

## 4. DESCRIPTION OF DESIGN OPTIONS

### 4.1 OPTION C – FULL STATION REDEVELOPMENT

#### 4.1.1 OVERALL DESCRIPTION

In this option, long term planning needs for the station upgrade, satisfaction of the user requirements, improved safety and security have been given the priority rather than impact on overhead wiring and heritage buildings Figure 4.1 and Figure 4.2.

Refer Appendix 3 for Rail Operational, Interface and Development areas.

#### *Easy Access*

- Easy access to all the surface platforms is provided through the lifts located on the new central concourse. The new lifts are located in the centre of the new concourse and allow for sufficient circulation space on the concourse as well as the required clearance on the platforms.
- Access to the Illawarra relief platforms 11/12 is in two stages. From the central concourse a lift goes to platform 10 and then a ramp leads to a new lift over platform 11/12. This path of movement is similar for regular commuters also and hence does not lead to indirect discrimination.

#### *Concourse and Station entry*

- Option C proposes a more centrally located new concourse that is parallel to Lawson Street. The concourse has been positioned in a manner to allow for maximum utilisation of the platform width. There

are two sets of stairs and a lift for each platform from this central concourse. The existing stairs on the northern concourse are removed.

- The entrance to the station is from the north via a new civic space on Gibbons Street, through a landscape area to the south near Marian Street and through the pedestrian bridge on the west. There are two sets of barriers one located on the east of the concourse accessed through the unpaid concourse connecting Marian and Gibbons Street and the second located to the west of the concourse accessed from the pedestrian bridge.

Refer Appendix 7 for Structural report and drawings for Option C.

#### *Overhead wiring & Signalling*

- As this option is designed to provide maximum efficiency in terms of pedestrian circulation and platform distribution the main concourse runs diagonally across the tracks and OHW stanchions. This means two rows of stanchions would have to be removed and catenaries modified to accommodate the new concourse.
- Signal SY455 is affected by the new pedestrian bridge and will have to be reconfigured.

Refer Part B – Engineering report Section 6 for OHW analysis and Section 7 for Signalling analysis.

#### *Access to Illawarra relief*

- Access to the Illawarra Relief is through Platform 10. A wide stair on the south of the concourse provides connection to the intermediate concourse tunnel at platform level, which connects to Platform

11/12. There is a screen at the end of the tunnel to direct people toward the stairs and stop them from going to Platform 10.

- There is a possibility of separating the intermediate concourse from Platform 10 by a glass barrier in the future and provide a separate stair for Illawarra Relief if required.
- Two up only escalators and two stairs provide access to Platform 11/12 from a centrally located intermediate concourse.
- New Fire and emergency egress stairs have been provided both at the north and south end of Platform 11/12.

### *Heritage*

- All the platform heritage buildings except on Platform 1 and booking office on Platform 1 would be removed in this option to allow for better positioning of the new concourse and more efficient pedestrian circulation.
- The existing station entrance building on Lawson Street and ventilation stacks on Platform 1 are retained.
- The masonry wall on the Lawson Street overbridge is also retained

### *Station operation areas*

- All the station operation areas are located between the space connecting the paid concourse and the unpaid concourse. This makes the management of the station very efficient and also allows full retail potential on the unpaid concourse.

### *Interface areas*

- A civic space as required by the Redfern-Waterloo Built Environment Plan at the end of Redfern Street would mark the entrance of the station. It would

also provide unpaid at-grade connection to Marian Street and Lawson Street.

- Connection to the ATP is through the Marian Street and Cornwallis Street. Marian Street and Cornwallis Street have been terminated at the corner to allow for a generous pedestrian connection from the station entry to the ATP. A complying ramp provides disabled access to the concourse level from Marian Street.
- A pedestrian bridge parallel to the new concourse would connect North Eveleigh to Redfern. The unpaid concourse would provide an at-grade pedestrian connection between Gibbons Street and Marian Street and connect with the new pedestrian bridge. An unpaid pedestrian access east of the existing station entrance provides connection between Lawson Street and the new civic place at the station entrance. This bridge would also provide access to the University of Sydney students as per the RWA Built Environment Plan and form an integrated part of station upgrade.

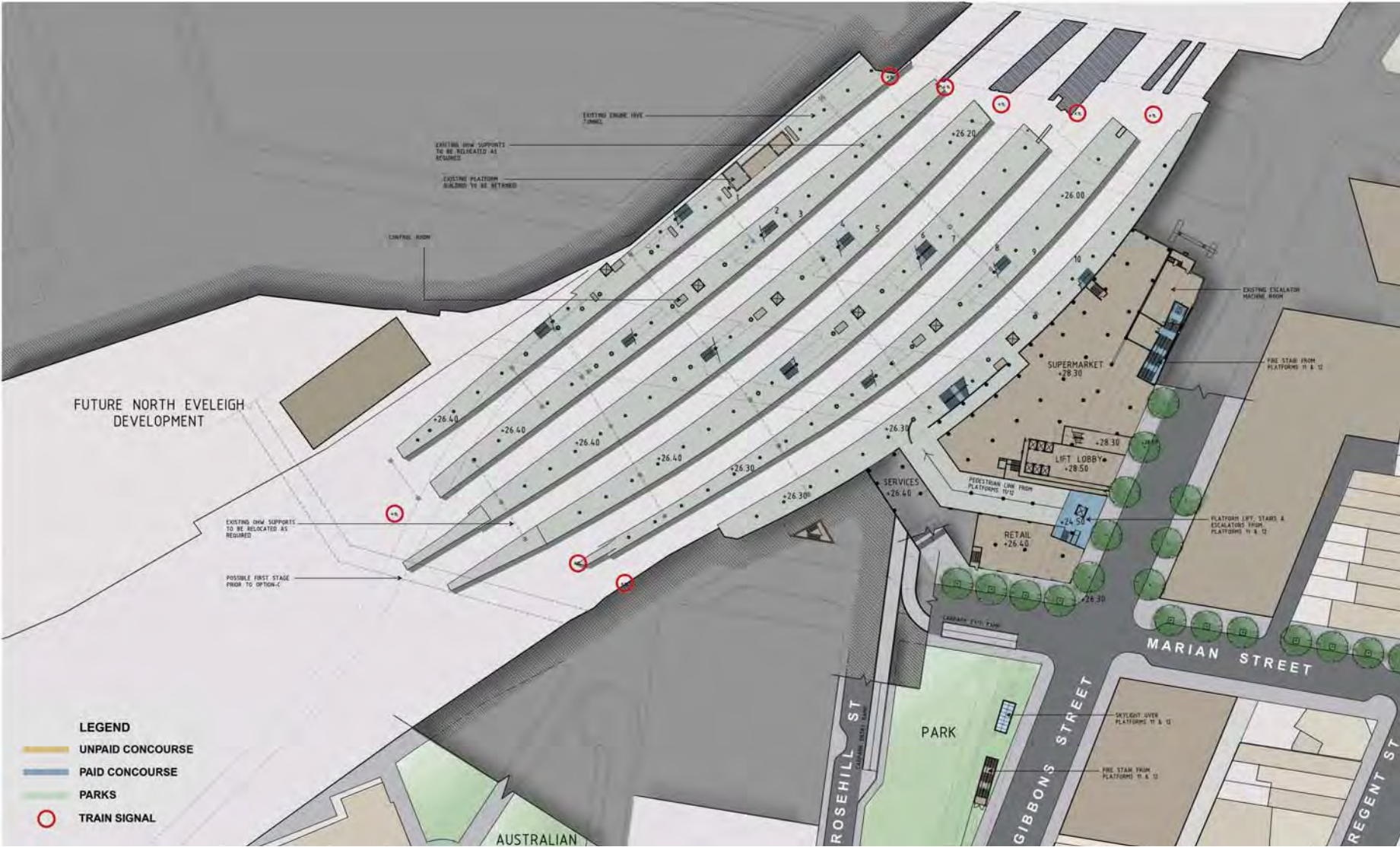


Figure 4.1 - Option C Platform level plan





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## 4.1.2 DDA COMPLIANCE

*Option C* does *provide* the following key elements required to provide an accessible facility and goes furthest towards addressing the requirements of the DDA:

- An accessible *entry* to the paid concourse meeting the requirements of AS1428.1 and the DSAPT from the proposed Public Plaza, and buses on Gibbons Street and via a 1:20 common walkway for all commuters from the ATP site.
- An alternate additional accessible *entry* from North Eveleigh.
- *Unisex accessible sanitary facilities* designed to meet the requirements of AS1428.2 clause 15, and the DSAPT adjacent to gender specific facilities on the new concourse area.
- *Ambulant user cubicles* in proposed new gender specific toilet areas to meet the requirements of AS1428.1 and the DSAPT.
- Clear, direct paths of travel to assist in *wayfinding* and to meet the requirements of DSAPT. In our opinion this would also appear to offer a potentially safer approach to access provision.
- Circulation space on the concourse levels to meet the requirements of AS1428.1 and which is not impacted in peak periods by passenger movement.
- *Lifts* to provide complying vertical access with features that include:
  - (i) Proposed centrally located positions with complying circulation spaces in the paid concourse area.
  - (ii) Positioning centrally on each platform (nos 1-10) to facilitate access to boarding ramps, reduce distances required to be travelled and facilitate clear vision, ease of wayfinding and potential safety.

(iii) An accessible path of travel to the Eastern Suburbs Platform that is for the most part shared with other commuters and provides a more direct path of travel.

- The issues related to the existing reduced *platform* width are minimised due to the entry/exit point location.
- Potential full compliance in the provision of *hearing augmentation* to meet the requirements of the DSAPT.
- With the topping of platforms the potential to eliminated non-complying *crossfalls* within the circulation spaces of the accessible paths of travel on the platforms.
- Potential for provision of equitable facilities in relevant *staff* areas.

Despite of all the advantages of Option C it still does not provide full DDA compliance with regards to accessible path on Platform 1 because of the existing platform shelter.

## 4.1.3 PEDESTRIAN FLOW

### 2031 AM peak

*Concourse* - A very good level of service is achieved. No significant congestion is expected on the concourse in 2031 even with multiple train arrivals.

*Platforms* - In general the platforms operate at a reasonable Level of Service as the increase in demand is partially offset by higher train frequencies. The two sets of stairs spread the design evenly along the platform.

*Stairs* - Platform 1 – Minor queuing of 11 people with the queue lasting for around 45 seconds.

Platform 2/3 - Some significant queuing is occurring of up to 89 people. Delays of 40 seconds may be encountered and a queue is present for almost 90 seconds.

Platform 4/5 - Typically only very minor queues or congestion in the AM peak. However should 2 services arrive at the same time extensive queues may form at the stairs (up to 64 people) with delays of up to 75 seconds encountered.

Platform 6/7 - Typically only minor queues or congestion in the AM peak. However should 2 services arrive at the same time extensive queues may form at the stairs (up to 37 people) with delays in excess of 40 seconds encountered.

Platform 8/9 - No queuing or congestion issues.

Platform 11/12 - Only very minor queuing (maximum of 8 people) occurs at the foot of the up escalator. A queue of 37 people also occurs at the stair on Platform 10 used by people from Platform 11/12.

For a detailed report refer Part B – Engineering report Section 2.

## 4.1.4 FIRE AND LIFE SAFETY

The NFPA 130 requirements are for a maximum platform load to be cleared within 4 minutes with these passengers clearing the station within 6 minutes. These times are mandatory for sub surface platforms (11/12) and are provided as guidelines for surface platforms.

Using NFPA 130 criteria the evacuation time for Platform 2/3 is 8.29 minutes and the station evacuation time is 9.62 minutes. This therefore does not meet the guideline NFPA 130 criteria. Whilst platform 2/3 does not meet the NFPA 130 standards, it is possible that a fire engineering solution may be possible. This would involve analysis of the maximum fire load which may occur and the subsequent impact on the platform environment. From this calculation a Required Safe Egress Time (RSET) is calculated and compared to the Available Safe Egress Time (ASET).

Using NFPA 130 criteria the platform 11/12 evacuation time is 3.53 minutes and the station evacuation time is 6.21 minutes. This design does meet the NFPA 130 criteria.

For a detailed Pedestrian evacuation and Fire engineering report refer Part B – Engineering report Section 3.

## 4.1.5 CONSTRUCTABILITY

- Programme is possession driven (approx 47 months)
- Major OHW works required due to new concourse (resource risk)
- No impact to existing concourse until decommissioned
- Significant disruption to Illawarra Relief concourse and platforms
- Significant disruption to surface platforms (Canopies, new structures and resurfacing)
- Significant temporary works required (Crash deck and temporary access bridge)
- Construction interface with development works by others

## 4.1.6 COST

Station upgrade -	\$143.3m
Development enabling works -	\$13.9m
Development works up to RL31.7 -	\$ 34.1m
Development works above RL31.7 -	\$127.7m

**Total - \$ 319m**

Refer Cost, Constructability and Programming review Revision 3 prepared by Tenix for a full report on cost and constructability.

## 4.1.8 DEVELOPMENT SITE OPTION DS-1

The proposal for the development site shown in Option-C consists of a 2-storey podium with a 14-storey tower. Option DS-1 considers building over the Illawarra Relief to provide maximum retail space on the concourse and platform levels.

There is retail potential at two levels along Gibbons Street. The retail at platform level is accessed at the corner of Gibbons and Marian Street. There is also a possibility of having a small supermarket at this level accessed from a pedestrian connection between Gibbons Street and the unpaid concourse. Concourse level retail is accessed from the unpaid concourse in front of the station entry.

The total net lettable area of the building is approximately 33,000m<sup>2</sup> with an FSR of approximately 6.8:1. There is approximately 2000m<sup>2</sup> of retail on platform level and 1600m<sup>2</sup> retail space on concourse level. There are two levels of basement with approximately 141 car parking spaces.

The lift lobby is accessible from Gibbons Street and also from the unpaid concourse allowing appropriate connectivity with public transport. There can also be some retail outlets and cafes in the building at the corner of Lawson Street and Gibbons Street. The new 3-storey commercial building at the corner of Lawson Street and Gibbons Street has been set back to provide for a wide footpath and trees. There would also be retail and cafeterias on ground floor to help make Lawson Street more safe and secure.

Refer Appendix 1 for floor plans of the building, Appendix 2 for Preliminary station views and views of the building, Part B – Engineering report Section 1 for Preliminary service

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recommendations and Section 5 for Structural report and drawings for Option C.

### 4.2 OPTION D – EASY ACCESS AND F&LS

#### 4.2.1 OVERALL DESCRIPTION

This option considers minimum changes to the station in order to address DDA and meet FL&S requirements Figure 4.3 and Figure 4.4. The features of this option are:

##### *Easy access*

- Easy access is provided to all the platforms from the existing concourse at the northern end as shown in Figure 4.1. All the lifts have a capacity of 17 people except the lift for Illawarra relief which has a capacity of 13 people due to space constraints.
- Platform 1 - The lift must be elevated 1500mm (1.5m) from the platform level as there is an existing Engine Dive tunnel underneath. A 30 metre disabled access ramp located from the door of lift to platform level is provided.
- Platform 2/3 - A 3 metre long fence at the end of the platform will provide a waiting area for people using the lift. The platform is extended to the south by approximately 8m to compensate for the space taken up by the lift and the waiting area.
- Platform 4 to 10 – Platform 4/5 and 6/7 are extended on the northern to provide access to the lift. A minimum clearance of 3000mm has been provided from the concrete blade wall to the lift in platforms 8/9. On Platform 10 the existing brick retaining wall is modified to provide access to the lift at platform level.

- The location of the lifts at the end of platforms 1 to 9 does not encourage the use of the lifts. These lifts might require collision protection.
- Platform 11/12 - The lift access to Platforms 11/12 is in two stages with a changeover at the existing intermediate concourse level. Lift 1 is located between the escalators and the stairs at concourse level (RL 31.4). This lift descends to the existing intermediate level (RL 25.24), where people must change to the Lift 2. This lift is located on the eastern side of Lift 1 so that it can land at a central location on platforms 11/12. Each lift has a capacity for 13 people which still allows for a stretcher to fit.
- It is noted that these solutions are not ideal and work is continuing to better address the intent of the DDA.

##### *Concourse and Station entry*

- The Lawson Street Concourse width remains as existing.
- A 3000 mm extension to the north is required to provide lift access to platform 8/9 in the bridge between the Gibbons Street Concourse and the Lawson Street Concourse. Figure 4.5 shows a section through this extension.

##### *Stairs to Platforms*

- Platform 1 – The stairs remain the same as the existing station.
- Platform 2/3 - The width of the platform at the existing landing of the stairs does not allow the clearance of 2700 mm at either side of stairs as indicated in the *User Requirements*. The clear width of the existing stairs is 2200mm with 1600mm and 1400mm clearance on either side. In order to meet the clearances, the stairs have been moved south to

a central location. The new stair width is 2000 mm with a cleared width of 1700mm. A bridge above the platform will be required to connect the new stairs to the concourse. The bridge will descend 1.4m

from the concourse to avoid conflicts with the OHW support. A single up only escalator 1000mm wide is provided between the stairs and the lift to improve the flow of people. Refer Figure 4.5 for the cross section through the bridge.

- Platform 4/5 and 6/7 - The stairs these platforms will have to be moved to the centre line of the platform to allow a cleared area of 2700mm on each side of the stairs. The canopy supports will be reconfigured to avoid protrusions in the accessible path.
- Platform 8/9 and 10 - There are no modifications required for the stairs to these platforms.

#### ***Overhead wiring & Signalling***

- Impact on the OHW in this option will be confirmed after electrical clearances are considered from the cross sections. The OHW portal is likely to be modified because of the new walkway over platform 2/3.
- The construction of over-platform concourse 'fingers' will likely have a negative impact on the achievable signal sighting, particularly for City-bound trains.
- Platform 2/3 and 4/5 lifts may obstruct sighting of signals.
- Each of these issues require further investigation

#### ***Access to Illawarra relief***

- Access to the Illawarra relief platforms 11/12 is same as the existing condition.
- A 3000 milimetre fire stair has been provided at the southern end of the station. These stairs will exit onto the open space west of Gibbons Street.

#### ***Heritage***

- All the heritage items within the station have been retained.
- The new pedestrian ramp on Platform 1 might have impact on the existing heritage building on platform 1.
- The brick retaining wall on platform 10 is modified on the northern end of the platform to allow for lift access.

#### ***Station operation areas***

- Only minor new station operation areas and staff facilities have been provided in the Base Case.

#### ***Interface area***

- No modification is done to the station surrounding areas in this option.



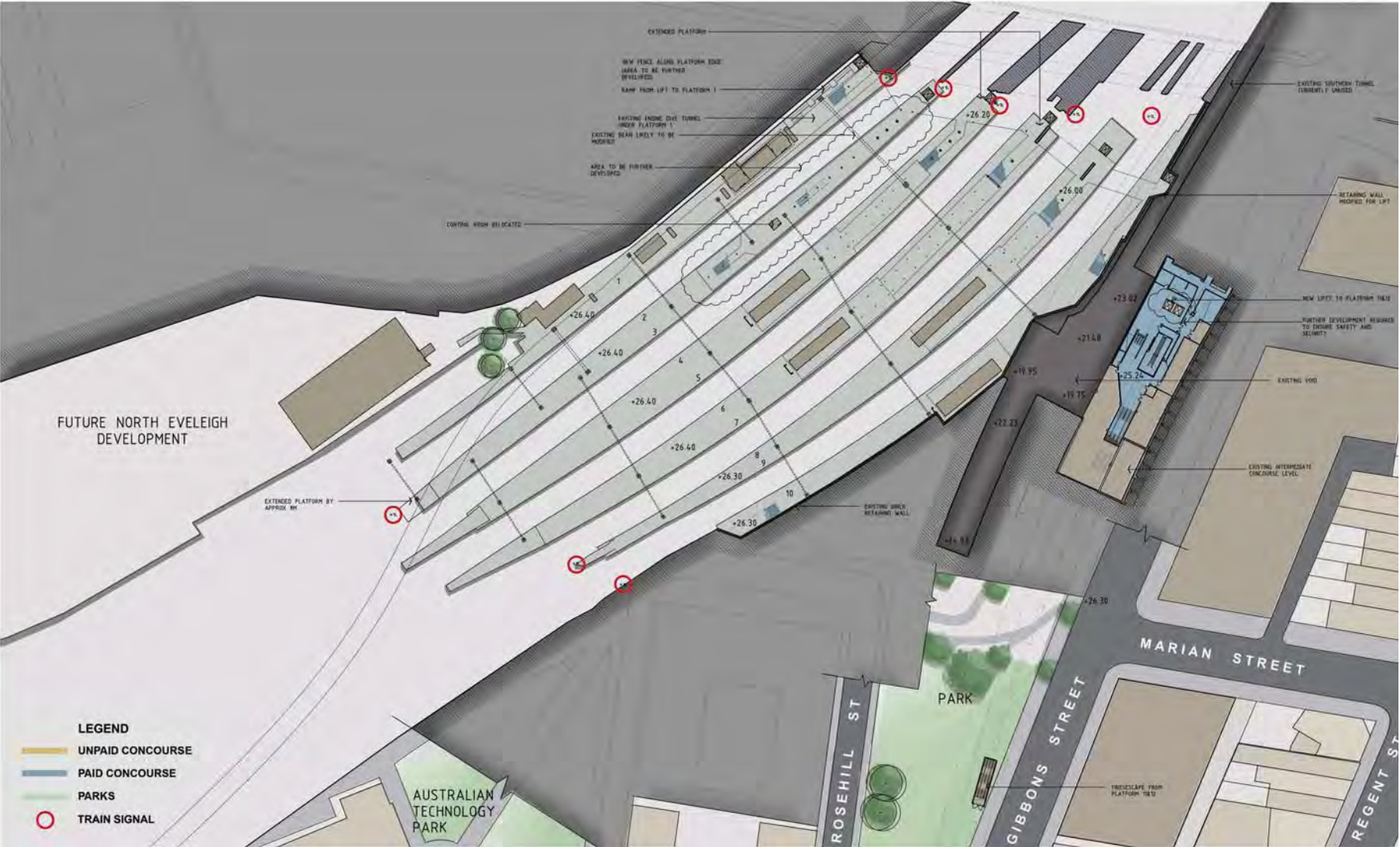


Figure 4.3 - Option D Platform level plan





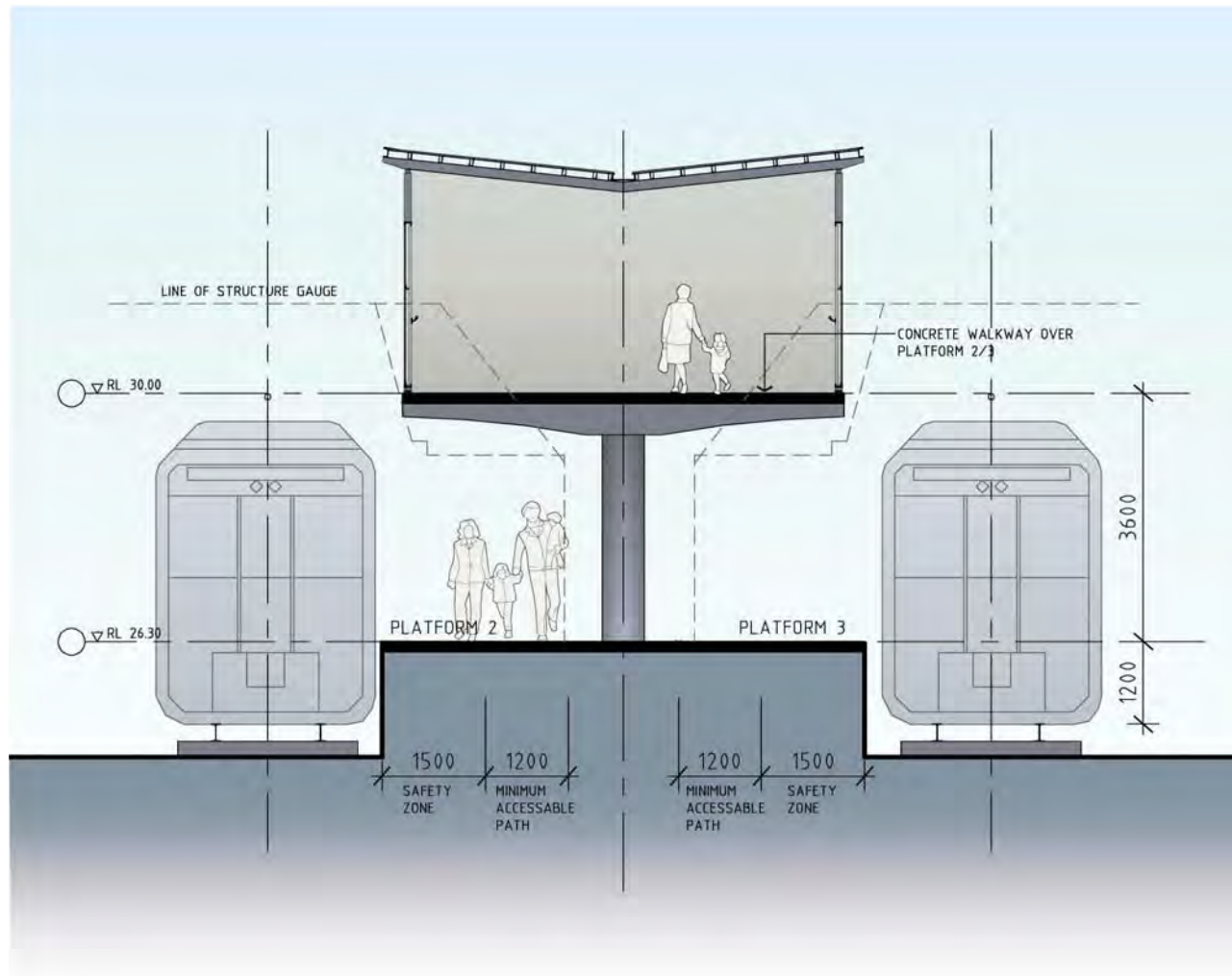


Figure 4.5 Cross section through Platform 2/3

## 4.2.2 DDA COMPLIANCE

- Option D *does not provide* the following key elements required to meet the requirements of the DDA A complying continuous accessible path of travel to meet the requirements of AS1428.1 and the Disability Standards on Accessible Public Transport (DSAPT) at the *entry* from Lawson Street footpath to the concourse area (step included at the change in level)

***Note: Movement along the Gibbons Street footpath does not meet the intent of the DDA. A clear path 1800mm wide is required to allow 2 wheelchairs to pass and meet the requirements of AS1428.2. This footpath is adjacent to a street with a high volume of traffic.***

- An equitable accessible *path of travel* linking to adjacent facilities including the bus interchange.
- Proposed *lifts* to each platform do not provide vertical access that meets the intent of the DDA to provide dignified, independent (potentially secure) paths of travel. Issues include:
  - Due to the constraints of the existing concourse location it is proposed to locate all lifts at the city end of the platform therefore requiring people using the lifts and requiring assistance to board a train via the boarding ramps to move from the city end of the platform to the middle of the platform. Extensive movement is not desirable for people with low activity levels and the general existing platform widths particularly at peak times will make this transfer along the platform difficult which in our opinion may be interpreted as indirect discrimination.
  - The lifts are proposed to be located as far off the main paths of travel as possible and are designed to facilitate waiting areas with

circulation space to meet the requirements of the DSAPT, but in our opinion, it appears that at peak times the general flow of passengers will impinge on these areas and create potential difficulties for people with disabilities.

- Platform 1** – Proposed lift entry at platform level is 1500mm above the platform due to the location of the engine dive tunnel in this area which prevents pit excavation. A 30m ramp (gradient 1:14) is required to link the lift to the platform. This will be unsuitable for people with low activity tolerance, including older people and people with luggage and in our opinion could be deemed indirect discrimination.
- Platform 4/5** – the proposed lift will deliver customers to the city end of the platform in an area behind the stairs without clear views to the centre of the platform required to assist with wayfinding and facilitate safety. In our opinion this could be deemed indirect discrimination for people with disabilities and in particular people with vision and cognitive impairments.
- Platform 6/7** - the proposed lift will deliver customers to the city end of the platform in area behind the stairs without clear views to the facilities located midway down the platform required to assist with wayfinding and facilitate safety. In addition the existing concrete blade pier for the overhead bridge restricts circulation space and clear view in the area. In our opinion this could be deemed as not meeting the intent of the DDA by treating people with disabilities equitably.

(vi) **Platform 8/9** - the proposed lift will deliver customers to the city end of the platform in area behind the stairs without clear views to the facilities located midway down the platform required to assist with wayfinding and facilitate safety. In addition the existing concrete blade pier for the overhead bridge located centrally in the lift circulation space restricts circulation space and clear view in the area. In our opinion this could be deemed as not meeting the intent of the DDA by treating people with disabilities equitably.

(vii) **Eastern Suburbs Platforms** - the proposed lift design which is required to accommodate the existing structures in this area necessitates customers changing lift cars on the interim level between the concourse and the platform. This will create unacceptable issues of way finding for people with intellectual disabilities and will be difficult for people with low vision to negotiate. It does not comply with the intent of the DDA.

- **Platforms with crossfalls** to meet the requirements of AS1428.1 clause 5.1 which requires the surface area within a landing or circulation space to not exceed 1:40. Crossfall is a basic part of providing DSAPT Part 2 access paths compliance.

**Note:**

**Platforms currently include gradients, which slope toward platform edge and track. It is considered that on platform 4/5, in particular have higher slopes towards the track.**

- Provision of facilities to assist people with hearing impairments, including **hearing augmentation** on the public address system as required to meet the DSAPT and BCA.

- An **equitable path of travel to the ATP** site along Platform 10. The public currently can access the platform to provide a direct link to the station entry. This path of travel includes stairs. The alternate route along Gibbons Street is significantly longer and could be discriminatory.
- The **staff facilities** do not include any provision to facilitate employment of employees with disabilities
- **Emergency egress** provisions do accommodate people with a disability.
- If option to modify platform is not adopted, then potentially **platforms with crossfalls** will require the surface area within a landing or circulation space to not exceed 1:40 in order to meet the requirements of AS1428.1 clause 5.1.  
**Note: Platforms currently include gradients which slope toward platform edge and track.**

## 4.2.3 PEDESTRIAN FLOW

### 2031 AM peak

**Concourse** - The lift serving Platform 2/3 significantly reduces the width of the concourse in front of the Platform 2/3 stairs. Significant congestion would be expected here, especially after the arrival of trains on Platform 2/3, as these passengers are all funnelled in front of the Platform 2/3 stairs.

The mid level concourse to the Platform 2/3 stairs would result in frustration for passengers as the stairs are some way from the main concourse. Passengers would be moving past their train with no opportunity to reach it. The long thin shape has the potential for severe conflict of movement at the top of the stairs, with potentially very frustrated passengers running to the top of the stairs meeting passengers ascending from the platform. This

represents poor design and the potential for accidents would be considerable.

**Platforms** - No significant differences to the existing design. Platform 3 has a slightly better distribution of boarding passengers, as the stairs are more towards the centre of the platform.

**Stairs** - Congestion for platform 3 is worse than the existing design as the stairs are 300mm narrower than the existing. Their central location results in demand from two directions adding to the congestion. The escalators only serve alighting passengers (the minor flow) and have little impact on congestion. Peak services would have queues in excess of 120 people with delays in excess of 2.5 minutes.

## 4.2.4 FIRE AND LIFE SAFETY

The only changes to the egress capacity are on Platform 2/3 and 11/12.

Using NFPA 130 criteria the platform 2/3 evacuation time is 12.28 minutes and the station evacuation time is 14.57 minutes.

Platform 11/12 has been analysed as it represents Redfern's only sub surface platform. Using NFPA 130 criteria the platform evacuation time is 4.8 minutes and the station evacuation time is 6.9 minutes.

Whilst both platforms fail the NFPA 130 standards it is possible that a fire engineering solution may be possible. This would involve analysis of the maximum fire load which may occur and the subsequent impact on the platform environment. From this calculation a Required Safe Egress



Time (RSET) is calculated and compared to the Available Safe Egress Time (ASET).

For a detailed Pedestrian evacuation and Fire engineering report refer Part B – Engineering report Section 3.

## 4.2.5 CONSTRUCTABILITY

- Programme is possession driven (approx 24 months)
- Least impact upon existing rail systems (OHW, signalling etc.)
- Significant disruption to concourse area during works
- Temporary toilet facilities required during remodelling works
- Significant disruption to Platform 2/3
- Some disruption to Illawarra Relief concourse
- Extended shutdown of IR required for new fire stair installation
- Craneage in some possessions will block intersection of Lawson Street and Little Eveleigh Street and will constrict Gibbons Street.

## 4.2.6 COST

Station upgrade -	\$29.5m
Development enabling works -	Not Applicable
Development works up to RL31.7 -	Not Applicable
Development works above RL31.7 -	Not Applicable

Total - \$29.5m

Refer Cost, Constructability and Programming review Revision 3 prepared by Tenix for a full report on cost and constructability.

## 4.2.7 DEVELOPMENT SITE

Although no construction is proposed for the development site in this option, this does not preclude the site from being developed with a scheme similar to the one indicated in Option E.

## 4.3 OPTION E – UPGRADE/INTERFACE WORKS IN ADDITION TO OPTION D

### 4.3.1 OVERALL DESCRIPTION

All the modifications of Option D are incorporated in Option E with the following additions or improvement to the design Figure 4.6 and 4.7.

Refer Appendix 3 for Rail Operational, Interface and Development areas.

#### Concourse and Station entry

- The width of Lawson Street Concourse is increased by 3 m to the south in order to allow more circulation space around the new lifts.
- Stairs Platforms 1, 2/3, 4/5, 6/7 have been relocated as a result of the widening of the concourse.
- Gibbons Street entrance has been reconfigured to provide a new entry forecourt and to activate the plaza on the corner of Lawson Street and Gibbons Street. A new awning and ticketing facilities have also been provided at this entrance. The set back barrier locations of the reconfigured entry provide a reduced risk for pedestrian and vehicular conflict at Gibbons Street.
- An entrance has also been provided on the southern side to allow for a better connection with ATP and the new development site.

#### Stairs to platforms

- Stairs Platforms 1, 2/3, 4/5, 6/7 have been moved south because of the widening of the concourse.

#### Overhead wiring & Signalling

- In addition to the impacts in Option D, OHW near the concourse is likely to be reconfigured because of the extension of the concourse.

#### Station operation areas

- Some new station operation areas have been provided near the Gibbons Street entrance.

#### Interface areas

- A new pedestrian bridge at the southern end of the station improves east-west linkages, especially from the North Eveleigh Precinct and the University of Sydney to Marian Street. The bridge is functionally separate from the station, and not integrated with the upgraded station, but there is a possibility of having fire escape stairs at the southern end of the platform that connect to the bridge.
- A 5 metre wide footpath abutting the retaining wall on Platform 10 connects Marian Street with the Gibbons Street station entrance.
- The new Gibbons Street entrance provides a better address to the station at the end of Redfern Street.
- New bus stop is located along Gibbons Street to provide better interchange facility.

### 4.3.2 DDA COMPLIANCE

*Option E* does **not** provide the following key elements required to provide an accessible facility and meet the requirements of the DDA (see also comments in section 4.2.2):

- A complying continuous accessible path of travel to meet the requirements of AS1428.1 and the Disability Standards on Accessible Public Transport (DSAPT) at the **entry** from the Lawson Street footpath to the concourse area (step included at the change in level)
- **Note: Movement along the footpath does not meet the intent of the DDA. A clear path 1800mm wide is required to allow 2 wheelchairs to pass and meet the requirements of AS1428.2. This footpath is adjacent to a street with a high volume of traffic.**
- Proposed **lifts** to each platform do not provide vertical access that meets the intent of the DDA to provide dignified, independent (potentially secure) paths of travel. Issues include:
- Due to the constraints of the existing concourse location it is proposed to locate all lifts at the city end of the platform therefore requiring people using the lifts and requiring assistance to board a train via the boarding ramps are required to move from the city end of the platform to the middle of the platform. Extensive movement is not desirable for people with low activity levels and the general existing platform widths particularly at peak times will make this transfer along the platform difficult.
- **Platform** issues as per Option D.
- It would be possible to provide **staff facilities** that make provision for employees with disabilities
- **Emergency egress** provisions do accommodate people with a disability.
- If option to modify platform is not adopted, then potentially **platforms with crossfalls** will require the surface area within a landing or circulation space to not exceed 1:40 in order to meet the requirements of AS1428.1 clause 5.1.
- **Note: Platforms currently include gradients that slope toward platform edge and track.**

## 4.3.3 PEDESTRIAN FLOW

### 2031 AM peak

**Concourse** - The extended concourse reduces the congestion in front of Platform 2/3 stairs to levels similar to the existing design. The extended ticket area results in a more pleasant environment and a reduced level of congestion. All other comments as per Option D.

## 4.3.4 FIRE AND LIFE SAFETY

There is no difference in the egress characteristics of Option E compared to Option D without the additional fire stairs to the south of the station connecting to the pedestrian bridge. If the fire stairs are considered the evacuation times will be as shown below.

Using NFPA 130 criteria the evacuation time for Platform 2/3 is 7.53 minutes and the station evacuation time is 9.83 minutes. Using NFPA 130 criteria the evacuation time for Platform 11/12 is 4.8 minutes and the station evacuation time is 6.69 minutes.

Whilst both platforms fail the NFPA 130 standards it is possible that a fire engineering solution may be possible. This would involve analysis of the maximum fire load that may occur and the subsequent impact on the platform environment. From this calculation a Required Safe Egress Time (RSET) is calculated and compared to the Available Safe Egress Time (ASET). It is possible to improve the evacuation times of the surface platforms by adding stairs to the southern end of the platform that would connect with the proposed pedestrian bridge.

For a detailed Pedestrian evacuation and Fire engineering report refer Part B – Engineering report Section 3.

## 4.3.5 CONSTRUCTABILITY

- Programme is possession driven (approx 36 months)
- Reconfiguration of existing OHW under extended concourse
- Opportunity to reduce impact of works by extending concourse area prior to lift installation works
- Temporary toilet facilities required during remodelling works
- Significant disruption to Platform 2/3
- Significant disruption to surface platforms (Canopies and new control rooms)
- Some disruption to Illawarra Relief concourse
- Extended shutdown of IR required for new fire stair installation
- Craneage in some possessions will block intersection of Lawson Street and Little Eveleigh Street and will constrict Gibbons Street.
- Construction interface with development works by others

## 4.3.6 COST

Station upgrade -	\$55.5m
Development enabling works -	\$5.5m
Development works up to RL31.7 -	\$27.1m
Development works above RL31.7 -	\$120.2m

Total - \$208.3m

Refer Cost, Constructability and Programming review Revision 3 prepared by Tenix for a full report on cost and constructability.

## 4.3.7 DEVELOPMENT SITE OPTION DS-2

In Option DS-2 the building is setback from Gibbons Street to minimise the impact on Illawarra Relief. The proposal shows a terraced landscaped café forecourt addressing Gibbon St and the corner at Marion St.

The Commercial building has been provided with a separate address from the rail interchange and away from busy Gibbon St to allow taxi pickup drop off while still providing lobby access to the interchange at two levels.

To promote way finding and accessibility, the concourse has been designed to be robust 2 storey high plus spaces, open and airy, naturally lit with views through to spaces and facilities beyond. Pedestrian axis directs patrons to the station and building with cross-site routes to and from the interchange past spaces for retail, restaurants and cafes.

The total net lettable area of the building is approximately 26,880m<sup>2</sup> with an FSR of 6.5:1. There is approximately 1176m<sup>2</sup> of retail space on platform level and 820m<sup>2</sup> of retail space on concourse level. There are two levels of basement with space for approximately 117 cars.

Refer Appendix 1 for floor plans of the building.

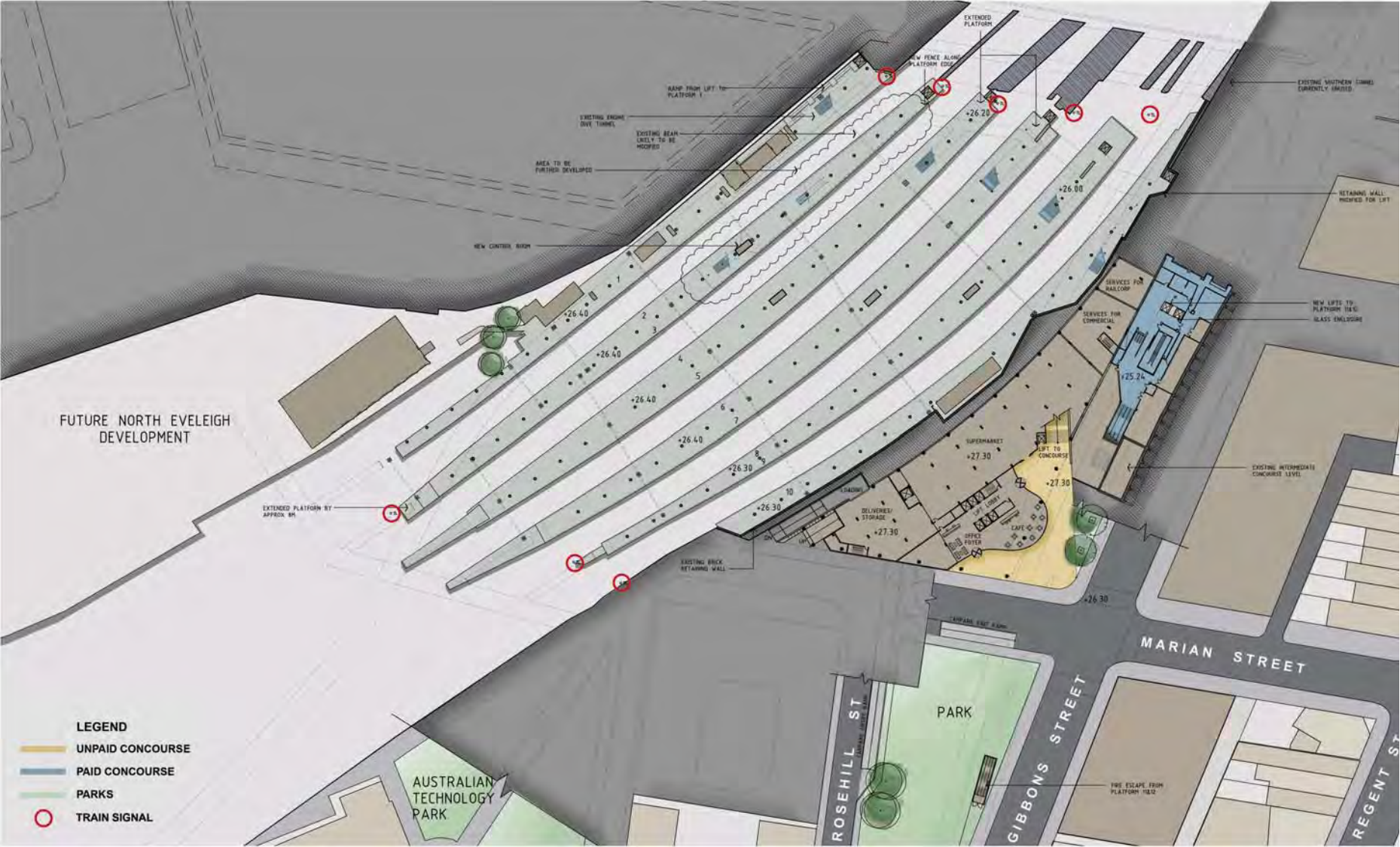


Figure 4.6 - Option E Platform level plan



2006044 Redfern Station – Concept Design Study  
Part A – Urban Design Report



## 5. NON COMPLIANCE WITH THE USER REQUIREMENTS

The non compliance of all the three options with the User requirement Version 1.1 are listed in the table below:

NO.		OPTION C: FULL STATION REDEVELOPMENT	OPTION D – EASY ACCESS AND F&LS	OPTION E – UPGRADE/INTERFACE WORKS IN ADDITION TO OPTION D
3.1	Station and Surrounds			
3.1.1	General	Complies with all the general requirements except has a significant impact on station operation during construction.	Does not provide Kiss N Ride facilities, emergency vehicle parking area and new staff facilities.	Does not provide Emergency vehicle parking area and provides very little new staff facilities.
3.1.2	Way Finding, Information, Advertising and Queuing	Provides new way finding systems, signage and addresses all the queuing issues at booking offices and ticketing areas.	Provides only the new signage and way finding systems required under DDA. No other new signage to be installed. Does not provide new seating on the platform, or address any queuing issues.	Provides only the new signage and way finding systems required under DDA. No other new signage to be installed. Does not provide new seating on the platform. Queuing and ticketing issues addressed on the new Gibbons Street entrance but not on the Lawson Street entrance.
3.1.3	Platform	Complies with all the requirements	No modification to platform surfaces and control rooms on the platform except making sure the cross fall is not greater than 1:40 and addition of new tactile indicators	No modifications to platform surfaces except making sure the cross fall is not greater than 1:40 and addition of new tactile indicators. New control rooms on Platforms 2/3, 4/5, 6/7, 8/9.
3.1.4	Concourse	Complies with all the requirements	Does not provide new staff facilities, new cleaning rooms and new garbage facilities.	Provides very little new staff facilities, but does not provide new cleaning rooms and new garbage facilities.
3.1.5	Disability Discrimination Act – Disabled Access	Complies with all the DDA requirements. For detail refer to DDA compliance in the analysis table.	Does not provide level access, new staff areas are not provided and existing areas are not reconfigured, no disabled parking spaces or kiss n ride zones provided. Accessible path clearances not met on all the platforms. For detail refer to DDA compliance in the	Level access provided only on Platform 1 but not on other platforms. Accessible path clearances not met on Platform 1. For detail refer to DDA compliance in the analysis table.

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			analysis table.	
3.1.6	Vertical Transport	Provides centre loading on all platforms and meets all the requirements.	Does not provide centre loading of platforms.	Does not provide centre loading of platforms.
3.1.7	Ticketing	Complies with all the requirements.	No modification to the existing ticketing facilities.	New ticketing facilities on the Gibbons Street entrance complies with all the requirements.
3.1.8	Public level-Street level RWA	Complies with all RWA requirements.	No new station entrances designed. Does not provide improved connection with ATP, North Eveleigh and University of Sydney. Does not provide for new development in North Eveleigh and Gibbons Street	Improves the connection with ATP satisfactorily but poorly with North Eveleigh and University of Sydney.
<b>3.2</b>	<b>Conceptual – Safety, Security, Building Services, Heritage</b>			
3.2.1	Safety	Complies with safety requirements. For details see FL&S section	Fire evacuation times not satisfactory for surface as well as underground platforms. For details see FL&S section	Fire evacuation times not satisfactory for surface as well as underground platforms. For details see FL&S section.
3.2.2	Security	Does not consider blast impact.	Does not consider blast impact.	Does not consider blast impact.
3.2.3	Heritage	Store building and booking office on Platform 1 retained.	All heritage items retained as identified in P Davies and McPhee report.	Platforms shelters on Platforms 4/5, 6/7 and 8/9 removed.
<b>3.3</b>	<b>Rail Infrastructure</b>			
3.3.1	General	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,
3.3.2	Track and ROW	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,

<i>NO.</i>		<i>OPTION C: FULL STATION REDEVELOPMENT</i>	<i>OPTION D – EASY ACCESS AND F&amp;LS</i>	<i>OPTION E – UPGRADE/INTERFACE WORKS IN ADDITION TO OPTION D</i>
3.3.3	Bridge Structures	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,	The option would generally meet all the requirements in this section  More detailed work is required to fully assess the impact and extent of the requirement. ,
3.3.4	Electrolysis, earthing and bonding	The option would generally meet all the requirements in this section  Further investigations are required to assess compliance.	The option would generally meet all the requirements in this section  Further investigations are required to assess compliance.	The option would generally meet all the requirements in this section  Further investigations are required to assess compliance.
3.3.5	Pier and Column Protection Requirements	New paid and unpaid concourse and the wall between the IR tunnel and the car park comply with the requirements.	There are no modifications to the Illawarra Relief underground structure. A risk assessment will be required to determine compliance with 3.3.5.2	New pedestrian bridge and the wall between the IR tunnel and the car park comply with the requirements. There are no modifications to the Illawarra Relief underground structure. A risk assessment will be required to determine compliance with 3.3.5.2
3.3.6	Signalling and control Systems	Signal SY455 needs to be relocated.	Might have impact on the access for signals on Platforms 2/3 and 4/5. The lift on the northern end of Platform 2/3 might have an impact on signal sighting.	Might have impact on the access for signals on Platforms 2/3 and 4/5. The lift on the northern end of Platform 2/3 might have an impact on signal sighting.
3.3.7	Power	Additional areas for electrical installations can be located in the vicinity of the development site.	Additional areas for electrical installations can be located within the intermediate levels of the Illawarra Relief Station Building..	Additional areas for electrical installations can be located in the vicinity of the development site or in the intermediate levels of the Illawarra Relief Station Building
3.3.8	High Voltage	No service search has been carried out.	No service search has been carried out.	No service search has been carried out.
3.3.9	1500v Overhead Wiring system	OHW needs to be reconfigured because of the new paid and unpaid concourse.	Further assessment is required to determine the impact on the overhead wiring as a result of the walkway over Platform 2/3.	Further assessment is required to determine the impact on the overhead wiring as a result of the walkway over Platform 2/3 and the extension of the northern concourse. The pedestrian bridge on the southern end of the

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				station will also have impact on OHW and might need reconfiguring.
3.4	<i>Maintainability</i>	Complies with all the requirements.	No new services, storage and cleaners room provided	Complies with all the requirements.
3.5	<i>Environment and Quality</i>			
3.5.1	Environment	Complies with all the requirements.	No new garbage facilities and cleaning rooms provided.	No new garbage facilities and cleaning rooms provided.
3.5.2	Quality	Complies with all the requirements.	Complies with all the requirements.	Complies with all the requirements.
3.6	Interface with other rail projects	Complies with all the requirements.	Complies with all the requirements.	Complies with all the requirements.

The non-compliance of all the three options with the Redfern-Waterloo Built Environment Plan objectives are listed in the table below:

	OPTION C - FULL STATION REDEVELOPMENT	OPTION D – EASY ACCESS AND F&LS	OPTION E – UPGRADE/INTERFACE WORKS IN ADDITION TO OPTION D
<i>BEP / Cabinet Objectives</i>			
Pedestrian and cycle connection from Station to Wilson Street (North Eveleigh)	Bridge integrated into Station and part of unpaid area of Station.	No connection provided.	Bridge proposed near southern of the station (opposite Cornwallis Street at entrance to ATP).
Improved connection between ATP, North Eveleigh, Redfern Street, Regent Street to the Station entrance	Connections improved and better integration with paid entrances to Station.	No change to existing.	Connections improved and integrated into proposed development site along Gibbons St.
Provision of public/civic space along Gibbons Street	New public plaza established and integrated into Station unpaid and paid area.	No change to existing.	Existing public space on the corner of Lawson and Gibbons Street maintained and entrance to Station set back from the street to create improved entrance.
Improved public domain promoting better	Design activates Gibbons And Marion	No change to existing.	Design activates Gibbons And Marion

amenity, safety and security	Street with entrance and business activity. The existing station building on Lawson Street is retained with minimal change but is not a station entry.		Street with entrance and business activity. Existing station building remains as a station entry with minimal change
Improved entrance to Station	Complete reconfiguration of all the station entrance with a new entry from Gibbons Street through a public plaza. Opportunity to provide unpaid access from north (Lawson Street) to Station entrance. ATP entrance to paid area on Station improved as Station entrance moved further south towards ATP.	No change to existing.	Maintained location of existing entrance along Gibbons Street but setback from Gibbons St. Lawson Street entrance maintained. ATP connection provided through development.
Identification of developable land along Gibbons and Lawson Streets (at any time).	Developable land prepared.	No developable land prepared.	Developable land prepared.
The future of Lawson Street building identified.	Not maintained as a station entrance. Possibility of converting it into a restaurant or an exhibition space.	Maintained as Station entrance.	Maintained as Station entrance.
Cater to increase patronage resulting from future residential and employment growth in Redfern-Waterloo	Caters for future growth in the area and provides appropriate connections	Caters for future growth in the area but not satisfactorily.	Caters for future growth in the area but not satisfactorily.



## 6. SUMMARY OF ADVANTAGES AND DISADVANTAGES

	<i><b>OPTION C: FULL STATION REDEVELOPMENT</b></i>	<i><b>OPTION D – EASY ACCESS AND F&amp;LS</b></i>	<i><b>OPTION E – UPGRADE/INTERFACE WORKS IN ADDITION TO OPTION D</b></i>
<i><b>Summary of Advantages</b></i>	<ul style="list-style-type: none"> <li>Provides centrally loaded access to all the platforms with a compact central concourse.</li> <li>Meets all the DDA requirements.</li> <li>Provides a strong image for the station</li> <li>Improves quality of service and congestion on the platform and stairs and provides optimum access for rail users.</li> <li>Has the fastest evacuation time for surface platforms and meets NFPA 130 for platforms 11/12.</li> <li>Satisfies BEP Objectives by: <ul style="list-style-type: none"> <li>Providing a public space in front of Redfern Street and the built form required by the RWA Built Environment Plan.</li> <li>Providing good direct access to the University of Sydney, to the ATP and to North Eveleigh.</li> <li>Providing an unpaid at-grade connection from North Eveleigh to Redfern Street.</li> </ul> </li> <li>Providing generous opportunities for retail development</li> </ul>	<ul style="list-style-type: none"> <li>The cheapest option to build.</li> <li>Least impact on station operation during construction than Option C</li> <li>Retains all the platform heritage buildings</li> <li>Meets most DDA requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Meets BEP Objectives by: <ul style="list-style-type: none"> <li>Providing opportunities for retail development</li> <li>Providing a satisfactory connection from ATP to station.</li> <li>Providing a civic space at the intersection of Gibbons and Marian Street.</li> <li>Providing a pedestrian bridge connecting the future North Eveleigh development with Redfern</li> </ul> </li> </ul> <p>New commercial building has less impact on Illawarra relief compared to Option C</p> <ul style="list-style-type: none"> <li>Meets the basic DDA requirements</li> </ul>

<p><i>Summary of Disadvantages</i></p>	<ul style="list-style-type: none"> <li>• Higher capital cost</li> <li>• Requires the reconfiguration of OHW and the relocation of Signal SY455.</li> <li>• All the platform heritage buildings, except on Platform 1, are removed.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not meet all the DDA requirements satisfactorily</li> <li>• Existing concourse would become more congested than it is at the moment with the introduction of lifts.</li> <li>• Does not address congestion and security issues at the existing entrances.</li> <li>• Does not meet NFPA-130 for platforms 11/12, although a fire engineering solution may be possible</li> <li>• Does not provide connections to North Eveleigh future development, ATP, University of Sydney or improve the character of the area</li> </ul>	<ul style="list-style-type: none"> <li>• Does not meet all the DDA requirements satisfactorily.</li> <li>• Provides a new entrance on Gibbons Street, but Lawson Street entrance congested and unsafe, as at present</li> <li>• Connections with North Eveleigh, Australian Technology Park and University of Sydney better than Base case but not satisfactory.</li> <li>• Does not meet NFPA-130 for platforms 11/12, although a fire engineering solution may be possible.</li> </ul>
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