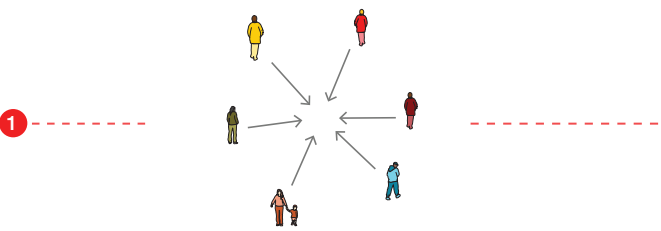


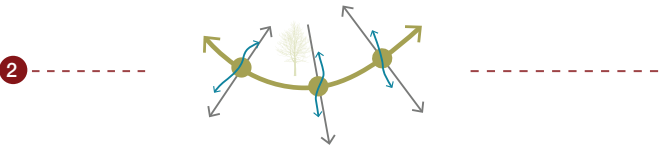
5.4 ASSESSMENT OF THE M4-M5 LINK AGAINST THE URBAN DESIGN PRINCIPLES

Principle

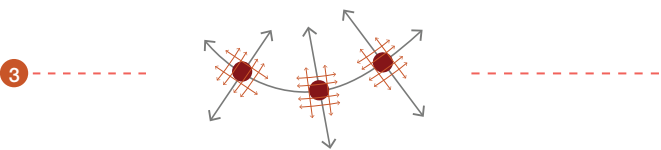
Responses



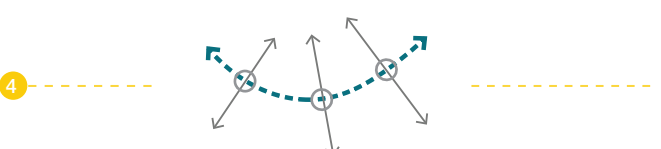
An integrated and collective approach
Create holistic and integrated design solutions generated by collaboration across disciplines, the community, stakeholders and government bodies.



An environmental vision
Create a sustainable and enduring design response which enhances and connects local ecologies and green spaces.



Cross scale connection of spaces
Prioritise local and regional significant connections that respond to broader issues, and support aims and initiatives of the local neighbourhoods and the city.



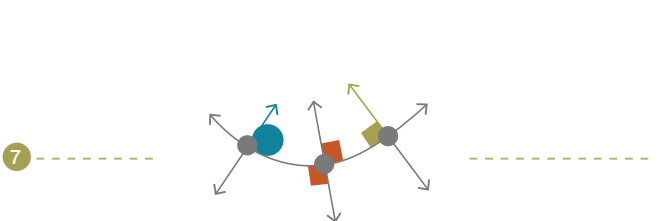
A motorway integrated within its context
Understand the existing landscape and respond in a respectful manner that seeks to enhance and or contribute back to its context.



Place sensitive design
Celebrate and work with the character of each place and destination, responding to their unique histories, materiality, architecture, built fabric, cultural context, landform and topography.



A multidimensional user focus
Consider holistically how a diversity of users experience space including all ages, abilities and transport modes for a truly inclusive, universally accessible and safe outcome.



Revitalisation, opportunity and economics
Establish opportunities for development that supports and connects existing neighbourhoods, complements and stimulates local economies and provides opportunity for growth across existing and future local industries.

Iron Cove	Rozelle Rail Yards
Bring locals back to Victoria Road through activation of remaining project land and integrate community facilities such as outdoor gyms, play spaces or recreational spaces.	Offer a parkland destination that stitches together previously disconnected communities by providing a range of social infrastructure at a central, easily accessible location.
Connect green spaces and canopy along Victoria Road and the remaining project land with King George Park and Callan Park. Also, make use of the topography along Victoria Road and the remaining project land in the harvesting and polishing of water run-off.	Reactivate closed off land though new green spaces and links. This will strategically connect a series of significant, green spaces located in an old creek and swamp bed, and employ WSUD to filter run-off before it enters the harbour.
Integrate Iron Cove active transport network along the southern edge of Victoria Road, linking to Rozelle in the east, Drummoyne and the Bay Run in the north and the wider network beyond.	Create a new active transport spine that works directly with existing and future connections providing a much needed funnel between previously disconnected communities, the Bay Run and the CBD.
Terminate the tunnel portals to the west of the Terry and Toelle Street alignment, enabling through connection across Victoria Road. Locate the portals below the adjacent opportunity sites to minimise amenity impacts on these sites. Also, locate the ventilation outlet between the Victoria Road carriageways, improving the separation distance from residential and commercial receivers.	Use landform to disguise the motorway and maximise usable open space. Co-locate motorway infrastructure to maximise areas of land that would be available for future open space and community and social facilities. Provide a new connection between the Rozelle Rail Yards and the Rozelle Bay light rail stop.
Scale any proposed built form to respect the existing fine grain character with materials that are sympathetic to the local area. Consult with the community to determine the range of uses that could be delivered in this area.	Respect and maintain the unique heritage, industrial character and topography of the Rozelle Rail Yards, and the port and maritime history of the surrounds.
Improve connections of local streets with Victoria Road for pedestrians and cyclists, ensuring universal accessibility. Provide new road infrastructure for motorists as an underground alternative to Victoria Road.	Establish entirely new “public streets” and enhance the surrounding neighbourhood with new public spaces, and much needed universally accessible links. Provide new and upgraded road infrastructure for motorists.
Investigate opportunities for sensitive growth along Victoria Road and portions of the remaining project land. This growth could include low-scale infill development. Improve connections along the southern side of Victoria Road, connecting to the Bay Run, as well as residents and businesses further east and west along Victoria Road.	With the intended future growth of the area, deliver much needed and quality open space and social infrastructure that works both for existing and future communities.

		PRINCIPLE		INCLUDES BUT IS NOT LIMITED TO	ADDRESSES THE FOLLOWING INPUTS
1		An integrated and collective approach Create holistic and integrated design solutions generated by collaboration across disciplines, the community, stakeholders and government bodies.	→	<ul style="list-style-type: none"> working across disciplines holding regular stakeholder workshops and contribution to design options prioritising comprehensive community input and consultation working with all future plans and government bodies considering all relevant regulatory frameworks on the site and in surrounding areas. 	Beyond The Pavement Principles: 1, 3 Beyond The Pavement UD Goals: a WestConnex Motorway Objectives: 1, 4 WestConnex Motorway UD Opportunities: n ,p, q, s, u
2		An environmental vision Create a sustainable and enduring design response which enhances and connects local ecologies and green spaces.	→	<ul style="list-style-type: none"> enhancing connectivity between streets, facilities, neighbourhoods, green spaces, cycle and pedestrian connections across the site and the city integrating and connecting transport modes connecting local and regional road, cycle, public transport and pedestrian links reducing the need for car travel. 	Beyond The Pavement Principles: 4, 5, 6, 9 Beyond The Pavement UD Goals: a WestConnex Motorway Objectives: 1, 3, 6 WestConnex Motorway UD Opportunities: c, d, e, f, g, h, k, l, s
3		Cross scale connection of spaces Prioritise local and regional significant connections that respond to broader issues, and support aims and initiatives of the local neighbourhoods and the city.	→	<ul style="list-style-type: none"> ensuring CPTED Principles Driven Designs creating safe, legible connections with way finding for all user types ensuring universal design outcomes considering the user experience for all modes including drivers, pedestrians, cyclists and public transport users. 	Beyond The Pavement Principles: 3, 7, 8, 2 Beyond The Pavement UD Goals: a, b, c WestConnex Motorway Objectives: 2, 6 WestConnex Motorway UD Opportunities: g, h, i, k, l, n, o, r
5		Place sensitive design Celebrate and work with the character of each place and destination, responding to their unique histories, materiality, architecture, built fabric, cultural context, landform and typography.	→	<ul style="list-style-type: none"> incorporating heritage respecting and responding to cultural contexts respecting and working with the local landform responding to the natural patterns complement the existing built fabric Increasing the legibility of places, buildings, streets and landmarks 	Beyond The Pavement Principles: 2, 4 ,5, 6, 9 Beyond The Pavement UD Goals: a, b, c WestConnex Motorway Objectives: 2, 3, 6 WestConnex Motorway UD Opportunities: a, b, f, g, m, o, s, t, u
6		A multidimensional user focus Consider holistically how a diversity of users experience space including all ages, abilities and transport modes for a truly inclusive, universally accessible and safe outcome.	→	<ul style="list-style-type: none"> enhancing waterways, creeks and rivers using, where possible WSUD connecting fractured green spaces enhancing local ecologies and vegetation using durable, sustainable and long lasting materials and timeless design. 	Beyond The Pavement Principles: 3, 7, 8, 2 Beyond The Pavement UD Goals: a, b, c WestConnex Motorway Objectives: 2, 5 WestConnex Motorway UD Opportunities: g, i, l, m, o, r
7		Revitalisation, opportunity and economics Establish opportunities for development that supports and connects existing neighbourhoods, complements and stimulates local economies and provides opportunity for growth across existing and future local industries.	→	<ul style="list-style-type: none"> contributing to urban structure and revitalisation connecting existing and fragmented spaces though property acquisition capitalising on traffic reduction to enhance local streets and increase neighbourhood liveability creating opportunities for urban renewal. 	Beyond The Pavement Principles: 1, 3, 6 Beyond The Pavement UD Goals: a, c WestConnex Motorway Objectives: 1, 4, 6 WestConnex Motorway UD Opportunities: g, k, n

5.5 GUIDING PRINCIPLES

5.5.1 BUILT FORM DESIGN AND MATERIALS

The built form of all structures for the project would be detailed in the UDLP to be developed in stages [refer to section 7]. The built form components of the project include:

- Ventilation facilities and outlets
- Water treatment plants
- Electricity substations
- Ventilation supply facilities
- Tunnel portals.

The built form structures would be designed to complement the surrounding context. During the detailed design process a material palette would be developed that draws on materials of the surrounding areas. Material palettes for each built form structure would be included in the relevant UDLP which will be made available for public comment.

5.5.2 PORTAL DESIGN

The design of portals would be treated carefully to reduce the impact of these structures within the landscape. A Portal Design Review has been undertaken to examine national and international examples of portal design [see Annexure 1]. The review provides key criteria by which the detailed design of portals for the project would be developed. The UDLP will contain the portal designs in accordance with the following themes:

Threshold

While tunnel portal design is largely the result of strict controls relating to speed and volume of traffic, the articulation of these structures has historical and symbolic value. City boundaries are often marked with gateways, describing a transition from one context to another. Portals for the project have the ability to exemplify this gateway phenomenon.

Contextual conditions

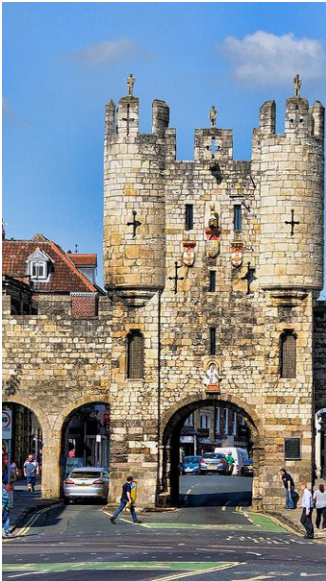
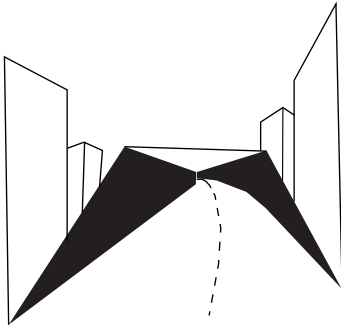
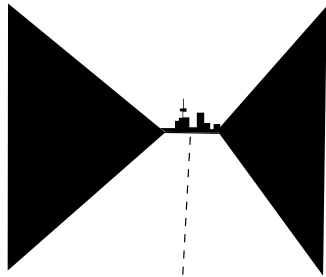
The nature of tunnel design requires engagement with two or more specific contexts at entry and exit points. These two conditions can be radically different to each other by virtue of their surroundings. There are two ways in which to mark these thresholds:

1. A unified expression which treats the tunnel experience at the entry and exit with the same expression, often as an extension of the tunnel.
2. Use the portal design as a response to its local context.

Entry and exit experience

The treatment of portals varies greatly. Historically, the portal acts as a threshold to the city, a marker, which delineates suburban with urban. Whether entering or exiting the tunnel, one is required to depart and arrive from their point of origin. As such, tunnel portals can often be suggestive of embracing the motorist on arrival, and releasing on departure.

This often has symbolic as well as practical reasons. When exiting the tunnel, the abrupt change in light conditions is often mediated by the gradual transition from tunnel to open roadway. Likewise, on entering, colours and form can be used as wayfinding devices for the motorist.



ARRIVAL



DEPARTURE

Figure 5.31: Portal design threshold

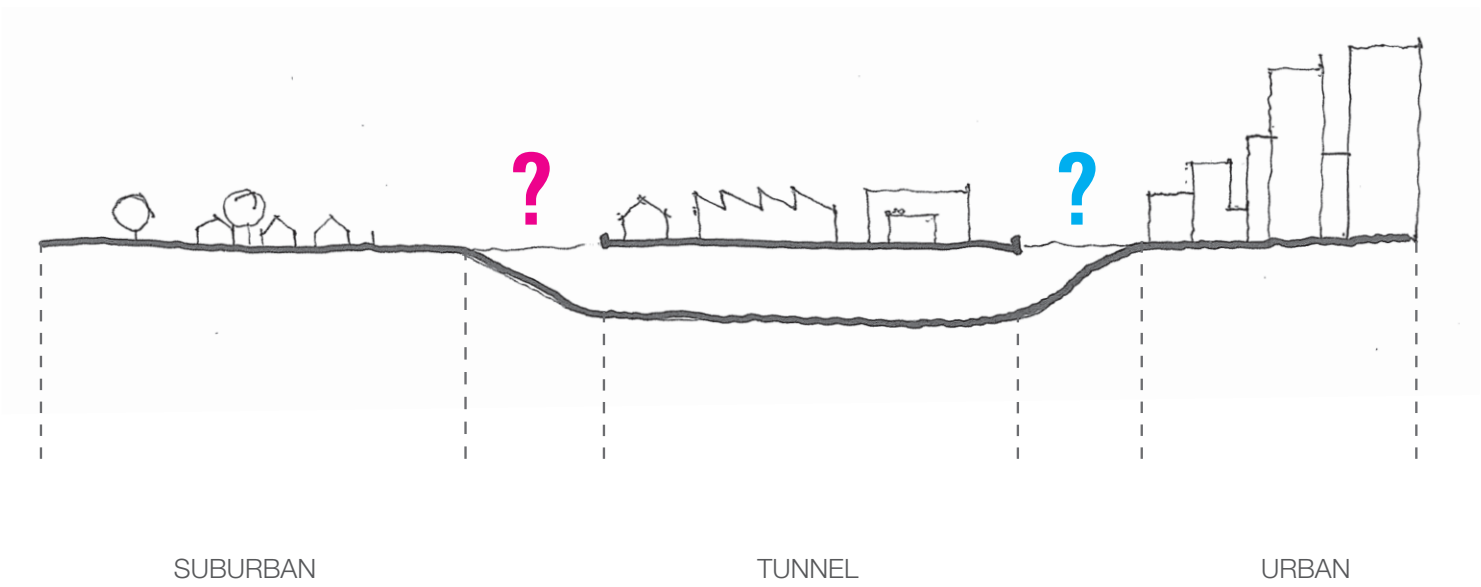


Figure 5.32: Portal design contextual conditions

5.5.3 TUNNEL INTERIORS

Completion of the project would create a tunnel network of approximately 23 kilometres [including the M4 East and New M5 components of WestConnex]. A tunnel of this length requires consideration of the driver experience in relation to safety, alertness and driver comfort. The New M5 and M4 East include a ‘tunnel experience’ overlay that includes feature lighting and suburb identifiers along the tunnel walls. These features would assist in providing interest for the motorist along the journey and assist in wayfinding.

A concept for in-tunnel experience would be prepared as part of the UDLP for M4-M5 Link that continues the principles developed for both the New M5 and M4 East. The principles by which the M4-M5 Link in-tunnel experience would be developed include:

- Creation of landmark or site specific/ unique experiences
- Use of optimal lighting / adaptable luminance
- Creation of subtle variations to keep drivers alert
- Measures to break-up long continuous underground travel distances
- Shifting gradients and alignments to avoid monotony
- Providing clear speed and distance references
- Legible wayfinding.

The images to the right represent a possible design overlay that would reflect the above principles. In order to assist wayfinding, a lighting wash could be projected on the left hand tunnel lining to indicate a diverge point. In addition to regulatory signage, the lighting would provide an indication to the motorist of a decision making point along the journey. The light would then envelope the tunnel lining at the point of diversion indicating to the motorist that the journey decision has been made.

Such a concept for in-tunnel experience is an example of how the principles could be applied for the project. The UDLP for the main tunnel component would outline the final concept to be used for the project.



Figure 5.33: Portal design: entry and exit experience

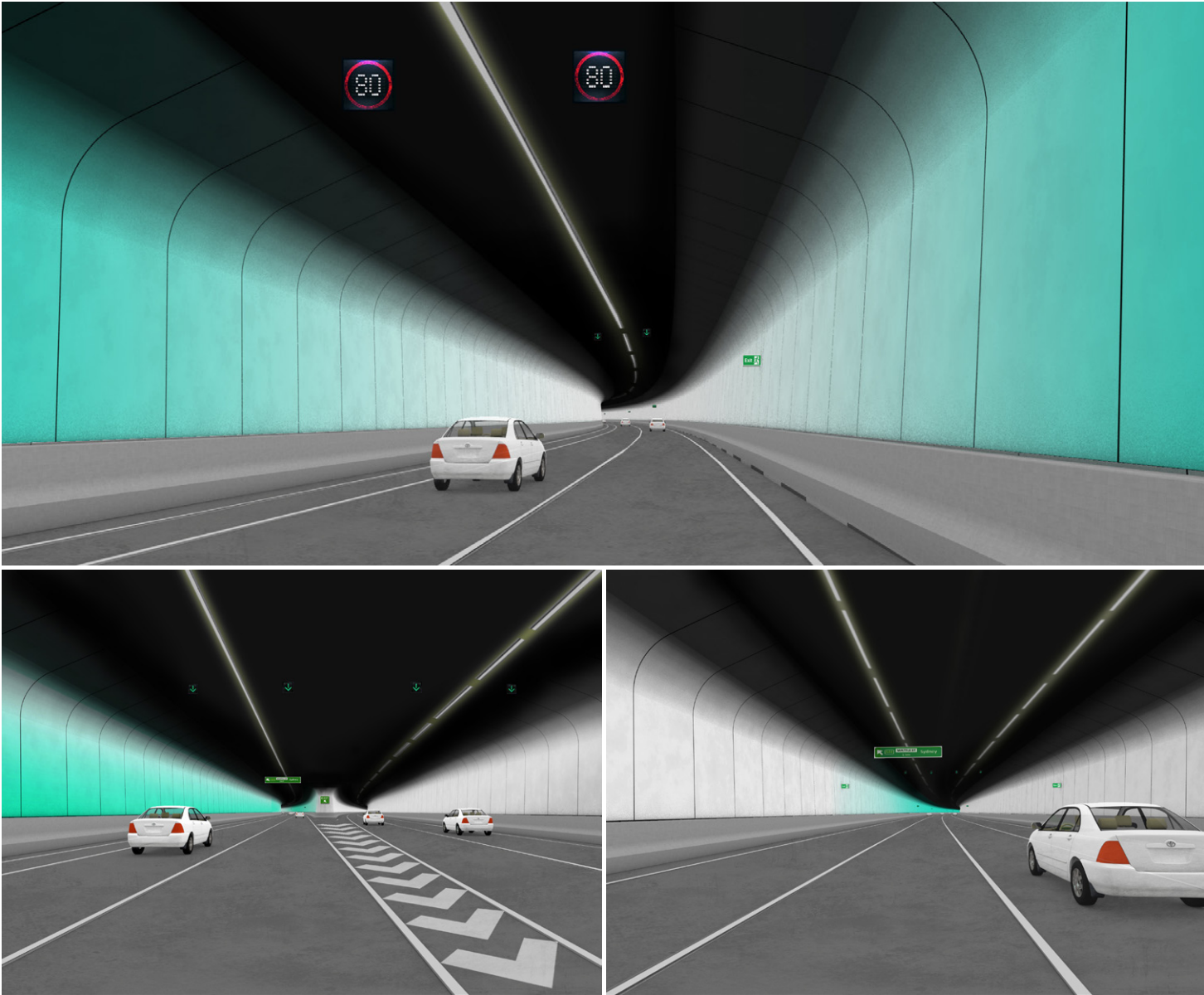


Figure 5.34: Tunnel interiors

5.5.4 VENTILATION FACILITY DESIGN

The ventilation facilities would form a dominant marker of the project within the landscape. A Ventilation Facility Design Review has been undertaken to examine national and international examples of ventilation facility design [see Annexure 2]. The review provides key criteria by which the detailed design of ventilation facilities for the project would be developed.

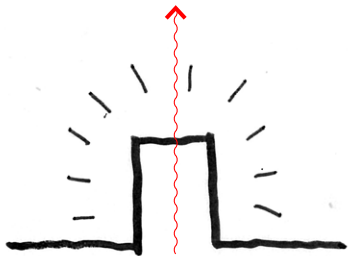
Across the history of ventilation facility design there appear to be four fundamental approaches by way of expression. In some cases, the [historical] approach appears as a representation of the spirit of the time - perhaps an expression of an attitude towards a new form of transport or technology. In many cases the approach appears rooted in the nearby physical context. More recently there appears to be a tendency towards a more stylistic form of expression, as demonstrated by Figure 5.35.

The UDLP will contain the ventilation facility designs in accordance with the following themes:

- The design strategy employed for the ventilation facility should be intrinsically linked to the community and its immediate context
- By understanding the ventilation facility as a ‘signifier’ for the wider project, there is an opportunity where appropriate for these structures to celebrate infrastructure, as opposed to disguising it
- Embedding an additional function could provide additional benefit to the surrounding context, and also help mitigate the negative associations with ventilation facilities in general [pollution, visual impact]. This addition can also be of social value to the community
- Distance from residential areas is often the point of strongest contention. By locating the ventilation outlet close to the portals the amount of impact from the community’s perspective could be reduced.

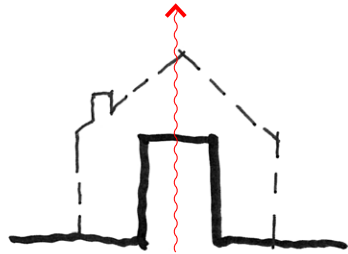
VENTILATION FACILITY AS...

‘MONUMENT’



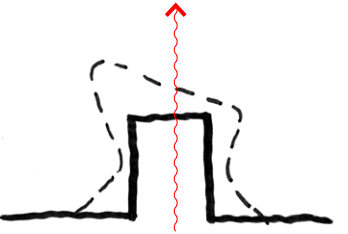
Hyde park obelisk, Sydney, Australia.

‘CAMOUFLAGE’



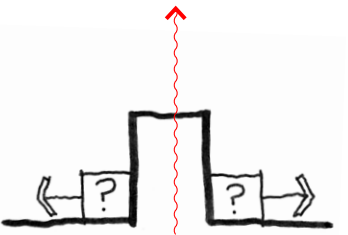
Bayswater, London, UK.

‘SCULPTURAL ARTWORK’



Miami port tunnel, Miami, USA.

‘SUPPORTING INFRASTRUCTURE
& DESTINATION’



Queensway tunnel, Liverpool, UK.

Figure 5.35: Ventilation facility design

5.5.5 LIGHTING

The final designs for Rozelle and Iron Cove would include a detailed lighting concept based around the considerations outlined below, and would be developed in accordance with AS/NZS 1158 *Lighting for roads and public spaces*, AS 2560 *Guide to sports lighting*, AS 4282 *Control of the obtrusive effects of outdoor lighting*, and AS/NZS 60598 - Series *Luminaires*.

Below are the principles that should guide the development of the detailed concepts.

1. Reinforce wayfinding and legibility

- Allow lighting to facilitate orientation and wayfinding to assist in creating a legible night time environment
- Encourage active transport and recreation at night through appropriate applications of lighting to path networks and recreation facilities.

2. Make use of open space to its full potential

- Create and enhance the night time experience of the public domain to increase visitation and use
- Create an enjoyable nightscape and feeling of comfort by improving the aesthetic quality of the environment at night time.

3. Distinctiveness and place

- Develop a strategic framework for targeted specialised lighting applications to express distinctiveness of place and emphasise landmarks
- Ensure lighting is integrated as part of urban design, streets and public art.

4. Promote safety and inclusive design

- Establish appropriate lighting levels, in line with relevant standards and luminaire criteria that promotes a safe public domain
- Create an enjoyable night-scape and feeling of comfort by improving the aesthetic quality of the environment at night time.

5. Promote sustainability

- Achieve a reduction in greenhouse gas emissions by using fittings that are powered by renewable energy sources such as integrated solar
- Establish appropriate lighting levels, standards and luminaire criteria to minimise light spill, energy consumption, and potential adverse environmental effects.



5.5.6 WATER SENSITIVE URBAN DESIGN

WSUD is considered a fundamental inclusion in the design of the project. Whilst achieving a number of environmental benefits, the inclusion of WSUD would also provide amenity benefits and add interest to the open spaces being planned as part of the project.

The final design of WSUD features would be undertaken in tandem with the design of surface sites at UDLP stage. The following section, in referencing to Water by Design [2009] by Healthy Waterways Partnership, outlines the considerations that would be included in this final design in relation to WSUD.

1. Protect and improve water quality

2. Protect and conserve precious drinking water supply

3. Restore lost waterways and ecological communities

4. Provide habitat to improve biodiversity in a highly urban context

5. Use water to reduce the urban heat island effect and improve local micro climates

6. Express water in the landscape to create water literate communities

7. Provide benefits to the community and multiple stakeholders

The strategies to implement the seven key principles for sustainable water management at the Rozelle Rail Yards and Iron Cove could include:

1. Water quality

- Treat intercepted tunnel groundwater to best practice from road infrastructure
- Treat stormwater to best practice from new road infrastructure
- Treat all wash down and emergency water use from road infrastructure to best practice
- Treat the external Rozelle catchment draining to Rozelle Bay
- Use a combination of natural treatment systems including vegetated bioretention facilities and wetlands to treat the above sources of water.

2. Water supplies

- Provide a non-potable water source for new development and new and existing parklands
- Harvest all treated groundwater in a storage tank and/or open pond integrated into the landscape suitable for one day's storage supply
- Provide a post storage filtration and disinfection system to polish the water prior to supply
- Develop a non-potable reticulation system to distribute the water to the new development and parklands for irrigation.

3. Restore lost waterways and ecological communities

- Divert all water sources entering the Rozelle Rail Yards into restored creek lines and waterways
- Wherever possible, use natural vegetated systems to transport water rather than pits and pipes
- Recreate lost waterways and creek lines to create the foundations for new ecologies previously lost.

4. Provide habitat

- Provide a wide range of wet and dry natural areas using natural treatment systems
- Provide a diverse range of habitat including native vegetation, running water, shallow and deep water
- Incorporate designed habitat features for birds, frogs, lizards, fish, turtles and other habitat.

5. Reduce urban heat island

- Maximise irrigation of green spaces to reduce local temperatures
- Maximise the areas of open water and marshlands to provide cooling.

- Retain water in the landscape to reduce temperatures
- Maximise use of trees which are irrigated with non-potable water to provide for quick growth to establish a tree canopy
- Where possible, use pavement which reduce urban heat island effect and maximise cooling.

6. Express water in landscape

- Maximise interaction with park users and water systems using bridges, informal waterways, crossings, opportunities to get close to water systems
- Use appropriate signage and art to express water in the landscape
- At key locations such as where water enters the natural systems express this water creatively in the landscape
- Provide opportunities for engaging with nature eg bird watching, catching tadpoles, fish etc.

7. Provide benefits to community

- Irrigate local playing fields to improve quality of surface
- Partner with Sydney Water to gain access to their infrastructure and achieve their water management goals
- Partner with UrbanGrowth NSW to integrate into the new developments at the White Bay Power Station, Glebe Island, Rozelle Bay, White Bay and beyond
- Partner with local councils to look at opportunities to integrated water reuse schemes such as the City of Sydney Jubilee Park harvesting scheme.



5.5.7 WAYFINDING, INTERPRETATION AND PUBLIC ART

Wayfinding is an important inclusion in the urban design components of the project. Together, wayfinding, interpretation and public art would be viewed as an integrated whole and developed collectively. Strategies would be developed as part of the UDLPs, based on the final design to be constructed. The following section outlines the principles that wayfinding, interpretation and public art should follow.

Wayfinding

1. Legibility

- Select the appropriate text size required for legibility of signage
- Adhere to international best practice models for placement of signage.

2. Directional hierarchy

- Develop and follow a protocol for ordering messages on wayfinding signage.

3. Signage height

- Develop and follow signage heights to ensure a consistent and legible signage system.

4. Pictogram language

- Use pictograms to supplement the written message ensuring it is understood by all. Where required by code use the correct pictogram and colours [eg Accessibility symbol].

5. Proportions

- Develop a proportional sign system whose forms maximise standard material sheet sizes to minimise waste and reduce cost.

6. Contrast

- Ensure there is adequate contrast between the text and the background colour of the signs in line with relevant standards.

7. Mapping

- Mapping should be incorporated at key decisions points to ensure visitors can orient themselves.

Interpretation and public art

1. Excellence

- The commissioning of artworks [of whatever scale, style or function], which embody imaginative and appropriate concepts, well executed, intelligently and appropriately sited and which would therefore stand up well to national and international comparison.

2. Site specificity

- The commissioning of artworks that reflect and express different aspects of the sites and add to the enjoyment of the particular qualities of the place in which they are sited.

3. Strategically considered

- The commissioning of artworks within the context of other Council objectives and plans and which measurably add value to the place; for example, by increasing its profile, by increasing the ease of the public usage, by creating a new meeting place, or by improving the quality of an old one.

4. Inclusion and diversity

- The commissioning of artworks that reflect fully the range of places, interests and cultures that make up local areas.



5.5.8 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN

The strategy for Crime Prevention Through Environmental Design [CPTED] would be in accordance with *Crime Prevention Through Environmental Design* [Queensland Government, 2007] and Safer By Design principles. The key principles to be considered in order to reduce opportunities for crime are outlined below.

1. Surveillance

- The public realm and buildings would be designed and managed to maximise, consistent with other legitimate goals, the potential for passive surveillance.

2. Legibility

- The public domain would be designed, detailed and managed to make them legible for users, especially pedestrians and cyclists, without losing the capacity for variety and interest
- Legibility would be promoted in both the overall structure and form of the public domain and in appropriate detail within them.

3. Territoriality

- Security would be supported by designing and managing spaces and buildings to define clearly legitimate boundaries between private, semi- private, community-group and public space
- Territoriality would be delivered without significant loss of surveillance.

4. Ownership of the outcomes

- A feeling of individual and community ownership of the public realm and associated built environments would be promoted to encourage a level of shared responsibility for their security.

5. Management

- The public realm would be designed and detailed to minimise damage and the need for undue maintenance, without undermining the aesthetic and functional qualities that make the places attractive to the community
- Systems of both regular and reactive maintenance and repair would be implemented to maintain the quality of the place
- A regular auditing system of CPTED issues in the public domain would be implemented.

6. Vulnerability

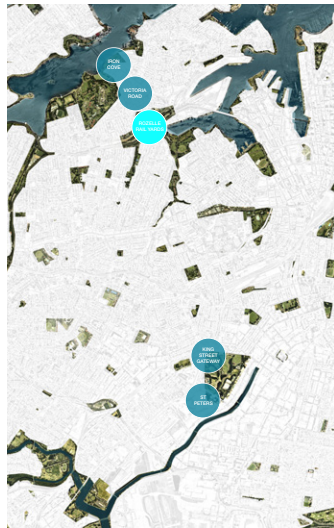
- The public domain would be designed and managed to reduce or limit risk from assault by providing well-lit, active and places of high visibility, and pedestrian and cyclist systems and routes to important places
- The design and management of places would avoid creating or maintaining hidden spaces close to pedestrian/cyclist travel routes in the public realm, in ways that remain consistent with the purpose of the place
- The design and management of the public domain should provide a variety of routes and other ways to avoid potential or actual problems
- The pursuit of safety should be delivered in ways consistent with the purpose of the place.



6.0 Future Opportunities

The following provides an outline of future projects that could be undertaken by others to capitalise on the opportunities provided by the project [Figure 5.6 shows the components to be delivered by the M4-M5 Link project]. These projects require coordination across agencies and levels of Government and would be best championed by an agency with a development/planning focus.

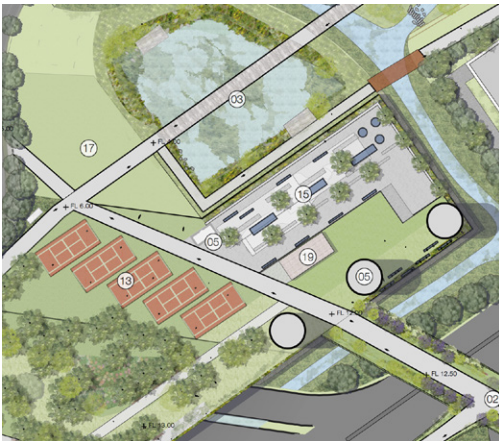
6.1 FUTURE OPPORTUNITIES AT THE ROZELLE RAIL YARDS



Location: Rozelle Rail Yards



Rozelle Rail Yards master plan 01



The Rozelle Rail Yards master plan options provide the opportunities for further open space embellishment to suit the needs of current and future communities. The options demonstrate how the principles could be applied in a final site design.

The final master plan would account for active recreation and consider a number of studies that have been conducted in the Local Government Areas adjacent to the M4-M5 Link project. Overwhelmingly, they identify a shortage of sporting and recreational facilities. Survey outcomes from UrbanGrowth NSW's



Active Recreation Needs Study for The Bays Precinct indicates the following:

- The general view is there are insufficient sporting facilities in the CBD and inner west
- Increasing numbers of residents wanting to engage in active recreation will result in people being turned away or an increase in facilities operating at or over capacity

- The need for synthetic fields that can withstand high levels of use
- Quality pedestrian and cycle connections to future active recreation areas.

In addition to these findings, the Leichhardt Recreation & Open Space Needs Study identifies a number of open space and recreational and sporting findings for the surrounding area. These include:

- A high value is placed on the provision of quality and accessible parks and

open space areas by residents and groups

- A demonstrated overuse of current sports grounds
- An expressed demand for additional sporting fields
- The integration of facilities and spaces suitable for young people in the broader open space network.



Rozelle Rail Yards master plan 02



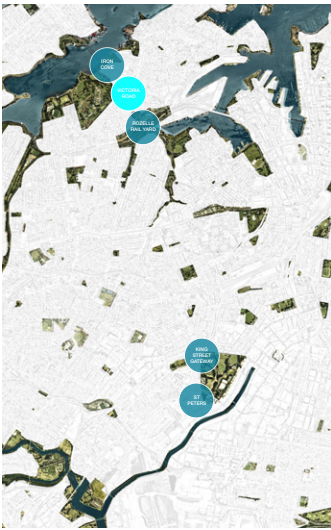
It is envisaged that the quantum of active recreation within the Rozelle Rail Yards would be further developed by others as projects such as The Bays Precinct are developed. The concept plan provides spaces that could include an array of active recreation opportunities and even community facilities such as gardens or a school. The concept plan would catalyse such future embellishments, providing the space for these uses to be determined according to the needs of future communities.



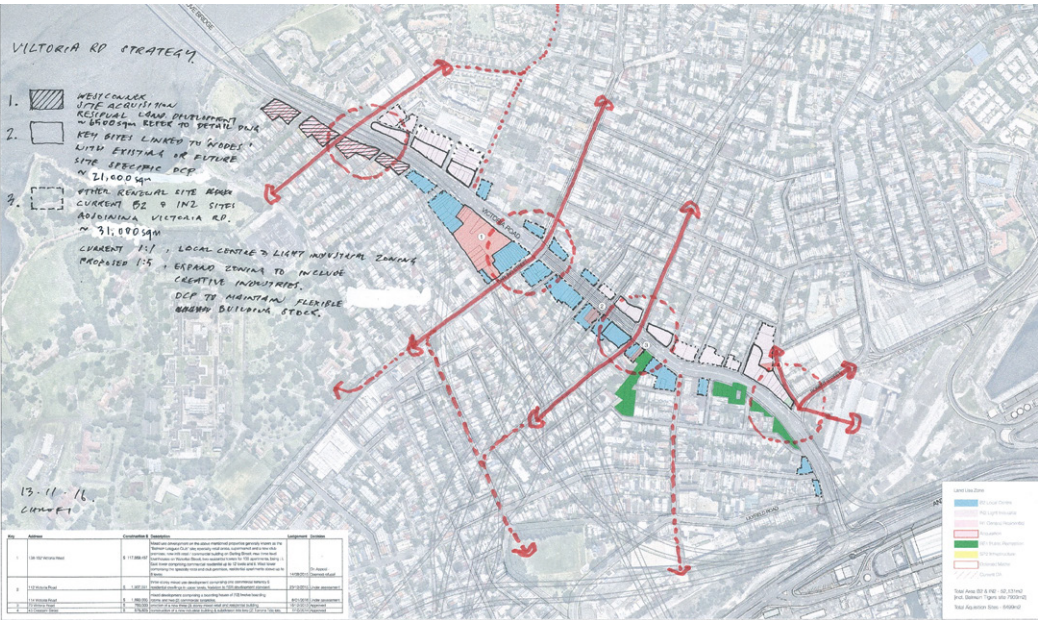
Rozelle Rail Yards master plan 03



6.2 FUTURE OPPORTUNITIES ON VICTORIA ROAD



Location: Victoria Road, Rozelle NSW



Urban regeneration along Victoria Road has been identified as a future project facilitated by the M4-M5 Link. It is outside the current scope of works, however the forecast reduction in traffic along Victoria Road resulting from the Iron Cove Link presents a number of opportunities.

High level concept work identified a small uplift in floor space ratio, from 1:1 to 1.5:1, combined with an expansion of the current definitions governing uses in IN2 Light Industrial lands, as presenting a number of opportunities. Site specific Development Control Plans could further maximise the potential of redevelopment sites along the corridor on a case by case basis.

A revitalised Victoria Road would become more like a 'Street', presenting new opportunities for businesses, locals and visitors, while providing strong local pedestrian and cycle connections between Lilyfield and Rozelle. The streetscape upgrades to be provided by the project could be continued through to Roberts Street as part of this future project.

7.0 Summary

The concepts and principles outlined in this report would be developed into detailed designs under UDLPs for the various components of the project. These UDLPs would relate to one another and the other stages of WestConnex. A series of UDLPs would be developed including:

Mainline tunnel - a detailed design that includes:

- Assessment of final designs for all surface elements against the principles outlined at section 3
- Final design and material composition for built form structures such as water treatment plants and electricity substations
- Final design for in-tunnel overlay
- Final design and material composition for the St Peters ventilation facility and a car parking strategy
- Final landscape plans around permanent operational infrastructure.

Rozelle interchange - a detailed design that includes:

- Final master plan
- Final design and material composition for built form structures, including a specific study regarding the design of ventilation facilities
- Final landscape design
- Final heritage interpretation, in accordance with the recommendations of Appendix U [Technical working paper: Non-Aboriginal heritage] of the EIS
- Wayfinding strategy
- Public art strategy
- Lighting strategy
- WSUD strategy
- CPTED review of design
- Active recreation facilities to be provided by the project to be developed in consultation with Council within the UDLP, under a recreational facilities needs analysis
- Final location of parking to support recreational uses to be determined.

Iron Cove Link - a detailed design that includes:

- Final land use for remaining lands
- Final design and material composition for built form structures, including a specific study regarding the design of ventilation facilities
- Final landscape design
- Final heritage interpretation plan
- CPTED review of design.

8.0 References

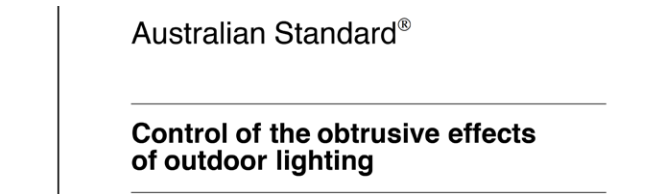
The following policies and guidelines have been used to develop the concepts contained within this report. These policies and guidelines would be further followed in the development of UDLPs for the various components of the project.



WestConnex Active Transport Network



Beyond The Pavement - Urban Design Procedures and Design Principles



AS 4282-1997 - Control Of The Obtrusive Effects Of Outdoor Lighting



Technical Guidelines for Urban Green Cover in NSW



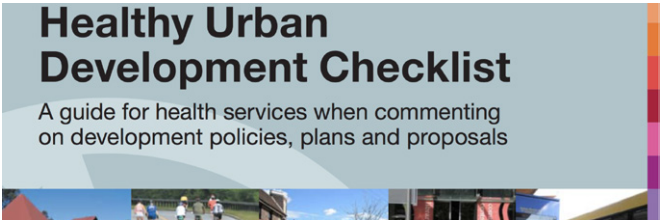
Sydney Green Grid by McGregor Coxall



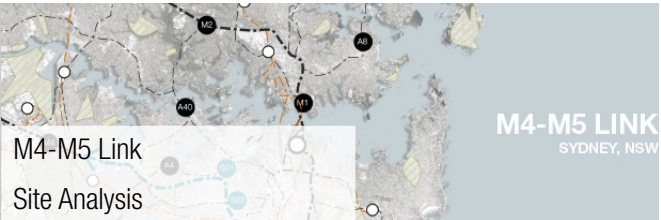
Westconnex Motorway - Urban Design Framework



NSW Sustainable Design Guidelines Version 3.0 [Transport for NSW, 2013]



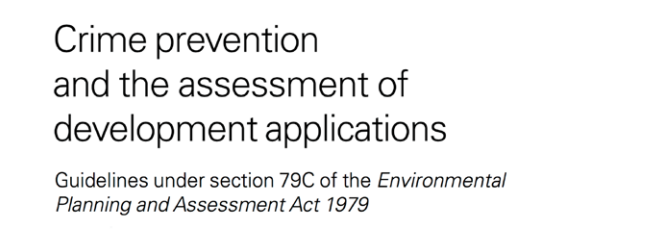
Healthy Urban Development Checklist [NSW Health 2009]



M4-M5 Link, Site Analysis & Related Studies



Bridge Aesthetics



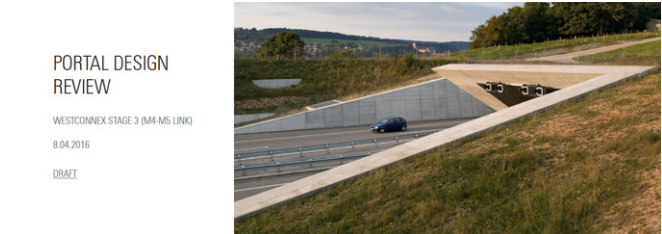
Crime Prevention And The Assessment Of Development Applications [DUAC, 2001]



Water by Design [2009] Concept Design Guidelines for Water Sensitive Urban Design



A Plan for Growing Sydney by the Greater Sydney Commission



Portal Design Review



Crime Prevention Through Environmental Design [CPTED] [Queensland Government, 2007]



Sydney 2030 Report



Ventilation Facility Review



Disability [Access To Premises - Buildings] Standards 2010

Annexure 1 - Portal Design Review

PORTAL DESIGN REVIEW

WESTCONNEX STAGE 3 (M4-M5 LINK)

03.05.2016



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- SYDNEY TUNNEL NETWORK

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- EAST LINK - MELBOURNE
- PENINSULA LINK - MELBOURNE
- LANE COVE TUNNEL - SYDNEY
- CROSS CITY TUNNEL - SYDNEY
- EASTERN DISTRIBUTOR - SYDNEY
- TUGON BYPASS - BRISBANE
- AIRPORT LINK TUNNEL - BRISBANE
- CLEM 7 TUNNEL - BRISBANE
- WATERVIEW CONNECTION - AUCKLAND, NZ
- VEDEGGIO CASSARATE - SWITZERLAND
- FIGUEROA ST TUNNELS - LOS ANGELES, USA
- OLYMPIC SCULPTURE PARK - SEATTLE, USA
- MIAMI PORT TUNNEL - USA
- SAN PANCRAZIO TUNNEL - ITALY
- TRANSJURANNE MOTORWAY - SWITZERLAND

8. CONCLUSION

1.0 INTRODUCTION

This review is presented in 2 parts. Part 1 explores the physical parameters and characteristics of the entry and exit portals of tunnels already within the Sydney road network. Part 2 is a qualitative review of local and international examples of tunnel portal design.

A tunnel by definition has a beginning and an end. Experientially, the beginning is marked by the point at which the tunnel is entered and the end of the tunnel is marked by an 'exit'. These moments of entry and exit, or portals, were historically expressed as a quite pragmatic termination of the tunnel - a point at which a stark distinction was felt between inside and outside with little consideration of the need for a sense of transition from one state to the other or for the journey.

This review asks:

Can the portal be defined as more than just the termination of the tunnel?

Is there an opportunity in each of the 3 Westconnex Stage 3 sites for the tunnel portals to mark a place with some greater relevance for the nearby community and also for the tunnel users?



2.1

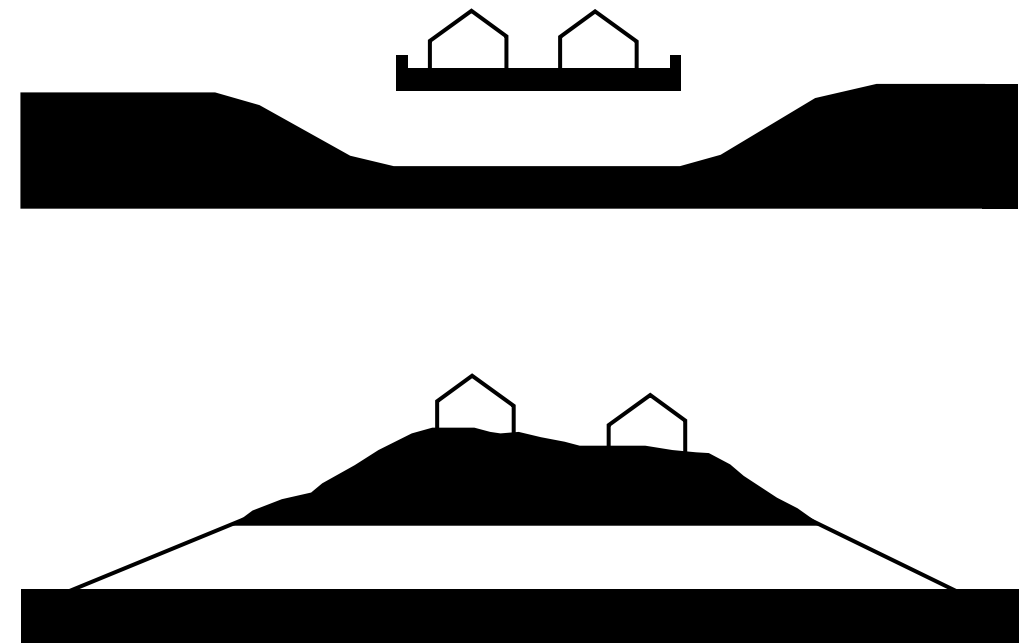
TUNNEL CONDITIONS: TOPOGRAPHICAL RESPONSE

TUNNEL TOPOGRAPHY

Tunnel design typically falls in to two topographically responsive categories: depression under natural ground level or on grade excavation.

These two conditions ultimately dictate the portal design, as well as the vehicle speed and gradient of approach/exit.

This review has been laid out to explore the two primary topographical and contextual conditions in which tunnels occur and the possible opportunities these conditions present for the design of the tunnel entry and exit portal structures.



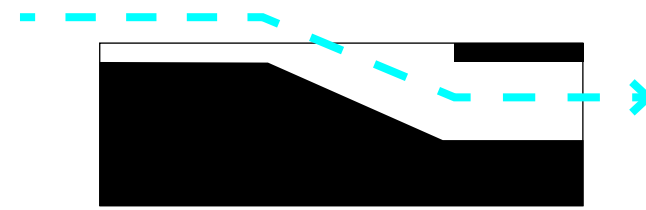
2.2

TUNNEL CONDITIONS: ENTRY & EXIT

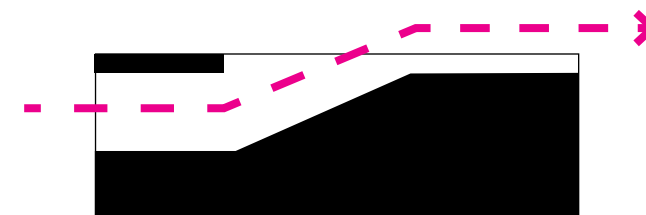
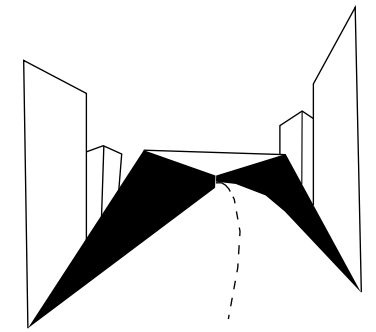
Each tunnel portal structure, whether entry or exit, serves a dual purpose.

The moment at which entry to the tunnel is made defines the beginning of the tunnel experience but it also marks a point of departure from a specific public domain context.

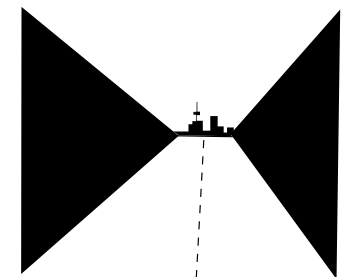
Conversely, the tunnel exit marks an arrival point, often within and at a context rather different from the context left behind at the entry of the tunnel.



' TUNNEL ENTRY '
 DEPARTURE



' TUNNEL EXIT '
 ARRIVAL



PORTAL DESIGN REVIEW - PART 1

LOCAL TUNNEL REVIEW



3.0

INTRODUCTION: METHODOLOGY & FINDINGS

METHODOLOGY

This report catalogues the physical conditions of existing portal entries/exits in Sydney and Australia.

This desktop review is intended to be used as a design reference only, and as such the methods by which data has been obtained is simplistic. Nearmaps maps have been used in order to ascertain ramp lengths, while a combination of RMS tunnel authority data and google street view is used to form an understanding of clearance heights, ramp grades and speeds limits.

Each of the case studies has been categorised into single entrance, single exit and dual entrance/exit as well as the topographic strategy used.

FINDINGS

This review has identified that there is no singular approach to tunnel portal design with regard to ramp grades/lengths or posted speed limits.

It appears that the existing local topography, urban context and traffic speeds are the determining factors for each portal configuration.

3.1
INTRODUCTION:
SYDNEY TUNNEL
NETWORK

WestConnex



PROPOSED WESTCONNEX STAGE 3
TUNNEL & PORTAL ENTRY/EXITS



EASTERN DISTRIBUTOR TUNNEL &
PORTAL ENTRY/EXITS



CROSS CITY TUNNEL & PORTAL
ENTRY/EXITS



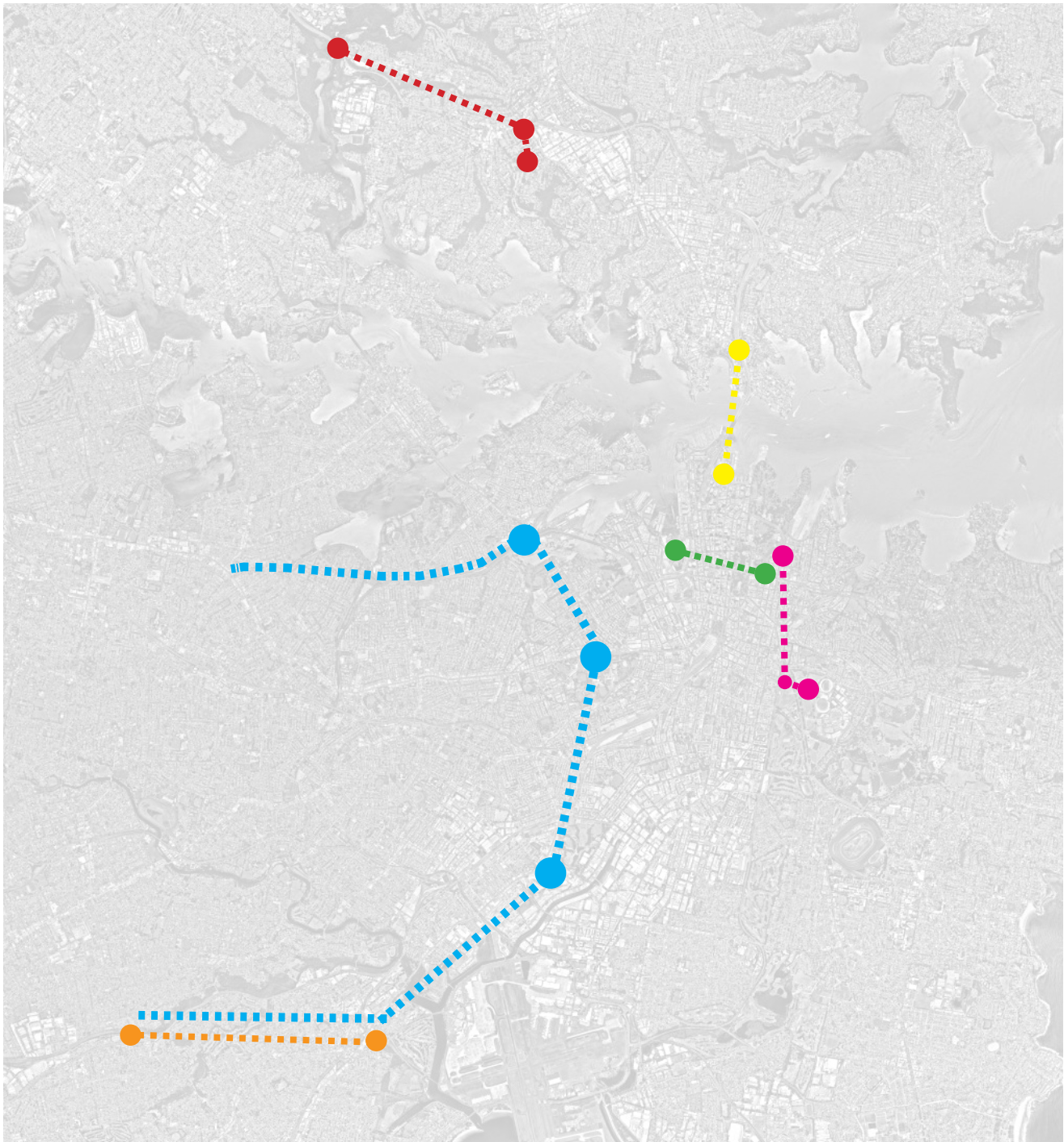
M5 EAST TUNNEL & PORTAL
ENTRY/EXITS



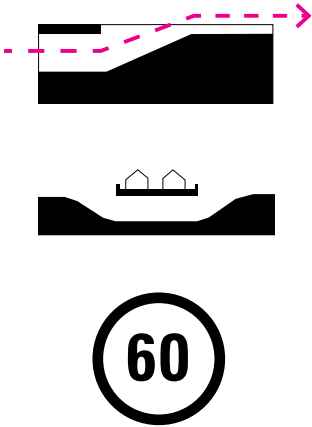
SYDNEY HARBOUR TUNNEL &
PORTAL ENTRY/EXITS



LANE COVE TUNNEL & PORTAL
ENTRY/EXITS

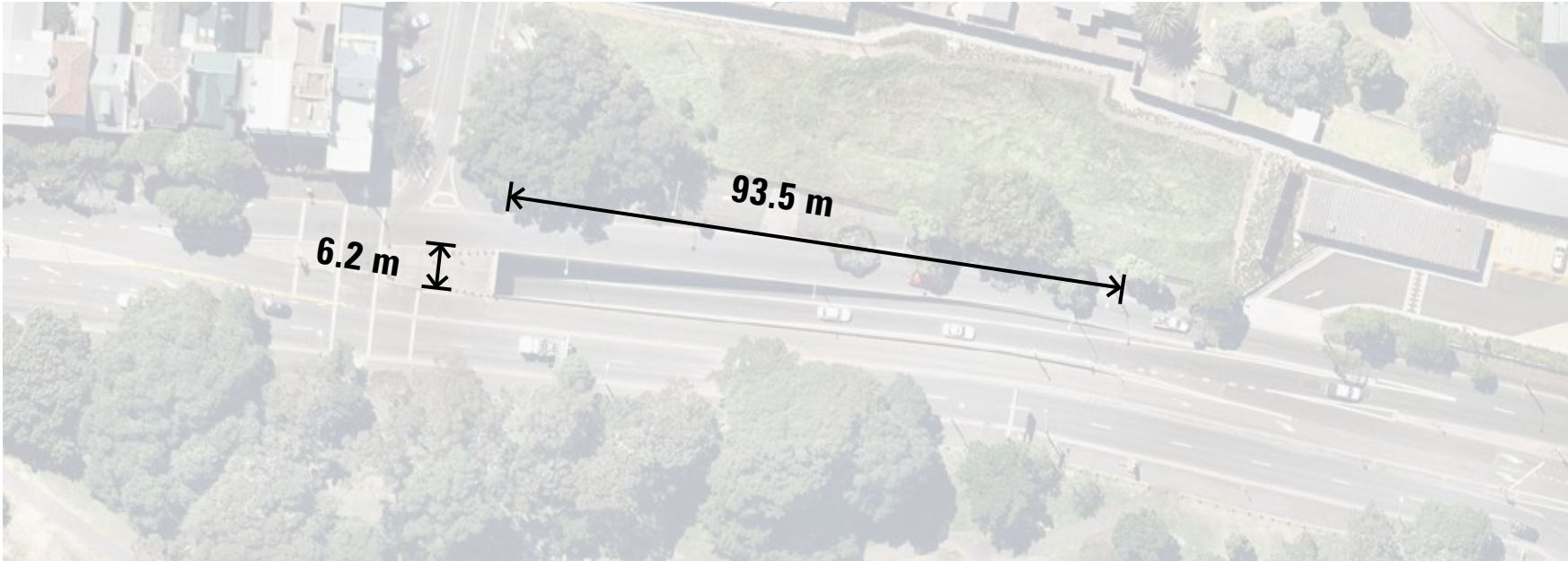


4.0
PRECEDENT:
EASTERN
DISTRIBUTOR
SYDNEY, AUS



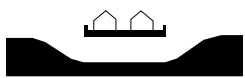
Program
Tunnel Exit Portal Ramp
Location
Moore Park Rd, Paddington
Year
2000
Size
93.5m (L) x 6.2m (W)

- TUNNEL EXIT SPEED - 60 Km/H
- LOCAL SPEED LIMIT - 50 Km/H
- CLEARANCE HEIGHT - 4.4 m
- RAMP GRADIENT - MODERATE



4.0

PRECEDENT:
EASTERN
DISTRIBUTOR
SYDNEY, AUS

**Program**

Tunnel Entrance Portal Ramp

Location

Flinders St, Darlinghurst

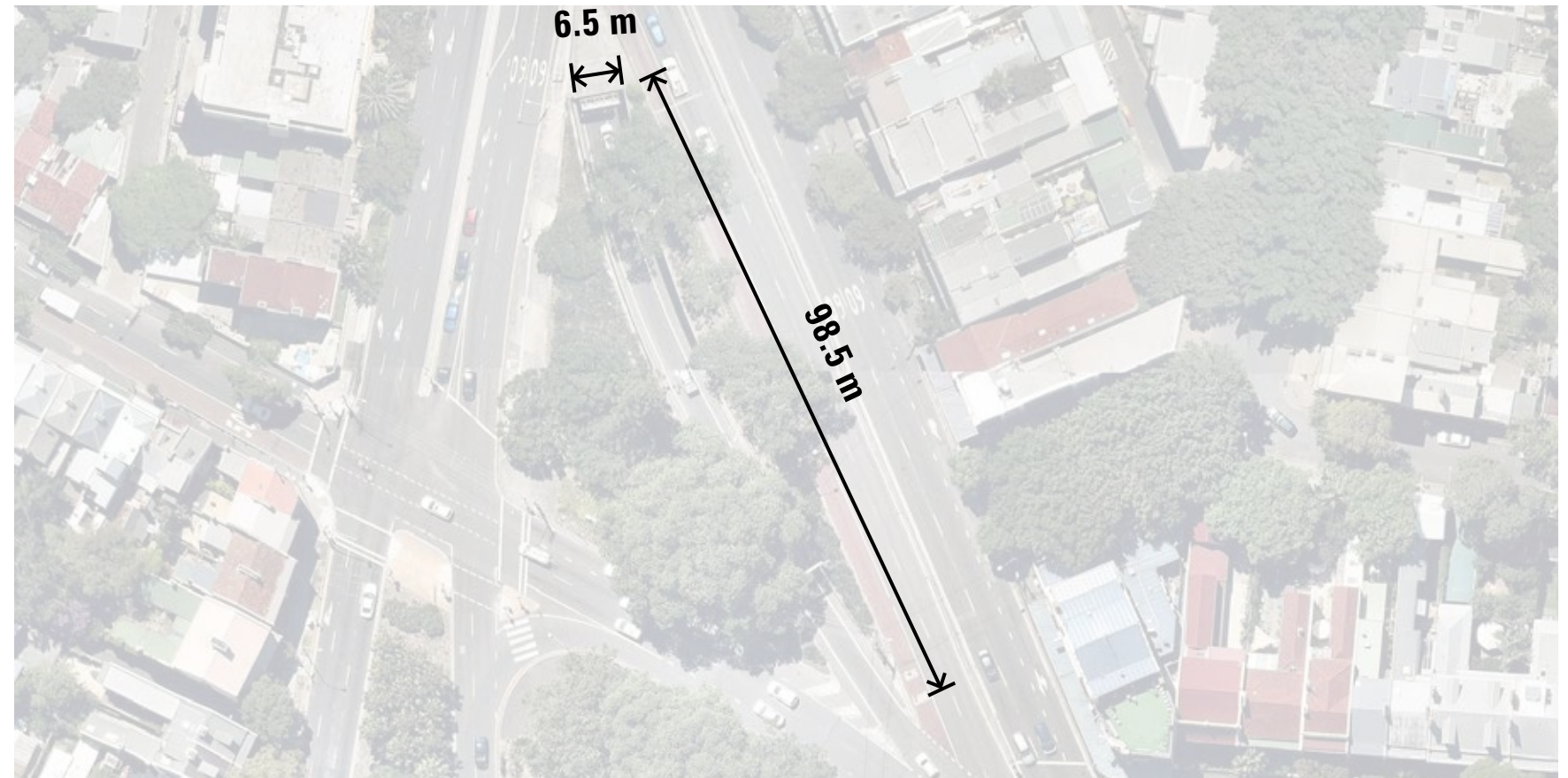
Year

2000

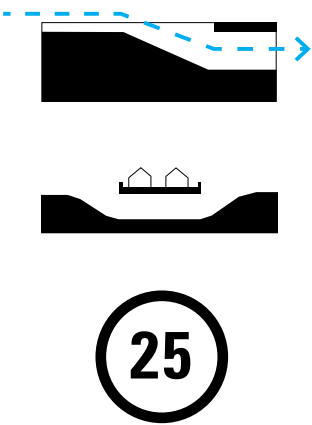
Size

98.5m (L) x 6.2m (W)

- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 60 Km/H
- CLEARANCE HEIGHT - 4.4 m
- RAMP GRADIENT - MODERATE

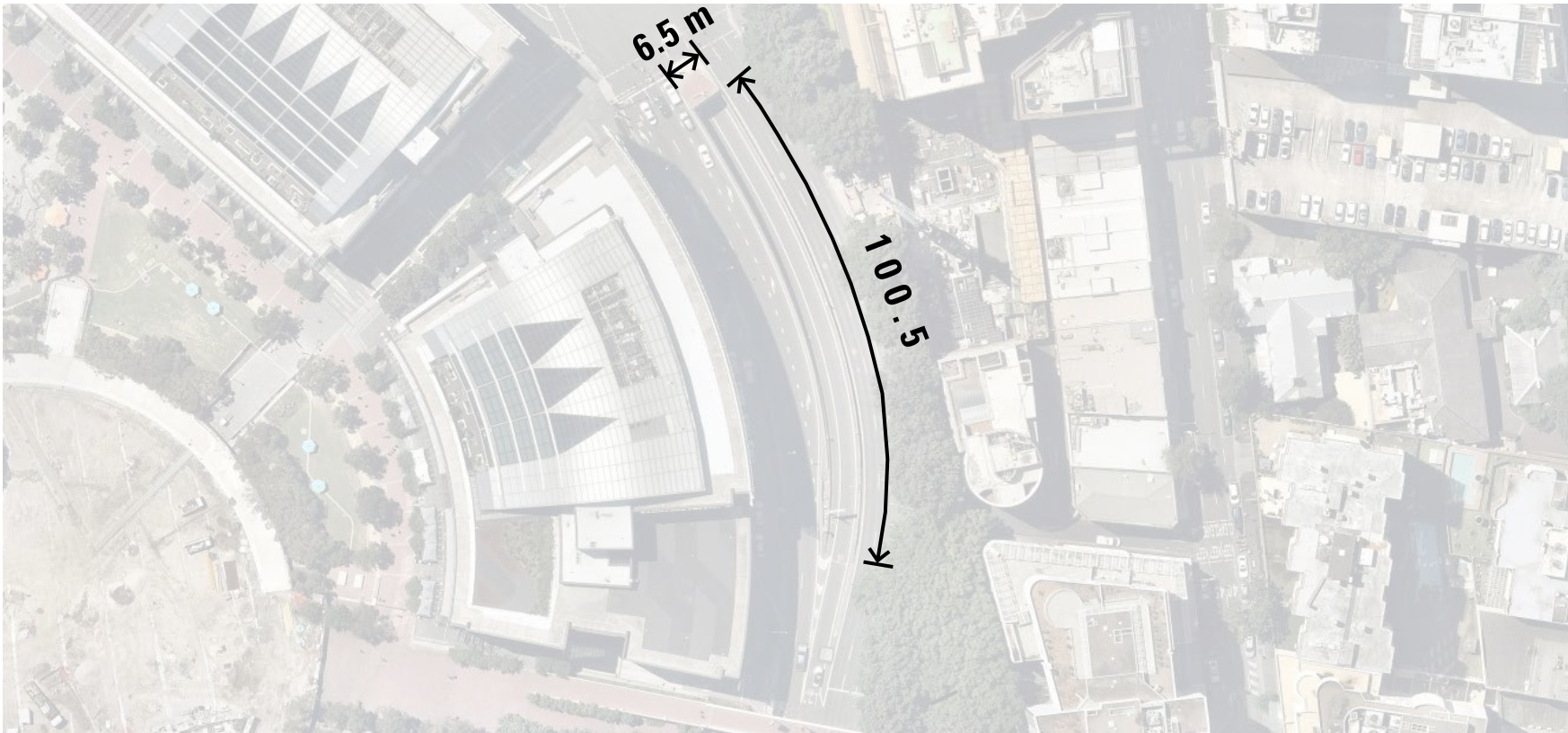


4.0
PRECEDENT:
CROSS CITY
TUNNEL
SYDNEY, AUS

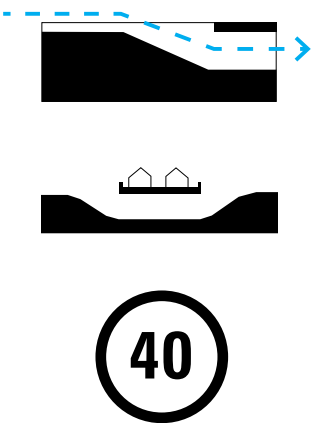


Program
Tunnel Entrance Portal Ramp
Location
Harbour St, Darling Harbour
Year
2000
Size
100.5 m (L) x 6.5m (W)

- TUNNEL ENTRANCE SPEED - 25 Km/H
- LOCAL SPEED LIMIT - 50 Km/H
- CLEARANCE HEIGHT - 4.4 m
- APPROX. GRADIENT - MODERATE

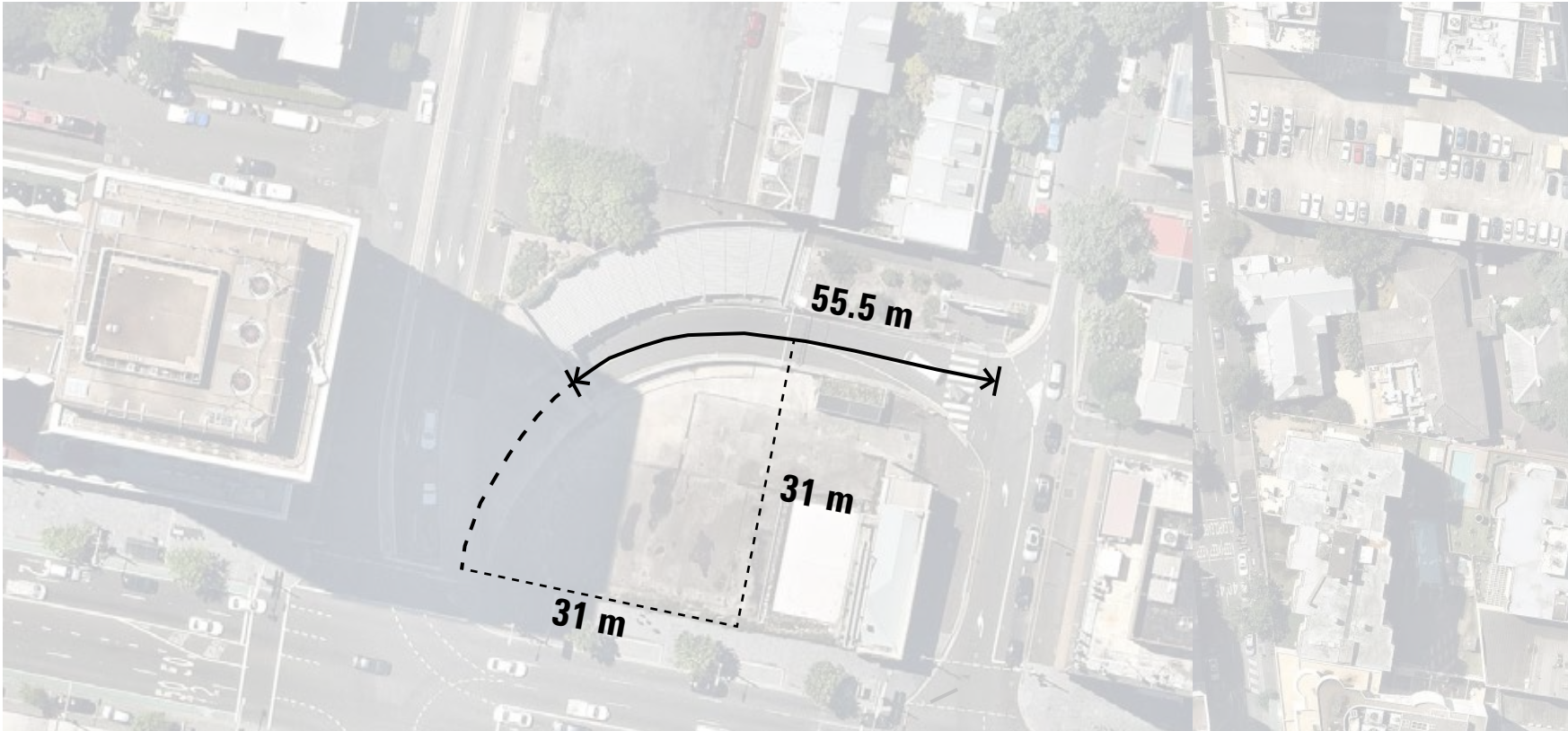


4.0
PRECEDENT:
CROSS CITY
TUNNEL
SYDNEY, AUS

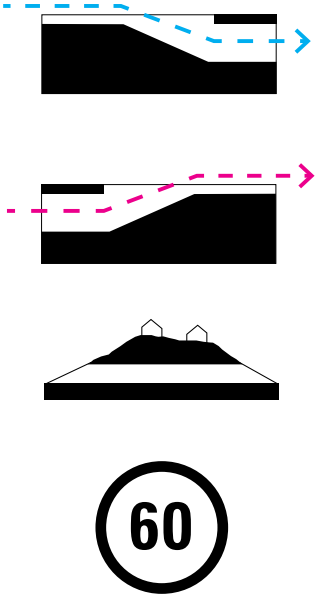


Program
Tunnel Entrance Portal Ramp
Location
Bourke St, Woolloomooloo
Year
2000

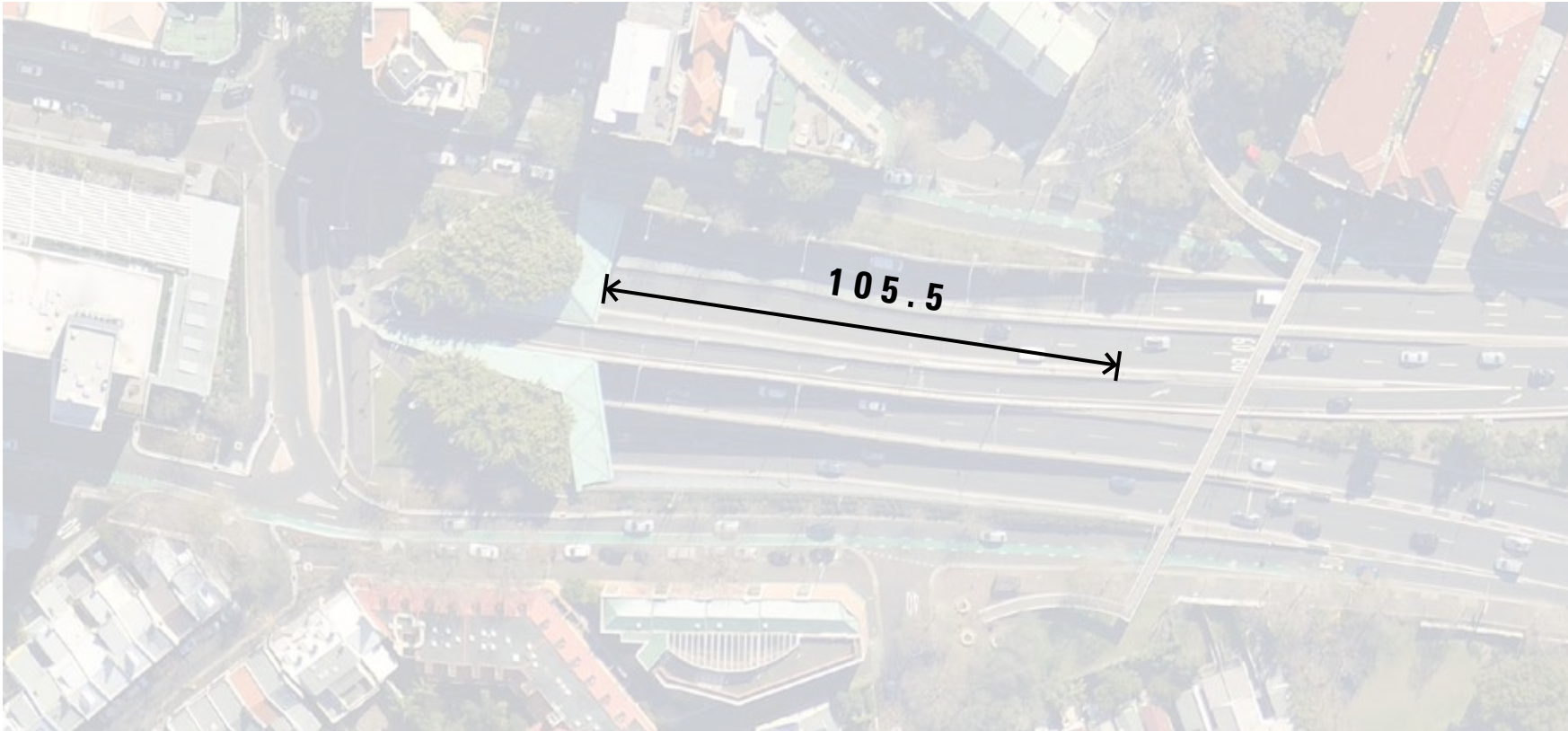
- TUNNEL ENTRANCE SPEED - 40 Km/H
- LOCAL SPEED LIMIT - 50 Km/H
- CLEARANCE HEIGHT - 4.4 m
- APPROX. GRADIENT - STEEP



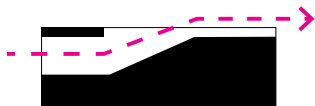
4.0
PRECEDENT:
CROSS CITY
TUNNEL
SYDNEY, AUS



- Program**
Tunnel Entrance Portal Ramp
- Location**
William St, Rushcutters Bay
- Year**
2000
- Size**
105.5m (L) x 18.5m (W)
- TUNNEL ENTRANCE SPEED - 60 Km/H
 - LOCAL SPEED LIMIT - 60 Km/H
 - CLEARANCE HEIGHT - 4.4 m
 - APPROX. GRADIENT - GENTLE

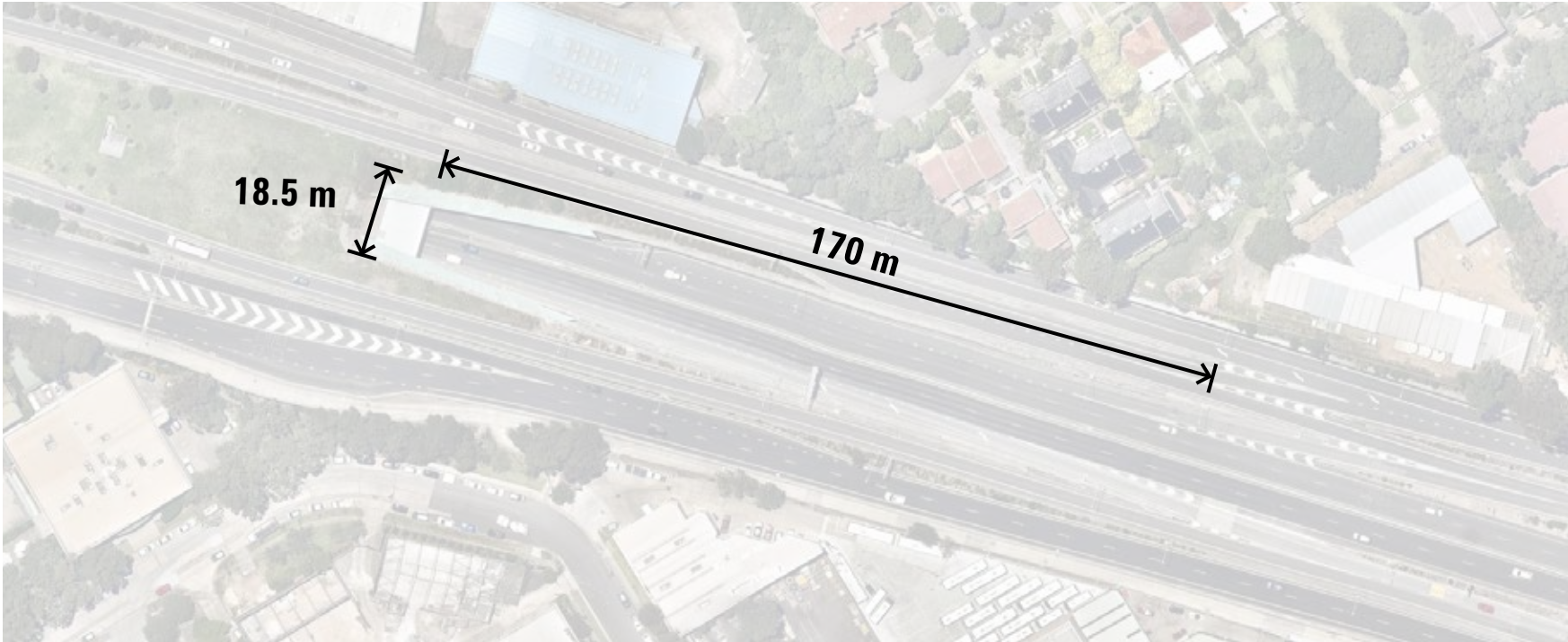


4.0
PRECEDENT:
LANE COVE
TUNNEL
SYDNEY, AUS

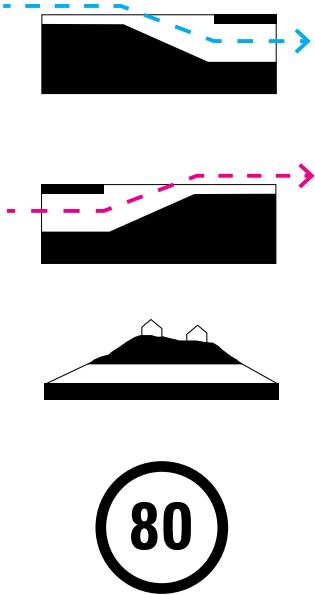


Program
Tunnel Entrance/Exit Portal & Ramp
Location
M2 Hills Motorway, Lane Cove
Year
2007
Size
170m (L) x 18.5m (W)

- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 80 Km/H
- CLEARANCE HEIGHT - 4.4 m
- GRADIENT - GENTLE

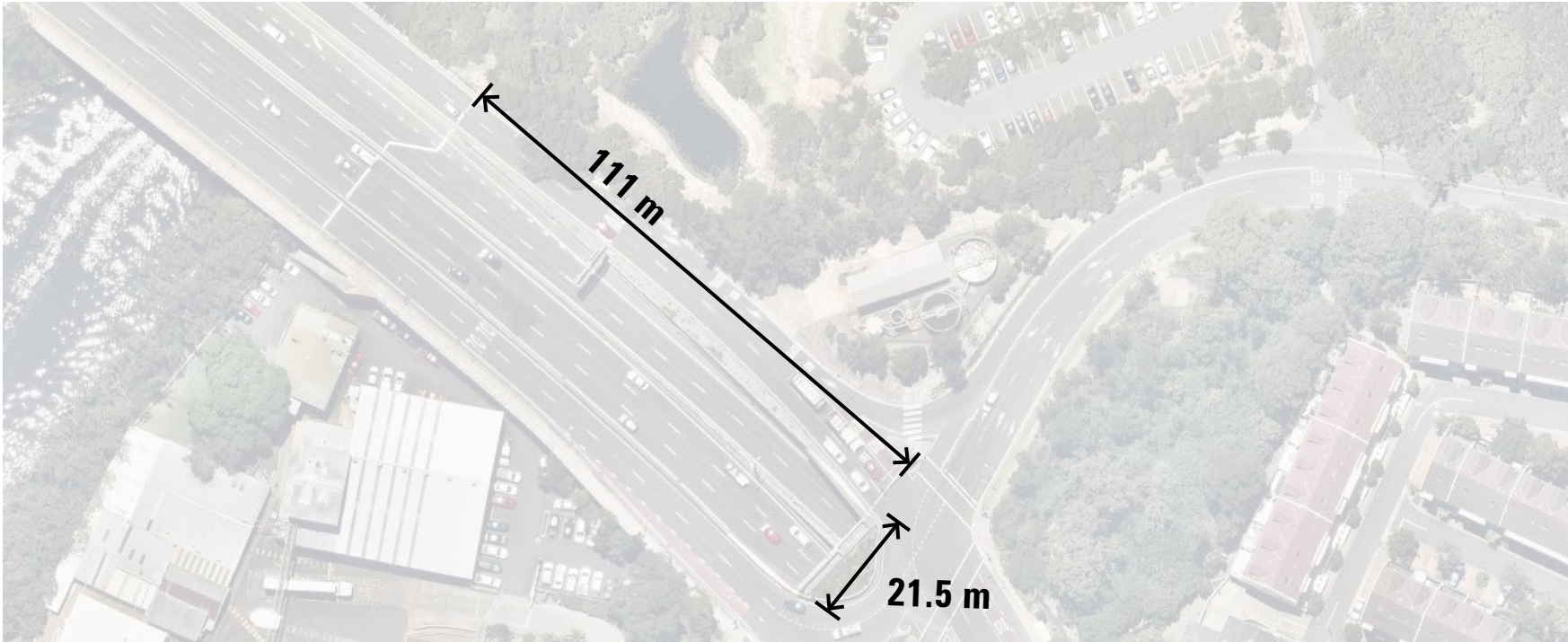


4.0
PRECEDENT:
LANE COVE
TUNNEL
SYDNEY, AUS

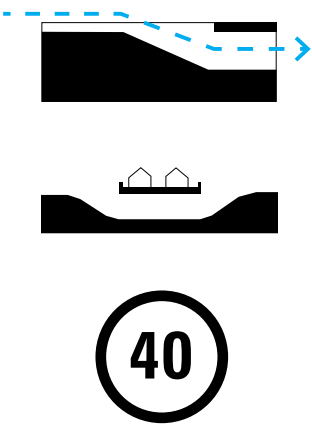


Program
Tunnel Entry/Exit Portal & Ramp
Location
M2 Hills Motorway, Lane Cove
Year
2007
Size
111m (L) x 21.5m (W)

- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 80 Km/H
- CLEARANCE HEIGHT - 5 m
- GRADIENT - GENTLE

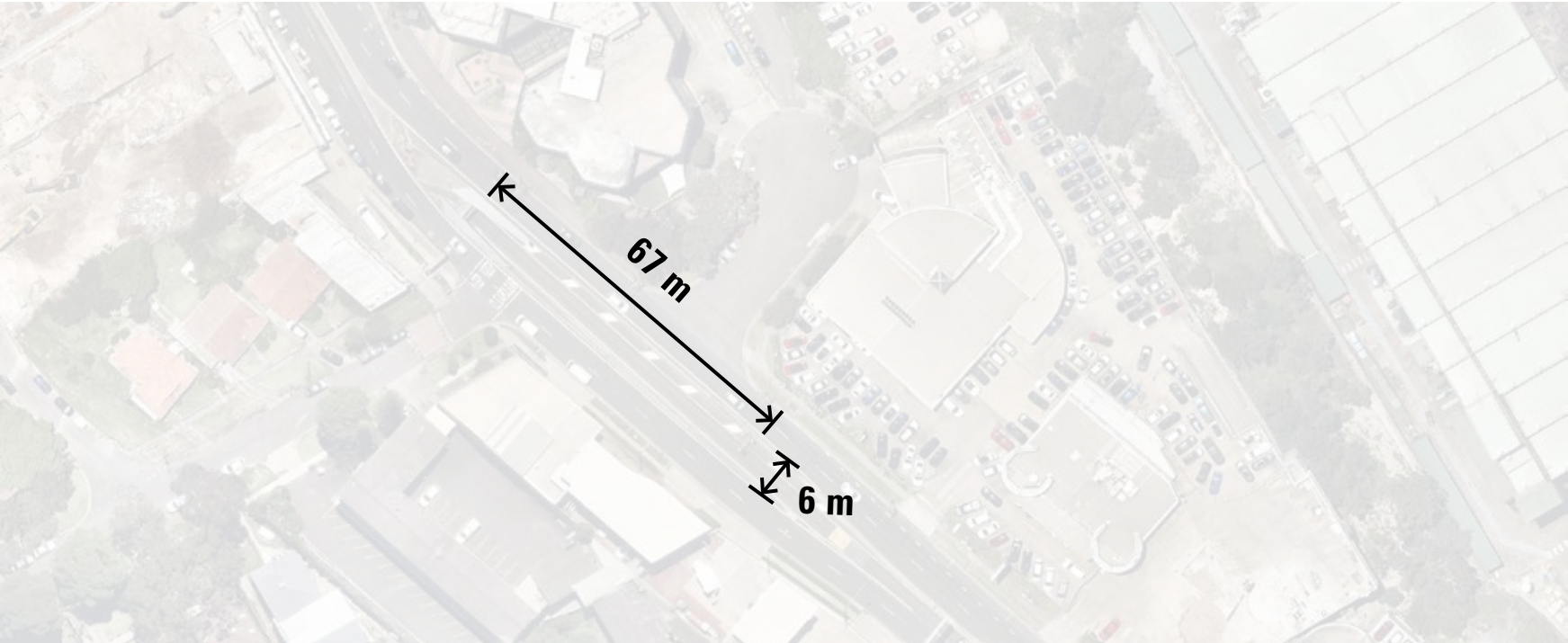


4.0
PRECEDENT:
LANE COVE
TUNNEL
SYDNEY, AUS

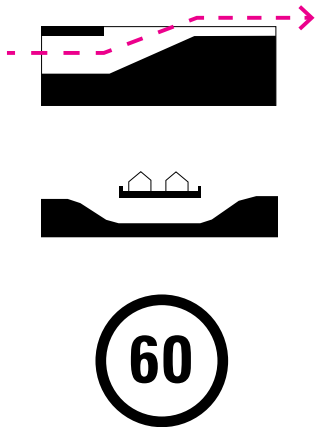


Program
Tunnel Entrance Portal & Ramp
Location
Pacific Hwy, St Leonards
Year
2007
Size
67m (L) x 6m (W)

- TUNNEL ENTRANCE SPEED - 40 Km/H
- LOCAL SPEED LIMIT - 60 Km/H
- CLEARANCE HEIGHT - 5 m
- GRADIENT - STEEP SLOPE

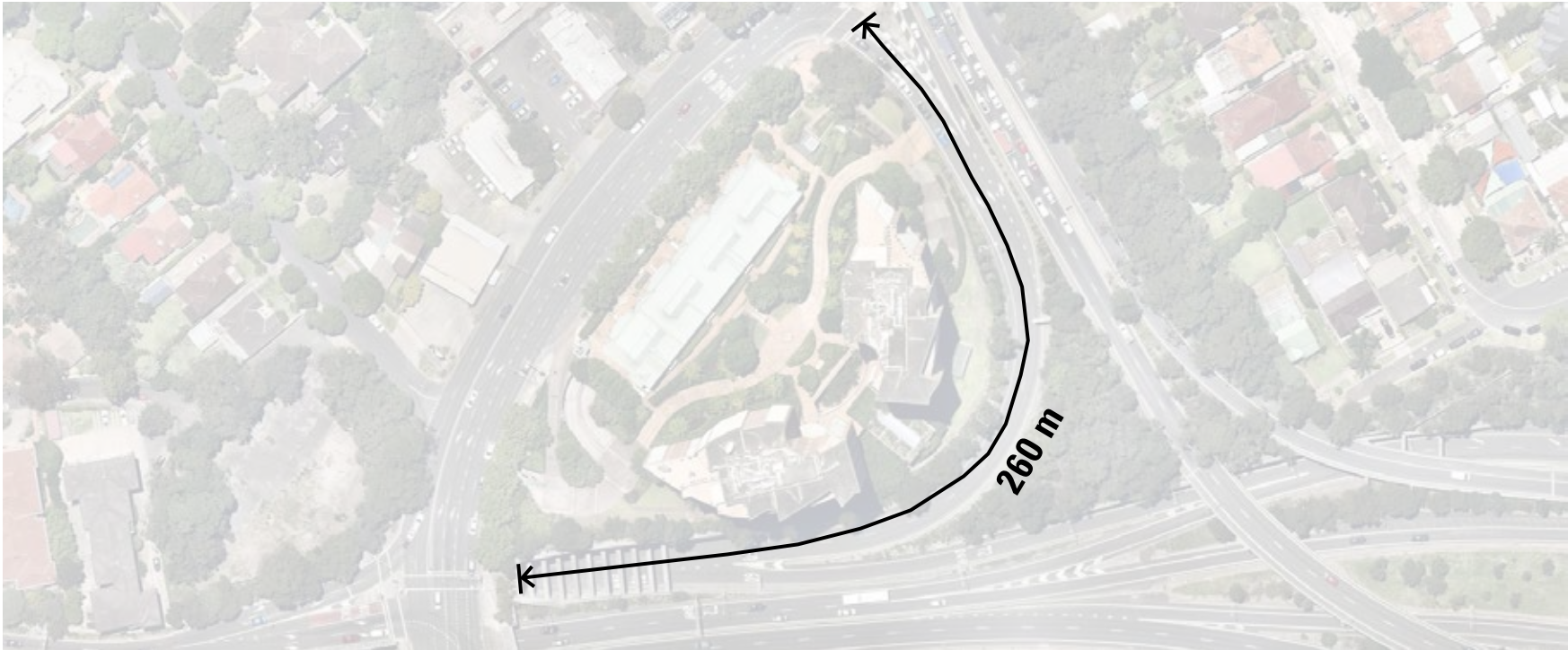


4.0
PRECEDENT:
LANE COVE
TUNNEL
SYDNEY, AUS

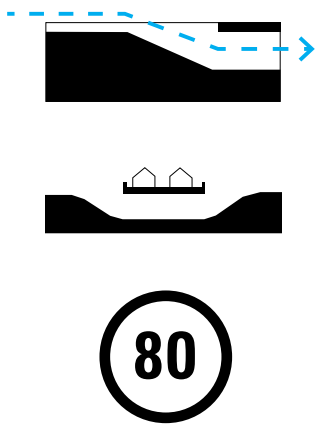


Program
Tunnel Entrance Portal & Ramp
Location
Pacific Hwy, St Leonards
Year
2007
Size
260m (L) x 11m (W)

- TUNNEL EXIT SPEED - 60 Km/H
- LOCAL SPEED LIMIT - 60 Km/H
- CLEARANCE HEIGHT - 4.4 m
- GRADIENT - MODERATE

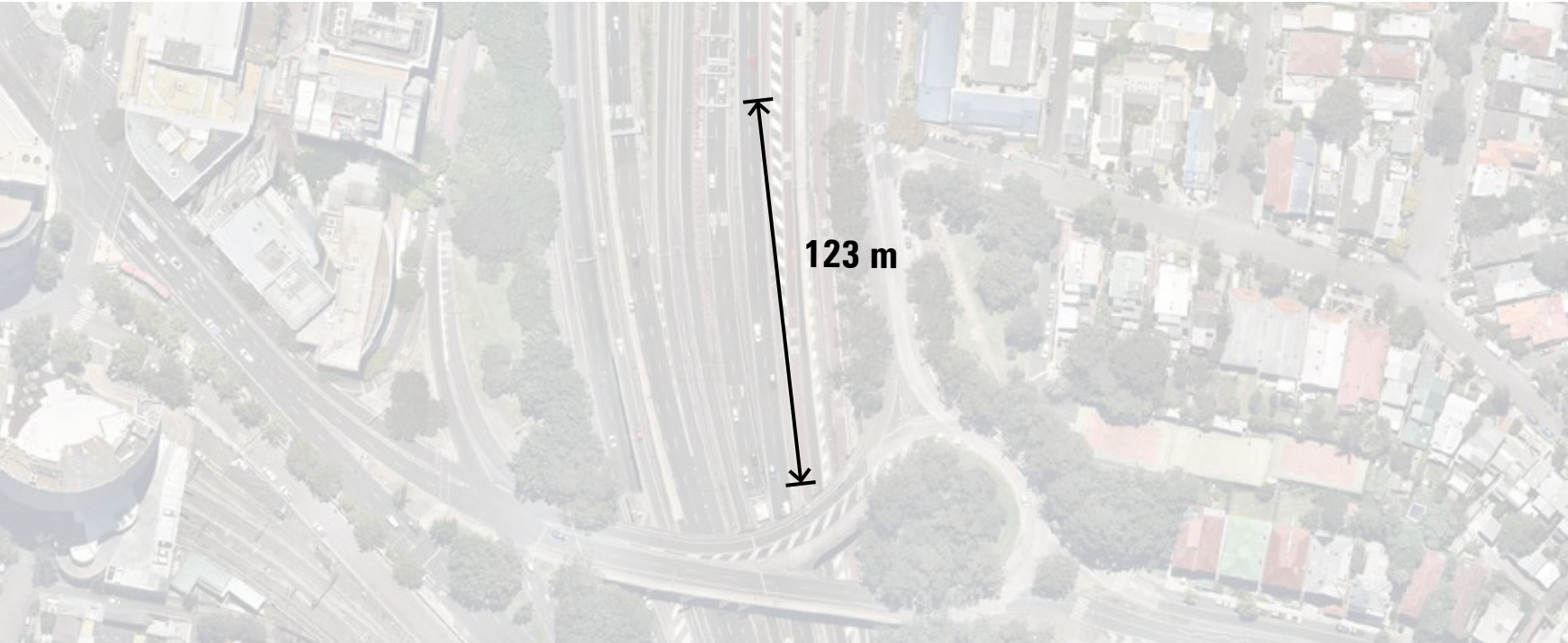


4.0
PRECEDENT:
SYDNEY HARBOUR
TUNNEL
SYDNEY, AUS

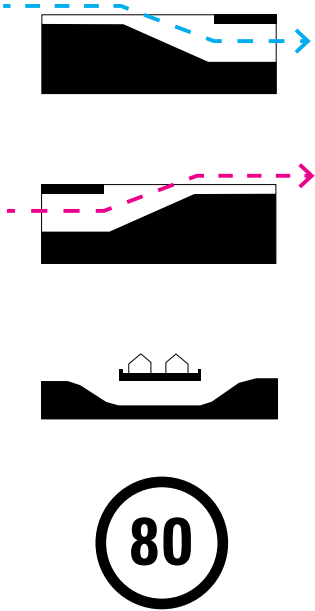


Program
Tunnel Entrance Portal & Ramp
Location
Bradfield Hwy, North Sydney
Year
1992
Size
123m (L) x 7.5m (W)

- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 80 Km/H
- CLEARANCE HEIGHT - 4.4 m
- GRADIENT - GENTLE



4.0
PRECEDENT:
SYDNEY HARBOUR
TUNNEL
SYDNEY, AUS

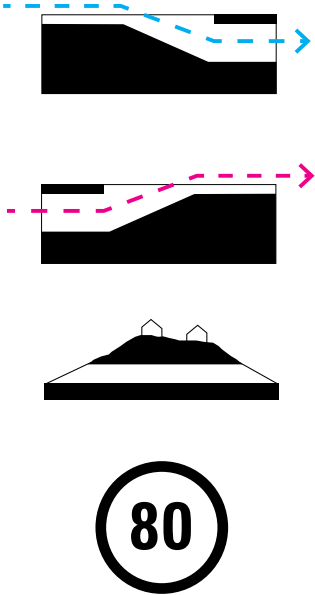


Program
Tunnel Entrance Portal & Ramp
Location
Bradfield Hwy, North Sydney
Year
1992

- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 80 Km/H
- CLEARANCE HEIGHT - 4.4 m
- GRADIENT - GENTLE



4.0
PRECEDENT:
CLEM 7
TUNNEL
BRISBANE, AUS

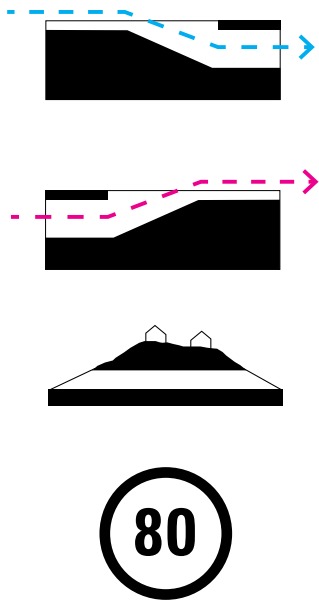


Program
Tunnel Entry/Exit Portal & Ramp
Location
M7 - Clem 7, Herston
Year
2010

- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 80 Km/H
- CLEARANCE HEIGHT - 4.4 m
- GRADIENT - ON GRADE



4.0
PRECEDENT:
LEGACY WAY TUNNEL
TUNNEL
BRISBANE, AUS

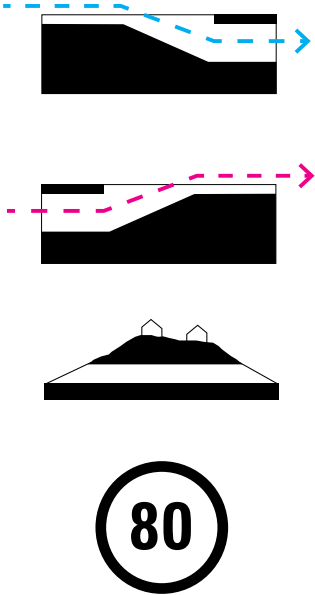


Program
Tunnel Entry/Exit Portal & Ramp
Location
Legacy Way Tunnel, Taringa
Year
2015

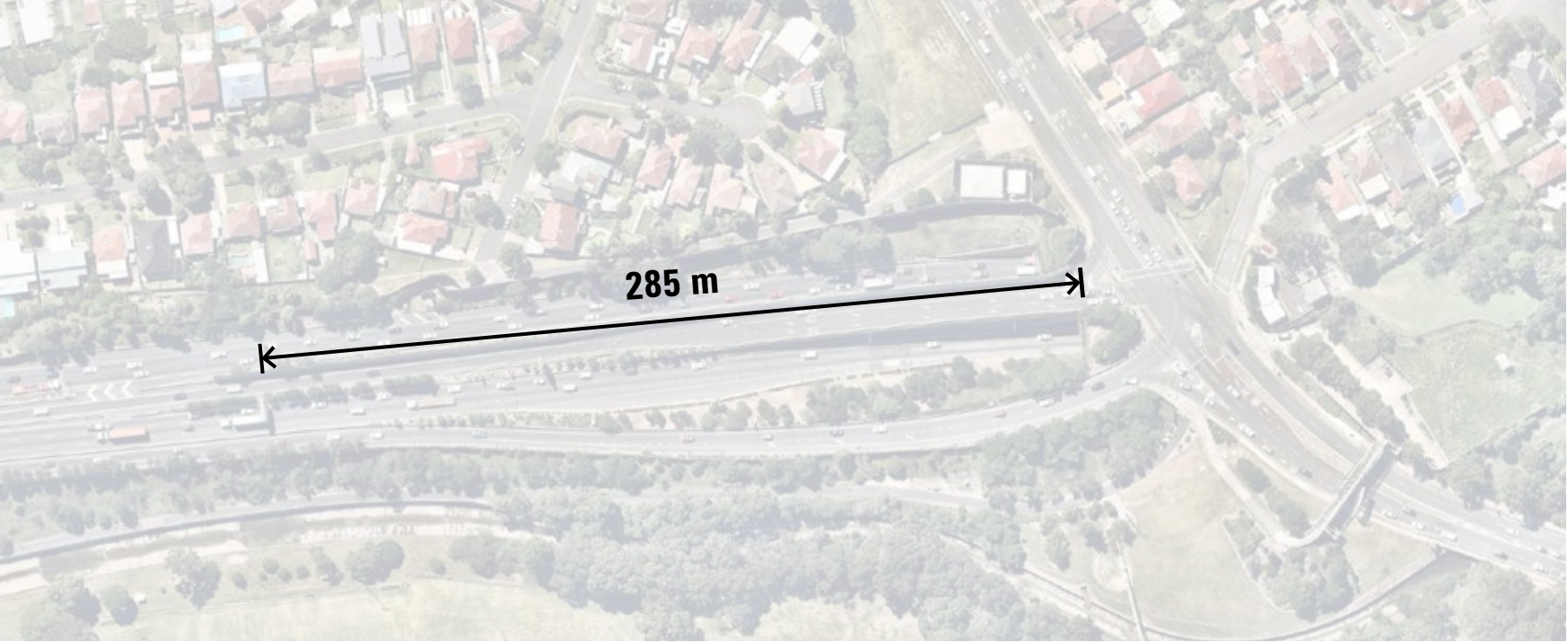
- TUNNEL ENTRANCE SPEED - 80 Km/H
- LOCAL SPEED LIMIT - 80 Km/H
- CLEARANCE HEIGHT - 4.4 m
- GRADIENT - ON GRADE



4.0
PRECEDENT:
M5 EAST
TUNNEL
SYDNEY, AUS



- Program**
Tunnel Entry/Exit Portal & Ramp
- Location**
M5 East, Wolli Creek
- Year**
2000
- Size**
285m (L)
- TUNNEL ENTRY/EXIT SPEED - 80 Km/H
 - LOCAL SPEED LIMIT - 80 Km/H
 - CLEARANCE HEIGHT - 4.4 m
 - GRADIENT - GENTLE



PORTAL DESIGN REVIEW - PART 2

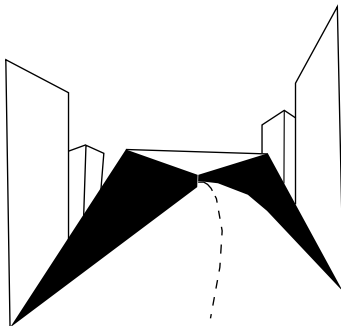
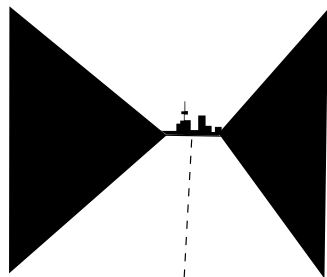
QUALITATIVE REVIEW



5.1
PORTAL DESIGN:
THRESHOLD

While tunnel portal design is largely the result of strict controls relating to speed and volume of traffic, the articulation of these structures has historical and symbolic value. City boundaries are often marked with gateways, describing a transition from one context to another. In this sense the following review is not limited to only tunnel portals, but also various articulations which define this threshold.

The following review attempts to gather a wide variety of strategies which define this threshold condition.



ARRIVAL

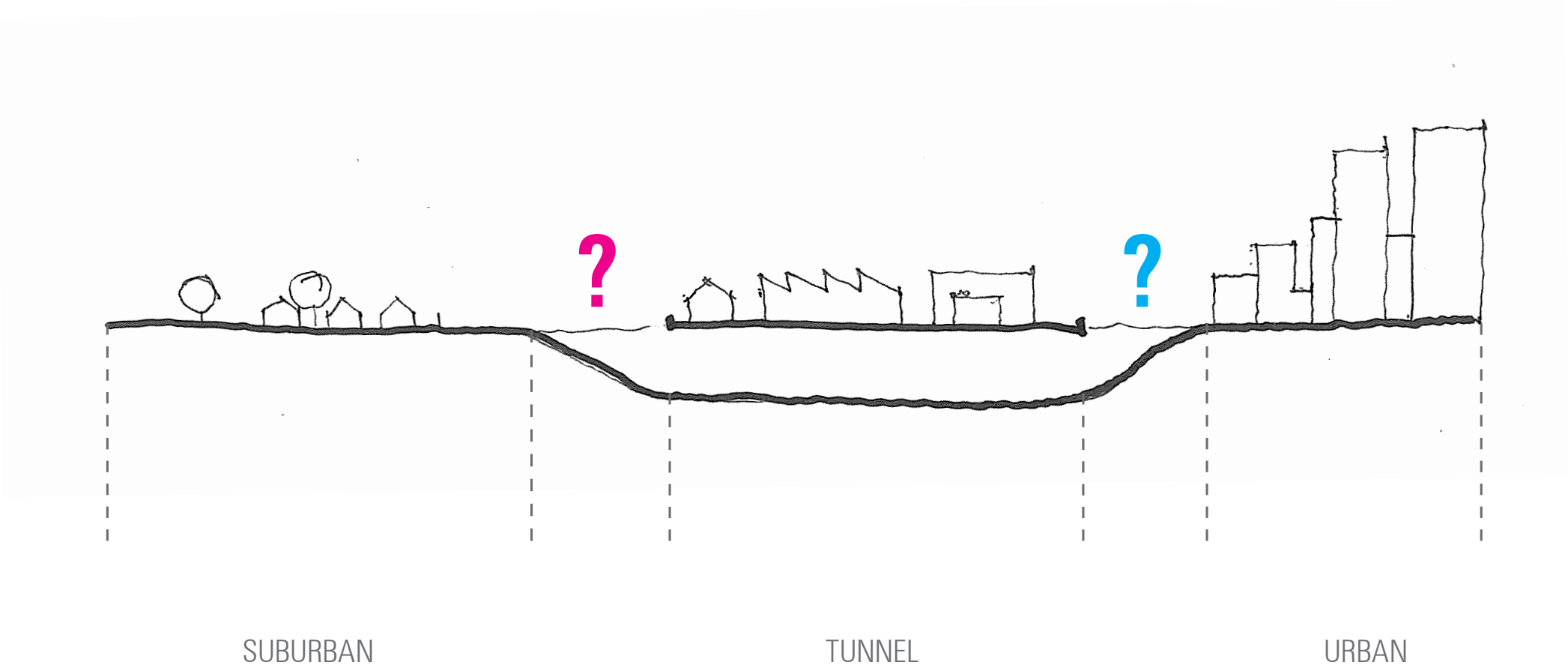


DEPARTURE

5.2
PORTAL DESIGN:
CONTEXTUAL
CONDITIONS

The nature of tunnel design requires engagement with two or more specific contexts at entry and exit points. These two conditions can be radically different to each other by virtue of their surroundings.

Two trends emerge in the following case studies which deal with how to mark these thresholds. The first is a unified expression which treats the tunnel experience at the entry and exit with the same expression, often as an extension of the tunnel. An alternative approach is to use the portal design as a response to its local context.



5.3
PORTAL DESIGN:
ENTRY/EXIT EXPERIENCE
& TREATMENT

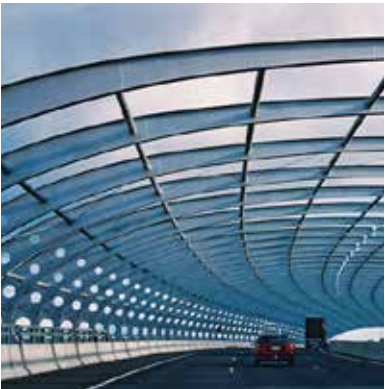
The treatment of portals varies greatly. Historically, the portal acts as a threshold to the city, a marker which delineates suburban with urban. Whether entering or exiting the tunnel, one is required to depart and arrive from their point of origin. As such, tunnel portals can often be suggestive of embracing the motorist on arrival, and releasing on departure.

This often has symbolic as well as practical reasons. When exiting the tunnel, the abrupt change in light conditions is often mediated by the gradual transition from tunnel to open roadway. Likewise, on entering, colours and form can be used as way-finding devices for the motorist.



6.0
VISUAL SUMMARY:
TUNNEL PORTALS

Adjacent is a local and international summary of portal designs in its various stylistic and historical forms.



1



2



3



4



5



6

- 1. CITY LINK GATEWAY. MELBOURNE
- 2. CRAGIEBURN BYPASS. MELBOURNE
- 3. WATERVIEW CONNECTION. NZ
- 4. PENINSULA LINK. MELBOURNE
- 5. TUGON BYPASS. BRISBANE
- 6. AIRPORT LINK. BRISBANE
- 7. CLEM 7. BRISBANE
- 8. LANE COVE TUNNEL. SYDNEY
- 9. VEDEGGIO CASSARATE. SWITZERLAND
- 10. FIGUEROA ST TUNNEL. USA
- 11. SAN PANCRAZIO TUNNEL. ITALY
- 12. TRANSJURANNE. SWITZERLAND
- 13. TRANSJURANNE. SWITZERLAND
- 14. TRANSJURANNE. SWITZERLAND
- 15. CROSS CITY TUNNEL. SYDNEY
- 16. MIAMI PORT TUNNEL. USA
- 17. EASTERN DISTRIBUTOR. SYDNEY
- 18. EASTLINK, MELBOURNE. 2014



7



8



9



10



11



12



13



14



15



16



17

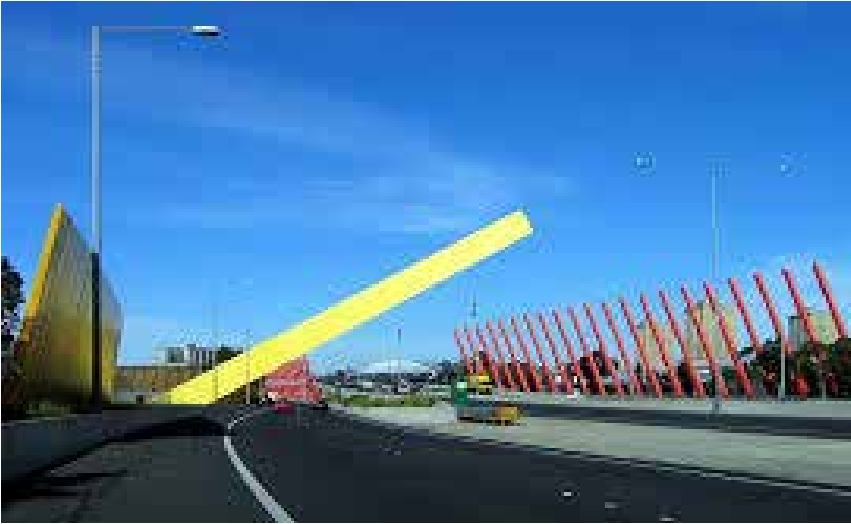


18

7.0
PRECEDENT:
CITY LINK GATEWAY
MELBOURNE, AUS

Program
Entrance Portals
Architect
DCM
Year
1996

- + VE COLLECTIVE ENSEMBLE OF STRUCTURES WHICH UTILISES THE NATURE OF SPEED AND PERSPECTIVE AS AN ELEMENT OF COMPOSITION.
- + VE FRAMED PORTAL STRUCTURE EMPHASISES THE EXPERIENCE OF 'EXIT/ARRIVAL'



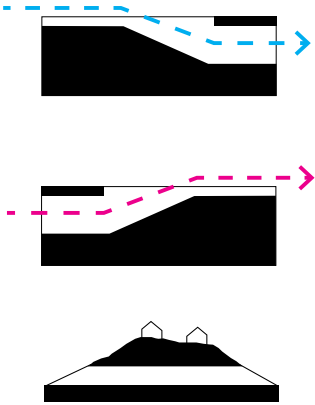
7.0
PRECEDENT:
CRAGIEBURN BYPASS
MELBOURNE, AUS

Program
Pedestrian Bridge & Sound Walls
Architect
TZG & TCL
Year
2014

- + VE COLLECTIVE ENSEMBLE OF STRUCTURES WHICH UTILISES THE NATURE OF SPEED AND PERSPECTIVE AS AN ELEMENT OF COMPOSITION.
- + VE ROBUST MATERIALITY AND SUBTLE ARTICULATION SOFTEN THE STRUCTURE IN THE LANDSCAPE.



7.0
PRECEDENT:
EAST LINK
MELBOURNE, AUS



Program
Ventilation Facility
Architect
Wood Marsh
Year
2014

- +VE INTEGRATED VENTILATION FACILITY WITH TUNNEL PORTAL. MINIMISES IMPACT ON SURROUNDING RESIDENTIAL AREA. REDUCES PERCEPTION OF EXHAUST TOWER.
- +VE GRAPHIC OVERLAY PROVIDES RELIEF FROM SCALE OF TOWER.



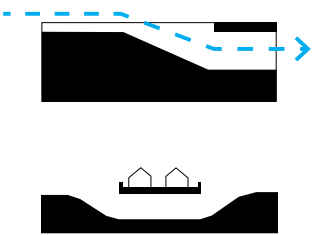
7.0
PRECEDENT:
PENINSULA LINK
MELBOURNE, AUS

Program
Sound Wall & Freeway Threshold
Architect
Wood Marsh
Year
2013

- + VE SIMPLE BOLD GEOMETRY AND COLOUR IS IMPLEMENTED TO MAKE USE OF LIGHT AND SHADOW AT SPEED.
- + VE REFERENCES TO SUBURBAN VERNACULAR ASSISTS IN CREATING A PLACE MARKER FOR THE MOTORWAY.



7.0
PRECEDENT:
LANE COVE
TUNNEL
SYDNEY, AUS

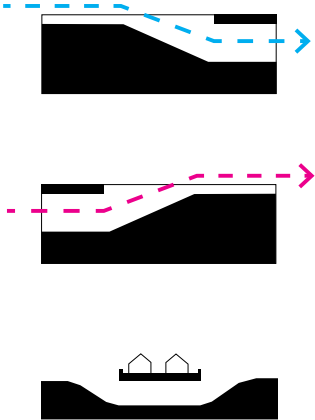


Program
Tunnel Pacific Hwy Entrance Portal & Ramp
Architect
KI Studio
Year
2003

- + VE SHORT RAMP LENGTH & DISCREET ARTICULATION OF ENTRANCE MINIMISES VISUAL IMPACT.
- + VE POSITIONING RAMP IN CENTRAL LANE MINIMISES IMPACT ON PEDESTRIAN MOVEMENT .
- VE DESIGN MISSES OPPORTUNITY TO MARK SENSE OF PLACE WHEN ENTERING TUNNEL.



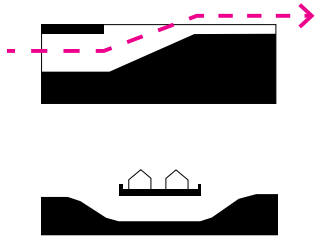
7.0
PRECEDENT:
LANE COVE
TUNNEL
SYDNEY, AUS



- Program**
Tunnel Entrance/Exit Portal & Ramp
- Architect**
KI Studio
- Year**
2003
- +VE COLLECTIVE ENSEMBLE OF STRUCTURES WHICH IS IMPLEMENTED ACROSS ALL PORTALS ADDING TO A SENSE OF LEGIBILITY.
- VE DESIGN MISSES OPPORTUNITY TO MARK SENSE OF PLACE WHEN ENTERING TUNNEL.



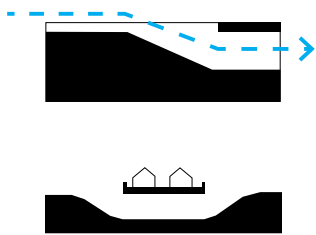
7.0
PRECEDENT:
LANE COVE TUNNEL
SYDNEY, AUS



- Program**
Tunnel Exit Portal Ramp
- Architect**
KI Studio
- Year**
2003
- + VE ROBUST MATERIALITY
- + VE USE OF BEAM STRUCTURE ABOVE RAMP ENTRY PROVIDES GRADUAL TRANSITION BETWEEN DARK TUNNEL EXPERIENCE AND NATURAL LIGHT OF ROAD NETWORK.
- VE DESIGN MISSES OPPORTUNITY TO MARK SENSE OF PLACE WHEN ENTERING TUNNEL.



7.0
PRECEDENT:
CROSS CITY
TUNNEL
SYDNEY, AUS

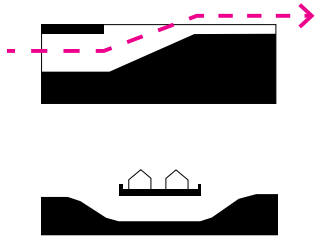


Program
Tunnel Entrance Portal Ramp
Architect
Hassell
Year
2005

- +VE DISCREET ARTICULATION OF ENTRANCE
MINIMISES VISUAL IMPACT.
- +VE POSITIONING RAMP IN CENTRAL
LANE MINIMISES IMPACT ON PEDESTRIAN
MOVEMENT .
- VE DESIGN MISSES OPPORTUNITY TO MARK
SENSE OF PLACE WHEN ENTERING TUNNEL.



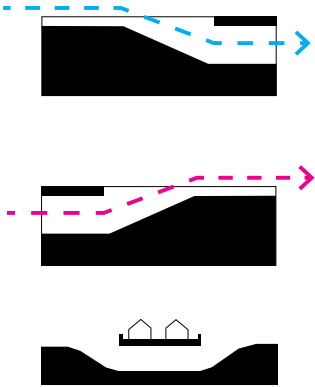
7.0
PRECEDENT:
EASTERN
DISTRIBUTOR
SYDNEY, AUS



- Program**
Tunnel Exit Portal Ramp
Architect
Conybeare Morrison
Year
2000
- + VE DISCREET ARTICULATION OF ENTRANCE
MINIMISES VISUAL IMPACT.
- + VE POSITIONING RAMP IN CENTRAL
LANE MINIMISES IMPACT ON PEDESTRIAN
MOVEMENT .
- VE DESIGN MISSES OPPORTUNITY TO MARK
SENSE OF PLACE WHEN ENTERING TUNNEL.



7.0
PRECEDENT:
TUGON BYPASS TUNNEL
BRISBANE, AUS

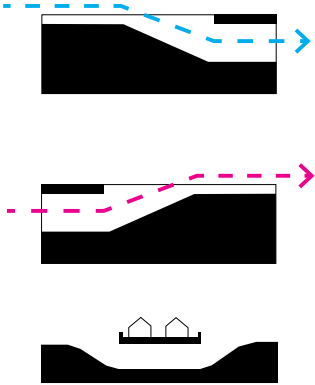


Program
Tunnel Entrance Portal
Year
2012

- +VE EXPRESSIVE FORM ASSISTS IN
TRANSITIONING MOTORIST FROM
TUNNEL ENVIRONMENT TO OPEN ROAD
NETWORK.
- +VE STRONG SCULPTURAL FORM ACTS AS
MEMORABLE PLACE MAKER FOR WAY-FINDING
AND LEGIBILITY.



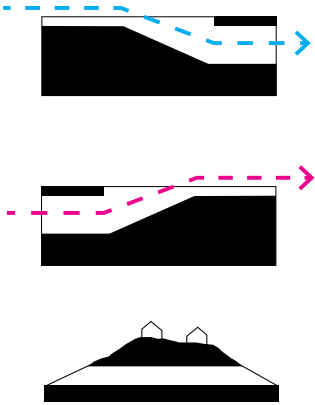
7.0
PRECEDENT:
AIRPORT LINK TUNNEL
BRISBANE, AUS



- Program**
Tunnel Entrance Portal
Architect
RPS Group
Year
2014
- + VE EMBRACING SCULPTURAL GESTURE UTILIZES
ROADS GEOMETRY TO GENERATE FORM.
+ VE INTEGRATION OF LANDSCAPE AND OPEN AREA
ADDS BENEFIT TO SURROUNDING COMMUNITY.
- VE TRANSITION OF SCALE FROM
MOTORWAY INFRASTRUCTURE TO
SURROUNDING RESIDENTIAL LACKING
MEDIATION



7.0
PRECEDENT:
WATERVIEW CONNECTION
AUCKLAND, NEW ZEALAND

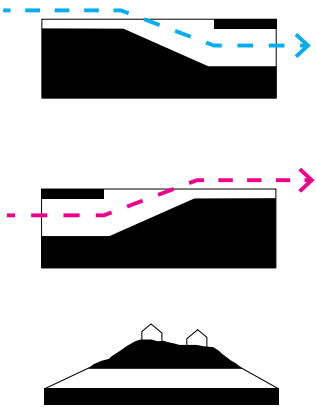


Program
Tunnel Entrance Portal & Vent Facility
Architect
Warren Mahoney
Year
Under Construction

- +VE INTEGRATED VENTILATION FACILITY WITH TUNNEL PORTAL. MINIMISES IMPACT ON SURROUNDING RESIDENTIAL AREAS. REDUCES PERCEPTION OF EXHAUST TOWER.
- +VE EXIT & ENTRY TUNNELS EACH HAVE DISTINCTIVE VISUAL RELIEF & ARTICULATION.
- +VE GOOD OPPORTUNITY FOR PLANTING BETWEEN TRAFFIC, PROVIDING FURTHER RELIEF.



7.0
PRECEDENT:
CLEM 7 TUNNEL
BRISBANE, AUS

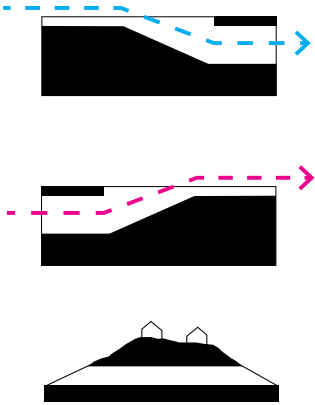


Program
Tunnel Entrance Portal
RPS Group
Year
2012

- +VE DISTINCTIVE CANOPY FORM CREATES MEMORABLE PLACE MARKER FOR MOTORIST.
- +VE CANOPY SHADING DEVICE HELPS TRANSITION LIGHT CONDITION FOR MOTORIST APPROACHING WESTERN SUN.



7.0
PRECEDENT:
VEDEGGIO CASSARATE
TUNNEL
LUGANO, SWITZERLAND

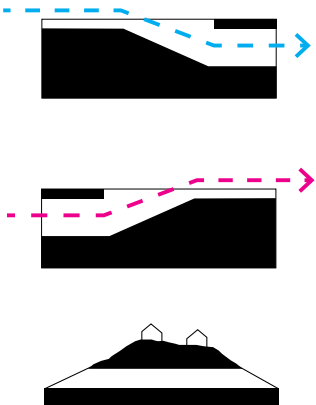


Program
Tunnel Entrance Portal
Architect
Cino Zucchi
Year
2012

- + VE SCULPTURAL FORM SUGGESTIVE OF EMBRACING MOTORIST ON JOURNEY FROM ONE CONTEXT TO ANOTHER.
- + VE SUBTLE ARTICULATION HELPS SOFTEN THE STRUCTURE IN THE LANDSCAPE.



7.0
PRECEDENT:
FIGUEROA STREET TUNNELS
LA, USA

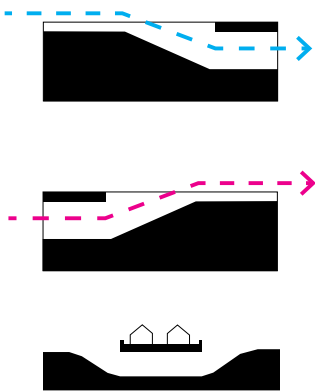


Program
Tunnel Entrance Portal
Architect
Unkown
Year
1931

- +VE FINELY DETAILED ART DECO MOTIF INTEGRATES WELL WITH SURROUNDING INFRASTRUCTURE.
- +VE PORTAL DESIGN TREATED AS BRIDGING ELEMENT, MINIMISING IMPACT ON THE LANDSCAPE AND POTENTIALLY CONNECTING EITHER SIDE OF THE MOTORWAY.



7.0
PRECEDENT:
OLYMPIC SCULPTURE PARK
SEATTLE, USA

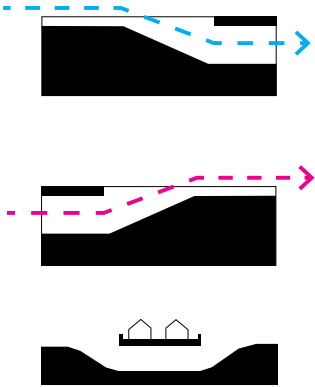


Program
Tunnel Entrance Portal & Sculpture Park
Architect
Weiss/Manfredi Architects
Year
2007

- +VE PORTAL DESIGN IS INTEGRATED INTO LARGER URBAN DESIGN ROLE OF BRIDGING DISCONNECTED PARTS OF THE CITY FOR THE PEDESTRIAN.
- +VE CONTINUOUS CONNECTION TO THE WATERFRONT IS PROVIDED BY MAKING USE OF A LARGE-SCALE URBAN DEVELOPMENT AS AN OPPORTUNITY TO CONNECT CITIES.

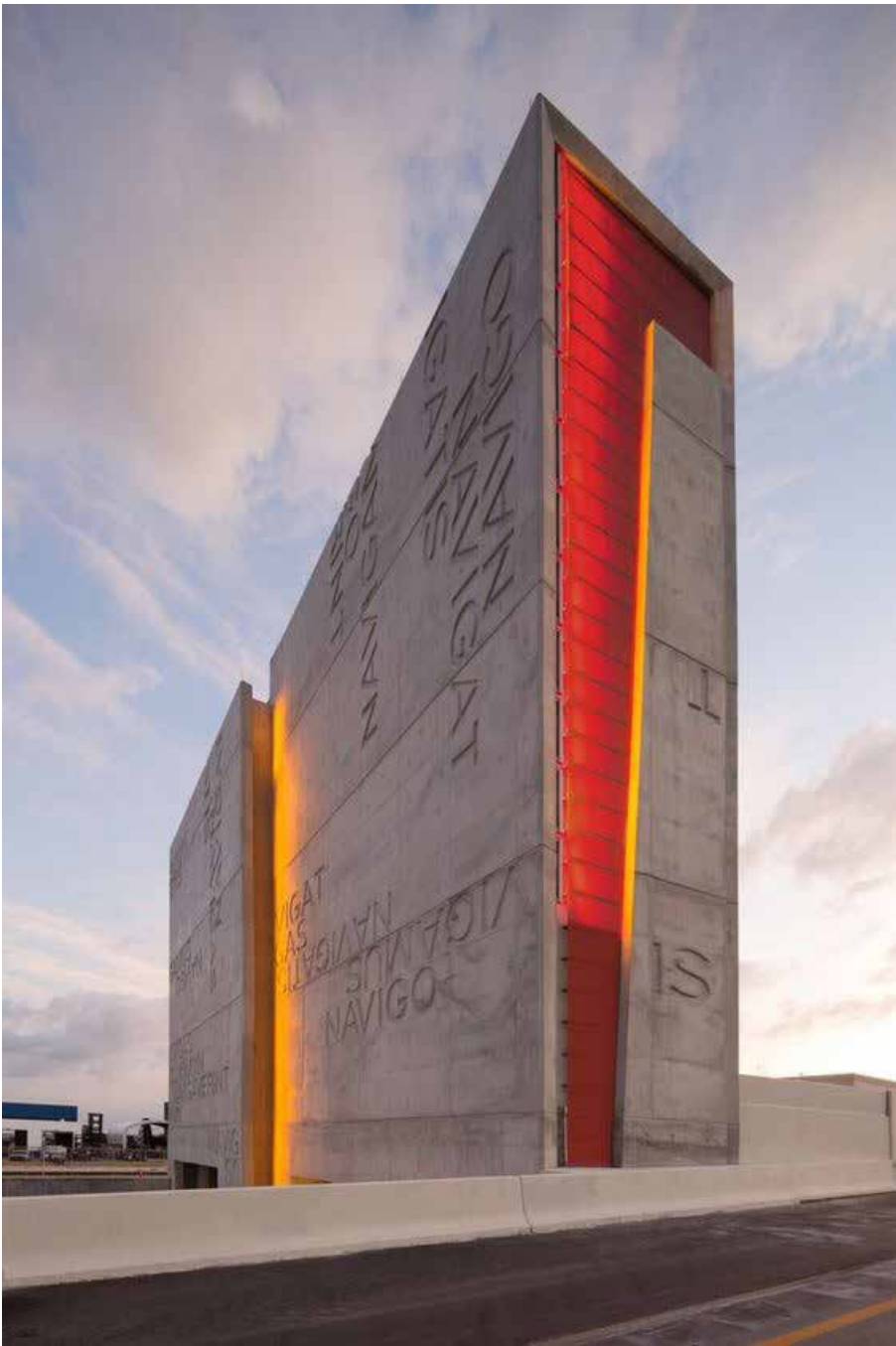


7.0
PRECEDENT:
MIAMI PORT TUNNEL

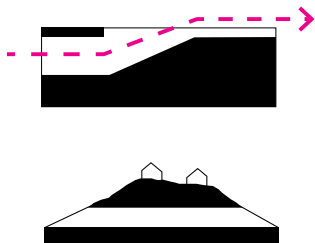


Program
Tunnel Entrance, Vent Shaft & Flood Gate
Architect
ArquitectonicaGEO
Year
2014

- +VE CLEAN INTEGRATED FORM ACTS AS BOTH PORTAL ENTRANCE TO TUNNEL & VENTILATION FACILITY.
- +VE ROBUST MATERIALITY.
- +VE ADDITION OF TEXT OVERLAY PROVIDES CULTURAL LAYER.



7.0
PRECEDENT:
SAN PANCRAZIO TUNNEL
ITALY

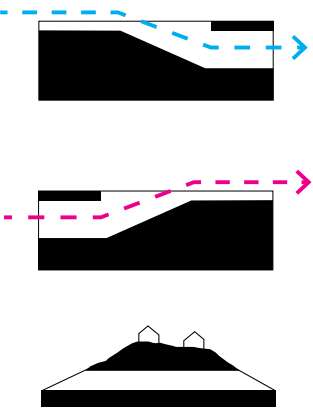


Program
Tunnel Entrance Portal
Architect
DISSING+WEITLING architecture
Year
Under Construction/Concept

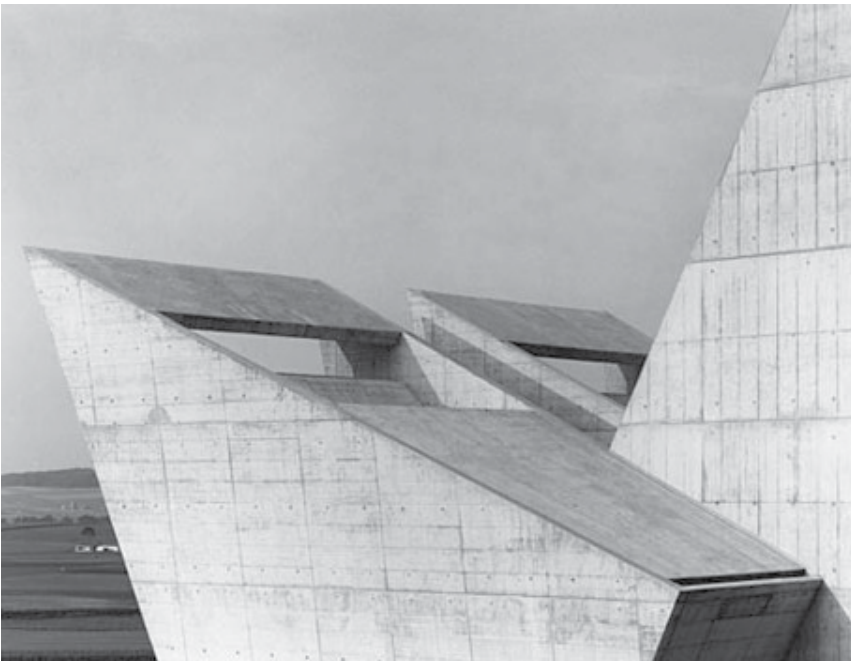
- +VE EXPRESSIVE FORM CELEBRATES THE ENGINEERING AND FUNCTIONALITY OF INFRASTRUCTURE
- +VE ROBUST MATERIALITY SUGGESTS PERMANENCE.
- +VE FORM OF THE TUNNEL USES SPEED AND MOVEMENT AS AN ELEMENT IN THE COMPOSITION, ALLOWING THE SCULPTURAL FORM TO BE READ DIFFERENTLY AT DIFFERENT SPEEDS AND VANTAGE POINTS.



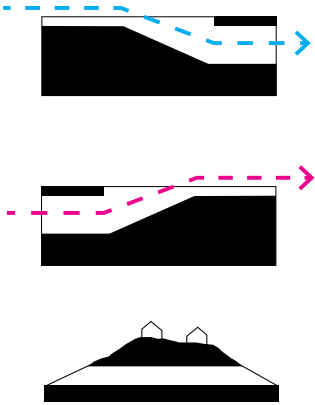
7.0
PRECEDENT:
TRANSJURANNE MOTORWAY
SECTION 4
LUGANO, SWITZERLAND



- Program**
Tunnel Entrance Portal & Ventilation Facility
- Architect**
Flora Ruchat
- Year**
1998
- +VE EXPRESSIVE FORM CELEBRATES THE ENGINEERING AND FUNCTIONALITY OF INFRASTRUCTURE
 - +VE ROBUST MATERIALITY SUGGESTS PERMANENCE.
 - +VE VENT FACILITY LOCATED IN CLOSE PROXIMITY TO PORTAL, MNIMISING IMPACT ON SURROUNDING LANDSCAPE SETTING.
 - +VE CONSISTENT FORMAL LANGUAGE OF SIMPLE VOLUMES IS REPEATED, PROVIDING A DISTINCTIVE MARKER IN THE MOTORISTS MEMORY.



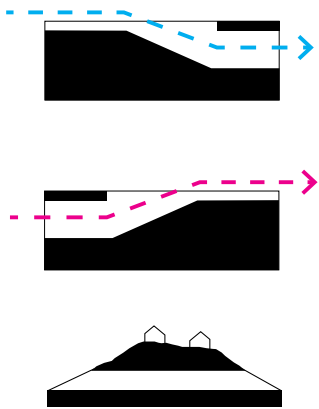
7.0
PRECEDENT:
TRANSJURANNE MOTORWAY
SECTION 4
LUGANO, SWITZERLAND



- Program**
Tunnel Entrance Portal & Ventilation Facility
- Architect**
Flora Ruchat
- Year**
1998
- +VE EXPRESSIVE FORM CELEBRATES THE ENGINEERING AND FUNCTIONALITY OF INFRASTRUCTURE
 - +VE ROBUST MATERIALITY SUGGESTS PERMANENCE.
 - +VE VENT FACILITY LOCATED IN CLOSE PROXIMITY TO PORTAL, MINIMISING IMPACT ON SURROUNDING LANDSCAPE SETTING.
 - +VE CONSISTENT FORMAL LANGUAGE OF SIMPLE VOLUMES IS REPEATED, PROVIDING A DISTINCTIVE MARKER IN THE MOTORISTS' MEMORY.



7.0
PRECEDENT:
TRANSJURANNE MOTORWAY
SECTION 3
LUGANO, SWITZERLAND



- Program**
Tunnel Entrance Portal & Ventilation Facility
- Architect**
Flora Ruchat
- Year**
1998
- +VE EXPRESSIVE FORM CELEBRATES THE ENGINEERING AND FUNCTIONALITY OF INFRASTRUCTURE
 - +VE ROBUST MATERIALITY SUGGESTS PERMANENCE.
 - +VE VENT FACILITY LOCATED IN CLOSE PROXIMITY TO PORTAL, MNIMISING IMPACT ON SURROUNDING LANDSCAPE SETTING.
 - +VE CONSISTENT FORMAL LANGUAGE OF SIMPLE VOLUMES IS REPEATED, PROVIDING A DISTINCTIVE MARKER IN THE MOTORISTS' MEMORY.



8.0

CONCLUSION

The Tunnel Portal design will play a key role in defining motorists experience of WestConnex Stage 3. While the structure is largely experienced by the motorist, the portals can also contribute to the nearby public domain.

Portal design evolves out of two conditions: topographical context in which the tunnel emerges; and the degree to which the threshold is celebrated or downplayed.

The design of portals are often seen as an opportunity to create a landmark, though they also have the ability to respond to their specific context and be simple and legible to the motorist.

The strategies to articulate the portals are often based upon the user experiencing them. In the case of the motorist, speed and perspective are equally important elements in the composition as materiality and colour. The structures are transient, often only in view for a matter of seconds. Conversely, the surrounding community experiences the portal at a much slower, pedestrian scale. This duality of experience must be carefully considered to ensure an integrated outcome is achieved.

On a larger scale, these portals typically apply a consistent architectural language at both the entry and exit points for the motorist. While this can provide a unified experience across the city, it can ignore the contextual surroundings in which it sits. By marking these points with distinctive, context driven design, the portals can begin to become way-finding markers and integrate more seamlessly with the local road and pedestrian networks.



ROZELLE



VIEW TOWARDS CITY FROM ROZELLE



CAMPERDOWN



SANDSTONE WALL, PARRAMATTA RD



ST. PETERS



SYDNEY PARK BRICK STACKS

Annexure 2 - Ventilation Facility Design Review

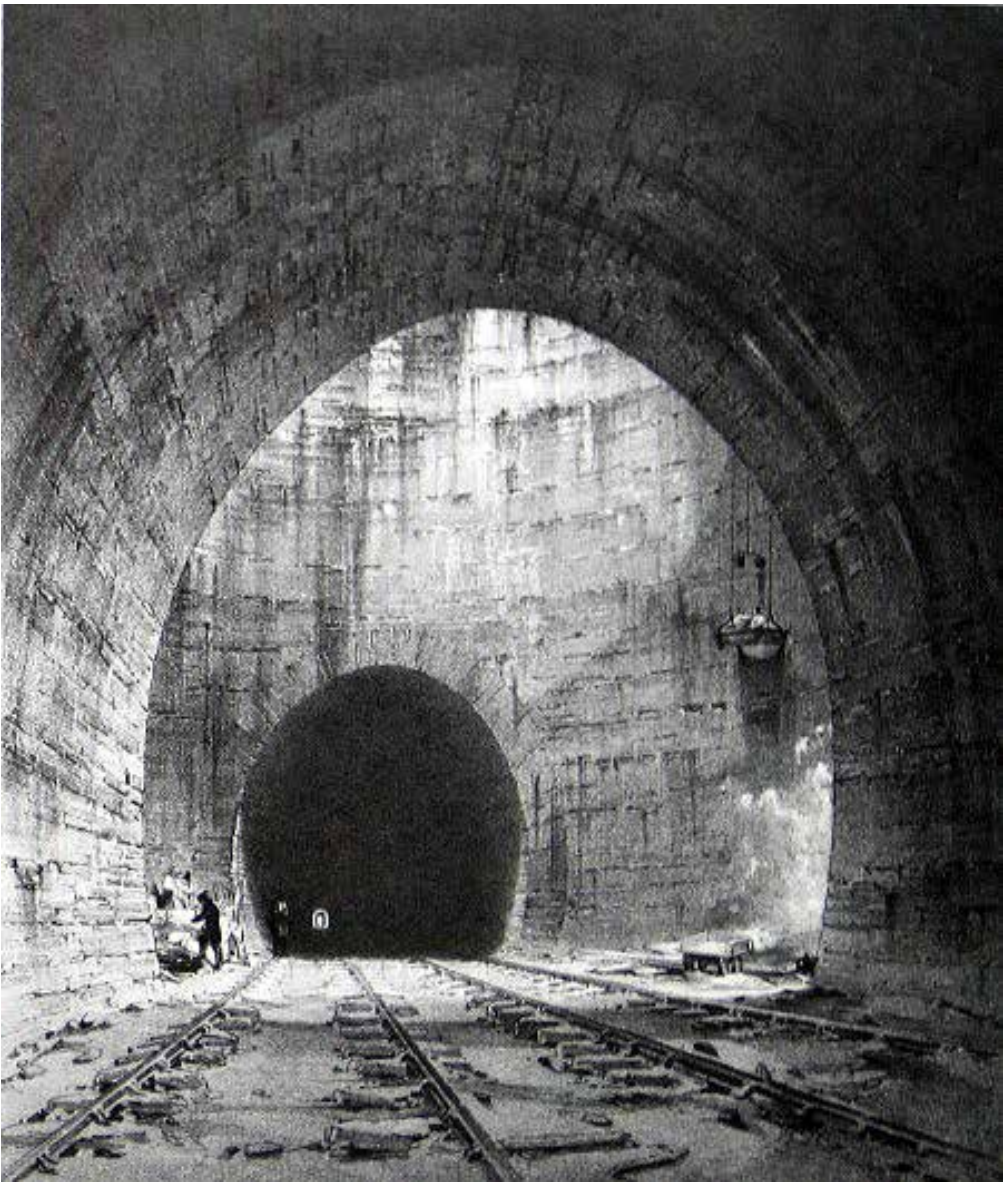
VENTILATION FACILITY REVIEW

WESTCONNEX STAGE 3 (M4-M5 LINK)

03.05.2016



CONTENTS



KILSBY TUNNEL, UK (FRONT COVER SHOWS ABOVE GROUND VENT)

- 1. INTRODUCTION
- 2. VENTILATION FACILITY PRINCIPLES
- 3. VISUAL SUMMARY
 - TUNNEL VENTILATION FACILITIES
 - SIMILAR INFRASTRUCTURE
- 4. KEY STRATEGIC APPROACHES
- 5. PRECEDENT CASE STUDIES:
 - CROSS CITY TUNNEL - SYDNEY
 - TRANSGRID VENTILATION SHAFT - SYDNEY
 - M5 EAST TUNNEL - SYDNEY
 - EASTLINK TUNNEL - MELBOURNE
 - CITY LINK TUNNEL - MELBOURNE
 - LEGACY WAY TUNNEL - BRISBANE
 - AIRPORT LINK TUNNEL - BRISBANE
 - CLEM 7 TUNNEL - BRISBANE
 - QUEENSWAY TUNNEL - LIVERPOOL, UK.
 - JUBILEE LINE - LONDON, UK
 - MIAMI PORT TUNNEL - MIAMI, USA
 - CHEMINEE MORRETTI - PARIS,FRANCE
 - PATERNOSTER VENTS - LONDON, UK
 - TRANSJURANNE MOTORWAY -SWITZERLAND
 - SIGNAL BOX -SWITZERLAND
- 6. CONCLUSION

1. INTRODUCTION

This review has been laid out to reflect briefly on the history of ventilation facilities and to investigate the opportunities these structures can bring to WestConnex Stage 3.

This review is the result of a desktop study which has uncovered a demonstrative cross section of ventilation facility design from an historical and geographical point of view.

Ventilation facilities play a vital role in civic infrastructure projects. With the majority of the infrastructure being underground they are often highly contested pieces of public architecture.

As such, the architectural strategies employed to implement these structures are often tied up in a wider civic role. In some cases they are signifiers of progress, monumental and unashamedly proud of their industrial function. Conversely, the contested nature of the structures and their association with pollution often require camouflage and concealment.

This review raises two key questions:

How can the ventilation facilities respond to their context in a meaningful way?

How can WestConnex use the ventilation facilities to provide visual amenity to the skyline and greater social value at ground level?



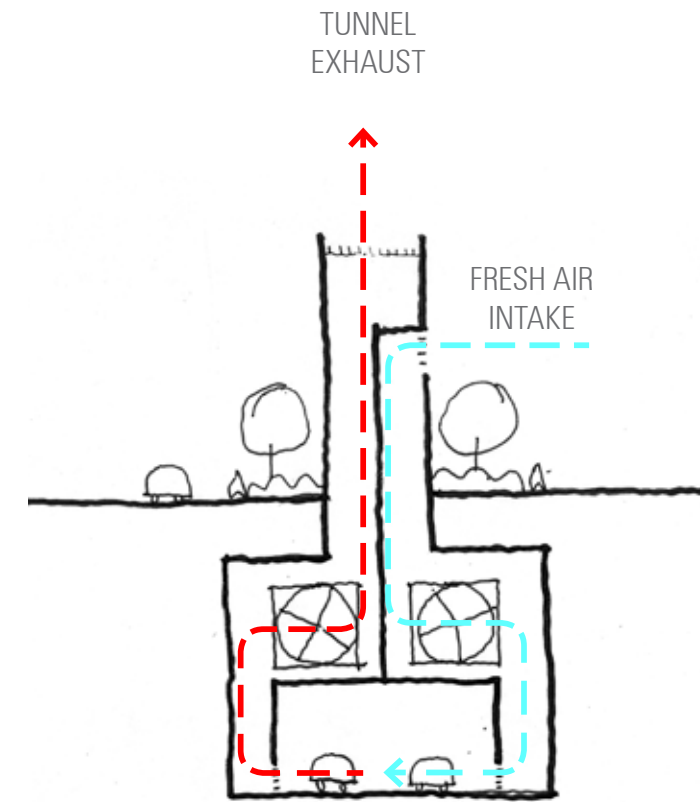
HOLLAND TUNNEL, USA.

2. VENTILATION FACILITY PRINCIPLES & CURRENT VENTILATION PHILOSOPHY

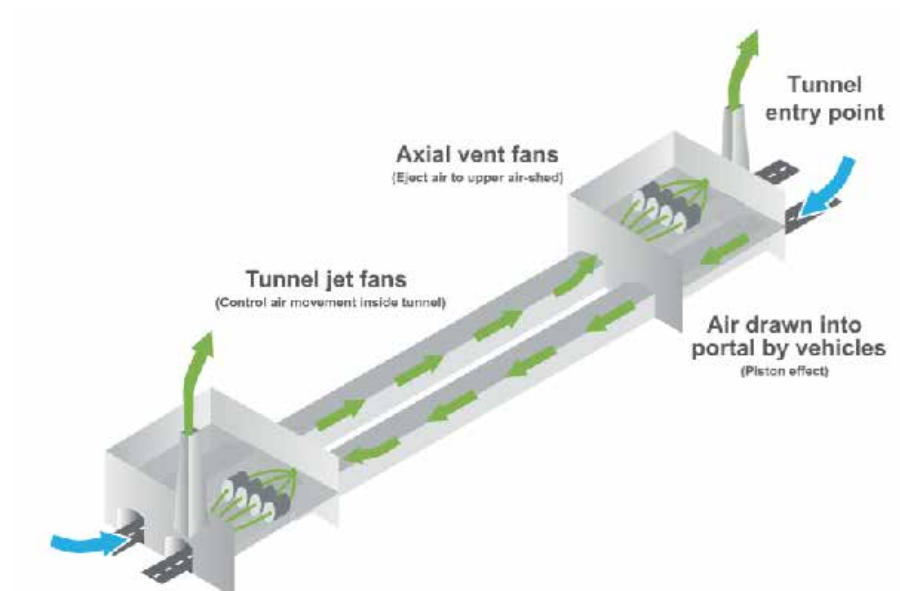
PRINCIPLES & TRENDS

The design of Tunnel ventilation facilities is generally governed by a number of technical and functional principles. The shape, size, location and height of the facility ensures the tunnel has minimal impact on local and regional air quality.

- Typical tunnel design requires both intake of fresh air, and removal of exhaust air.
- The current ventilation philosophy is to employ the 'piston effect', by dragging fresh air via the entry portal and exhausting tunnel air at or very close to the exit portal. This reduces the need to bring in fresh air through the stack, potentially unlocking ground level activation around the shaft.



FRESH AIR AND EXHAUST PRINCIPLES



WESTCONNEX TUNNEL VENTILATION DIAGRAM

3.1
VISUAL SUMMARY:
TUNNEL VENTILATION
FACILITIES

Adjacent is a local and international summary of tunnel ventilation facility design in its various stylistic and historical forms.

CHRONOLOGICAL OVERVIEW:

- 1. KILSBY TUNNEL. UK. 1838
- 2. HYDE PARK OBELISK. SYDNEY. 1857
- 3. BAYSWATER, UK. 1863
- 4. QUEENSWAY TUNNEL, UK. 1925
- 5. HOLLAND TUNNEL, USA. 1927
- 6. BROOKLYN TUNNEL, USA. 1950
- 7. GIBSON SQUARE, UK. 1965
- 8. BLACKWALL, UK. 1967
- 9. KINGSWAY TUNNEL, UK. 1971
- 10. JUBILEE LINE TUNNEL, UK. 1990
- 11. JUBILEE LINE TUNNEL, UK. 1990
- 12. CHEMINÉE MORETTI, FRANCE. 1991
- 13. M5 EAST, SYDNEY. 2001
- 14. CROSS CITY TUNNEL, SYDNEY. 2005
- 15. TRANSGRID, SYDNEY. 2006
- 16. MIAMI PORT TUNNEL, USA. 2014
- 17. CLEM 7 TUNNEL, BRISBANE. 2014
- 18. EASTLINK, MELBOURNE. 2014



1



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16



17



18

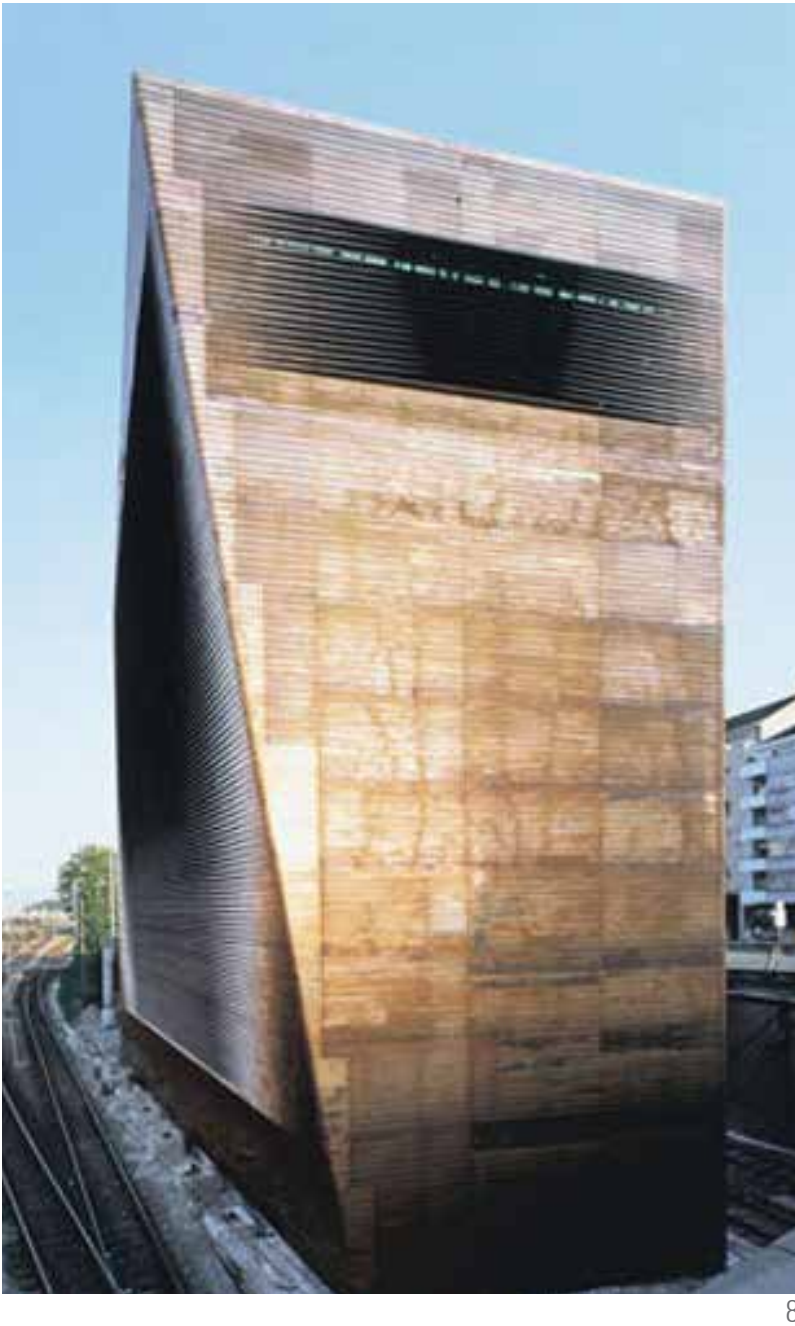
3.2
VISUAL SUMMARY:
SIMILAR
INFRASTRUCTURE

Ventilation facility design shares many similarities with other infrastructure typologies such as substations, signal boxes and residential ventilation outlets. These typologies demonstrate that infrastructure can be celebrated with sculptural form and finely crafted detail, regardless of its use or context.

Colour, materiality and composition can play a key role in the integration of these elements into their context.

SELECTED OVERVIEW:

- 1. TORRES DE SATÉLITE, MEXICO CITY. 1958
- PUBLIC SCULPTURE
- 2. TOWER OF WINDS. TOKYO. 1986
- WATER TANK/ART INSTALLATION
- 3. INCINERATION LINE, DENMARK. 2014
- WASTE TO ENERGY PLANT
- 4. STAZIONE OLIMPICA, LONDRA. 2012
- ELECTRICAL SUBSTATION
- 5. PETROL SUBSTATION, ANTWERP, 2010
- ELECTRICAL SUBSTATION
- 6. SWITCHING BOX, ZURICH. 1999
- 7. UNITÉ D'HABITATION, MARSEILLE. 1952
- RESIDENTIAL VENTILATION
- 8. SIGNAL BOX, SWITZERLAND. 1994



4.
KEY STRATEGIC
APPROACHES

Across the history of ventilation facility design there appear to be 4 fundamental approaches by way of expression.

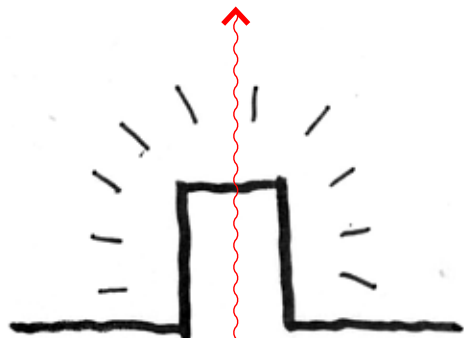
In some cases, the (historical) approach appears as a representation of the zeitgeist or spirit of the time - perhaps an expression of an attitude towards a new form of transport or technology.

In many cases the approach appears rooted in the nearby physical context.

More recently there appears to be a tendency towards a more stylistic form of expression.

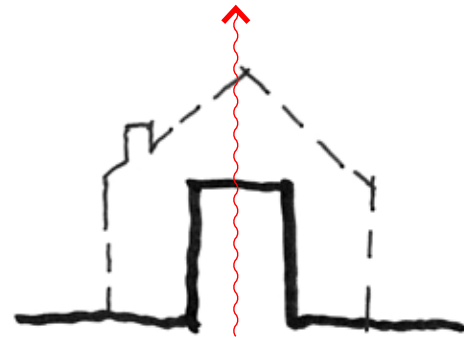
VENTILATION FACILITY AS...

' MONUMENT '



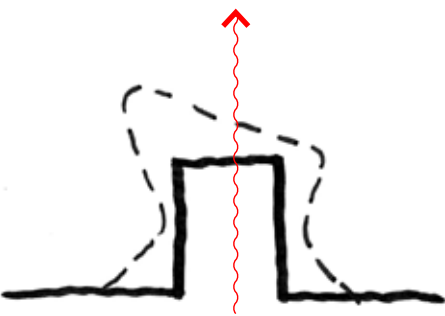
HYDE PARK OBELISK. SYDNEY.

' CAMOUFLAGE '



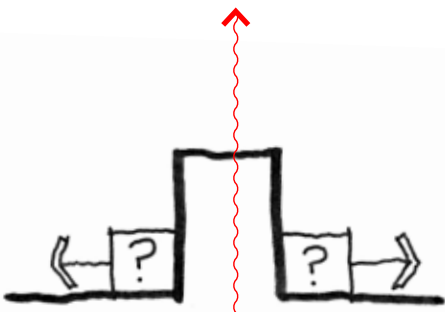
BAYSWATER, UK.

' SCULPTURAL ARTWORK '



MIAMI PORT TUNNEL, USA.

'SUPPORTING INFRASTRUCTURE
& DESTINATION '



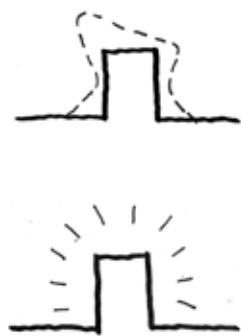
QUEENSWAY TUNNEL, UK.

5.
PRECEDENT CASE
STUDIES:

The following case studies have been identified as representative of the broad cross section of local and international approaches to ventilation facility design.



5.
PRECEDENT:
CROSS CITY TUNNEL
SYDNEY, AUS



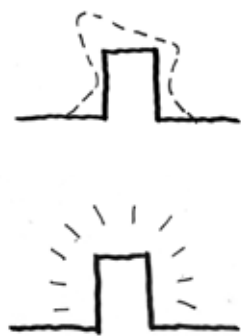
Program
Vent Facility
Architect
HASSELL
Year
2005
Size
16m (L) x 13m (W) x 62m (H)

- +VE TALL SLENDER PROPORTIONS SIT COMFORTABLY WITH URBAN TOWER CONTEXT.
- +VE LIGHT GREY MATERIALITY AND HORIZONTAL ARTICULATION REFLECTS MANY COMMERCIAL FACADES IN ITS SURROUNDING AND AS SUCH APPEARS TO BE AN EXTENSION OF THE CITY.



VIEW OF CROSS CITY TUNNEL VENTILATION FACILITY

5.
PRECEDENT:
TRANSGRID
VENTILATION FACILITY
SYDNEY, AUS



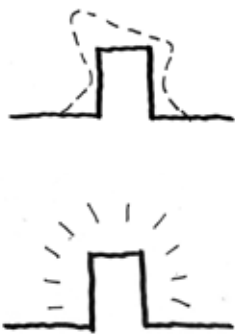
Program
Vent Facility
Architect
CHROFI
Year
2006
Size
5m (L) x 5m (W) x 6m (H)

- +VE FORM AND ARTICULATION CELEBRATE THE NATURAL FORM OF THE FACILITY.
- +VE INTERPLAY BETWEEN THE INNER STRUCTURE AND CLADDING IS ACCENTUATED, SOFTENING THE PROFILE OF THE FORM AGAINST THE SKY.



VIEW OF VENTILATION FACILITY AT HENDERSON RD

5.
PRECEDENT:
M5 EAST
SYDNEY, AUS



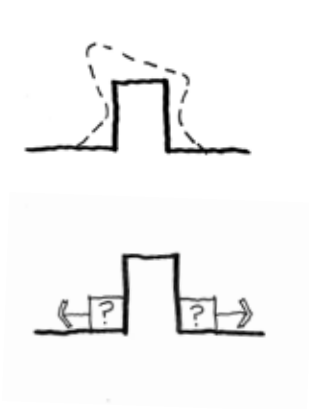
Program
Ventilation Facility
Architect
DEM
Year
2001
Size
16m (L) x 13m (W) x 31m (H)

- +VE STRONG FORM CLEARLY ARTICULATES ITS FUNCTION AS A VENTILATION FACILITY.
- +VE MATERIALITY DRAWS ON SUBURBAN SANDSTONE CHARACTER AND VERTICAL HEIGHT IS BROKEN DOWN INTO HORIZONTAL EXPRESSIONS.
- VE HEIGHT AND PROPORTION OF FACILITY TOO LARGE FOR SUBURBAN CONTEXT.
- VE MISSED OPPORTUNITY TO ACTIVATE WITH ADDITIONAL PROGRAMME GIVEN OPEN SPACE IN PROXIMITY.



VIEW OF VENTILATION FACILITY FOR M5 EAST TUNNEL FROM TURRELLA RESERVE, EARLWOOD. NSW

5.
PRECEDENT:
EAST LINK
MELBOURNE, AUS



Program
Ventilation Facility
Architect
Wood Marsh
Year
2014
Size
16m (L) x 13m (W) x 31m (H)

- +VE INTEGRATED VENTILATION FACILITY WITH TUNNEL PORTAL. MINIMISES IMPACT ON SURROUNDING RESIDENTIAL. REDUCES PERCEPTION OF EXHAUST TOWER.
- +VE GRAPHIC OVERLAY PROVIDES RELIEF FROM SCALE OF TOWER.



GRAPHIC OVERLAY ON VENTILATION FACILITY



VIEW OF VENTILATION FACILITY AND PORTAL ENTRY OF EASTLINK TUNNEL

5.
PRECEDENT:
CITY LINK
MELBOURNE, AUS



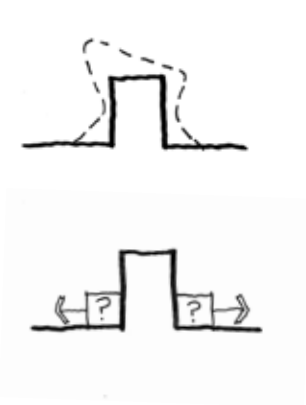
Program
Ventilation Facility
Architect
Unkown
Year
1999
Size
7m (L) x 10m (W) x 31m (H)

- + VE SCALE AND PROPORTION SITS COMFORTABLY AS 'SCULPTURAL' ELEMENT'.
- VE MISSED OPPORTUNITY TO ACTIVATE WITH ADDITIONAL PROGRAMME GIVEN OPEN SPACE IN PROXIMITY.



VIEW OF VENTILATION FACILITY FROM ACCA FORECOURT

5.
PRECEDENT:
LEGACY WAY TUNNEL
BRISBANE, AUS



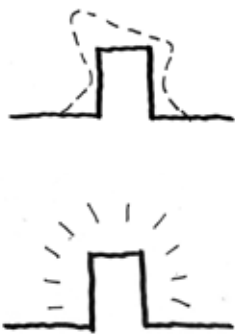
Program
Ventilation Facility and Shading Structure
Architect
RPS Group
Year
2014
Size
5m (L) x 5m (W) x 10m (H)

- +VE 3 DIMENSIONAL PATTERN ADDS VISUAL INTEREST AND SHADOW PLAY WITHIN PARK SETTING.
- +VE ADDITION OF SHADING CANOPY PROVIDES GOOD AMENITY TO PARK.
- +VE SCALE AND PROPORTION SITS COMFORTABLY AS 'SCULPTURAL' ELEMENT.



VIEW OF VENTILATION FACILITY & SHADING FROM BRISBANE BOTANIC GARDENS

5.
PRECEDENT:
AIRPORT LINK
BRISBANE, AUS



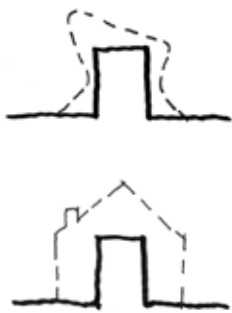
Program
Ventilation Facility and Fan Exhaust
Architect
RPS Group
Year
2014
Size
16m (L) x 6m (W) x 23m (H)

- + VE TALL SLENDER PROPORTIONS REDUCE VISUAL IMPACT.
- VE MATERIALITY SITS UNCOMFORTABLY WITHIN PRIMARILY RESIDENTIAL CONTEXT.
- VE MISSED OPPORTUNITY TO ACTIVATE WITH ADDITIONAL PROGRAMME GIVEN OPEN SPACE IN PROXIMITY.



VIEW OF VENTILATION FACILITY FROM BRISBANE AIRPORT LINK ROAD

5.
PRECEDENT:
CLEM 7
BRISBANE, AUS



- Program**
Ventilation Facility and Fan Exhaust
- Architect**
John Ilett
- Year**
2014
- Size**
45m (L) x 20m (W) x 23m (H)
- + VE PATTERN AND COLOUR ARE REPEATED
ACROSS MULTIPLE VENTILATION STRUCTURES
AND PORTAL ENTRIES, PRESENTING A UNIFIED
FAMILY OF INFRASTRUCTURE.
- VE HEIGHT AND PROPORTION OF FACILITY TOO
LARGE FOR SUBURBAN CONTEXT.
- VE COLOUR AND PATTERNING HAVE
LITTLE CONTEXTUAL RELATIONSHIP WHICH
EMPHASISES THE SIZE OF THE STRUCTURE.
- VE FUNCTIONALITY IS NOT TRANSPARENT,
CAMOUFLAGING PURPOSE AT THIS SCALE
SEEMS INAPPROPRIATE.

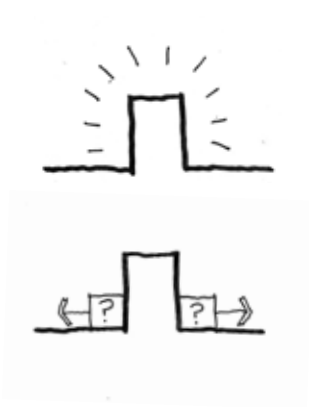


VIEW OF VENTILATION FACILITY FROM CLEM 7 PORTAL



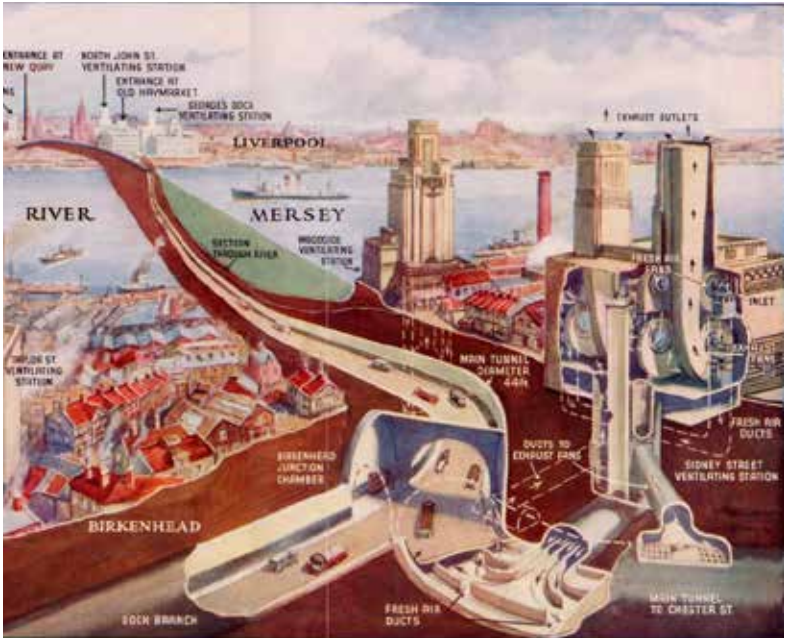
VIEW OF VENTILATION FACILITY AT CLEM 7

5.
PRECEDENT:
QUEENSWAY
VENTILATION TOWER
LIVERPOOL, UK



Program
Tunnel Ventilation Facility & offices
Architect
Herbert J Rowse
Year
1925
Size
10m (L) x 10m (W) x 40m (H)

- +VE COMBINATION OF VENTILATION FACILITY AND ASSOCIATED OFFICES REDUCE THE VISUAL IMPACT.
- +VE PRESENTS AN ACTIVE FRONTAGE TO THE STREET.
- +VE MATERIALITY SITS WELL IN CONTEXT.



CUTAWAY DIAGRAM ILLUSTRATING VENTILATION PROCESS



VIEW OF VENTILATION FACILITY AND OFFICES AT QUEENSWAY TUNNEL

5.
PRECEDENT:
JUBILEE LINE
LONDON, CANADA
WATER, UK



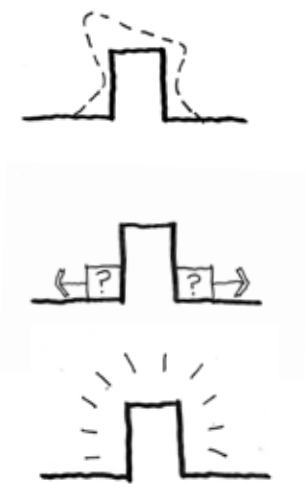
Program
Train Tunnel Ventilation Facility & Escape Exit
Architect
Ian Ritchie
Year
1990
Size
16m (L) x 6m (W) x 4m (H)

- +VE SCULPTURAL RIBBON FORM SUGGESTS AIR MOVEMENT OF VENTILATION FUNCTION.
- +VE CELEBRATES FUNCTION AND INFRASTRUCTURE.
- +VE COPPER MATERIALITY SITS WELL IN CONTEXT.
- +VE SCALE AND PROPORTION SITS COMFORTABLY AS 'SCULPTURAL' ELEMENT.
- VE OPPORTUNITY MISSED TO INCORPORATE ADDITIONAL PUBLIC AMENITY GIVEN PROMINENT LOCATION.

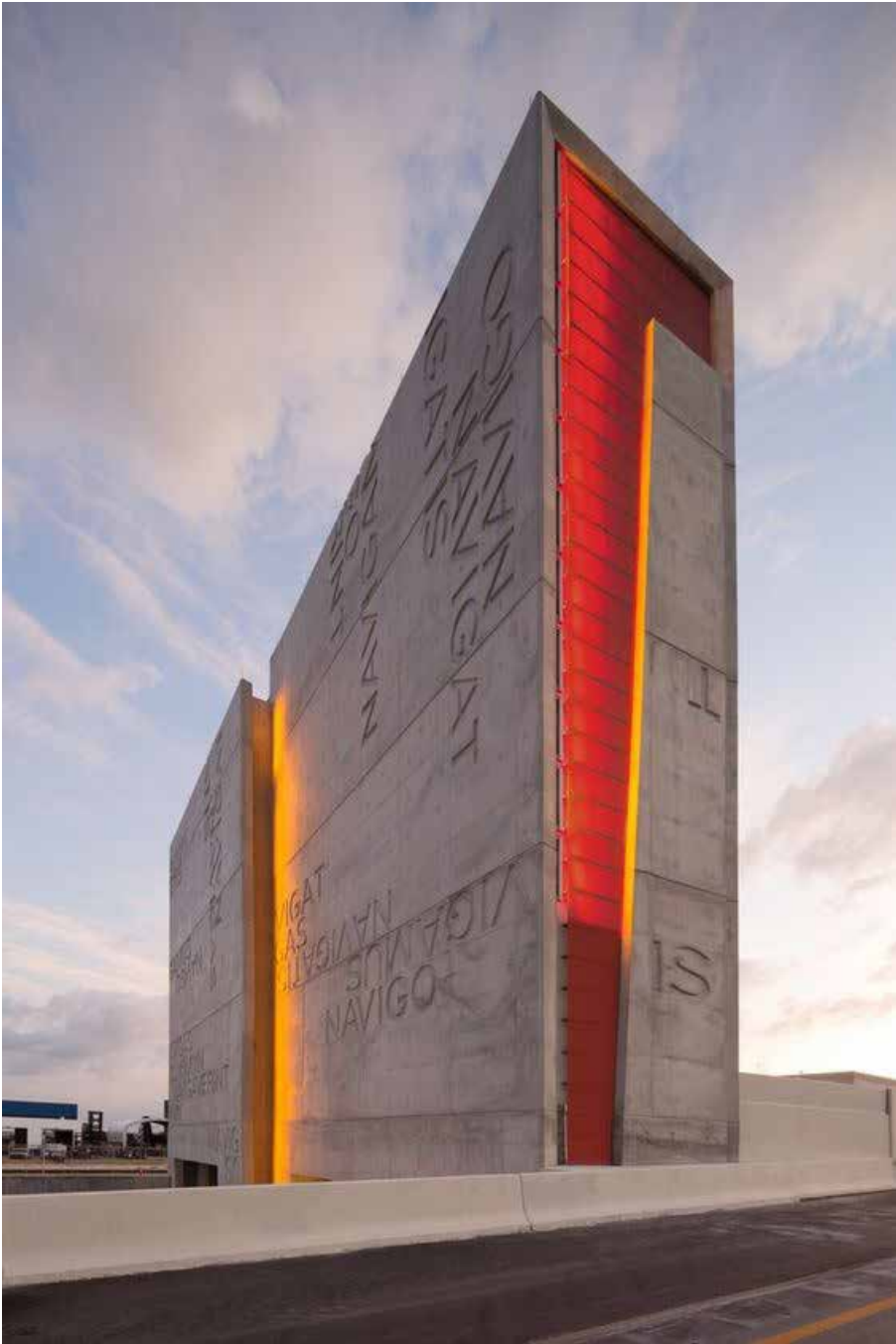


VIEW OF VENTILATION FACILITY AT CANADA WATER STATION, LONDON

5.
PRECEDENT:
MIAMI PORT TUNNEL



- Program**
Tunnel Entrance, Vent Facility & Flood Gate
- Architect**
ArquitectonicaGEO
- Year**
2014
- Size**
29m (L) x 6m (W) x 19m (H)
- + VE CLEAN INTEGRATED FORM ACTS AS BOTH PORTAL ENTRANCE TO TUNNEL. & VENTILATION FACILITY.
- + VE ROBUST MATERIALITY.
- + VE ADDITION OF TEXT OVERLAY PROVIDES CULTURAL LAYER.



VIEW OF VENTILATION FACILITY & FLOOD GATES AT MIAMI PORT TUNNEL

5.
PRECEDENT:
CHEMINÉE MORETTI
PARIS, FRANCE



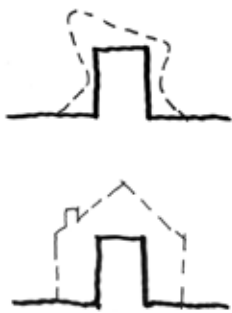
Program
Ventilation Facility
Architect
Raymond Moretti.
Year
1990
Size
7m (L) x 7m (W) x 32m (H)

- +VE BOLD COLOUR SELECTION CELEBRATES FUNCTION AND INFRASTRUCTURE.
- +VE SCALE AND PROPORTION SITS COMFORTABLY AS 'SCULPTURAL' ELEMENT.
- VE OPPORTUNITY MISSED TO INCORPORATE ADDITIONAL PUBLIC AMENITY GIVEN PROMINENT LOCATION.



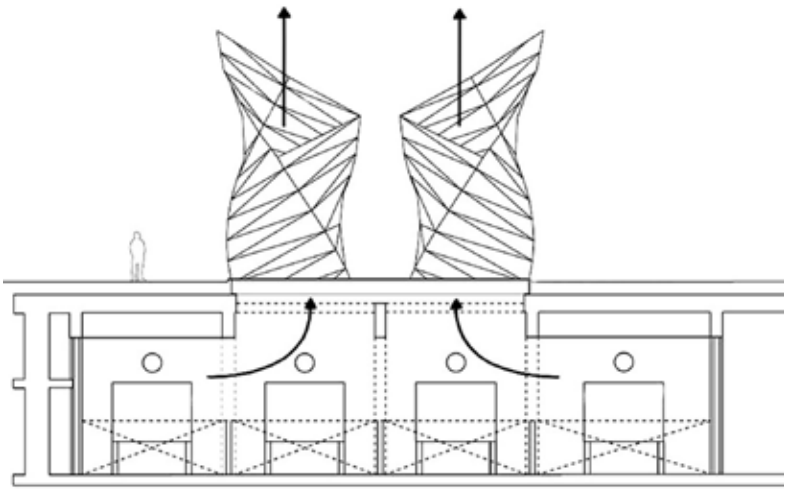
VIEW OF VENTILATION FACILITY AT LA DÉFENSE, PARIS

5.
PRECEDENT:
PATERNOSTER VENTS
LONDON, UK



Program
Substation Ventilation Facility
Architect
Thomas Heatherwick
Year
1990
Size
3m (L) x 3m (W) x 5m (H)

- +VE SCULPTURAL FORM ADDS VISUAL AMENITY TO PUBLIC SQUARE.
- +VE SCALE AND PROPORTION SITS COMFORTABLY AS 'SCULPTURAL' ELEMENT.
- VE OPPORTUNITY MISSED TO INCORPORATE ADDITIONAL PUBLIC AMENITY GIVEN PROMINENT LOCATION.

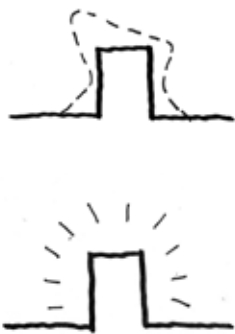


SECTION DIAGRAM ILLUSTRATING SUBSTATION VENTILATION



VIEW OF VENTILATION FACILITY FROM PATERNOSTER SQUARE, LONDON

5.
PRECEDENT:
TRANSJURANNE MOTORWAY
SECTION 4 & 5
SWITZERLAND

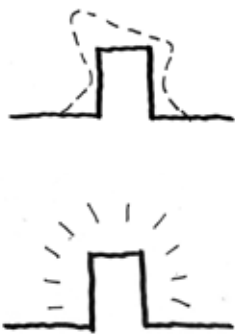


Program
Tunnel Entrance Portal & Ventilation Facility
Year
1998
Size
21m (L) x 26m (W) 24m (H)

- +VE EXPRESSIVE FORM CELEBRATES THE ENGINEERING AND FUNCTIONALITY OF INFRASTRUCTURE
- +VE ROBUST MATERIALITY SUGGESTS PERMANANCE.
- +VE VENT FACILITY LOCATED IN CLOSE PROXIMITY TO PORTAL, MNIMISING IMPACT ON SURROUNDING LANDSCAPE SETTING.
- +VE CONSISTENT FORMAL LANGUAGE OF SIMPLE VOLUMES IS REPEATED, PROVIDING A DISTINCTIVE MARKER IN THE MOTORISTS MEMORY.



5.
PRECEDENT:
SIGNAL BOX,
SWITZERLAND



Program
Control Box
Architect
Herzog & de Meuron
Year
2014
Size
16m (L) x 10m (W) x 19m (H)

- +VE SCULPTURAL FORM WITH INTEGRATED VENTILATION STRATEGY.
- +VE ROBUST MATERIALITY SOFTENED WITH REFLECTIONS THROUGHOUT DAY.



EXTERNAL CLADDING DETAIL - COPPER STRIPS



VIEW OF SIGNAL BOX FROM GUTERBAHNHOFSTATION, BASEL

6. CONCLUSION

The outcome of this review are a suite of strategies which distills best practice in ventilation facility design. These strategies can be applied to specific sites, with the hope of achieving a mutually beneficial outcome for WestConnex and the community.

Each of the 3 sites provide the opportunity for a contextual urban response. Rather than a repetitive stamped design philosophy, each ventilation facility can act as a place marker for both the commuters and community.

In reviewing the above case studies and identifying key strategies for ventilation facility design, the following key principles have been identified:

- The design strategy employed for the ventilation facility should be intrinsically linked to the community and its immediate context.
- By understanding the ventilation facility as a 'signifier' for the wider project, there is an opportunity where appropriate for these structures to celebrate infrastructure, as opposed to disguising it.
- Embedding an additional function could provide additional benefit to the surrounding context, and also help mitigate the negative associations with ventilation facilities in general (pollution, visual impact etc). This addition can also be of social value to the community.
- Distance from residential areas is often the point of strongest contention. By locating the vent stack close to the portals the amount of impact from the communities perspective could be reduced.



ROZELLE



VIEW TOWARDS CITY FROM ROZELLE



CAMPERDOWN



SANDSTONE WALL, PARRAMATTA RD



ST. PETERS



SYDNEY PARK BRICK STACKS