
Crows Nest Over Station Development – Site B

Transport and Accessibility Impact Assessment

Prepared for: Thirdi Crows Nest Commercial Developments Pty Ltd

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Revision

Revision	Date	Comment	Prepared By	Approved By
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B-Dr	21 March 2025	Updated to address Response to Submissions	S.Hong	B.Maynard

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For and on behalf of

Stantec Australia Pty Ltd

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Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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Appendix A. Design Review

1. Introduction

1.1 Background

It is understood that a State Significant Development Application (SSDA) is to be lodged with the Department of Planning, Housing and Infrastructure (DPHI) for a mixed use development (predominantly residential) above the Crows Nest Metro Station, otherwise known as Crows Nest Over Station Development (OSD) Site B. The subject site will be one of three OSD sites (identified as sites A, B and C).

A concept SSDA was lodged with the DPHI (SSD-9579) for all three sites and was approved in 2020.

Stantec was commissioned by Thirdi Group to prepare a Transport and Accessibility Impact Assessment (TAIA) to support the proposed SSDA for Site B.

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

Figure 1: Subject site and its environs



Base image source: Nearmap

Crows Nest OSD Site B is a 14 storey tower above the Crows Nest Metro Station.

The site area is 1,872m². The concept approval includes a maximum height to the top of the service zone of RL 158m and includes a maximum residential FSR of 13,000m².

The Metro Station is comprised of three levels:

- Ground Level – Hume Street includes the OSD tower lobby, retail, and back of house spaces.
- Level 01 includes a retail mezzanine, back of house, and a loading dock which is used for OSD garbage collection and is a future easement for rail authority access.
- Level 02 contains plant rooms for the metro station.



The OSD car parking levels are located on level 5 and 6. These are naturally ventilated with 27 car spaces on level 5 and 28 car spaces on level 6. There is a total of 55 spaces.

Apartments are located from level 7 to 18. Level 19 and 20 contain penthouses.

The roof terrace on level 17 includes communal gardens and pools, as well as private penthouse terraces.

- Level 7-8: 10 apartments per floor
- Level 9-18: 11 apartments per floor
- Level 19: 8 apartments (5 x two storey)
- Level 20: 3 apartments
- Total number of apartments: 130

1.2 Secretary's Environmental Assessment Requirements

This TAIA has been prepared to address issue 10 of the Secretary's Environmental Assessment Requirements (SEARs) for SSD-61400212 issued on 25 August 2023. Issue 10 is outlined in Table 1.

Table 1: SEARs Issue 10

Issue 10	Reference within this report
<p>Traffic, Transport and Accessibility</p>	
<p>Provide a transport and accessibility impact assessment, which includes:</p>	
<p>An analysis of the existing transport network, including the road hierarchy and any pedestrian, bicycle or public transport infrastructure, current daily and peak hour vehicle movements, and existing performance levels of nearby intersections.</p>	<p>Section 2</p> <p>The operation of the existing intersections surrounding the site, were modelled as part of the Sydney Metro City and Southwest EIS Technical Paper 1. This has been referred to in this report, additional existing conditions modelling is not considered necessary as part of this TAIA. The traffic generated by the development is expected to be minimal and have no adverse impact to the existing conditions of the surrounding road network. As such, SIDRA modelling post developed is not considered necessary. This is all discussed in Section 2.</p>
<p>Details of the proposed development, including pedestrian and vehicular access arrangements (including swept path analysis of the largest vehicle and height clearances), parking arrangements and rates (including bicycle and end-of-trip facilities), drop-off/ pick-up zone(s) and bus bays (if applicable) and provisions for servicing and loading/ unloading.</p>	<p>Section 4.6</p> <p>Drop-off/ pick-up zone(s) and bus bays are not applicable to this development.</p> <p>The loading dock is being delivered as part of the Sydney Metro works and the review of the loading dock design is outside the scope of this SSDA.</p>
<p>Analysis of the impacts of the proposed development during construction and operation (including justification for the methodology used), including predicted modal split, a forecast of additional daily and peak hour multimodal network flows as a result of the development (using industry standard modelling), identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cyclist conflict) and any cumulative impact from surrounding approved developments.</p>	<p>Impacts of the proposed development during construction are covered within the Preliminary CTMP which is a separate report and will be submitted with the SSDA.</p> <p>Impacts of the proposed development during operation are provided in Section 5.</p>
<p>Measures to mitigate any traffic impacts, including details of any new or upgraded infrastructure to achieve acceptable performance and safety, and the timing,</p>	<p>Section 5.3</p> <p>The development is expected to have no adverse impact on the existing performance of the surrounding road</p>

Issue 10	Reference within this report
viability and mechanisms of delivery (including proposed arrangements with local councils or government agencies) of any infrastructure improvements in accordance with relevant standards.	network. No mitigation measures are considered necessary.
Proposals to promote sustainable travel choices for employees, residents, guests and visitors, such as connections into existing walking and cycling networks, minimising car parking provision, encouraging car share and public transport, providing adequate bicycle parking and high quality end-of-trip facilities and implementing a Green Travel Plan.	A Green Travel Plan has been prepared as a separate report and will be submitted with the SSDA.
Provide a Construction Traffic Management Plan detailing predicted construction vehicle routes, access and parking arrangements, coordination with other construction occurring in the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated.	A CTMP has been prepared as a separate report and will be submitted with the SSDA.

It is noted that this TAIA pertains to Site B only.

1.3 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site.
- suitability of the proposed parking in terms of supply (quantum) and layout.
- service vehicle requirements.
- pedestrian and bicycle requirements.
- the traffic generating characteristics of the proposed development.
- suitability of the proposed access arrangements for the site.
- the transport impact of the development proposal on the surrounding road network.

1.4 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds.
- Planning Secretary’s Environmental Assessment Requirements (SEARs) SSD-61400212 (dated 25 August 2023).
- SSD-9579 Consolidated Consent.
- Sydney Metro City & South West: Crows Nest Over Station Development Transport, Traffic and Pedestrian Assessment Report (prepared by Metron, dated November 2018).
- Crows Nest Station Design Site A & B OSD Enabling Report (prepared by SMEC, dated 29 June 2023).
- North Sydney Council Development Control Plan (DCP) 2013.
- Australian/New Zealand Standard, Parking Facilities (AS 2890).
- TfNSW’s Guide to Transport Impact Assessment (the Guide) 2024.
- plans for the proposed development prepared by Woods Bagot.



2. Existing Conditions

2.1 Land Zoning

The subject site is located on the south-eastern corner of the intersection between Pacific Highway and Hume Street, and comprises of the following properties:

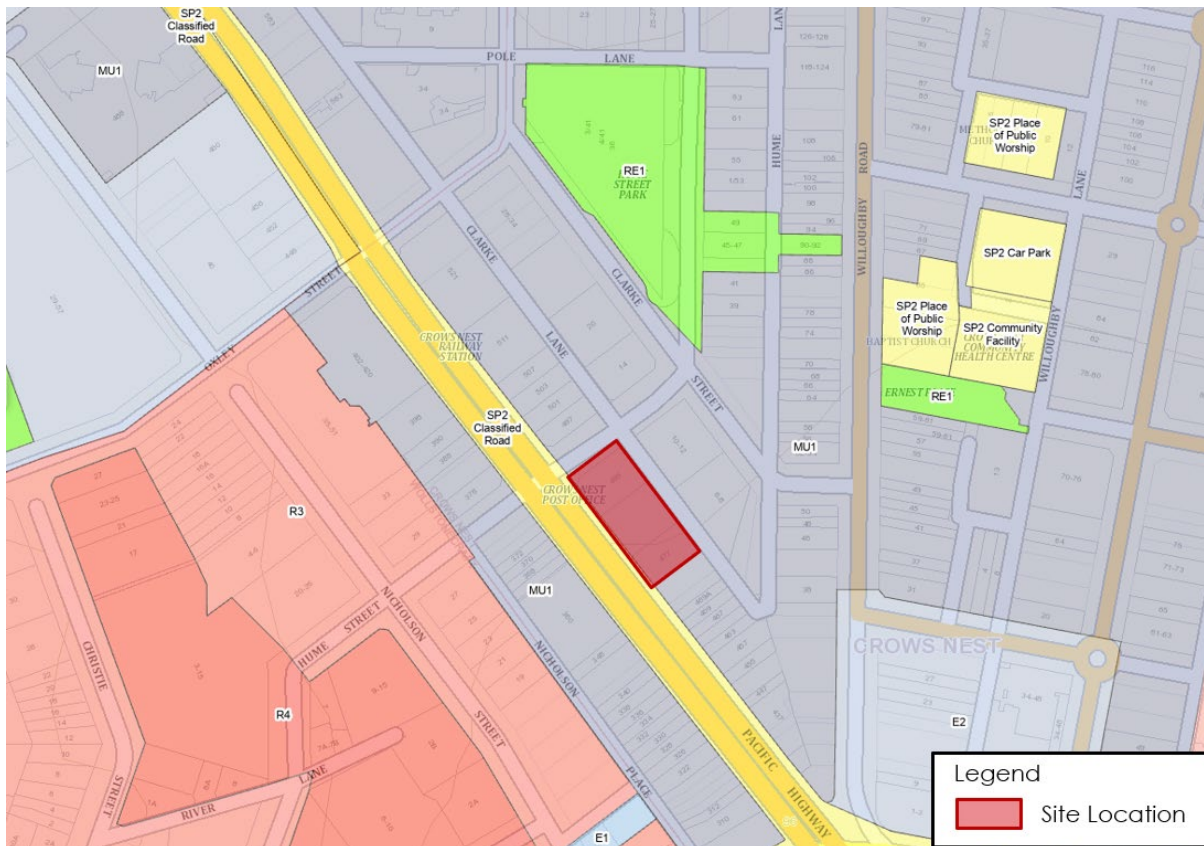
- 477 Pacific Highway (Lot 100, DP 747672)
- 479 Pacific Highway (Lot 101, DP 747672)
- 491-495 Pacific Highway (Lot 100, DP 442804)

The site currently has a land use classification as MU1 – Mixed Use and was historically occupied by a commercial building which has been demolished to make way for the Crows Nest Metro Station.

The site is located on the eastern side of Pacific Highway and is approximately 800 metre walking distance from St Leonards Station. The surrounding land uses predominantly comprise of mixed use and high density residential developments.

The site and surrounding land uses is shown in Figure 2.

Figure 2: Local land use map



Base image source: ePlanning Spatial Viewer

2.2 Road Network

2.2.1 Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules.

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- Arterial Roads – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).
- Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.
- Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2 Adjoining Roads

The configuration of the roads in the immediate vicinity of the site have changed due to the construction works associated with the Crows Nest Metro Station, particularly Clarke Lane and Hume Street. This section summarises the characteristics of the surrounding roads before the Crows Nest Metro Station construction works.

The roads surrounding the site are classified according to the functional hierarchy described in Table 2 and shown in Figure 3.

Table 2: Adjoining Roads

Street	Hierarchy	Description
Pacific Highway	Arterial	Two-way road with three lanes of traffic in each direction. Parking is generally permitted in the kerbside lane outside of peak hours. The sign posted speed limit varies along Pacific Highway but is 60 kilometres per hour along the site frontage.
Oxley Street	Local Road	Two-way road with one lane of traffic in each direction. Parking is generally permitted in kerbside areas. The speed limit along Oxley Street is 50 kilometres per hour.
Hume Street	Local Road	Two-way road with one lane of traffic in each direction. Parking is generally permitted in kerbside areas. The speed limit along Hume Street is 50 kilometres per hour
Hume Lane	Local Road	One way laneway, with traffic permitted northbound north of Clarke Street and southbound south of Clarke Street. Kerbside parking is not permitted along Hume Lane. The speed limit along Hume Lane is 50 kilometres per hour, however considering the narrow width of the laneway the average speed is expected to be lower.
Clarke Street	Local Road	Two-way road with one lane of traffic in each direction. Parking is generally permitted in kerbside areas. Classified as an on-road cycle route, with some on road and some segregated cycle lanes installed. The speed limit along Clarke Street is 50 kilometres per hour.
Clarke Lane	Local Road	One way laneway, with traffic permitted northbound only. Kerbside parking is not permitted along Clarke Lane. The speed limit along Clarke Lane is 50 kilometres per hour, however considering the narrow width of the laneway the average speed is expected to be lower.

Street	Hierarchy	Description
Willoughby Road	Collector	Two way road with one lane of traffic in each direction and kerbside parking. Frequent traffic calming measures have been installed. Partly classified as an on-road cycle route, with on-road pavement markers installed. The posted speed limit along Willoughby Road is 40 kilometres per hour through the main retail/ commercial precinct and 50 kilometres per hour in other areas.

Figure 3: Road hierarchy surrounding the site

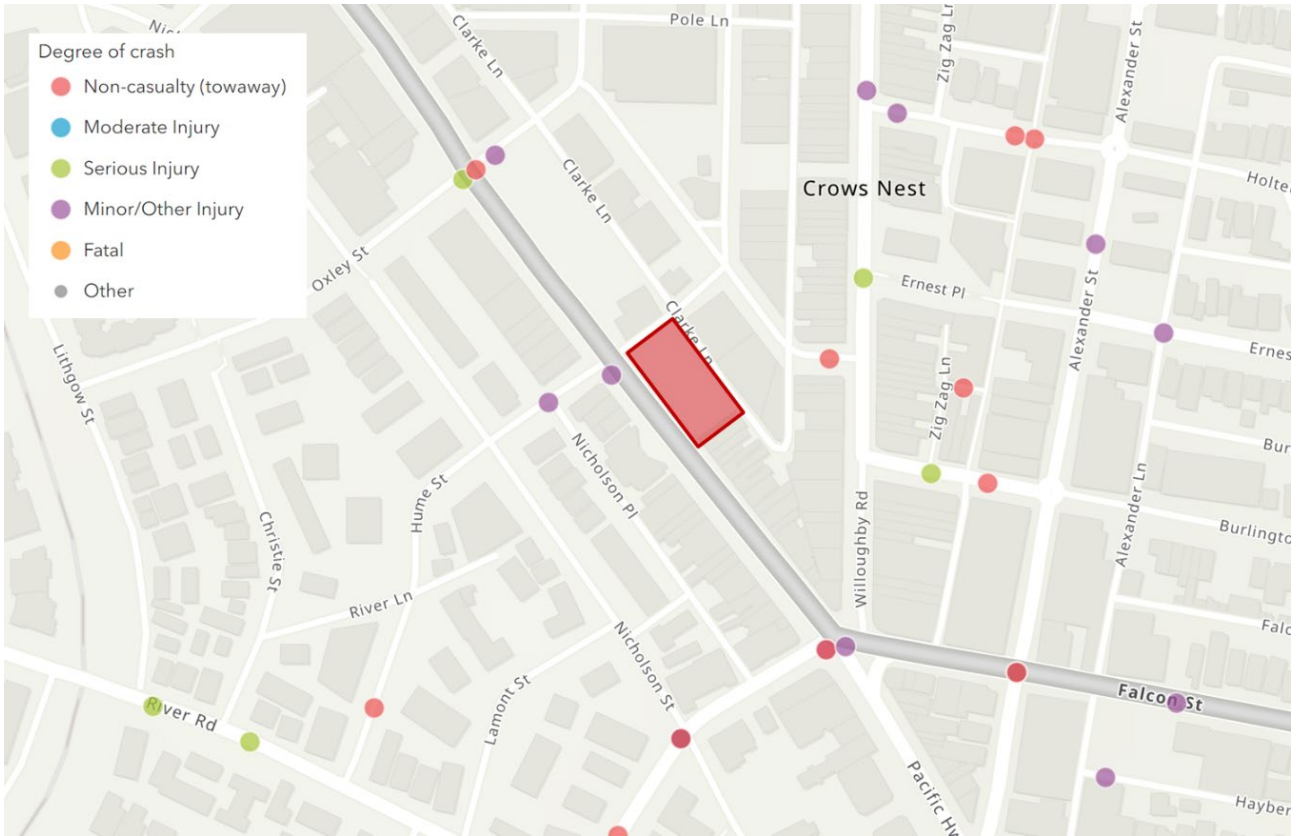


Base image source: TfNSW Road Network Classifications

2.3 Crash History

Analysis of the most recent five-year period of available crash data (2017-2021) has been undertaken based on crash data obtained from the TfNSW Centre for Road Safety for the roads surrounding the site. The locations and severity of the crash data for the five-year period is shown in Figure 4 and detailed in Table 3.

Figure 4: Crash Map from 2017 to 2021



Base image source: Transport for NSW LGA View Crashes Map (2023)

Table 3: Crash History from 2017 to 2021

Road	Number of Crashes	People Injured	Number of Fatalities
Pacific Highway	7	5	0
Falcon Street	5	5	0
Oxley Street	1	1	0
Hume Street	2	1	0
Shirley Road	10	6	0
Albany Street	3	3	0
Willoughby Road	3	4	0
Burlington Street	2	0	0
Holtermann Street	3	1	0
Alexander Street	2	2	0
Total	38	28	0



The following key statistics can be drawn from the crash data:

- Approximately 74 per cent of crashes resulted in an injury.
- Approximately 84 per cent of crashes occurred during daylight hours.
- No fatalities were recorded during the five-year period.

A review of the crash data indicates that incidents occurring on Shirley Road account for 26 per cent of recorded crashes, where most of these crashes are located at the Shirley Road / Nicholson Street / Sinclair Street roundabout. Crashes at this intersection mainly comprise of right through and cross traffic crashes. Pacific Highway also accounts for 18 per cent of crashes that occurred near the site.

2.4 Car Parking

2.4.1 Public off-street parking

Several off-street publicly accessible car parks are near the site. Four of these car parks are operated by North Sydney Council and offer free parking for up to two hours, while the remaining three are privately operated and charge by the hour, up to a daily maximum. These parking areas are summarised in Table 4.

Table 4: Off-street public car parking in the vicinity of the site

Car Park	Location	Cost
North Sydney Council Nicholson Street car park	Nicholson Street, Crows Nest	Monday – Saturday: Free parking up to 2 hours, fees apply thereafter up to \$42.00 each day (applies for hours 7am to 11pm only) Sunday: Free
North Sydney Council Hume Street car park	Hume Street, Crows Nest	Monday – Saturday: Free parking up to 2 hours, fees apply thereafter up to \$49.00 each day (applies for hours 7am to 6pm only). Flat rate of \$9 after 6pm. Sunday: Free
North Sydney Council Holtermann Street car park	Holtermann Street, Crows Nest	Monday – Saturday: Free parking up to 2 hours, fees apply thereafter up to \$58.00 each day (applies for hours 7am to 11pm only) Sunday: Free
North Sydney Council Alexander Street car park	Alexander Street, Crows Nest	Monday – Saturday: Free parking up to 2 hours, fees apply thereafter up to \$58.00 each day (applies for hours 7am to 11pm only) Sunday: Free
Wilson Parking Oxley Street	40 Oxley Street, Crows Nest	Monday – Friday: Up to \$39.00 per day (Open 6:00am – 7:00pm) Saturday – Sunday: \$5.00 flat rate (Open 6:00am – 6:00pm)
Charter Grove Car Park	29-57 Christie Street, St Leonards	Monday – Friday: Flat rate of \$12.00 (Open 6:00am – 7:00pm) Closed weekends
Norths Rugby Club Car Park	80 Christie Street, St Leonards	Monday – Friday: Up to \$39.00 per day Saturday – Sunday: \$8.00 flat rate

The limited supply and cost of parking in public car parks, including those privately owned, is likely to discourage employees travelling to Crows Nest for work via car, and contributes to the higher-than-average use of public transport for workers commuting to Crows Nest.

2.4.2 On-street parking

This section summarises the varying available on-street parking surrounding the site, before the Crows Nest Metro Station construction works.

On-street car parking near the site is typically time restricted and/ or ticketed during weekday business hours and during some time periods at the weekend, as shown in Figure 5. Areas in the immediate vicinity of the site also do not permit parking, except for residential parking permit holders. The limited number of on-street all day parking spaces in Crows



Nest limits current workers from travelling to Crows Nest by vehicle as part of their daily commute, encouraging high public transport mode share.

Figure 5: Existing on-street parking restrictions in the immediate vicinity of the site.



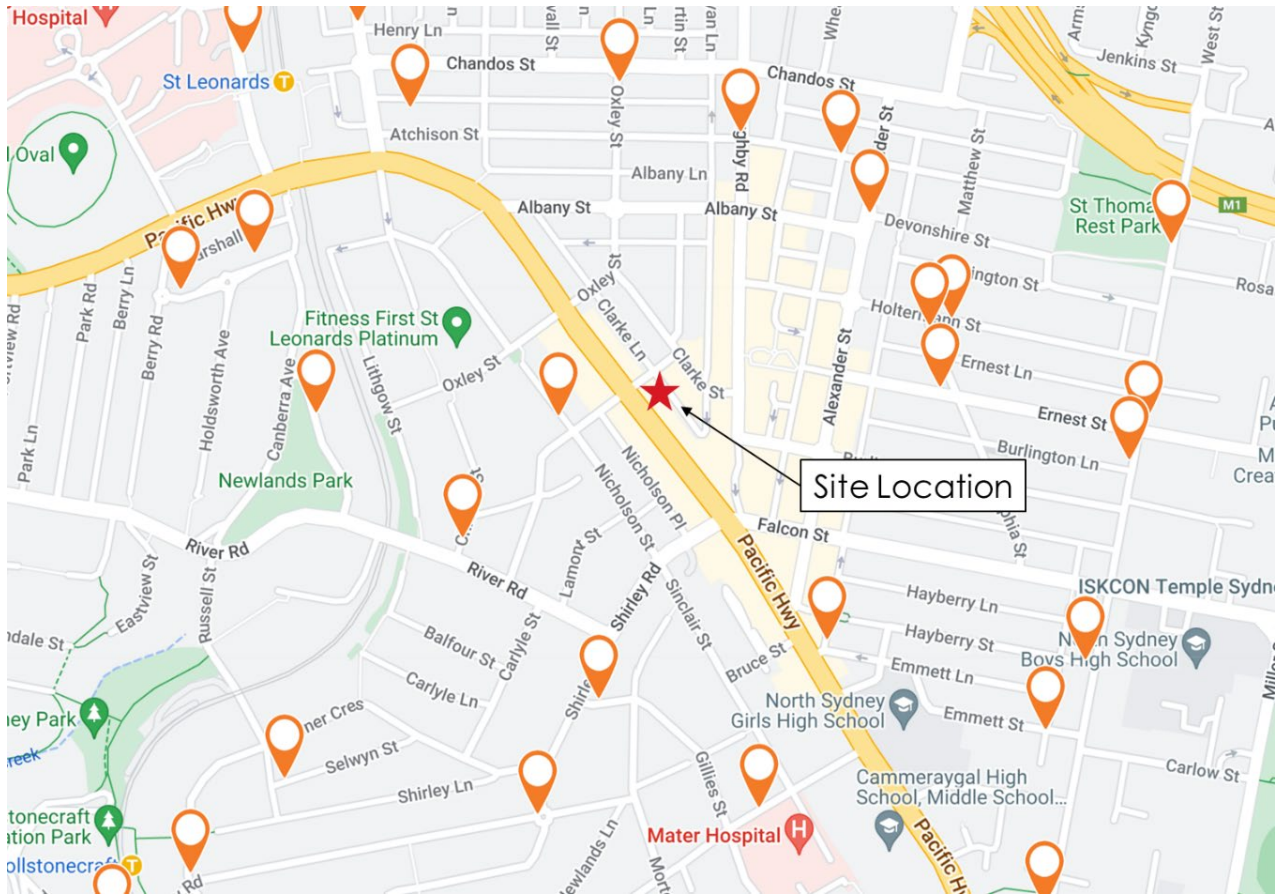
Source: Sydney Metro City & South-West Crows Nest OSD Transport, Traffic & Pedestrian Assessment Report (2018)

2.5 Local Car Sharing Initiatives

Car share schemes have become increasingly common throughout Sydney and are now recognised as a viable transport option for a range of trip purposes throughout Sydney, particularly shorter trips. Such facilities are likely to be of benefit to future tenants at the site.

GoGet car share for example has a significant number of pods close to the site, as shown Figure 6, with opportunities to provide further facilities as part of the precinct redevelopment to further limit travel by private car. Other providers like Flexicar and Car Next Door also offer services in the area.

Figure 6: GoGet car share pods



Source: GoGet (2023)

2.6 Public Transport

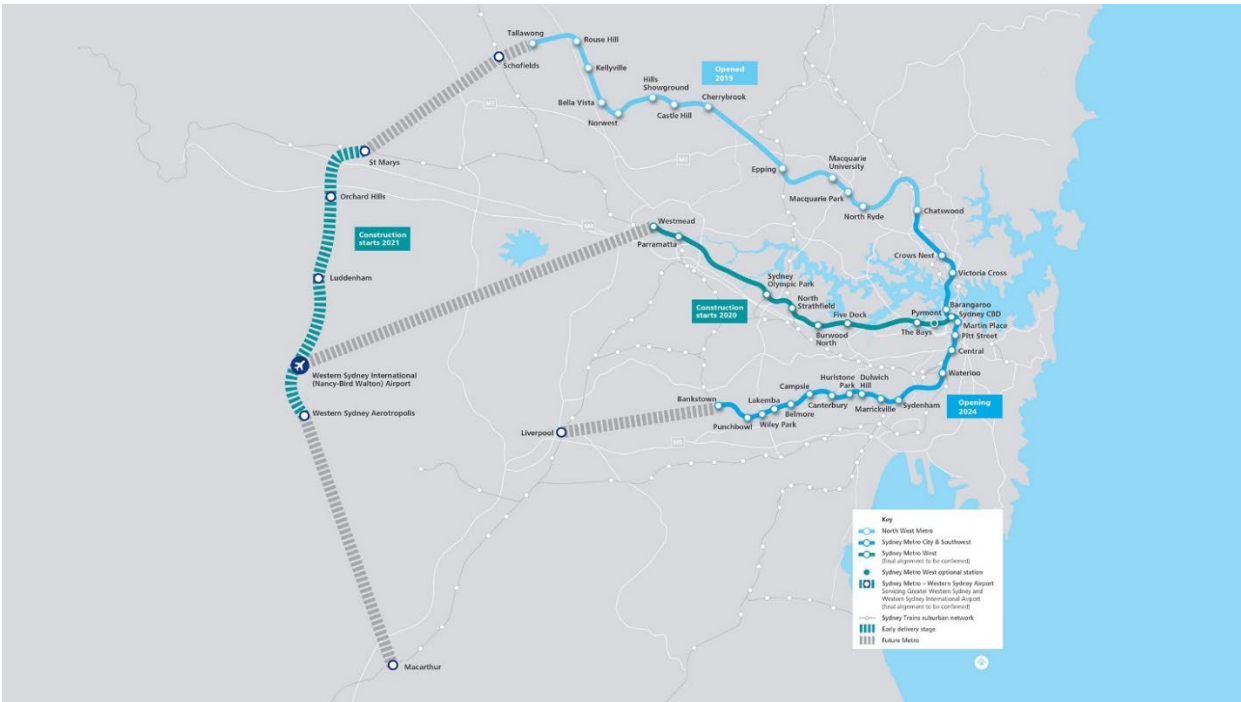
2.6.1 Sydney Metro

The completion of the Sydney Metro City & South-West project in 2024, is expected to increase public transport accessibility in the surrounding area and increase public transport options. The new line will connect with the North West Metro line at Chatswood and provide direct connection between Chatswood to Sydenham and onto Bankstown via the Sydney's CBD. The project will involve the delivery of six new metro stations, including Crows Nest and will significantly increase capacity on the public transport network to/ from the area, further driving development and expansion in the area.

Future projects are also in the pipeline to further improve the Sydney Metro network and improve accessibility and travel times for workers, particularly to/ from Sydney CBD and Parramatta.

An overview of the future Sydney Metro network is shown in Figure 7.

Figure 7: Sydney Metro Route Alignments



Source: Transport for NSW (2023)

2.6.2 Rail

St Leonards Station is located approximately 800 metre walking distance from the site. The station is serviced by the T1 North Shore and Western Line, Northern Line services, and Central Coast and Newcastle Line. The rail network context is shown in Figure 8.

The station provides a high level of service for people accessing various locations, with frequent, direct services to major employment centres such as the Sydney CBD, North Sydney CBD, Chatswood and Macquarie Park during the weekday peak periods. Train frequencies occur every 3-4 minutes during peak period, although, it is noted that service changes will occur once Sydney Metro City and Southwest opens in 2024.

Figure 8: Sydney rail network map



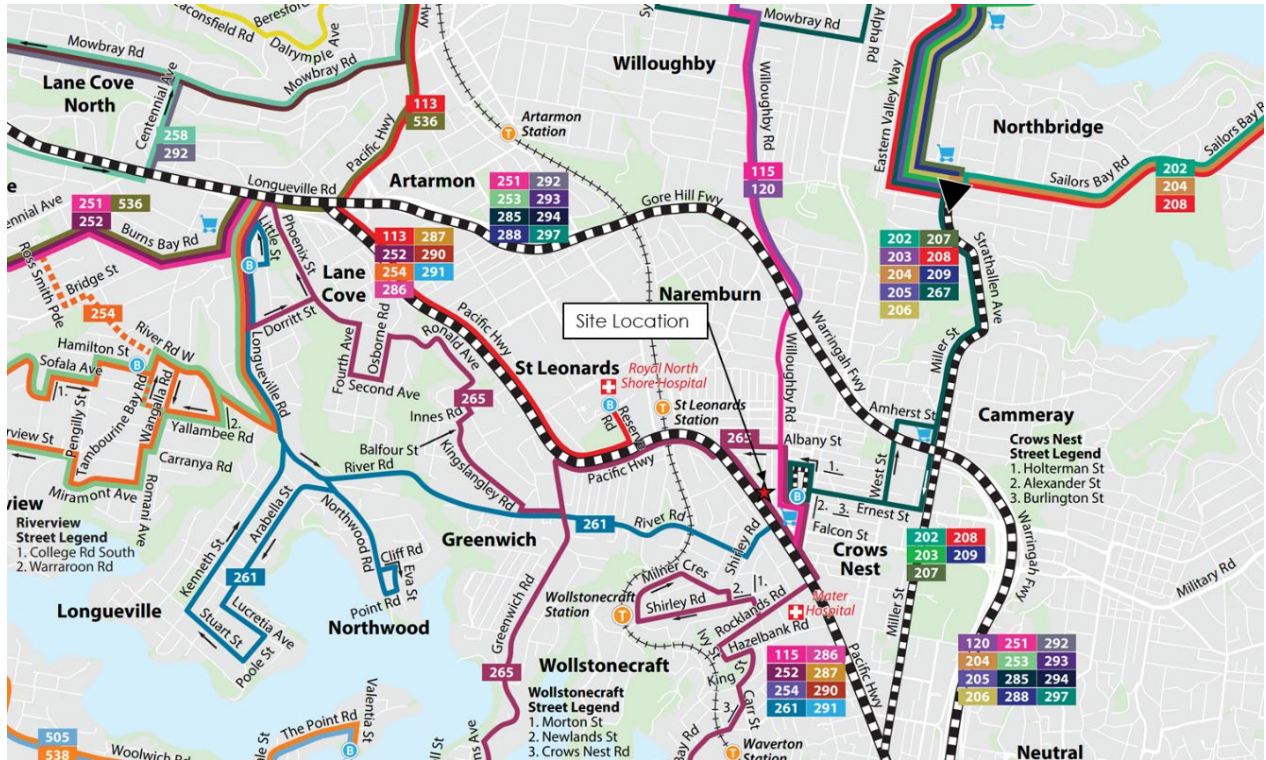
Source: Transport for NSW (2023)



2.6.3 Buses

Numerous bus stops are located close to the site, with buses serving a variety of destinations across the North Shore, Northern Beaches, Northern Suburbs and Inner City. A summary of where bus routes operate in the greater area are shown in Figure 9.

Figure 9: Bus network map



Source: Transport for NSW (2023)

A number of bus routes operate along Pacific Highway and Willoughby Road. These routes primarily serve the northern suburbs. The primary bus stops near the site are:

- Pacific Highway – one stop, northbound, south of Oxley Street (relocated from south of Hume Street).
- Pacific Highway – one stop, southbound, north of Hume Street.
- Willoughby Road – one stop, northbound, south of Holtermann Street.
- Willoughby Road – one stop, southbound, south of Holtermann Street.

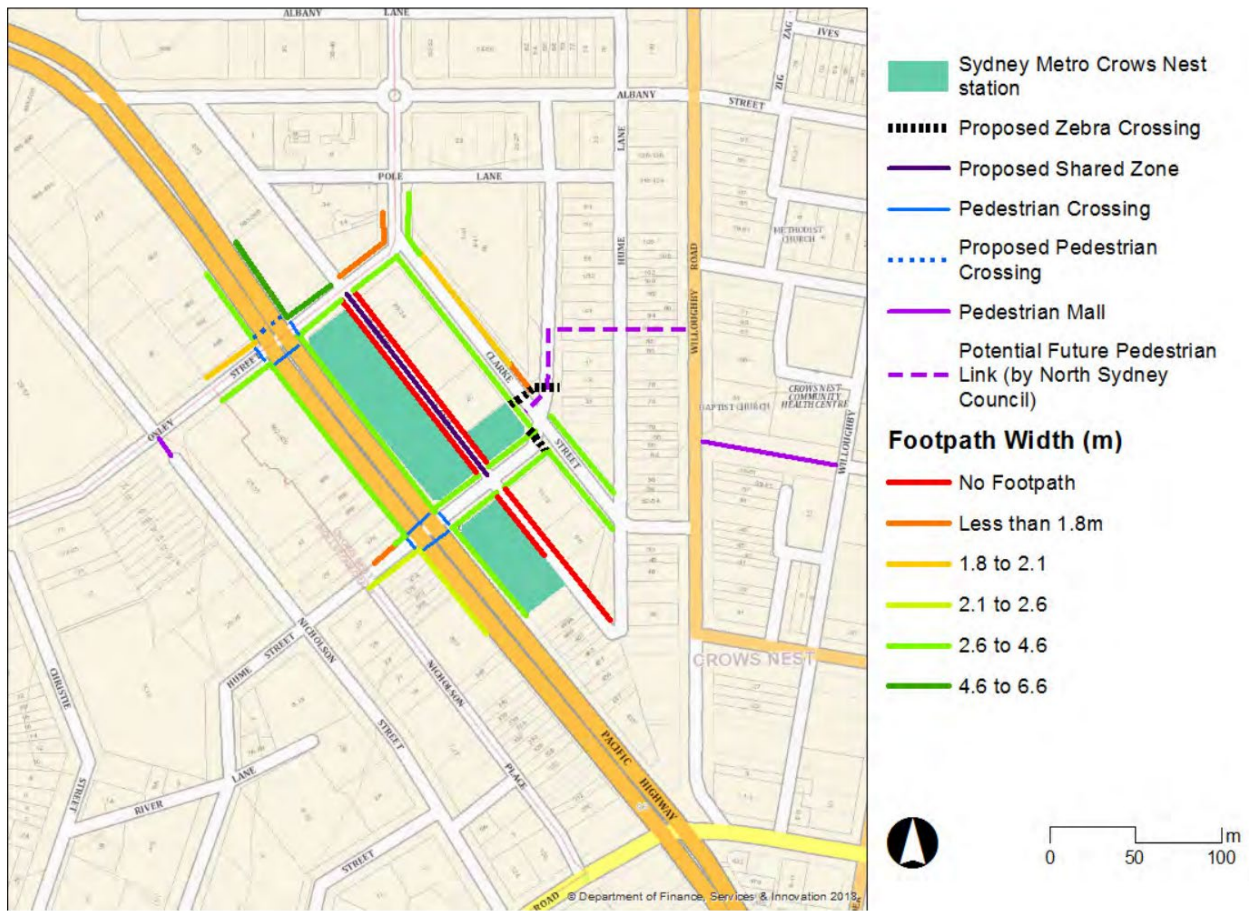
Bus services to most destinations are focused heavily on providing weekday peak direction services, with some bus services to destinations not provided in the non-peak direction on weekdays (for example outbound in AM peak) or at weekends. Service frequencies at weekends are also generally lower than during weekdays, however trunk routes to major destinations such as the Sydney CBD, North Sydney, Chatswood, Lane Cove, Neutral Bay and Green Square maintain a reasonably high frequency through the weekend, across various services.

Existing bus stops throughout Crows Nest are generally of good quality and provide a combination of shelter, covered seating and service information at all stops, with most containing all four.

2.7 Pedestrian Infrastructure

Improvements to the existing pedestrian infrastructure will be made as part of the delivery of the Crows Nest Metro Station. The proposed improvements are shown in Figure 10.

Figure 10: Proposed improvements to the surrounding pedestrian infrastructure



Source: Sydney Metro City & South-West Crows Nest OSD Transport, Traffic & Pedestrian Assessment Report (2018)

The key features of the pedestrian network around the proposed Crows Nest OSD include:

- predominantly covered footpaths along the Pacific Highway
- frequent signalised pedestrian crossings along the Pacific Highway provide appropriate crossing facilities near the site
- signalised crossings on the Pacific Highway at Oxley Street and Hume Street
 - no pedestrian leg on the north-west side of the Oxley Street / Pacific Highway intersection
- widened footpaths on the western frontage and part of the eastern frontage of Clarke Street, including covered sections at the south eastern ends. This is a result of new developments along the Pacific Highway being required to have a three metre public domain set back, and is expected to produce a wider footpath along this section of the Pacific Highway over time.
- partly widened footpaths on Oxley Street with partly sheltered sections of footpath
- sporadic placement of trees for shade along footpaths without awnings
- inconsistent and narrowing sections of footpath on Clarke Street at Hume Street park
- a lack of pedestrian crossings within the blocks bound by the Pacific Highway, Albany Street and Willoughby Road (excluding the crossing at Clarke Street / Willoughby Road)
- no pedestrian footpaths or amenity provided along Hume Lane or Clarke Lane (south of Oxley Street).

The Sydney Metro 2018 Transport Report noted that there were generally low pedestrian volumes in the existing environment around the proposed OSD site.

Key destination points from the proposed Crows Nest OSD site include to:

- St Leonards train station

- Royal North Shore and North Shore Private Hospital campus
- shops and workplaces along the Pacific Highway (north and south)
- St Leonards office precinct
- North Sydney CBD
- Crows Nest town centre, primarily Willoughby Road between Albany Street and Falcon Street
- local schools including North Sydney Girls High, Cammeraygal High School and North Sydney Boys High
- the Mater hospital.

However, it should be noted that the new metro station and associated bus stops are likely to be the preferred transport mode for OSD residents, employees and visitors, resulting in changes to existing pedestrian trip patterns, including a large proportion of pedestrian trips between the OSD and the metro station below.

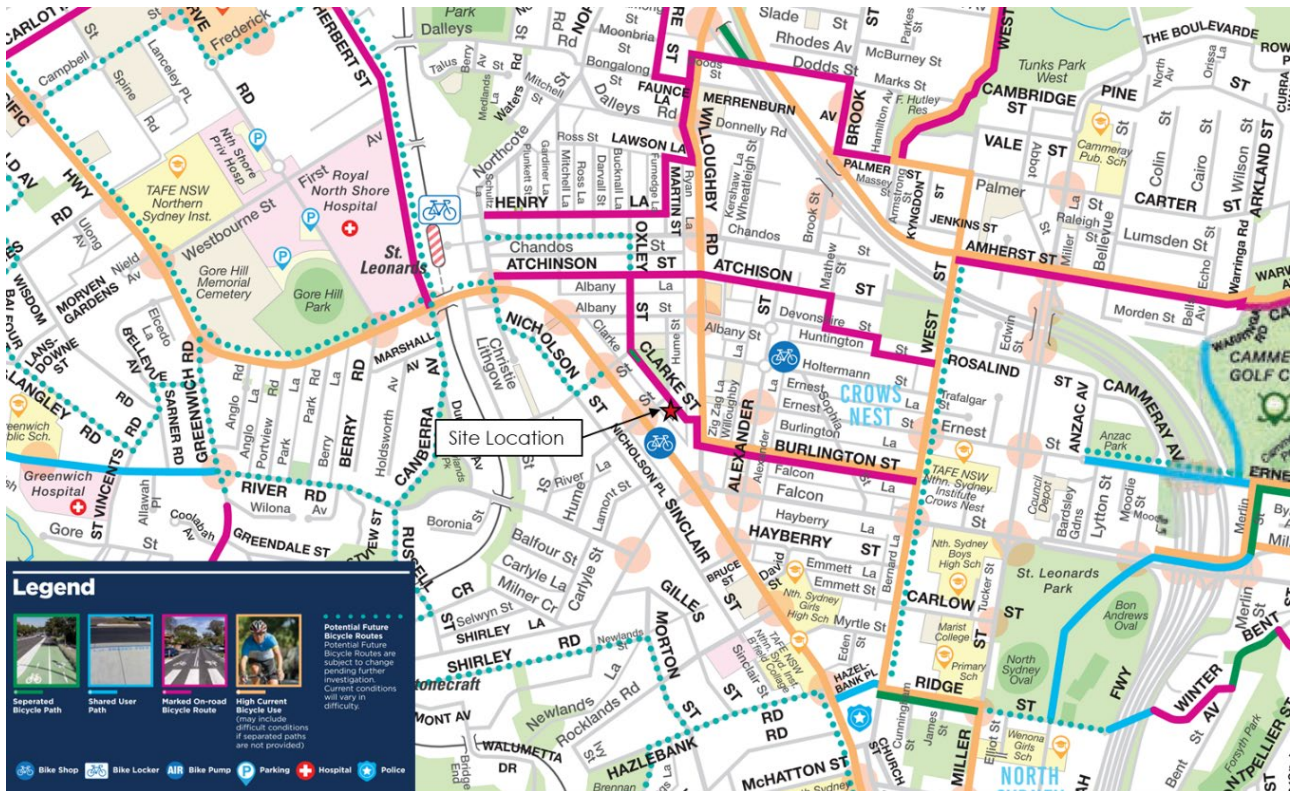
It should also be noted that North Sydney Council is in the process of implementing its proposed upgrades for Hume Street Park, which will provide new pedestrian connections from Hume Street and Clarke Street through to Willoughby Road, including the pedestrianisation of Hume Street north of Clarke Street, and a new mid-block pedestrian link from Hume Street to Willoughby Road. The first stage of the Hume St Park expansion project was completed in 2022, adding more than 1,200 square metres of new open space in Crows Nest.

As part of the Crows Nest Station works, pedestrian movements and access will be improved by the development of new crossing points on nearby streets and the widening of footpaths along the OSD site through increased ground floor setbacks.

2.8 Cycle Infrastructure

There is a limited cycling network through the Crows Nest town centre, which provides a partial connection to the proposed Crows Nest OSD site. The existing cycling network is shown in Figure 11.

Figure 11: Crows Nest cycling network and infrastructure.



Source: North Sydney Cycling Guide and Map, accessed June 2023

The cycling network along these routes is incomplete and of moderate difficulty, with some gaps, circuitous routes and steep grades. The cycle network provides a connection through Crows Nest, connecting to St Leonards Station and

North Sydney CBD via a series of mixed traffic roads, marked lanes and small sections of separated cycleways and shared paths.

Some public bike racks are installed along Willoughby Road for cyclists accessing Crows Nest town centre, however these do not feature weather protection and there are none currently installed in the immediate vicinity of the proposed Crows Nest OSD site.

It is noted that as part of the broader Crows Nest Station development, a separated cycleway will be installed on Hume Street, connecting the cycle route on Clarke Street to the cycle route on Nicholson Street.

The North Sydney Council DCP requires new development to make provision for secure bicycle facilities and end of trip facilities which is expected to address deficiencies in secure cycle parking facilities over time.



3. Development Proposal

3.1 Overview

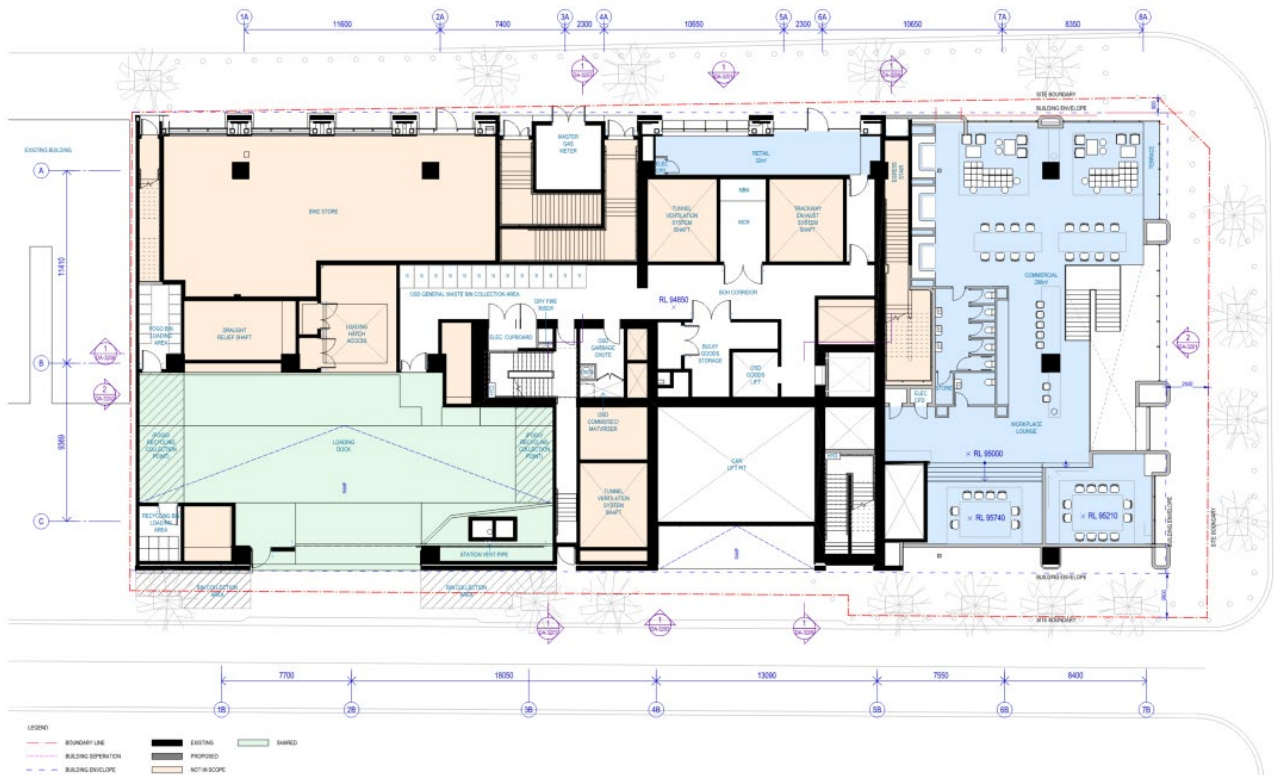
The proposed development includes construction of a mixed use building (predominantly residential) above the Crows Nest Metro Station, which will comprise of 130 units and 360m² GFA of retail space. Pedestrian access to the site is proposed along Hume Street frontage, whilst vehicular access to the Level 5 and 6 car parks will be off the Clarke Lane frontage.

A breakdown of the land use is shown in Table 5 and the site plan shown in Figure 12.

Table 5: Breakdown of land-use

Land-use	Unit type	No. of units/ GFA
Residential	1-bedroom	44 units
	2-bedroom	63 units
	3-bedroom	23 units
	Total	130 units
Retail	-	360m ² GFA

Figure 12: Site Plan – Upper Ground Level



Source: Woods Bagot (2024)



3.2 Vehicle Access Arrangements

A single eight metre (approx.) wide two-way vehicular crossover will be provided along Clarke Lane, which will provide access to the two car lifts.

A single 12 metre (approx.) wide two-way vehicular crossover will also be provided along Clarke Lane, which will provide access to the loading dock located on the ground floor. Whilst this loading dock and associated driveway crossover forms part of the building, it is being delivered as part of the Crows Nest Metro Station works.

3.3 Mechanical Car Lifts

The development will be relying on two car lifts to transport vehicles between ground level and the car park levels located above on Levels 5 and 6.

The queuing analysis is discussed in Section 4.7 of this report.

3.4 Parking and Loading Overview

The proposed development includes on-site parking for 55 car parking spaces across two upper levels of parking and includes six accessible spaces.

Bicycle parking will also be provided on the car park levels, which can be accessed via the lifts. Alternatively, there is also a bicycle store located at the Upper Ground Level.

A dedicated loading dock is to be provided on ground floor, which will be delivered as part of the Crows Nest Metro Station works. As per the OSD Enabling Report (SMCSWSCN-SMC-SCN-EN-REP-000001, dated 29 June 2023), the loading dock has been designed to accommodate two Small Rigid Vehicles (SRV) and a Medium Rigid Vehicle (MRV) simultaneously. The design also allows a 9.6 metre long waste vehicle to pull over onto the loading access driveway without obstructing through traffic along Clarke Lane.

Swept paths have been completed throughout the car park levels, circulation aisles and access driveway as included in Appendix A. This assessment assumes that the loading dock and access has been designed in accordance with AS2890.2:2018 requirements.

The suitability of the car parking provision and layout is discussed in Section 4.6 of this report.

3.5 Impact on On-Street Parking Conditions

The proposed over station development is not expected to impact the on-street parking conditions or result in the loss any on-street parking spaces in addition to those that may have been identified and approved for the Crows Nest Metro Station.

3.6 Pedestrian Infrastructure and Safety

The site will be afforded wide footpaths (minimum 2.5 metres) along the Pacific Highway, Hume Street and Clarke Lane frontages. The main pedestrian access into the site will be via Hume Street, which will provide direct access into the building lobby and lifts. This will allow the separation of vehicular and pedestrian access, hence minimising conflict at the driveway crossover into the car lifts along Clarke Lane.

Whilst it is acknowledged that the design is unable to incorporate the 2.0 metre by 2.5 metre triangular pedestrian sight splays at the driveway into the car lifts along Clarke Lane, the use of flashing lights and associated warning signage can be installed to mitigate the risk of conflict between exiting vehicles and pedestrians. This can be further investigated during the detailed design stage.



4. Parking and Loading Assessment

4.1 Car Parking

In accordance with the Consolidated Conditions of Consent for SSD-9579, Site B is required to provide a maximum of 55 car parking spaces.

The site proposes to provide 55 car parking spaces across two levels, and as such, satisfies the maximum requirement outlined in the Consolidated Conditions of Consent.

The car parking spaces will be allocated to the residential tenants of the building.

4.2 Accessible Parking

In accordance with the Consolidated Conditions of Consent for SSD-9579, Site B is required to provide a minimum of six accessible spaces, which is to be included in the total car parking provision.

The site proposes to provide six accessible spaces, which is included in the total 55 car parking spaces.

4.3 Bicycle Parking and End of Trip Facilities

The North Sydney Development Control Plan (DCP) 2013 requires new residential developments to provide bicycle parking at a minimum rate of one space per dwelling for residents and one space per 10 dwellings for visitors.

Based on a yield of 130 dwellings, the site is required to provide a minimum of 130 bicycle parking spaces for residents and 13 bicycle parking spaces for visitors.

For retail premises, the North Sydney DCP 2013 requires a minimum of one space per 150m² GFA for occupants and one space per 400m² GFA for customers.

Based on a yield of approximately 360m² GFA of retail space, the site is required to provide a minimum three bicycle spaces for occupants and one bicycle spaces for customers.

In total the development is required to provide 147 bicycle parking spaces. The development will provide 148 bicycle parking spaces across the car parking levels which meets the DCP requirements.

The DCP also requires End-of-Trip Facilities (EOTF) to be provided for non-residential uses which includes 1 personal locker for each bicycle parking space and 1 shower and change cubicle for up to 10 bicycle parking space. The development will provide two ambulant DDA bathrooms, both including showers, located within the commercial tenancy on Level 1. Four lockers will also be provided, which are located between the two ambulant DDA bathrooms.

4.4 Motorcycle Parking

In accordance with the Consolidated Conditions of Consent for SSD-9579, Site B is required to provide a maximum of two motorcycle spaces.

The development will provide two motorcycle spaces located on the car parking levels.

4.5 Loading and Waste Collection

The North Sydney DCP 2013 requires developments containing more than 60 dwellings to provide at least one service delivery space, capable of accommodating at least one Heavy Rigid Vehicle (HRV) or two Medium Rigid Vehicles (MRV). The subject site will be sharing the dedicated loading, located on the ground floor and accessible via Clarke Lane, which will be delivered as part of the Crows Nest Metro Station works. As per the OSD Enabling Report (SMCSWSCN-SMC-SCN-EN-REP-000001, dated 29 June 2023), the loading dock has been designed to accommodate two Small Rigid Vehicles (SRV) and a Medium Rigid Vehicle (MRV) simultaneously. The design also allows a 9.6 metre long waste vehicle to pull over onto the loading access driveway without obstructing through traffic along Clarke Lane.

The proposed provision is considered to be sufficient for the servicing requirement of Site B which will be limited to waste collection, removalist activities and minor maintenance activities which will require vans/ utes to access the loading dock.



4.6 Car Parking Layout Review

The car park layout has been reviewed against the requirements within the Australian Standard for Off Street Car Parking Facilities (AS2890.1). This assessment included a review of the following:

- bay and aisle width
- adjacent structures
- turnaround facilities
- circulation roads
- height clearances
- parking for persons with disabilities
- motorcycle/motor scooter parking.

Details of this review is shown graphically in Appendix A. This review indicates that the proposed site access arrangements, internal circulation and car parking layout is expected to operate well with peak demands readily accommodated. The main circulation aisles ensure adequate widths and sightlines with convenient access to and from the lifts.

All vehicles can enter and exit the site in a forward direction with independent movements throughout, where necessary.

As outlined in Section 3.6 the design is unable to incorporate the 2.0 metre by 2.5 metre triangular pedestrian sight splays at the driveway into the car lifts along Clarke Lane, the use of flashing lights and associated warning signage can be installed to mitigate the risk of conflict between exiting vehicles and pedestrians. This can be further investigated during the detailed design stage.

It is also understood that due to design constraints (i.e. columns have already been located and constructed by the Metro works), the shared bays have columns located in areas which may not strictly comply with the requirements of AS2890.6:2022. Any variations from this requirement will need to be approved by an access consultant, noting that the proposed layout may still be supportable if it can be demonstrated that the column location does not obstruct the manoeuvring requirements of the associated users (e.g. wheelchair/ mobility scooter manoeuvring requirements) and otherwise meets the intent of the standards. From a traffic perspective, these columns are not located in areas that will obstruct vehicle manoeuvring areas, parking envelopes or door opening clearances.

4.7 Queuing Analysis

Section 5 of this report includes details on the expected traffic generation of the site. It is noted that queuing on entry would be most critical during the afternoon peak when residents generally return home. The morning peak is not as critical as vehicles generally exit the site and would therefore wait within the car park levels. With only 14 vehicle trips in any weekday peak hour and an 80:20 directional split favouring the peak flow direction, up to 11 vehicles could enter the site at any peak hour.

Based on Stantec's experience and understanding of mechanical vertical vehicle transportation systems, a proposed car lift system could include the following operational characteristics:

- 10 seconds to open the door to let the car in;
- approximately 15 seconds to drive in and park in the car lift;
- 10 seconds to close the car lift door;
- 150 millimetres per second for the car lift to transport vehicle up to car park levels (average travel distance of 14.5 metres = 97 seconds)¹
- 10 seconds to open the car lift door;
- approximately 15 seconds to let the car out at the car park level;
- 10 seconds to close the door; and
- 150 millimetres per second for the car lift to travel back down to street level (average travel distance of 14.5 metres = 97 seconds).

¹ Travel distance from street level to Level 3 car park is 14.5 metres.



This equates to 264 seconds per cycle or a capacity of 13 vehicles per hour for a single car lifting system. As such, the proposed two car lift system will be able to service a total of 26 vehicles per hour. This cycle time is also conservative as it is based on the longest travel distance between the street level and Level 6 car park.

For the critical afternoon peak hour period, a queue analysis based on the Guide to Traffic Management Part 2: Traffic Theory (Austroads, 2020) concludes that the 98th percentile queue entering the site in the afternoon peak is expected to be two vehicles (93rd percentile queue is expected to be one vehicle). This queue includes the vehicles that are in the system as well, which indicates that there will be no vehicles queuing to use the lift. In the event that both car lifts are in use and there is a car waiting, the vehicle can park on the western side of Clarke Lane without obstructing through movement along Clarke Lane. This is demonstrated through the swept paths included in Appendix A.

It is expected that the car lifts will be operated by remote control only, which is considered appropriate noting no visitor access is necessary. The car lifts will also return to the default position, which would be at street level, to ensure that if one car lift is in operation the other would be available.

Management of the car lift during breakdowns or maintenance is outlined in the Car Parking Strategy and Management Plan.



5. Traffic Impact Assessment

5.1 Traffic Generation

Traffic generation rates for the proposed development have been sourced from the Guide to Transport Impact Assessments (the Guide) 2024.

The person trips per dwelling for a high density residential development with high public transport accessibility is:

- **High Density Residential:** 0.66 person trips per dwelling in the AM peak
0.56 person trips per dwelling in the PM peak

Based on these rates, the development is expected to generate approximately 86 person trips in the AM peak and 73 person trips in the PM peak.

The Green Travel Plan, prepared by Stantec, assesses the existing mode share for residents living in Crows Nest commuting to work. Based on the existing mode share, the estimated trip generation for each of the travel modes are summarised in Table 6.

Table 6: Trip generation for each mode share

Travel Mode	Existing Split ¹	Development AM Trips	Development PM Trips
Car (as driver and passenger)	32%	28	23
Train	17%	15	12
Bus	24%	21	18
Walking	16%	14	12
Cycling	1%	1	1

¹ the total does not equate to 100% as the mode share data included those working from home or other (not stated)

Based on the table above, the development is estimated to generate 28 vehicle trips in the morning peak and 23 trips in the afternoon peak.

It is noted that the site is providing parking based on reduced rates, to reduce private ownership and promote use of public and active transport. As such, the development is unlikely to generate the total vehicle trips estimated for a development of this site, based on the Guide 2024 rate. In accordance with the parking requirements for a Category 1 high density residential development stipulated in the Guide 2024, a development of this size would require 89 car parking spaces. As the development is providing 55 car parking spaces, this represents approximately 62% of the potential car parking capacity the Guide 2024 considers appropriate for a development of this size. As such, a 38% reduction factor has been applied to the estimated vehicle trips above, resulting approximately 17 vehicle trips in the morning peak and 14 vehicles trips in the afternoon peak.

In accordance with the Guide 2024, when adopting the commercial (office) trip rates of 1.69 vehicle trips per 100m² GFA in the weekday morning peak and 1.20 vehicle trips per 100m² GFA in the weekday afternoon peak, the non-residential component of the development (approx. 360m² GFA) is estimated to generate approximately six vehicle trips in the morning peak hour and four vehicle trips in the afternoon peak hour.

However, considering the small nature of the non-residential component, the intention for it to be ancillary to the development and support surrounding land-uses (i.e. not intended to be a key attractor to the area), and all on-site parking spaces to be allocated to residents, the non-residential component of the development is expected to generate little to no vehicle traffic during the road network peak periods.

5.2 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- surrounding employment centres, retail centres and schools in relation to the site



- configuration of access points to the site.

Having consideration to the above, and based on the local knowledge of the area, it is appropriate to assume that majority of the traffic will approach and depart the site via Pacific Highway.

On departure, majority of the traffic are expected to enter Pacific Highway via the signalised intersection with Hume Street. There may be some minor volume of traffic travelling north via the local roads such as Willoughby Road.

On approach all vehicles will be required to enter the site via Clarke Lane. Considering that Clarke Lane is one-way westbound, towards Hume Street, vehicles will be required to approach the site via Willoughby Road, turn into Clarke Street and then turn left into Clarke Lane/ Hume Lane.

Further to the above, the inbound to outbound split in the morning peak is expected to be 20:80 and vice versa in the afternoon peak. This will result in approximately five vehicles exiting and one vehicle entering the morning peak and one vehicle exiting and two vehicles entering in the afternoon peak.

5.3 Traffic Impact

Given the minor additional traffic generation anticipated for the development (up to six vehicle trips in any peak hour), the development would have negligible impact on the surrounding road network and therefore no further traffic analysis is warranted.



6. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- The proposal includes an over station residential development, above Crows Nest Metro Station, otherwise known as 'Site B'. The development will comprise of 130 residential units.
- In accordance with the Consolidated Conditions of Consent for SSD-9579, the development is required to provide a maximum of 55 car parking spaces, including six accessible spaces and a maximum of two motorcycle spaces.
- The proposal includes 55 on-site car parking spaces, including six accessible spaces, across two levels of parking. As such, the development satisfies the requirements of the Consolidated Conditions of Consent for SSD-9579.
- The proposal includes 148 bicycle parking spaces which satisfies the North Sydney DCP 2013 requirements for bicycle parking.
- The proposal includes two ambulant DDA bathrooms with showers and four lockers which satisfies the North Sydney DCP 2013 requirements for EOTF.
- The North Sydney DCP 2013 also requires the development to provide a dedicated service delivery space, capable of accommodating at least one HRV or two MRVs. The site will be sharing the dedicated loading dock, located on the ground floor, which will be delivered as part of the Crows Nest Metro Station works. The intention is for the loading dock to accommodate the servicing needs of the Metro Station and the over station residential development.

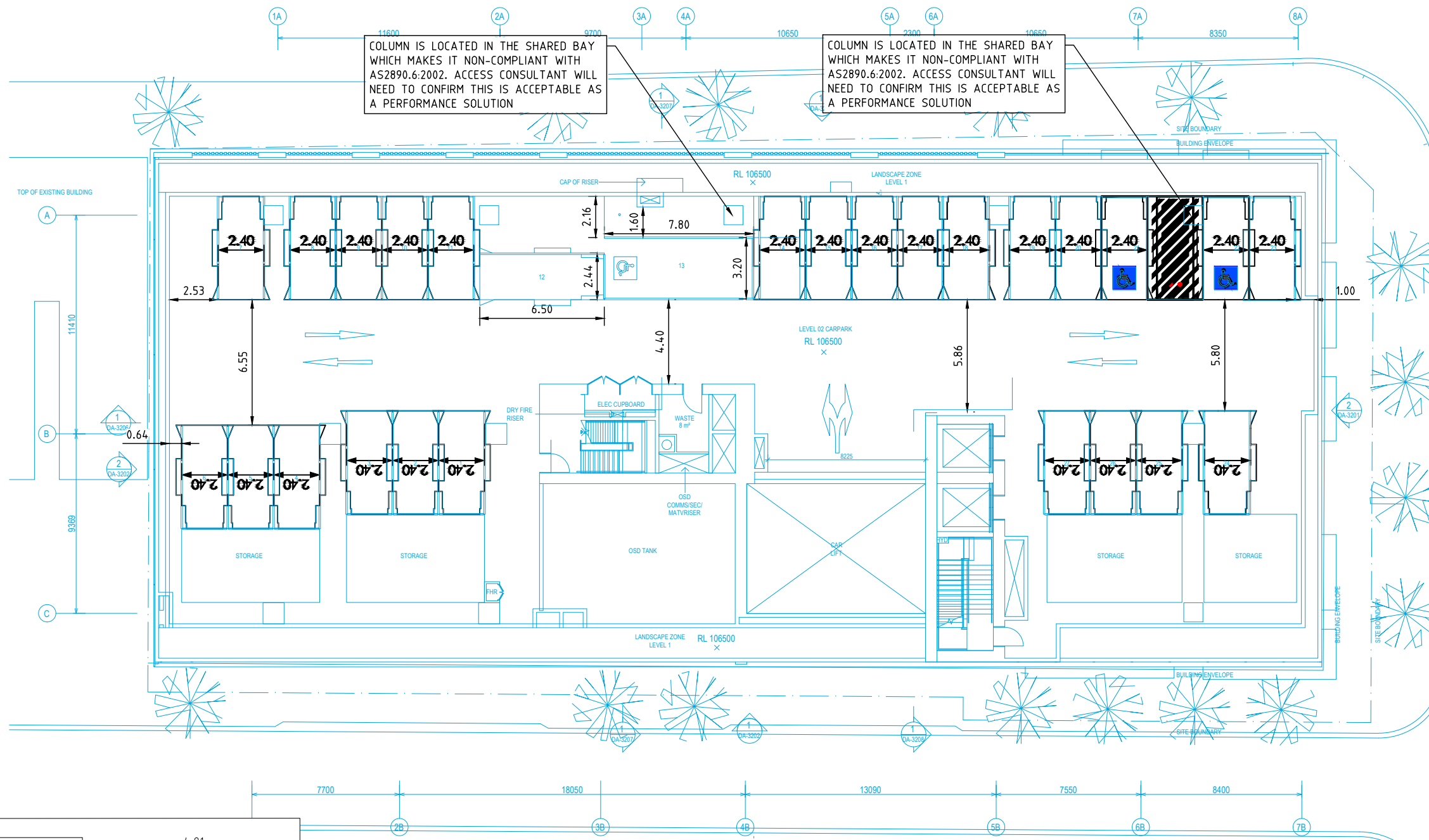
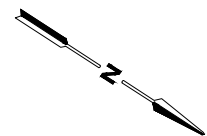
As per the OSD Enabling Report (SMCSWSCN-SMC-SCN-EN-REP-000001, dated 29 June 2021), the loading dock has been designed to accommodate two SRVs and one MRV simultaneously. The design also allows a 9.6 metre long waste vehicle to pull over onto the access driveway without obstructing through traffic along Clarke Lane.

The proposed provision is considered to be sufficient for the servicing requirement of Site B which will be limited to waste collection, removalist activities and minor maintenance activities which will require vans/ utes to access the loading dock.

- The site is expected to generate approximately 17 vehicle trips in the AM peak and 14 vehicle trips in the PM peak.
- The queuing analysis indicates that the 95th percentile queue for vehicles entering the site will be two vehicles (the 93rd percentile queue is one vehicle) which indicates that it will be unlikely that there will be a vehicle in the queue and impact the through movement along Clarke Lane. In the event that that a vehicle is required to queue, the swept path analysis indicates that a vehicle can wait along the Clarke Lane without obstructing through movement.
- Given the minor additional traffic generation, the development is expected to have negligible impact on the surrounding road network.



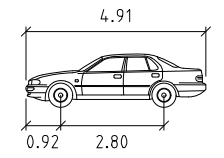
Appendix A. Design Review



- LEGEND
- BOUNDARY LINE
 - BUILDING SEPARATION
 - BUILDING ENVELOPE
 - OPERABLE LOUVRE OVER

SWEPT PATH KEY

- VEHICLE CENTRE LINE
 - VEHICLE TYRE PATH
 - VEHICLE BODY PATH
 - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



B85

Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 34.1

ARCHITECTURAL BASE IN BLUE
DRAWING DA-2205
REVISION A
BY WOODS BAGOT
DATED 15.03.2024



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P.OBMASCA

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S.HONG

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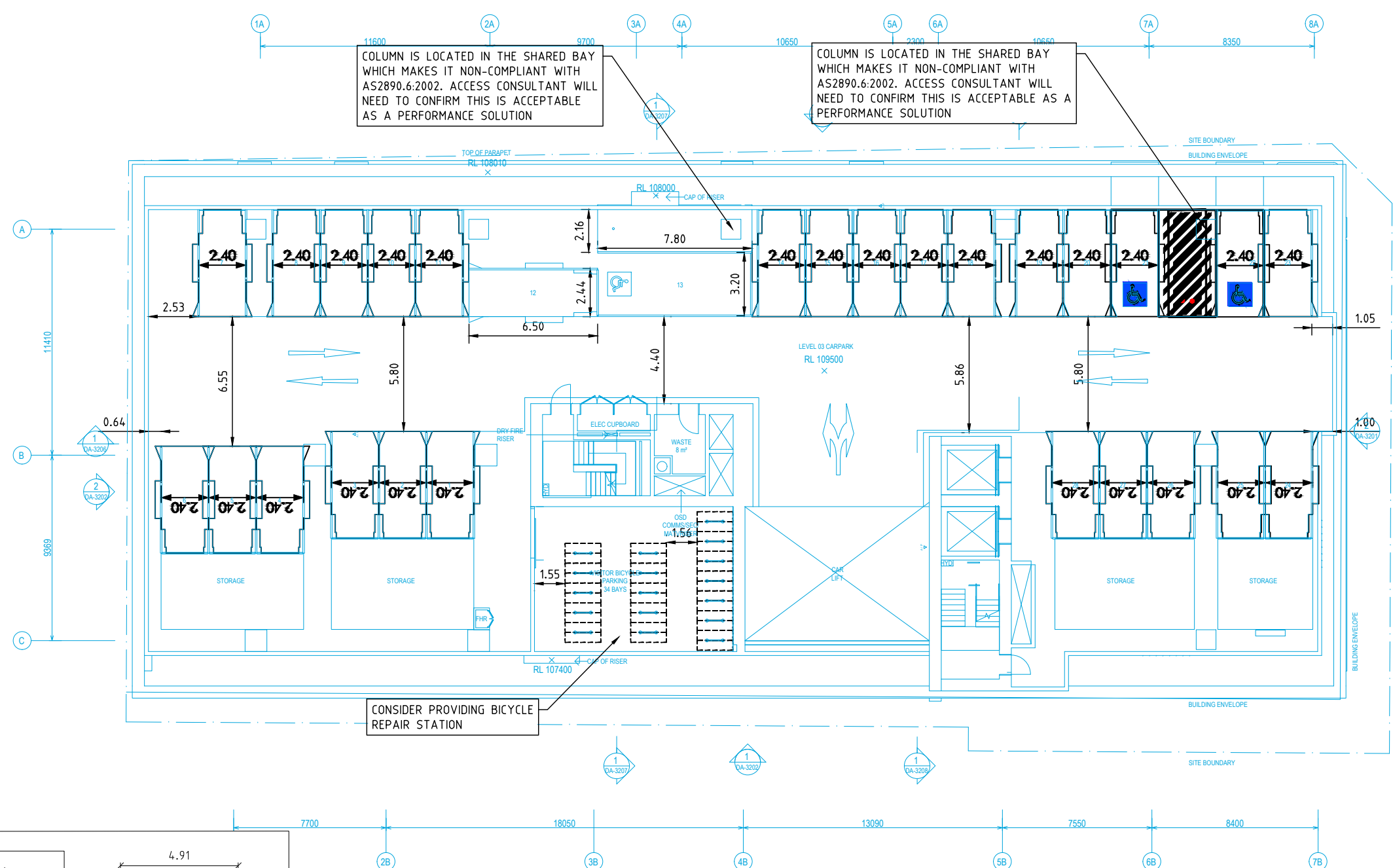
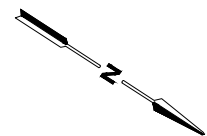
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BASEMENT 2**

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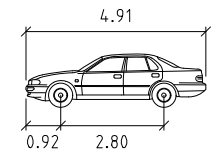
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SWEPT PATH KEY

- VEHICLE CENTRE LINE
 - VEHICLE TYRE PATH
 - VEHICLE BODY PATH
 - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



B85

Width	: 1.87	meters
Track	: 1.77	
Lock to Lock Time	: 6.0	
Steering Angle	: 34.1	

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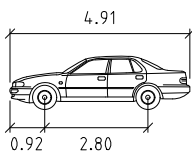
**CROWS NEST OSD - SITE B
BASEMENT 3**

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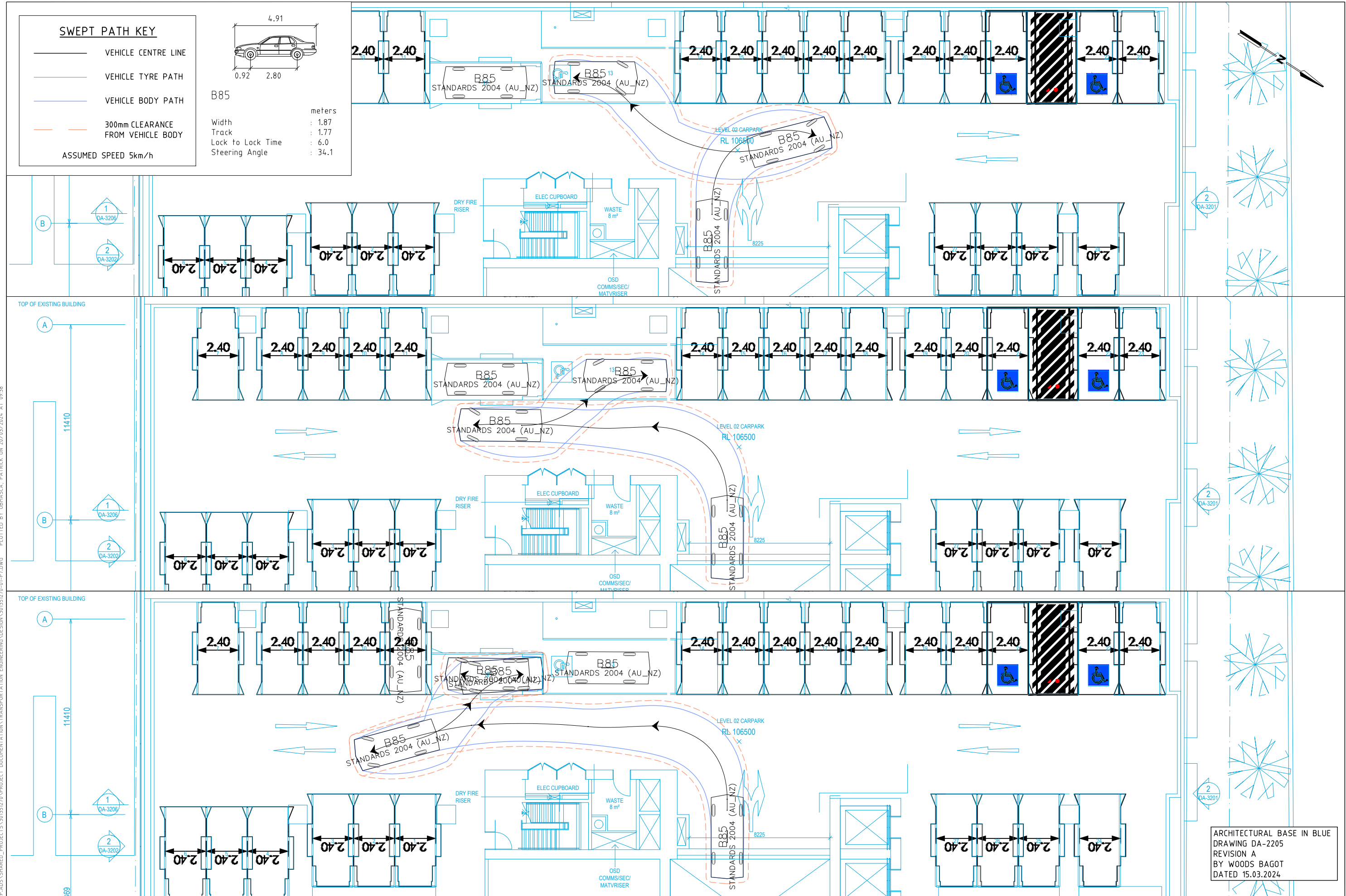
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-  VEHICLE CENTRE LINE
-  VEHICLE TYRE PATH
-  VEHICLE BODY PATH
-  300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



B85

Width : 1.87 meters
 Track : 1.77
 Lock to Lock Time : 6.0
 Steering Angle : 34.1



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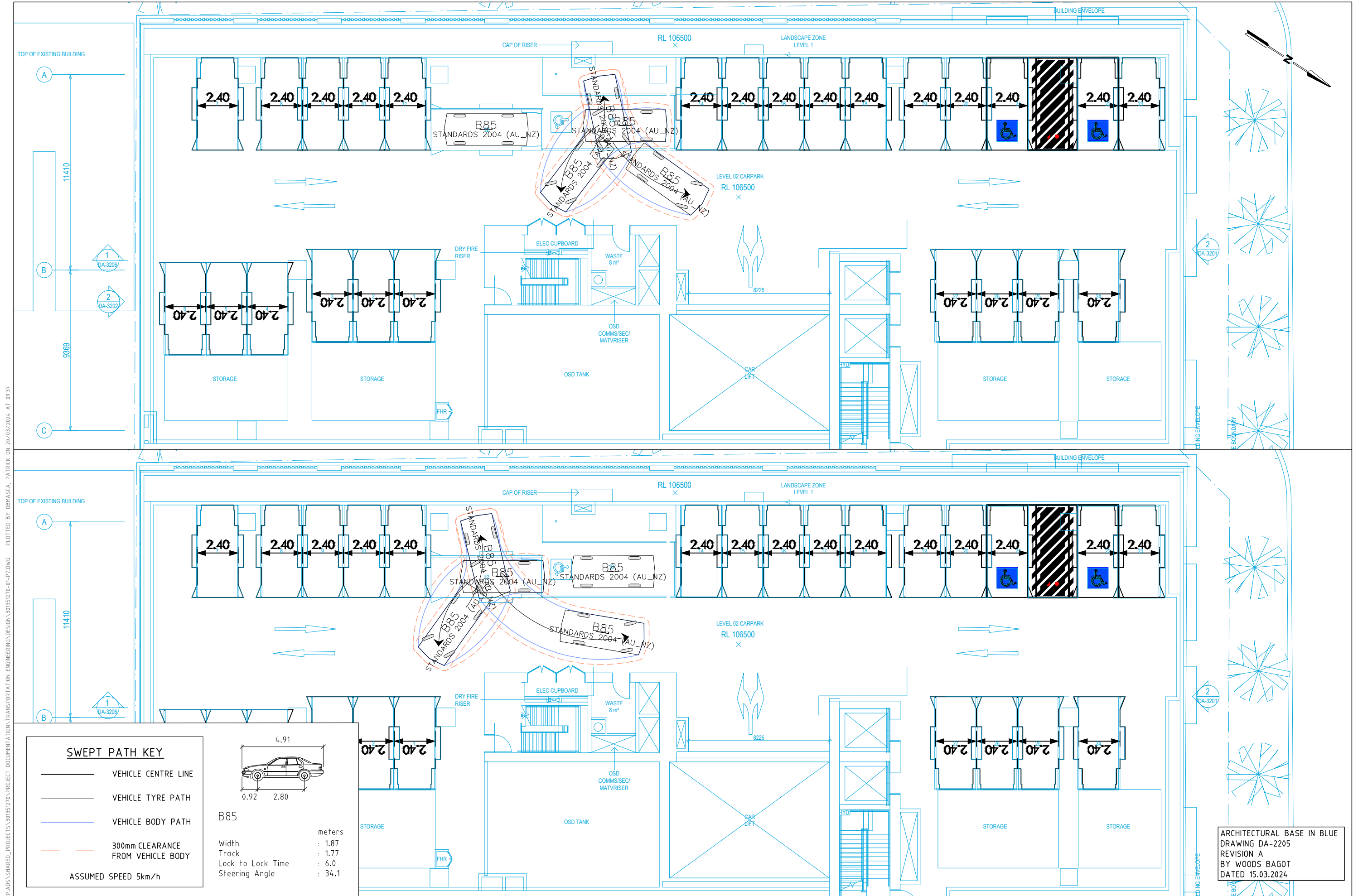
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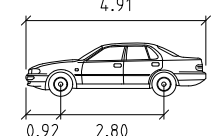


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SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



B85

Width : 1.87 meters

Track : 1.77

Lock to Lock Time : 6.0

Steering Angle : 34.1

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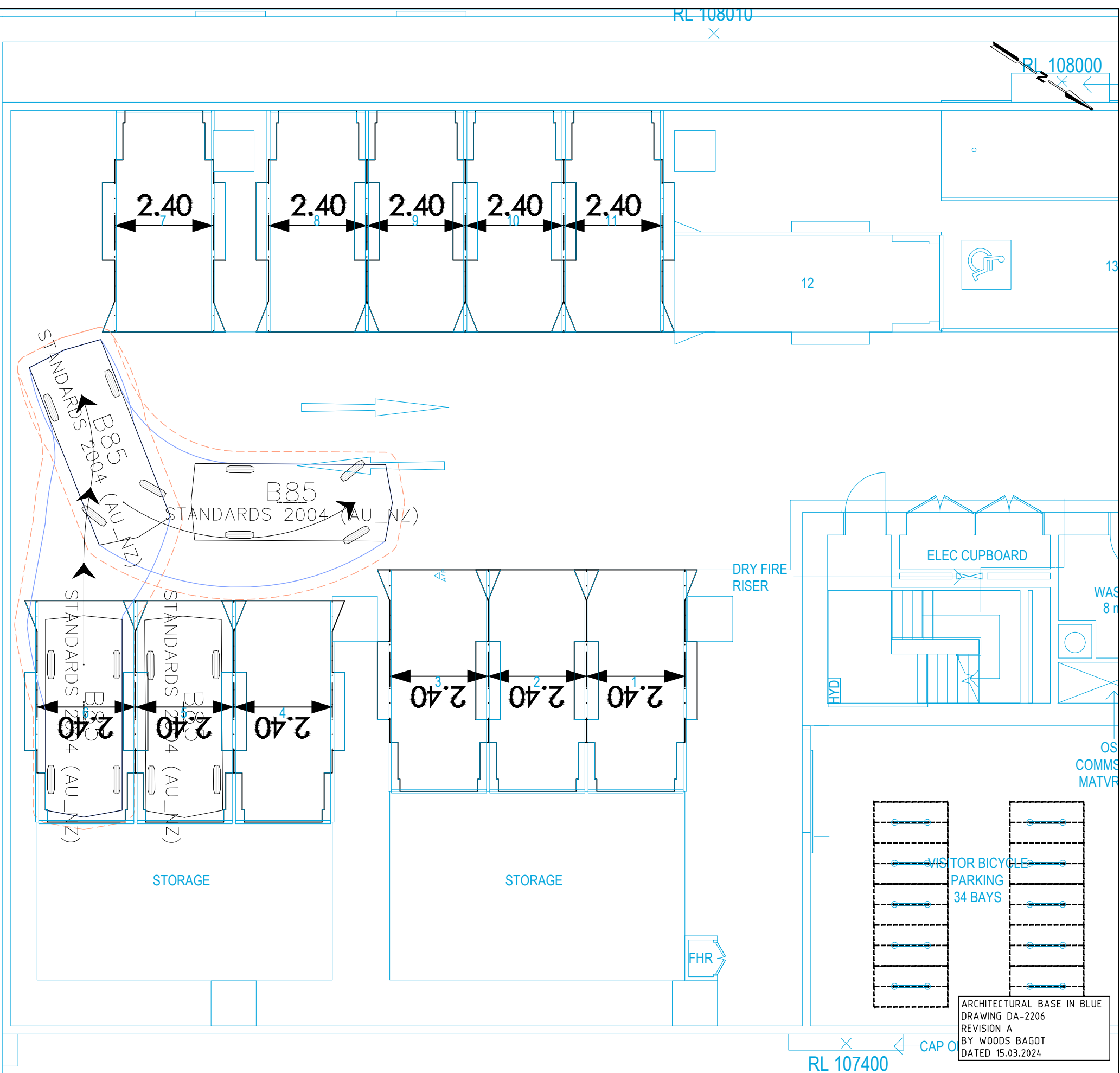
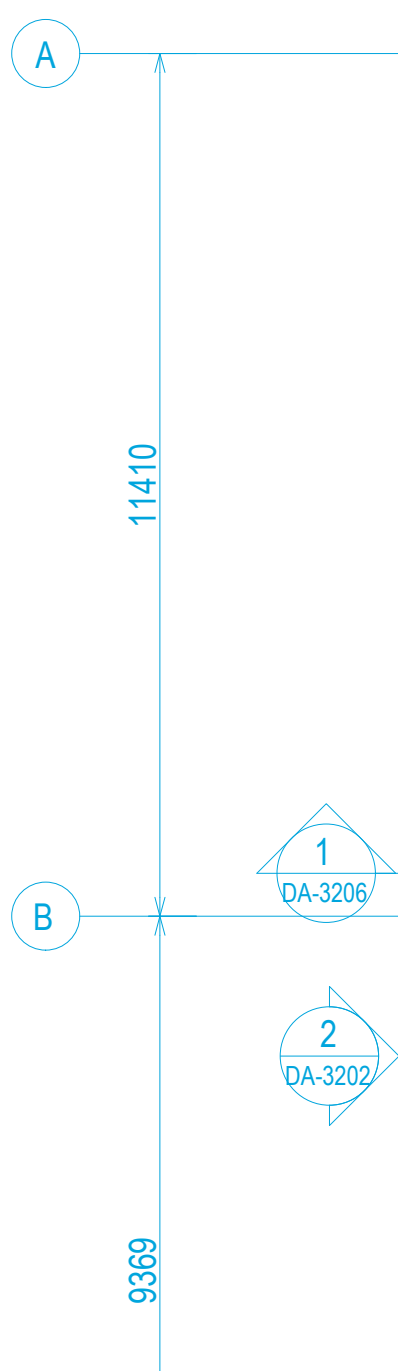
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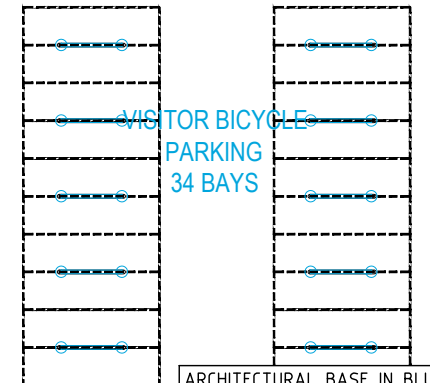
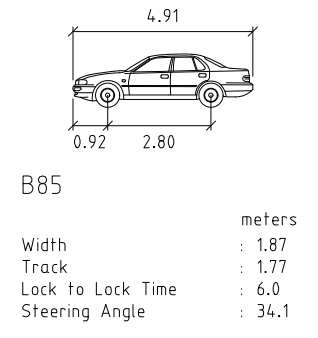
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SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



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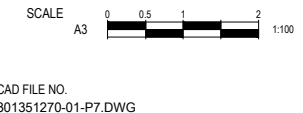
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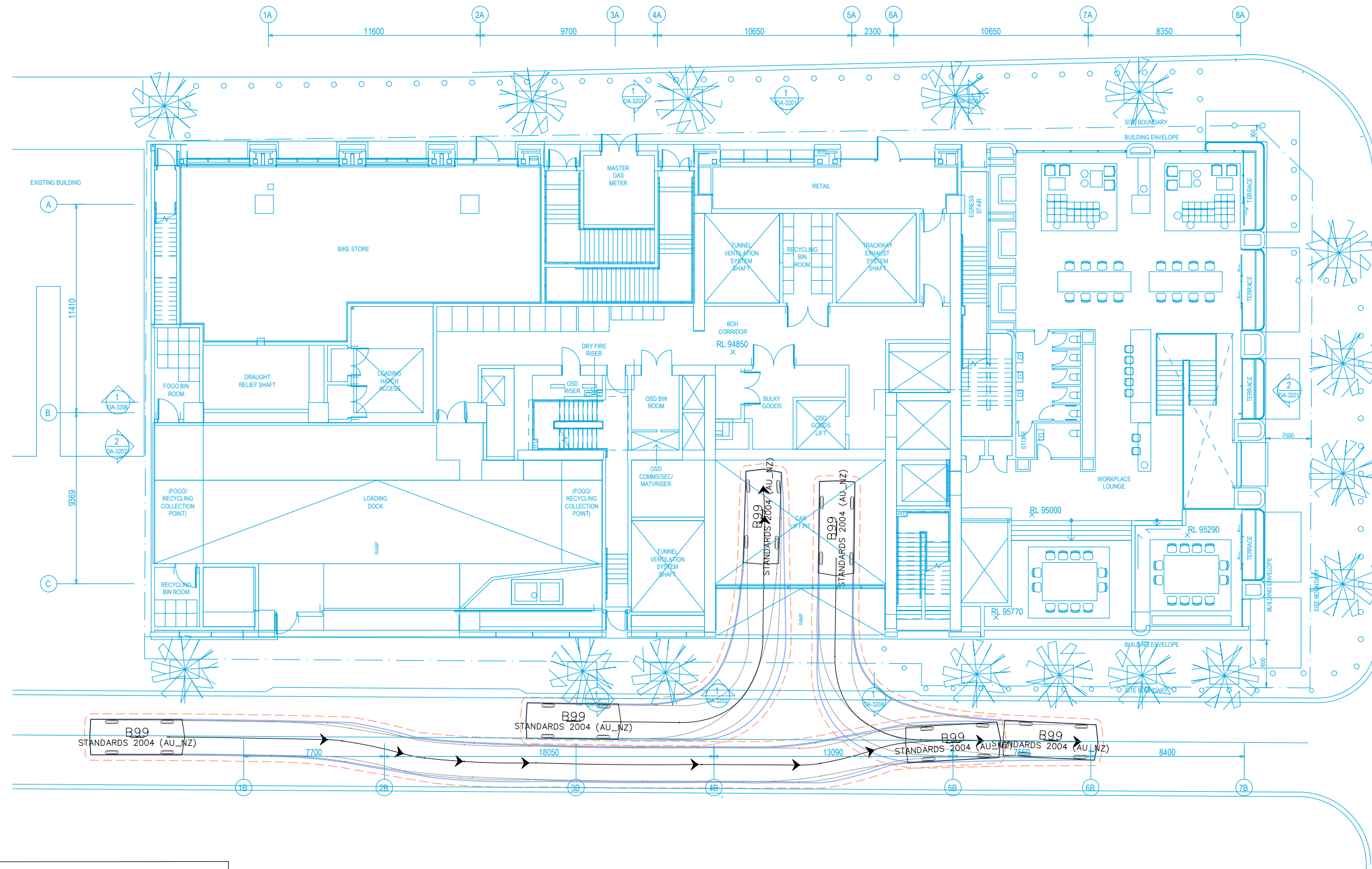
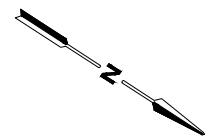
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BASEMENT 3**

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SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

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**CROWS NEST OSD - SITE B
 CLARKE LANE**

CAR PARK COMPLIANCE REVIEW

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