

Reallocating space along Auckland's Karangahape Road (This paper has been peer reviewed)

AUTHORS

Mr Cory Manson

Qualifications: Bachelor of Landscape Architecture, Victoria University of Wellington; Master of Landscape Architecture, Victoria University of Wellington.

Professional Affiliations: NZ Institute of Landscape Architects - Registered Landscape Architect

Employment Position: Landscape Architect, LandLAB

Contact Details cory@landlab.co.nz; +64276968001

Mr Umer Malik

Qualifications: Bachelor of Environments (Architecture), University of Melbourne; Master of Engineering (Civil), University of Melbourne

Professional Affiliations: Engineering New Zealand

Employment Position: Civil Engineer, Development Infrastructure – Beca

Contact Details: umer.malik@beca.com; +64220755971

ABSTRACT

Karangahape Road's uniqueness is founded on the combination of its ridge-top location, urbanity and architectural cohesiveness. The street provides a city fringe mixture of creativity and a diverse local community. Karangahape Road is an ideal cycle route and a benchmark opportunity for an integrated multimodal transport project within a highly urban environment. It is a crucial part of the Auckland Cycle Network, given its high priority status.

There is a strong sense of community and pride in Karangahape Road and the diversity and creativity that it attracts. The streets mixture of urban life and experiences are unique nationally. The one-kilometre length of the street supports both a vibrant day-time economy along with an equally dynamic night-time economy. Historically the Karangahape ridgeline was an essential walking route between Auckland's two harbours for mana whenua. A partnership was established with mana whenua and resulted with input across the project and the expression of several artworks.

The project established a robust consultation programme between the Karangahape Road Business Association (KBA), an interested and passionate local community and property owners. This involved a multi-layered consultation approach and the appointment of a Community Reference Group (CRG). These relationships with both the KBA and local businesses have continued through construction. Currently, the wider precinct is undergoing considerable change initiated by Auckland's growth and the future Central Rail Link (CRL) station already under construction. Balancing the needs of all users (current and future) required an intelligent, designed solution that achieves optimal outcomes for pedestrian movement, cycling, public transport, street trading, local businesses and private vehicle use.

With the Karangahape Road Enhancement Project's built outcomes close to being realised, the project provides a great example of a strong consultation process having a life throughout the duration of the project and into construction. This has resulted in built outcomes that provide an equitable and decarbonised transport solution for one of Auckland's most unique urban streets.

INTRODUCTION

Karangahape Road has long been overdue for a transformation that implements Auckland Transport's road user hierarchy, a hierarchy that appears built with this precinct in mind. The street also features in the Auckland Cycle Network (CAN) as one of the top five priority cycle routes in the Auckland city centre area.

Reallocation of space has been integral to achieving the desired cycling outcomes while also making the street more equitable for all users. The intent has been to transform the street to be a destination rather than just a transport corridor. The design requires integrating different transport modes in a cohesive way that acknowledges and retains the uniqueness of the street. The latter can only be achieved through a robust and innovative consultation strategy that captures the aspirations of the community.

This paper looks to highlight what makes Karangahape Road unique and the distinct challenges that result from this. The consultation and design process resulted in a non-standard and site-specific outcome through reallocation of space and subsequent decarbonisation of transport.



Figure. 1.0 – Context of Karangahape Road within Central Auckland

UNIQUENESS OF KARANGAHAPE

Karangahape Road is one of New Zealand's great streets. Like Auckland's other great streets – Queen Street, Ponsonby Road and Dominion Road – Karangahape Road has a particular identity and role in the city.

HISTORIC CONTEXT

Karangahape Road has always been an important area in relation to the settlement and development of Auckland. A place for both movement and meeting, rich in culture and history. Over time, the evolution of the site has seen its transformation from a strategic ridge line walking

route and vantage point for mana whenua (pre-European settlement). There is specific kōrero (narratives) relating to Te Ara O Karangahape (The Path of Karangahape) that describe the ridgeline as a social place where mana whenua would travel along between the Waitematā and Manukau harbours.

URBAN CONTEXT

There is a strong sense of community and pride in Karangahape Road and the diversity and creativity that it has historically nourished.

The streets specialist business economy of retail, hospitality and commercial activity also includes a dynamic night-time economy. The night-time economy features a conspicuous sex industry, bars, restaurants, night clubs and performance venues. These all contribute to making this precinct 'one of a kind'.

Further, the precinct is an important incubator of artistic, musical and creative endeavours and communal and collaborative activity. The Karangahape Road Precinct Plan lays out a vision for developing the road to establish transport network connectivity while retaining and embracing the uniqueness of the precinct.

CHALLENGES OF KARANGAHAPE

The growth along Karangahape Road is best described as gentrification. For many in the community, this type of change is daunting, particularly alongside other parts of the city facing similar changes. For others, it is just another iteration of the many faces the street has seen. The enhancement project itself came when many changes were well underfoot – yet the project became a symbol of that change – for better or worse. Karangahape Road has a 'gritty' urban quality to the street environment that will last beyond these new changes; it is unlikely to become an extension of either the city centre or Ponsonby due to its innate nature. This needed to be considered in the way the design progressed. This was a street where doing business as usual would not be accepted. This project presents a unique set of challenges with end-users of varying needs all the way down the AT road user hierarchy, constraints associated with maintaining a significant transport corridor and a highly diverse group of stakeholders.

Balancing all users needs (existing and potential) requires a solution that achieves optimal outcomes for street trading, pedestrian movement, cycling, public transport, servicing/loading, taxis and private vehicle use. The existing corridor is typically 27m wide which is less than the combined optimal dimensions for all proposed user activities. The main design challenge was in the careful consideration of how best to provide for each user group within that overall dimension.

Managing expectations with key stakeholders from Auckland Transport, AT Metro and the Karangahape Road Business Association (KBA) through to interested and passionate community members and property owners is an integral component to executing the project objectives.

As a uniquely diverse community, consideration was given to how best represent this sense of place within a street upgrade. While options of bold and outrageous were considered, there was strong feedback that the identity of Karangahape Road was not necessarily with the street itself – but the people and community that inhabit it. Designing the street through the project teams interpretation of what made Karangahape Road 'unique' could be disingenuous and only represent the most visible aspects of the community. This would also only be a snapshot in time considering the streets long history.

An approach was formed that the street should be simple and recessive, urban and of high quality, and most importantly, provide the space for the community to use the street to its fullest. This also gave consideration to generating more space for existing public art and new pieces of cultural design narratives and opportunities.

Recent changes to Auckland's Unitary Plan have enabled the redevelopment and intensification of the Karangahape Road precinct, including a forecast of up to 5,000 new residents and workers. The CRL project will additionally deliver approximately 20,000 - 30,000 additional people to the precinct each day, enhancing its appeal as a destination and access point to the wider city centre. These changes will place further pressure on the precincts public realm to provide for an appropriate range of recreational and community activities. It also puts increased pressure on the existing street environment to accommodate an associated increase in pedestrian flow.

MULTIMODAL EQUITY

OBJECTIVES

The project brief had identified two distinct but interwoven high-level objectives:

1. To provide a dedicated and safe cycleway to connect the existing and future cycle network with this key ridgeline route along Karangahape Road from Ponsonby Road to Symonds Street;
2. To provide an enhanced public realm environment that addresses the tensions that a dedicated cycleway brings, coupled with a significant increase in public transport numbers.

This established an intent for the project that looked to truly integrate several different modes of transport access with the Karangahape Road corridor. The recent history of the street from a transport view has been dominated by private cars. The motorway expansion in the 1960s literally severed two parts of the community. When this project commenced, the street provided six vehicle lanes, no cycle facility, sub-standard bus capacity and limited green space.

This project set the goal of rebalancing this spatial condition and providing safer interfaces between these modes. Providing greater access to a broader range of transit options and further reducing the carbon footprint of the city has been the aspiration of the project.

CYCLEWAY NETWORK

Karangahape Road acts as a connector for three of the busiest cycleways in Auckland; therefore, it is a route that will benefit the greatest number of existing and future cyclists. At the network level, Karangahape Road provides a ridgeline link from Great North Road to many central destinations. As a result, the Auckland Cycle Network (ACN) has classified Karangahape Road as a top-five priority route (Auckland Transport, 2015). The project also has a 'high strategic fit' in the NZTA assessment framework rating, given that it is along a primary corridor within a strategic cycling network in a main urban area.

Karangahape Road is both a destination and an origin for cycling trips in its own right at the local level. There is a small but rapidly growing residential population on and around Karangahape Road, as well as a diverse range of retail and commercial businesses. The location makes it a short ride from the inner city and inner suburbs, which have been identified through research as those most likely to use bikes for transport.

The modelled and assessed the forecasted cyclist demands indicated a 148% increase in 2026 relative to 2013 numbers per Flow Transportation Specialists Limited (Ormiston & Jongeneel, 2015). The 2026 forecasted increase is based on the creation of the Karangahape Road cycleway connecting to other recently completed cycleways. The combination of all planned cycle routes in the CBD in comparison is predicted to further bolster ridership along Karangahape Road with a 246% increase from 2013 numbers. Likewise, completing the cycleway on Karangahape Road will result in increased cycle trips in other parts of the network. The completion of the planned cycle infrastructure is predicted to result in a 51% increase in cycle trips to and from the city centre (Ormiston & Jongeneel, 2015). This is considered a lower end estimate, as the growth of cycle movements on recently completed cycleways has been much higher. For example, the Grafton Gully Cycleway resulted in an increase in cycle movements of 113% over the first two years after opening, a much higher number than originally predicted (Hall, 2015).

PUBLIC TRANSPORT

Karangahape Road is part of the Rapid and Frequent Service Network. The section between Pitt Street and Symonds Street is used by the City, Inner and Outer Links services, with the NX3 utilising the corridor from Ponsonby Road to Symonds Street. In this regard, AT's City Centre Bus Reference Case (MRCagney, 2015) had identified an increased frequency of bus services using Karangahape Road in the future, particularly between Ponsonby Road and Pitt Street. On this basis, AT Metro determined that bus lanes in both directions would be required long-term with weekday peak hour bus lanes in the short-term. The design has also considered the form and location of bus stops along the corridor.

PEDESTRIAN ENVIRONMENT

Based on initial modelling work undertaken by MRCagney (Wolfman, 2016), the existing Pedestrian Level of Service (LoS) at key parts of the corridor is a LoS 'F'; which translates to a poor level of pedestrian amenity.

The contributing factors to this low level of service are;

- Unsafe crossing opportunities along the corridor but particularly at side street locations,
- Congestion associated with pinch points in the effective footpath,
- Poorly located street furniture and regulatory signage reduces the effective footpath width, and
- The existing quality of the footpath varies and is inconsistent.

The project intent is to further spread the level of public realm investment along the street.

DESIGN THROUGH CONSULTATION

The project team understood from the outset that establishing positive relationships with the community was paramount. Before the current design team was engaged, there was previous work involved in the Karangahape Road Plan 2014-2044 that also understood how crucial this was. It was an opportunity to consult in a broader way than had been done previously. From the outset, the consultation on this project looked to become a benchmark for future projects of this type within Auckland.

Standard public consultation checkpoints for the project were established that were focused on open public feedback from the entire community. A layered consultation process was also undertaken, acknowledging that this was not a community whose feedback could be understood through a single step.

The project team began testing the appetite for the upgrade at several community events. This involved asking what was important about the street to them, what could be improved, and what they had concerns about within the precinct. There were two events like this before any design work was commenced.

As part of Open Streets in 2016, the entire length of Karangahape Road was closed to vehicles for the day; this was an immensely successful way of showing what the street could be and what the community could do with their street without the vehicle traffic. The event was the first event that the design team shared several cycle facility options. A virtual reality station was set up on-site, which enabled the public to visualise how the street was currently – and what these two options would look like. This face to face interaction with the public helped shape the way forward for the design team.

The clear response was that people felt safer separated with a physical barrier from vehicles. The more confident cyclists saw benefits in a Copenhagen style where there is no separation from the carriageway as it gave greater flexibility. Copenhagen style refers to a cycleway that sits at 'half-kerb' height, with a mountable kerb to the footpath. In this instance, the cycleway would have two mountable kerbs.

CONSULTATION THROUGHOUT THE PROJECT

Some of the critical groups and forms of consultation that the project team undertook are listed below:

1. Mana whenua site walkover and several hui throughout the design process,
2. Auckland Cycling Advocacy Groups consultation,
3. A Karangahape Road Community Reference Group was established specifically for this project with members from the local business and residential community. This group met regularly with the project team,
4. Karangahape Road Business Association (KBA) have been consulted regularly through the design development phase and during construction,
5. Individual property owners and residents,
6. Feedback was sought and received via engagement at 3 x public events Myers Park Medley (March 2016), White Night (March 2016) and the Open Streets Festival (May 2016),
7. Engagement with internal Council Stakeholders includes the Waitemata Local Board, Howell Davies (arborist), AT Metro and the CRL and LRT project teams.

MULTI-CRITERIA ANALYSIS OVERVIEW

A multi-criteria analysis (MCA) was undertaken to evaluate the options considered for the Karangahape Road corridor on the basis of the public and stakeholder consultation that had been carried out to date. Options were developed for the different segments along the corridor. This was to provide appropriate consideration of the localised environments in terms of their nature, character, and function. This was from both a transport and urban realm perspective, as well as the desired future outcomes.

The desired outcomes were determined by the following five project criteria with the key indicators identified to evaluate options:

1. To provide a safe and attractive cycle route along Karangahape Road for all levels of cyclists, including less confident "interested but concerned" cyclists. This is achieved through;
 - Enabling the actual and perceived separation of people on bikes from general traffic and pedestrians,
 - Achieving consistency and legibility with the quality of existing and proposed connecting facilities, and
 - Supporting and encouraging people on bikes of all ages and abilities (through a safe, fit for purpose and appropriate design)
2. To deliver a high-quality, integrated streetscape environment that prioritises pedestrians and public life. This is achieved by;
 - Increasing the quantum of the public realm to provide space that supports both movement (walking and cycling) and occupation (outdoor dining and street furniture) of the street
 - Providing additional streetscape amenity and planting in keeping with the character of Karangahape Road, and
 - A streetscape that supports reduced vehicle speeds (30km per/hour)
3. Ensure the protection of priority public transport routes and facilities and limit impacts to general traffic. This is achieved by;
 - Providing facilities to maintain bus journey times and reliability
 - Minimising delay to traffic, and
 - Allowing for flexible lane use across the day
4. To provide a streetscape environment that invites multiple uses and activities that support and empower local community/ business led place-making opportunities. This is achieved by;
 - Supporting informal movement across the corridor to increase local interactions between people

- Creating a street that encourages people to visit, linger and spend money locally, and
 - Providing flexible street space enabling use across the day/week and supporting one-off events
5. To create a distinct streetscape destination that celebrates, integrates and responds to the historic built form, social character and public life inherent to the identity of Karangahape Road. This is achieved by;
- Increasing awareness of the unique built form and activities on/along Karangahape Road
 - Keeping consistency with Auckland Council's Roads & Streets Design Guide outcomes, and
 - Developing design consistent with the aspirations of the Karangahape Road Plan

The options evaluation was undertaken for the various sections along the street. A preferred design option was then identified for each, and this was applied and integrated into the final design concept.

FOOTPATH PROVISION

The existing 4.5m wide footpath along Karangahape Road can be considered 'sub-optimal' as it does not provide the necessary spatial allocations for both movement and occupation. Based on Auckland Transport Code of Practice (ATCOP) guidelines for a main street (refer figure 2.0), the optimal dimension would be 5.35m. The existing widths are more consistent with the New Zealand Transport Agency guidelines, which suggest an overall width of 4.5m for a 'main street' environment (NZ Transport Agency, 2008).

However, the current 'effective width' (clear width) of the footpath along the street is compromised through the placement of street furniture, garden areas and location of light poles and signage, which are set back 0.5m from the kerb. This results in episodic congestion and 'pinch points' along the corridor. The preferred design approach seeks to optimise footpath widths - whilst accepting that achieving best practice design guidelines and also balancing the needs of other users cannot be achieved.

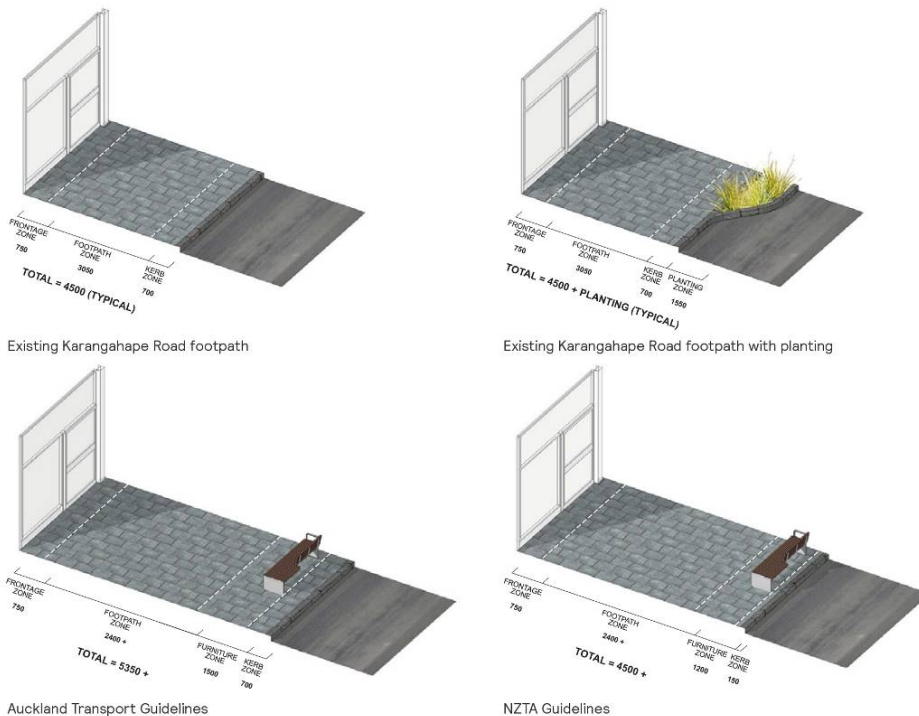


Figure. 2.0 – Footpath Provision Options

CYCLEWAY PROVISION

Four cycleway strategies were explored and tested for their suitability for Karangahape Road (refer figure 3.0). A minimum width of 1.5m was agreed as a baseline design parameter for the cycleway with the understanding that this would be an aspirational goal itself, considering the constraints associated with the road corridor.

The Separated and Copenhagen options were identified as preferable design approaches and were used to test several street configurations and conditions. Furthermore, the separated cycleway was identified as the preferred design approach via internal and stakeholder consultation. The preference for this is as follows:

- Physical separation between cyclists and vehicles,
- Grade separation between pedestrians and cyclists, and
- Ability to use the buffer for pedestrian refuge or planting

CYCLEWAY PLACEMENT

The placement of the cycleway within the Karangahape Road corridor was explored between three options. A bi-directional facility on the north and south sides of Karangahape Road - or a separated cycleway on both sides. The main benefit of uni-directional cycleways is that cyclists are on the side of the street that the traffic is moving, allowing for safer negotiation of conflicts at side streets. It is also easier for cyclists to connect into side streets and move off the cycleway when required. The disadvantage is that the narrower cycleway (1.5m) does not provide as many passing opportunities. Requiring double the buffer capacity also takes away space in which a bi-directional facility could retain one parking lane.

The preferred outcome was a uni-directional cycleway on each side. The benefits of connecting into the wider network outweigh the spatial disadvantages.

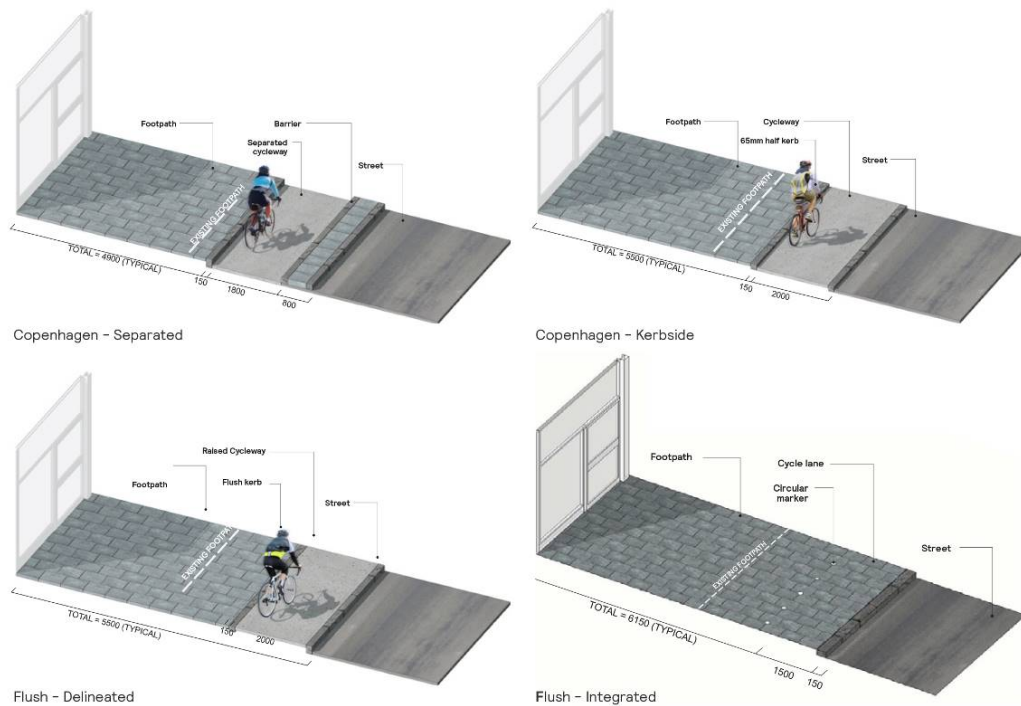


Figure. 3.0 – Cycling Provision Options

DESIGN PROPOSAL

The design proposal established a simple, cohesive cycleway and enhanced public realm that provides an appropriate balance between the needs of all users and supports the vision of Karangahape Road as a great urban street.

LAYOUT CONFIGURATIONS FOR EACH ZONE

The preferred design proposes a one-way cycleway on both sides of the road, to be separated from general traffic for the majority of the route by a buffer island. The island provides for additional streetscape amenity, the framing of the public realm and vertical definition of the corridor. The island also provides space for lighting, raingardens, tree pits and signage, further reducing clutter within the pedestrian space. This also allows good access to shops and restaurants, connections to side roads on either side of the road corridor, and keeps cyclists travelling in the same direction as the general traffic.

Due to existing site constraints and traffic corridor requirements, cycle treatment varies between different sections of the route. The design provides a cohesive spatial strategy between Ponsonby Road (west) and Symonds Street (east) that establishes legibility between spaces allocated for movement and occupation. The design provides for bus lanes between Ponsonby Road and Pitt Street to maintain good levels of service for buses along this section of the project. These would initially operate during the weekday morning and evening peak periods but will transition to 12-hour operation (7 am to 7 pm), as required, to maintain good levels of service for buses.

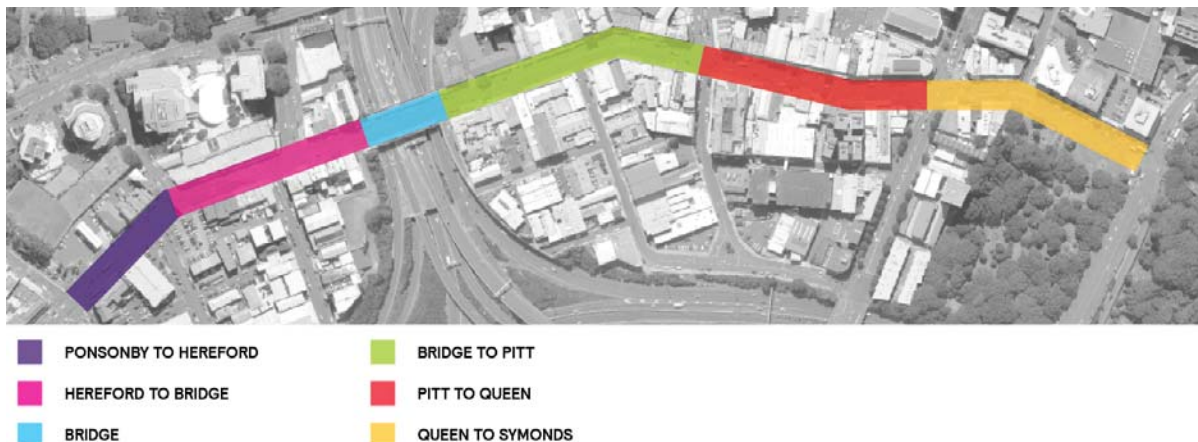


Figure. 4.0 – Karangahape Road's Different Zones

As shown in figure 4.0 above, different sections of the street required varying execution of the typical design.

The typical design included a 1.6m half-raised cycleway with a 1.2m wide planted/paved buffer zone (refer figure 5.0). Four lanes of traffic are provided, with the outer lanes functioning as a peak hour bus lane and off-peak parking/loading. Existing light poles and planting will be shifted into the buffer zone to increase usable footpath space and introduce a furniture zone that could function as restaurant dining, bicycle parking and public seating.

Both Ponsonby Road and Symonds Street ends of the project required additional vehicle lanes for turning movements and therefore reduced the available space. The cycle facility continued but in a reduced capacity. There is potential for improving the Symonds Street section with a future closure to the Motorway on-ramp.



Figure. 5.0 – Typical Street Cross Section

Bus stops can be a challenging conflict point with cycle facilities. Cyclists need to navigate either buses or pedestrian movements. Several options were tested for this location, with the preferred outcome being a 1.5m cycleway raised to footpath level that diverts behind the bus shelters, so they are separated from bus & bus passengers. The flush treatment acknowledges the conflict but also gives both cyclists and pedestrians the ability to navigate it. A change of grade would limit the capacity of cyclists to react. The cycleway treatment is painted pink and has a tumbled stone texture edge. This also signifies to all users, including cyclists, to be vigilant. The space in total is more usable for any temporary events or activation of the space.

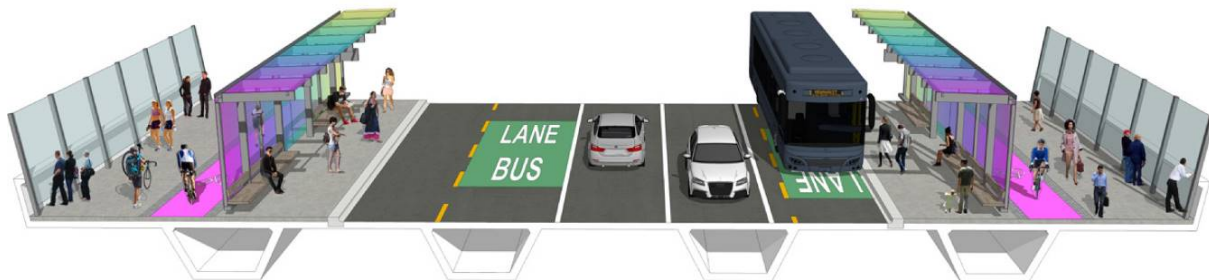


Figure. 6.0 – Karangahape Road Bridge Cross Section

The existing condition on the Karangahape Road bridge (over the motorway junction) had an array of bus stop treatments that did not acknowledge the incredible views to both Mangawhau and the Waitematā. The proposed design at Karangahape Road Bridge (refer figure 6.0) involves relocating the existing bus shelters towards the new kerbline to create a more generous space for pedestrians and cyclists behind the bus shelter. The bus shelters themselves are a simple yet elegant piece of infrastructure. There was a clear mandate from the community that standard designs would not be appropriate, and the overbridge was an opportunity to expand on this. The specific colours of the glass were a narrative of pāua, developed with a local mana whenua artist Tessa Harris. This represented the importance of the overbridge and its views as the 'eyes' of Karangahape Road. Pāua being traditionally used in Maori carving as the eyes. Tessa was also involved in repurposing screens from the sides of the overbridge to use with tukutuku weaving.

The operational assessment undertaken on the bus stop location had confirmed that this will provide for appropriate future bus stop demand and will not have any more than minor adverse impacts on the reliability and journey times for buses along Karangahape Road (Ormiston, 2016).

The section between Pitt Street and Queen Street is located at the heart of Karangahape Road and faces the most change in the near future. The adjacent CRL and public transport projects

highlight the need for the integrated and staged delivery of the Pitt to Queen Street block to minimise impacts on the wider city centre transport network. Once CRL is completed, the increase in pedestrian demand to this section will be significant.

The proposed design for Upper Queen Street retains the existing traffic lane configuration of five traffic lanes on the northern end and narrows to four lanes approaching Canada Street. A low investment style cycleway is provided on both sides of the carriageway with precast concrete separators which connect Karangahape Road to the Grafton Gully Cycleway.

KEY DESIGN FEATURES

The proposed street upgrade will include the following key design features that will enhance the overall amenity and place function of Karangahape Road:

- Upgraded footpaths using a similar paving material to the existing
- New kerb and channel to accommodate the proposed cycleway where required
- Improved legibility and functionality of pedestrian crossings and intersections
- Increasing east-west pedestrian priority through the proposed side street raised tables
- Additional planting, amenity and opportunities for the occupation of these sides street spaces
- New street lighting to improve the visual amenity and safety of the street corridor Reduced clutter through the rationalisation of regulatory and way-finding signage, lighting and street furniture
- A bespoke, project-specific suite of street furniture that provides improved comfort, new opportunities for occupation and increased sociability of the street
- Rain gardens and planting that provides additional greening and supports council and mana whenua environmental aspirations and cultural design narratives. Rain garden zones are positioned strategically to optimise treatment and choreograph the street environment.
- A combination of existing and new street trees are clustered to provide vertical identity and rhythm using repositioned trees from the corridor wherever possible.

SIDE ROAD TREATMENT

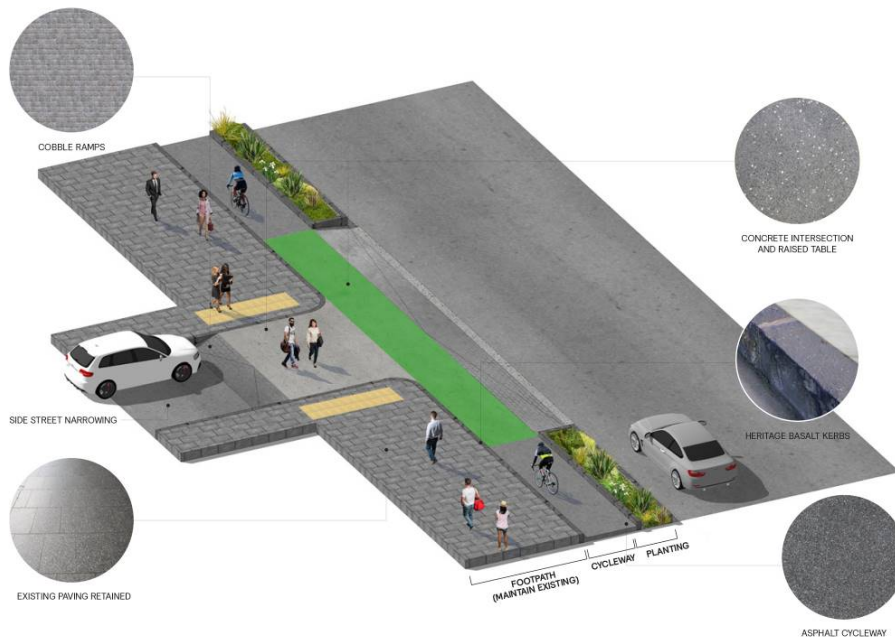


Figure. 7.0 – Side Road Treatment

The side road treatment is an example of balancing several user groups at a critical junction. The

proposed design prioritises people on bikes across unsignalised side roads through the raised table and green paint marking for the cycle throughway. The raised table provides increased pedestrian safety and amenity – while also slowing traffic. The raised table maintains the footpath level through the intersection for both pedestrians and cyclists (refer figure 7.0).

ECONOMICS

The Karangahape Road Cycleway economic evaluation was undertaken in accordance with the Transport Agency's Economic Evaluation Manual (EEM) Qualitative inputs, particularly using the Simplified Procedure (SP-11) in terms of considering the cycle benefits. A previous preliminary design for the Karangahape Road cycleway, prepared by MWH, has been considered in the economic analysis, in addition to two options developed through this phase of the project.

CITY CENTRE NETWORK CONTEXT

The Karangahape Road cycleway is a critical component of the overall City Centre cycle network. An economic evaluation of the proposed City Centre cycle network has previously been undertaken by Flow, which includes this project (Ormiston & Jongeneel, 2015). That evaluation identified that the combined package of projects would likely result in an overall BCR of almost seven; this would achieve 'high' economic efficiency.

OPTIONS CONSIDERED

The three options considered in the economic evaluation against the existing environment are:

- Option 1 - MWH Design with bus lanes from Ponsonby Road to Symonds Street (no public realm work)
- Option 2 - A 'Copenhagen' cycle facility (both sides) along the entire corridor length with bus lanes Ponsonby Road to Pitt Street.
- Option 3 - A separated cycle facility, as per the preferred design, with bus lanes from Ponsonby Road to Pitt Street.

SUMMARY OF OUTCOMES

The economic evaluation focussed on the transport benefits / dis-benefits of the project, as quantitative outcomes being more easily determined. This was in comparison to the qualitative amenity outcomes associated with the streetscape & urban realm enhancements. Thus, to indicate the transport efficiency of the project, the analysis has initially focussed on comparing the transport benefits against the transport infrastructure cost for the options developed through this phase of the project (Options 2 and 3). This is consistent with the approach to considering amenity benefits in the EEM.

TRANSPORT IMPROVEMENT ANALYSES

The total costs for Option 2 and Option 3 are inclusive of amenity improvements. If the evaluation were to exclude the costs associated with those improvements, then the balance of the costs associated with transport improvements would be around 46% of their respective total costs. Comparing those transport improvement costs with the quantified transport benefits / dis-benefits, the BCRs for both these options would then increase to above 1.0. Option 2 and Option 3 would then have BCRs of 1.8 and 2.0 respectively, which would obtain a LOW economic efficiency rating.

TRANSPORT AND PUBLIC REALM COSTS – ALL OPTIONS

Based on the economic analysis, the evaluation of all three options is summarised below:

- Option 1 has the highest BCR due to the much lower cost relative to Options 2 and 3.
- Option 1 has a LOW economic efficiency rating under the National Land Transport Programme

(NTLP) 2015/18.

- Option 3 has a BCR just below 1, which is due to the higher cost of the proposed option. However, this high cost provides for qualitative health and safety benefits for pedestrians, which cannot be quantified in this economic analysis.

CONCLUSION

Karangahape Road is an excellent reference for integrating new cycle facilities into a holistic urban public realm upgrade while not losing the street's character. Within a New Zealand context, cycle infrastructure is still young, and this is one of the first examples of such a project in a high street environment. This approach expanded the initial brief from purely cycling infrastructure to a holistic street enhancements project. A cycleway could not be implemented in such an iconic street as Karangahape Road without doing so.

With the project close to completion, some of the decisions around mode share can already be witnessed. As sections are completed, Auckland Transport has opened these to cyclists in good faith. There is patience with those using the Karangahape Road bridge section, and the side streets are operating as intended. Vehicles are slowing down, cyclists and pedestrians have a safer crossing point. From where the street started with six vehicle lanes, the most significant move has been reallocating two of those lanes to pedestrians and cyclists. The improvements have been carefully integrated into the street and not imposed on top of it. The community has preserved with the construction, and the pay-off is close to being realised.

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AUTHOR CONTRIBUTION STATEMENT

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