



05 ACTIVE TRANSPORT BRIDGES

Artist's impression - Aerial view south east over the new Falcon Street active transport bridge

05 ACTIVE TRANSPORT BRIDGES

Across the Project, bridges are the most visible element and act as sculptural markers within the corridor.

At the active transport bridges, the opportunity to embed cultural storytelling through integrated artwork will provide a series of project legacy elements that deepen the meaning of the overall project and heighten the user experience.

Design philosophy

The suite of active transport bridges represent an upgrade to the connection of communities that are physically separated by the Warringah Freeway corridor.

The design of the bridges on the Project aims to serve the community at the highest level by providing comfortable, safe and enjoyable connectivity.

The bridges are located and designed to enhance views, create high legibility from the roadway and connecting local links, and to respond to considered alignments, desire lines, and improved connectivity.

Bridges have been designed as a consistent family, with similar forms, detailing, materials or finishes, and where appropriate, be individually distinctive to act as visual markers and reflect their location, role and span.

The major structural elements, which include abutments, balusters, throw screens and shade structures, form an integrated suite of urban design elements that will remain timeless, contemporary and sit comfortably within the North Sydney landscape.

Our approach is to develop contextual, refined and elegant design solutions that benefit users and the wider community and set a new benchmark for infrastructure in North Sydney.

The relationship of bridge elements is crucial to how the bridge is viewed from near and far. Careful consideration of the inter-relationship of the bridge elements and the incorporation of subtle designed elements has been developed to unify the design.

This family of bridges provides a unique opportunity within the corridor to work with local knowledge holders and designers to tell the stories of the areas first people, the Cammeraygal.

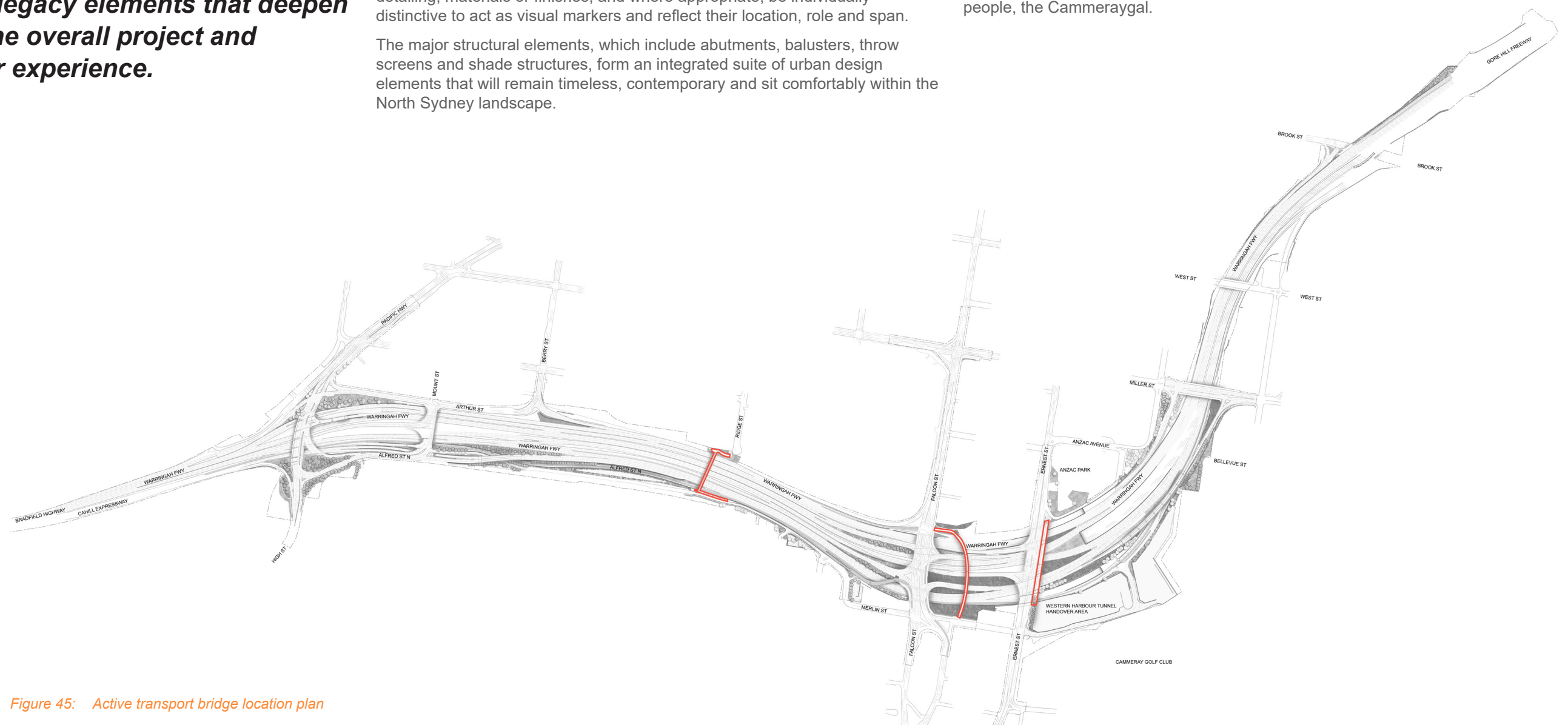


Figure 45: Active transport bridge location plan

05.1 Design principles

The overall design intent for bridge designs is to create a refined design aesthetic that avoids clutter and poor finishing. The structures have been designed as architectural elements that are attractive, welcoming and signature items within the corridor experience.

The structural designs are elegant and refined, with simple and consistent detailing, creating a consistent experience for the user, aiding in the overall network wayfinding and legibility.

There has been a considered attempt to avoid unnecessary embellishment in the design of bridges that may date with age, with a focus on designing the elements to fit within their context, emphasising the simple and consistent detailing within all materials and finishes.

Local Aboriginal design language and elegant touches of feature lighting is provided and integrated into the design of the Active Transport Bridges over the corridor.

The major strategies for the design of Project bridges are described following.



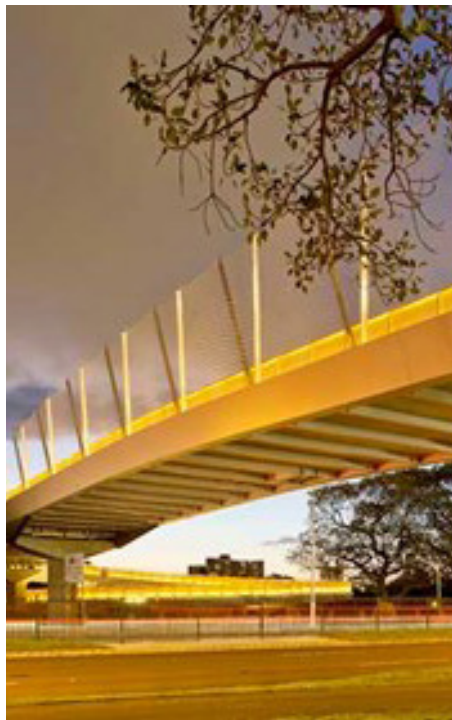
Connecting and serving communities

- Bridges have been designed, upgraded and replaced at key locations and along well-trafficked paths, to improve connectivity and provide the community with a lasting project legacy
- Bridges connect to the wider North Sydney network of active transport routes
- All active transport bridges will be wider than existing bridges to cater for increased patronage and safety of users
- The active transport routes will tie in with the North Sydney CBD Public Domain Strategy.



A coordinated family of bridges

- The design, form, materials and finishes of the bridges will present smooth, clean lines and create a family of structures to be consistent to ensure visual continuity of the corridor
- Bridges have been designed as the centrepiece and legacy of the project. The bridges are a key, consistent, visual component of the corridor, therefore it is crucial that they read as family
- Materiality, colour and overall simplicity and elegance of the designs will help tie together the overall project aesthetically
- Bridges will incorporate indigenous storytelling through design and material choice.



Simple, refined and elegant

- Bridge detailing has been designed to be simple, refined, and elegant, with slender profiles and accentuated forms connected to landscape
- Substructures, superstructures, lighting and barriers have been designed to form part of an integrated suite of high-quality elements
- Finely detailed and carefully integrated materials, structures and joints, provide a high-quality outcome and experience to be viewed at slower (cycling and walking) speeds
- Feature lighting subtly accentuates the key features, with no visible light fittings.



Integrated with Aboriginal cultural storytelling

- Artwork embedded on the bridge balustrades, canopies and lift shaft will make reference to the Aboriginal cultural heritage of the area
- Many other corridor wide themes such as saltwater people, rock art, sense of place, native flora and fauna, geology and local ingenuity will be embedded into the integrated art across the bridges
- The project has worked with Aboriginal artists and knowledge holders to refine the design and artistic thinking
- Informative plaques will be installed at the active transport bridges that allow the importance of the stories told in the artwork to be permanently conveyed as part of the legacy of the project.

05.2 Design approach

The design of the Active Transport Bridges throughout the project are conceived as a series of 'floating' sculptural elevated walkways that act as a ribbon across the corridor, creating a 'family' of bridges, and heightening the experience of the user. The Active Transport Bridges are as follows:

- Ridge Street Active Transport Bridge
- Falcon Street Active Transport Bridge; and
- Ernest Street Active Transport Bridge.

The structures will be simple and elegant, integrating a series of repeated inclined posts, perforated aluminium balustrades, concrete decks, stainless steel woven mesh and handrails as required. Materials were chosen for longevity, utility, beauty and value.

Aboriginal cultural storytelling will also be integrated into the design of Active Transport Bridges and associated lift shafts through integration of art, providing a large canvas to convey their storytelling. Informative plaques will be installed at the active transport bridges that allow the importance of the stories told in the artwork to be permanently conveyed as part of the legacy of the project.

These bridges will chronicle cultural heritage through the use of colour, texture, pattern and light. This will be contemporary and stylised rather than direct literal interpretations – increasing their richness and not diminishing their value - to create a modern sense of place and ownership by today's custodians of the land.

The key design principles for the development of the bridge are:

- A design with smooth, clean lines with minimum structural depth
- Urban design elements including lighting and fencing will all be considered as part of the overall composition and form, with a view to developing a slender, symmetrical, visually uncluttered and well-ordered profile
- Signage requirements will be kept to a minimum
- The design will complement the surrounding built-form, natural environment and existing structures
- All accessible surfaces will be treated with a non-sacrificial anti-graffiti paint coating
- Feature lighting will be provided through handrail puck lighting, used to create a subtle and elegant wash of lighting to heighten the overall night-time experience
- Abutments will be simple elements, kept as small as possible to mitigate areas for vandalism.

This chapter includes elevations, sections, and details of the major bridges as typical to illustrate the overall design of bridges across the Project.



Figure 46: Ridge Street Active Transport Bridge



Figure 47: Ernest Street Active Transport Bridge



Figure 48: Falcon Street Active Transport Bridge

05.3 Materiality and elements

The bridge materiality of the Project is based on longevity, utility, beauty and value, consistent with the overall Project architectural language and integrated with subtle Connection to Country storytelling through Aboriginal art and storytelling.

The main bridge components detailed within this section include the following:

- Stainless steel tensile mesh throw screen
- Stainless steel handrails
- Laser cut aluminium balustrade
- Laser cut aluminium integrated throw screen and shade canopy
- Concrete - Deck, pier, abutment wall
- Piers
- Lighting - Handrail and canopy; and
- Posts.

The following section details the materiality of the active transport bridges.



Balustrades and shade canopy structure

The balustrades of the Active Transport Bridges over the corridor present a unique opportunity to embed Indigenous art and storytelling within the laser cut aluminium panels, creating a sophisticated and meaningful feature across the bridge, enhancing the experience for active transport users and motorists, leaving a lasting legacy with artwork specific to its place.

Refining the material palette from the reference design has meant that artwork will be represented through perforated aluminium without additional adornment.

The shade canopies are perforated aluminium that can provide solar cover and an opportunity to embed a long linear art piece within.



Anti-throw safety screens

Safety screens located on the bridge will be integrated with the design of the bridge as a whole. Post spacing must be designed to have a pleasing and ordered visual relationship with other bridge details such as safety barrier posts, lighting columns and parapet joints.

All active transport bridges must all feature safety screens to protect road users below bridges, which will be provided in the form of a lightweight stainless steel mesh (webmesh or equivalent), on posts that feature an outward 5-degree slope, with a diamond aperture 45 mm x 20 mm or maximum square grid of 50 x 50 mm.

This will add a sense of transparency to the throw screens and add a lightness to the bridge form.



Lighting

There will be pedestrian lighting poles along the ramps and approaches and integrated lighting within the canopy structures across bridge spans.

An integrated handrail feature light is also used along the length of the bridge to increase safety, and provide a subtle, elegant wash of light down the integrated balustrade detail.

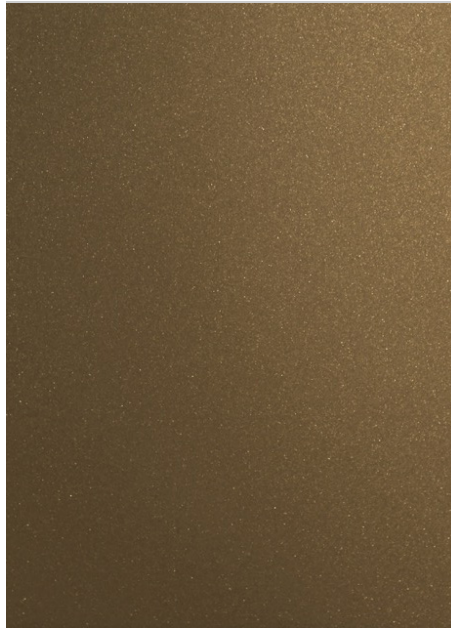


Posts

Safety screen posts have been developed to work with the form and materiality of the broader family of bridge elements across the project.

Posts are a painted and tapered 5-degree Square Hollow Section (SHS) post that is designed to integrate across the multiple materials of safety screens and noise barriers.

A SHS was chosen for it's ability to accommodate services, reduce overall bulk and dimensions, giving the shade structures an elegant and refined exterior.



Colour and paint finish

The paint system will be compliant with the Transport B220 specification in regards to paint finishes.

Posts will be painted, with balustrade panels powder coated aluminium.

In working with 500 Voices, there was a concerted decision to ensure that the colour was warm, welcoming and contrasting to the mostly grey concrete of the city.



Piers

The pier design presents as a refined, elegant solution fitting with the overall Project architectural language.

Due to the width of the bridge deck, headstocks were required to cater for two bearing locations, however a sophisticated tapered capital design has been used to reduce the visual scale of the structural requirements. The narrow width of the circular column ensures a reduction in visual clutter, while minimising its footprint in a corridor with an extreme lack of space throughout the corridor.

This pier type can accommodate all of the Active Transport Bridges requiring a pier, ensuring a connected family aesthetic.



Figure 49: Artist's impression - View west across Falcon Street Active Transport Bridge

05.4 Connection to Country

With the Government architect's draft Connecting with Country guidelines leading the way, our approach has been to listen to Knowledge Holders and co-design cultural outcomes with them.

The aim of cultural interpretation is to make visible the history of the site with traditional knowledge and contemporary storytelling etched into the project and landscape. Across the Project, the design team has integrated art with built elements and adapting materiality and colour choices to convey meaning and reflection of place.

Cultural interpretation has been developed based on the knowledge gained through the targeted engagement process with the local Aboriginal community and in consultation with the Project's selected indigenous artist, Transport and key stakeholders.

The curation of integrated art across the project has been guided by the emerging narratives from the co- design process with the local knowledge holders.

This section summarises the approach taken to explore and implement the emerging themes across various Project elements based on the cultural narrative developed in Section 3.

Connection to Country - Integrated art

Active Transport Bridges will incorporate feature balustrades, canopy and screen panels, which will reference Connection to Country storytelling through integrated Aboriginal art. The Project has teamed with 500 Voices and knowledge holders to refine the integrated design further to create a truly memorable and connected project.

Through local Aboriginal community engagement and research, line-based design was and is the design of Aboriginal Sydney. Hence, the Project team has taken this forward to ensure that this particular historic design vernacular is continued and built upon across the Project elements.

A key initiative for the Project is to elegantly embed local Aboriginal design language and vernacular into key visual Project elements and are unified by the overarching theme of 'a place of sky, water and earth' that have been translated and applied to the following key elements:

Ridge Street Active Transport Bridge

- Balustrades
- Canopy
- Lookout
- Lift shaft

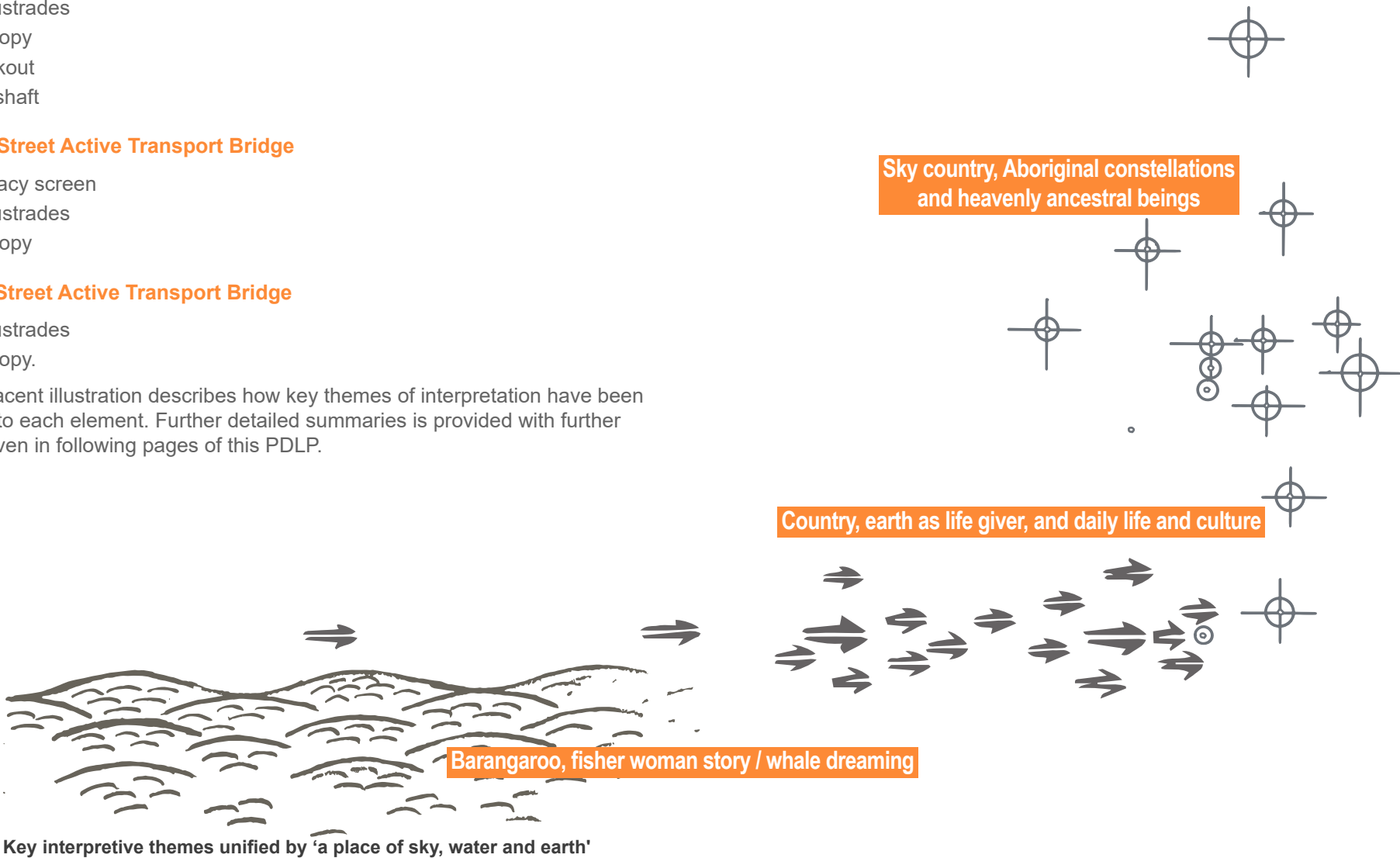
Falcon Street Active Transport Bridge

- Privacy screen
- Balustrades
- Canopy

Ernest Street Active Transport Bridge

- Balustrades
- Canopy.

The adjacent illustration describes how key themes of interpretation have been applied to each element. Further detailed summaries is provided with further detail given in following pages of this PDLP.



Emerging patterns, motifs and language

The emerging patternation is a translation of the important thematic established through consultation, in particular 'a place of country, sky and water'.

Outcomes of consultation

During consultation, the project team met on multiple occasions with Karen Smith from the Aboriginal Heritage Office (AHO) and separately with Uncle Denis Foley.

During consultation, questions were asked about how one would go about sharing spirituality in an integrated art and infrastructure approach. The answer was that the traditional visual language of the Dharug/Eora people is primarily symbolic with meaning and ceremonial roles ascribed to certain animals, or ancestral beings.

Based on the Balarinji report, external stakeholder consultation and the artist's style, philosophy and cultural approach, three initial concepts emerged. Furthermore, these three concepts will be rendered on the three bridges as follows:

Ridge Street Bridge (Connection to Ancestors)

Barangaroo, fisher woman story / whale dreaming.

Falcon Street Bridge (Connection to Earth)

Country, earth as life giver, and daily life and culture.

Ernest Street Bridge (Connection to sky)

Sky Country, Aboriginal constellations and heavenly ancestral beings.

Ridge Street Bridge (Connection to Ancestors)

In many ways, the Ridge Street Bridge offers the greatest opportunities of the three bridges. This is largely due to its proximity to the harbour and its view, but is also enhanced by the viewing platform and opportunity for additional works such as a sculpture, signage and wayfinding. Dr Shane Smithers from 500 Voices explains the design further:

The Ridge Street Bridge artwork introduces the ancestors as the third of three foundational concepts upon which Aboriginal belief, philosophy and culture arise.

The Balustrades, ramps, lookout and lift well are decorated with fisher women and water. This important cultural practice shows women fishing from bark canoes called 'nawi' providing for their families. Importantly, men and women had different roles such that responsibilities for providing for the family, for making tools and other cultural practices were shared between men and women. In essence, society incorporated gendered roles but maintained equality between the sexes.

Additionally, women held important roles in the elder circle and often presided over matters of justice, marriage law, the discipline and teaching of children. Where each ramp and the lift well touch the ground, the water pattern gives way to the earth pattern transitioning and setting down gracefully upon our country.

The overhead panels feature a whale story about the importance of lore in maintaining balance and respect for life, the earth and sky. The first panel shows the old man of the sea observing people being wasteful and destructive. The second panel shows the whale instructing dolphins to round up the boys, represented as small fish, and take them off to ceremony. The third panel shows the fish being driven up onto the shore where they flat about before changing into small kangaroos and following Badagurang (a red kangaroo) off toward initiation.

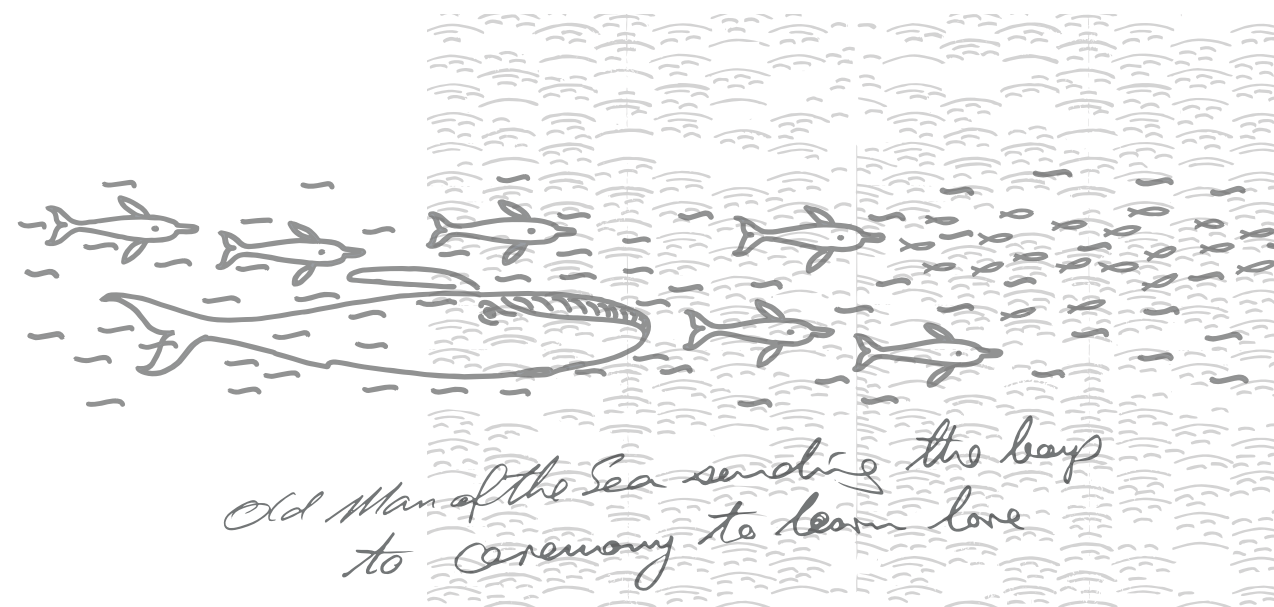


Figure 50: Connection to Country - 'Water' motif

Two symbols, a spiral and a set of concentric circle with short radiating lines (also known as the lore symbol), appear at either end of the overhead panel. The spiral represents the cycle of life, growing in knowledge and wisdom. While the 'Lore symbol' represents the interconnectedness of all things.

Ridge Street Bridge lookout area

Given Ridge Street Bridge's harbour views, it is well suited to artworks that address Barangaroo, the fisher women's story and whale dreaming.

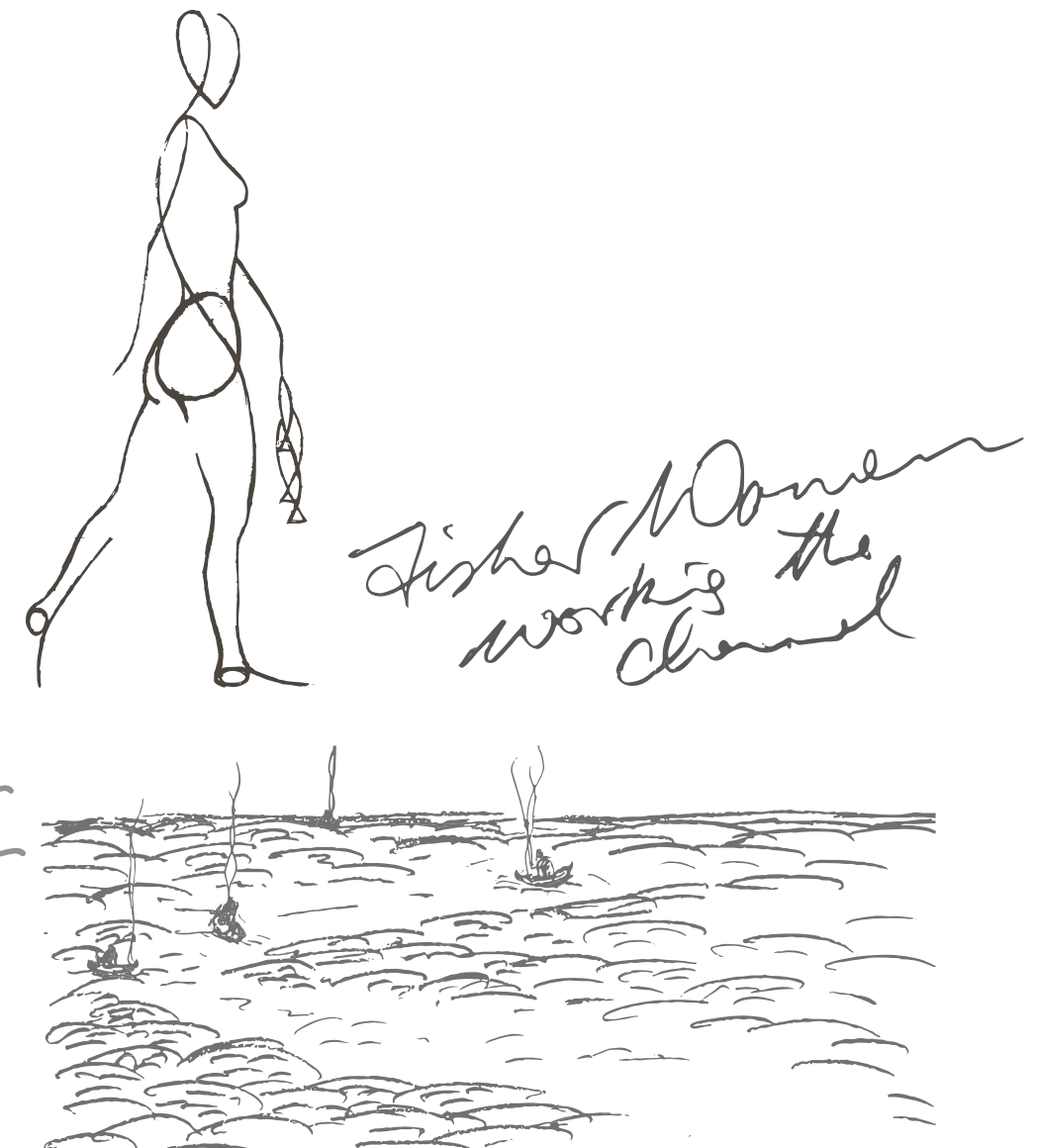


Figure 51: Connection to Country - 'Fisherwomen' motif

Falcon Street Bridge (Connection to Sky)

Dr Shane Smithers from 500 Voices explains the design of the Falcon Street Active Transport Bridge integrated art as follows:

The Balustrades and ramps are decorated with rain inspired artwork. For us rain connects us to the sky and is shown as dashes or abstracted into vertical lines rather than droplets. The artwork creates cascades of rain giving some depth to the artwork. This is an important artwork as it introduces one of three foundational concepts that form the basis of Aboriginal belief, philosophy and culture. Where each ramp touches the ground, the rain pattern transitions to the earth pattern uniting the structure with the earth.

The canopy panels feature the five eel story, stars and constellations. This story originated in the tumultuous events caused by the dramatic sea level rise at the end of the last ice age. The story begins by describing our ancestors living happily on country that is now beneath the sea. One day a great story came from the sea, the waves surged and covered the earth. People stranded on small hillocks were drowning, some became limpets, when you turn them over you can still see the tongues of the people inside the shell.

As the waves rushed over the land the people called out to Baiami (the great Eel) who directed his four children, to go into the earth and push it up to create a barrier to the raging sea. As they pushed the land upward, they created the Sydney heads and the coastline that we see today.

This story has been passed down through our ‘oral story telling tradition’ which incorporates visual language, drawing, painting, stencilling, body paint, earth works, effigies, choreography, dance, song, rhythm and so on. Together, these communication methods relayed the environmental event, and catastrophe down through time to be relayed here today.

Ernest Street Bridge (Connection to Earth)

Dr Shane Smithers from 500 Voices explains the design of the Falcon Street Active Transport Bridge integrated art as follows:

The Balustrades and ramps are decorated with earth inspired artwork. For us the Earth is our mother. We show connection to the earth with horizontal lines. In this case the horizontal dashed or lines have been abstracted into twitching horizontal lines that reference the sedimentary layers in the sandstone upon which the city of Sydney is built.

The artwork includes feature panels that show a stylized modern city skyline extending the earth upward through the built environment. Telling this story is important as it underpins our concept of country and reinforces our connection to the earth mother Wiari and introduces the second of three foundational concept to inform Aboriginal belief, philosophy and culture.

For the canopy panels, there are two lore symbols, bookending the overhead artworks. The main artwork incorporates three feature panels telling the complex coming of age story when boys went through initiation into manhood. This story shows the transition that boys take from being under women’s lore to men’s lore. The related signage may include reference to other artwork to further explain the message in the emu and kangaroo tracks. The lore symbols are about the life cycle and growing in wisdom and about the connection between all things. These are traditional ancient symbols of the east coast people.

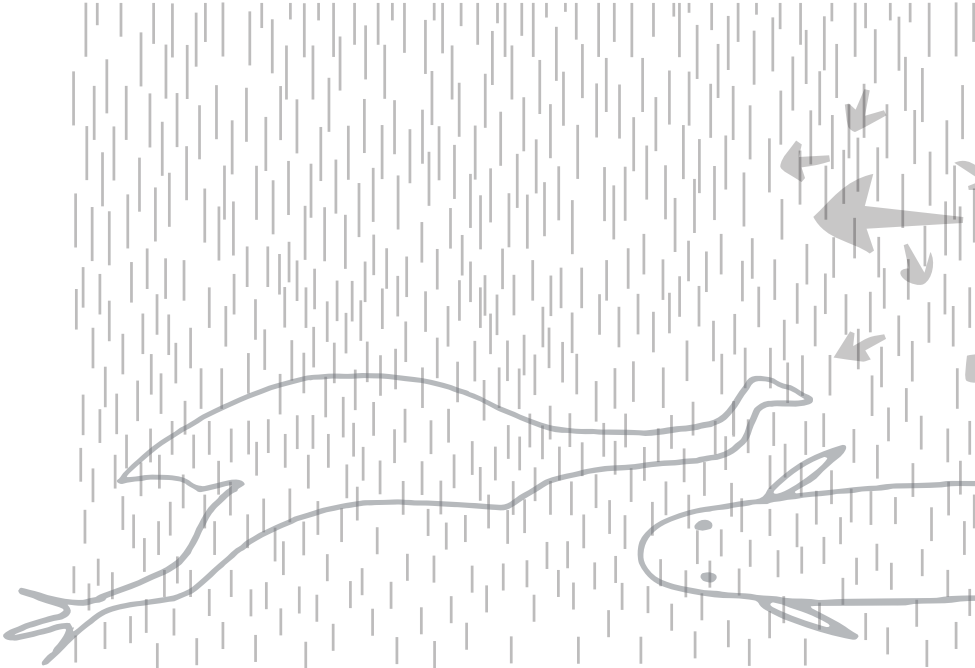


Figure 52: Connection to Country - 'Sky Country' motif



Figure 53: Connection to Country - 'Earth Country' motif

Colour and paint finish

Posts will be painted and balustrade panels will be a powder coated paint finish.

The colour of the bridges is a major consideration in the overall composition of the structures, where a colour palette that is refined and subtle but rich and earthy enough that it can stand the test of time was chosen.

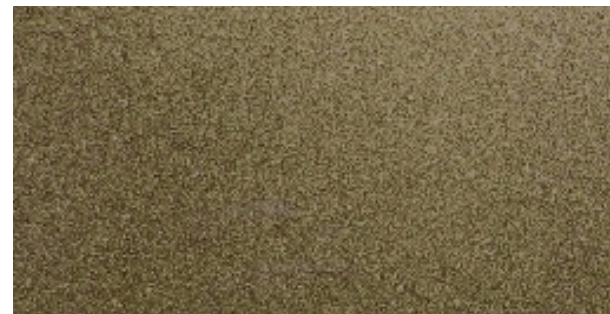
The following shows the paint colours and finishes for each bridge and element, where a concerted effort was taken to align the colour to the integrated Aboriginal artwork and story relating to that bridge. For example, a darker, earthier tone was chosen to represent Ernest Street bridge where the integrated artwork focuses on terrestrial country, earth as life giver, and daily life and culture.

*Note: Final bespoke artwork and colour choices may be subject to change through the construction and fabrication process.



Ridge Street Active Transport Bridge

Salt-Water Country, Barangaroo, fisherwomen / whale dreaming



Canopy and balustrade

Aluminium powder coated
Dulux Electro 'Aged Brass Kinetic' or similar



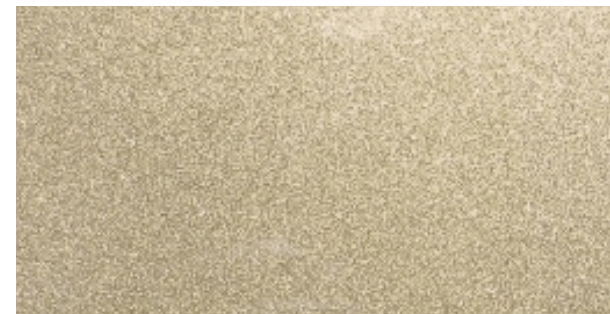
Posts

Galvanised steel and painted
Dulux Weathermax HBR 'Showdown' or similar



Falcon Street Active Transport Bridge

Sky Country, constellations and heavenly ancestral beings



Canopy and balustrade

Aluminium powder coated
Dulux Electro 'Pale Bronze Kinetic' or similar



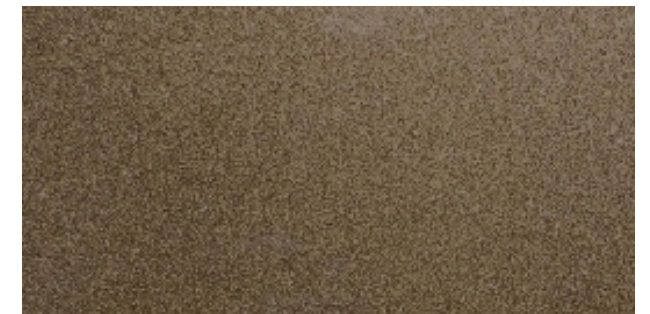
Posts

Galvanised steel and painted
Dulux Weathermax HBR 'Algae' or similar



Ernest Street Active Transport Bridge

Terrestrial Country, earth as life giver, daily life and culture



Canopy and balustrade

Aluminium powder coated
Dulux Electro 'Medium Bronze Kinetic' or similar



Posts

Galvanised steel and painted
Dulux Weathermax HBR 'Steel Girder' or similar

Integrated art

Through design development with 500 voices and the stakeholders, including discussions with manufacturers and installers, the design team has developed a refined and repeatable design for the installation of perforated, powder coated aluminium panels with bespoke integrated artwork that will adorn all three active transport bridges.

The following images highlight the development and provide a sense of how the final arrangement will appear.

*Note: Final bespoke artwork and colour choices may be subject to change through the construction and fabrication process.

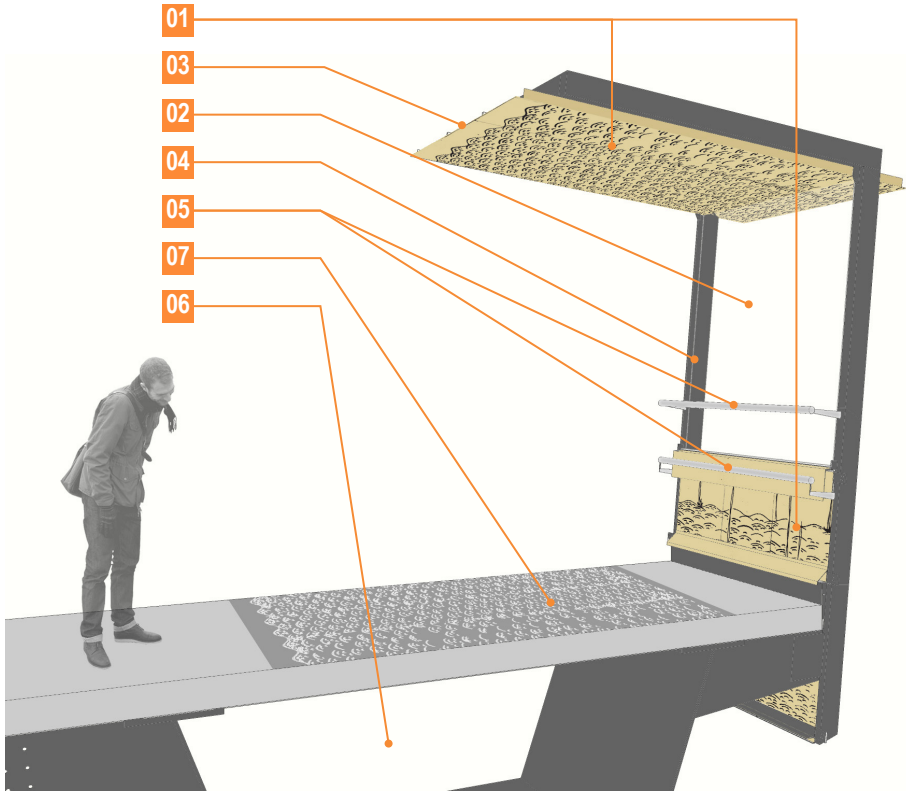


Figure 55: Integrated art perspective - NTS

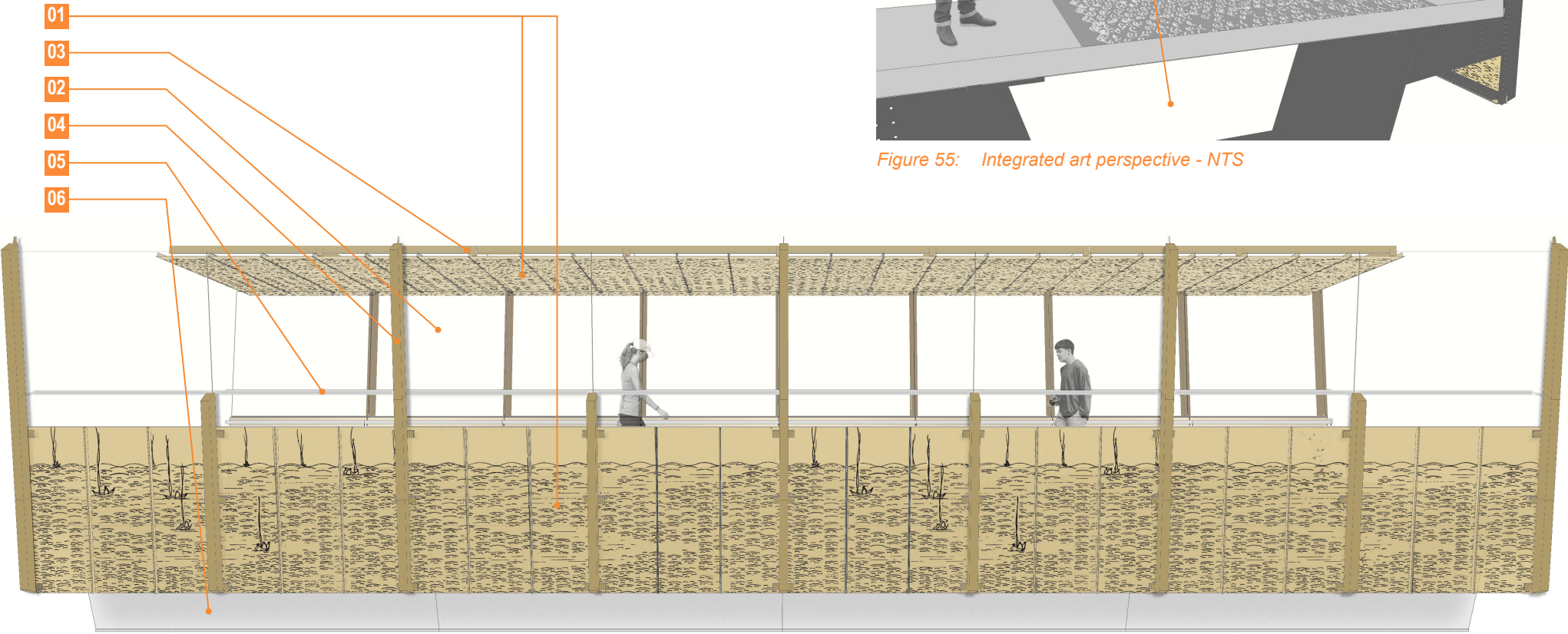


Figure 54: Integrated art illustration - NTS

Item	Description
01	Perforated aluminium balustrade / canopy
02	Tensile mesh safety screen
03	Pedestrian light recessed in shade screen
04	Bridge post
05	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
06	Trapezoidal single box girder
07	Bridge / ramp deck

Lighting and feature lighting

Throughout the Project, lighting will enliven the travel experience over and above lighting for road safety. The key principles to achieve outcomes for the design of lighting throughout the Project are to be dynamic and creative, to create an artistic effect, articulate urban forms of walls and bridges, and amplify the night time experience.

Across the active transport bridges, lighting is delivered via three main typologies:

- Recessed handrail Light Emitting Diode (LED) feature lights:
 - Handrail will include recessing puck style luminaires into the top cyclist rub rail. The asymmetric luminaires are spaced at 1m centres.
- Recessed canopy LED lighting:
 - Where the footpath is under the structure canopy, illumination of the ATL is reliant on the LED recess downlights integrated into the canopy.
- Post top LED Lighting:
 - Where the canopy is not available at pedestrian ramps and on approaches, an LED luminaire will be mounted on post-top Rectangular Hollow Section (RHS) support.

The adjacent image highlights the intended lighting effect across the active transport bridges.



Figure 56: Artist's impression - Falcon Street Active Transport Bridge highlighting lighting elements



Artist's impression: Ridge Street Active Transport Bridge - View south

05.5 Ridge Street Active Transport Bridge

Design approach

The existing Ridge Street bridge is being replaced with a new 5m wide shared path bridge. The design of the Ridge Street Active Transport Bridge is conceived as a simple and elegant structure, embedding the bridge into the landscape setting and urban fabric in a highly visible and important context.

Since the EIS submission, the Project has also improved connectivity in this location with the inclusion of a new public lift that will improve usability and safety for pedestrians.

The design was refined from separated pedestrian and cycle paths to a shared path. This maintains the required functionality for both pedestrians and cyclists whilst not restricting the available width of the path or requiring a larger, bulkier structure to accommodate additional width (which, in turn, could result in additional visual impacts). The refined design is fully compliant with Austroads Guide to Road Design Part 6A: Pedestrian and Cycle Paths with the appropriate linemarking and signage.

The external components, including the bridge deck and underside of the deck will also be considered visually from Warringah Freeway as a key focus of design in terms of an artistic facade component.

The relationship of bridge elements is crucial to how the bridge is viewed from all angles and distances. Careful consideration of the inter-relationship of the bridge elements and the incorporation of subtle designed elements has been developed to unify the design.

Perforated aluminium upstands meet tensile mesh safety screens, which take full advantage of the harbour views. The posts are capped off with a 3m wide shade screen providing sun protection to active transport users. This continuous linear shade structure will provide a canvas for indigenous artwork and storytelling to be incorporated into the bridge form.

Bridge details

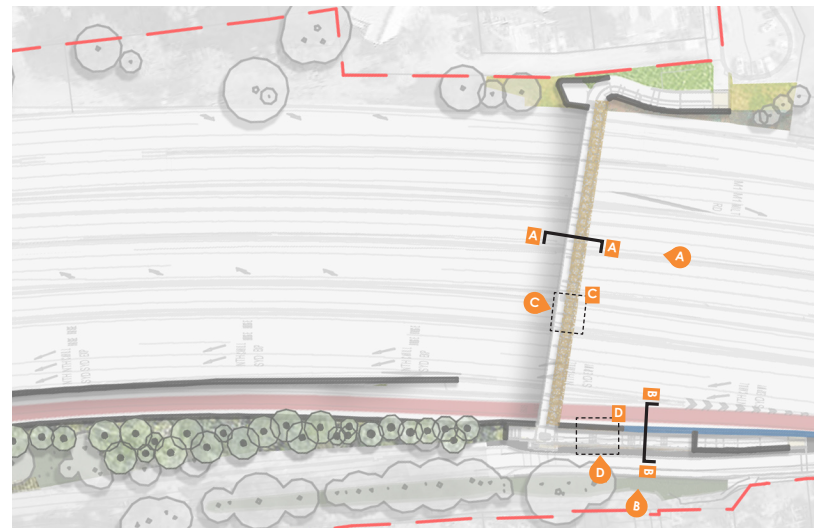
- Single trough girder with two steel outriggers (one on each side)
- Circular column with tapered capital pier across the central span
- Two circular columns supporting the ramp and landing to the east
- Safety screen with integrated continuous shade canopy and open section of webmesh anti-throw screen
- Perforated aluminium balustrade, with an extension below the deck and outriggers to conceal services and drainage elements
- Pedestrian handrails and cyclist rub rails to each side of the bridge deck
- Integrated handrail lighting and centrally located roof lighting
- Integrated Aboriginal artwork into the perforated aluminium screens
- Glazed lift shaft to the east of the bridge, with integrated Aboriginal artwork
- Informative plaques that allow the importance of the stories told in the artwork to be permanently conveyed as part of the legacy of the project.

Details including elevations, cross sections, and visualisations of the bridge are shown within this section.



Figure 57: Ridge Street Active Transport Bridge perspective

Ridge Street Active Transport bridge - Details



Key plan

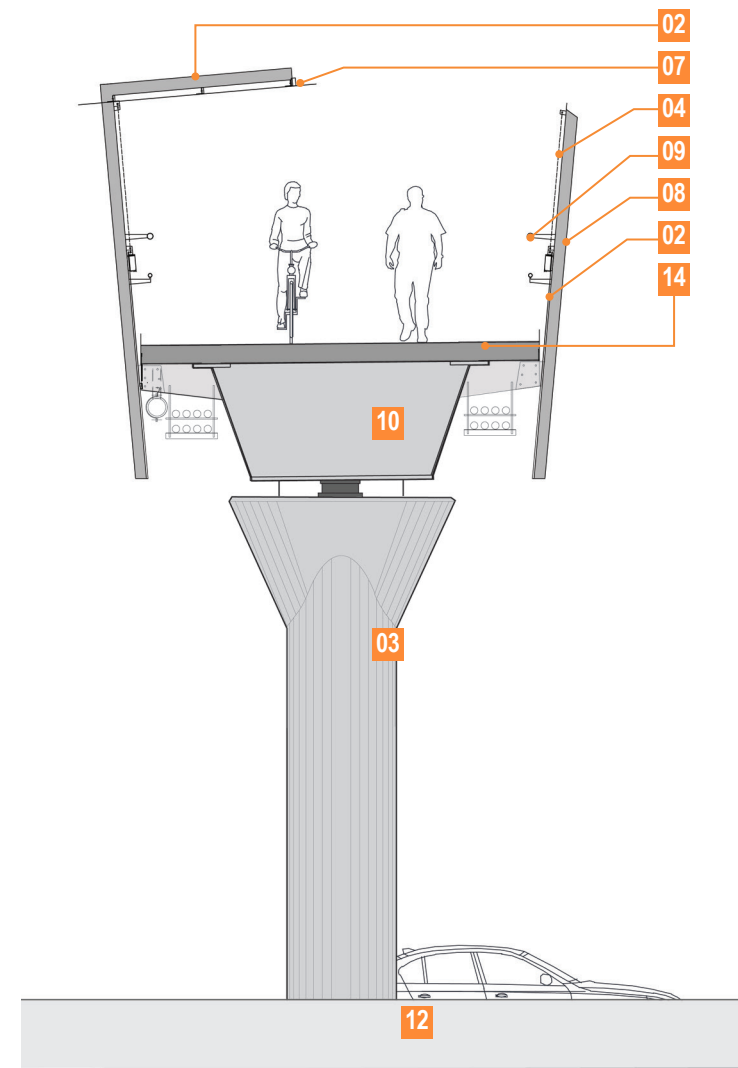


Figure 59: Ridge Street Active Transport Bridge - Section AA - 1:100

Item	Description
01	Glazed lift shaft with concrete base
02	Perforated aluminium balustrade / canopy
03	Circular pier / circular pier with tapered headstock
04	Tensile mesh safety screen
05	Road signage
06	Transparent noise wall on road barrier
07	Pedestrian light recessed in shade screen
08	Bridge post
09	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
10	Trapezoidal single box girder
11	Landscape planting
12	F Type concrete barrier
13	Retaining wall with vertical rebates
14	Bridge / ramp deck

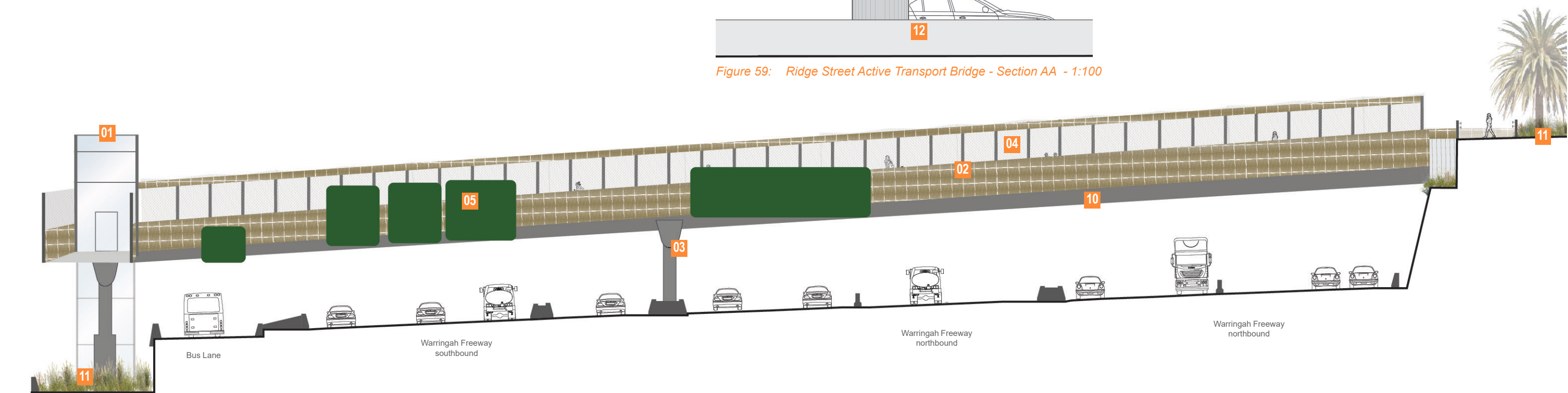


Figure 58: Ridge Street Active Transport Bridge - Elevation A 1:400

Item	Description
01	Glazed lift shaft with concrete base
02	Perforated aluminium balustrade / canopy
03	Circular pier / circular pier with tapered headstock
04	Tensile mesh safety screen
05	Road signage
06	Transparent noise wall on road barrier
07	Pedestrian light recessed in shade screen
08	Bridge post
09	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
10	Trapezoidal single box girder
11	Landscape planting
12	F Type concrete barrier
13	Retaining wall with vertical rebates
14	Bridge / ramp deck

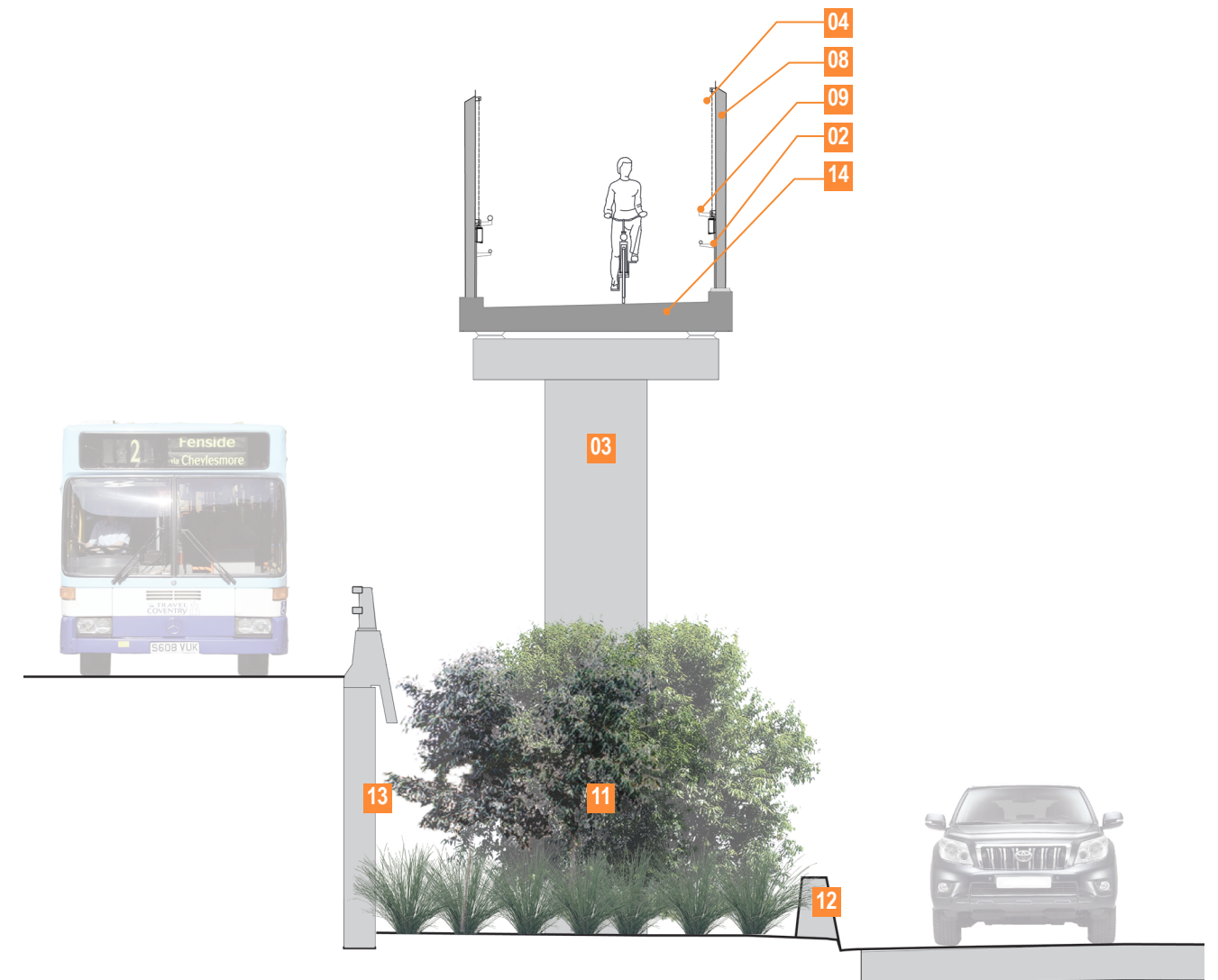


Figure 61: Ridge Street Active Transport Bridge - Section BB - 1:100

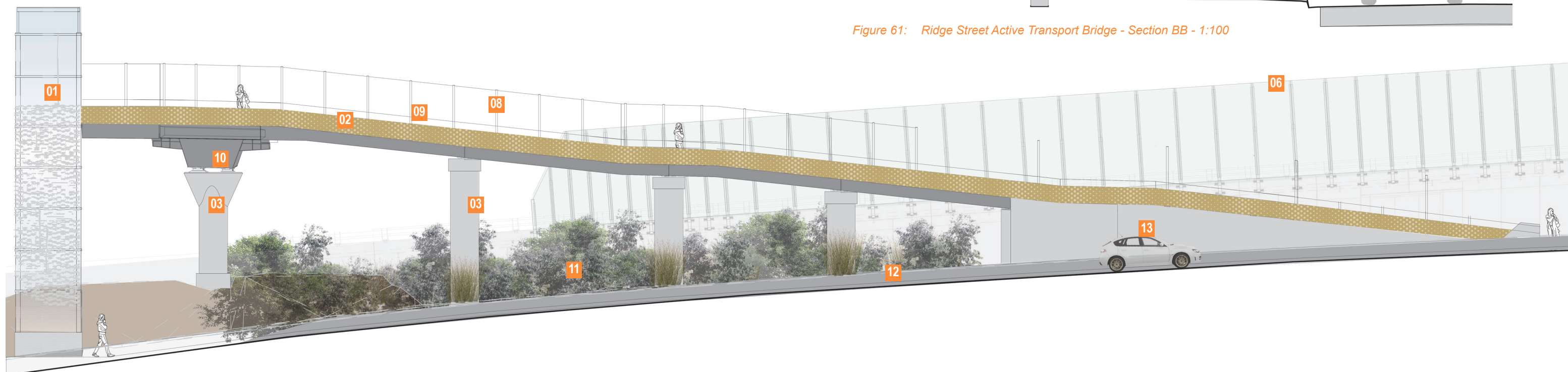
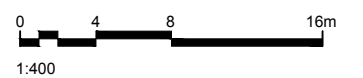


Figure 60: Ridge Street Active Transport Bridge - Elevation B 1:400



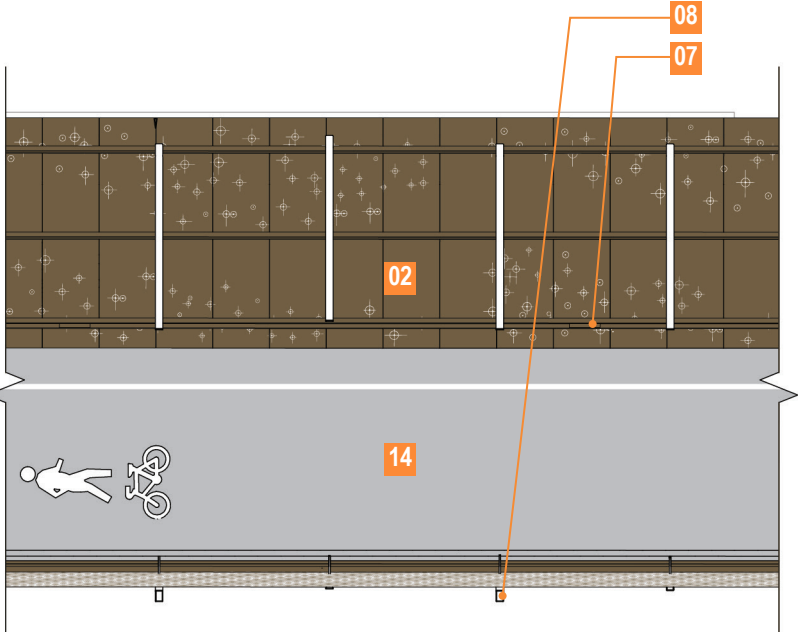


Figure 62: Ridge Street Active Transport Bridge - Plan C 1:100

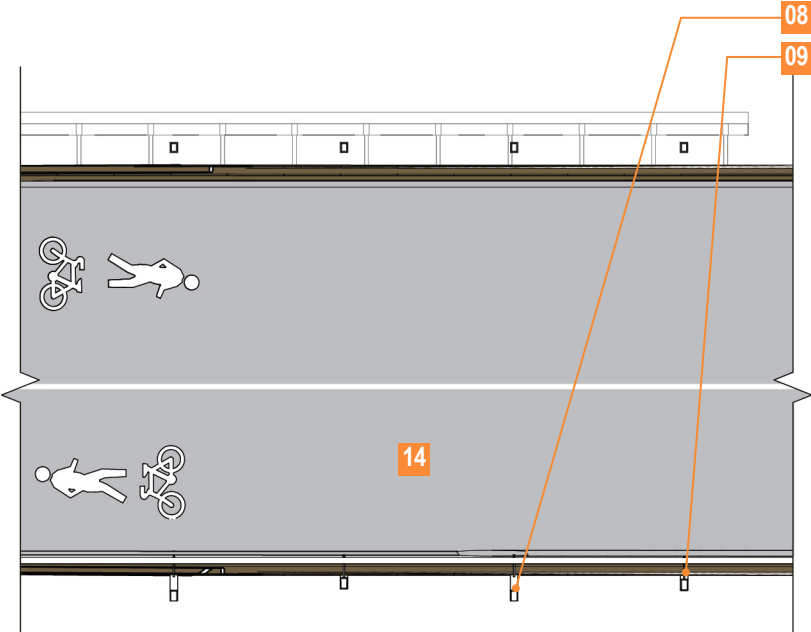


Figure 64: Ridge Street Active Transport Bridge - Plan D 1:100

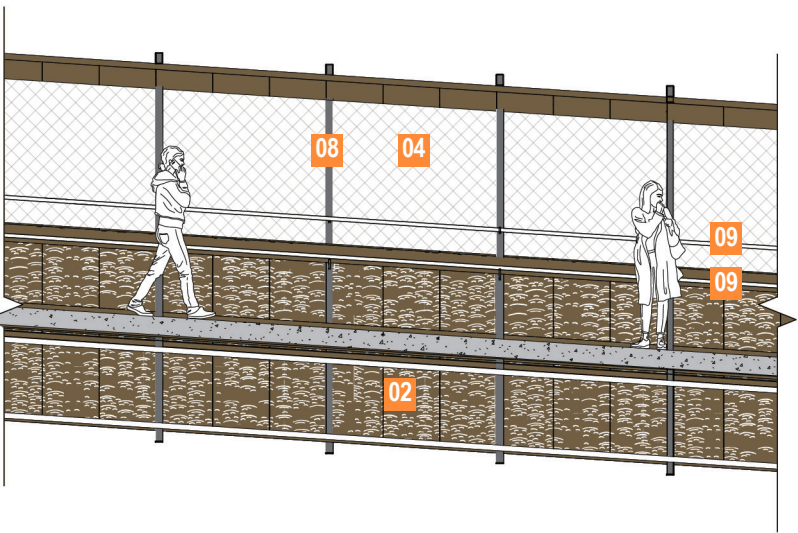


Figure 63: Ridge Street Active Transport Bridge - Elevation C 1:100

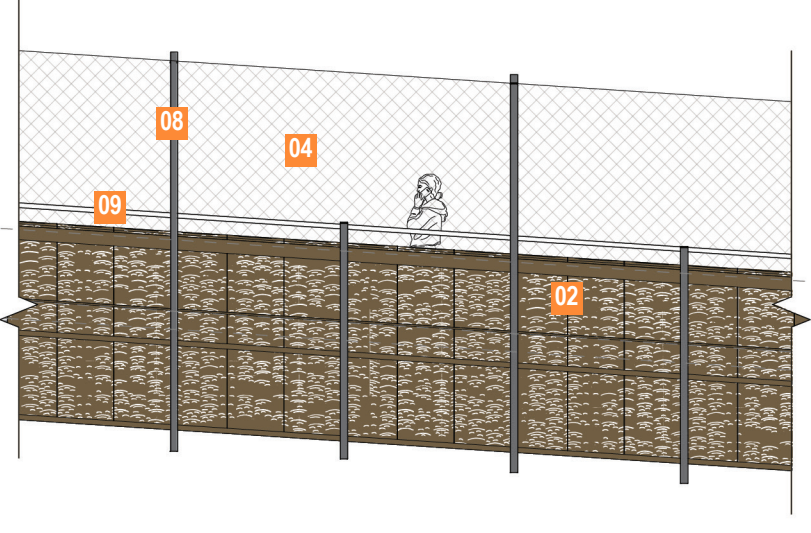


Figure 65: Ridge Street Active Transport Bridge - Elevation D 1:100

Item	Description
01	Glazed lift shaft with concrete base
02	Perforated aluminium balustrade / canopy
03	Circular pier / circular pier with tapered headstock
04	Tensile mesh safety screen
05	Road signage
06	Transparent noise wall on road barrier
07	Pedestrian light recessed in shade screen
08	Bridge post
09	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
10	Trapezoidal single box girder
11	Landscape planting
12	F Type concrete barrier
13	Retaining wall with vertical rebates
14	Bridge / ramp deck



Figure 66: Artist's impression - Ridge Street Active Transport Bridge - View south along western ramp

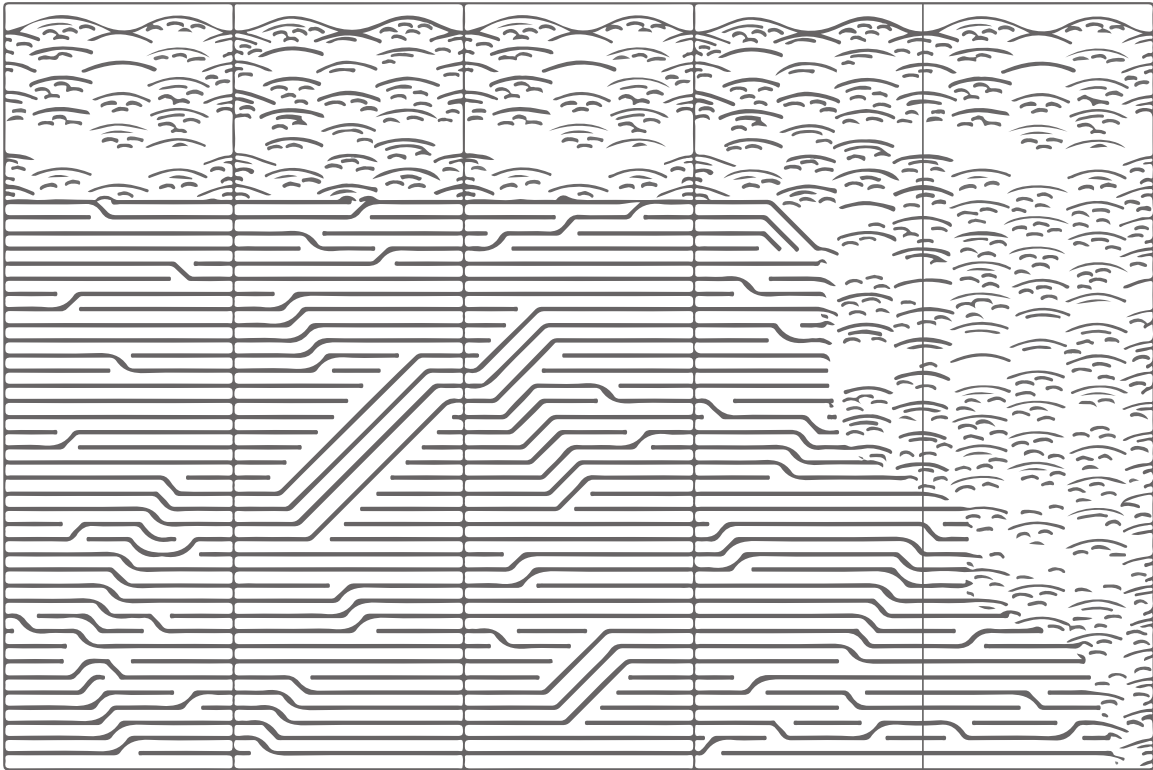
Ridge Street lift

The Ridge Street Active Transport Bridge features lift access to Alfred Street North. The design of the lift shaft will be compliant with the technical guidelines and features the following:

- Glazed external walls to minimise visual impact
- A lift structure and glazing specification to match the lifts installed at the Sydney Harbour Bridge
- A minimum capacity of 2025kg and/or 27 people
- Utilities, drainage, communications and electrical pipes and conduits enclosed within the lift core.

The lift shaft will integrate the outcomes of the Aboriginal storytelling and community consultation into the design of the glazing details of the structure.

Also shown are precedent images of the Sydney Harbour Bridge lift shafts, where a simple dot pattern was used on the glazing to add a sense of curiosity and reduce the bulk of the overall structure.



'Earth' and 'Sky' motif that will be integrated with the lift shaft facade



Figure 67: Precedent imagery from the recent Sydney Harbour Bridge lift upgrades. Images by Transport for NSW.



Figure 68: Artist's impression: Ridge Street Active Transport Bridge - View south along Alfred Street North

Ridge Street Lookout

The design of the Ridge Street lookout is conceived as a refinement of the reference design, improving the amenity of the space and including public realm enhancements. Two key moves highlight the refinement of the lookout layout and design:

- Refinement of materiality to form a cohesive marriage with the bridge form and material choices
- Adjustment of the lookout shape and form to orientate the lookout towards the harbour and beyond.

The perforated aluminium balustrade continues from the adjacent ramp and bridge span, with the integrated artwork highlighting Barangaroo and the Eora fisherwomen, ensures the inter-relationship of the bridge elements and the incorporation of subtle designed elements to form a single unified element. Street furniture elements will also borrow from this materiality and form and be incorporated into the space. Furniture elements are covered within Section 09 of the PDLP.

The existing lookout and reference design currently look directly south toward North Sydney. A minor adjustment to the layout of the lookout will re-orient views toward the Opera House and Harbour Bridge, maximising viewing space for users at all times of year, in particular, event times such as New Years Eve.

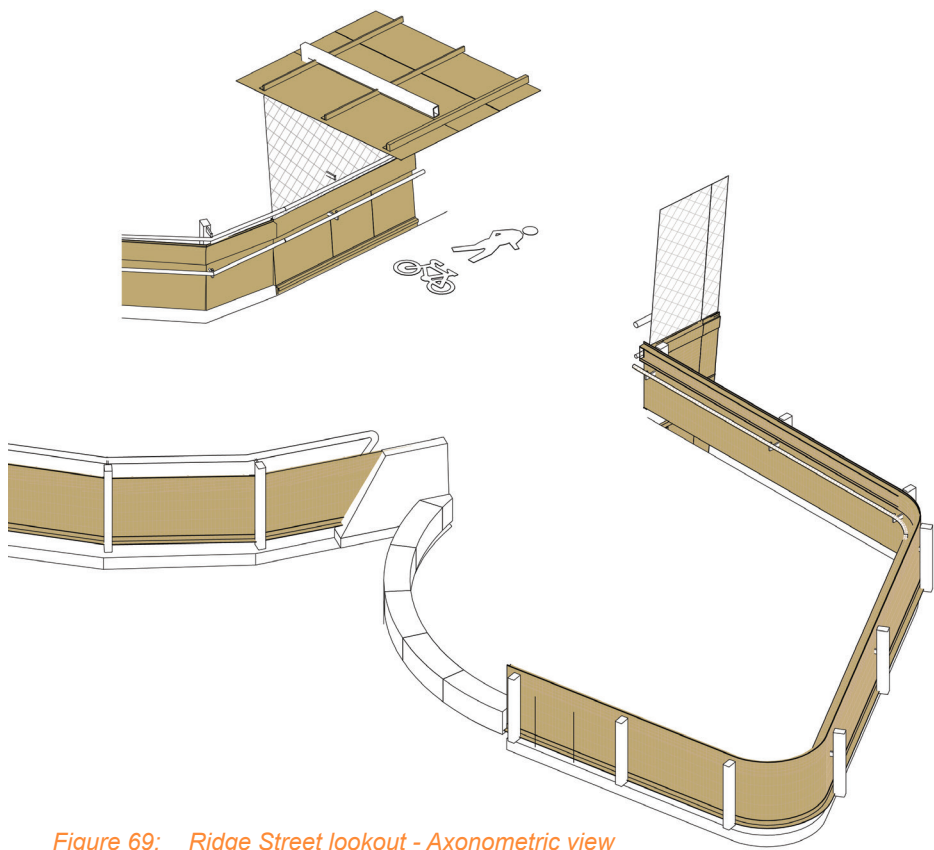


Figure 69: Ridge Street lookout - Axonometric view

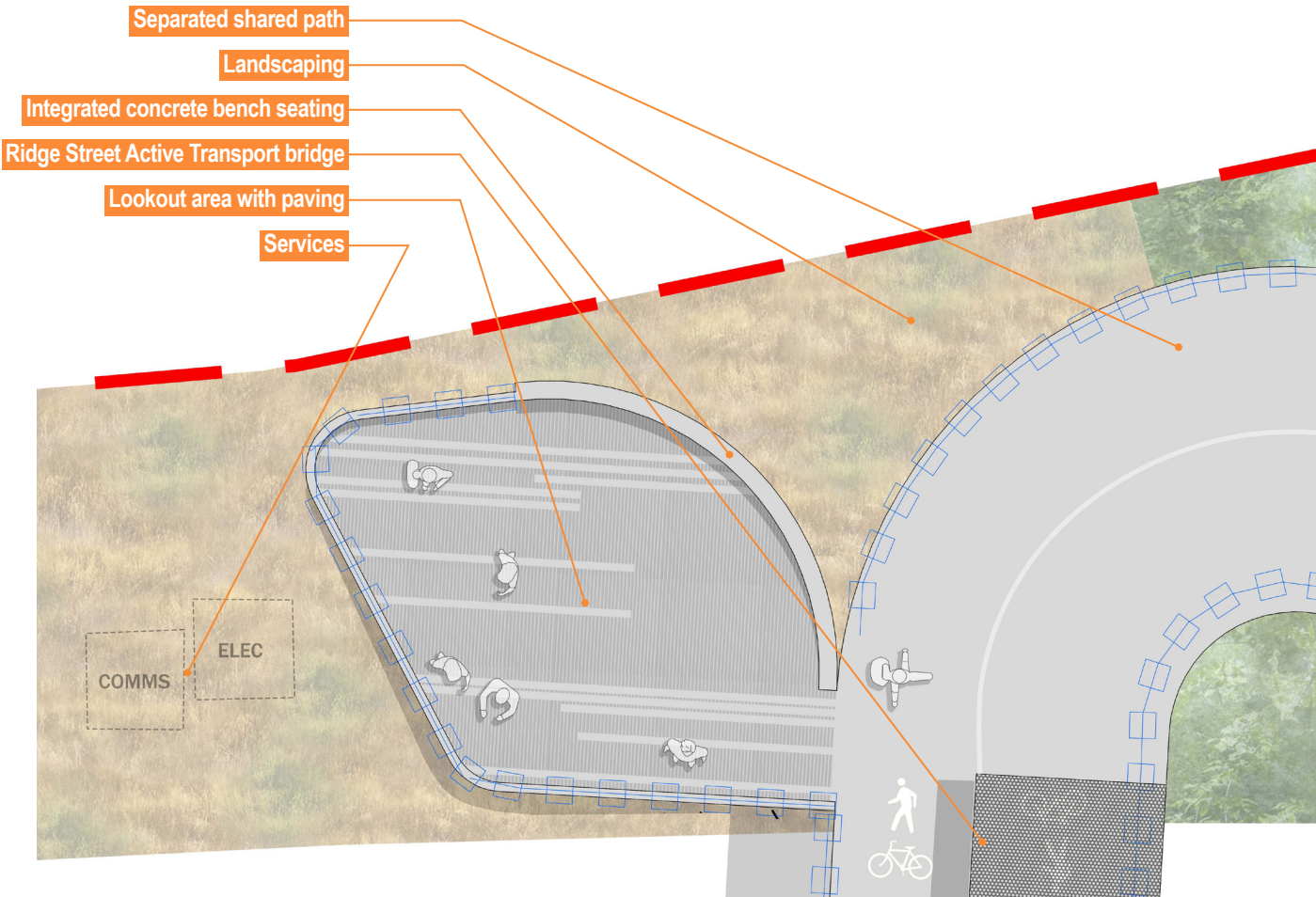


Figure 70: Ridge Street lookout - Plan



Figure 71: Artist's impression: Ridge Street Active Transport Bridge - View south from the Ridge Street lookout



Figure 72: Artist's impression: Ridge Street Active Transport Bridge - View east

Ridge Street Active Transport Bridge - Connectivity 30m Radius - Ridge St Ramp Access

In this location, the ramp ties into existing active transport infrastructure with a widened footprint for projected increased future usage.



1 - Existing condition on Ridge St

Item	Description
	Site Boundary
	Shared path
	Existing shared path
	Existing pedestrian path
	Existing tree to be retained and protected
	Tree
	Planting area
	Pedestrian path
	Shared path
	Existing Fence/Barrier
	30m radius of tie-in

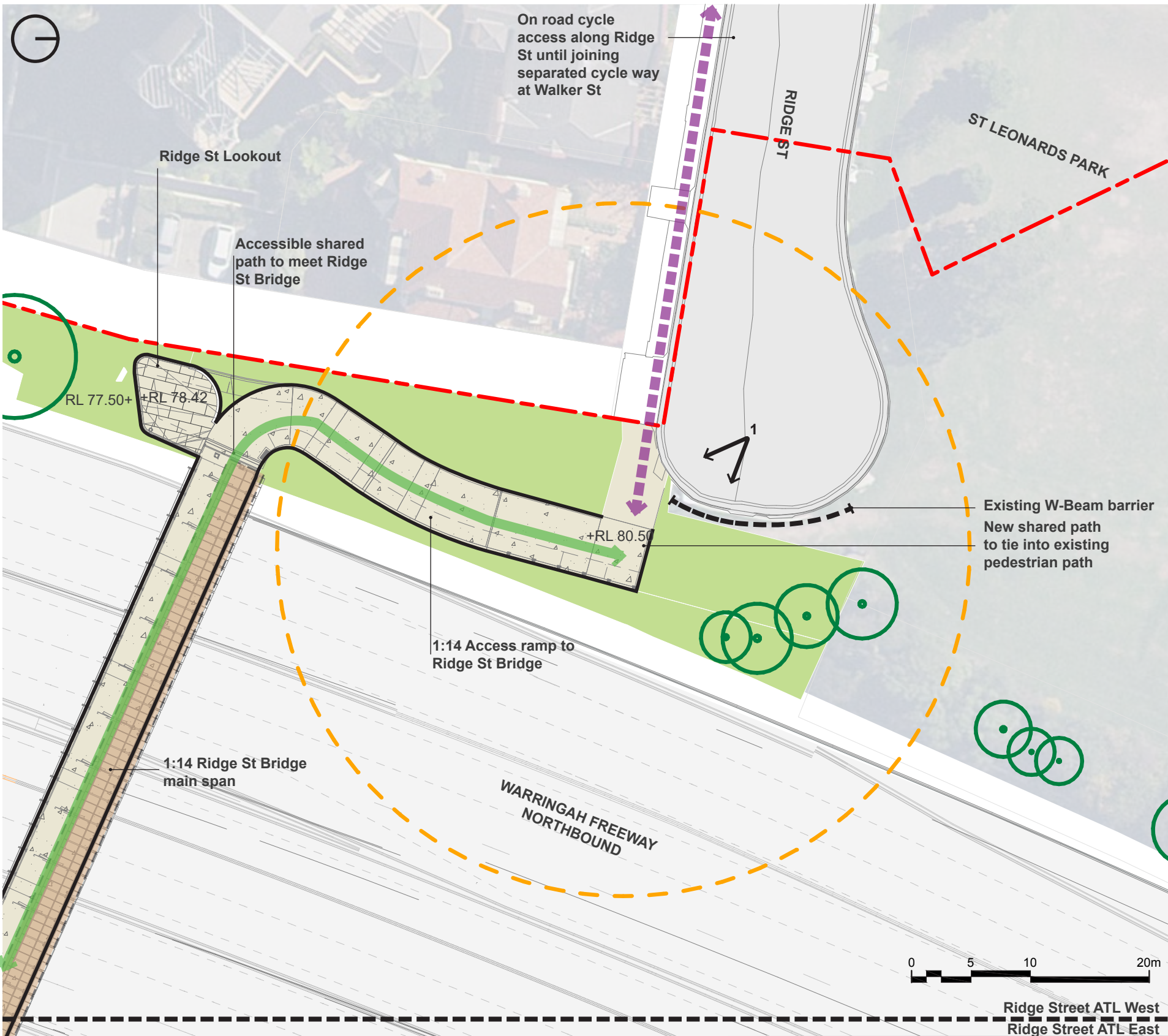


Figure 73: Plan of Ridge St ATL (West) and connections within a 30m Radius

Ridge Street Active Transport Bridge - Connectivity 30m Radius - Alfred St North - Lift Access

Following recent community consultation on two bridge options at this location, a new lift and ramp access will be provided to improve accessibility, with path upgrades to link to the lift access point.



2 - Existing condition on Alfred St North creates accessibility challenges

Item	Description
	Site Boundary
	Shared path
	Existing shared path
	Existing pedestrian path
	Existing tree to be retained and protected
	Tree
	Planting area
	Pedestrian path
	Shared path
	Existing Fence/Barrier
	30m radius of tie-in

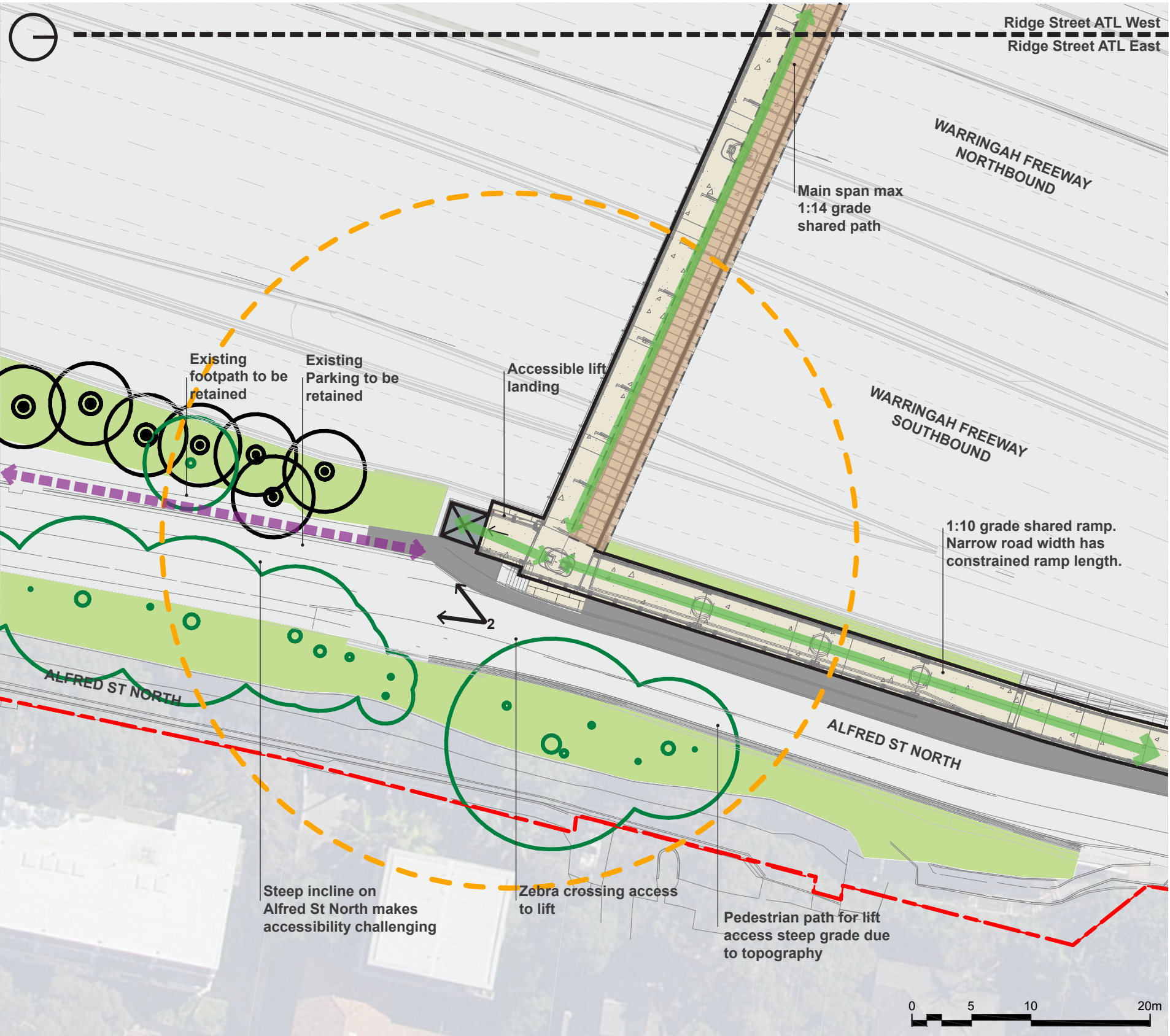


Figure 74: Plan of Ridge St ATL (East) and connections within a 30m Radius

Ridge Street Active Transport Bridge - Visualisations

The following imagery highlights the existing and new connectivity at Ridge Street bridge.



Figure 75: Existing connection - West (Ridge St access)



Figure 77: Existing connection - East (Alfred St North)



Figure 76: New connection - West (Ridge St access) *Artist's impression



Figure 78: New connection - East approx. 30m south of existing ramp tie in point (Alfred St North access) *Artist's impression

05.6 Alfred Street North - Rezoning and road alignment arrangement

For the new road design alignment on Alfred Street North a few alternative designs were developed. Following recent community consultation on three options at this location, the option to provide a shared zone from Winter Avenue to the new Ridge Street active transport bridge was selected.

Key features

Key features of the selected option include:

- Provision of a shared zone extending between the Ridge Street Active Transport Bridge ramp and about 5 m north of Winter Avenue, that manages interaction of pedestrians, cyclists, road and property access vehicle movements with a reduced speed limit of 10km/h
- Allows for retention of existing loading zone outside of 433 Alfred Street North, which is considered an important community amenity
- Relocates the footpath from the eastern side of Alfred Street North to the western side, adjacent to the Ridge Street Active Transport Bridge.
- Realignment of Alfred Street South between the lift at the Ridge Street Active Transport Bridge and the shared zone.

Key considerations for the preferred option include:

- Improves safety for interaction of pedestrians, cyclists and vehicles by reducing the speed limit to 10km/h
- Cyclists and pedestrians would use the shared zone
- The adjusted loading zone near 433 Alfred Street North would be retained.
- Safety considerations include:
 - The speed will be reduced to 10km/h creating a low speed environment for the safety of pedestrians and cyclists
 - This low speed environment will assist vehicles moving through the zone and exiting the 433 ASN driveway safely.

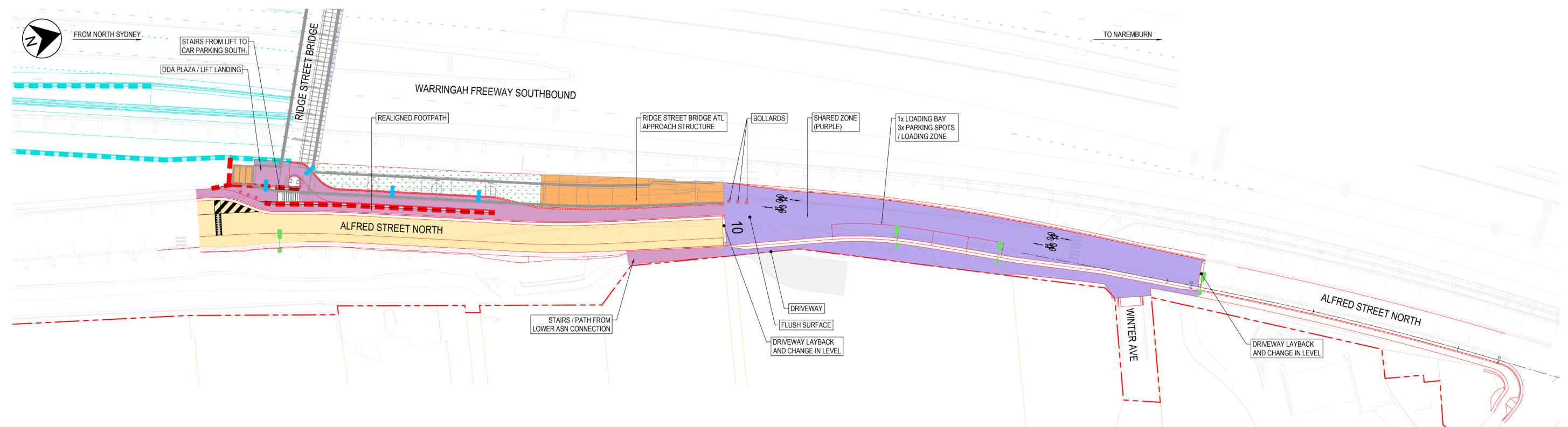


Figure 79: Alfred Street North road layout design

05.7 Falcon Street Active Transport Bridge

The upgraded new shared user path bridge spans across the Warringah Freeway between Military Road in Neutral Bay and Falcon Street, North Sydney.

The bridge is a four-span steel box girder bridge, with a composite insitu deck. The bridge has an overall deck length of 187m, comprising of four spans. The shared user path provides a 4.8m clear width between handrails and adopts a feature lighting detail that is integrated with the safety screen and shade canopy.

The design of the Falcon Street Active Transport Bridge will be visually confident and inspiring, optimising safety for all users, ensuring ease of maintainability and contributing positively to the local built form character.

Bridge details

- Single trough girder with two steel outriggers (one on each side)
- Three circular columns with tapered capital pier across the central span
- Safety screen with integrated continuous shade canopy and open section of webmesh anti-throw screen
- Integrated privacy screen at the western edge of the bridge for adjacent residents
- Perforated aluminium balustrade, with an extension below the deck and outriggers to conceal services and drainage elements
- Pedestrian handrails and cyclist rub rails to each side of the bridge deck
- Integrated handrail lighting and centrally located roof lighting
- Integrated Aboriginal artwork into the perforated aluminium screens
- Informative plaques that allow the importance of the stories told in the artwork to be permanently conveyed as part of the legacy of the project.

Details including elevations, cross sections, and visualisations of the bridge are shown within this section.

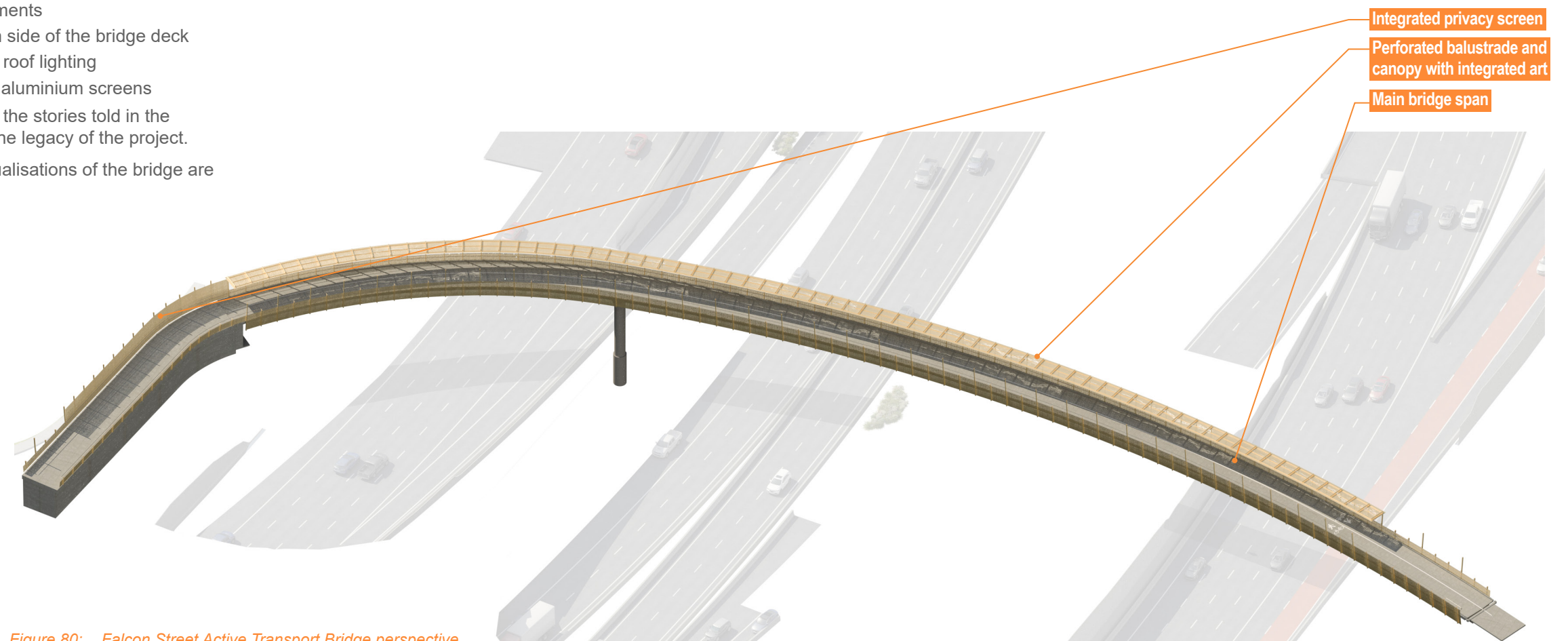
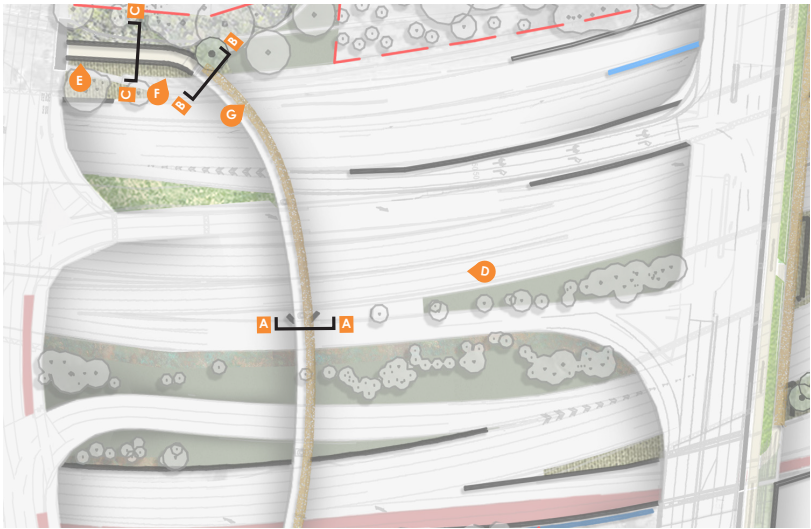


Figure 80: Falcon Street Active Transport Bridge perspective



Artist's impression: Falcon Street Active Transport Bridge - View south east

Falcon Street Active Transport bridge - Details



Key plan

Item	Description
01	Perforated aluminium balustrade / canopy
02	Tensile mesh safety screen
03	Pedestrian light recessed in shade screen
04	Bridge post
05	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
06	Landscape planting
07	F Type concrete barrier
08	Retaining wall with vertical rebates
09	Bridge deck
10	Services location
11	Perforated aluminium privacy screen
12	Existing balustrade fall protection in front of new abutment to remain
13	Maintenance access bench
14	Single cell steel trough girder

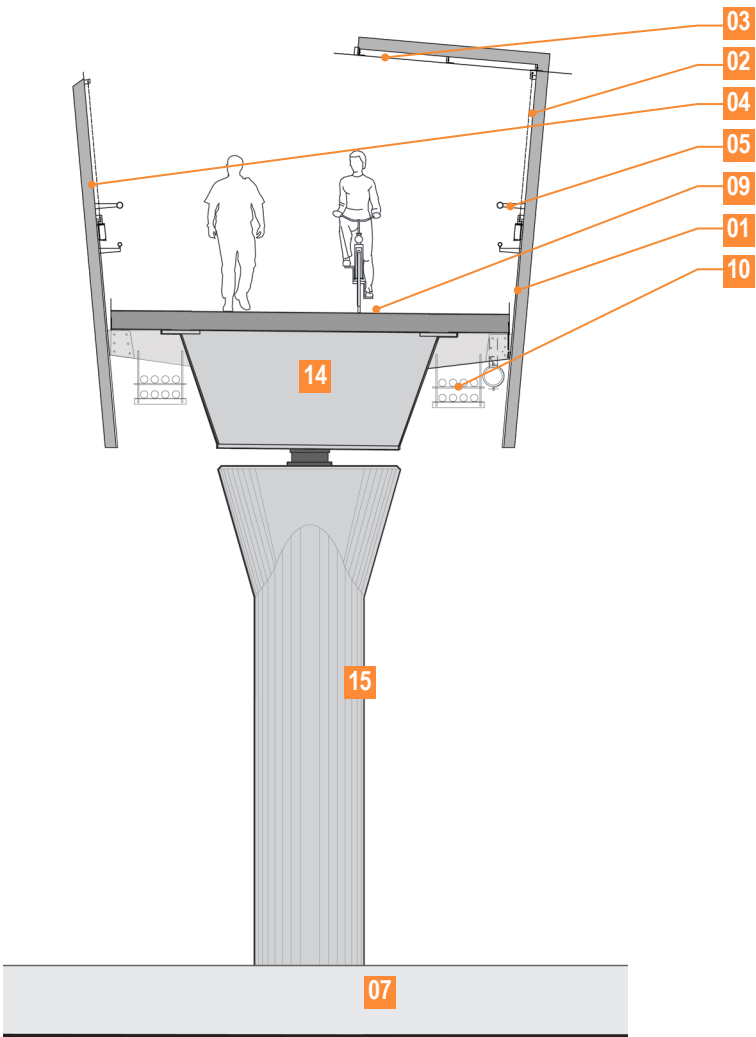


Figure 81: Falcon Street Active Transport Bridge - Section AA - 1:100

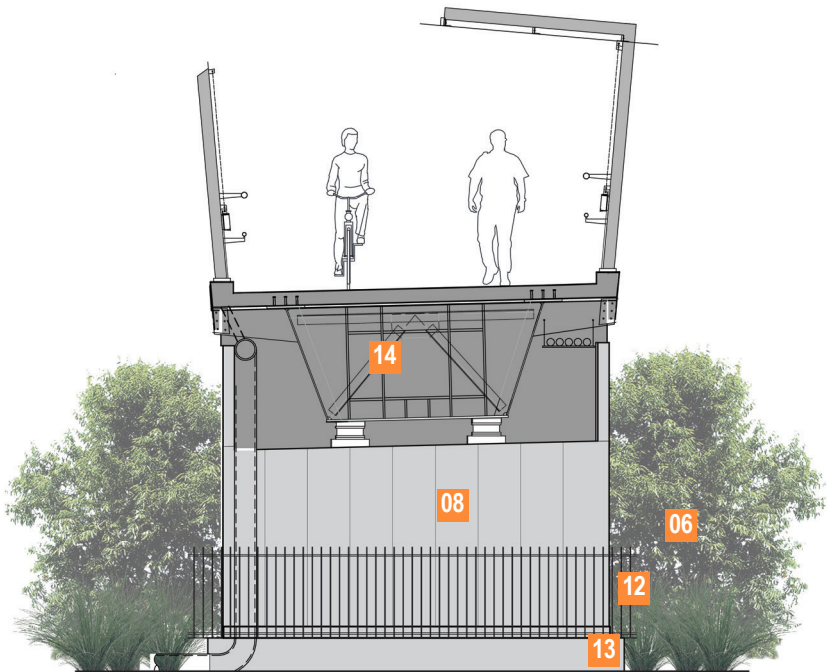


Figure 82: Falcon Street Active Transport Bridge - Section BB - 1:100

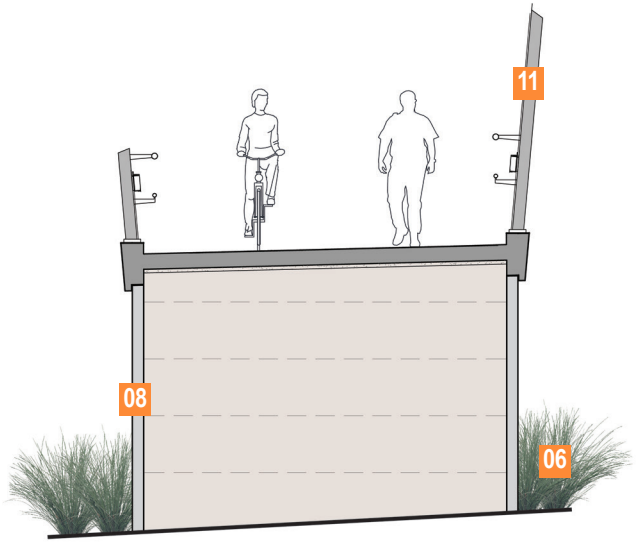


Figure 83: Falcon Street Active Transport Bridge - Section CC - 1:100

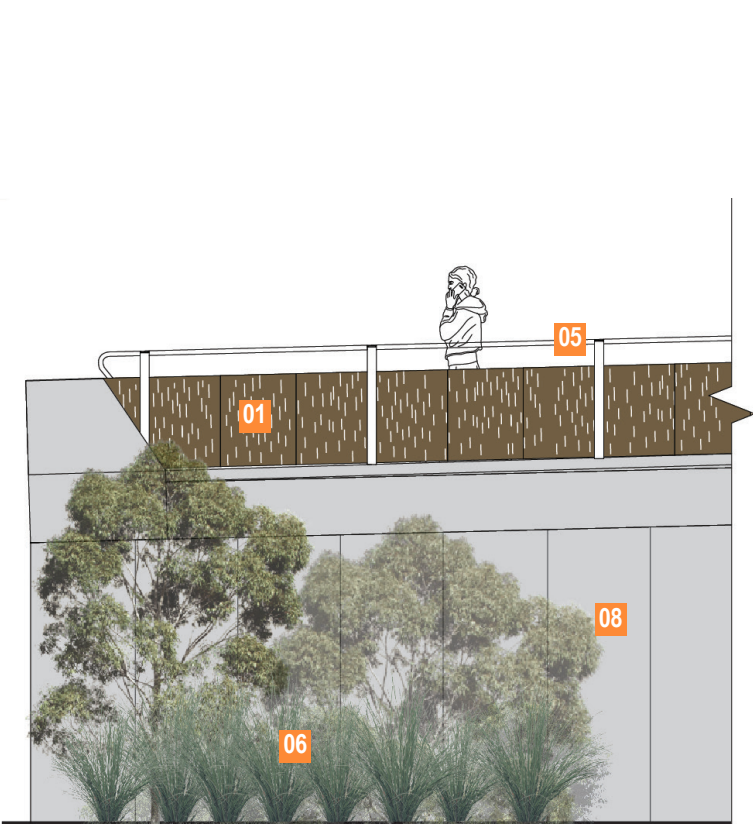


Figure 84: Falcon Street Active Transport Bridge - Elevation E 1:100

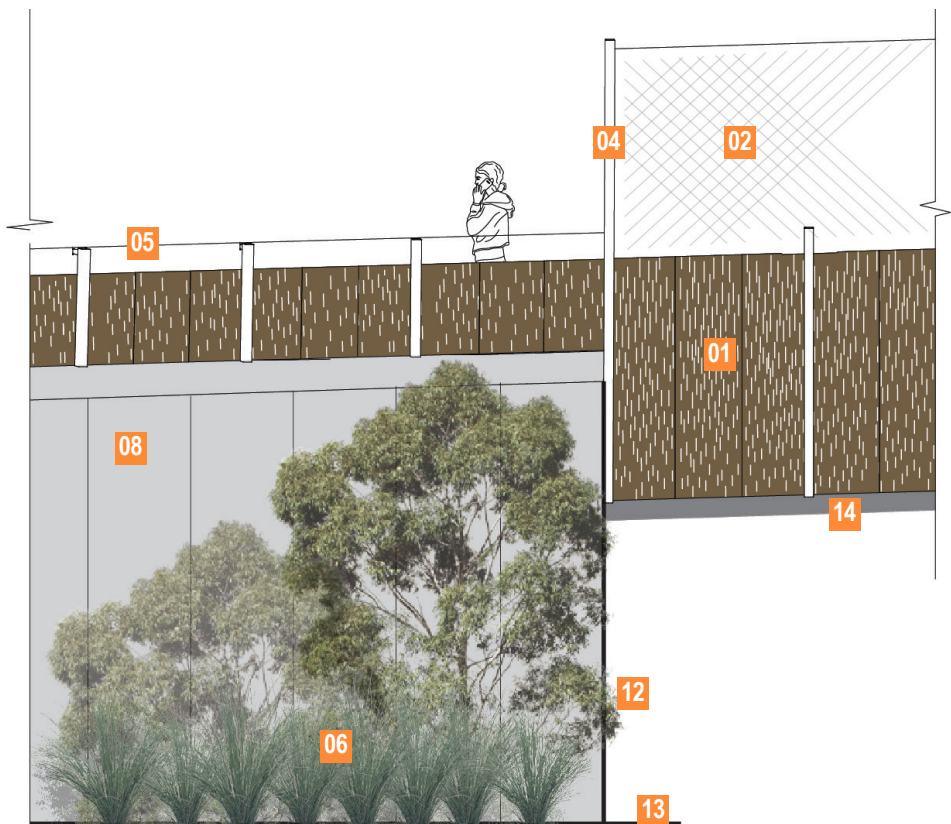


Figure 86: Falcon Street Active Transport Bridge - Elevation F 1:100

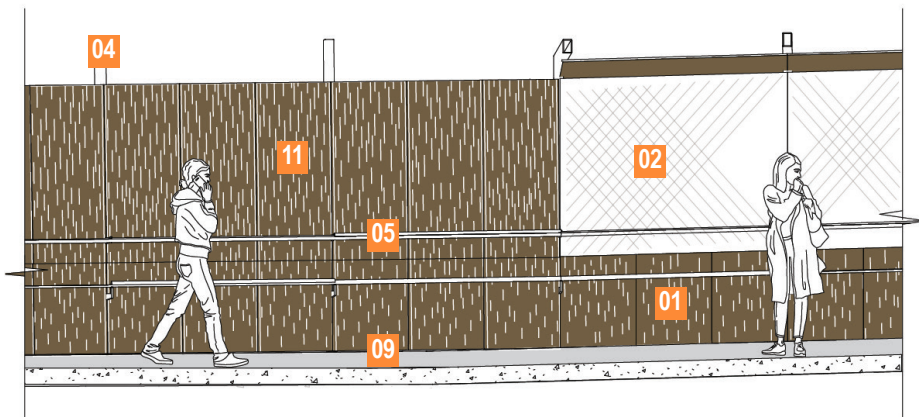


Figure 87: Falcon Street Active Transport Bridge - Elevation G 1:100

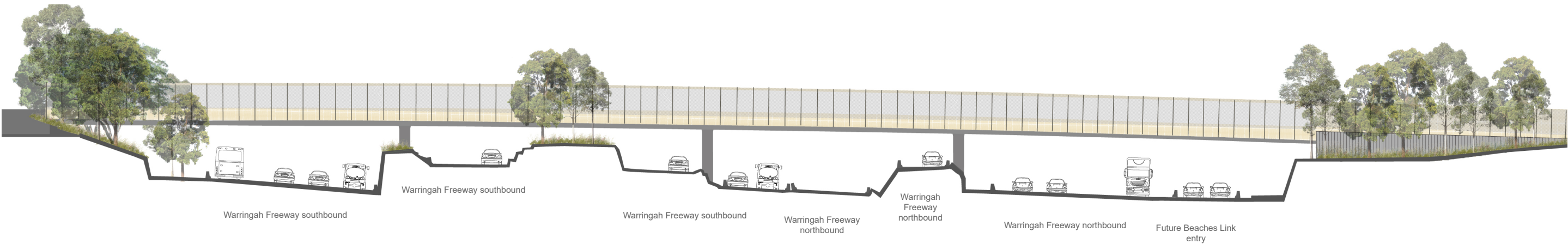


Figure 85: Falcon Street Active Transport Bridge - Elevation D 1:400

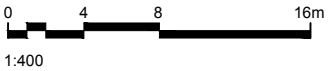




Figure 88: Artist's impression: Falcon Street Active Transport Bridge - View west during the day



Figure 89: Artist's impression: Falcon Street Active Transport Bridge - View south along Project corridor



Figure 90: Artist's Impression: Falcon Street Active Transport Bridge - View west at night

Falcon Street Active Transport Bridge - Connectivity 30m Radius - Falcon Street Western Access

Bridge ties into existing active transport infrastructure with widened footprint for projected increased future usage



4 - Existing condition on Falcon St. New bridge will improve visibility

Item	Description
	Site Boundary
	DDA compliant shared path
	Existing DDA compliant shared path
	Existing pedestrian path
	Existing tree to be retained and protected
	Tree
	Planting area
	Pedestrian path
	Shared path
	Existing Fence/Barrier
	30m radius of tie-in



Figure 91: Plan of Falcon St ATL (West) and connections within a 30m Radius

Falcon Street Active Transport Bridge - Connectivity 30m Radius - Merlin St Access

Bridge ties into existing active transport infrastructure on Merlin Street with widened footprint, with the existing Falcon Street underpass removed due to corridor width constraints.



5 - Existing condition on Merlin St tying into existing infrastructure

Item	Description
	Site Boundary
	DDA compliant shared path
	Existing DDA compliant shared path
	Existing pedestrian path
	Existing tree to be retained and protected
	Tree
	Planting area
	Pedestrian path
	Shared path
	Existing Fence/Barrier
	30m radius of tie-in



Figure 92: Plan of Falcon St ATL (East) and connections within a 30m Radius

Falcon Street Active Transport Bridge - Visualisations

The following imagery highlights the existing and new connectivity at Falcon Street bridge.



Figure 93: Existing connection - West (Falcon St access)



Figure 95: Existing connection - East (Merlin St access)



Figure 94: New connection - West (Falcon St access) *Artist's impression



Figure 96: New connection - East (Merlin St access) *Artist's impression

05.8 Ernest Street Active Transport Bridge

Ernest Street Active Transport Bridge will ultimately incorporate a 10m linear land bridge with dedicated pedestrian and cycle lanes, helping to form a green link between the open spaces to the east and west. Future trees and planting are to be installed with the provision of 1m deep soil vaults, irrigation and drainage.

The Project's scope for Ernest Street bridge (interim state) does not include the landscaping, finalised pathways for pedestrians and cyclists (future state), as this will form part of the WHT scope that will be completed at the opening of that Project in the future. The widened bridge element constructed by the Project will not be accessible to the public during this time.

A safety screen and shade structure will be constructed on the northern elevation, to match with the design aesthetic of the family of bridges preceding Ernest Street which will be installed by the Warringah Freeway scope of works.

Perforated aluminium upstands meet tensile mesh safety screens, which take full advantage of the harbour views. The posts are capped off with a 2.5m wide shade screen providing sun protection to active transport users. This continuous linear shade structure will also provide a canvas for indigenous artwork and storytelling to be incorporated into the bridge form.

Bridge details

The new AT bridge is structurally independent from the existing Ernest Street bridge, as the new bridge is to be built 1m higher than the existing bridge to allow for minimum vertical clearances to the traffic on the Warringah Freeway and additional services required to cross the corridor. The Ernest Street Active Transport Bridge will include the following elements:

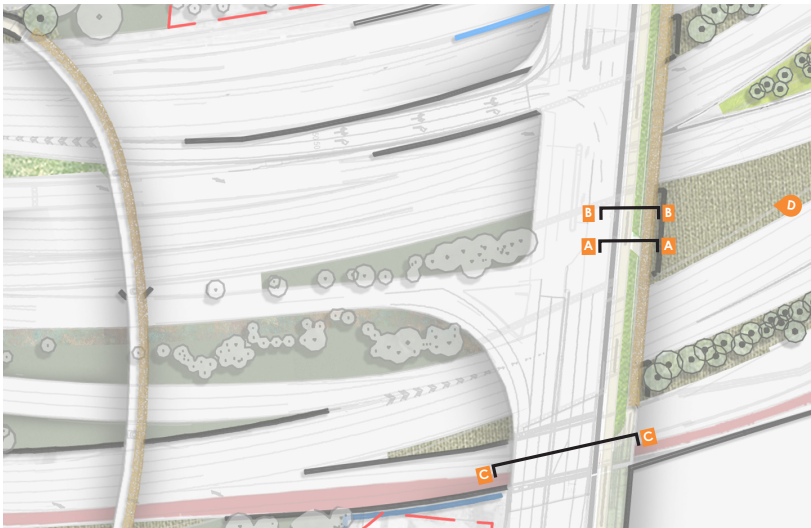
- Safety screen with integrated continuous shade canopy and open section of webmesh anti-throw screen
- Perforated aluminium balustrade, with an extension below the deck and outriggers to conceal services and drainage elements
- Provision for 1m deep centrally located soil vaults for future WHT planting and bridge details
- Pedestrian handrails and cyclist rub rails
- Integrated handrail lighting and centrally located roof lighting
- Integrated Aboriginal artwork into the perforated aluminium screens
- Informative plaques that allow the importance of the stories told in the artwork to be permanently conveyed as part of the legacy of the project.

Details including elevations, cross sections, and visualisations of the bridge are shown within this section.



Figure 97: Artist's impression: Ernest Street Active Transport Bridge - View east (Future state shown)

Ernest Street Active Transport bridge - Details



Key plan

Item	Description
01	Perforated aluminium balustrade / canopy
02	Tensile mesh safety screen
03	Pedestrian light recessed in shade screen
04	Bridge post
05	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
06	Landscape planting
07	F Type concrete barrier
08	Retaining wall with vertical rebates
09	Bridge deck
10	1m deep soil vaults
11	Temporary construction fence
12	Concrete deck
13	Existing shared path to become new cycle path
14	Services location

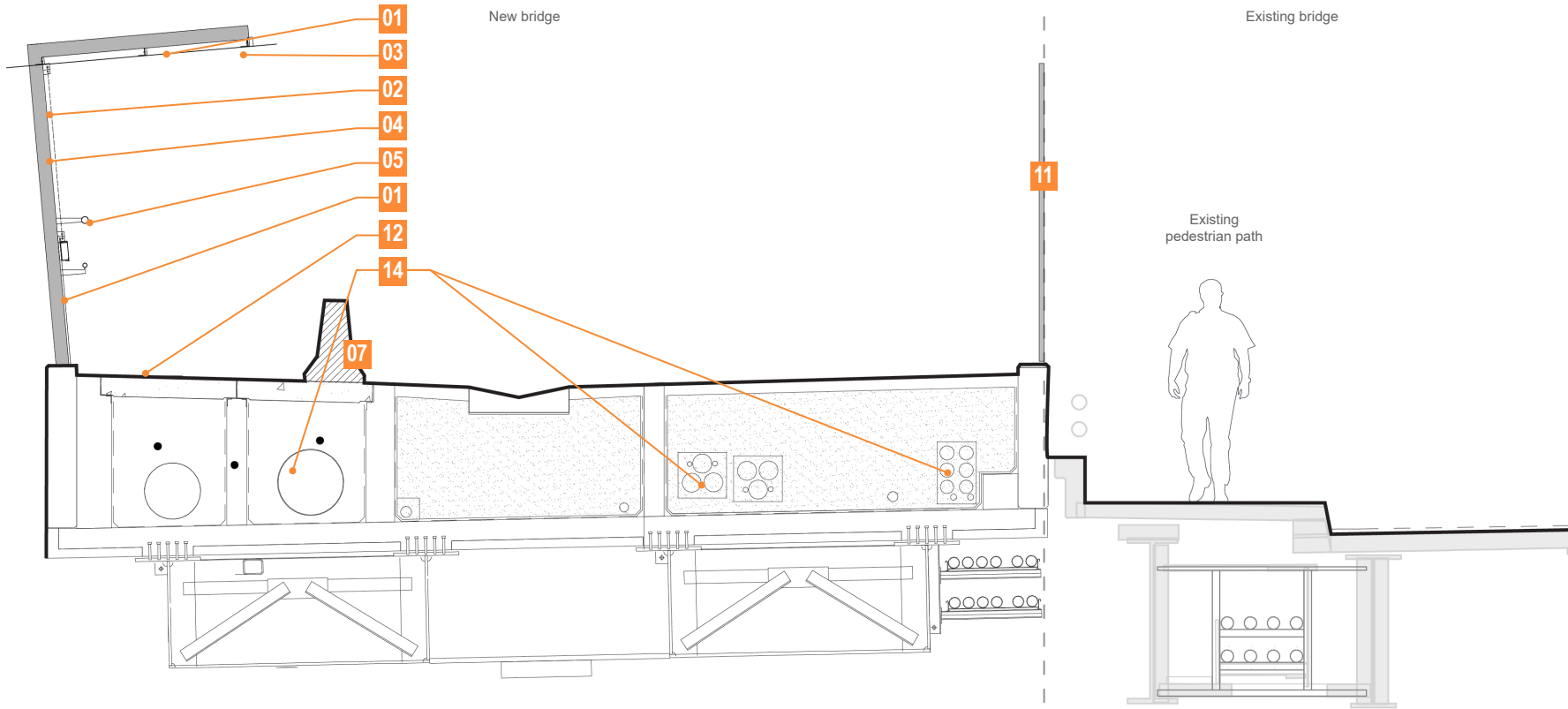


Figure 98: Ernest Street Active Transport Bridge - Interim state - Section AA 1:100

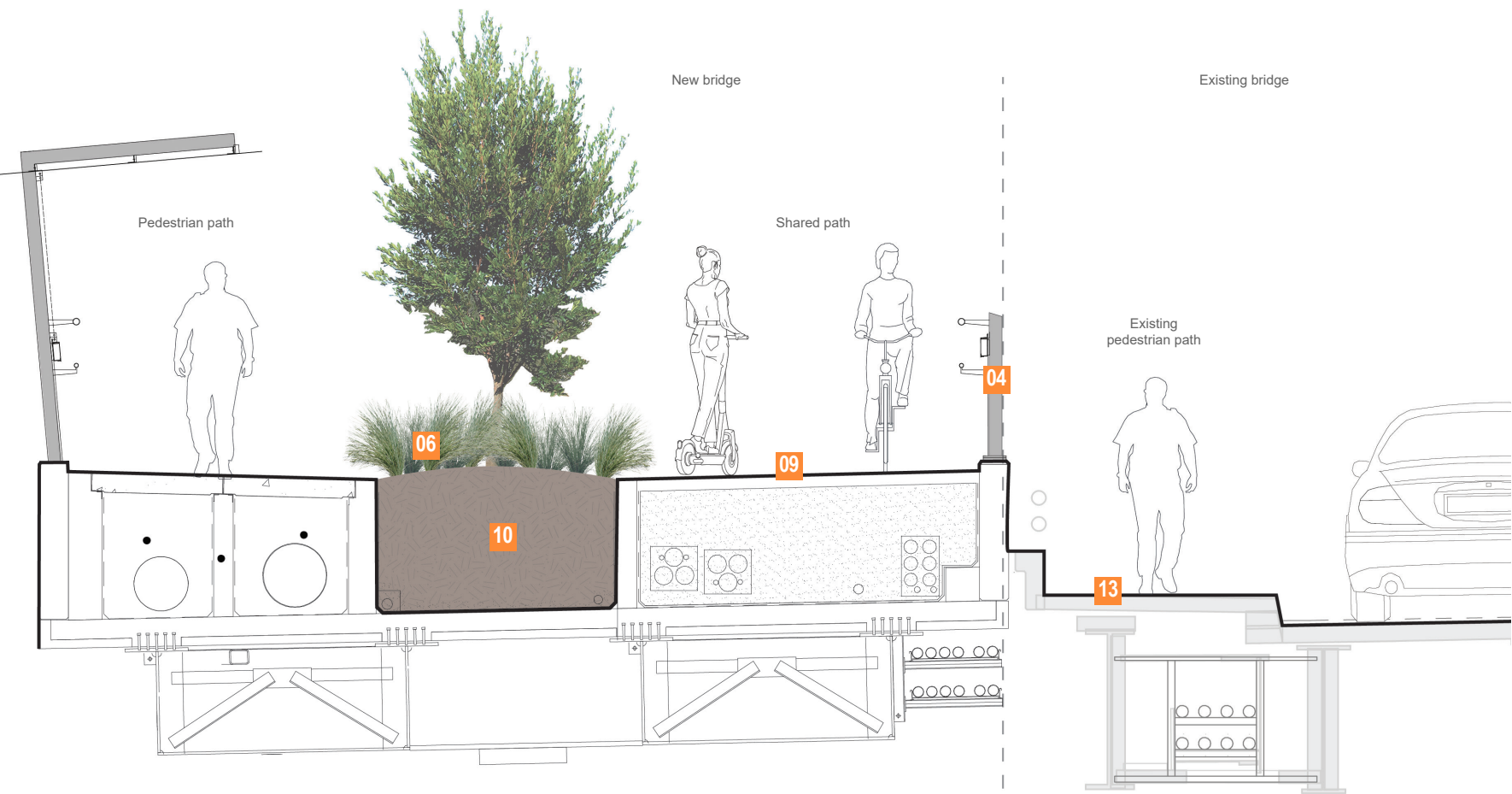
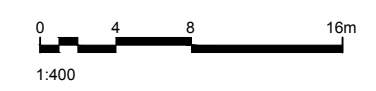
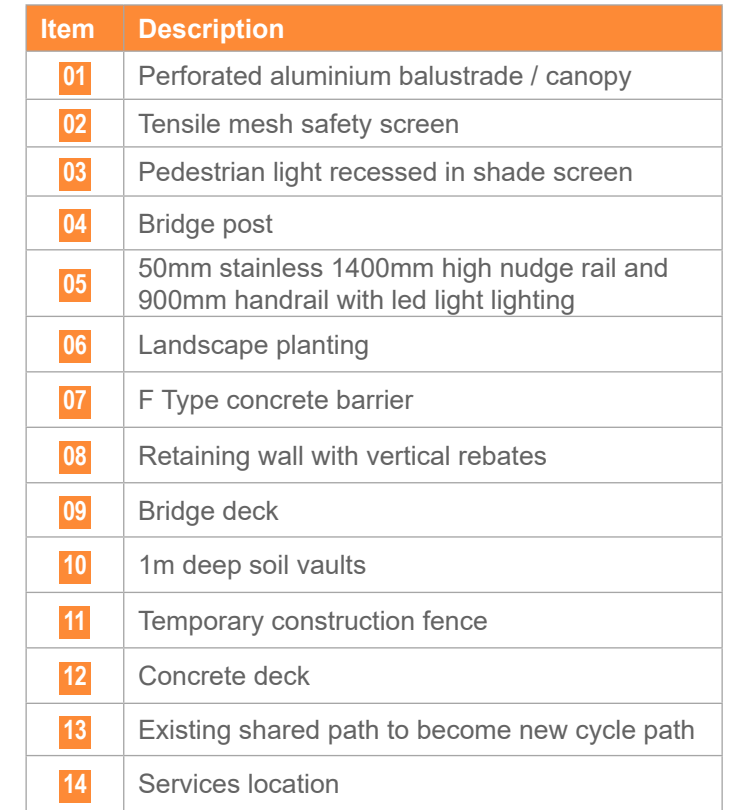


Figure 99: Ernest Street Active Transport Bridge - Future state - Section BB 1:100

Item	Description
01	Perforated aluminium balustrade / canopy
02	Tensile mesh safety screen
03	Pedestrian light recessed in shade screen
04	Bridge post
05	50mm stainless 1400mm high nudge rail and 900mm handrail with led light lighting
06	Landscape planting
07	F Type concrete barrier
08	Retaining wall with vertical rebates
09	Bridge deck
10	1m deep soil vaults
11	Temporary construction fence
12	Concrete deck
13	Existing shared path to become new cycle path
14	Services location



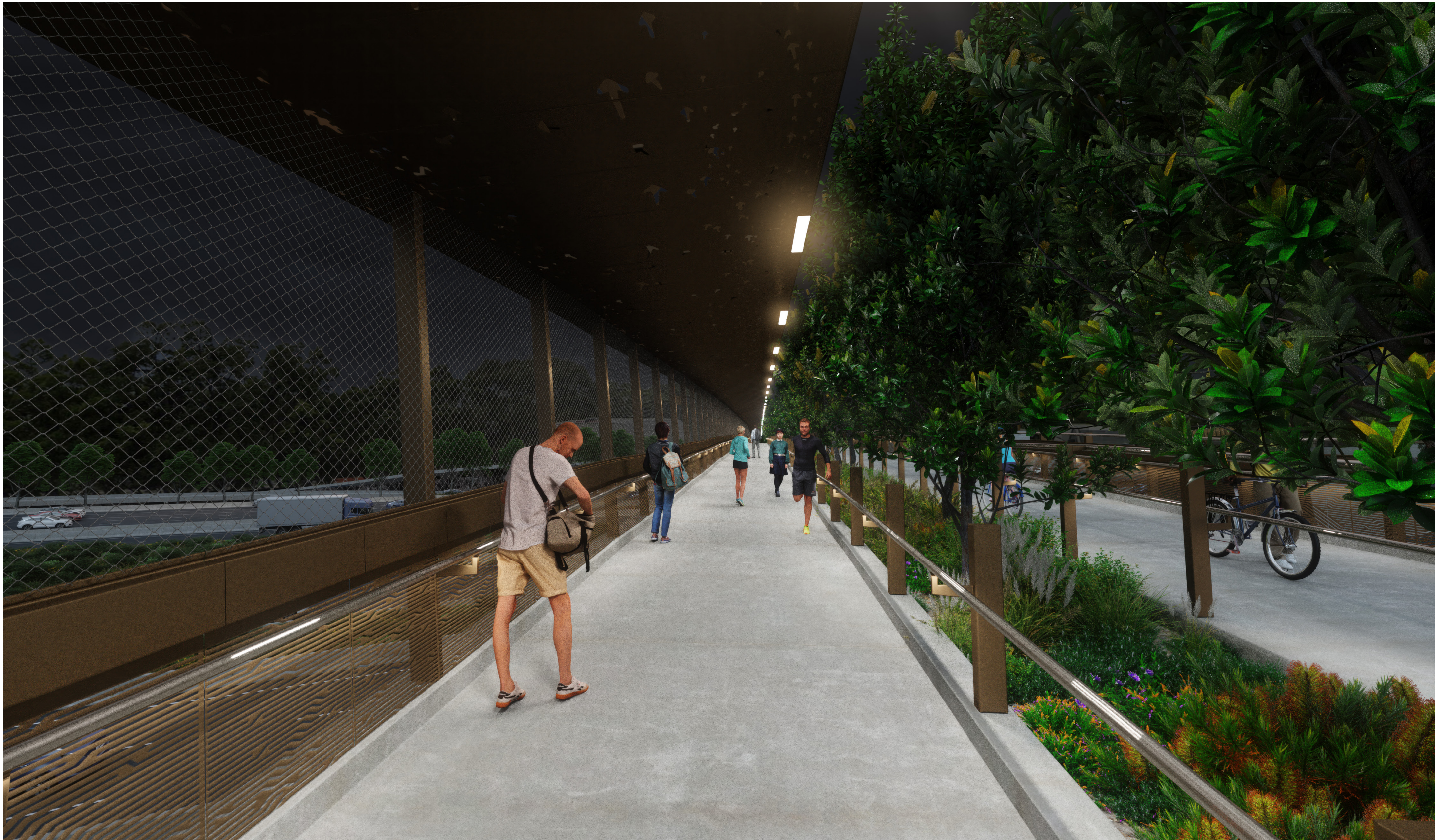


Figure 102: Artist's impression: Ernest Street Active Transport Bridge - View east at night (future state shown)



Figure 103: Artist's impression: Ernest Street Active Transport Bridge - View west (future state shown)

Ernest Street Active Transport Bridge - Connectivity 30m Radius - Ernest Street at Cammeray Avenue Access

Bridge ties into existing active transport infrastructure with widened footprint for projected increased future usage. Widened shared and pedestrian path additions also come with shade canopy and planting for future proofing against climate extremes.



6 - Current condition on Ernest St at Cammeray Ave

Item	Description
	Site Boundary
	DDA compliant shared path
	Shared path
	Existing DDA compliant shared path
	Existing pedestrian path
	Pedestrian path
	Existing tree to be retained and protected
	Tree
	Planting area
	Pedestrian path
	Shared path
	Existing Fence/Barrier
	30m radius of tie-in

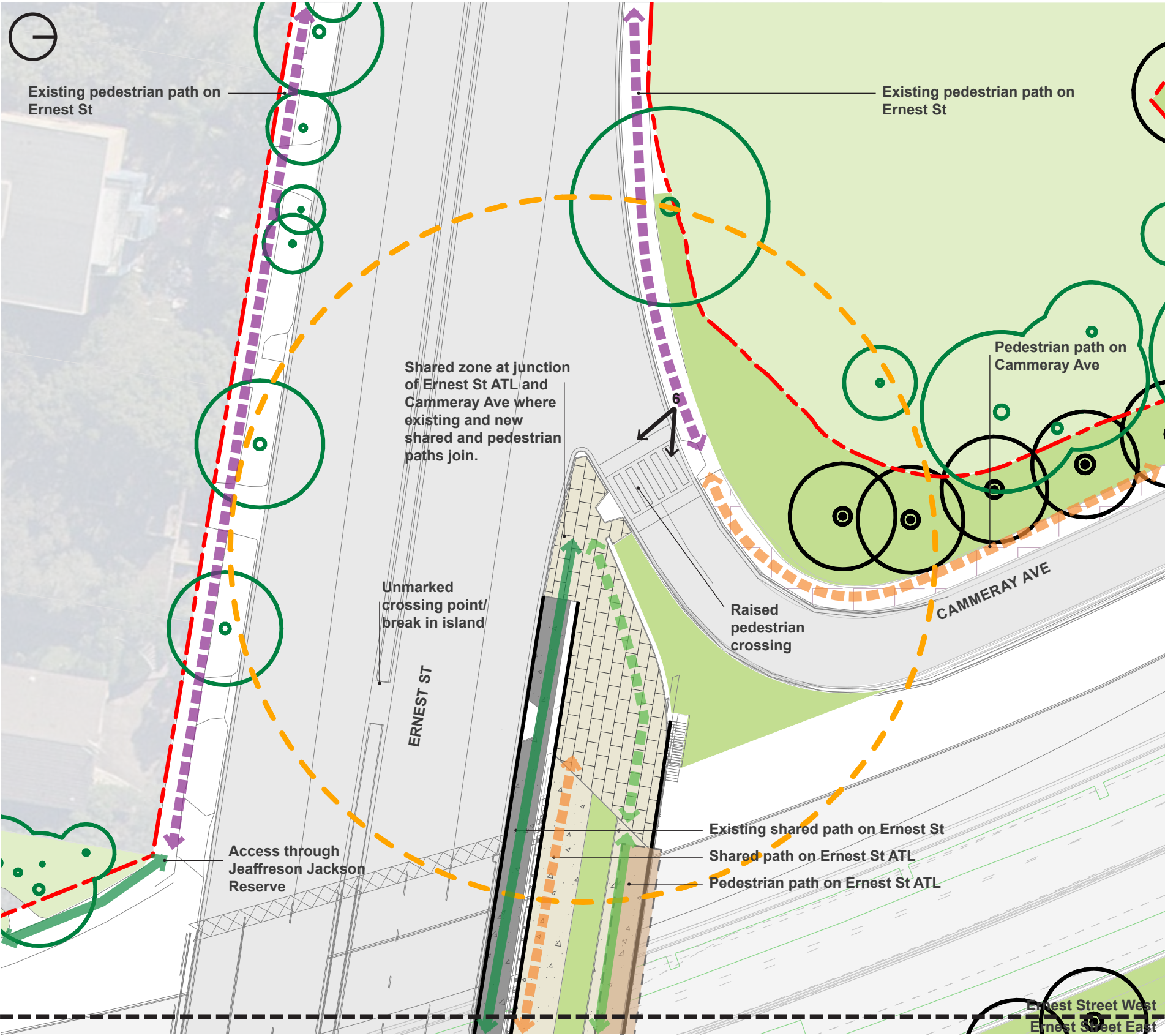


Figure 104: Plan of Ernest St ATL (West) and connections within a 30m Radius

Ernest Street Active Transport Bridge - Connectivity 30m Radius - Ernest Street Western Access

Ramp ties into existing active transport infrastructure with widened footprint for projected increased future usage.



7 - Current condition on Ernest St with new intersection

Item	Description
	Site Boundary
	DDA compliant shared path
	Shared path
	Existing separated cycle path
	Existing DDA compliant shared path
	Existing pedestrian path
	Pedestrian path
	Existing tree to be retained and protected
	Tree
	Planting area
	Pedestrian path
	Shared path
	Existing Fence/Barrier
	30m radius of tie-in

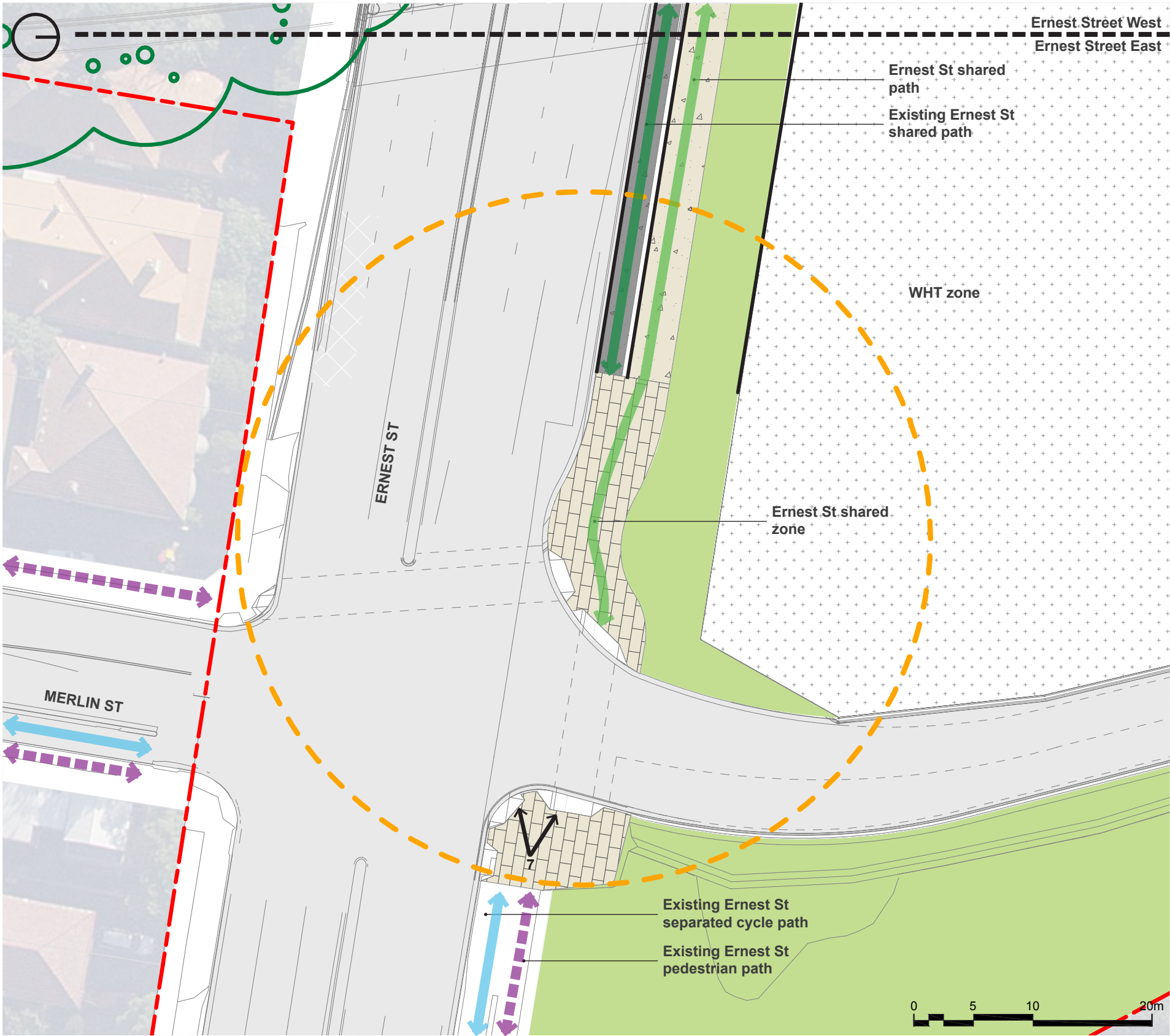


Figure 105: Plan of Ernest St ATL (East) and connections within a 30m Radius

Ernest Street Active Transport Bridge - Visualisations

The following imagery highlights the existing and new connectivity at Ernest Street bridge.



Figure 106: Existing connection - West (Ernest St access near Cammeray Ave)



Figure 108: Existing connection - East (Ernest St access)



Figure 107: New connection - West - Future WHT shown (Ernest St access near Cammeray Ave) *Artist's impression



Figure 109: New connection - East - Future WHT shown for clarity (Ernest St access) *Artist's impression