Central Transport Infrastructure Impact Assessment

Atlassian

Prepared for Avenor / 23 September 2020

191797

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Document History

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Contents

1.0 Introduction

TTW has been commissioned by Atlassian (the Applicant) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSD-10405 for a commercial and hotel development above the Former Inwards Parcel Shed at 8 – 10 Lee Street, Haymarket.

Specifically, this report addresses the following SEARs:

SEARs	Report Reference
19. Infrastructure	Section 6.0

This assessment has some overlap with the broader assessment required under the State Environmental Planning Policy (Infrastructure) 2007 (the infrastructure SEPP) which requires assessment of any development (irrespective of whether this is state significant or not) close to rail infrastructure.

2.0 State Environmental Planning Policy (Infrastructure) 2007

The infrastructure SEPP covers) consent for development on existing and proposed rail corridors. The clauses (paraphrased under the infrastructure SEPP relevant to Atlassian Central include:

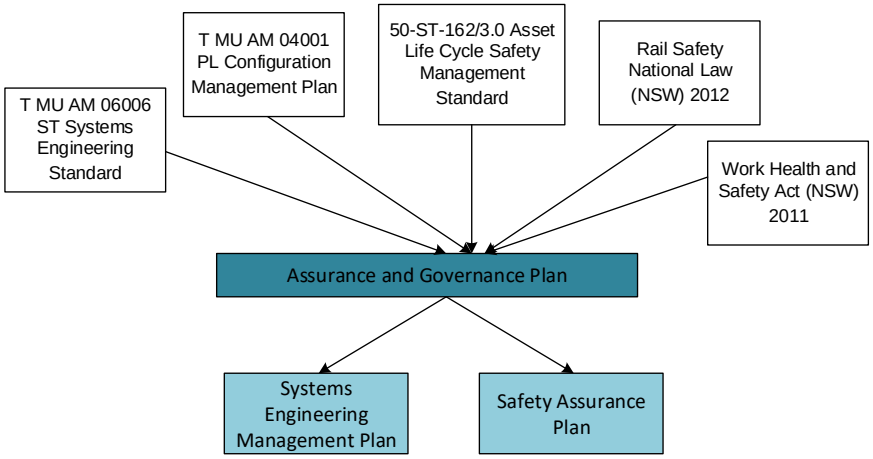
- Division 15, Subdivision 2, Section 85
    - This requires the consent authority to notify the relevant rail authority and take into consideration its response where:
        - The development is likely to have an adverse effect on rail safety.
        - The development involves a metal finish on the structure and rail corridor is electric.
        - The development involves the use of a crane in air space over the rail corridor.
        - The development is located within 5 metres of an exposed overhead electricity power line used for rail.
- Division 15, Subdivision 2, Section 85
    - This requires concurrent consent between the consent authority (eg Department of Planning and Environment) and the rail authority where an excavation greater than 2m is within 25m of a rail corridor (measured horizontally).
    - When determining concurrent consent, the rail authority must consider:
        - The potential effects of the development on i) the safety or structural integrity of existing or proposed rail infrastructure and ii) on the safe and effective operation of existing or proposed rail infrastructure.
        - The measures proposed to minimise these potential effects.
- Division 15, Subdivision 2, Section 88
    - This requires concurrent consent between the consent authority (eg Department of Planning and Environment) and the rail authority where development is proposed on either zone A or zone B of an interim rail corridor. Refer Figure 4.
    - When determining concurrent consent, the rail authority must consider:
        - The practicability and cost of carrying out rail expansion projects on the land in the future
        - The structural integrity or safety of, or ability to operate, such a project.
        - The land acquisition costs and the costs of construction, operation or maintenance of such a project.

For completeness, and where possible, this report will seek to address both the SEARS and infrastructure SEPP requirements.

3.0 ASA Compliance and AEO Process

The Atlassian Building Project, as part of the greater Central Precinct Renewal project, is required to comply with ASA Standards and due to the interface with the rail corridor is required to follow an AEO process throughout the project lifecycle.

The Assurance structure adopted by the project in order to deliver a compliant project is as shown below:



The Assurance and Governance of the project, in accordance with the AEO Requirements set out in the TfNSW standards - Configuration Management Plan (T-MU-AM-04001-PL V6.0), Systems Engineering Standard (T-MU-AM-06006-ST V2.0) and Asset Lifecycle Safety Management Standard (50-ST-162/3.0) is documented within the Project Assurance and Governance Plan (ABC-AGP-PLN-0001 V6.0).

This plan sets out the governance arrangement and assurance principles that will be applied throughout the project lifecycle, further details pertaining to the conduct and assurance of systems engineering principles and safety assurance are set out in the project Systems Engineering Management Plan ABC-SEMP-PLN-0001 V6.0 (SEMP) and Safety Assurance Plan ABC-SAP-PLN-0001 V6.0 (SAP) respectively.

The compliance of the project with ASA standards is carried out at an individual design discipline level. A list of the ASA Standards applied to the activities conducted by TTW during the design of the Structure is presented below.

Discipline	Sub Discipline	Document Number	Document Title	Revision
Civil	General Standard	ESC 001	Civil System	4.7
Civil	Structures Standards	ESC 300	Structures System	2.3
Civil	Structures Standards	ESC 302	Structures Defect Limits	2.1
Civil	Structures Standards	ESC 340	Tunnels	2.3
Civil	Structures Standards	T HR CI 12002 ST	Durability Requirements for Civil Infrastructure	1.0

Civil	Structures Standards	T HR CI 12008 ST	Capacity Assessment of Underbridges	2
Civil	Structures Standards	T HR CI 12020 ST	Underbridges	1
Civil	Structures Standards	T HR CI 12027 ST	Design of Transoms	1
Civil	Structures Standards	T HR CI 12030 ST	Overbridges and Footbridges	2
Civil	Structures Standards	T HR CI 12040 ST	Overhead Wiring Structures and Signal Gantries	1
Civil	Structures Standards	T HR CI 12051 ST	Development Near Rail Tunnels	2
Civil	Structures Standards	T HR CI 12060 ST	Retaining Walls	2
Civil	Structures Standards	T HR CI 12065 ST	Station Platforms	2
Civil	Structures Standards	T HR CI 12070 ST	Miscellaneous Structures	2
Civil	Structures Standards	T HR CI 12071 ST	Guard Rails	1
Civil	Structures Standards	T HR CI 12072 ST	Track Slabs	2
Civil	Structures Standards	T HR CI 12073 ST	Safe Places	1
Civil	Structures Standards	T HR CI 12075 ST	Airspace Developments	1
Civil	Structures Standards	T HR CI 12080 ST	External Developments	1
Civil	Structures Standards	T HR CI 12500 ST	Civil Infrastructure Design Standards	1

4.0 Site

4.1 The Site

The Site is known as 8-10 Lee Street, Haymarket. It is an irregular shaped allotment. The allotment has a small street frontage to Lee Street, however this frontage is limited to the width of the access handle. The Site comprises multiple parcels of land which exist at various stratums. All the lots are in the freehold ownership of Transport for NSW, with different leasing arrangements:

- Lot 116 in DP 1078271: YHA is currently the long-term leaseholder of the Site which covers the areas shown in blue below.
- Lot 117 in DP 1078271: This is currently in the ownership of TNSW and the applicant is seeking the transfer of the leasehold on this land to provide for an optimised basement and servicing outcome for the Site.
- Lot 118 in DP 1078271: This is currently in the ownership of TNSW and the applicant is seeking the transfer of the leasehold for part of the air-rights above part of this allotment to allow for an optimised building envelope for the project. The proposal also uses a part of Lot 118 in DP 1078271 within Ambulance Avenue for Day 1 vehicle access and services.
- Lot 13 in DP 1062447: This is currently in the ownership of TNSW but TOGA (who hold the lease for the Adina Hotel) have a long-term lease of this space in the lower ground area.

The Site has an area of approximately 3,485m2 when measured at the Upper Ground Level. Figure 1 shows the site location.

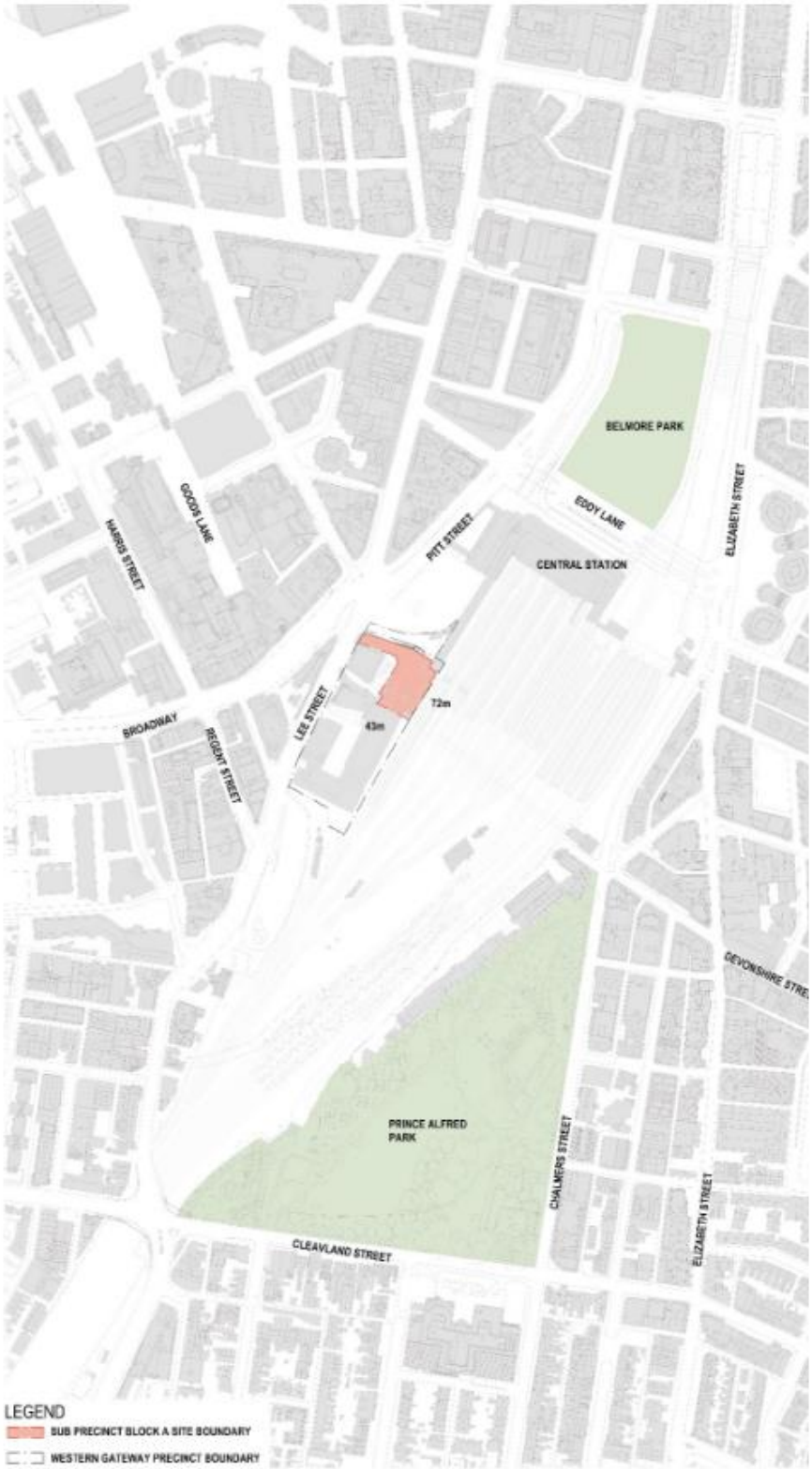


Image Source: BVN / SHoP

Figure 1: Site location

4.2 Surrounding Context

The Site is directly adjacent to the Western Wing Extension of Central Station, and forms part of the 'Western Gateway Sub-precinct' of the Central Railway Station lands. It is situated between the existing CountryLink and Intercity railway platforms to the east and the Adina Hotel (former Parcel Post Office) to the west.

Existing vehicle access to the Site is via Lee Street, however the Lee Street frontage of the Site is only the width of the access handle. Current improvements on the Site include the Parcels Shed, which operated in association with the former Parcels Post Office (now the Adina Hotel). The Site is currently used as the Railway Square YHA. The Site also includes the western entryway to the Devonshire Street Pedestrian, which runs east-west through Central Station under the existing railway lines.

The Site is situated in one of the most well-connected locations in Sydney. It is directly adjacent to Central Station Railway which provides rail connections across metropolitan Sydney, as well as regional and interstate connections and a direct rail link to Sydney Airport. The Site is also within close proximity to several educational institutes and is a city fringe location which provides access to key support services.

Central Railway Station is currently undergoing rapid transformation to allow for integration of rail, metro and light rail transport infrastructure. This will elevate the role of Central Station not only for transport but also enhance opportunities for urban renewal and revitalisation of the surrounding precinct. This is one of the key drivers for the identification of the Central SSP and the Western Gateway Sub-precinct to accommodate a new innovation and technology precinct.

The proximity of the Western Gateway Sub-precinct to the city, while still being located outside the core Sydney CBD, provides opportunity for it to evolve to attract technology and innovation companies. It has access to all required services while being sufficiently separate to the CBD to establish a distinct technology industry ecosystem. Its CBD fringe location will provide affordable commercial rents which will support Startups and entrepreneurs which are a key component of an innovation precinct.

4.3 Project Description

The proposed SSDA will facilitate the development of a new mixed-use development comprising 'tourist and visitor accommodation' (in the form of a 'backpackers') and commercial office space within the tower form. Retail, lobby and food and drink premises at the Lower Ground level and Upper Ground level.

Atlassian Central at 8-10 Lee Street will be the new gateway development at Central Station which will anchor the new Technology Precinct proposed by the NSW Government. The new building will be purpose-built to accommodate the Atlassian Headquarters, a new TfNSW Pedestrian Link Zone, and the new Railway Square YHA backpacker's accommodation, in addition to commercial floorspace to support Tech Start-ups.

The new development is to be built over the existing heritage former Inwards Parcels Shed (the Parcels Shed) located on the western boundary of Central Station with the Adina hotel to the west. The works includes a 38-storey mixed-use tower with basement loading dock facilities and EOT facilities accessed off Lee Street, 2 storey lobby utilising the Parcels Shed building, lower ground and upper ground retail, YHA hostel and commercial tower with staff amenities to the mid-level and roof top areas and a pedestrian Link Zone works for TfNSW.

The building design has been conceived to support the delivery of a site plan designed to connect with future developments to both the south and east and integrate with a cohesive public realm for the broader Sydney community in accordance with NSW government strategic planning.

The tower design is a demonstration project for Atlassian, representing their commitment to environmental sustainability and contemporary workplace settings through tower form and construction systems along with a set of emblematic outdoor workplaces stacked in the tower form.

The existing Parcels Shed will be adaptively re-used in accordance with best practice heritage process and form the upper level of a 2-storey entry volume that connects visually with the 2 level Link Zone. Over the roof of the Parcels Shed, a new privately owned publicly assessible landscaped area will be created as the first part of a new upper level public realm that may extend to connect to a future Central Station concourse or future Over Station Development.

The proposed mixed use tower directly adjoins a live rail environment to the east and public domain to the north, west and south. These works will consider these rail environments and have been designed to ensure that all TfNSW external development standards are achieved. This ensures there is no impact to the operation or safety of these TfNSW assets.

Interfaces from the overall site and especially the State works Link Zone have been designed in consultation with the adjoining stakeholders. These stakeholders include TfNSW to the north and south, Toga and the Adina Hotel operator to the west and the Dexus Fraser's site to the south. Connections via the Link Zone, through the basements, and off the proposed new Link Zone dive ramp will be designed to enable existing and future developments to function in both the day 1 scenario and end state when all developers have completed their works.

The overall project aspiration is to create a world class tech precinct with effective pedestrian links through the Atlassian site to the Central Station western forecourt to Central Walk west and adjoining stakeholder's sites.

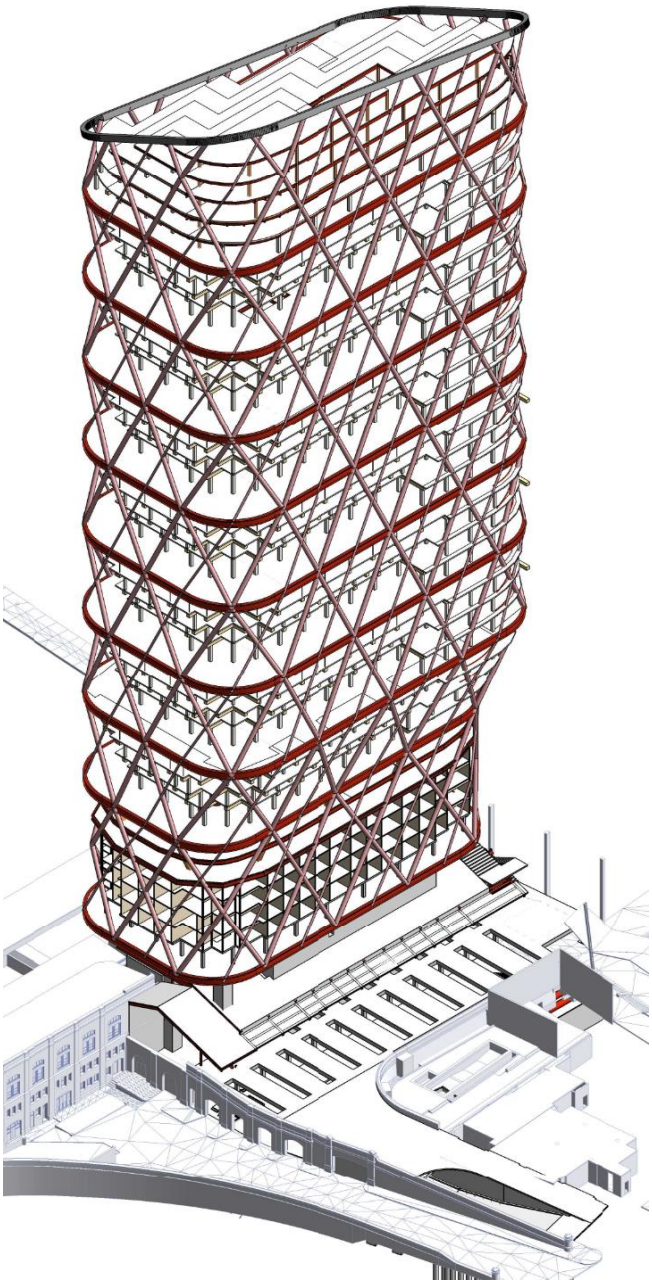


Figure 2: Proposed development

4.4 Ground Conditions

As part of the concept design, Douglas Partners has prepared a Geotechnical report based on site investigations which included 9 boreholes, and 3 standpipes for ground water level assessment.

The rock immediately under the existing heritage structure is a class IV fine grained sandstone. Excavation of the proposed basement will reach class I medium grained sandstone

The water table has been estimated at approximately RL 14m which is the current ground level immediately under the existing heritage structure.

5.0 Existing Rail Corridors and Existing Transport Assets

The impact that the proposed development will have on the existing rail corridor immediately adjacent during both construction and operation is evaluated in terms of safety and structural integrity.

Similarly, the impact that the rail corridor will have on the proposed development is also assessed in terms safety and structural integrity under construction and operation of the development.

5.1 Impact on rail corridor and existing assets

5.1.1 During construction

The existing rail corridor, specifically platform 01, will be immediately adjacent the Eastern shoring wall for the site, which will be propped during the excavation sequence. During construction, deflection of the shoring wall and resulting settlement behind the wall will be carefully monitored, to ensure all movement is within the designed tolerance limits, as outlined in the relevant ASA standards. These movements will correspond directly to the affected track speed, platform 01, currently signposted as 40km/hr. In the permanent condition the constructed basement box and central structural core will provide the load path for any lateral loads to be transferred to the foundations and surrounding rock strata.

Ground water changes resulting from construction will be monitored and pumped out of the site to ensure structural collapse or erosion of any shoring wall is prevented. Flow rates of ground water are to be based on the Geotechnical Engineers investigation / standpipe monitoring, in conjunction with on-site monitoring. Loss of fines behind the shoring walls will be prevented through use of drainage points / well points, from which excess water is removed.

ASA external development requirements will be met and communicated through TNAC gate submissions. Consultation with TfNSW representatives is ongoing. Risks are reduced to the level of so far as is reasonably practical. Temporary ground anchors which extend beneath the rail corridor are subject to a minimum design life of 10 years, in accordance with ASA guidelines, with a 3D finite element analysis conducted for stressing, temporary, and destressing states during construction. Upon destressing, the ground anchors will be grout filled and left in place to avoid any cavitation within subsoil layers being supported by the shoring wall.

Safety during construction is outlined in the construction management plan by Built Obayashi Joint Venture (BOJV). In addition to this, as per NSW legislation, engagement in Safety in Design is a requirement for all consultants.

Fire and associated risks in the southern and western baggage tunnels during construction will be managed by the contractor. Mitigation measures shall be put in place so far is reasonably practical (SFAIRP).

Foundation forces and resultant settlement effects on adjacent Transport assets will be assessed in accordance with agreed criteria (such as the Burland scale)

Construction noise will be managed by the contractor in line with City of Sydney code of practice.

Vibration during construction will be monitored and limits imposed to meet the NSW Environmental Protection Agency Vibration Guideline.

5.1.2 In operation

Ground water changes in the proposed / permanent condition will be assessed by Douglas Partners but expected to have minimal impact on the surrounding TfNSW assets and rail corridor because of the high strength sandstone. The proposed basement levels are to be drained with an application to be made to the National Access Resource Authority (NRAR). As the sandstone layer occurs close to the founding level of the existing structure, we do not expect any significant changes or settlement to occur as a result of the development. These estimates are based on Geotechnical investigation and standpipe monitoring.

Fire borne risks associated with structural elements will be accounted for during the design phase, following coordination and incorporation of recommendations from the Fire Engineering consultant. Where possible, risks will be eliminated in the proposed developed / permanent condition, and where not possible risks will be reduced to the level SFAIRP. All spaces open to the public will be fully sprinklered and appropriately ventilated to reduce the level of risk posed to all land and assets adjacent to or operated by TfNSW.

Fire protection in the baggage tunnels in the permanent condition will be subject to the NCC and fire engineering assessment. Risks will be reduced SFAIRP.

5.2 Impact on proposed development

5.2.1 During construction

All moving of materials and drainage lifts will be controlled and monitored by BOJV. Refer to the Construction Management Plan.

Due to the proximity of the construction works to the live rail operating constraints, all efforts are to be taken during operation of a construction project to minimise risk of egress into the rail corridor. Site access for vehicles and pedestrians related to or involved in works will be controlled and directed with clear signage and fencing / hoarding. So far as is reasonably practical, platform 01 and adjacent areas within the rail corridor will be protected using appropriate hoarding and upkeep of all work areas.

A risk assessment for rail impact due to derailment has been carried out for the project for the following scenarios: current condition, more trains more services (MTMS), and future development condition (central precinct renewal program – CPRP). During construction, this has been assessed to be similar to the current condition so far as the risk for damage due to derailment will not change or be affected by the proposed development.

5.2.2 In operation

A risk assessment for rail impact due to derailment has been carried out for the project for the following scenarios: current condition, more trains more services (MTMS), and future development condition (central precinct renewal program – CPRP). In operation there will potentially be two separate conditions which will change the risk on the proposed development from the current condition – MTMS and CPRP. MTMS will only change the frequency and quantum of the trains not the track speeds, however CPRP does have the potential to change the frequency, quantum of trains, track speeds, and arrangement of the rails / platforms. The results of the risk assessment have shown the worst case for risk of collision from a derailed train to be very small (1 in a 33,000-year event). The risk of derailment in any condition will not be increased as a direct result of the proposed development. The risk of collision between a derailed carriage with the proposed development has been minimised through the inclusion of a deflection wall in accordance with AS 5100, and all structure adjacent to the rail corridor designed to limit damage in the event of a collision in accordance with AS 5100.

Train vibrations and their impact on the proposed development will be assessed. Mitigation strategies will be employed if required such as Isolation and damping of foundations.

Train noise will be assessed by the acoustics engineer, and the façade design and detailing adjusted accordingly. All operable louvres are located on the opposite side to the rail yard.

6.0 Future Infrastructure

The CBD Rail Link and the CBD Metro corridors are recognised in the infrastructure SEPP and, although the tunnels are unlikely to both occur, assessment of both is required.

The CBDRL is a future tunnel alignment developed in 2007 while the CBD Metro is a tunnel alignment first developed in 2007 and then again in 2012.

6.1 CBD Rail Link and CBD Metro 2007

The CBD Rail Link and CBD Metro 2007 is shown in Figure 3.

Based on prior experience it is TTW's understanding the key issues that need to be addressed as part of the development are:

a) Foundation forces

b) Construction vibrations

c) Vibrations from the rail corridor

d) Electrolysis, stray currents, Electromagnetic fields

e) Noise

f) Maintenance and access

It is anticipated that these aspects of the design will be addressed as broadly outlined below.

a) **Foundation Forces**. The proposed foundation scheme for the new tower relies on shallow pad foundations. The piles will be located outside the second reserve. As the design develops, rock modelling will be able to be used to demonstrate the impact that the building will have on the future Metro.

b) **Construction Vibrations**. The rail tunnel will not exist during construction of the new building. During construction of the rail tunnel, the building can be assessed for any ground borne vibrations. It is not anticipated that vibration of movement during tunnelling will impact the proposed development.

c) **Vibrations from the rail corridor**. There are no uses proposed within the new structure which will make it susceptible to ground borne vibration from the operational rail tunnel. Detailed analysis will be carried out during design to confirm the impacts of the operational tunnel. The building is not proposed to be isolated as part of the overall design.

d) **Electrolysis and stray currents**. The use of DC can have an impact on buried structures and may lead to an increased risk of corrosion. This will be assessed by specialist review.

e) **Noise**. Due to the depth of the tunnel, noise is unlikely to be an issue for the new structure. Low frequency sound will be required to be considered as part of the design in a similar means to the vibration assessment.

f) **Maintenance and Access**. Due to the proximity to the reserve zones, access for maintenance and emergency works to the tunnel may need to be provided. The structural design will allow for this option if required in the future.

Figure 3: CBD rail link corridor

There are no overlaps with the first reserve, and some lightly loaded piles (supporting a driveway across a heritage stormwater drain) that extend below the second reserve, as shown in Figure 4.

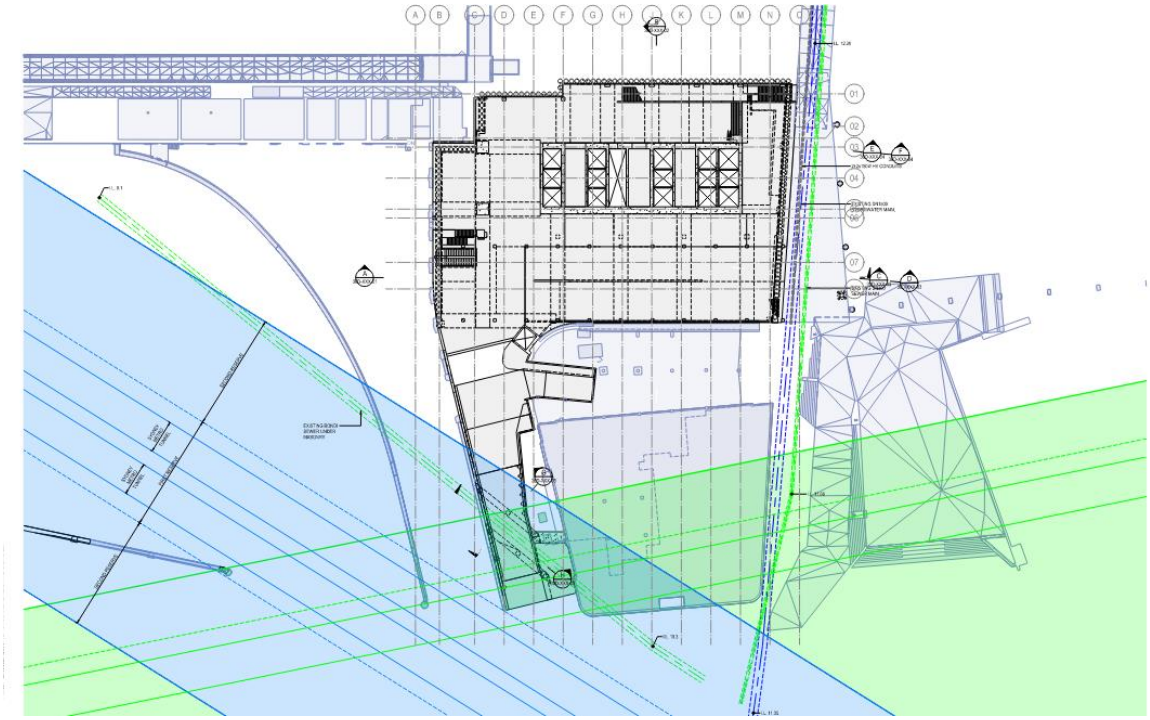


Figure 4: CBDRL alignment and overlap with Atlassian Central development

6.2 CBD Metro

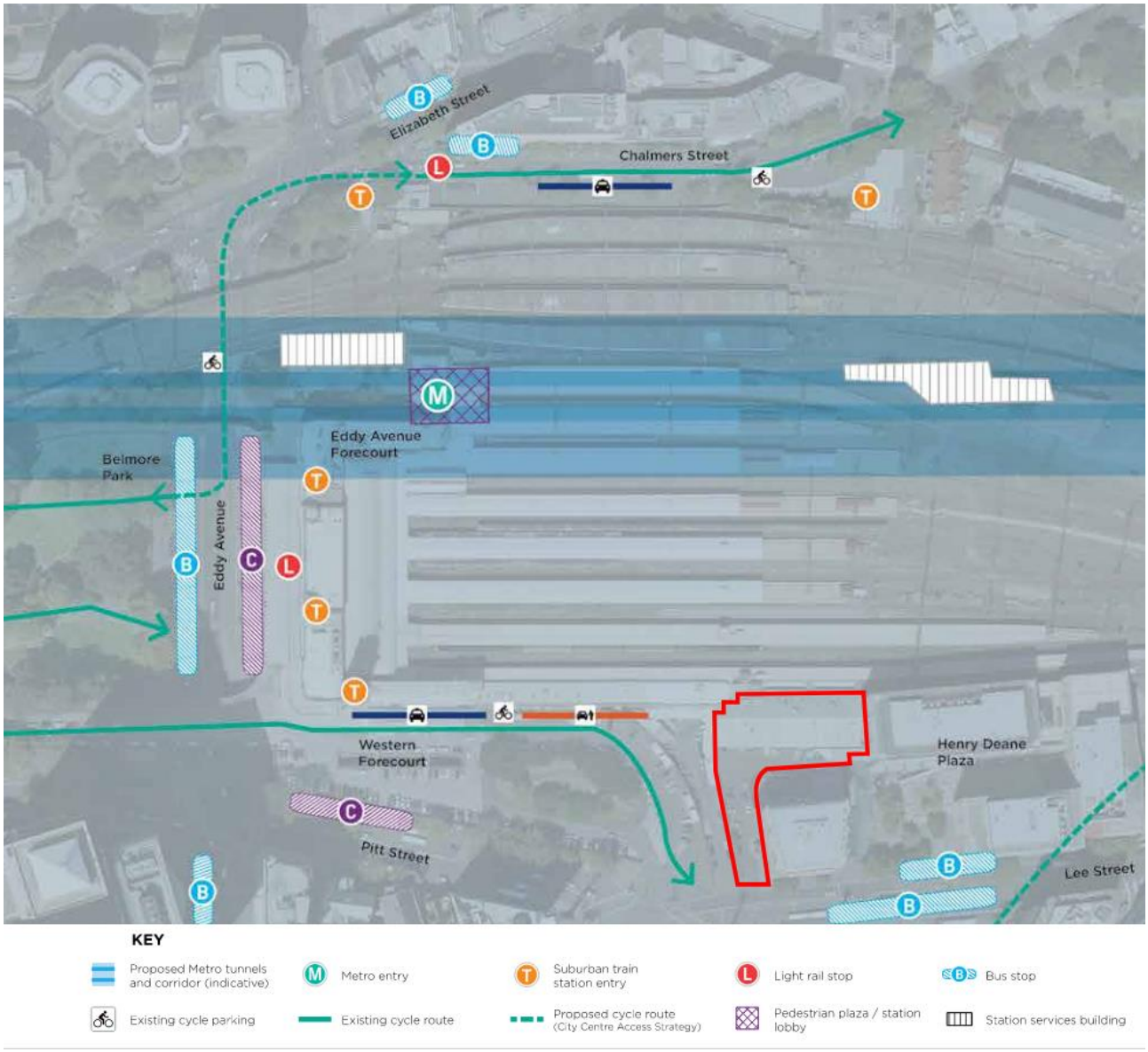


Figure 5: CBD Metro corridor

The CBD Metro alignment is shown in Figure 5, an extract from the 2016 Environmental Impact Statement Summary produced by Sydney Metro. The metro is approximately 100m from the development shown outlined in red.

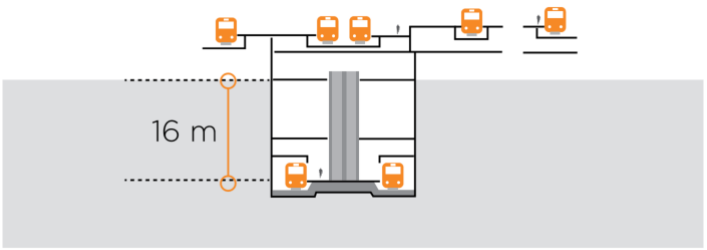


Figure 6: CBD metro station depth

Impacts on the Metro rail corridor are assessed in accordance with the Technical guidelines provided by Sydney Metro and Transport for NSW titled, document number "NWRLSRT-PBA-SRT-TU-REP-000008".

The technical guidelines states "Any construction that is located outside these protection reserves, but still has the potential to cause construction-induced groundwater drawdown and vibration that will affect underground metro infrastructure are considered development that falls within the scope of this document."

Because of the strength of the rock, and because the Metro sits well outside the zone of influence of the proposed development foundations, only the following issues are proposed as being relevant:

a) Groundwater contamination during construction

b) Groundwater drawdown

c) Noise

It is anticipated that these aspects of the design will be addressed as broadly outlined below.

a) **Groundwater contamination during construction**. This will be addressed in the construction management plan

b) **Groundwater drawdown**. Drawdown in the construction and operational phases will be assessed by Douglas Partners. Due to the high strength of the rock, it is unlikely a drop in the water table will cause instabilities. There may be a requirement to check hydrostatic pressures on the Metro retaining walls (if undrained) are not changed unsymmetrically.

c) **Noise**. Due to the depth of the tunnel, noise is unlikely to be an issue for the new structure. Low frequency sound will be required to be considered as part of the design in a similar means to the vibration assessment.

6.3 Other future infrastructure

While no other future infrastructure plans have been communicated to TTW outside those described in sections 6.1 and 6.2, TTW is aware that future developments may occur around the Atlassian Central development. The following issues have been considered;

a) Temporary anchors will be destressed and grout filled once the permanent retention system is in place. These can be cut and removed if and when excavations adjacent occur.

b) Lateral stability does not rely on the retention system, and the building has been designed to take all lateral loads via the core and into the ground below.

c) Ground water drawdown will have negligible effect on surrounding ground settlements because the depth of the water table is in medium strength sandstone and the water has little effect on the sandstone.

7.0 Summary

Based on the design undertaken at present, previous discussions held with Mecon and the technical guidelines provided, the design team understands the design constraints associated with the existing and future rail corridors. Our preliminary investigation suggests that the construction of the building is unlikely to have a negative impact on the future transport infrastructure and that the design of the proposed structure will be able to proceed without significant changes to the overall concept.

Further design is required to demonstrate the following impacts and issues are addressed:

- Foundation forces
- Construction vibrations
- Vibrations from the rail corridor
- Electrolysis, stray currents, Electromagnetic fields
- Noise
- Maintenance and access

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