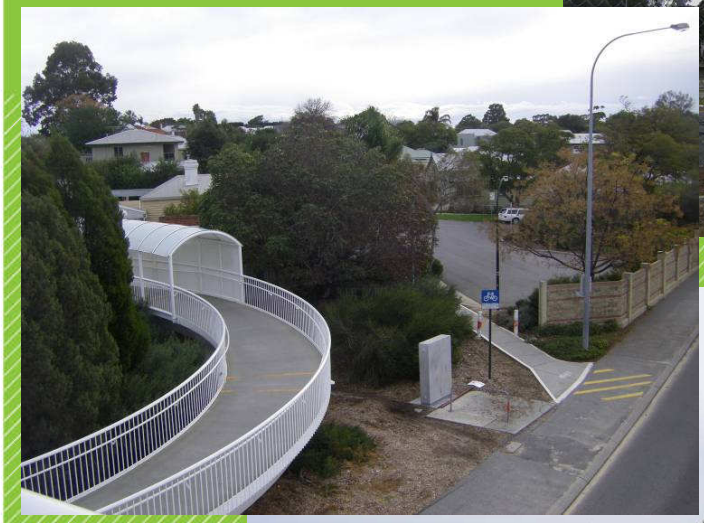

Leederville Station Link Design and Feasibility Study Draft Final Report

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City of Vincent & Town of Cambridge

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Contents

1. Project Overview

1.1 Overview and Purpose

The objective of the Leederville Station Link Design and Feasibility Study is to progress to the development of design and delivery options for the Leederville Station Link incorporating the transport, precinct and master planning concepts already adopted by the City of Vincent and Town of Cambridge.

The purpose of this report is to investigate the Leederville and West Leederville areas to identify opportunities and constraints to their function as an integrated and combined Transit Oriented Development (TOD) centre. The City of Vincent and Town of Cambridge have recently completed detailed planning and urban studies for either side of the Mitchell Freeway. The studies follow TOD principles, proposing a significant increase in development around the Leederville Station. The purpose of this study is not to review the outcomes of these studies, but to identify the synergies and drivers that contribute to options for the Leederville Station Link.

This report will focus on:

- Current status of the study area;
- Drivers for change that have identified the development of air space over the Freeway corridor as a beneficial type of development to promote revitalisation and sustainability;
- Vision and benchmarking for the Leederville Station Link;
- Criteria to guide infrastructure provision that has been addressed in the development and assessment of options for the physical design of a Link between the two centres;
- The outcomes of the design and option development process; and
- A funding and delivery strategy.

1.1.1 Vision

The City of Vincent's *Leederville Town Centre Masterplan* identified several redevelopment sites within the town centre and significant opportunity to guide wider redevelopment within the Leederville area, The Masterplan set a key goal to capitalise on the location of the Leederville train station and to ensure development is consistent with the principles of TOD. The Vision for the Oxford Town Square precinct, as outlined in the *Leederville Town Centre Masterplan and Built Form Guidelines* (2009), includes the creation of an overhead link to Leederville Station. Further, the creation of a civic square is proposed, through which a connection to the Train Station overpass can be established.

The *Leederville Train Station Precinct Study* (DPI, October 2008) suggested scenarios to demonstrate how the precinct could be better redeveloped over time. It is primarily focussed on improving the environment and efficiency of this public transport hub for patrons and the town centre users in general; increasing delivery of greater density and diversity of dwellings; and activation of mixed use and commercial opportunities within the walkable catchment of Leederville Train Station.

Part Two of the Town of Cambridge *West Leederville Planning and Urban Design Study* (2010) outlines the desired future character for each study area. According to the study it is envisaged that the precinct shall, *"be developed as a high density mixed use TOD community, with a safe and comfortable pedestrian and public transit link to the Leederville railway station and the Town Centre."*

These preceding studies highlight the significance of the connection to the station and to the areas either side of it. Therefore it is proposed that the collective project vision for the purpose of this study be:

> *"for Leederville Station to be a link between the Leederville and West Leederville centres in order that they can function as an integrated, combined TOD centre"*

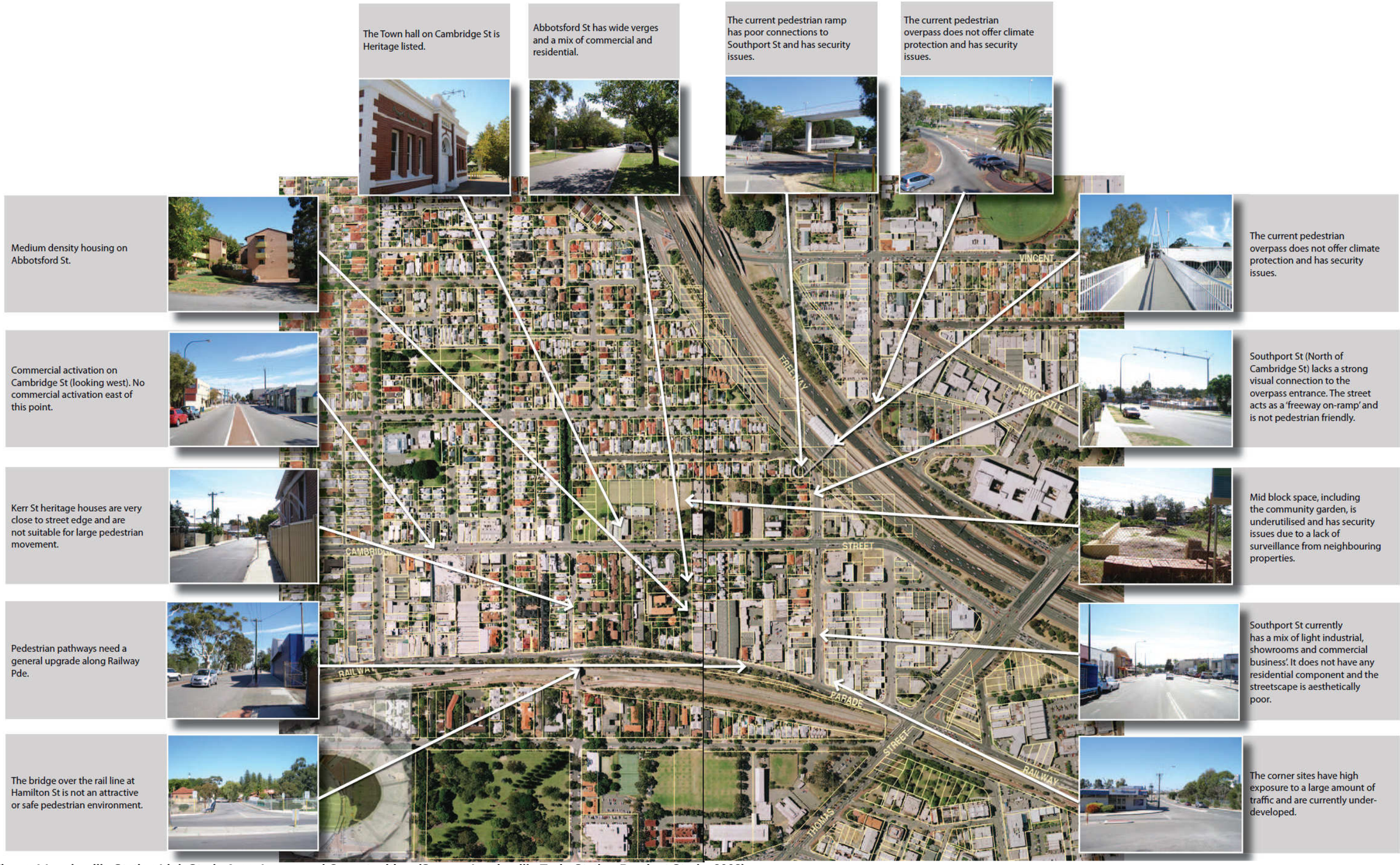


Figure 1 Leederville Station Link Study Area, Issues and Opportunities (Source: Leederville Train Station Precinct Study, 2008)

1.2 Current Movement and Land Use Patterns

Existing Infrastructure

The Leederville Train Station is located at the southern end of Oxford Street between Leederville Parade and Southport Street, and services both the City of Vincent and Town of Cambridge. The Leederville Town Centre is located within 400m of the Train Station and the links to Cambridge Street and associated redevelopment potential there provide ideal opportunities to implement TOD principles. If developed appropriately this TOD development could reduce the physical and psychological severance effect caused by the construction of the Freeway and railway, which separates Leederville and West Leederville.

The station is not serviced by Park and Ride or Kiss and Ride facilities, and while it is close to a number of public car parks, these are not intended for use by commuters. It is noted that there is some all-day parking in the Avenue and Frame Court car parks that is cheaper than car parking in the CBD (at $14/day 2011/2012 financial year), and therefore there are commuters parking in the City of Vincent car parks and then catching the train from Leederville Station to the CBD.

The station is a destination station, rather than an origin station. Most of the trains coming from the northern suburbs are full in the mornings, when they arrive at Leederville, going into the city. There is not currently any bus interchange, it is predominantly "walk-on" patronage. However, it is noted that the Department of Transport is due to release its report on a proposed “shuttle” bus link from the Leederville Station connecting West Perth and Subiaco (continuation of existing No.97 route to UWA) which will give the station a more important interchange role, allowing the station to be used as a transfer point for passengers bound for City West and Subiaco destinations. The possible introduction of a green Central Area Transit (CAT) bus, similarly serving West Perth and connecting to the Esplanade Bus Port, will similarly increase the interchange function of the station. It will be important to integrate this potential bus interchange role, without compromising the station’s connectedness with surrounding destinations by providing many access options to and from the Leederville Station Link.

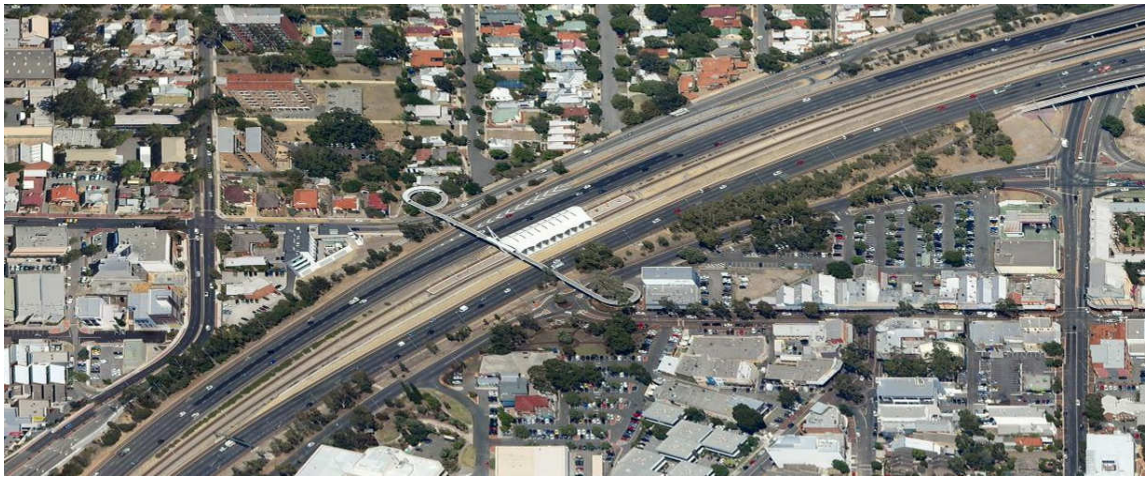
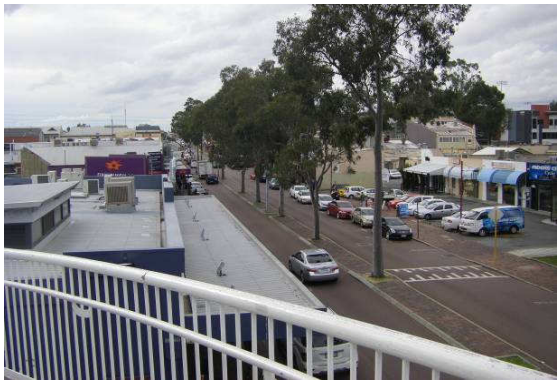


Figure 2 Aerial view of Leederville Station

Leederville (Oxford Street) pedestrian bridge connection

Cable stay bridge structure



View along Oxford Street from pedestrian bridge

West Leederville (Southport Street) pedestrian bridge connection

Figure 3 Photographs of Local Context

Leederville station is located in the centre of the Mitchell Freeway, in common with all the Northern Suburbs stations. It is accessed via a pedestrian overpass at the southern end of Oxford Street, and via pedestrian overpass from the western side of Southport Street. The current pedestrian overpass existed before the station was built. It largely does not offer climate protection and has security issues due to the lack of passive surveillance and overlooking at many points. At either end of the overbridge, the bottom of the pedestrian ramp, and hence the entry point to the station, has poor connection to Southport Street on the west and is not clearly visible from Oxford Street on the eastern side. In addition, the view from the bridge does not create a sense of entry into the Oxford Street precinct, and people travelling southwards and having to re-cross Southport Street.

Where a station is not well appointed, nor intermodally connected, even a well-designed new transit-oriented development will tend towards failure on a number of levels. Failure can be measured through a loss of patronage and/or an increase in incidents like graffiti or vandalism, rising with a public perception of insecurity. A high level of day and night time activity around the proposed 'transit plaza' and along the approaches to the Freeway overpass, Leederville Station and Town Centre has the potential to reduce anti-social behaviour, although Crime Prevention Through Environmental Design (CPTED) principles will still be highly important in any design.

The existing land to the east of the Freeway is relatively flat with Oxford Street on a gentle slope to the south from the Vincent Street intersection to the roundabout with Leederville Parade. The Freeway is elevated slightly from the adjacent Leederville Parade and the land rises from the existing roundabout to the south beneath the footprint of the existing overbridge. The existing level at the southern end of Oxford Street is approximately 15m AHD. The southbound carriageway of the Mitchell Freeway is approximately 17m AHD with the track levels and platform in the centre of the Freeway approximately

18.5m and 19.5m AHD respectively. The northbound carriageway of the Mitchell Freeway is approximately 18m AHD and then the land to the south of the Freeway climbs relatively steeply towards Cambridge Street with an average gradient of approximately 6%.

The pedestrian overpass is a cable stay structure with a deck thickness of approximately 800mm. The main cable stay support is located in the centre of the bridge located on the station platform with further supports in the highway reserve on the eastern and western sides of the Freeway with additional support provided at the spiral ramps connecting to the street level. The maximum span of the existing overbridge structure is over 40m which is only possible due to the support provided by the cable stay.

The connection from the overbridge to the Train Station currently consists of covered stairs and a ramp for accessibility. There is currently no lift or escalator services within the station to access the overbridge.

The overpass currently maintains a minimum vertical clearance of 5.5m from the bridge soffit to the Mitchell Freeway and is highest at the centre of the structure. The bridge and ramps have been designed and constructed prior to the introduction of accessibility requirements; therefore the ramp gradients may be as steep as 1 in 8 without any landings.

The minimum clearance requirements for the railway will be in accordance with Public Transport Authority (PTA) guidelines which require a minimum vertical clearance of 5.2m.

Land Use Patterns

Currently there is a commercial land use focus around the Leederville Train Station, with a retail and entertainment area centred around Oxford Street, and commercial uses in the eastern portion of West Leederville. Oxford Street originally extended through to the Fremantle railway line. The establishment of Mitchell Freeway severed this established main street. The West Leederville area is generally more residential in nature; however the Southport Street commercial area within West Leederville is currently experiencing renewal and new development more in keeping with TOD.

Within the 400m walking distance of Leederville Station is the Water Corporation site, the School of Isolated and Distance Education (SIDE), Leederville Oval and the Oxford Lane residential apartments, which comprises 63 multiple dwellings, and the Office of Energy. The Water Corporation are looking at further development on their site and as this link would support their green transport plan. Within the 800m walking distance of the station are the TAFE Leederville Campus, the City of Vincent Administration and Civic Centre, the Department of Sport and Recreation offices and the Loftus Recreation Centre. The northern part of the Cambridge catchment is largely residential. The Station Precinct area contains a mix of low, medium and high density residential developments, commercial and light industrial businesses as well as hospitality, retail and entertainment uses, but currently does not have the densities required for a truly successful TOD.

The provision of activity above the station in the form of a ‘transit plaza’ is attractive as the pedestrian ramps from the station to the street level are themselves so long that whilst in plan a 400m walking distance contains the retail and commercial activities, in fact pedestrians have to walk approximately 150m before reaching them. The station has no street presence on either side of the railway and does little to promote use of the train. Any potential design should give the Station a ‘front door’ or entry statement that is consolidated with supporting development, to attract and direct people to the station and to better integrate the station with its surroundings, and with peoples’ movement patterns.

Movement Patterns

Due to the mix of low, medium and high density residential developments, commercial and light industrial businesses as well as hospitality, retail and entertainment uses in the surrounding area, Leederville Station has consistently attracted a steady patronage level. With the expansion of the railway to Mandurah in December 2007 there was interest in whether this attracted patrons from further away to visit Leederville, especially to the entertainment venues.

The boarding trends at Leederville Train Station over a 32 week period between 2 September 2007 and 23 March 2008, using the recorded number of Smartrider 'tags' made at the station each week, was analysed as part of the *Leederville Train Station Precinct Study*. There was a noticeable increase in patronage after the opening of the Mandurah line, however, these numbers are still relatively low in comparison to other stations where a greater diversity and number of housing options are offered in conjunction with a range of retailing and business opportunities, such as Subiaco Station.

To summarise the patronage pattern in order to understand the balance between origins and destinations in the peak periods (ie in terms of patrons alighting at the station in the peak periods, compared to getting on trains to go elsewhere) further analysis was undertaken on data collected by the Public Transport Authority between 14 and 18 March 2011. The balance between boardings (347) and alightings (1518) in the AM period between 06:30 and 09:00 clearly shows that Leederville is a Destination station. In the PM period between 16:00 and 18:00 boardings (872) far outweigh alightings (375). The total number of station boardings averaged at Leederville Station in March 2011 was 2,920 per day, which is an increase from 2575 boardings in October 2010, and when compared with 2007/2008 data shows a trend of steady increase, despite the capacity constraints of the rolling stock which restrict patronage growth.

Land Tenure

The Freeway reserve is State Government land vested in the Commissioner of Main Roads. Land parcels on Southport Street are also owned by Main Roads WA and encompass the pedestrian access to the footbridge, and remaining unutilised land. One dwelling near the spiral ramp was recently purchased from Main Roads WA by the Town of Cambridge (refer Figure 4 and 5 for land ownership in the Town of Cambridge West Leederville Precinct and City of Vincent Leederville Precinct). The Leederville Station infrastructure and footbridge are managed and maintained by the PTA.

During the development of aspects of the Leederville Town Centre Masterplan there was discussion relating to the construction of retail/commercial outlets over the rail station. One of the areas of discussion was the desire by the PTA to have the option of excluding the public from PTA's property. PTA's particular concern was security of its property late at night. A key issue to understand is the role of the pedestrian overpass as a public thoroughfare, used to link communities across the Freeway, if it is to be given a more important role in public access. Although there is no data available to understand the level of use by non-train users, it is suspected that the numbers are as high as, or higher than, the numbers of people using the pedestrian overpass to access the rail station. Therefore infrastructure improvements would need to be accompanied by station security improvements to establish paid and unpaid areas.

Also, State Government approaches to strategic and transformational projects may now have changed with consideration for alternative strategies through projects such as the Hub (Perth City Link Rail Master Plan), with Public-Private-Partnerships providing integrated development outcomes. While PTA must ensure the provision of an efficient, safe, robust public transport infrastructure and operating system, the Authority is increasingly considering proactive measures in negotiation with developers to allow air rights and innovative tenure strategies such that PTA land and infrastructure becomes an integrated part of the urban fabric. This increasing recognition of the role of the station as a facilitator of and contributor to urban development may offer opportunities for outcomes that benefit PTA, local authorities and developers, but will require recognition of PTA's station management and security needs in any design solution, as well as agreed precinct management plans between the parties.

Figure 4 Land Ownership in West Leederville Precinct (Town of Cambridge)

Figure 5 Land Ownership in Leederville Precinct (City of Vincent)

2. Key Drivers for Change

2.1 Relationship with key State Government Policy

Early planning work undertaken for the Leederville Station Link area was considered according to the Department for Planning and Infrastructure's Network City in which a TOD was described as "a compact, mixed use community within a walkable catchment of a transit place, blending housing, shopping, employment and public uses in a pedestrian friendly environment that makes it convenient and practicable for residents and employees to travel by public transport".

Planning Policies and Framework

Directions 2031

Directions 2031 and Beyond (August 2010)('*Directions 2031*'), responds directly to several of the tasks identified in the Western Australia Planning Commission (WAPC) Statement of Planning Policy (SPP) No. 1 *State Planning Framework Policy* (Variation No. 2), including detailing the metropolitan structure, determining local population housing and job targets, managing growth and developing the activity centre concept. It is based on a vision that:

> "By 2031, Perth and Peel people will have created a world class liveable city: green, vibrant, more compact and accessible with a unique sense of place."

Western Australia has a suite of policies focussed on the integration of public transport with land use planning. The implementation of *Directions 2031* through growth management strategies provides more opportunities to reinforce this integrated approach.

SPP 4.2 Activities Centres State Planning Policy also supports this approach, as does *DC Policy 1.6 Transit Oriented Development - Development Control Policy*. Whilst the TOD policy is under review, State Government is taking the position that this should ensure that there is a focus on, and investment in, areas that have genuine development potential and that can have a positive influence on public transport use.

Directions 2031 is a high level spatial framework and strategic plan that establishes a vision for future growth of the metropolitan Perth and Peel region. It will guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate a range of growth scenarios.

Directions 2031 identifies the connected city model as the preferred medium-density future growth scenario for the metropolitan Perth and Peel region. Importantly, a connected city pattern of urban growth is characterised by:

- Reducing energy dependency and greenhouse gas emissions;
- Developing and revitalising activity centres as attractive places in which to invest, live and work; and
- Planning and developing key public transport corridors, urban corridors and transit oriented developments to accommodate increased housing needs and encourage reduced vehicle use.

To achieve a connected city pattern of growth, *Directions 2031* has set the following targets as medium to long-term aspirations and to ensure growth of the city can be sustained beyond 2031:

- A 50 per cent improvement on current infill residential development trends of 30 and 35 per cent; and, has set a target of 47 per cent or 154,000 of the required 328,000 dwellings as infill development; and
- A 50 per cent increase in the current average residential density 10 dwellings per gross urban zoned hectare; and, has set a target of 15 dwellings per gross urban zoned hectare of land in new development areas.

Central Sub-regional Strategy

The *Central Sub-regional Strategy* (Draft, August 2010) includes the City of Vincent and the Town of Cambridge. It is based on the outcomes sought by *Directions 2031* which set employment and housing targets for the Central sub-region. The Strategy investigates opportunities for the delivery of the targets and sets strategic priorities for the long-term development of the sub-region.

Leederville is identified as a secondary activity centre where planning for a diverse mix of services, facilities, activities, amenity and housing types is a key focus to facilitate economic development and employment. West Leederville is a district centre in the Activity Centres hierarchy, generally serving the main weekly household shopping, service and community needs of the district. District centres are predominantly retail focused but many also include a limited mix of other uses. Leederville is a key transit oriented growth area. The take-up of dwelling yield to 2031 in this key growth area under the Medium (85%) scenario is 800 dwellings.

West Leederville, whilst designated as a district centre, shares characteristics with secondary centres. In terms of its retail function, West Leederville serves more of a lower order function, providing for the daily and weekly needs of residents. However, the centre's proximity to the city centre and accessibility to the Leederville and West Leederville train stations has increased the attraction of the area for offices and professional and service businesses; which is more a characteristic of secondary centres. The Town of Cambridge's plan for West Leederville seeks to capitalise on the centre's distinct locational advantages.

The Town of Cambridge has identified a potential dwelling yield for West Leederville of at least 500 dwellings, and likewise the City of Vincent has identified a potential dwelling yield for West Leederville of at least 305 dwellings. The Town Planning Scheme will provide incentives for inclusion of residential development within mixed use developments to help achieve this target.

Capital City Planning Framework

The *Capital City Planning Framework* (Draft, June 2011) provides a detail contextual analysis of central Perth and outlines the key challenges for the future. It incorporates both short and long term implementation actions and these are aligned with those of *Directions 2031* and the *Central Metropolitan Sub-Regional Strategy*.

The framework focus area includes a number of significant activity centres beyond the central core that display high levels of employment, including Leederville. It is also recognised as a popular retail, recreation and social destination. Leederville Station is noted to be a key potential transit-oriented development location close to the inner city.

Transport Policy

The public transport network plan, *Public Transport for Perth in 2031* (July 2011), identifies the public transport network needed to support Perth's growing population under the connected city pattern of growth identified in *Directions 2031*, and links to and between strategic centres. It also proposes the preferred type of public transport service (mode) and priorities for infrastructure investment across the network. The vision of this plan is that "Public transport will be the preferred choice of travel to Perth's strategic centres and through growth corridors."

Planning for existing and potential activity centres into the future will have an increased focus on transport integration and transit oriented development, agglomeration of economic activities and mixed use development including higher density housing. This is also recognized in the draft *Capital City Planning Framework* where it is noted that planning is required for better mass transit systems that do not divide, but instead connect the major centres of activity, health, education and tourism with our town centres, for example Crawley to Subiaco, and Subiaco to Leederville. Also, better connections north of the city centre linking the east with the west, and West Leederville with Leederville are noted as a key requirement.

The public transport network plan shows a long term light rail connection to Stirling at 2031 (refer **Figure 4**). Connection to Leederville train station could provide a more immediate opportunity, the benefit being that Oxford Street is already an active retail/entertainment precinct), and a logical opportunity for inter-modal connections.

Figure 6 Proposed public transport network plan at 2031 (DoT, 2011)

A number of transformational projects are identified in the public transport network plan as a further opportunity to achieve strong alignment and integration with land use. It is recognised that existing planning policies may need to be enhanced to secure minimum development outcomes and

contributions to projects from the private sector. The recent changes to the *Planning and Development Act 2005* to provide for Improvement Schemes provide such a mechanism. A careful focus on application of those schemes is needed.

The public transport network plan notes that the transformational projects ought to be conditional on specific criteria, including:

- A contribution to the capital cost of the projects by the private sector, based on value transfer from increased property value;
- Alignment of support from local authorities to achieve a practical network across local boundaries; and
- Minimum development outcomes being secured.

These factors will need to be considered in the options for Leederville Station Link particularly with its identification as a key location for medium to large scale transit oriented development, which will lead to increasing boardings.

2.2 Local Government

The Town of Cambridge and City of Vincent have explored scenarios for change, and have adopted a detailed planning framework based on the West Leederville Planning and Urban Design Study and the Leederville Masterplan.

The adopted growth scenarios provide the basis for establishing option development in this study. The key elements of each scenario relevant to developing design options for the Leederville Station Link are identified below:

- Upgrade pedestrian access to and from Leederville Station in conjunction with the removal of spiral ramps to the overpass and the installation of lifts and escalators at the northern end of Southport Street;
- Extend the Route 97 Shuttle Bus from Station Square in Subiaco to connect with the Leederville Station via Cambridge Street;
- Make an at-grade, desire-line pedestrian connection between Cambridge Street and the Leederville Station in conjunction with the co-ordinated, transit oriented redevelopment of the residential towers near the corner of Cambridge and Southport Streets;
- Integrate a Shuttle Bus stop and turn-around into the design of the new Southport Street mixed use development adjacent to the Freeway to provide ready access to the Leederville Station and Town Centre;
- Extend selected streets from the West Leederville street grid southwards to make strategic connections to Subiaco and West Perth to improve permeability of the area for vehicles and/or pedestrians; and
- Develop an at-grade ‘transit bridge’ connection between the Leederville Town Centre and West Leederville that accommodates an open air pedestrian arcade with escalator access to the Station and Oxford Street, an extension of the Route 97 Shuttle Bus and a single level of activated retail tenancies with contiguous awnings to seamlessly connect Cambridge ‘High Street’ with Leederville Station and Oxford Street in the Town Centre.

2.2.1 Redevelopment Scenarios

A number of other studies and concepts have been explored relating to transport and land use integration which should be considered in the context of this study. They are summarised below for reference.

Impact of Growth in the Northern Metropolitan Area

The growth in the northern metropolitan area will place increased demand on public transport services and infrastructure. The implications for the Leederville Station Link are that already capacity services

during peak usage times for rail users will need to be supplemented with either additional services, or alternative public transport modes.

A focus on increasing densities through infill development of inner-city suburbs Leederville and West Leederville will also continue to impact on rail services. This is the basis for incorporation of multi-modal transport into the Leederville Station Link design options.

Economic activation of the area will also present additional opportunities for local employment and an alternative focus to existing transport movements in-bound and out-bound from the CBD.

Surrounding Redevelopment Context

Previous studies identified potential urban regeneration projects within an 800 metre radius of the Leederville Train Station. These include the Leederville Masterplan, West Perth Regeneration Masterplan, and City West Precinct, and now the West Leederville Precinct. All contain a mix of uses and entail a large increase in residential density in the area. Although some of these urban regeneration areas are outside the immediate catchment of the Leederville Train Station, due to their scale they have the potential to impact significantly on the Leederville Station Precinct.

Since the completion of these studies, some priorities and infrastructure locations have changed. The most significant of these is the relocation of Perth Stadium to Burswood as a State Government initiative. Kitchener Park, adjacent to Subiaco Oval, and the Burswood Peninsula were identified as possible sites for a new stadium by a task force headed by businessman John Langoulant. The Langoulant review found the Burswood site would be more expensive than other options due to the significant upgrade in transport infrastructure needed. This new 60,000 seat stadium will replace the existing Subiaco Stadium. This has been a highly political outcome which will change some of the drivers associated with the Leederville Station Link but will not detract from its importance to reconnect and link the Leederville and West Leederville centres in order that they can function as an integrated, combined TOD centre.

Proposed Bus Routes

The ‘Subiaco Shuttle’ bus service (route 97) is operated by Transperth, with contributions from the City of Subiaco, Sir Charles Gairdner Hospital and UWA. The service runs from Subiaco Train Station to UWA, passing the QEII Medical Centre, which includes Sir Charles Gairdner Hospital. Between 2001 and 2006, boardings on the Subiaco Shuttle increased by 40%, indicating public acceptance of the service.

The *Integrated Transport Study* for the DPI (Connell Wagner, 2008) supported an extension of the ‘Subiaco Shuttle’ route and proposed 7 different route options, each of which require infrastructure changes to facilitate the extension to Leederville Station. The purpose of the proposed extension was to allow patrons to alight from the Joondalup rail line at Leederville station and transfer to the ‘Subiaco Shuttle’ bus service, connecting them with a range of services and activity centres.

The proposed routes for a bus service linking the Leederville town centre with West Leederville were considered as part of an ‘inner collar’ service. Subsequently, a number of redevelopment scenarios were identified in the Leederville Masterplan, Leederville Train Station Precinct Study and built upon by the Town of Cambridge as part of the *West Leederville Planning and Urban Design* Study. The DoT has also recently undertaken a Bus Interchange Feasibility Study, addressing the Subiaco shuttle bus extension, which is further discussed below.

Some key components of the previous scenarios that are relevant to this study, and that may be further considered in the development of options for the Leederville Station Link, are summarised below:

- Pick-up/drop-off facility;
- Bus stop for future bus services (the ‘Inner Collar’);
- Wider and fully enclosed pedestrian overpass;

- Vertical access via stairs and a lift at both Southport and Oxford Street locations;
- Mixed use/commercial tower on prime corner site currently occupied by spiral ramp for pedestrian overpass access (MRWA land);
- Train Station upgrades including revised vertical access (a lift and stairs), security improvements and additional services, such as a kiosk on the platform;
- Integration of cyclist access and incorporation of bike storage facilities; and
- Full length climate protection for pick-up/drop-off facility and bus patrons. Vertical circulation via stairs and lift.

Bus Interchange

There is currently no dedicated inter-modal transfer point at Leederville Train Station, although there is an identified opportunity to link the station with significant employment areas, origins and destinations including West Perth, West Leederville and Subiaco, as well as QEII and UWA and key land uses along the Cambridge Street corridor.

The Department of Transport (DoT) commissioned the *Leederville Station Bus Interchange Feasibility Study* (DoT, 2011) which outlines concept designs for a bus interchange facility at the Leederville Train Station to serve modal transfers from the Joondalup Line to inner city locations.

The development of an interchange at this location would allow for new routes to be introduced, existing routes to be diverted and alternate routes proposed. The PTA recently undertook a review of CAT services within Perth. An identified option is to introduce a new 'Green' CAT service that would run from a location near the Esplanade in the CBD and terminate at the Leederville bus interchange facility. In this scenario the Green CAT would generally follow the same alignment as the Medium Term Option (along Colin Street in West Perth) until it reaches Wellington Street. At this point the CAT travels along Wellington Street, Sutherland Street, Railway Street, Railway Parade and Southport Street to access the southern side of Leederville Train Station. Additionally, the option to extend route 97 from Subiaco to Leederville Train Station was considered within the study.

The assessment undertaken identified that the option shown in **Figure 7** below provides the most effective outcome, subject to a number of steps recommended for progression of the proposal to a more detailed stage. However, the benefits of the bus interchange concept to the local area are not clear. Therefore bus stops along the existing route would still be maintained and not all buses would divert through the bus interchange in order to maintain local services to the local area.

The existing Cambridge Street bus stop locations (on each side of Southport Street) are not ideal as the stops (which serve the same bus services but for inbound and outbound routes) are relatively distant from each other, but serve local Cambridge Street destinations (destined to become more of a main street) as well as Leederville Station. While the existing stops are something of a compromise between providing local bus accessibility and catering for bus-rail interchange, the Leederville Station Bus Interchange proposal would provide benefits to bus-rail commuters (expected to increase with planned bus network changes), but would potentially disadvantage local bus users (not least by locating stops in a more isolated area – personal safety issues ought to be considered). The planned developments in the West Leederville precinct (including the development of a stronger main street environment in Cambridge Street) and the desire for greater public transport use for local access would not be strongly supported by the proposed interchange. Impacts on local bus access are not discussed in the Leederville Station Bus Interchange Feasibility Study.

While retention of one of the existing bus stops is canvassed from a bus operational perspective, impacts on local accessibility of the relocation of the Cambridge bus stops are not identified. Data on existing average daily bus stop use quoted in the study appear very low and ought to be confirmed, and there is no forecast of future passenger use of stops, from either local growth or increased intermodal transfer.

It is important to note that bus stops in this precinct will have an important role in encouraging public transport use locally, as well as supporting increased intermodal transfer. The Leederville Bus Interchange proposal appears to consider only the needs of bus-rail commuters.

The DoT and PTA will need to consider the bus network benefits and implications of a new bus connection over the Freeway, should this be a feasible option that is taken forward.

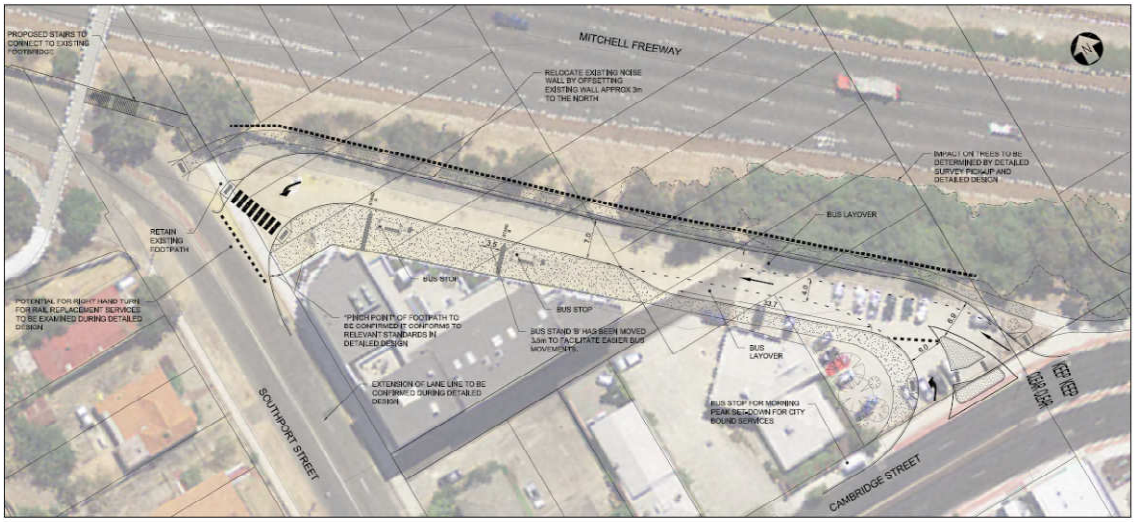


Figure 7 Leederville Station Bus Interchange Facility, Design Concept Preferred Option (DoT, June 2011)

Figure 8 Location of the proposed Leederville Station Bus Interchange Facility (view from the pedestrian bridge)

2.3 Local Economy

Various studies have assessed the forecast growth potential for the Leederville Station area. The figures below are a summary of these sourced from documents supplied by the City of Vincent and Town of Cambridge, including:

- Leederville Masterplan Development Proposition and Marketing Presentation (Colliers International, date unknown);
- *Integrated Transport Study Leederville Masterplan* (Connell Wagner, 2008);
- *Commercial Viability Study –West Leederville Economic Analysis* (Pracys, May 2010); and
- *Economic Development Strategy 2011-2016* (SGS Economics and Planning, November 2011).

2.3.1 Land Supply and Demand – Leederville

Residential

Within the Leederville Masterplan area, and portion of the West Leederville area, there is an existing residential catchment of 2,500 dwellings, or 4,800 residents. This is expected to rise to 3,400 dwellings, or 6,500 residents, when development under the Masterplan is realised. This represents a 36% increase in residents. *(Note figures rounded to 100s for ease of reference).*This increase excludes any residential land use increases outside of the Masterplan area.

Residential Demand Summary

Demand assessment identifies strong underlying demand for inner city apartments from investors/owner occupiers. Apartments in Leederville are targeted at the investor and young professional markets. Market absorption of new apartment developments inner city has been fast paced (990/0 uptake within 1st year) with strong demand leading to rapid price escalation (500/0 increase from 2006-08). Demand is expected to remain strong with pressure from various markets and demographic shifts e.g. inner city living, smaller households.

Office

The West Perth and Subiaco office market is tight which will create demand for the Leederville locality (0.70/0 vacancy). Currently much of the demand is for smaller areas 150 - 200 sq m. The southern railway line was expected to open the catchment up and increase likelihood of attracting larger tenants. The CBD future supply cycle may have an impact on fringe office locations, and continued economic and business expansion will assist in maintaining underlying demand.

Employment

Employment opportunities within the study area are expected to increase by 145% (floorspace area) with redevelopment under the Masterplan. The existing 58,000 m2 of office and retail floorspace corresponds to 2,300 jobs. The ultimate land use will yield a forecast 142,000 m2 of floorspace / 6,250 jobs. This represents an increase in employee density, from 3.97 jobs per 100m2 to 4.40 jobs per 100m2.

Mixed Use Land

The area of mixed use land within the Leederville Masterplan area is dependent upon the built height. For mid height buildings, an increase from 5,900 m2 to 14,750 m2 (150%) is expected; for mid/high height buildings, an increase from 5,900 m2 to 24,600 m2 (316%) is expected.

Summary of land potentially available for development

- 1.34 - 1.57 ha of Land potentially available for development.

- Possible staged sales process.
- Developer to provide 720 car bays.
- Alternatively provide cash payment to construct bays.

The changes to floorspace dedicated to the different land uses and the percentage increase in the different land use categories are shown below. Changes to the areas of mixed-use and office land uses are expected to be the most significant.

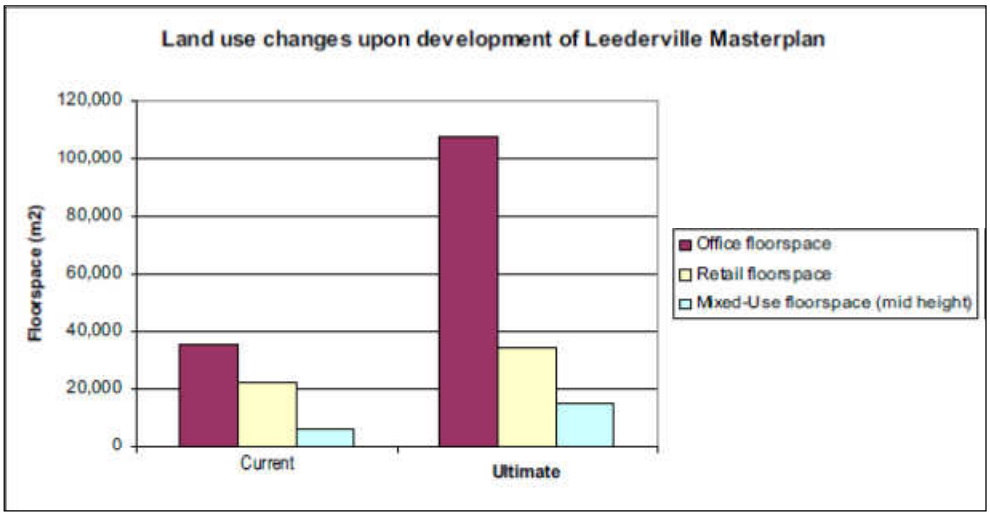


Figure 9 Changes to floorspace upon development of Masterplan

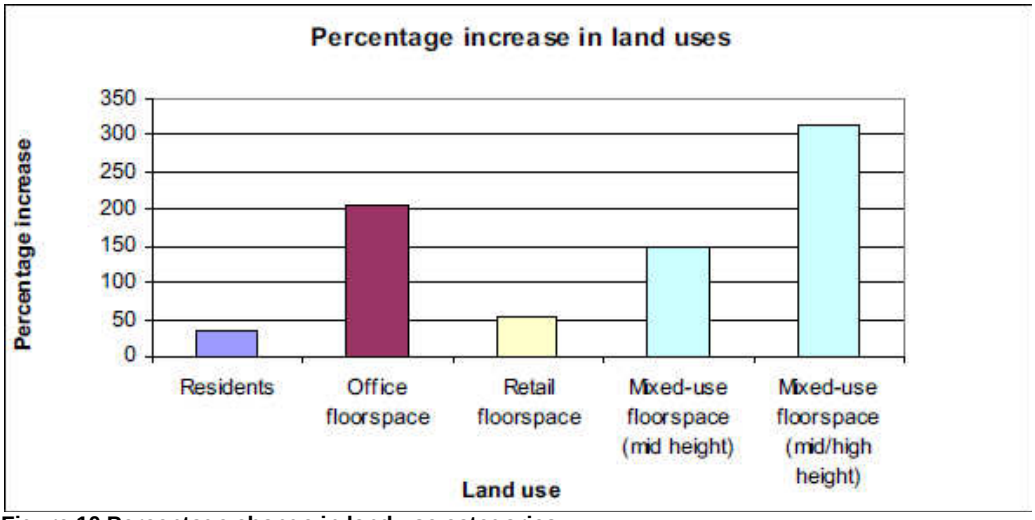


Figure 10 Percentage change in land use categories

2.3.2 Land Supply and Demand – West Leederville

Previous studies identify the following land required to activate the area and which would potentially be available for development. Once an understanding of the future built form of the precinct is developed, it is possible to determine a likely future user mix that will be associated with it. The number of residents in the precinct will be directly related to the number of dwellings within the

precinct. Likewise, the number of workers is directly related to the quantity of retail, commercial and office floorspace within the precinct.

Table 1 Future Land Use Mix – Summary

	Leederville Station Link		Cambridge High Street		Southport Street	
Planning Land Use Code	A	B	A	B	A	B
Manufacturing/ Processing/ Fabrication	-	-	-	-	1565	**33**
Storage/ Distribution	-	-	-	-	11735	**353**
Retail	3000	93	9483	268	7041	**148**
Service Industry	-	-	1806	29	5476	**35**
Office/Business	6,319	255	22127	892	45376	**543**
Health/Welfare/ Community Services	-	-	4064	123	780	**31**
Entertainment/Recreation/Culture	596	10	4064	67	3129	**95**
Residential	**	-	2709	12	1565	**26**
Utilities	-	-	903	17	1565	**7**
Total	**9,915**	**358**	**45156**	**1408**	**78232**	**1271**

A: Floorspace (sqm NLA)
B: Employees (FTE)
****The Leederville Station Link currently accommodates around 200 dwellings. Future redevelopment of the Leederville Station Link would look to increase this number of dwellings.**

A number of assumptions have gone into the land supply, demand and potential employment figures such as the actual densities that may be achieved, the appropriateness of commercial activity in different nodes and street frontages, and intensity of the built form. On the grounds of commercial viability, the outcomes of the analysis support the level of development proposed by the West Leederville Planning and Urban Design Study. The recently developed West Leederville Activity Centre Plan provides a further summary of the commercial viability study and estimated employment, It has not been reproduced here but further supports future development in West Leederville.

The relationship between the number of visitors and the built form of a precinct is more complex. This is due to the correlation between the number of visitors and the quantity of residential and commercial activity within a precinct not being necessarily linear due to the impacts upon perceived amenity that occurs with increased diversity and intensity on offer. To account for this, the number of visitors to the precinct was modelled to increase in direct proportion to the number of residents and workers, with an additional 25% growth in visitor numbers incorporated to account for the likely growth in surrounding catchments and the growing role of West Leederville as a regional destination. It is also assumed that the frequency of visitation to the precinct doubles to 106 visits per annum from 53.

Table 2 Future User Mix

Users	Number of users	Frequency of Visitation (per annum)	Number of Visits (per annum)
Visitors			
General	1,019	80	**107,983**
By Passers	143	157	**22,492**
Special Events	169,049	2	**338,098**
Residents	485	365	**177,005**
Workforce	358	236	**84,500**
TOTAL	**171,054**		**730,078**

Economic Activation

The Economic Activation Diagram below illustrates the existing and future key nodes within the Leederville Station precinct and identifies areas of active frontage.

Recent demand analysis for the precinct suggests that whilst the proposed supply of entertainment floorspace will be viable, only slightly more than half of the retail floorspace provision will potentially achieve the benchmark productivity (Pracsys 2010). The viability of the precinct will improve slightly when the demand for retail and entertainment services from precincts such as the community precinct and the Kerr to Abbotsford Street precinct (which contain no retail and entertainment offering) is considered. Knowing that the viability of the proposed quantity of floorspace may be marginal, it is important that retail and entertainment offering is staged within the precinct and encouraged to concentrate around a central core, rather than attempting to activate too greater area, and risk dispersing activity to the detriment of the vibrancy and viability of the area. Likewise, retail achieving lower floorspace productivities may still be viable with the precinct, however consistently lower floorspace productivity may reflect a decreased value of offer.

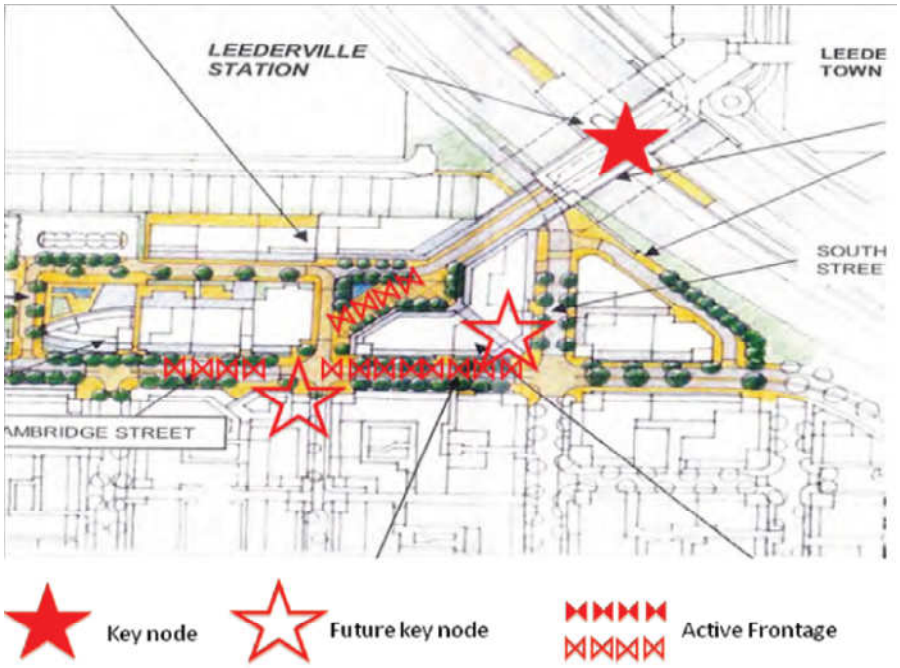


Figure 11 Leederville Station Link Economic Activation Diagram (Pracsys 2010)

2.3.3 Land Supply and Demand Summary

This background study points to there being a solid case on which to leverage further activity and encourage development through better levels of accessibility to and from Leederville via the Leederville Station Link.

The developments realised to date in the study area have been “transit adjacent but not transit oriented.” The urban infill/regeneration projects identified for Leederville and West Leederville have identified a supply of land potentially available for development and supporting demand for an increase in residential population, an increase in workforce and students of over 4,000 people, significant increase in office/commercial floorspace as well as moderate increase in mixed use and retail floorspace.

Strong demand in the inner-city residential apartment market and a tight office market in West Perth and Subiaco underpin the growth of the area. In order to achieve the development potential of the area, the Leederville Station Link provides a key element in providing connectivity and economic activation of the Leederville Station Precinct.

Connectivity and Pedestrian Movement

The large employment catchment of Leederville and West Leederville is reflected in the travel to work data, which indicates that employees are drawn to the precinct from all over the metropolitan area. Private transport is slightly more prevalent in Leederville than other centres, with this trend largely supported by the relative availability of car parking in the precinct. Public transport travel is heavily influenced by the train station. This has resulted in a substantial proportion of employees travelling to the centre from all along the northern and southern lines. Improved pedestrian access to local employment and access to retail and services for an increased residential population can be facilitated through the Leederville Station Link.

The link is important in providing connectivity to the major trip attractors of the area including TAFE, the café strip, entertainment opportunities and the Water Corporation. The link would also improve access for the major trip generators for the study area including businesses accessing clients and suppliers, and residents accessing UWA, QEII Medical Centre and Perth CBD.

The Leederville Station Link is also important in providing multi-modal public transport options (i.e. better connectivity with bus services) for intra-suburban trips to reduce reliance on rail services (in-bound and out-bound from the CBD).

Conclusions

The Leederville Station Link is crucial to achieving the economic future for the precinct that is aspired to in the planning frameworks developed by the Local and State Governments.

This conclusion is based on the scale of growth in the areas of population, workforce and floorspace compared to the lower order potential patronage growth of the rail station. Through these key drivers the case is demonstrated for the Leederville Station Link to support transit oriented development and growth.

3. Consultation Outcomes

3.1 Approach

Preliminary consultation with key stakeholders was undertaken prior to the Design Workshop to identify key issues and opportunities, generate understanding of the project scope, and understand the level of stakeholder buy-in and support of the Leederville Station Link concept.

Meetings were held with:

- Public Transport Authority;
- Main Roads WA;
- Department of Planning (DoP); and
- City of Vincent and Town of Cambridge project team.

Subsequently a Design Workshop was held on 28 July 2011, the aim of which was to have an interactive session to run through:

1. **Purpose**

2. **Drivers and Basis of design**

- State Policy
- Local Planning for Leederville and West Leederville
- Design principles
    - Land use Integration and transport
    - Form and Function
    - Hierarchy of users (User requirements)

3. **Location characteristics**

- Fixed and negotiable items
- Entry, access and movement network characteristics
- Bus interchange requirements (current and future space/capacity requirements)
- Land tenure and ownership

4. **Options Development**

The workshop presentation and minutes are provided in **Appendix A**.

3.2 Outcomes

Discussions with the DoP identified that a key consideration will be the structure working around an operating rail station and Freeway. This will guide the height of the structure and building block, which will give order of costs which will lead to a determination of economic feasibility. Issues with timing of construction and impact on operations of rail and road create a potentially major cost impact (night-time construction, construction management etc).

The potential concept of integrating a multi-storey building over the rail station (potential office accommodation) was also discussed. A number of recent projects and practices were discussed that have made use of right-of-way air rights in reclaiming buildable space in dense urban areas plagued by a shortage of developable land (e.g. Graham Farmer Freeway, 140 William Street). The framework for implementation of such development needs to explore Freeway title where boundaries fixed by height above height datum (AHD), positive covenants and easements. It should be noted that this is

not a new concept. The idea of air rights utilisation as a means of reconnecting a city divided by a right-of-way has been applied since the 1970's. Some case studies are further explored in Section 4 of this report.

The PTA voiced concern over the feasibility and implementation aspects of the Leederville Station Link options. These concerns have previously been raised during the planning studies for Leederville and West Leederville. Key issues included the need for upgrade of the station (vertical transfer), bus integration and functionality to attract people off the train into West Perth (particularly given that only every second train stops at Leederville and the rolling stock is at capacity). PTA representatives have shown support for a bus overpass at Leederville Station to benefit movement, though it was reiterated that this would be unlikely to be funded by the PTA as the Authority is not a developer.

It is also noted that the PTA has recently engaged consultants to undertake a review of potential TOD locations along the Perth rail network. The PTA Project Manager indicated a commitment to keep lines of communication up with the Leederville Station Link team regarding progress with this study, with particular regard to consistency of approach in the development of design guidelines and frameworks.

Technical discussions have been had with Main Roads WA around the standards and acceptable guidelines for development over the Freeway. The workshop highlighted areas of concern regarding gradients and space for a suitable connection from the Leederville side to the station should a transit link be proposed. The issue of connectivity with Oxford Street was discussed and overall agreed not a feasible solution, due to the differences in elevation and 'iconic' value of the existing street which could not be raised to meet the structure as part of any proposal for the area.

Following the workshop and the discussions with Main Roads WA, the option for transit connection looked at connecting to the north of Leederville Parade. This option also considered the space available and utilisation of existing support locations following the outcomes of the workshop with the stakeholders. Further concept design work would be required for the bus ramp to determine a suitable layout in conjunction with Leederville Parade and any modifications required to the road, the work undertaken to date however suggests that this is feasible. Further consultation will be required to determine more specific land requirements and locations for support piers when this further work is undertaken.

Discussions also on the existing bridge revealed that the structure was not designed to accommodate loadings that would be experienced should the structure be covered. The existing bridge drawings were provided by MRWA to Aurecon following the workshop and the general arrangements assessed for suitability for modifications.

Finally, a presentation was given to staff and Councilors at a joint meeting of the City of Vincent and Town of Cambridge on 6 September 2011. The presentation slides and minutes of this meeting are provided in **Appendix B**.

4. Benchmarking

Many urban communities are collaborating with transportation agencies to promote air rights development and re-stitch the urban fabric. Furthermore, highway departments, encouraged by regulations that allow them to benefit financially from air rights leases, have began to consider marketing such sites. As a local example, the PTA has demonstrated a willingness to consider better integration of required parking infrastructure with development fringing the proposed Eglinton Rail station by granting air rights above the carpark to achieve both a benefit to the developer and financial benefit for the State, as well as an ultimately good urban outcome.

Various information has been assembled from cities which have reached critical densities that can sustain development of the air rights over urban arterials and that have shown innovation in crafting workable public-private agreements, and even privately funded air rights ventures receiving none or minimal public financial support. The research shows that until recently the argument against engaging in the development of this project typology was the overwhelming contribution of public funds required to make them feasible. It also shows that there are potential socioeconomic opportunities for the affected neighbourhoods as a result of reconnecting the neighbourhoods disrupted by the passage of the highway.

4.1 Case Studies

Perth is home to a number of examples of integrated transport and land use planning which demonstrate the ability to establish three dimensional title along with innovative design and development giving close consideration to the technical and operational requirements of the road and public transport network. Graham Farmer Freeway and 140 William Street are examples of these. The 140 William Street site is located over the platforms of the new Perth underground railway station and is based in the retail heart of Perth, bounded by Forrest Place and Murray Street Mall.

In terms of transit oriented design, Subi Centro is frequently held up as an example of how TODs can work in the Perth context. None of these are true examples of ‘bridging the gap’ between communities divided by Freeway and rail infrastructure, as is the case at Leederville Station. However, there are examples where this severance has been addressed through innovative design and planning frameworks. Some relevant examples are explored below.

4.1.1 International Examples

In the City of Boston, a Strategic Development Study of potential air rights development over the Boston extension of the Massachusetts Turnpike resulted in the creation of a Civic Vision for Turnpike Air Rights (Boston Redevelopment Authority, 2000). This initiative involved several City agencies, particularly the Boston Transportation Department, the impacted neighbourhoods and the Massachusetts Turnpike Authority.

In order to facilitate community and neighbourhood input into the Study, a 26-member group of residents, business owners, and other community members was appointed as the Strategic Development Study Committee to work with the City agencies to create corridor-wide urban design principles and alternative development scenarios for Turnpike air rights parcels in Boston.

Following an 18-month planning process with extensive public participation, including over 30 public meetings, and another 20 working sessions, the consultant team developed a comprehensive vision for the Turnpike Air Rights Corridor with corresponding development guidelines and a recommended development process for the Turnpike Authority and City of Boston.

The Civic Vision emphasises four main points concerning the development of air rights and their use to enhance the quality of life and economic opportunity for all of the citizens of Boston; fostering increased use and capacity of public transportation and decreased reliance on private automobiles;

reinforcing the vitality and quality of life in adjacent neighbourhoods; enhancing Boston as a place to live, work, and invest; and repairing and enriching the city's public realm.

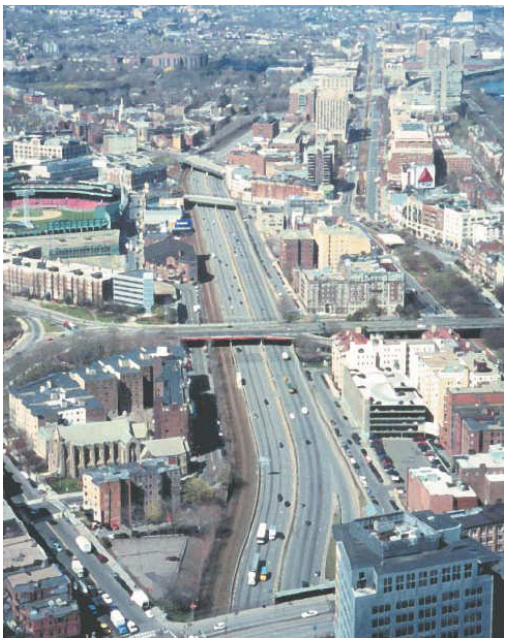


Figure 12 View of the Massachusetts Turnpike

The air rights parcels were envisioned as grouped "districts" along the Turnpike Corridor with guidelines focusing on the unique characteristics and needs of each community along the corridor.

Guidelines relevant to the Leederville Station Link case that were created from the vision in response to certain opportunities and challenges common to all parcels are:

- Filling the gaps between neighbourhoods and along major public streets by lining these streets with shops (emphasising local businesses, not national franchises), cafes, exhibit spaces, and other lively uses, creating a variety of new pedestrian links, public spaces and parks, and paying special attention to the ways in which buildings and public spaces can enrich the public realm;
- Promoting use of public transportation by reducing parking provisions below levels prevailing at the time and improving public transportation; and
- Creating architecture that combines respect for the unique historic character and expression of the vitality and character of the area.

Figure 13 Vision for the Massachusetts Turnpike

The Civic Vision for Turnpike Air Rights in Boston was adopted as the framework to review development proposals over the Turnpike Air Rights in Boston as well as a proposed process for air rights development. The process won a number of awards for Comprehensive Planning, Excellence in Urban Design and New Urbanism.

This is a potential example for the various government stakeholders to consider, particularly the PTA in reviewing a number of TOD opportunities through the Perth area. Projects along the Turnpike are now in various stages of completion. Columbus Centre was constructed from 2003 and has demonstrated that while the consultative framework creation process resulted in an award winning Vision, the reality of development has been rife with conflict between stakeholders with different goals.

Ultimately, the root of the tension was the disparity between what the community felt was an acceptable amount of development density and the amount of development necessary to make the project financially feasible.

A number of further examples are further explored in the following sections, taking into account locational aspects, construction issues, funding and delivery, and land tenure.

4.2 Locational Aspects

The "technical aspects" when it comes to air rights construction over an urban arterial, involve a number of specific problems and impediments common to all projects. Departments of transportation, like Main Roads WA, have strict design standards addressing safety and public health, lighting, ventilation, vibration and noise, traffic capacity, maintenance, emergency services and compatibility with the surrounding environment.

The location of access points is also a very important factor especially where the projects actually incorporate the access ramps within their structural grid and building envelope. These access points are efficiently servicing the air rights structures with integrated or adjacent exits to facilities incorporated in the development project. In the vast majority of cases this has been a conscious decision so as to effect the least impact on the traffic capacity of the system and of the adjacent city streets. A great deal of thought is also given to the ground floor uses so as to provide retail continuity and an active street frontage. Later developments in transit oriented development, including the decoupling of parking requirements from development site (effectively allowing car parking for a development to be located elsewhere) offer opportunities to reduce the impacts of vehicle access to a site on the feasibility of air rights developments.

The primary role of the rail station is to enable the most efficient and amenable travel connections to be made, with the elimination of stationmasters, conductors and ticket sellers, stations need to create opportunities for new forms of passive surveillance. People still require help and physical contact on occasions. Stations like Leederville are potential urban centres for higher densities and will need to win public perception of the station being a safe place to be.

Australia has witnessed 7/elevens moving in on revitalised urban centres of Melbourne, Sydney, and Brisbane. While these small super-milk bars have serviced a growing need they have also attracted a new wave of crime and drug-related violence, which needs to be better understood. Similar services that don't provide warmth or care in building up communities are fast food outlets. (Holt-Damant, 2005). Stations cannot afford to nurture such environments if they are to succeed as community centres and this gives rise to a need to closely consider the type of services and outlets that might be integrated into an expanded Leederville Station Link. However, high quality commercial and retail development integrated with Train Stations (such as at Parramatta and Bondi Junction stations in NSW) have been successful in establishing a complementary relationship between transport function and the retail and commercial life of cities and town centres.

Most public transport patrons barely have time to stop to eat or drink, and while speed is important in commuting it should not dictate the quality of environment a station offers. It is the people who linger longer who offer additional levels of passive surveillance, and notice local users or potential threat.

Additional facilities that might be considered in and around the station are:

- child care facilities;
- health related services such as dentists, doctors, chiropractors, and physiotherapists
- social facilities like gyms; personal training; swimming or jogging;
- service shops like chemists, bottle shops, dry cleaners, hair dresser or butchers;
- wine bars, restaurants, cafes or pubs, coffee shops; and
- information services.

The public perception of the railway station within the community is a key factor in the success of TOD – its visibility and accessibility are key factors. The station, as a public space, should be used as the

vehicle to integrate the community. If we can get this right at Leederville, the successful by-product will be greater patronage, appropriate and successful transit-oriented developments – simply because people will be willing to live near, above and around these new civic buildings.

4.3 Construction Issues

Since air rights development projects are often constructed in urban areas encumbered with heavy traffic congestion, every effort must be made to provide for the normal and safe movement of traffic during the construction period. According to public and private participants in the air rights development case studies examined, careful planning and scheduling routines are established in advance of construction initiation so as to phase the work and cause the least disruption to traffic (Savvides, 2005). As the construction activity along any given section of highway may last for many months, this fact causes financial strain on adjacent businesses and is an annoyance to adjacent residents.

Often the existing ground-level conditions at an air rights site dictate that the superstructure has to be of unusual form and quite likely with very long spans and a high number of transfer beams. The relative cost of the structure in an ordinary commercial building is typically around twenty percent of the total construction cost (Savvides, 2005). Therefore, as air rights construction is more expensive than a normal building, its effect on the total cost of the development varies according to the scope of air rights construction – usually structure up to the air rights deck – compared to the scope of conventional construction – usually structure upwards from the deck. What is of greater significance are the unfamiliar and special engineering assemblies required, which may introduce an element of extra risk to be reflected in an increase in costs due to extended construction scheduling.

More specifically, items unique to air rights construction include:

- Foundation Structure: Foundation constraints may include load-bearing retaining walls at the sides of the Freeway, supporting columns between the lanes and supporting beams spanning the Freeway. Cost estimates are based on soil studies, Freeway structure and building type;
- Other types of air rights construction costs include: Lack of basement for location of mechanical equipment and utilities; Reinforced floor on the first level above the highway, for safety purposes; Insulation from noise, exhaust fumes and vibration; Construction of safety provisions to protect the highway;
- Utility Access: Utility connections entail special costs and specialized access to the building, if portions of the first level are above grade;
- Construction Innovation: Air rights building assembly may require new technologies in construction or prefabrication, which may add to expenses. Consideration of all road traffic and safety factors will further extend the time schedule; and
- Project Timing: Due to the complexity of the construction and the requirement for safe and uninterrupted traffic flow (work above the right-of-way can only be done at nights and partially on weekends), overall construction time is extended. For this reason the costs of labour and construction loans are high. Further, negotiations and approvals with agencies to close down traffic in sections of the Freeway would entail additional delays/costs.

The greater construction complexity and higher construction costs of airspace development may deter major development in the airspace over the station in preference to surface sites in Leederville and West Leederville. However, development of a more substantial and integrated pedestrian link across the Freeway, with some smaller scale concessionary development, (which is integrated with adjacent development) could be feasible and may help to contrive new ‘front doors’ to Leederville station which better relate to surrounding communities to the north and south.

4.4 Tenure Framework

Commuter rail and Bus Rapid Transit (BRT) in the US face the same pedestrian access challenges that will limit the potential for TOD. It was noted in stakeholder meetings for this project that commuter rail’s pedestrian access will be limited over- or underpasses and at-grade road crossings because of the need for safety fencing separating freight and passenger operations in the corridor. With rapid

transit corridors, the location in the median of the highway (similar to the median location of the Joondalup Rail line), could restrict TOD since accessibility and connectivity is limited to pedestrian bridges.

This is precisely the situation rapid transit planners faced in Ottawa, Pittsburgh, and Phoenix, all of which are higher-speed transit bus facilities either exclusive or semi-exclusive from higher-speed roadway traffic. How officials in each case met the pedestrian access challenges determined in large part the success of TOD. As such, they have relevance to the Leederville Station Link.

In Ottawa, planning officials met with owners of the Saint Laurent Mall and other major commercial developments to discuss access issues with Ottawa's Transitway. Developers there saw the advantages of providing access on their property to the Transitway's in-line stations via pedestrian bridges and extending build-out of their property to walkable distances between their developments and Transitway stations. Today, the mall is the highest grossing in the region, and many officials there attribute at least some of this success to the outreach and coordination between transit planners and the development community (Bonsall, 2005).

The rights to air space over government-owned roadways are commonly held by the State. Therefore the State will play a major role in the tenure framework, leasing arrangements and funding, cash flows or property sales associated with the Link project.

4.5 Conclusion

The physical manifestation of a Link over a key transport corridor such as the one at Leederville Station can take on a variety of forms based on its relationship to transportation, urban scale, location and use. Mass transit experience has shown that there can be an intensive level of development at inter-modal transfer termini of passengers that provides a ready source of office occupants, retail customers or hotel guests and this model could be replicated at Leederville. The Link could therefore develop into a "destination" or "node" of mixed use activities, housed in leased arterial air rights that could provide a revenue stream in the maintenance and improvement of that arterial.

The Local and State Government are therefore presented with a unique opportunity of restructuring the urban context. Furthermore, a multidisciplinary approach by the entities involved in managing the transport and urban infrastructure could potentially plan and zone to accommodate complementary uses that would add new socioeconomic values to compensate for the Freeway's disruption of the urban fabric. It affords a "second chance" to integrate land use and transportation planning and management to achieve functional mobility and to provide environmental and urban development continuity.

5. Criteria to Guide Infrastructure Provision

5.1 Design

Urban Design

- Ensure connectivity and contextualised development that also reflects realistic assumptions about financial feasibility and development intensity.
- Reinforce the vitality and quality of life in adjacent neighbourhoods.
- Fill the gaps between the Leederville and West Leederville neighbourhoods and along major public streets by lining these streets with shops (emphasizing local businesses, not national franchises), cafes, exhibit spaces, and other lively uses, creating a variety of new pedestrian links, public spaces and parks, and paying special attention to the ways in which buildings and public spaces can enrich the public realm.

Architecture/Built Form

- Creating architecture that combines respect for the unique historic character and expression of the vitality and character of the area.
- Potential for an iconic structure to gain attention due to its location and exposure to the transport corridor.
- Scale of development should be deliberate in encouraging the behaviours and/or participation of public and private parties.
- Design buildings such that they work to engage pedestrians at the street and concourse levels and define the nature of activity that occurs in the public realm.
- Ensure appropriate and seamless transitions between new development and adjacent neighbourhoods by reducing the perceived or actual impact of level change.
- Preserve existing view corridors and create new ones.
- Provide several alternative access points
- 24 hour activity and consideration for CPTED principles

Technical

- To make development “transit oriented” and not just “adjacent,” the station design must make pedestrian access as easy as possible. A pedestrian overbridge will need to comply with the latest requirements for disability access. Access to the station from the street level will need to consider options of ramp gradients less than 1 in 20 or maximum gradients of 1 in 14 with level (1 in 40) platforms every 9m. This will need to be looked at in conjunction with any vehicular requirements for the options considered to ensure all requirements are met.
- Construction Innovation: Air rights building assembly may require new technologies in construction or prefabrication, which may add to expenses. Span and width of the deck need to be investigated in proposing an adequate structure for the proposal which in turn will affect the thickness of the deck. The constraints in structure design will be the available space for support and function of the bridge given its location and potential uses.
- Foundation Structure: Economical bridge structures will need to consider potential locations for foundations and their potential impacts upon the operation of the Freeway. The design of bridge supports will need to consider minimum offsets from the running lanes and protection measures which may be incorporated into the design. It is noted that there are existing concrete barriers protecting the railway from vehicular impact, support structures could be investigated to interface with this and provide suitable support solutions which consider the existing infrastructure.

- Design solutions would also need to assess the current considerations for Freeway widening. The existing supports may need to be fixed and used as the basis for assessing the bridge spans to allow for full flexibility for future widening. Design solutions which involve wider deck structures will also consider long and narrow supports to reduce impacts.
- Design of ramp structures will need to consider the impact on potential developments and integration with the surrounding infrastructure, maximum gradients of 6% for bus connectivity over the link and the effect this has upon the ramp lengths and interface with existing infrastructure. This will also need to be assessed in conjunction with pedestrian requirements which may also drive the lengths of any approach ramps as outlined previously.
- Clearance requirements will also affect the overall footprint of the structure. Minimum clearance of 5.2m will need to be applied to the bridge over the railway with potentially a minimum of 5.3m clearance over the Freeway to bring the bridge in line with the current design standards.
- An overview of services at a very high level will need to be considered to ensure that there are no major supplies in the immediate vicinity which would have significant cost implications to either protect or divert in order to accommodate new development.

5.2 Planning and Transport Framework

Strategic

- Coordination among governmental agencies is important.
- Foster increased use and capacity of public transportation and decreased reliance on private cars.
- Promote use of public transportation by reducing parking provisions below levels prevailing at the time and improving public transportation.
- Understand the transport outcomes and opportunities of development of an improved link across the Mitchell Freeway (both on public transport network robustness as well as local accessibility); and understand and incorporate transport operator needs into solutions.

Statutory

- Promote greater densities and implement developer incentives as early as possible, with clear development parameters that give regulatory assurance to developers.
- Implement a robust and predictable regulatory framework to control the outcome of potential air rights development.

5.3 Implementation

- A systematic air rights lease negotiation process and framework that links leasing liabilities to future development revenues.
- Minimise disruption to rail operations, pedestrian movement and Freeway lane closures. Consideration of all road traffic and safety factors will further extend the time schedule.
- Early stakeholder and community engagement.

6. Option development

6.1 Options

The Leederville Station Link design options were developed on the basis of the design guidelines listed above, with primary consideration for:

- Land use and Transport Integration;
- Form and Function; and
- Hierarchy of users (User requirements).

A full set of drawings of the design options are provided in **Appendix C**.

The ultimate (long term) design outcome is shown in the Concept Master Plan below. It identifies a new wider bridge structure offering:

- sheltered pedestrian crossing with vertical transport to the station platform and lifts and stairwells at both West Leederville and Leederville;
- potential future bus transit integrated with the new road layout proposed in West Leederville, merging with Leederville Parade to the north of the Leederville Station Link in Leederville; and
- Opportunities for key developments to 'anchor' the Leederville Station Link

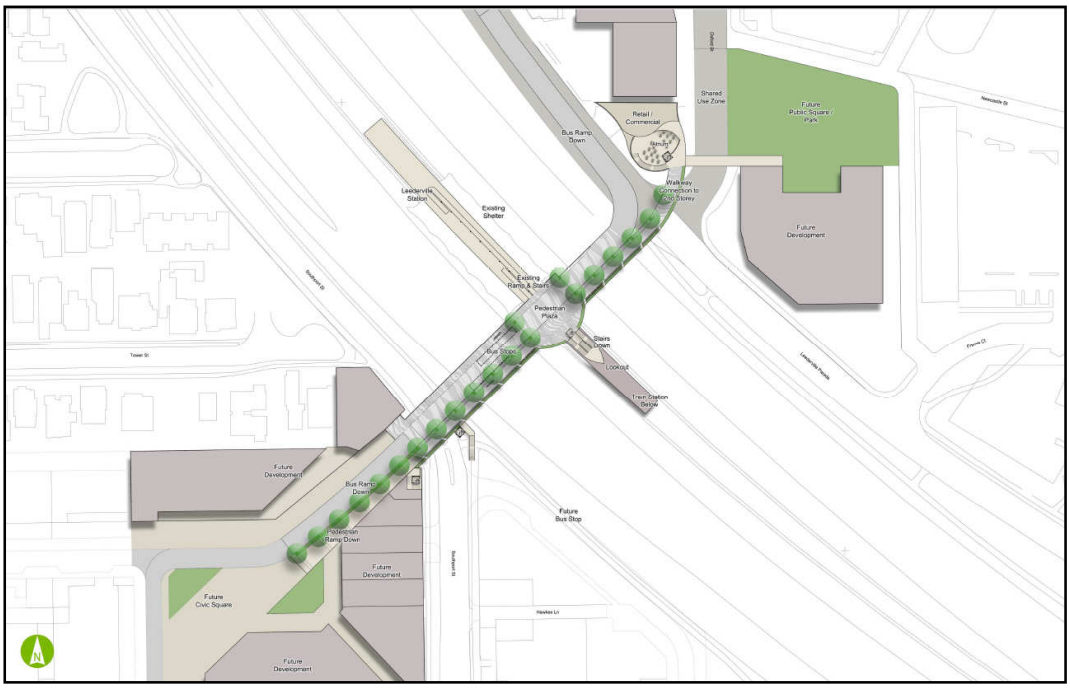


Figure 14 Leederville Station Link Concept Master Plan

The options outlined below demonstrate how the Concept Master Plan could be implemented through a number of stages of development which may be temporally linked to the future development of the Leederville and West Leederville precincts.

6.1.1 Option 1 – Modest Change (interim)

Upgrade existing pedestrian bridge

Option 1 considered slight modifications to the bridge to improve access through provision of a lift and stairs to the east side of Southport Street while retaining the existing bridge structure and spiral ramps. This could tie in with the Leederville Station Bus Interchange being considered by DoT.

Advantages

- Opportunity to upgrade access and vertical transport to improve train/bus interchange
- Low cost
- Minimal disruption during construction

Disadvantages

- Indirect bus/train interchange
- May not achieve benefits in prominence, transport network integration
- Structural design will not accommodate weather protection over the length of the bridge due to increased loadings (in particular wind)
- The width and gradient of the bridge are substandard when compared with the latest design requirements.
- The form of structure (suspension bridge) limits the potential for modifications, including widening due to the way the deck is supported. Any increase in width would need to be supported by a new structure.

Land Requirements

- No private land requirements: the proposed vertical transport is integrated with the bridge within the existing Freeway Reserve

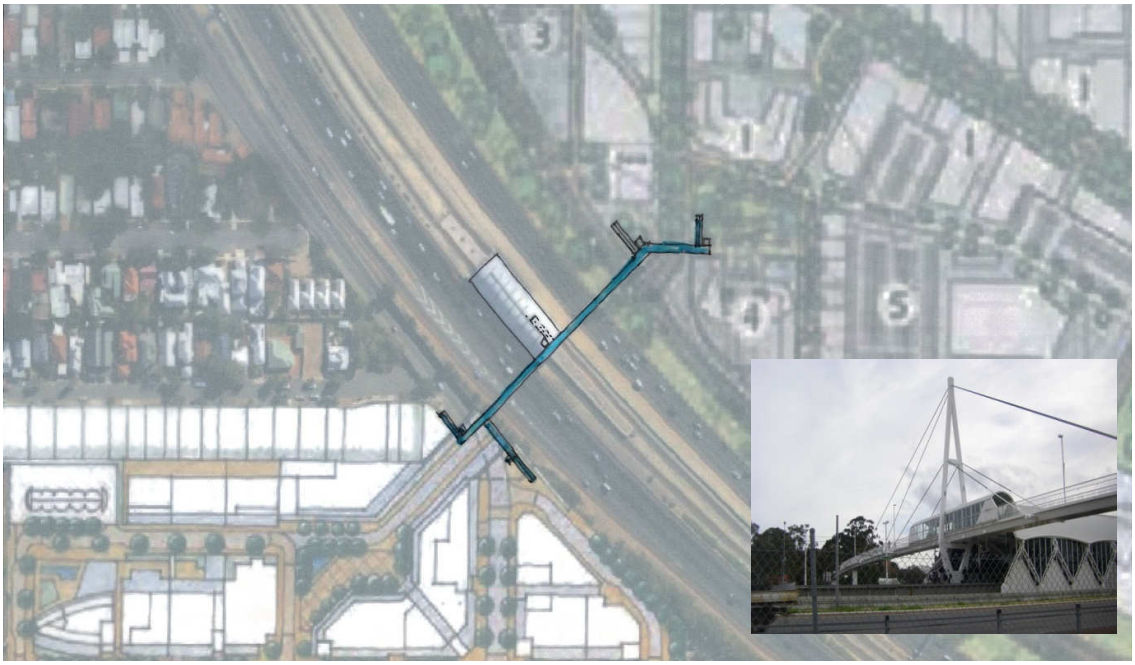


Figure 15 Workshop sketch for Option 1 (Inset: photograph of existing bridge structure)

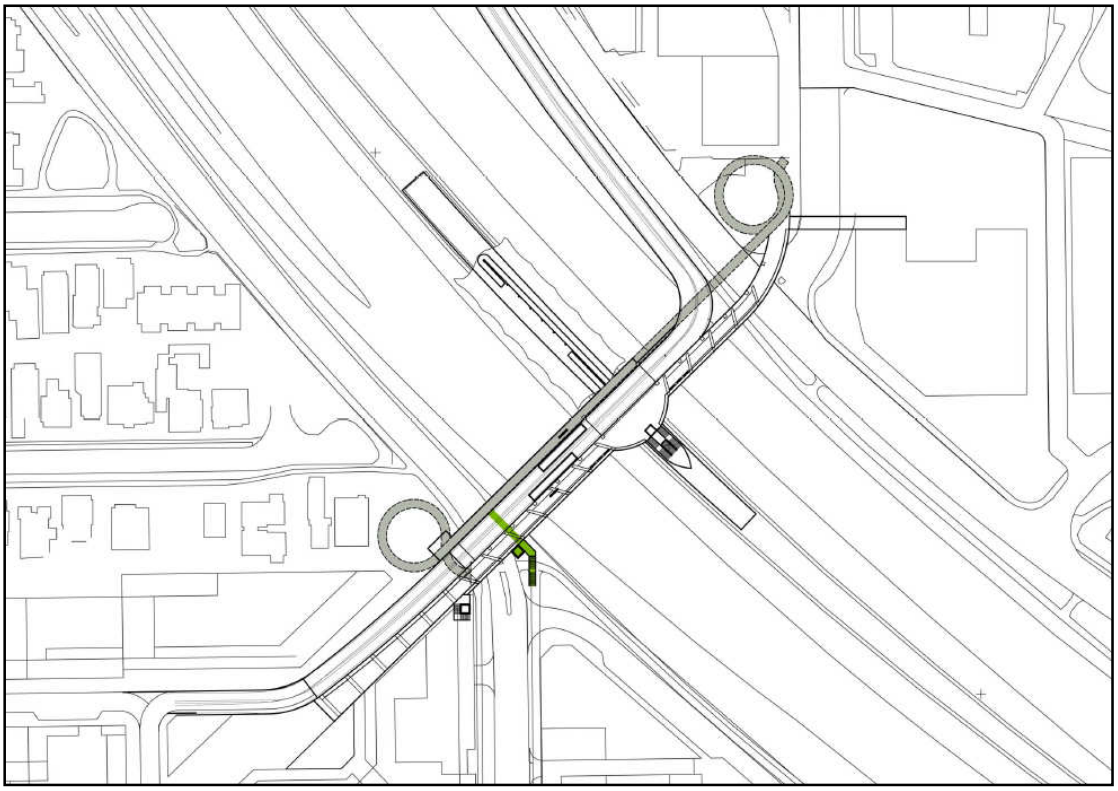


Figure 16 Staging Plan for Option 1

6.1.2 Option 2A and Option 2B – Functional Change (pedestrian/cyclist link)

New Pedestrian Bridge

Option 2A and 2B propose a new pedestrian connection from Cambridge Street to Leederville Station and through to Oxford Street. The design and positioning of the bridge structure would allow the existing bridge structure and spiral ramps to remain in use while the structure was constructed. The difference between the two options is Option 2A is a standard deck structure, while Option 2B is a viaduct structure and would provide the opportunity to develop the transit link identified in 'Option 3', should funding and demand allow for this in the future, without major redundancy of infrastructure.

Advantages

- Integration with pedestrian overpass to create an extra wide overpass with pedestrian shelter and amenity
- Ability to create more prominent station entrances to north and south that integrate with planning aspirations for Leederville and West Leederville.
- Construction and market feasibility, if integrated into adjacent development, with opportunity for 'anchor' developments that would experience high exposure to passing traffic.

Disadvantages

- Moderate cost
- Disruption of rail and road operations during construction
- Requirement to determine an interim solution for the construction stage when the Leederville spiral ramp would be removed and replaced with new vertical transport solutions.

Land Requirements

- West Leederville: the vertical transport and bridge supports would require land take over properties at 43 Southport Street (Town of Cambridge) and 39 Southport Street (Multiple adjoining properties in single ownership)

- Leederville: no additional private land take is required as the proposed ‘anchor’ development is on the land on which the spiral ramp currently sits. However, the acquisition of 99 Oxford Street would permit a more substantial and integrated development and may provide options for interim access to the Station during construction of the new bridge structure.

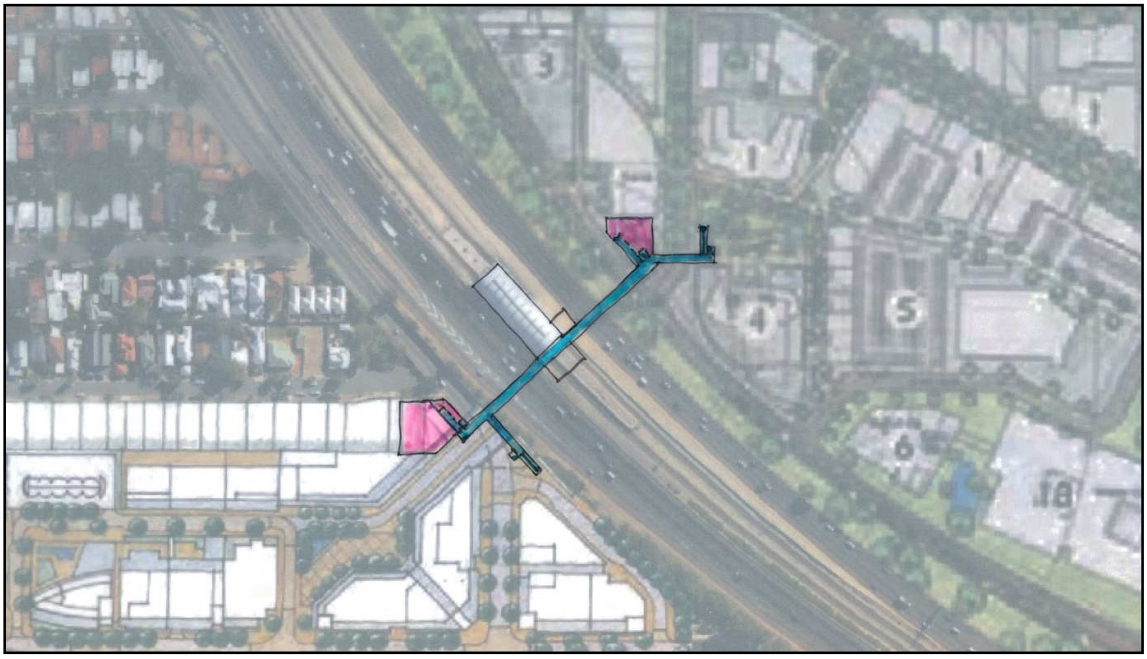


Figure 17 Workshop sketch for Option 2

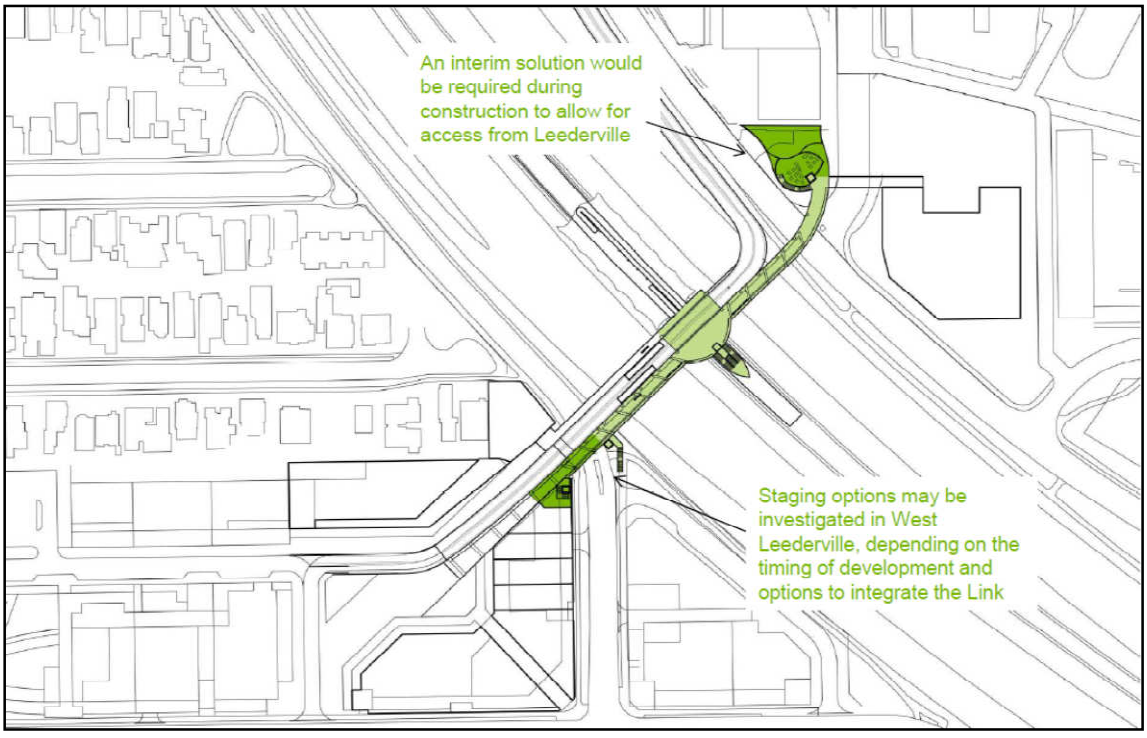


Figure 18 Staging Plan for Option 2

Figure 19 Concept Design Elevation (Option 2)

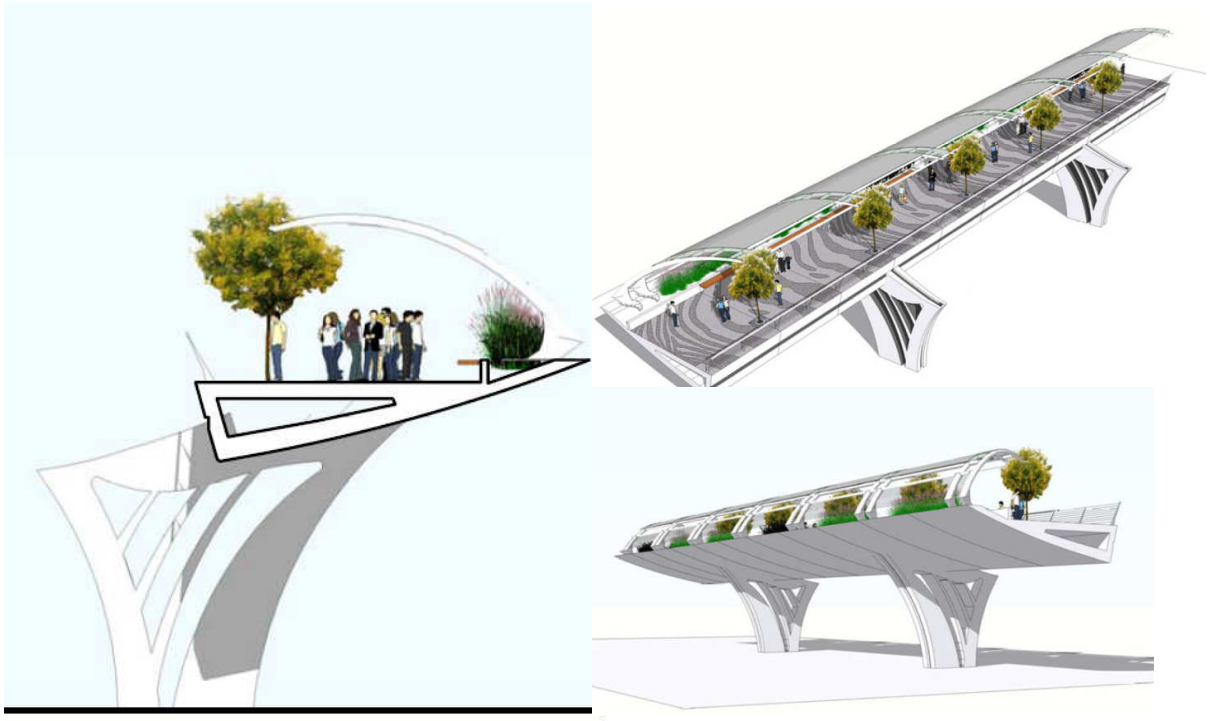


Figure 20 Concept Design Section and Perspectives (Option 2)

6.1.3 Option 3 – Functional Expansion (full transit link)

New Transit Bridge

Option 3 proposes a transit link from Cambridge Street to Leederville Station and through to Leederville Town Centre. The transit link could allow retail development along the bridge, particularly at the Station Concourse level and at the 'anchor' developments at the West Leederville and Leederville ends.

Advantages

- Direct modal interchange connection with Leederville Train Station
- Integration with pedestrian overpass to create an extra wide overpass
- Improved east – west Public Transport movement
- Avoids busy intersections on Vincent and Loftus Streets
- Increased legibility/accessibility/ridership of interconnecting buses

Disadvantages

- High cost and not currently a strong case for transit link from public transport network planning
- Disruption of rail and road operations during construction

Land Requirements

- Large land purchase required for overpass landing on Town of Cambridge side, requiring full long term implementation of the proposed West Leederville plans. Large tracts of land in this area are strata title properties with multiple ownership and would require a long term strategy for acquisition.
- No additional land take is required in Leederville, however Leederville Parade may require widening to allow for the merging of the bus ramp, potentially impacting on City of Vincent land.
- Opportunity to further integrate the pedestrian access with the proposed development and/or the proposed Civic Square on the City of Vincent land (100 Oxford Street).

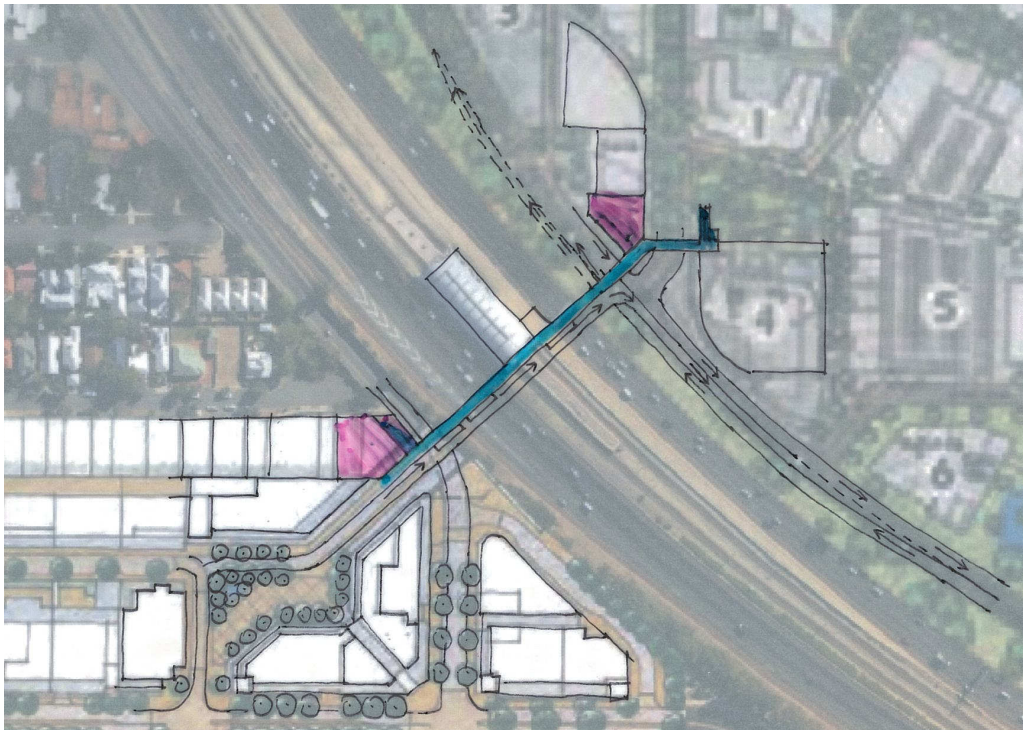


Figure 21 Workshop sketch for Option 3

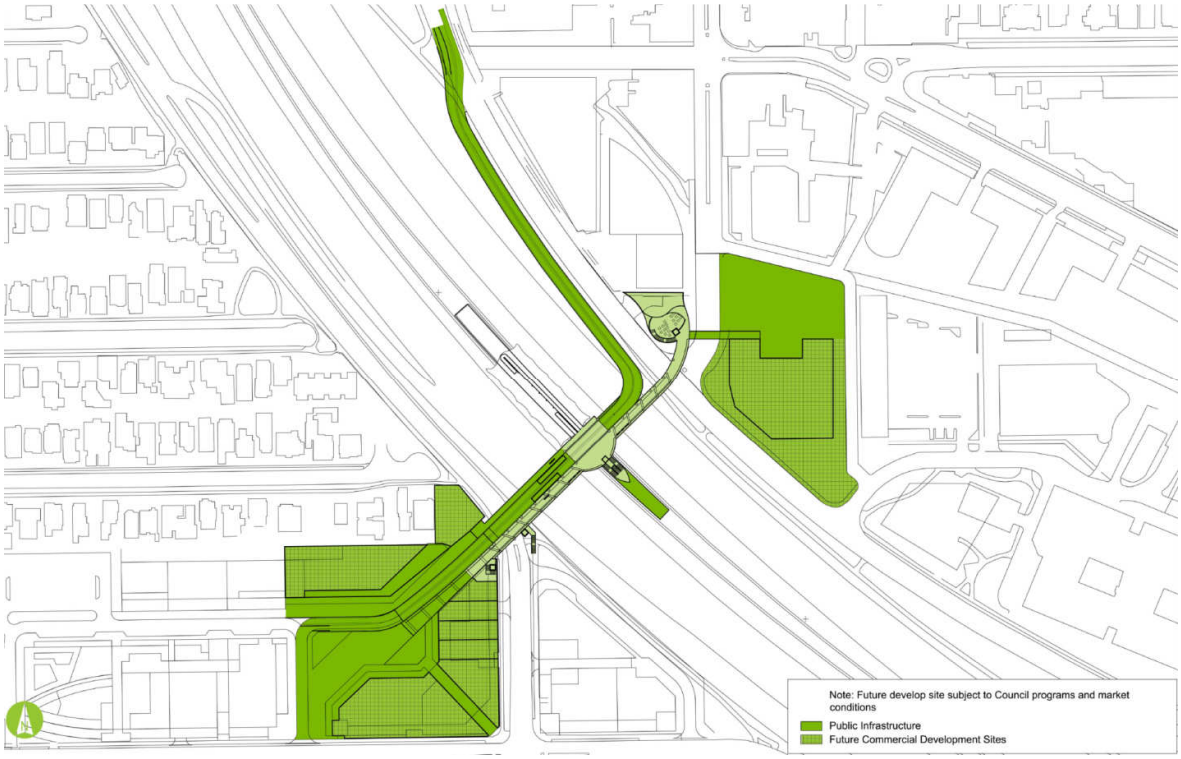


Figure 22 Staging Plan for Option 3

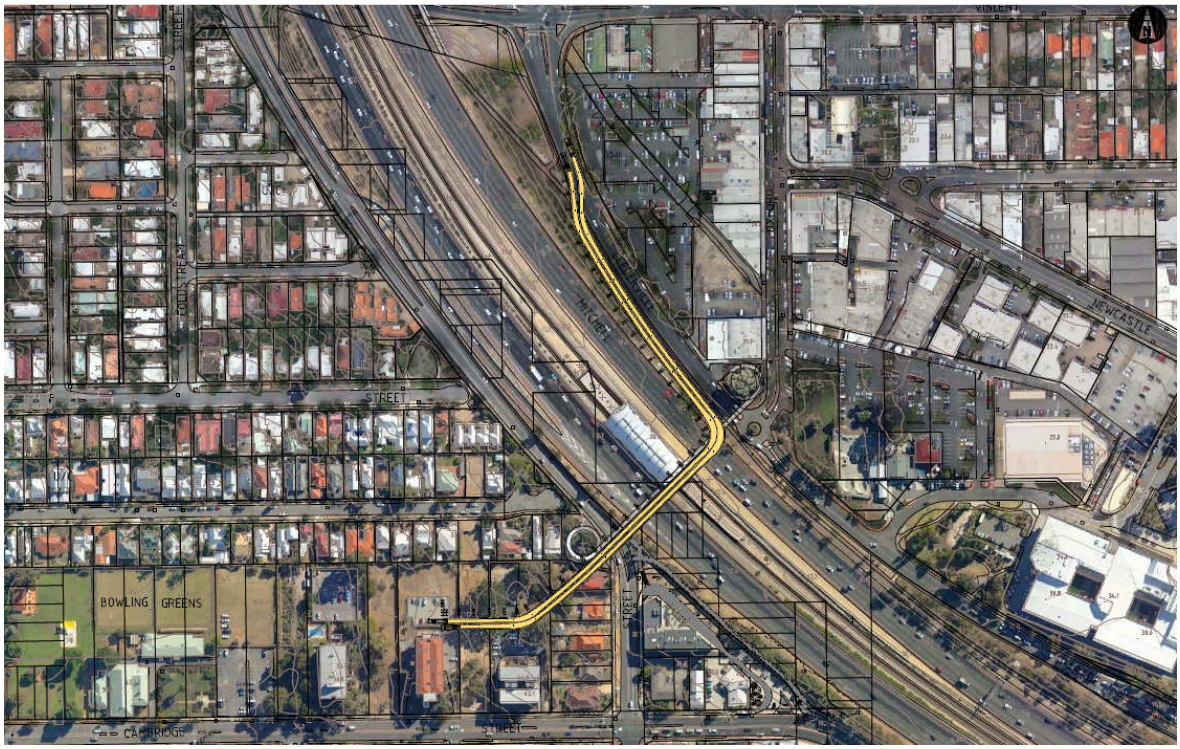


Figure 23 Ramp grade assessment for Option 3

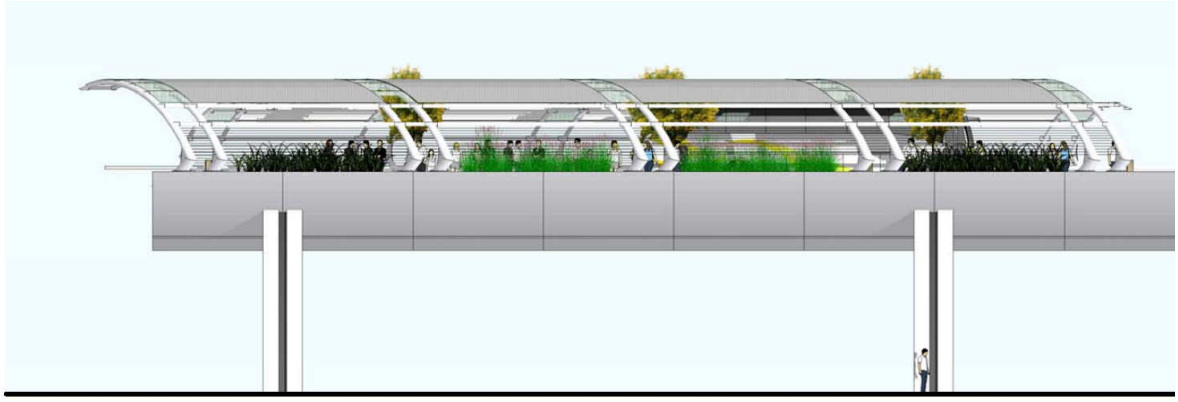


Figure 24 Concept Design Elevation (Option 3)

Figure 25 Concept Design Section and Perspectives (Option 3)

6.2 Indicative Costs

The indicative costs of the proposed infrastructure options are derived from similar types of structures required for the scheme and are an order of magnitude of costs. The costs have been based upon structures which Aurecon has designed and have been either costed to a degree of accuracy or constructed with a known cost.

Similar projects of reference are:

- James Street Bus Bridge
  The James Street bus bridge consists of a two way bus ramp of approximately 120m in length and bridge structure over the Perth to Fremantle railway line. The project was constructed in 2009 with a project cost of approximately $12.5 million.
- Stirling Bus Exchange
  The Stirling Bus Exchange is a concept design project, consisting of 2 lane widening of the existing bus bridge over the Mitchell Freeway and railway lines. The project included a cost estimate with an intended accuracy of +/- 25%. The project involved the widening of the existing curved bus station bridge with amendments to the intersections at Cedric Street and amendments on the existing Cedric Street bridge. The project would be considered more complex than the proposed concept design for option 3 in this report, however provided Aurecon with an indication of costs. The concept design cost estimate for the Stirling Bus Exchange project was $35 million.

The indicative costs are outlined in Table 3 below. It must be noted that the indicative costs have not been qualified by a quantity surveyor and only consider an order of magnitude cost for the structures including the bus ramp, transit link and pedestrian structure. The concept design does not include any assessments of modifications to Leederville Parade or any affects upon existing services. The estimate of costs does not include the acquisition of land required to implement the concept design nor the built structures that may form the “anchor” developments at either end of the bridge structure.

Table 3 Indicative Cost Estimate

Option	Indicative Cost
Option 1: Access to Bus Interchange (West Leederville)	<$1 million
Option 2A: Pedestrian Link on Standard deck structure	
(i) - To Southport Street only	$5.5 million
(ii) - With full integration	$7 million
Option 2B: Viaduct structure (including foundations for Option 3**)	
(i) - To Southport Street only	$10 million
(ii) - With full integration	$13 million
Option 3: Transit Link including Leederville Parade bus ramp	$28 million

** Option 2B retains the option for future Transit Link at an additional cost of $15,000,000

7. Funding and Delivery

7.1 Implementation

The redevelopment of Leederville and West Leederville in accordance with the adopted plans, as well as significant redevelopment of the wider area surrounding the Leederville Train Station aligns with a proposal to invest in public transport and ancillary infrastructure to accommodate proposed population growth of the inner city suburbs.

The potential constraints and opportunities learnt through previous examples and case studies are further explored below.

7.1.1 Scheduling Constraints

From the perspective of scheduling building assembly over an operational urban arterial such as the Mitchell Freeway, the case studies show that air rights projects are sensitive to the basic characteristics of the road's operation and to the fact that it precludes structural columns from intruding between lanes or onto the side clearances. Further, construction staging and storage have to be conducted with minimal interference of traffic flow, especially during hours of peak traffic, limiting traffic interruption to off peak hours at night and the weekends. These limitations imposed on the construction schedule have a negative impact on the cost of labour, which in turn raises the cost of construction significantly and reduces the amount of work that can be accomplished in a 24-hour period.

The end result is longer construction time that increases project financing costs and the associated project-to-market timing risk. Together, these limitations may cause substantial increase to the cost of the infrastructure.

7.1.2 The Development Premium

Comparisons between air rights values over the Freeway and adjacent fee land values on terra firma per square metre will generally indicate a significantly lower air rights value, due to higher development costs. Unless development costs are prohibitive, however, development will occur if the demand for land is sufficient and the reduced air rights value reflects the excess costs.

In addition to the unique costs associated with air rights construction there are also some unique savings and benefits that can be incurred. This is especially true in the context of high built densities on terra firma as might be expected of the land along the Freeway. These include:

- Land Assembly: savings in time and money spent on plot assembly of large sites in areas of fragmented land ownership;
- Building Demolition: savings due to lack of existing structures to be demolished and relocation of current tenants; and
- Site Visibility: advertising value of highly visible location or unique publicity during planning, development and operation.

When taking case studies such as the Massachusetts Turnpike in Boston as a point of reference, the increasing land values downtown at the Central Business District and its high-rise extension into the Back Bay/South End area have resulted in rendering the air rights development option increasingly more viable (Savvides, 2005). What will have to factor in this formula, however, is the price tag on the air rights to be imposed by the arterial's management agency, in this case the Massachusetts Turnpike Authority. At this stage, it might be appropriate for the agency in charge to carry out a broad cost benefit analysis over the potential program. The expectation by all the parties involved is that the proposed project will, upon completion, help the surrounding context to regenerate thereby raising land values and tax returns substantially. The affected municipality would then be reimbursed through the increased prosperity of its revitalized urban areas as well as investment repayments.

7.2 Funding

The funding strategy for the Leederville Station Link project needs to be developed around leveraging financing through the three areas below. The methodology that goes with these approaches depends on the preferred option and stakeholder outcomes including the response and level of support from state agencies, local government and the development industry.

A project such as this can benefit from strategic value capture to raise a base load of funding for the project program or vision. Typically, it cannot be justified by one project or driver alone, but rather a number of projects or drivers (e.g. demand for development of the Leederville and West Leederville precincts in concurrence with public transport needs). A value proposition that is linked to project benefits should be carefully developed, with a link identified between beneficiaries, and those impacted, such that investors or funding organisations can clearly see the value that can be captured by their contribution.

7.2.1 Transit

Some resistance has been met from State Government transport agencies to funding the upgrade of the Leederville Station Link, as the current access and operations of the station function effectively. In order to make investment in the Leederville Station Link attractive to the PTA and Transperth such that they will support the development, the aspects of land tenure/management and patronage / ridership need to be fully explored in order that the Business Case justifies transit benefits and improvements against the potential cost.

Transport related developments create a lot of value through increase level of services, value of property and economic activity. Therefore the ability to support cost sharing arrangements between stakeholders, support long term planning and policy development and support project affordability and funding options is increased and should be further explored as the project progresses.

7.2.2 Development

There is a strong circular relationship between financing transit and development, but development costs will also need to consider the high land costs for desirable locations, increasing construction costs with greater density, very dynamic relationship between costs and revenues, (this will also include sources of subsidy and other funding), as well as local levers for enhancing project feasibility (appropriate zoning, reduced parking ratios, and increased 'place-making' amenities).

These are all strategies which the Town of Cambridge and the City of Vincent can consider as the design progresses, and may include processes such as:

- active value capture through government and non-government property incentives to attract developers to the “anchor” developments that may result at either end of the Leederville Station Link - as has been shown in the case studies, increased traffic through their direct integration with the Link structure can result in higher revenue brought about by premium exposure of businesses to passers-by; or,
- passive measures such as Government property value increases, tax increases and developer contribution schemes.

7.2.3 Infrastructure/Place Making

It should be acknowledged that opportunities for capturing value are related to new development, and will differ from private to public sector value capture strategies, however the key to a successful link lies in the creation of an integrated place that effectively meets the requirements and aspirations of both the private and public sectors. The design options developed in this study provide flexibility for future approaches which may incorporate both public and private participation and investment, and also a staged approach that can take into account economic changes that may occur in the medium or long term. It provides a good basis from which to explore funding strategies in more detail and then enter into more detailed design and costing investigations.

7.2.4 Value Capture Process

The process for creating a value proposition is to:

- Understand the total project cost;
- Understand to whom the passive benefits accrue;
- Consider active value options whether they be;
    - Strategic; or
    - Project; and
- Negotiate contributions

At this stage there are no clear options for Federal funding sources. It is our recommendation that the Local Government work closely with the State Government stakeholders and private parties involved in the development of Leederville and West Leederville to establish the value proposition for the Leederville Station Link project, based on the framework and considerations above, to assess the implementation options and framework to support the value capture process.

8. Conclusions and recommendations

This study has resulted in a number of design options for the Leederville Station Link which may be staged over time as economic, urban and environmental factors change.

Aurecon has presented the option to undertake further design to explore architectural integration with the 'anchor' points through architectural modelling, which may assist in the presentation or 'marketing' of the development opportunity.

It is recommended that the design concepts be integrated with further iterations of Master Planning for Leederville and West Leederville to ensure integrated urban design outcomes

Detailed design and costing will be required as the Leederville Station Link progresses such that funding options can be further investigated, and a business case developed to assist in the identification of funding partners and implementation approaches.

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Town of Cambridge (2010) West Leederville Planning and Urban Design Study, Floreat WA

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Appendix A

Design Workshop presentation and meeting notes

Leederville Station Link – Feasibility & Design Study

28 July 2011

Agenda

1. Welcome & Introductions
2. Purpose
3. Drivers and Basis of design
4. Location characteristics
5. Options Development
6. Review of outcomes and next steps

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Purpose

• Progress to the development of design and delivery options for the Leederville Station Link incorporating the transport, precinct and master planning concepts already adopted by the City of Vincent and Town of Cambridge.

Vision:

“for Leederville Station to be a link between the Leederville and West Leederville centres in order that they can function as an integrated, combined TOD centre”

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Drivers for change

- State Policy & Strategy Framework
- Local Planning for Leederville and West Leederville
- Design principles
  - Land use Integration and transport
  - Form and Function
  - Hierarchy of users (User requirements)

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PRECINCT LOCATION PLAN

1. Oxford Street
2. Education Precinct
3. Civic Precinct
4. Oxford Markets
5. Entertainment Precinct
6. Oxford Town Centre
7. Carr Place Residential Precinct
8. Newcastle Street Commercial / Network City Precinct

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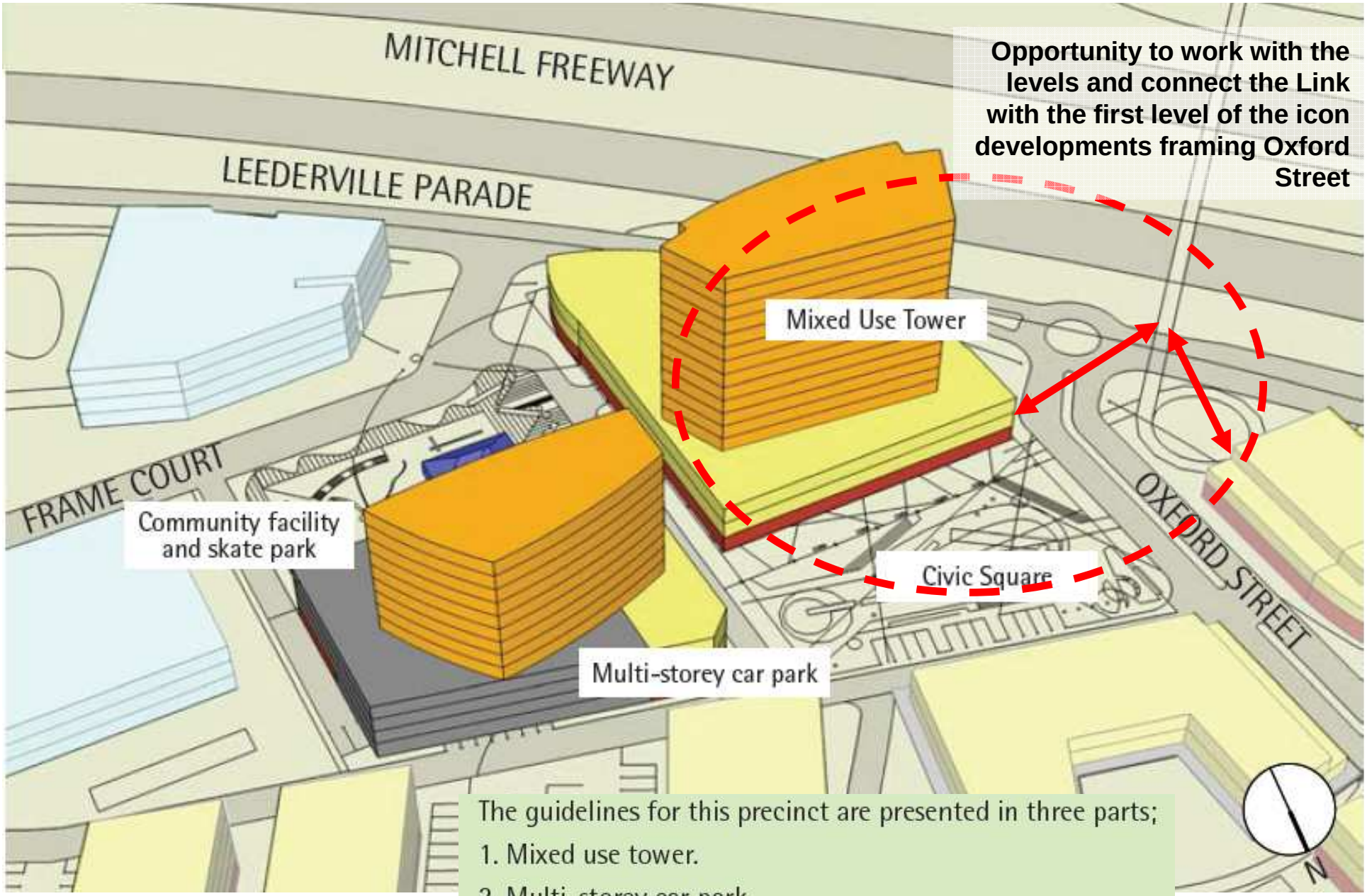
1. Redeveloped Commercial Buildings
2. Proposed Retail Anchor/ Supermarket/Multi-Level Council Car Park
3. Proposed Icon Building – Retail / Commercial Podium / Residential Tower
4. Proposed Icon Buildings – Retail / Commercial Podium / Residential Tower
5. Proposed Frame Court Multi-Level Council Car Park & Proposed Icon Building
6. Possible Water Corporation Building
7. Leederville Hotel
8. Possible New Retail Precinct
9. Possible new Office Building (WALGA)
10. T.O.V Administration and Civic Centre
11. Loftus Centre / State Gymnastics Centre
12. Library / Local History Centre
13. Possible new Childcare Centre / Kindergarten
14. Possible New TAFE Entry
15. Possible New TAFE Shop Front
16. Possible TAFE Industry Training
17. Possible new Residential
18. Existing Water Corporation
19. Possible New Service Station Redevelopment
20. Mixed Use – Shops / Retail
21. Department of Sport & Recreation
22. Leederville Oval Grandstand



The guidelines for this precinct are presented in three parts;

1. Mixed use tower.
2. Multi-storey car park.
3. Civic square.

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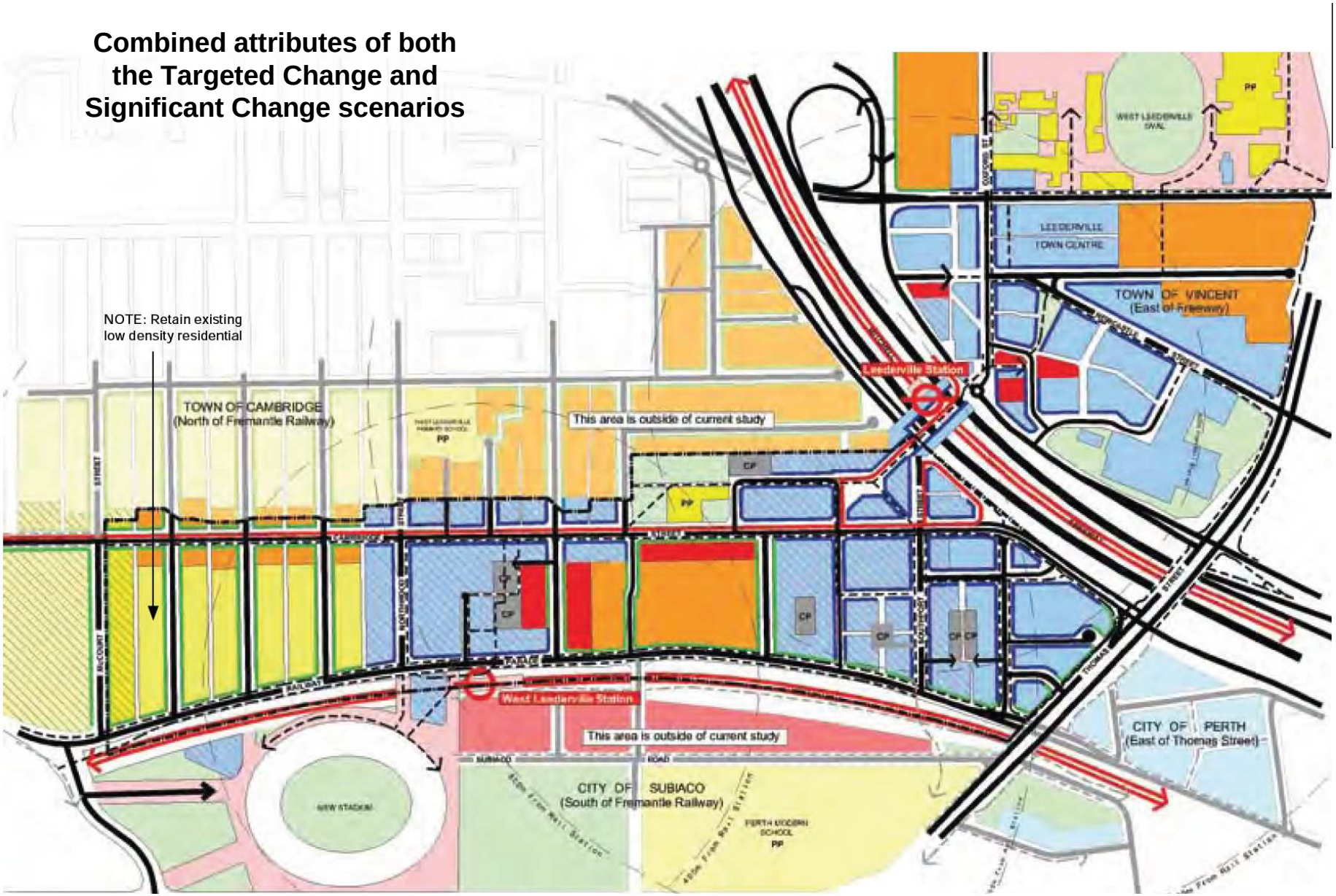
Combined attributes of both the Targeted Change and Significant Change scenarios



Sketch of option to integrate pedestrian bridge with transit plaza

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Location characteristics

- Fixed and negotiable items
- Entry, access and movement network characteristics
- Bus interchange requirements (current and future space/capacity requirements)
- Land tenure and ownership

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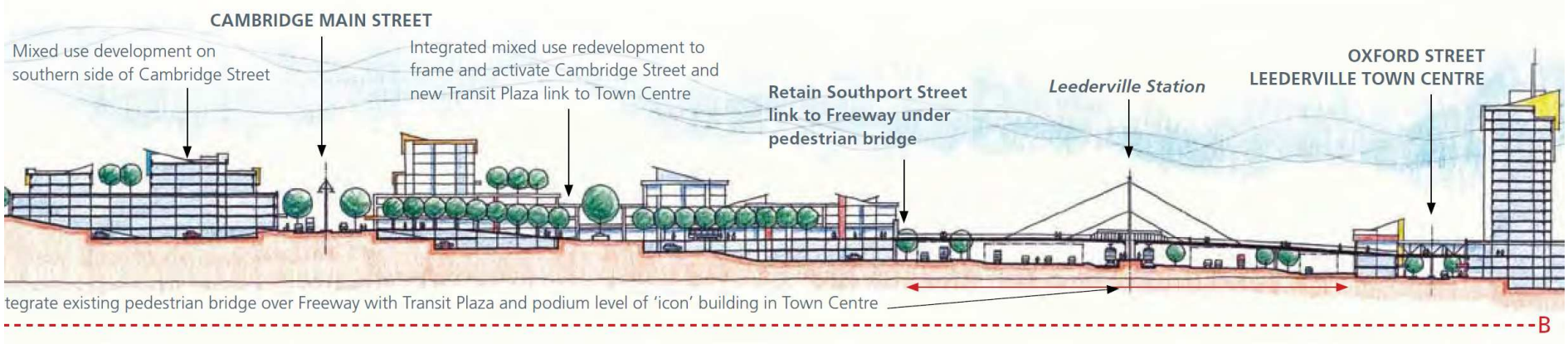
Indicative Long Section – Cambridge Street to Leederville Town Centre A – B:



Options

- Upgraded pedestrian bridge
- New pedestrian bridge
- Transit bridge
- Transit and development

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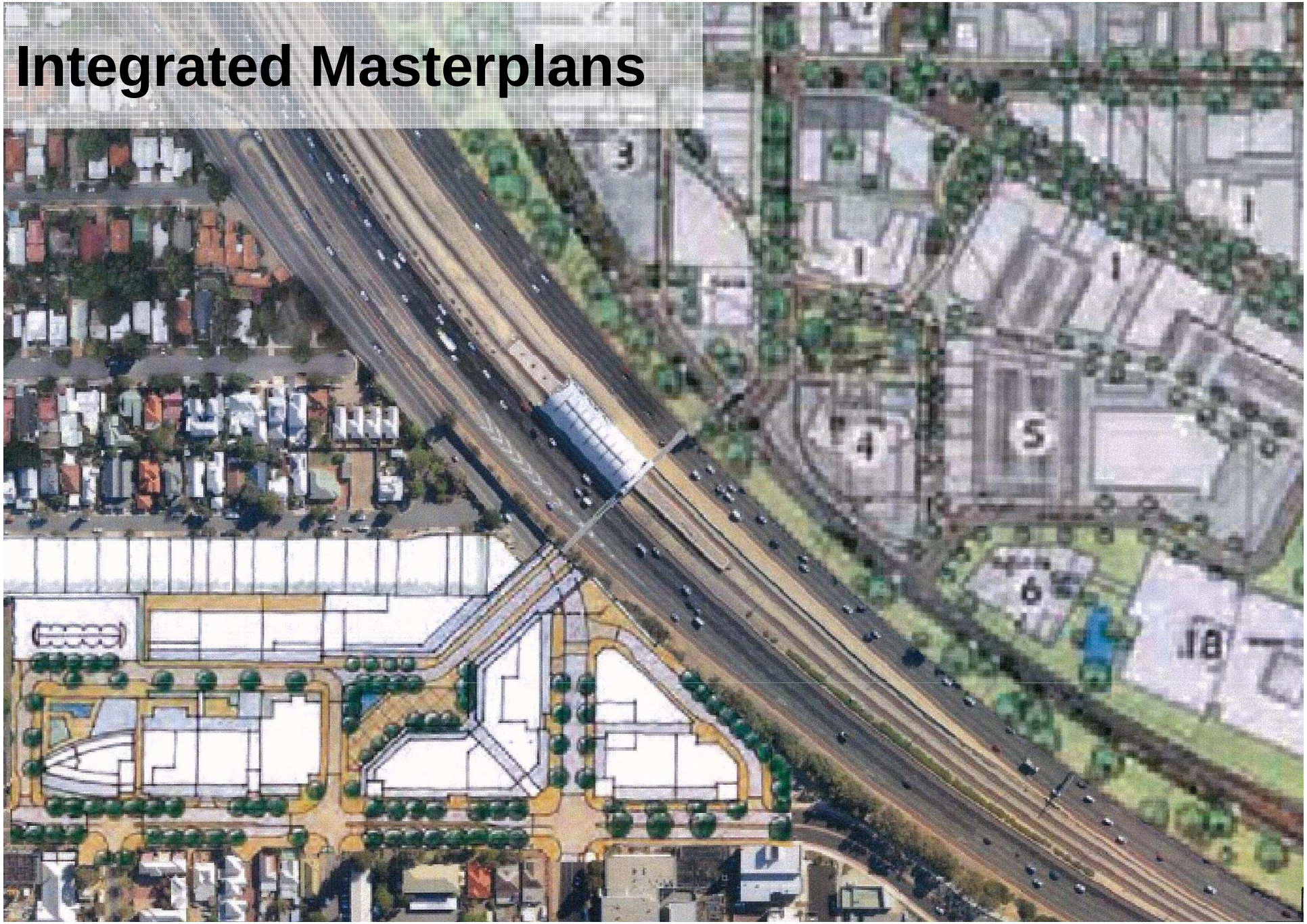
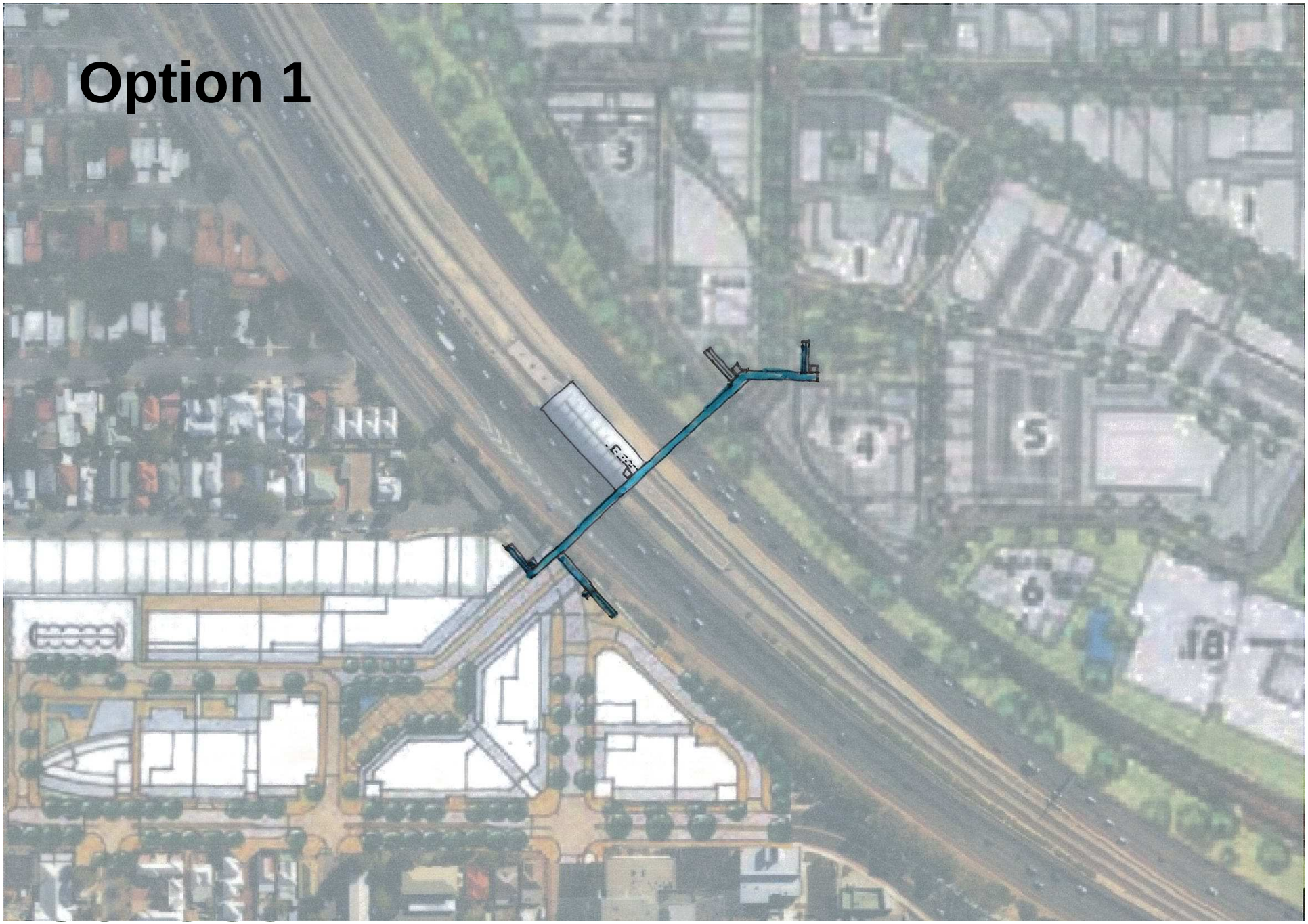
Integrated Masterplans



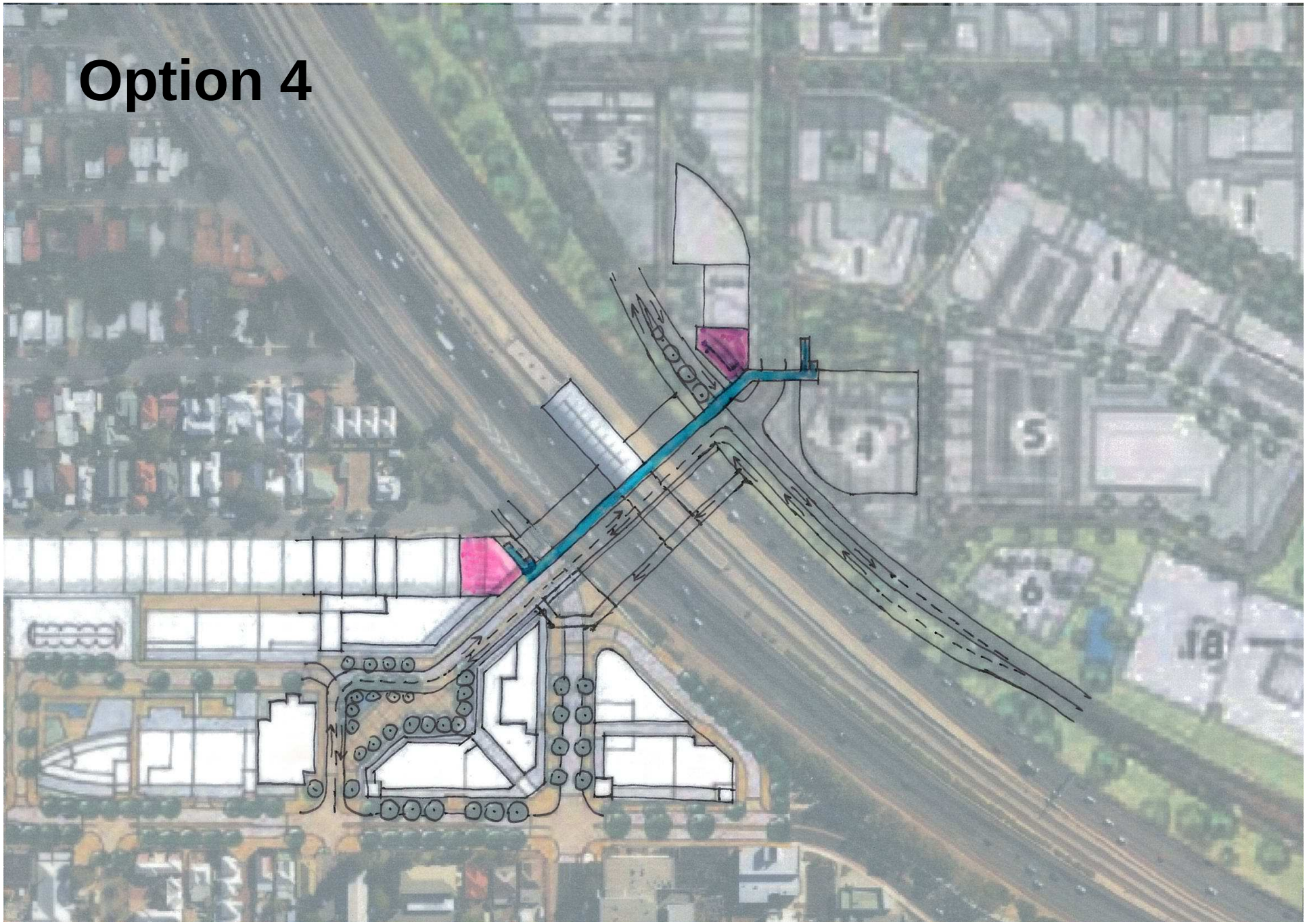
Option 1



Option 2

Option 3

Option 4



Way Forward

- Review of outcomes
- Next Steps

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Leederville Station Link Design Workshop

28 July 2011: 1.00pm – 4.30pm

ATTENDEES

Aurecon
- Rebecca Hollett;
- Roger Highfield;
- Andrew Russell; and
- Brian Smith (via phone).

City of Vincent
- Councillor Matt Buckels;
- Craig Wilson;
- Tory Woodhouse; and
- Elyan Lebbos.

Town of Cambridge
- Mayor Simon Withers;
- CEO Jason Buckley;
- Councillor Corinne MacRae;
- Ian Birch;
- Heidi Taylor; and
- Matt Burnett.

Stakeholders
- Public Transport Authority – Louise Howells;
- Public Transport Authority – Andrew Foreman;
- Main Roads Western Australia – David Van Den Dries;
- Main Roads Western Australia – John Van Luyn;
- Department of Transport – Dave Milliken; and
- Department of Planning – Dale Bastin.

NOTES

Department of Transport – Dave Milliken
- Acknowledged the 'good' work that has been done in the Town of Cambridge's West Leederville Planning and Urban Design Study and the City of Vincent's Leederville Town Centre Masterplan and Built Form Guidelines;
- Confirmed the difficulty of a transit link/road bridge;
- Supportive of the two Councils and the consultants to investigate the various options for a Link;
- Noted that connectivity to buildings on either side of the Freeway is important; and
- Questioned whether a transit link/road bridge should remain as an option, or is it perhaps better to move on, and simply investigate pedestrian options for the Link.

Public Transport Authority – Louise Howells
- Noted that a significant development is occurring around the West Leederville and Leederville areas (e.g. West Perth Regeneration Masterplan, New Northbridge, the City of Perth's Hamilton

Precinct etc.), all of which propose additional office space. In light of these proposed developments, there will be a need for an east-west connection, linking up to the Bus Rapid Transport proposed along Beaufort Street as well as the central northern corridor proposal along Fitzgerald Street.

Department of Planning – Dale Bastin

- On the Town of Cambridge side, there is a good case for providing public transport, and it won't be difficult to achieve a transit link on this side. On the City of Vincent's side however, it will be difficult to achieve a transit link, due to the engineering difficulties of constructing a ramp; and
- However, although today it appears that the engineering of a transit link/road bridge is not valid, this won't rule out the option of a transit link in ten or twenty years time. Therefore, whatever framework is put in place now, this should not rule out the possibility of a transit link in the future.

Main Roads Western Australia – David Van Den Dries

- Main Roads WA noted that because of topography and engineering issues, the likelihood of building a transit link/road bridge is nil. Therefore, Main Roads WA cannot support this idea; and
- Noted however that they are supportive of a footbridge, particularly as outlined in Option 2 as presented by the consultants. The reason for this is that the existing bridge cannot support additional structures, such as shading, and therefore, a new bridge will have to be built. In light of this, Main Roads advised that the original plans for the pedestrian bridge constructed in 1992 should be reviewed by the consultants, and contact be made with the engineer involved in the construction, in order to examine the limitations of altering the existing pedestrian bridge structure.

Town of Cambridge – Councillor Corinne MacRae

- Contrary to what was said in the Workshop regarding continuing to investigate a number of options for the Link, Corinne was of the view that a single option should be selected and developed, rather than leaving it open-ended as to what will happen in the area, as this will lead to more uncertainty for developers (e.g. proposed Kailis Bros. development).

Town of Cambridge – Mayor Simon Withers

- Supports a pedestrian bridge, but thinks that a transit link is a waste of time.

Public Transport Authority – Andrew Foreman

- Notes that both the West Leederville and Leederville areas are well located TOD's; and
- Requests that when determining road configuration, both Councils ensure that the bus system has a route free of congestion.

Additional Comments

- Public Transport Authority – Andrew Foreman: Noted that in relation to the Department of Transport's proposed Leederville Station Bus Interchange Facility, it is important to ensure that existing public transport users are not disadvantaged. Currently, the Public Transport Authority is looking to improve Route 15 service in the next few weeks, as it is a very important route;
- Aurecon – Brain Smith: Questioned the frequency of services for the Bus Interchange Facility, and whether these services will become more frequent;
- Public Transport Authority – Andrew Foreman: This is detail that hasn't been looked into, but buses are loaded in the morning peak periods, so it wouldn't be desirable to make them later by going into a Bus Interchange Facility;

- Department of Transport – David Milliken: Advised that there are approximately 3000 people that make the journey from the City of Vincent to Subiaco, Nedlands and UWA every day. Of these, approximately only 20 percent do this journey via public transport;
- Town of Cambridge - Councillor Corinne MacRae: Pointed out that there is a need to factor in people going to the northern suburbs, not only to Subiaco, Nedlands and UWA etc.;
- Main Roads Western Australia – David Van Den Dries: Advised that the Graham Farmer Freeway is built to maximum capacity. By natural growth, the six-lane Tunnel will be full by the years 2016 – 2021;
- Issues were identified with diverting a bus service in two directions on the City of Vincent's Leederville side (in order to avoid going straight down the middle through Oxford Street). Furthermore, attendees considered it illogical to split a bus route apart, and noted that this would conflict with the existing bus routes; and
- Attendees questioned where people would be going if they were traversing the Link by road. Furthermore, they noted that it would be quicker for people to walk from one end of the Link to the other as opposed to waiting for a bus, and in light of this, questioned the viability of a transit link/road bridge.

Appendix B

Council presentation and meeting notes

Leederville Station Link – Feasibility & Design Study

6 September 2011

Agenda

1. Welcome & Introductions
2. Purpose & Vision
3. Drivers and Basis of design
4. Options Development & Outcomes
5. Indication of Costs
6. Next Steps

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Purpose

• Progress to the development of design and delivery options for the Leederville Station Link incorporating the transport, precinct and master planning concepts already adopted by the City of Vincent and Town of Cambridge.

Vision:

“for Leederville Station to be a link between the Leederville and West Leederville centres in order that they can function as an integrated, combined TOD centre”

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Drivers for change

- State Policy & Strategy Framework
- Local Planning for Leederville and West Leederville
- Fixed and negotiable items
    - Entry, access and movement network characteristics
    - Train and Bus interchange requirements (current and future space/capacity requirements)
    - Land tenure and ownership

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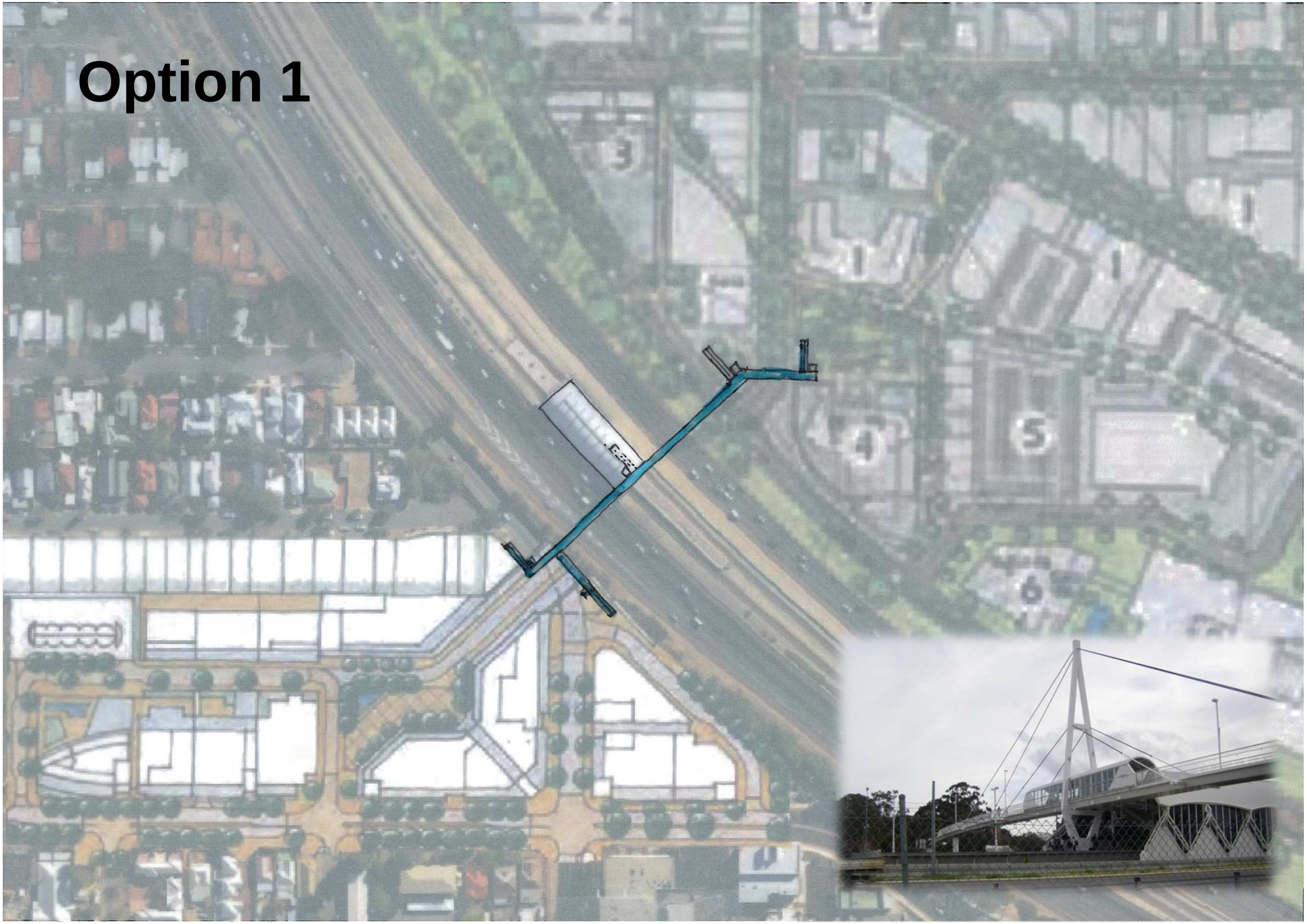
Options considered

1. Upgrade existing pedestrian bridge
2. New pedestrian bridge
3. Transit bridge

Option 1



Staging Plan for Option 1

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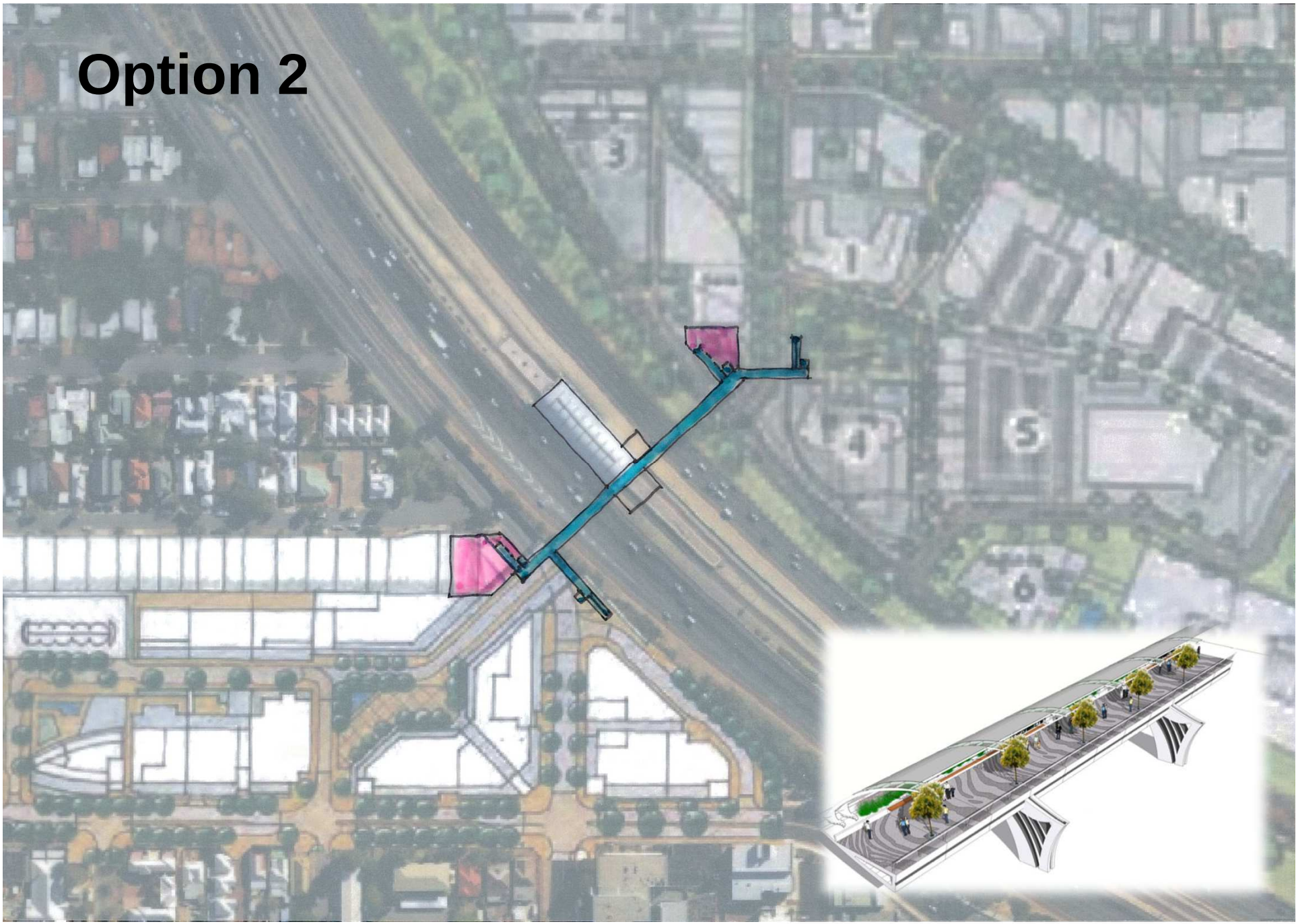
Option 2



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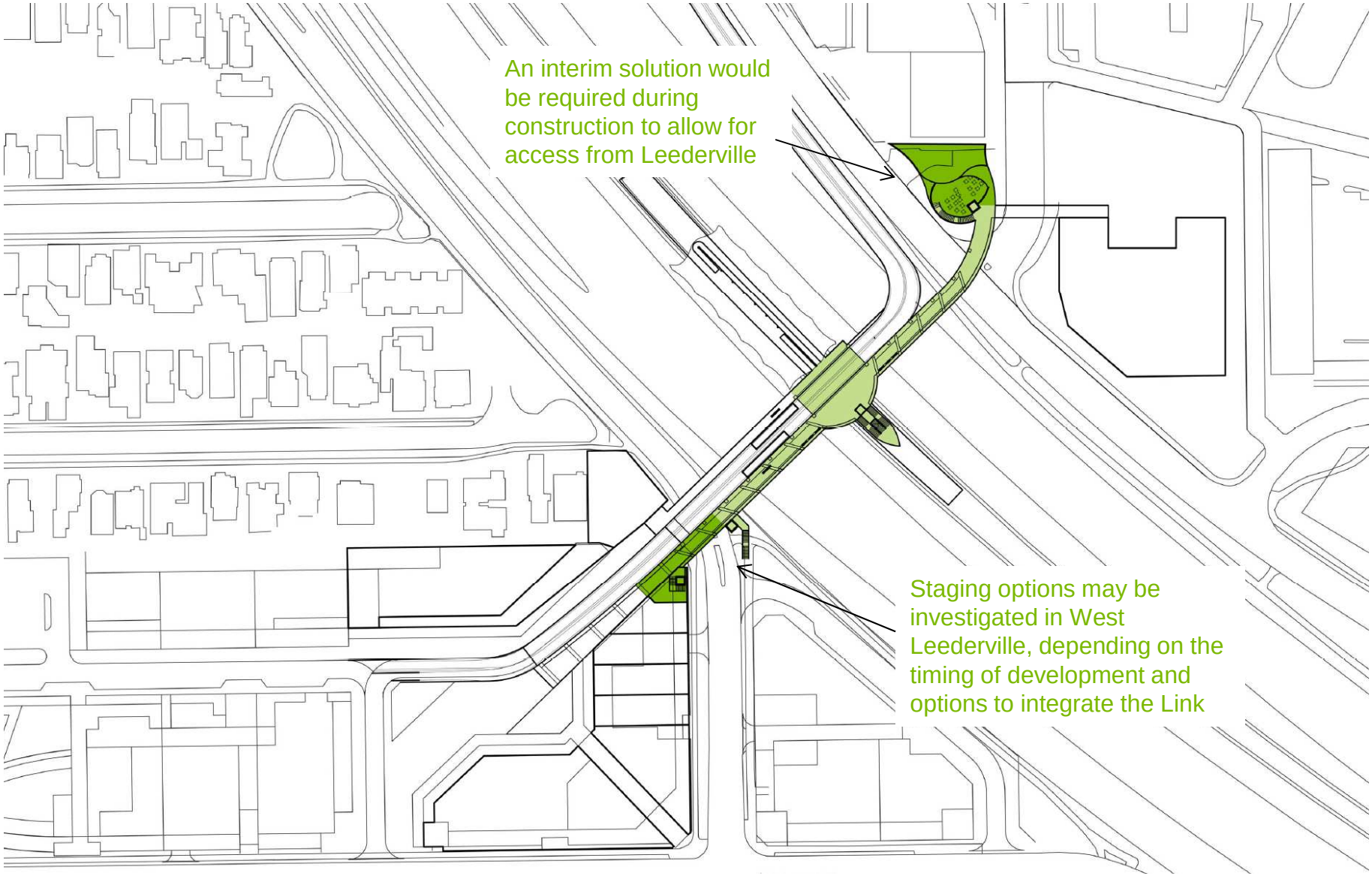

Option 2 Sections and Elevations

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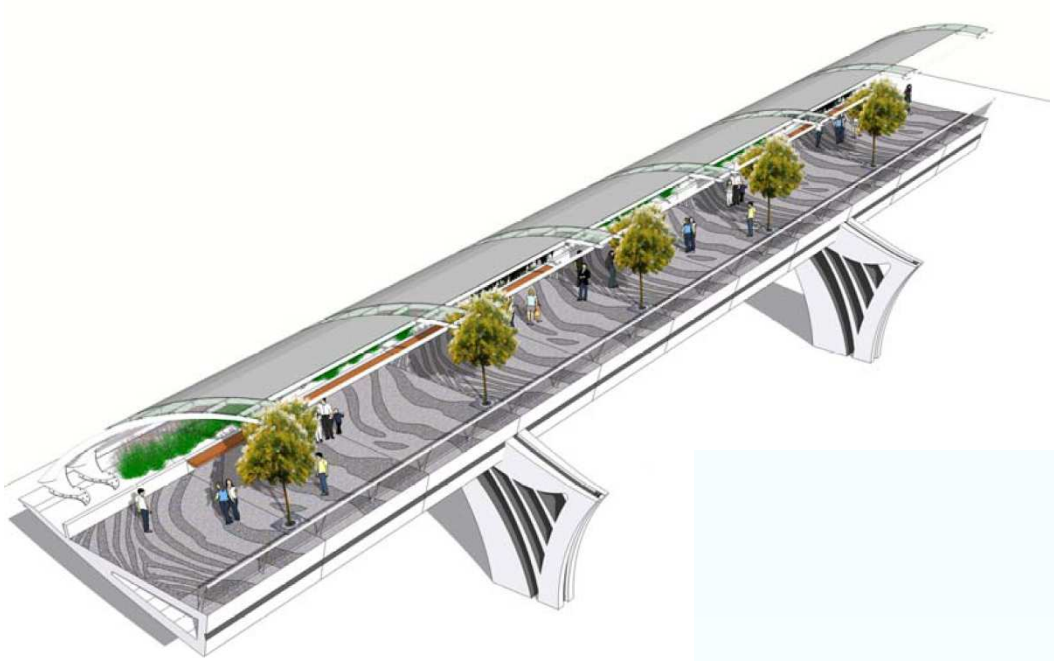
Option 2 Perspectives



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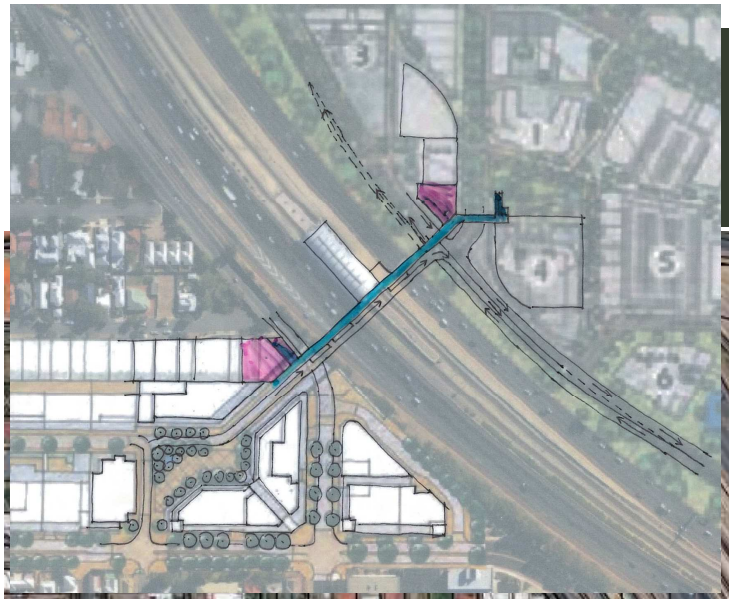
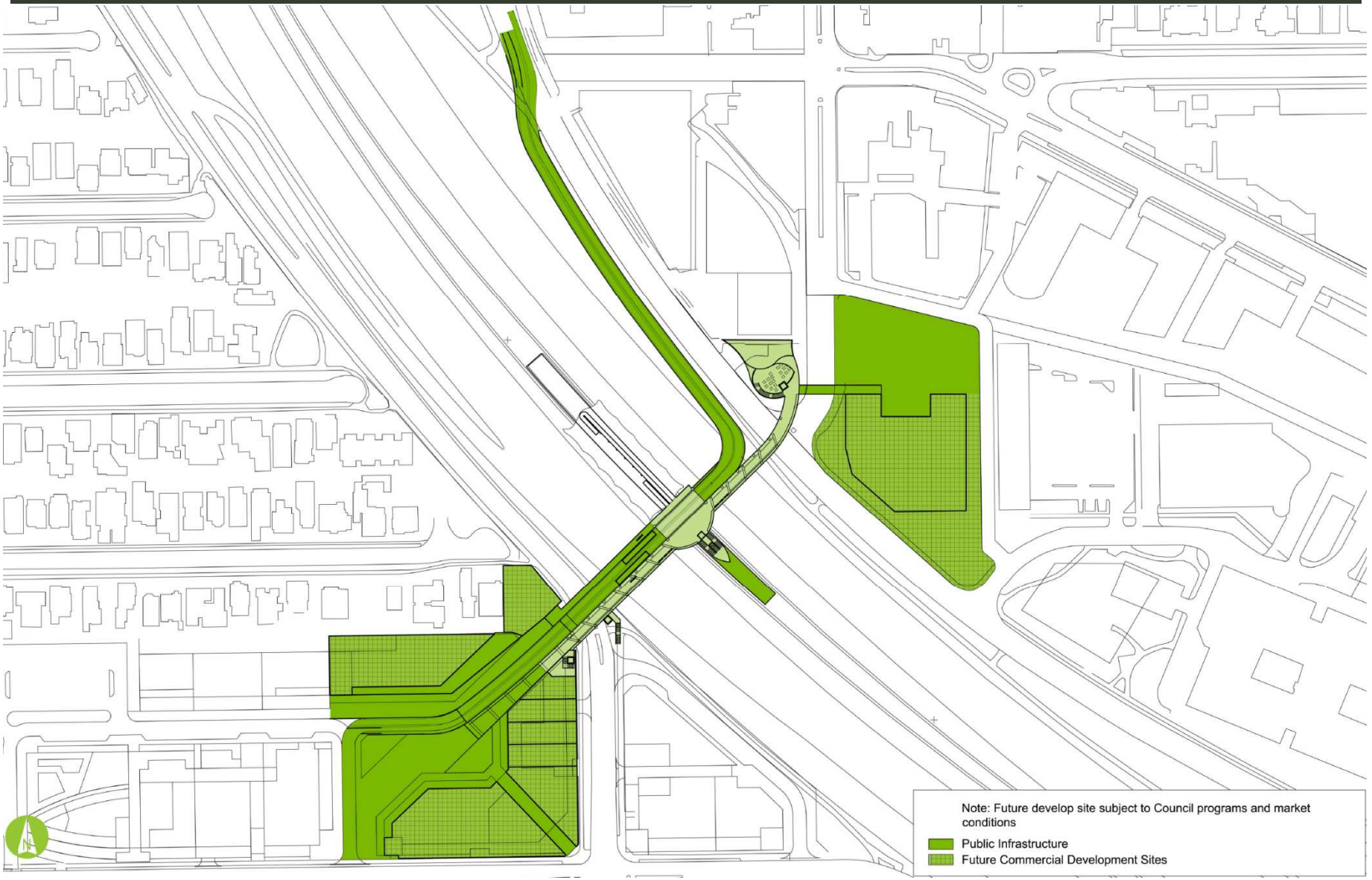
Option 3

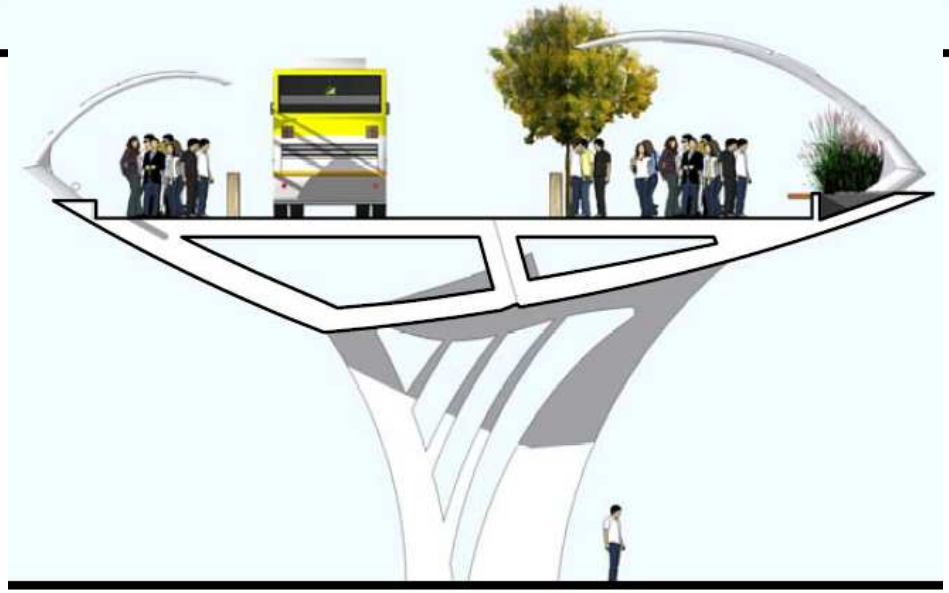



COLLINGWOOD
STREET
BOWLING GREENS
CAMBRIDGE
STREET
MITCHELL
STREET
NEWCASTLE
VINCENT

Staging Plan for Option 3



Option 3 Sections and Elevations



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Option 3 Perspectives

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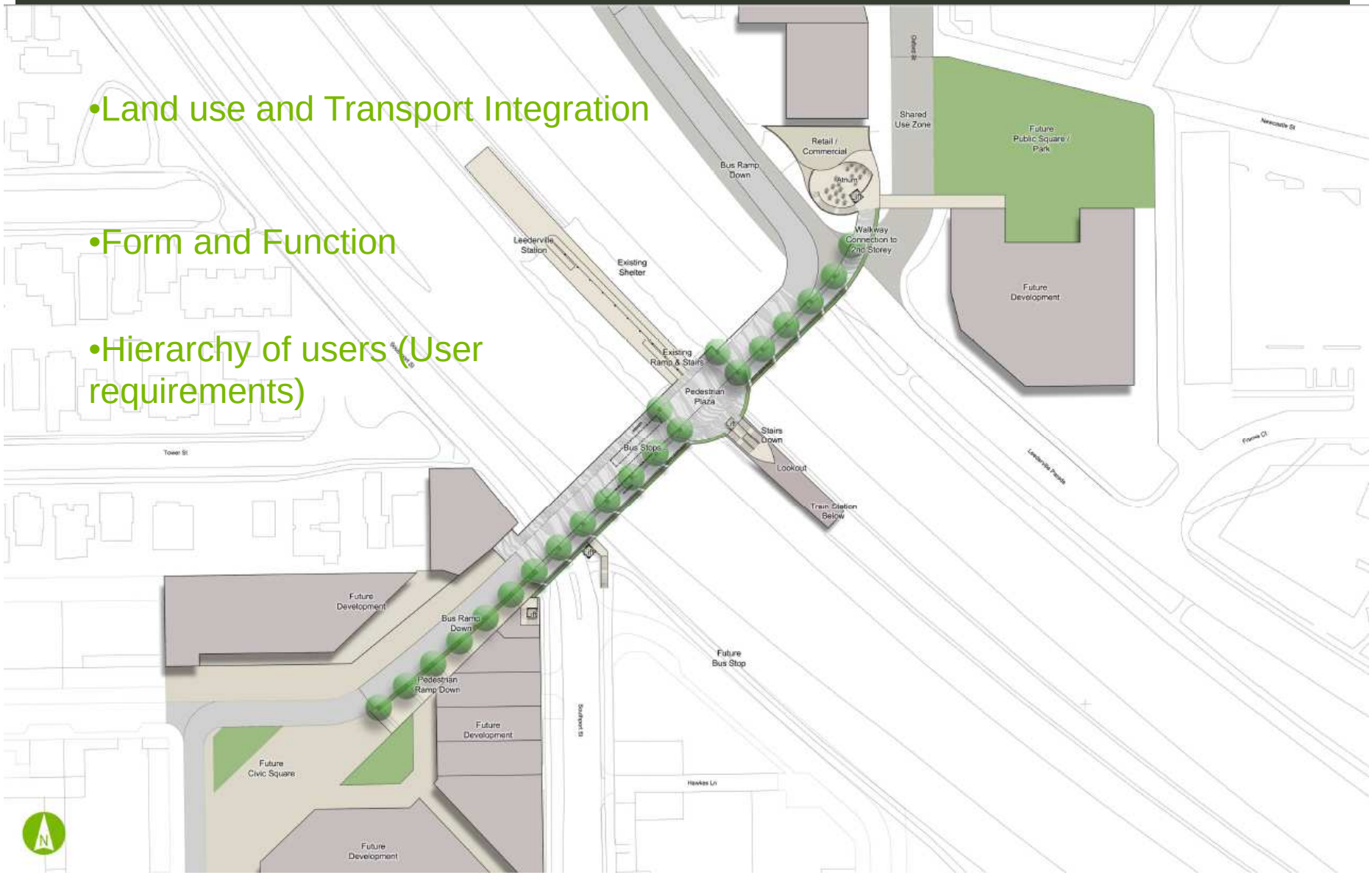
Design Principles

- Land use and Transport Integration
- Form and Function
- Hierarchy of users (User requirements)



Indicative Cost

Option	Indicative Cost
Option 1: Access to Bus Interchange (West Leederville)	<$1 million
Option 2: Pedestrian Link on Standard deck structure	
A - To Southport Street only	$5.5 million
B - With full integration	$7 million (excluding buildings)
Option 2: Viaduct structure (including foundations for Option 3)	
A - To Southport Street only	$10 million
B - With full integration	$13 million (excluding buildings)
Option 3: Transit Link	$15 million (including Leederville Parade ramp, excluding buildings)

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Next Steps

- Aurecon Report to be finalised and submitted
- Option to undertake further design to explore architectural integration with the ‘anchor’ points
- Integration with further iterations of Master Planning for Leederville and West Leederville
- Detailed design and Costing
- Investigate funding options

Questions?

Meeting Notes of the Combined Town of Cambridge and City of Vincent

Council Member Forum

Town of Cambridge

6 September 2011 – 7.00PM

1. Welcome and Introductions by Town of Cambridge Mayor.

2. Presentation by Aurecon, who gave an overview of the following:

   - Purpose and Vision;
   - Drivers and Basis of design;
   - Options Development and Outcomes;
   - Costing options; and
   - Where to from here.

3. Discussion/Questions by Town of Cambridge and City of Vincent Councillors:

   Q: How much land is needed to be acquired for Option 3?
   A: For Option 3, this will require the take up of the existing cadastral lots on both sides of the Freeway. The Consultants have worked this into the various options to minimise land take.

   Q: How does the building on the corner block on the Town of Cambridge side connect to the overpass?
   A: This really depends on the form that the building takes. It could be stairs/elevators connecting at both the ground level, and the first level.

   Q: Although the benefits of a pedestrian link are evident, what is the point of a transit link; is there even a need for this?
   A: The need for a transit link must be seen in light of the future, where increased densities will dictate the need for this to occur. Also, the destination of a transit link is to go east, so it's more than simply connecting to the Freeway. Improving the east-west connections in this area is also supported in the Department of Transport's Public Transport Plan 2031.

   Q: Would option 2 be disadvantaged until the development is undertaken.
   A: The need for a transit link must be seen in light of the future, where increased densities and commercial development opportunities will dictate how this option develops. Options for funding through private enterprise are considered important and should be explored.

Q: What will the spiral staircases be replaced with?
A: Vertical travel structures, such as elevators or escalators.

Q: Would the State/Federal Governments contribute money towards the bridge if Option 3 (transit option) will occur in the future?
A: Given the responsibility of transport routes of this nature falls with the State Government, it is understood that funding options could include State government contribution. However the details of this need to be further explored.

Q: Town of Cambridge Councillor asked what development will occur on the Frame Court car park?
A: City of Vincent CEO advised that this will most likely be a 24 storey development.

Q: Could Option 2 work without the development of the corner buildings on the City of Vincent side?
A: Aurecon explained the staging plan, and that for Option 2, there is the ability to build the new structure whilst maintaining the existing link.

Q: How does the PTA feel about this Project?
A: Aurecon advised that they haven't really discussed funding options with them, but have experienced some resistance in the initial contact that the consultants have had with them regarding the project. A lot more work needs to be done in this area.

Q: There is a need to discuss more than just funding options with the PTA; need to discuss the frequency of the bus services etc., to make Option 3 feasible.
A: Aurecon agreed with this.

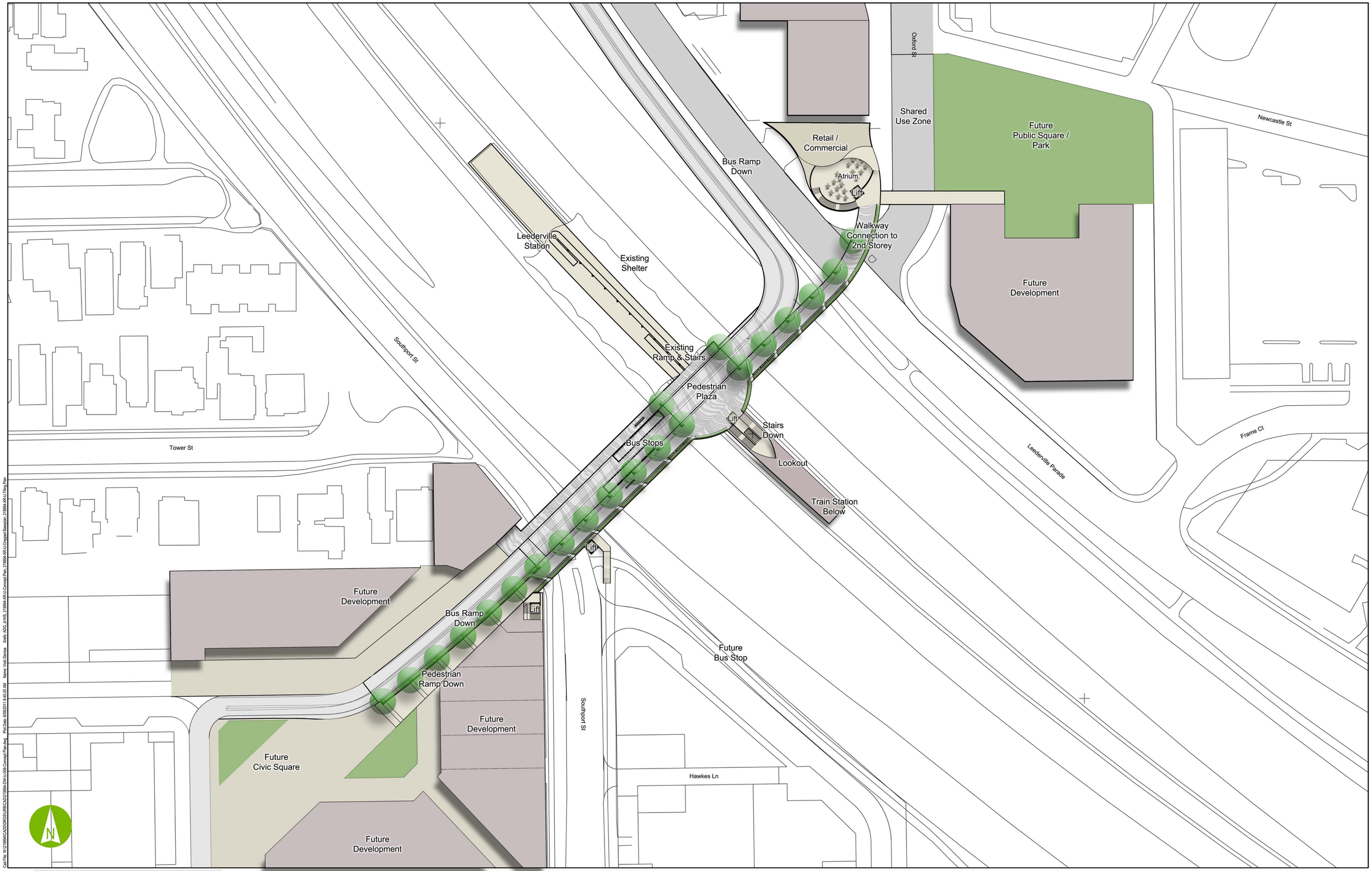
General comments /observations:

- Option 2 achieves the vision in terms of improving the linkage. However, there is a need to consider the private funding of the corner blocks in order to make Option 2 feasible.

- In relation to the costing options, Option 2 (ii) 'with full integration' is really the only one that works, so there is no need for Option 2 (i). For the standard deck option, which is $7 million, if the State Government goes fifty-fifty with the two local government authorities, this only equates to $1.5 million per local government.

Appendix C

Leederville Station Link Drawing Set



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Town of Cambridge

REV	DATE	REVISION DETAILS	APPROVED
1	05-09-11	PRELIMINARY	AR

DRAWN	DESIGNED
V.DENISA	V.DENISA

CHECKED
P.CITTADINI

APPROVED
DATE

PROJECT
LEEDERVILLE STATION LINK

TITLE
CONCEPT MASTER PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT No.
219894

SCALE	SIZE
1:500	A1

DRAWING No.	REV
DW-U-001	1

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DRAWN	V.DENISA
DESIGNED	V.DENISA
CHECKED	P.CITTADINI
APPROVED	
DATE	
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TITLE	STAGING PLAN OPTION 1
	PRELIMINARY NOT FOR CONSTRUCTION
PROJECT No.	219894
SCALE	1:750
SIZE	A1
DRAWING No.	DW-U-002
REV	1

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DESIGNED: V.DENISA
CHECKED: P.CITTADINI
APPROVED:
DATE

PROJECT
LEEDERVILLE STATION LINK

TITLE
STAGING PLAN
OPTION 2A & 2B - STAGE (i)

PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT No.: 219894
SCALE: 1:750
SIZE: A1
DRAWING No.: DW-U-003
REV: 1

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DRAWN	DESIGNED
V.DENISA	V.DENISA

CHECKED: P.CITTADINI

APPROVED: DATE

PROJECT: LEEDERVILLE STATION LINK

TITLE: STAGING PLAN
OPTION 2A & 2B - STAGE (ii)

PRELIMINARY
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PROJECT No.: 219894

SCALE	SIZE
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DRAWING No.	REV
DW-U-004	1

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CHECKED: P.CITTADINI

APPROVED: DATE

PROJECT: LEEDERVILLE STATION LINK

TITLE: STAGING PLAN OPTION 3

PRELIMINARY
NOT FOR CONSTRUCTION

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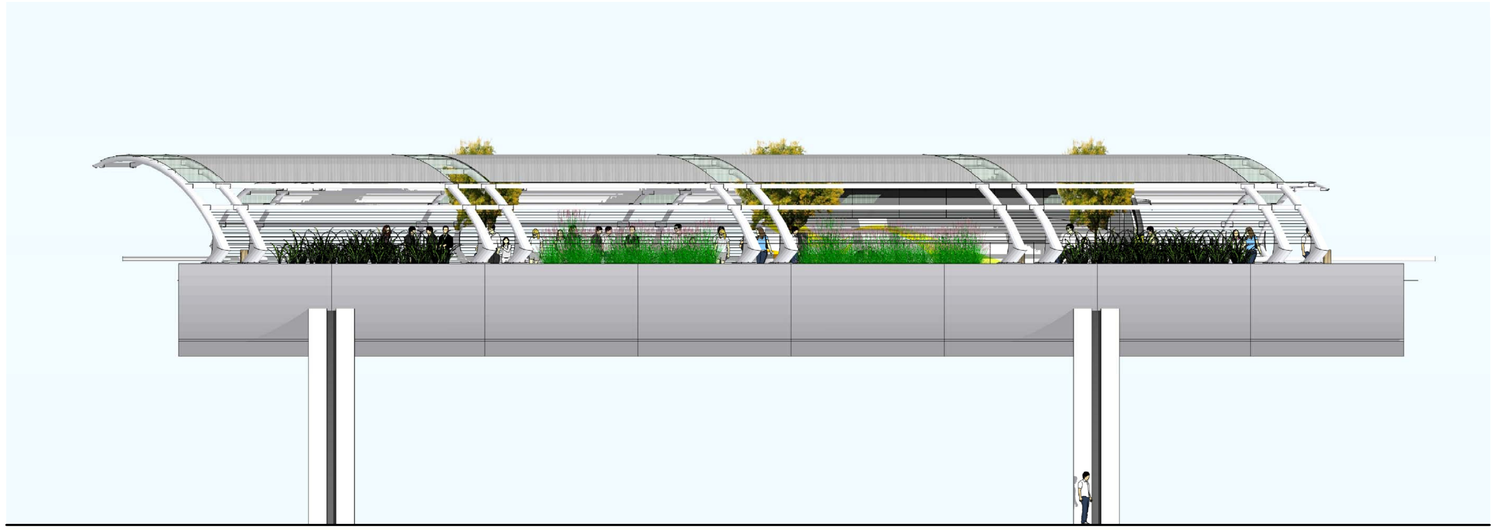
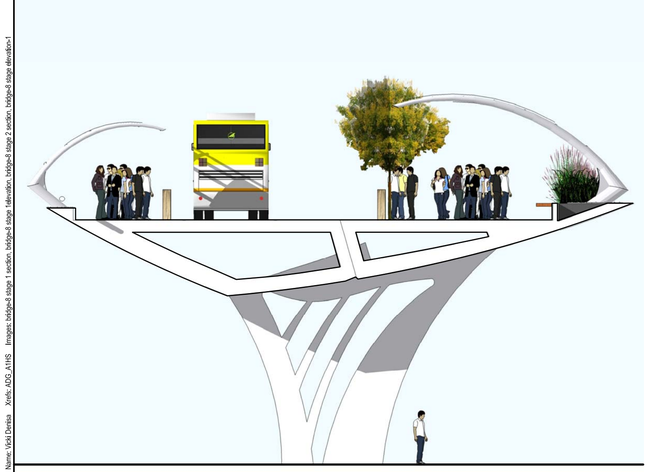
stage 1 pedestrian viaduct section s1

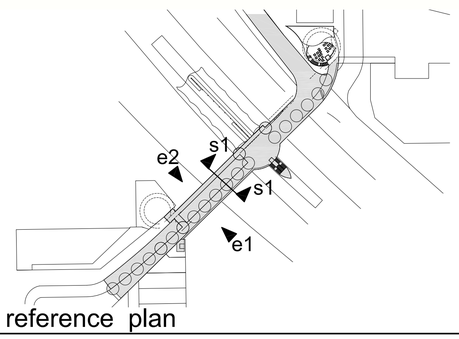


stage 1 pedestrian viaduct elevation e1



stage 2 typical viaduct section s1

stage 2 typical viaduct elevation e2



reference plan

0 5m 10m

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Town of Cambridge

REV	DATE	REVISION DETAILS	APPROVED
1	24-08-11	PRELIMINARY	AR

DRAWN	DESIGNED
Pcit	Pcit

CHECKED: P.CITTADINI
APPROVED: DATE

PROJECT: LEEDERVILLE STATION LINK
TITLE: Indicative Sections & Elevations of Viaduct

PRELIMINARY
NOT FOR CONSTRUCTION
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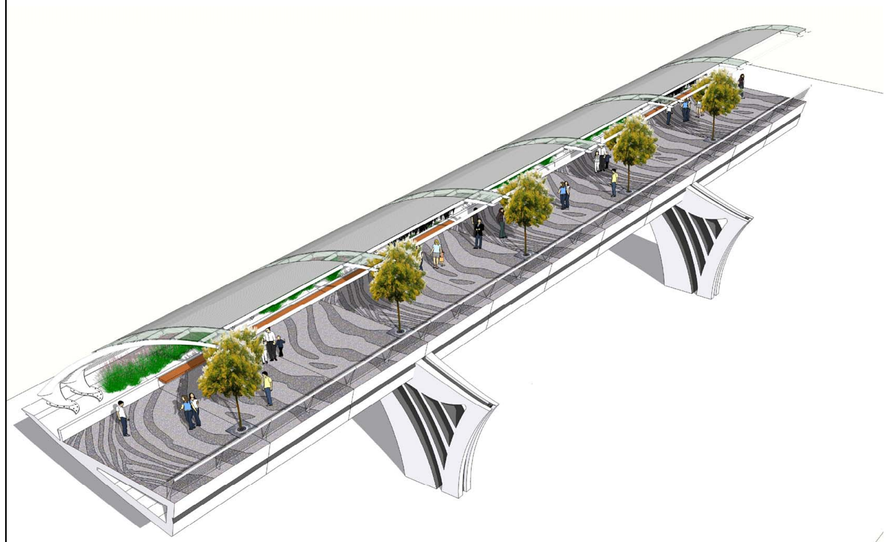
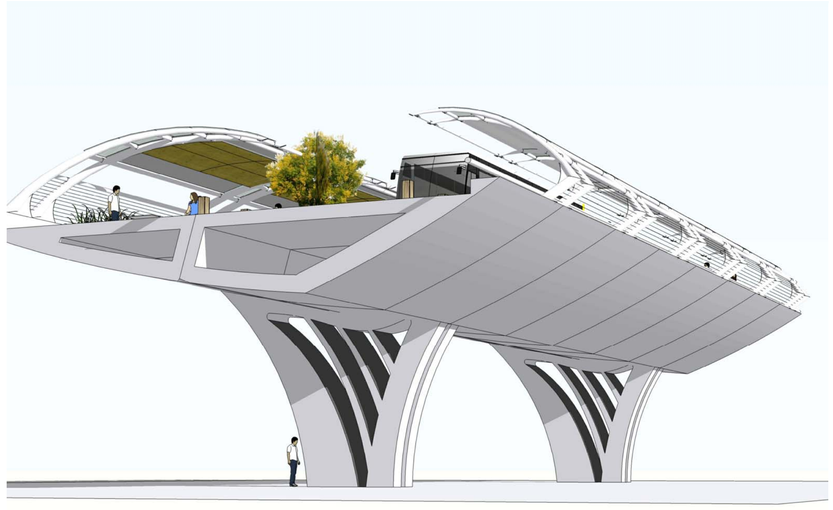


stage 1 pedestrian viaduct v1

stage 1 pedestrian viaduct v2

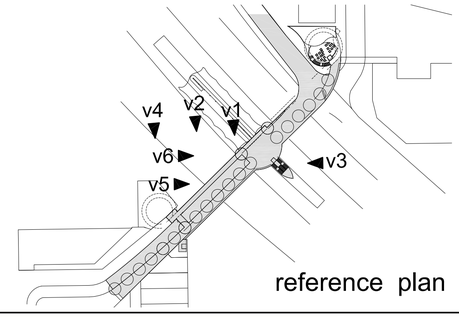
stage 1 pedestrian viaduct v3

stage 2 pedestrian viaduct v4



stage 2 pedestrian viaduct v5

stage 2 pedestrian viaduct v6



reference plan

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REV	DATE	REVISION DETAILS	APPROVED
1	24-08-11	PRELIMINARY	AR

DRAWN	DESIGNED
Pcit	Pcit

CHECKED: P.CITTADINI
APPROVED: DATE

PROJECT: LEEDERVILLE STATION LINK
TITLE: Indicative Perspectives

PRELIMINARY
NOT FOR CONSTRUCTION

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