
Approach		699	1.8	0.409	16.4	LOS B	7.8	55.2	0.71	0.65	47.0
All Vehicles		1614	2.0	0.409	16.8	LOS B	7.8	55.2	0.64	0.68	46.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P5	SouthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
P6	NorthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		105	27.8	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie & Pirie - PM Existing

New Site
Signals - Fixed Time Isolated Cycle Time = 67 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pirie St (SE)											
21	L2	564	4.3	0.262	12.5	LOS A	4.4	31.9	0.51	0.72	48.5
23	R2	123	0.9	0.319	30.6	LOS C	3.5	24.9	0.89	0.77	39.4
Approach		687	3.7	0.319	15.8	LOS B	4.4	31.9	0.58	0.73	46.6
NorthEast: Macquarie St (NE)											
24	L2	339	0.0	0.407	15.6	LOS B	6.5	45.4	0.62	0.75	46.7
25	T1	237	0.0	0.271	23.8	LOS B	3.3	23.0	0.87	0.69	43.2
Approach		576	0.0	0.407	19.0	LOS B	6.5	45.4	0.72	0.73	45.2
SouthWest: Macquarie St (SW)											
31	T1	179	0.0	0.150	5.9	LOS A	2.5	17.3	0.45	0.38	54.7
32	R2	457	0.7	0.414	26.3	LOS B	6.1	43.1	0.85	0.79	41.4
Approach		636	0.5	0.414	20.6	LOS B	6.1	43.1	0.74	0.67	44.5
All Vehicles		1899	1.5	0.414	18.3	LOS B	6.5	45.4	0.67	0.71	45.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P5	SouthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
P6	NorthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		105	27.8	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Terminus & Scott - AM Existing

7:45-8:45AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
West: Scott St(W)											
11	T1	140	0.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12a	R1	11	100.0	0.009	5.0	LOS A	0.0	0.0	0.00	0.55	54.0
Approach		151	7.0	0.072	0.4	NA	0.0	0.0	0.00	0.04	59.5
SouthWest: Terminus St(W)											
30b	L3	24	0.0	0.015	5.3	LOS A	0.0	0.0	0.00	0.58	53.3
32a	R1	149	0.0	0.138	3.7	LOS A	0.5	3.4	0.25	0.54	51.4
Approach		174	0.0	0.138	3.9	LOS A	0.5	3.4	0.22	0.55	51.7
All Vehicles		324	3.2	0.138	2.3	NA	0.5	3.4	0.12	0.31	56.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Terminus & Scott - PM Existing

7:45-8:45AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
West: Scott St(W)											
11	T1	140	0.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12a	R1	11	100.0	0.009	5.0	LOS A	0.0	0.0	0.00	0.55	54.0
Approach		151	7.0	0.072	0.4	NA	0.0	0.0	0.00	0.04	59.5
SouthWest: Terminus St(W)											
30b	L3	38	0.0	0.023	5.3	LOS A	0.0	0.0	0.00	0.58	53.3
32a	R1	28	0.0	0.026	3.6	LOS A	0.1	0.6	0.23	0.52	51.5
Approach		66	0.0	0.026	4.6	LOS A	0.1	0.6	0.10	0.55	52.5
All Vehicles		217	4.9	0.072	1.7	NA	0.1	0.6	0.03	0.20	58.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: George & Scott - Post development AM

New Site
Signals - Fixed Time Isolated Cycle Time = 64 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
5	T1	43	2.4	0.045	19.8	LOS B	0.5	3.7	0.79	0.56	45.3
Approach		43	2.4	0.045	19.8	LOS B	0.5	3.7	0.79	0.56	45.3
North: George St (N)											
7	L2	14	100.0	0.032	19.2	LOS B	0.3	3.5	0.64	0.67	44.7
9	R2	365	2.3	0.256	20.1	LOS B	3.9	27.9	0.72	0.77	43.6
Approach		379	5.8	0.256	20.1	LOS B	3.9	27.9	0.71	0.77	43.6
West: Scott St (W)											
11	T1	201	0.0	0.412	22.2	LOS B	5.4	37.8	0.88	0.72	43.9
Approach		201	0.0	0.412	22.2	LOS B	5.4	37.8	0.88	0.72	43.9
All Vehicles		623	3.7	0.412	20.8	LOS B	5.4	37.8	0.77	0.74	43.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	26.3	LOS C	0.1	0.1	0.91	0.91
P3	North Full Crossing	53	15.2	LOS B	0.1	0.1	0.69	0.69
P4	West Full Crossing	53	26.3	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		158	22.6	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: George & Scott - Post development PM

New Site
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
5	T1	52	2.0	0.119	35.7	LOS C	0.9	6.7	0.93	0.67	37.8
Approach		52	2.0	0.119	35.7	LOS C	0.9	6.7	0.93	0.67	37.8
North: George St (N)											
7	L2	18	100.0	0.029	13.9	LOS A	0.3	3.9	0.45	0.65	47.8
9	R2	661	1.3	0.312	15.2	LOS B	6.6	47.0	0.55	0.76	46.4
Approach		679	3.9	0.312	15.1	LOS B	6.6	47.0	0.55	0.76	46.4
West: Scott St (W)											
11	T1	140	0.0	0.638	39.2	LOS C	5.6	39.2	1.00	0.83	36.5
Approach		140	0.0	0.638	39.2	LOS C	5.6	39.2	1.00	0.83	36.5
All Vehicles		871	3.1	0.638	20.2	LOS B	6.6	47.0	0.65	0.76	43.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	26.5	LOS C	0.1	0.1	0.81	0.81
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		158	31.7	LOS D			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Terminus & Pirie - Post Development AM

New Site
Signals - Fixed Time Isolated Cycle Time = 135 seconds (User-Given Phase Times)Variable Sequence
Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pirie St (S)											
1	L2	142	0.7	0.238	53.0	LOS D	9.3	65.3	0.89	0.80	31.8
2	T1	93	0.0	0.238	53.2	LOS D	9.3	65.3	0.92	0.73	31.8
Approach		235	0.4	0.238	53.1	LOS D	9.3	65.3	0.90	0.77	31.8
East: Terminus St (E)											
4	L2	121	0.0	0.279	23.7	LOS B	9.8	70.8	0.59	0.61	43.9
5	T1	433	7.1	0.279	18.2	LOS B	9.8	72.7	0.59	0.54	45.7
6	R2	585	2.3	0.801	67.8	LOS E	17.8	126.9	1.00	1.00	28.2
Approach		1139	3.9	0.801	44.3	LOS D	17.8	126.9	0.80	0.79	34.6
North: Pirie St (N)											
7	L2	414	2.5	0.259	31.1	LOS C	8.5	60.9	0.68	0.76	39.0
8	T1	49	2.1	0.174	54.5	LOS D	2.9	20.5	0.91	0.69	31.8
9	R2	6	0.0	0.045	66.5	LOS E	0.4	2.7	0.93	0.66	28.4
Approach		469	2.5	0.259	34.1	LOS C	8.5	60.9	0.70	0.75	37.9
West: Terminus St (W)											
10	L2	9	0.0	0.638	34.0	LOS C	27.9	204.2	0.81	0.73	40.2
11	T1	1014	5.4	0.638	27.4	LOS B	27.9	204.2	0.78	0.70	41.5
12	R2	199	1.1	0.583	60.3	LOS E	12.1	85.6	0.97	0.82	29.7
Approach		1222	4.7	0.638	32.8	LOS C	27.9	204.2	0.81	0.72	39.0
All Vehicles		3065	3.7	0.801	38.8	LOS C	27.9	204.2	0.80	0.75	36.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	18.2	LOS B	0.1	0.1	0.52	0.52
P3	North Full Crossing	53	28.1	LOS C	0.1	0.1	0.65	0.65
P4	West Full Crossing	53	60.8	LOS F	0.2	0.2	0.95	0.95
All Pedestrians		158	35.7	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Terminus & Pirie - Post Development PM

New Site
Signals - Fixed Time Isolated Cycle Time = 111 seconds (User-Given Phase Times)Variable Sequence
Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Pirie St (S)											
1	L2	161	0.7	0.227	34.8	LOS C	6.9	48.6	0.78	0.77	37.7
2	T1	97	0.0	0.227	39.8	LOS C	6.9	48.6	0.87	0.70	36.1
Approach		258	0.4	0.227	36.6	LOS C	6.9	48.6	0.81	0.74	37.1
East: Terminus St (E)											
4	L2	29	0.0	0.330	24.7	LOS B	10.0	71.4	0.66	0.59	44.5
5	T1	574	2.8	0.330	19.1	LOS B	10.0	71.8	0.66	0.58	45.6
6	R2	529	3.4	0.419	14.6	LOS B	5.1	37.0	0.63	0.74	47.7
Approach		1133	3.0	0.419	17.1	LOS B	10.0	71.8	0.65	0.66	46.5
North: Pirie St (N)											
7	L2	719	0.6	0.429	25.6	LOS B	13.3	93.8	0.69	0.78	41.4
8	T1	101	0.0	0.274	41.9	LOS C	4.7	33.1	0.90	0.71	35.7
9	R2	27	0.0	0.148	52.7	LOS D	1.4	9.5	0.92	0.72	31.8
Approach		847	0.5	0.429	28.4	LOS B	13.3	93.8	0.73	0.77	40.3
West: Terminus St (W)											
10	L2	18	5.9	0.427	30.3	LOS C	13.0	92.4	0.76	0.66	41.7
11	T1	662	1.9	0.427	24.7	LOS B	13.0	92.7	0.76	0.66	42.7
12	R2	95	0.0	0.158	15.3	LOS B	2.0	13.9	0.57	0.70	46.9
Approach		775	1.8	0.427	23.7	LOS B	13.0	92.7	0.74	0.67	43.2
All Vehicles		3013	1.7	0.429	23.7	LOS B	13.3	93.8	0.71	0.70	42.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	19.1	LOS B	0.1	0.1	0.59	0.59
P3	North Full Crossing	53	29.6	LOS C	0.1	0.1	0.73	0.73
P4	West Full Crossing	53	47.9	LOS E	0.2	0.2	0.93	0.93
All Pedestrians		158	32.2	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie Memorial Scott - Post Development AM

New Site
Signals - Fixed Time Isolated Cycle Time = 74 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
4a	L1	240	2.2	0.266	14.9	LOS B	5.3	37.6	0.59	0.70	47.4
5	T1	136	3.1	0.266	17.8	LOS B	5.3	37.6	0.73	0.67	45.3
6	R2	38	0.0	0.266	25.0	LOS B	4.0	28.4	0.77	0.66	43.7
Approach		414	2.3	0.266	16.8	LOS B	5.3	37.6	0.65	0.69	46.3
North: Macquarie St (N)											
7	L2	17	0.0	0.067	36.5	LOS C	0.5	3.8	0.90	0.69	36.9
9a	R1	67	3.1	0.394	37.3	LOS C	3.4	24.6	0.96	0.77	37.1
9	R2	31	6.9	0.394	38.7	LOS C	3.4	24.6	0.96	0.77	36.3
Approach		115	3.7	0.394	37.5	LOS C	3.4	24.6	0.95	0.76	36.8
West: Memorial Ave (W)											
10	L2	49	8.5	0.051	13.7	LOS A	0.8	6.1	0.48	0.67	47.7
11	T1	67	0.0	0.151	19.3	LOS B	2.1	14.9	0.75	0.62	44.9
12b	R3	15	0.0	0.151	25.7	LOS B	2.1	14.9	0.75	0.62	44.1
Approach		132	3.2	0.151	17.9	LOS B	2.1	14.9	0.65	0.64	45.8
SouthWest: Macquarie St (SW)											
30b	L3	268	0.4	0.584	31.7	LOS C	8.6	60.2	0.91	0.82	39.1
30a	L1	205	0.5	0.380	27.8	LOS B	6.1	42.6	0.85	0.78	40.6
32a	R1	118	0.0	0.217	26.6	LOS B	3.3	23.0	0.80	0.75	40.9
Approach		592	0.4	0.584	29.3	LOS C	8.6	60.2	0.87	0.79	39.9
All Vehicles		1252	1.6	0.584	24.7	LOS B	8.6	60.2	0.78	0.74	42.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	31.3	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	21.2	LOS C	0.1	0.1	0.76	0.76
P4	West Full Crossing	53	26.9	LOS C	0.1	0.1	0.85	0.85
P8	SouthWest Full Crossing	53	26.0	LOS C	0.1	0.1	0.84	0.84
All Pedestrians		211	26.4	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie Memorial Scott - Post Development PM

New Site
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Scott St (E)											
4a	L1	487	0.2	0.502	11.3	LOS A	6.5	45.3	0.69	0.76	49.6
5	T1	158	1.3	0.502	15.0	LOS B	6.5	45.3	0.90	0.76	47.2
6	R2	41	2.6	0.502	21.3	LOS B	3.4	24.4	0.92	0.76	45.9
Approach		686	0.6	0.502	12.7	LOS A	6.5	45.3	0.75	0.76	48.8
North: Macquarie St (N)											
7	L2	17	0.0	0.060	22.2	LOS B	0.3	2.1	0.88	0.68	43.1
9a	R1	89	0.0	0.505	22.5	LOS B	2.8	19.6	0.96	0.78	43.5
9	R2	54	0.0	0.505	23.9	LOS B	2.8	19.6	0.96	0.78	42.6
Approach		160	0.0	0.505	22.9	LOS B	2.8	19.6	0.95	0.77	43.2
West: Memorial Ave (W)											
10	L2	46	6.8	0.050	10.7	LOS A	0.4	3.3	0.51	0.67	49.7
11	T1	48	0.0	0.245	16.6	LOS B	1.2	8.7	0.90	0.70	46.1
12b	R3	20	0.0	0.245	23.0	LOS B	1.2	8.7	0.90	0.70	45.2
Approach		115	2.8	0.245	15.3	LOS B	1.2	8.7	0.74	0.69	47.3
SouthWest: Macquarie St (SW)											
30b	L3	133	0.8	0.469	23.9	LOS B	2.5	17.9	0.94	0.78	42.6
30a	L1	93	1.1	0.279	21.0	LOS B	1.7	11.9	0.91	0.75	43.9
32a	R1	77	0.0	0.230	20.9	LOS B	1.4	9.6	0.90	0.74	43.7
Approach		302	0.7	0.469	22.2	LOS B	2.5	17.9	0.92	0.76	43.2
All Vehicles		1263	0.7	0.505	16.5	LOS B	6.5	45.3	0.82	0.76	46.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P3	North Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P4	West Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P8	SouthWest Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
All Pedestrians		211	14.5	LOS B			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie & Pirie - Post Development AM

New Site
Signals - Fixed Time Isolated Cycle Time = 67 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pirie St (SE)											
21	L2	463	3.0	0.185	9.6	LOS A	2.7	19.3	0.38	0.68	50.5
23	R2	197	0.0	0.395	27.7	LOS B	5.4	37.8	0.86	0.79	40.6
Approach		660	2.1	0.395	15.0	LOS B	5.4	37.8	0.53	0.71	47.1
NorthEast: Macquarie St (NE)											
24	L2	160	2.0	0.177	15.7	LOS B	2.9	20.7	0.59	0.72	46.6
25	T1	134	2.4	0.259	29.4	LOS C	2.1	14.6	0.93	0.71	40.5
Approach		294	2.2	0.259	22.0	LOS B	2.9	20.7	0.75	0.72	43.6
SouthWest: Macquarie St (SW)											
31	T1	414	0.8	0.409	11.3	LOS A	7.8	55.2	0.65	0.57	50.3
32	R2	285	3.3	0.409	23.8	LOS B	7.8	55.2	0.80	0.76	42.9
Approach		699	1.8	0.409	16.4	LOS B	7.8	55.2	0.71	0.65	47.0
All Vehicles		1653	2.0	0.409	16.8	LOS B	7.8	55.2	0.64	0.69	46.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P5	SouthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
P6	NorthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		105	27.8	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Macquarie & Pirie - Post Development PM

New Site
Signals - Fixed Time Isolated Cycle Time = 67 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pirie St (SE)											
21	L2	564	4.3	0.262	12.5	LOS A	4.4	31.9	0.51	0.72	48.5
23	R2	123	0.9	0.298	29.6	LOS C	3.5	24.3	0.87	0.77	39.8
Approach		687	3.7	0.298	15.6	LOS B	4.4	31.9	0.57	0.73	46.7
NorthEast: Macquarie St (NE)											
24	L2	367	0.0	0.425	15.2	LOS B	6.9	48.6	0.62	0.75	47.0
25	T1	237	0.0	0.271	23.8	LOS B	3.3	23.0	0.87	0.69	43.2
Approach		604	0.0	0.425	18.5	LOS B	6.9	48.6	0.71	0.73	45.4
SouthWest: Macquarie St (SW)											
31	T1	179	0.0	0.154	6.4	LOS A	2.6	18.0	0.47	0.39	54.3
32	R2	457	0.7	0.436	27.3	LOS B	6.3	44.1	0.86	0.79	41.0
Approach		636	0.5	0.436	21.4	LOS B	6.3	44.1	0.75	0.68	44.0
All Vehicles		1927	1.5	0.436	18.4	LOS B	6.9	48.6	0.68	0.71	45.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P5	SouthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
P6	NorthEast Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		105	27.8	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Terminus & Scott - Post Development AM

7:45-8:45AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
West: Scott St(W)											
11	T1	140	0.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12a	R1	11	100.0	0.009	5.0	LOS A	0.0	0.0	0.00	0.55	54.0
Approach		151	7.0	0.072	0.4	NA	0.0	0.0	0.00	0.04	59.5
SouthWest: Terminus St(W)											
30b	L3	43	0.0	0.027	5.3	LOS A	0.0	0.0	0.00	0.58	53.3
32a	R1	168	0.0	0.156	3.7	LOS A	0.6	3.9	0.26	0.54	51.4
Approach		212	0.0	0.156	4.1	LOS A	0.6	3.9	0.20	0.55	51.8
All Vehicles		362	2.9	0.156	2.5	NA	0.6	3.9	0.12	0.34	55.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Terminus & Scott - Post Development PM

7:45-8:45AM
Giveway / Yield (Two-Way)

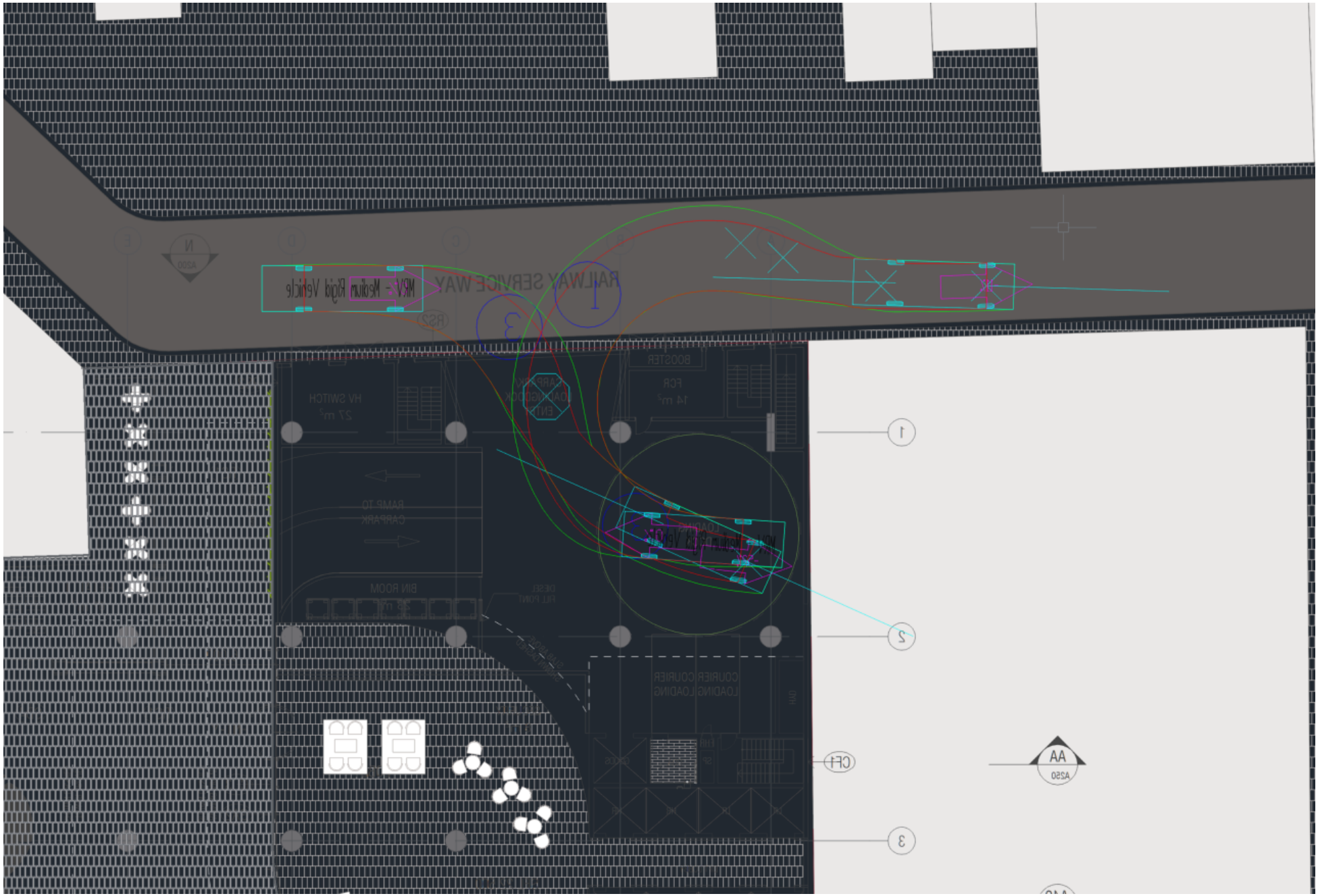
Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
West: Scott St(W)											
11	T1	140	0.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12a	R1	11	100.0	0.009	5.0	LOS A	0.0	0.0	0.00	0.55	54.0
Approach		151	7.0	0.072	0.4	NA	0.0	0.0	0.00	0.04	59.5
SouthWest: Terminus St(W)											
30b	L3	55	0.0	0.034	5.3	LOS A	0.0	0.0	0.00	0.58	53.3
32a	R1	45	0.0	0.042	3.6	LOS A	0.1	1.0	0.23	0.52	51.4
Approach		100	0.0	0.042	4.6	LOS A	0.1	1.0	0.11	0.55	52.5
All Vehicles		251	4.2	0.072	2.0	NA	0.1	1.0	0.04	0.24	57.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix C

Swept Path Analysis


RAILWAY SERVICE WAY
MRV - Medium Rigid Vehicle
RAMP TO CARPARK
BIN ROOM
COURIER LOADING
AA
A250