Boffa Miskell

A VALUE OF THE URBAN REALM TOOLKIT FOR AUCKLAND?

CASE STUDY RESEARCH INTO APPLYING THE TRANSPORT FOR LONDON VURT METHODOLOGY IN AUCKLAND, NEW ZEALAND

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3 X AUCKLAND CASE STUDIES

Selecting Case Study Locations & Future Scenarios

In order to test VURT in Auckland, three case study locations were selected for street segments within the city centre. In each case, proposals have already been developed (and in once case delivered) for improving the public realm. In each example, the numbers of people using the space has increased, or is forecast to do so. For one example (Karangahape Road), two different design options were evaluated. Collectively, the case studies represent a range of current and future contexts and user demand profiles.

Why City Centre?

Case study locations were selected in Auckland's city centre. Significant investment has already enhanced streets and public spaces for pedestrians in Auckland's city centre over the last ten years, including a major upgrade of Queen Street, the shared space programme and flagship public spaces such as St Patrick's Square. During this time, the city centre has also experienced significant growth in public transport patronage, which together with rising city centre employment, residential population, a retail revival and significant growth in the numbers of visitors from cruise ship industry, major events and other tourism activity, has led to significant increase in the number of daily pedestrian users in many areas.

This growth is set to continue strongly into the next decade, with unprecedented investment in the growth of the city centre being underpinned by transit investment in City Rail Link, the New Network for buses, and potential Light Rail Transit. Alongside this transport investment, the Council continues to allocate funds in the Long Term Plan to some of the flagship projects to realise the key moves of the City Centre Masterplan, as well as a suite of other streetscape and public space upgrades, roll out of a ‘minimum grid’ of city centre cycleway infrastructure, and a raft of more localised pedestrian safety improvements. All of these measures contribute to a significant change in the pedestrian environment and represent a significant investment in public realm.

Therefore there is no shortage of potential case study locations and future scenarios for testing the VURT methodology in Auckland’s City Centre, and given the amount of dollar investment involved, evaluating the benefit of future scenarios for pedestrian movement and public space users to test the benefits of this investment is of great potential value for Auckland.

The following criteria were used to select the three case study locations and future scenarios:

Availability of existing 24 hour pedestrian count data, to reliably determine the peak hour pedestrian period (ideally using Heart of The City's network of automatic pedestrian counters across the City Centre);

Availability of a future streetscape upgrade scenario with elements intended to enhance both pedestrian movement and place values, with dimensioned plans and cross-sections that enable quantifiable evaluation of key metrics such as effective footpath width, as well as a good understanding of the likely streetscape materials, street furniture, lighting, planting and other elements that contribute to streetscape quality;

Selection of street segments that represent a range of different contexts and segment attributes (for example street segment length, street width, existing pedestrian users, existing and future influence of public transport infrastructure, extent of anticipated future land use context change);

The ability to test more than one future scenario for the same street segment (i.e. have more than one future design option available) to test the ability of the tool to evaluate the relative benefits of different options;

The ability to test how a different projected growth in footfall affects the benefits of option/s

The ability of the tool to be used retrospectively, i.e. to measure the benefits that have accrued with recently implemented streetscape improvements relative to a known baseline prior to the upgrade.

Three case study locations, one encompassing two contrasting future scenarios / design options, were selected:

1. Queen Street Future Light Rail Transit Mall
2. Karangahape Road Cycleway Project Scenario 1: Existing Footpath Widths
   Karangahape Road Cycleway Project Scenario 2: Widened Footpaths
3. O'Connell Street Existing Shared Space Scheme (Implemented 2014).

Key attributes of each of these case studies is outlined on the following page.

Methodology

Identify case study street and segment locations:
- Queen Street Future Light Rail Transit Mall
- Karangahape Road Cycleway Proposals (Existing and Widened Footpath Scenarios)
- O'Connell Street Shared Space

Obtain existing site plans, drawings for future proposals, and 24 hour pedestrian count data.

Review pedestrian count data to identify peak hour period for existing user numbers and time period to undertake baseline on-street audits for each case study

Review team to individually undertake existing baseline PERS on-site audits for each case study during peak hour (O'Connell St baseline assessed using historical pre-upgrade Google Street View and photography)

Review team to individually undertake desktop PERS audits for **future proposal** for each case study utilising dimensioned plans, cross-sections, perspectives and supporting design documentation (O'Connell St audit undertaken on-site evaluating current upgraded environment)

Review team meet to discuss preliminary results of PERS audits for baseline existing and future scenarios and agree consensus ratings for all criteria.

Calibration of independent audits into one set of data for each case study.

Calibrate VURT Excel spreadsheet for local use:

- Set lifetime period of 20 years for all case studies

Enter data into VURT Excel spreadsheet to quantify annual and lifetime benefits in Pounds Sterling (GBP)

Exchange monetary value from Pounds Sterling (GBP) to New Zealand Dollars (NZD) utilising Online Foreign Exchange Calculator utilising rates current on date of entry (March-April 2017)

Auckland City Centre Case Studies

Queen Street Future Light Rail Transit Mall

SEGMENT ATTRIBUTES:

Block: Wyndham - Victoria Streets

Length: 210 metres

Width: 29 metres

CURRENT ATTRIBUTES:

Current Daily Footfall: 37,130 per day

Current Peak Hour Footfall: 3,865 per hour

4 x traffic lanes

7-10m widened footpaths with indented parking bays

Consistent street furniture zone maintaining clearway for pedestrian through movement

Signalised Barnes Dance (diagonal) crossings at Wydnham and Victoria Streets, signalised mid-block crossing at Durham Lane.

High quality streetscape with stone paving, street trees, and pedestrian lighting and some wayfinding signage

FUTURE ATTRIBUTES SCENARIO 1:

Assumed Future Daily Footfall: 74,260 per day (200% increase)

Assumed Future Peak Hour Footfall: 7,730 per hour (200% increase)

Central Light Rail Vehicle carriageway for two way operation

No private vehicle access (operational and managed service delivery access only)

Copenhagen-style cycle lanes each direction

Level surface design enhancing ease and freedom of pedestrian movement across the street at any point, subject to tram movements

Changes delivered to established high quality streetscape of existing design.

Student Flights
ATM

Queen Street:
Wyndham - Victoria Streets

200%
INCREASED FOOTFALL

NZ$702,000
YEARLY BENEFIT

NZ$15,150,000
LIFETIME BENEFIT

Results of Queen Street Case Study

While Queen Street is already far and away the busiest pedestrian street in the city, with some 37,000 average daily users in the case study block alone, big drivers of change are also afoot. These include future light rail services up Queen Street, associated creation of a pedestrian transit mall, and opening of the CRL Aotea Station one block to the west. 200% future growth in footfall has been assumed. User benefits for the Queen Street case study were fairly evenly distributed between link and space benefits, with a slight weighting towards greater space benefits.

This central segment of Queen Street already has a high number of pedestrian users. The PERS peak hour on-site audit considered that the existing width and spatial arrangement of footpaths was able to accommodate existing peak pedestrian flows. Significant user conflict with vehicular traffic and impediments to pedestrian movement was observed along the kerbside zones and it can be hard to cross the street away from formal crossing points.

The transformation to a transit pedestrian mall will greatly enhance ease of pedestrian movement across the street, and spread the heavy concentration of pedestrian flows across a greater effective width. In doing so, and by removing buses and general vehicular traffic from the street, this creates a much more pleasant environment for sitting and spending time in the street as public space.

Accordingly, key factors associated with the increase in link benefits were an increase in effective width and much greater pedestrian permeability (freedom and ease of movement across the street at any point along the segment). Attributes contributing to the greater space benefits included feeling comfortable, sense of place and opportunity for activity.

The VURT evaluation resulted in NZ$702,242 in annual benefits, or NZ$15,164,732 in lifetime benefits.

While the PERS evaluation suggested the improvement in link and space attributes are fairly moderate relative to a high existing baseline, and certainly less dramatic a transformation than under the O'Connell Street or Karangahape Road 2A future scenarios, the large dollar value ascribed to the user benefits demonstrates the effects of a busy street.

Where the numbers of users are already high, such as in Queen Street, modest improvements to streetscape can generate high total values. Even if the number of pedestrians in Queen Street remained unchanged, the future scenario would still accrue annual benefits of $381,400 or NZ$8,240,000 over a 20 year lifetime.

Karangahape Road Cycleway Project

SEGMENT ATTRIBUTES:

Block: Queen - Pitt Streets
Length: 195 metres
Width: 27metres

CURRENT ATTRIBUTES:

Current Daily Footfall: 17,000 per day

Current Peak Hour Footfall: 1,312 per hour

4 x traffic lanes with kerbside parking lanes

4.5m wide footpaths with kerb buildouts at intersections and midblock

Bus boarding zones, street furniture and other street clutter create regular obstacles to pedestrian through movement

Signalised crossings at Queen Street and Pitt Streets, signalised mid-block crossing at St Kevins Arcade

Moderate quality streetscape with stone paving, limited seating and planting, poor pedestrian lighting and no wayfinding signage

Scenario 1 - Existing Footpath Widths

FUTURE ATTRIBUTES SCENARIO 1:

Assumed Future Daily Footfall:
25,500 per day (150% increase)

54,400 per day (320% increase)

Assumed Future Peak Hour Footfall:
1968 per hour (150% increase)

4198 per hour (320% increase)

2 x general traffic lanes with kerbside peak vehicle lane / off-peak parking lanes

Copenhagen-style separated cycle lanes each direction with planting / pedestrian paving kerbside strip

Existing footpath width maintained with tree planting, lighting and other elements relocated outside of this zone between new cycleway and relocated kerb

High quality streetscape including new stone paving to pedestrian areas, street furniture, trees and planting and pedestrian-focused lighting

Scenario 2 - Widened Footpaths

FUTURE ATTRIBUTES SCENARIO 2:

Assumed Future Daily Footfall:
25,500 per day (150% increase)

54,400 per day (320% increase)

Assumed Future Peak Hour Footfall:
1968 per hour (150% increase)

4198 per hour (320% increase)

2 x general traffic lanes only

Copenhagen-style separated cycle lanes each direction with planting / pedestrian paving kerbside strip

Significantly widened footpaths with new outdoor dining / street furniture zone, and tree planting, lighting and other elements relocated between new cycleway and new kerbline

High quality streetscape including new stone paving to pedestrian areas, street furniture, expanded outdoor dining provision, trees and planting and pedestrian-focused lighting

Karangahape Road:
Pitt - Queen Streets

Karangahape Road
Scenario 1 -
Existing Footpath Widths

320%
INCREASED FOOTFALL

NZ$73,000
YEARLY BENEFIT

NZ$1,600,000
LIFETIME BENEFIT

Karangahape Road
Scenario 2 -
Widened Footpaths

320%
INCREASED FOOTFALL

NZ$261,000
YEARLY BENEFIT

NZ$5,600,000
LIFETIME BENEFIT

HAKA LODGE BACKPACKERS

Results of Karangahape Road Case Study

Karanghape Road provided the opportunity to test and evaluate the relative link and space benefits of two different design options.

This central section of Karangahape Road between Queen and Pitt Streets was the subject of a comprehensive streetscape upgrade in the early 2000s. The PERS on site audit found that in its current state, it has maintained a relatively high surface quality, has a positive sense of place and opportunity for activity, but pedestrian movement is negatively affected by most measures, particularly permeability, effective width, obstacles and overall maintenance and quality of environment. These factors also negatively influence the space attributes of moving and interpreting the space.

Karangahape Road Scenario 1 adds separated cycleways by removing the kerbside parking lanes, but retains existing footpath widths. User conflict between pedestrians and other street users is reduced, and the effective width of the footpath is improved by the relocation of trees, planting, light columns and other obstacles to a new street furniture zone between the cycleway and new kerbline. Of the potential space benefits, key factors were a significant improvement to moving in space, feeling comfortable, and personal security, with a more modest increase to sense of place and opportunity for activity that were already assessed as positive in the existing scenario.

Scenario 2 has all of the benefits of Scenario 1, plus wider footpaths following the removal of two traffic lanes. This provides greater effective width for pedestrian movement but also new pedestrian space that can be dedicated to placemaking activity, such as outdoor dining, seating, or artwork, that can be accommodated out of the way of the pedestrian movement zone.

An initial evaluation for both scenarios was modelled on an assumed 150% growth in footfall. This resulted in positive link and space benefits to a total of NZ$76,000 in annual benefits for Scenario 1, or $110,000 for Scenario 2. On review, the figure of 150% was deemed to be overly conservative, given that future footfall is projected to grow significantly with the opening of the Karangahape Road CRL Rail Station, and first stage of an LRT line along Queen Street. This adds two new “pedestrian fountains” in new transit stations at either end of the segment. Background studies for the streetscape project predict a 320% increase in link users for the peak hour.

With a 320% footfall increase, Scenario 1A becomes too overcrowded to be comfortable. While the existing footpaths could accommodate the increase in link users, this would come at the expense of people wanting to spend time in the street. Discretionary place-making activity such as outdoor dining would be impossible. All benefits under this scenario accrue solely due to link benefits.

By contrast, testing Scenario 2 with the higher 320% footfall figure demonstrated that the wider footpaths of this option delivered benefits for both link and space users, and given the much higher total number of users, the total dollar value of all benefits was much higher. The opportunity in this option for a dedicated outdoor dining / seating zone ‘offline’ from the main pedestrian flows, resulted in significant space and link benefits, with total benefits more than 3.5 times those of Scenario 1A.

Overall, these four scenarios, encompassing two different design options, and two different assumptions around future growth in footfall, highlighted how the VURT tool is able to assign value and assess the benefits of link and space benefits separately as well as together, and that different combinations of design outcomes and user numbers could vary widely in the range of positive and / or negative effects on link and space values.

Scenario	Link	Space	Annual	Lifetime
Existing Footpath Width 150%	$57,411.07	$29,992.39	$87,403.46	$1,887,578.47
Existing Footpath Width 320%	$116,454.25	-$42,969.37	$73,484.88	$1,586,233.12
Widened Footpaths 150%	$73,922.39	$52,866.65	$126,789.04	$2,737,873.31
Widened Footpaths 320%	$151,951.68	$108,670.34	$260,622.03	$5,628,114.89

Megs
Downer
Litter

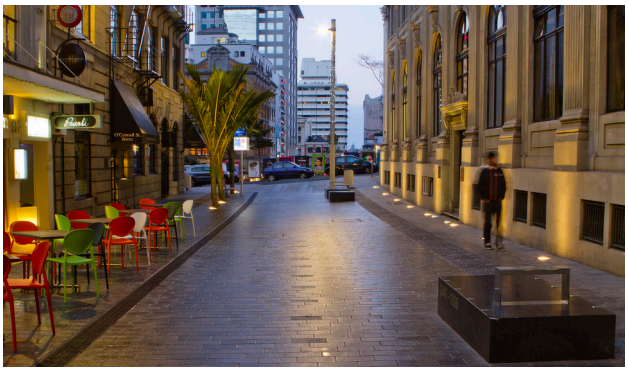
O'Connell Street Shared Space (Implemented 2014)

SEGMENT ATTRIBUTES:

Block: Shortland Street - Courthouse Lane

Length: 105 metres

Width: 10 metres



CURRENT ATTRIBUTES:

Current Daily Footfall: 6,997 per day

Current Peak Hour Footfall: 593 per hour

1 x traffic lane one way access with kerbside parking lanes

Narrow 1.2m wide footpaths with kerb buildouts at midblock crossing on Vulcan Lane

Parked cars, signage and other street clutter create regular obstacles to pedestrian through movement along the street

Mid-block build out and zebra crossing at Vulcan Lane but the rest of the street is dominated by kerbside parking with very high rates of occupancy by parked cars. This inhibits free pedestrian movement across what is an otherwise narrow, slow speed street

Low quality streetscape with asphalt pavement, no seating, very limited trees and planting, poor pedestrian lighting and no wayfinding signage

FUTURE ATTRIBUTES SCENARIO 1:

Assumed Future Daily Footfall: 10,495 per day (150% increase)

Assumed Future Peak Hour Footfall: 890 per day (150% increase)

Shared space treatment retaining one way vehicle access with managed service and delivery access

Shared surface design measures, including pedestrian priority, level surface and removal of parking greatly increases pedestrian priority and ease and freedom of pedestrian movement across the street at any point

High quality streetscape including new stone paving, seating and outdoor dining provision, trees, pedestrian-focused and building up-lighting, heritage interpretation elements.

150%
INCREASED FOOTFALL

NZ$39,000
YEARLY BENEFIT

NZ$660,000
LIFETIME BENEFIT

O’Connell Street Results

O’Connell Street was included as a case study to test whether VURT was capable of being used retrospectively to measure the benefits of already implemented streetscape improvements. O’Connell Street, a short and narrow 10 metre wide street that forms of the Laneway Circuit one block back and parallel with High Street, was upgraded from a conventional kerb and channel street to a paved shared surface treatment in 2014.

Another feature of the O’Connell Street case study is to test whether there are benefits to investing in streetscape for pedestrian movement and place/space benefits, when other factors influencing the total number of users remain much the same as the baseline. Unlike the projected future scenarios for Queen Street and Karangahape Road, there has been no major additional footfall growth on O’Connell Street. Other than the background growth in overall city centre users, the growth in O’Connell Street users and change in how they use the space, is the result of the behaviour changes that have occurred as a direct result of the streetscape changes implemented.

Pedestrians were previously confined to very narrow footpaths, approximately 1.2m wide and constrained between the building edge and a row of parked cars. Now they can move freely across the full width of the street, enjoying pedestrian priority over moving vehicles, with no parked cars other than managed service and loading access. This space gain has created significant opportunities for public seating, outdoor dining and tree planting, all elements and activities previously lacking.

Unlike the other case studies, the PERS on-site audit for O’Connell Street was able to evaluate the performance of the ‘after’ scenario during the peak hour. The ‘before’ PERS evaluation used historic Google Street View photography and analysis material from the original design proposal. This was supplemented by prior knowledge by the authors as to how the street functioned.

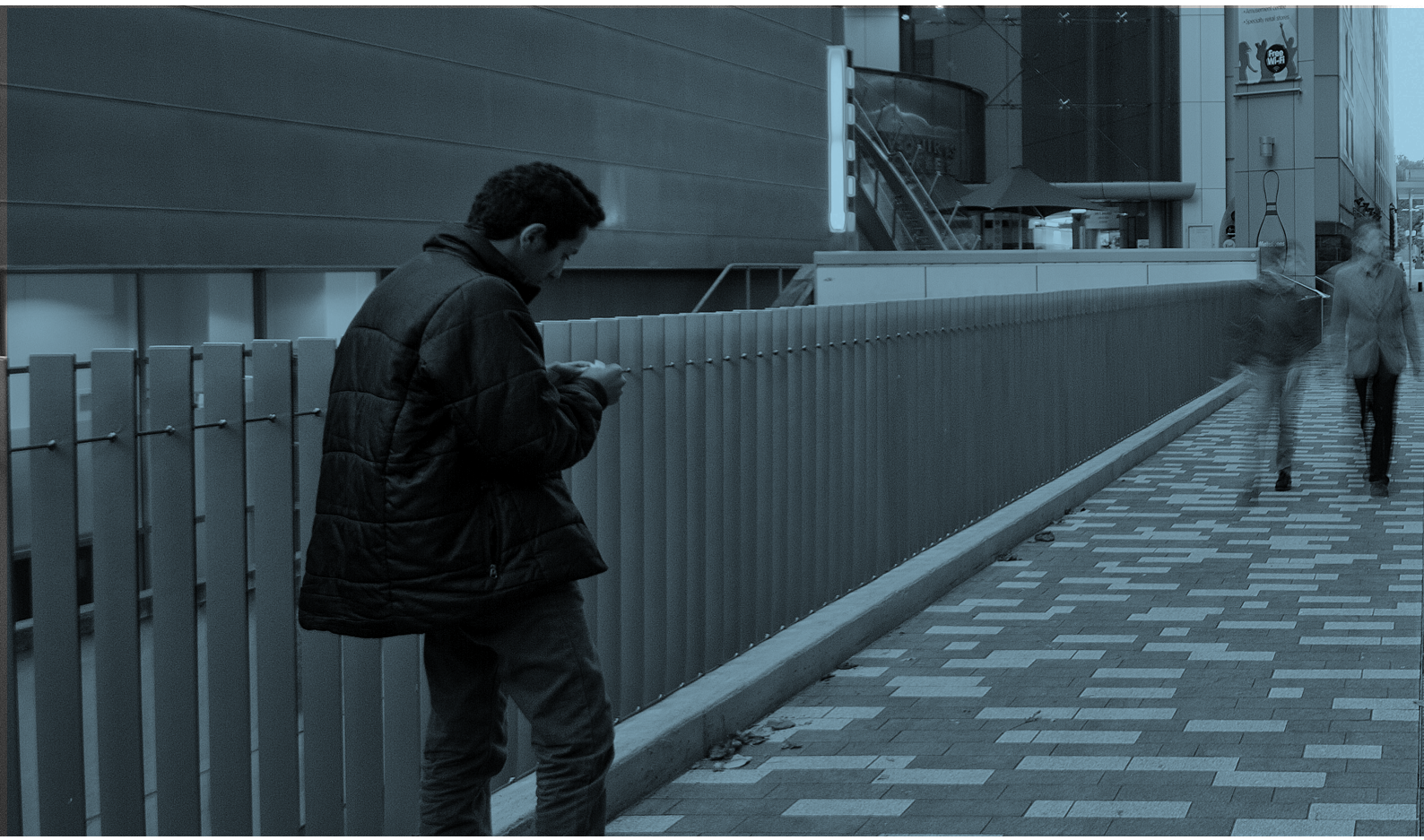
The PERS audit identified positive changes in all link attributes, but particularly those key factors of effective width, obstructions, permeability, user conflict, maintenance and quality of environment. Similarly, in terms of the space benefits, these were accrued across all the relevant PERS attributes, but most strongly for moving in space, feeling comfortable and sense of place.

The most significant change was in **opportunity for activity**, where the street’s transformation resulted in the strongest possible shift from a -3 prior to the upgrade to a +3 after the shared space was implemented.

While the transformation of O’Connell Street has been dramatic, the case study demonstrates how the monetary value of these benefits is linked to the total number of users, and length of the segment (shorter than the others at 105 metres). It also points to the importance of having reliable and recent 24-hour pedestrian count data available. Anecdotally, it is suspected that the current number of users, for link and especially space functions, is significantly higher than the 150% assumed in this case study. However, lack of data has prevented the determination of an informed increase in footfall that would allow even greater benefits to be calculated.

RESEARCH

PART 2: WHAT DOES THIS TELL US?



What does this tell us?

This section reflects on the key findings of the three case study streets and the experience of using VURT.

Overall, the case study research usefully demonstrates the usefulness of VURT and the PERS on-site audit that underpins it, to measure, evaluate and ascribe monetary value to a range of different future scenarios, each with different outcomes in terms of the link and space values measured by the tool.

Fundamentally, this research demonstrates that there are two main ways to add value to public realm: either through growth in the number of users, and/or improving the quality of the user experience. The VURT tool is predicated on the basis that if nobody is using the public realm, then it has no value to anyone.

The tool accounts for both of these things - growth in users and the quality of the user experience - through its calculation of pedestrian link and space benefits. The ability to calculate and ascribe these benefits both separately and together is a particularly invaluable aspect of the tool, given that there are quite often complex interrelated set of variables between link and space values for pedestrian users. Sometimes, through the PERS audit, the assessment will show that these factors will interrelate in a consistent manner for both link and space attributes, while in other circumstances, qualities that may have positive benefits for one set of values may reduce the level of benefits or even result in disbenefits for the other.

In particular, the Karangahape Road study shows how VURT can value link and space attributes both separately and together. It also shows how VURT can assess different future scenarios in terms of design outcomes and / or number of future users. These in turn influence the relative benefits of the link and place attributes. Comparative analysis of the four variant scenarios modelled for Karangahape Road demonstrated how a baseline option may have positive link and space benefits, that same option may have different benefits, including potential disbenefits to space values, if assumptions around future numbers significantly increase.

The Karangahape Road studies also demonstrated that the tool is capable of modelling different link and place benefits for different design options with the same number of future users. Ensuring that design options have strong differentiators that will influence the key link and space attributes - as in the difference in footpath width and flow-on benefits in this case - would be important to ensuring the tool provided a meaningful comparison of design options.

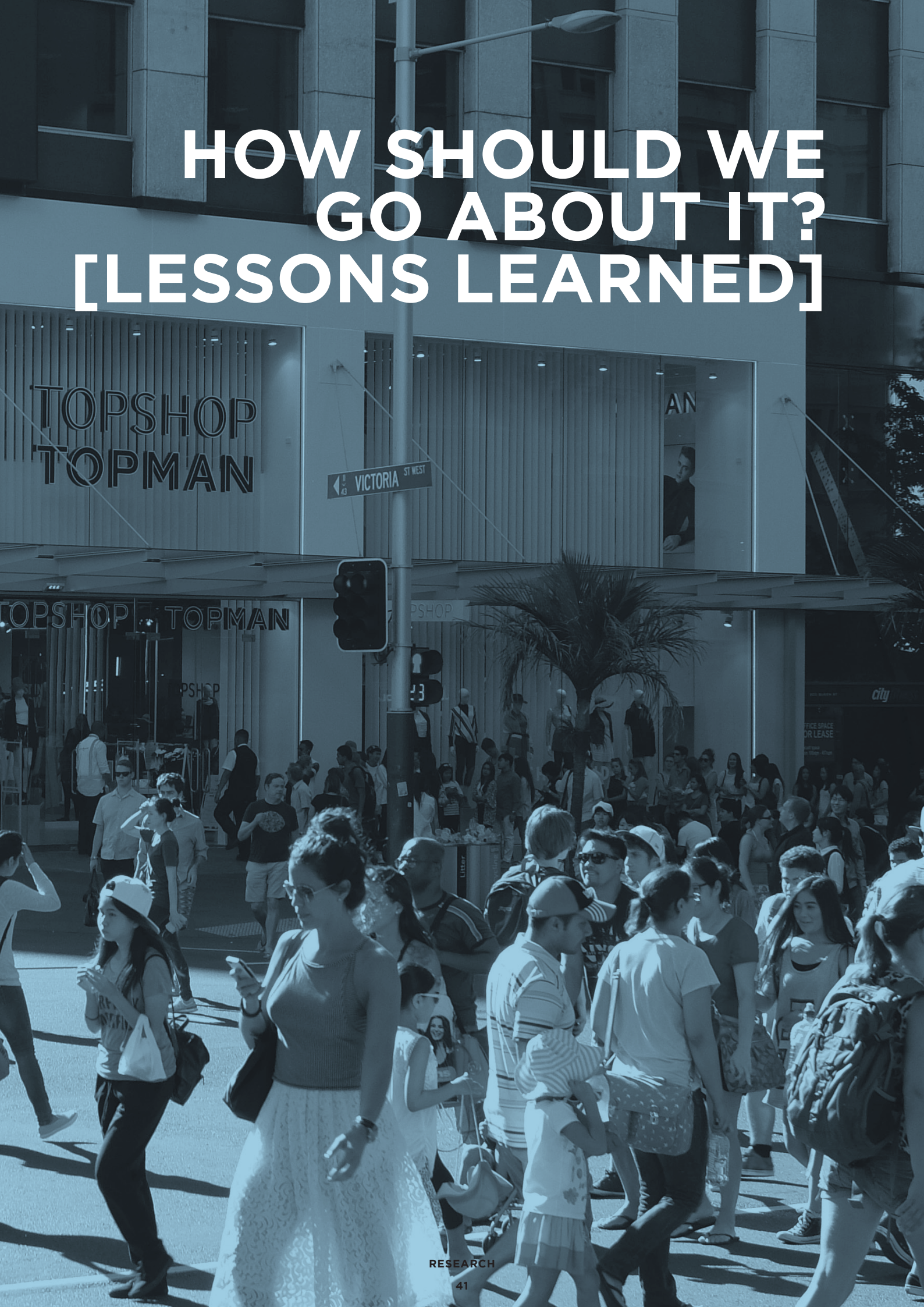
Where the differences between options are less about fundamental physical changes such as space allocation or the provision of particular streetscape elements, and more about the finer differences in material quality or design features of street furniture or other elements, then it is harder for the tool to quantify these sorts of qualitative design differences.

This aspect highlights another feature of the tool, which is that, by drawing on key space and volume metrics and user numbers and how these compare to the status quo, a reasonably quantified understanding can be developed. In particular, the space allocation for pedestrian movement and place-making functions, how streetscape elements are incorporated into an overall spatial arrangement and how this would likely affect pedestrian movement and use of the street as public space, enables assessment in a way that is fairly objective.

The PERS audits showed that there is considerable overlap and interrelationship between a number of link and space attributes. Additionally, in terms of the weighting assigned by VURT according to the baseline public preference research that underpins the tool, some factors are more important than others in determining overall value. Clearly, future user numbers are a key determinant of future benefits and this underscores the importance of making future assumptions that are as informed and robust as possible. Additionally, factors such as effective width (Link), personal security (Link and Space), sense of place (Space) and feeling comfortable (Space), have a major influence on the overall results, either through a greater weight being assigned, or the way in which they tend to inform other closely related attributes. Of these, personal security was considered notable as it has a significant overall bearing on the benefits calculated. The issues around assessing this factor are discussed further in reflecting on lessons learned in the subsequent section of this report.

RESEARCH
TOPSHOP
TOPMAN
QUEEN ST

HOW SHOULD WE GO ABOUT IT? [LESSONS LEARNED]



How should we go about it?

The following captures some of the key lessons learned in applying the tool to the local Auckland context:

IMPORTANCE OF ROBUST PEDESTRIAN COUNT DATA

VURT requires pre-existing pedestrian count data. This data must be up-to-date and measured over a 24 hour period. It must provide a whole-day figure and clearly identify the peak hour. This in turn enables detailed assessment of the existing on-site audit. This data is readily available, in a form that can be relied upon, for the locations covered by the autocounter network administered by Heart of the City. Heart of the City data was utilised for the Queen Street and Karangahape Road case studies, and made inputting these key baseline data very straightforward.

O'Connell Street by contrast, is not covered by the autocounter network, and it was not possible to obtain a 24 hour count from the most recent three years since the shared space scheme has been implemented. Like any tool in transport planning, outputs can only be as good as the inputs and in the case of O'Connell Street this has hampered a fuller and more informed evaluation of the benefits that have accrued to pedestrian users of O'Connell Street since the shared space has been implemented. Robust VURT modelling and evaluation would benefit greatly from an expanded network of pedestrian autocounters across the network of city centre streets and public spaces.

MAKING ASSUMPTIONS ON FUTURE FOOTFALL

The case study research demonstrated how assumptions around the future number of users relative to the baseline, are pivotal to determine the total user benefits. This was most evident in the Karangahape Road case studies where different assumed future user numbers were modelled for two different design options, resulting in four quite different sets of link and space benefits for moderate and high growth scenarios.

Similarly, in undertaking the Queen Street case study, the original assumption was of a 150% growth in foot traffic. However, when this factor was increased to 200% in light of projected footfall growth from the LRT stops and nearby CRL Aotea Station, the annual benefits increased from $511,190 to $702,242.

Where pre-existing studies are able to provide projected increases in footfall or at least, some base data such as future growth in public transport passengers on a certain bus route or rail station, as was available for the Karangahape Road case study, this can provide a more robust input to growth in future user numbers. Where this is not possible, an informed assumption can still be made and it is important to consider the full range of factors that may influence growth in the total number of users.

At this stage in Auckland's urban growth, it should be anticipated that there will be significant increases in user numbers. On-stream investment such as City Rail Link, Light Rail Transit and the New Network will continue to drive high additional patronage and growth in public transport. Additionally, the current very strong levels of migration and population growth will drive multi-billion dollar investment across the full spectrum of new commercial office, retail, convention centre, residential apartment, tertiary education, and domestic and international tourism sectors of the city centre economy over the current and coming period.

Accordingly, it is not conservative to expect a doubling or tripling or more in pedestrian users in many streets and public spaces across the city centre over the next 10 to 15 years as the impacts of this unprecedented period of growth and upheaval is felt. Coming off a low base, these growth figures are likely to be much higher when compared to more mature and stable established urban centres in other parts of the world, especially those with extensive and high frequency mass rapid transit networks such as London.

Being overly conservative in assuming future growth numbers risks significantly discounting the potential benefits of investment in streets for pedestrian users. Recent research by the Council has demonstrated that footfall on Queen Street has doubled in the past five years, a growth rate that has been achieved without any significant investment or change to the streetscape in this time period.

ASSESSING PERSONAL SECURITY IS DIFFICULT

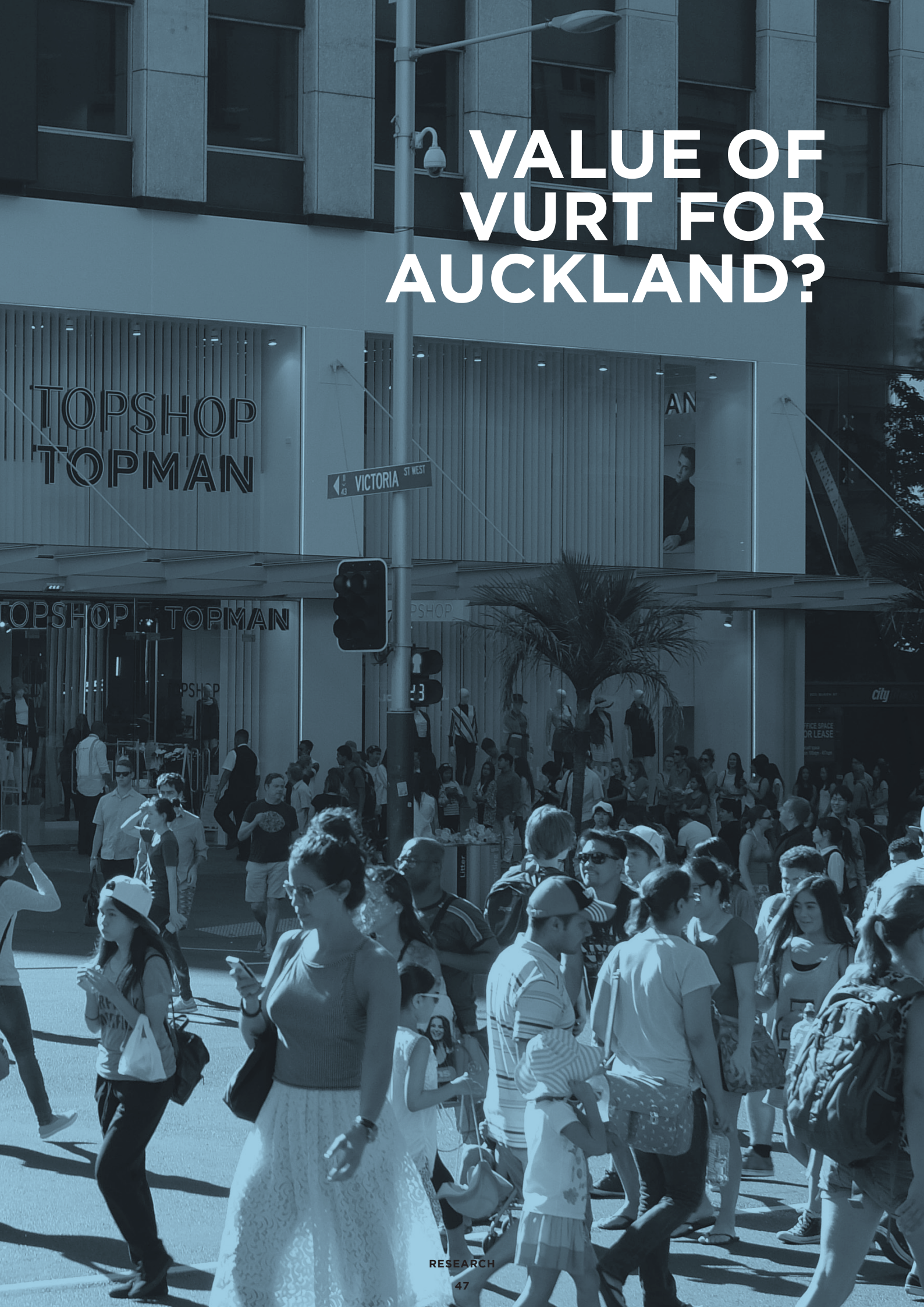
A key observation of the research team in undertaking the case study research, was the high weighting applied to the assessment of personal security in influencing the overall benefits calculated. This was considered somewhat problematic as in the eyes of the researchers it was somewhat difficult in the local Auckland context to assess objectively in an expert manner in the same way as was possible for other factors. Having good baseline data around levels of crime / perceived crime and public safety would be invaluable in undertaking VURT analysis in a local Auckland context.

GROUPTHINK IS GOOD

PERS evaluation requires to be undertaken by suitably qualified practitioners in urban design or transport planning, and benefits greatly from being undertaken by 2 or more practitioners, who may not have the same immediate impression of how an existing street is performing, or how a scenario may perform in future. Having 2 or more experts undertake an audit and then debating and deciding the final values to be in-putted into the VURT calculations makes for a more robust expert input.

RESEARCH
TOPSHOP
TOPMAN
QUEEN ST

VALUE OF VURT FOR AUCKLAND?



Value of VURT for Auckland?

Is the use of VURT, or a similar tool, of value to Auckland? The following are considered to be potential applications and benefits of such a tool to urban design and transport planning practice in the local Auckland / New Zealand context:

Quantifying a dollar value to use of the public realm

Fundamentally, the objectives of the VURT tool to account for the benefits of schemes to pedestrian movement and use of the public realm by pedestrian users is of great value in enabling these benefits to be considered alongside the other range of traditionally quantified transportation and safety benefits that make up the cost/benefit ratios that are a key input of the better business case model. Given that Auckland Transport and Auckland Council are now required to follow these procedures to be considered for funding from the New Zealand Treasury, the ability for this tool to input into these broader transport planning and business case processes and outputs is of tremendous potential utility.

We are placing much more weight on investment in streets for walking and public realm benefit, and we need tools that help us measure and evaluate the potential benefits of proposals in these areas in a robust and transparent way alongside other factors.

Wide potential applications

The potential applications of the VURT and PERS tools in Auckland and New Zealand are very broad. It is well suited to be used as an analytical tool and aid across the full gamut of planning, design and management activities undertaken with respect to streets and public spaces by cities.

It can be interoperated into design briefs, be utilised at a high level to inform potential work packages, be used to undertake detailed analysis of existing streetscape quality, optioning of potential futures, definitively

quantifying benefits for business case processes, and used as a tool for pre and post-evaluation.

It can be used by both transport planners and designers, could be written into requirements for transport planning and briefs for both strategic level and specific design proposals, and be a key informant of evaluation frameworks being assessed by project evaluators and decision-makers.

A consistent approach to assessing and auditing public realm use and quality

One of the key benefits to how pedestrian and public realms are addressed in Auckland at present is the way in which the tool utilises a consistent framework to audit and assess public realm use and quality. The PERS tool, or something similar, calibrated to the local context, is - in and of itself - of huge potential application and value to more consistently and comprehensively address the full range of attributes that matter to pedestrian users moving through and utilising streets as public space.

A greater focus on how public realm will be used rather than how it is designed

By being very clear that the value of public realm is to users, the VURT tool, and the PERS evaluation that underpins it, helps to refocus assessors of streetscape quality on the attributes that matter to how people use public realm, rather than on how public realm is designed. To date in Auckland, there has arguably been an over-emphasis on design quality - the quality of design detailing and materials for example - without an explicit acknowledgement and framework that says it is how all these things come together to benefit the user, that is what matters and is where the value of investing in public realm lies.

RESEARCH
TOPSHOP
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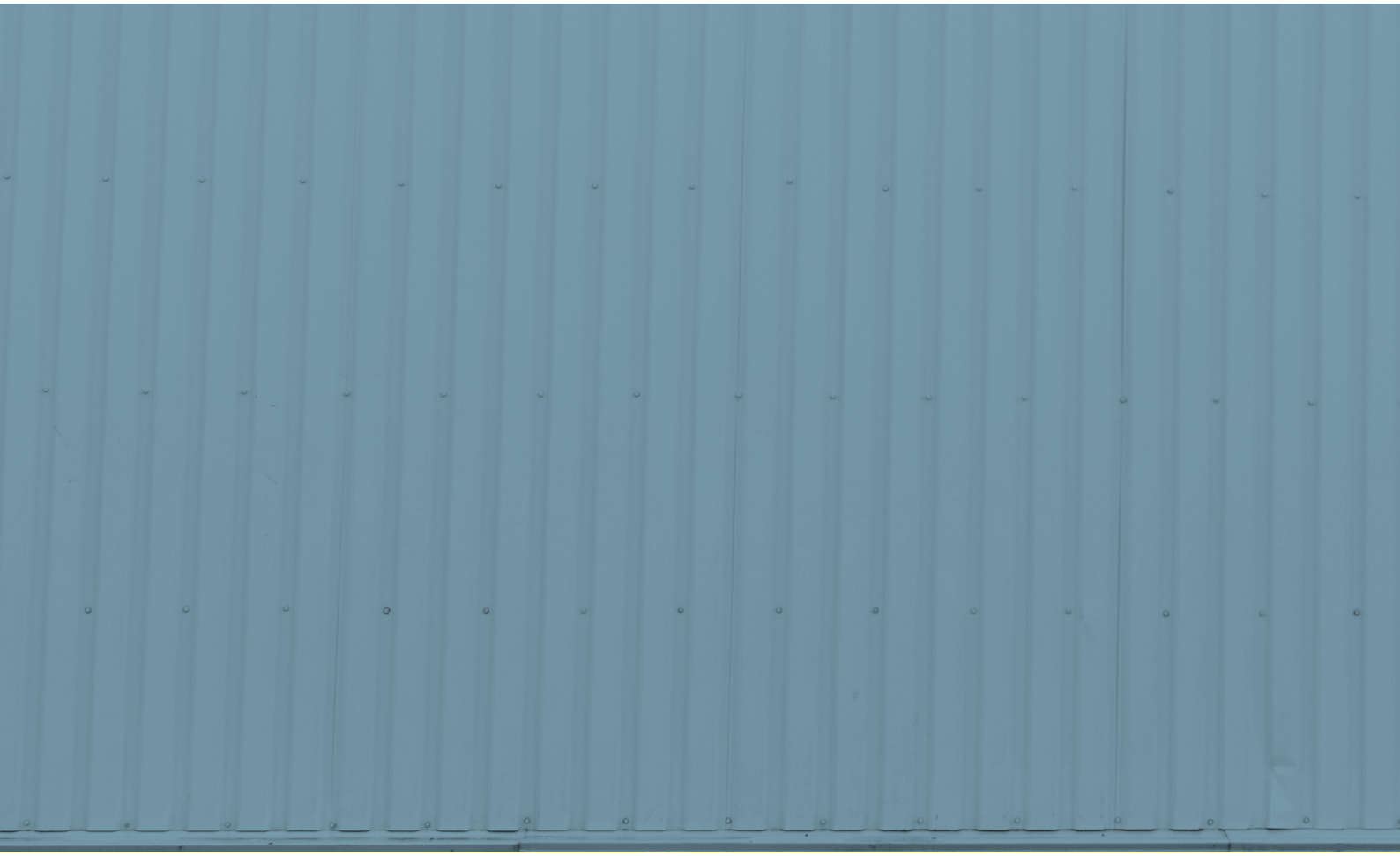
TOPMAN

ADAPT OR ADOPT? [NEXT STEPS]



Adapt or Adopt?

This case study research has demonstrated that both the PERS and VURT tools developed in the UK, provide a framework for consistently evaluating changes in public realm use and quality that could be of very wide potential application, and of great benefit, to, local transport planning and urban design practice in this part of the world.

VURT was developed by Transport for London for use in the UK. The baseline public preferences research took place in London. Additionally, PERS, which informed both the research and the design of the Toolkit, is also British-developed. This raises a number of issues regarding whether the existing VURT could be adapted or adopted to the local New Zealand context.

Some of these, such as the calibration of the percentage discount factor to apply in calculating lifetime benefits, are readily adapted to meet the local guidance. At present the discount factor in the excel spreadsheet is locked at the UK standard of 3.5%, and for these case studies has not been calibrated to the 6% discount factor recommended in the NZTA Economic Evaluation Manual.

Clearly, there is also the simple monetary matter of converting pounds and pence into dollars and cents. The excel spreadsheets publicly available block any changes to this feature meaning that for the purposes of undertaking this case study research, the currency conversation was undertaken separately to the workings of the spreadsheet utilising a current foreign exchange calculator available online. A more detailed considerations include the link and place attributes of the PERS system. A number of these, such as presence of CCTV cameras and ease of reporting crime, have a particular UK context that does not directly translate to New Zealand. There would be some benefit to considering the development of an equivalent PERS system that has been developed specifically for the local context. Such an exercise could consider whether there are other factors relevant to the local context that should be considered in auditing the link and space attributes.

These factors point to the proprietary issues that arise with contemplating the adoption or adaptation of the VURT and PERS tools in New Zealand.

A further consideration is the willingness of key organisations, such as Auckland Council, Auckland Transport and the New Zealand Transport Agency, to accept the use of the VURT and PERS tools, or similarly adapted or newly developed tools, into local transport planning practice.

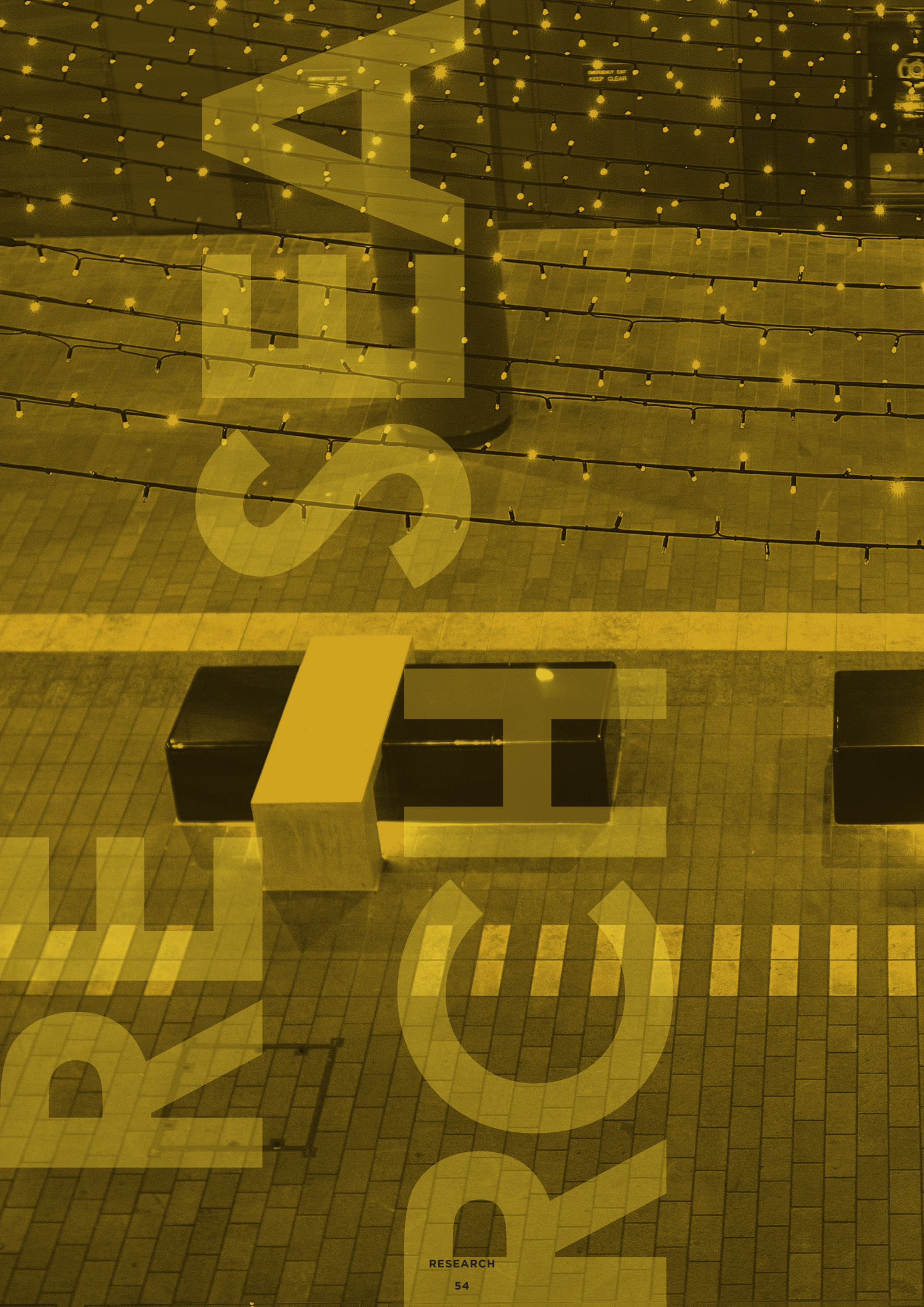
One particular stumbling block that was identified in undertaking this case study research was the possible need for verifying any local variance in the public preference survey work originally undertaken by TfL to determine the basis upon which VURT assigns nominal monetary values.

Next steps

It may be worth undertaking a benchmarking research exercise or similar to verify or calibrate the baseline inputs to VURT. This would give confidence to decision-makers and authorities that the tool reflects the preferences of pedestrians in New Zealand, should these values and user benefits not prove universal.

For the next steps, it is recommended that the need for any verification of the public preferences research that underpins VURT is clarified. At the same time, all proprietary issues relating to the use or adaptation of the VURT and PERS tools for use in New Zealand should be ascertained.

In putting these recommendations forward, it is the view of the research team that having satisfactorily overcome these hurdles, it would be possible to advance workable versions of both PERS and VURT. These could then be immediately put into practice, tested and interrogated through real world applications in local urban design and transport planning processes in New Zealand.


EMERGENCY EXIT
KEEP CLEAR

APPENDIX 1

Queen Street Future Light Rail Transit Mall

Scenario 1 - 150%

TRANSPORT FOR LONDON

User Benefits - Step One

Scheme Name	Queen Street - Scenario 1
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	3865	7730	3865
Average Walk Distance (m)	160	160	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	50	75	25
Average Dwell Time (mins)	10	20	

Time Period of Analysis	15-Feb
Weekday Scaling Factor	9.2
Annualisation Scaling Factor	3,054

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-1	2	3	0.010	0.024	0.014
Dropped kerbs	1	3	2	0.039	0.045	0.006
Obstructions	0	2	2	0.016	0.026	0.010
Permeability	-1	3	4	0.064	0.133	0.069
Legibility	0	2	2	0.028	0.047	0.019
Lighting	2	2	0	0.074	0.074	0.000
Personal security	-1	3	4	0.057	0.152	0.095
Surface quality	2	3	1	0.107	0.112	0.005
User Conflict	0	2	2	0.082	0.115	0.033
Quality of environment	1	3	2	0.215	0.277	0.062
Maintenance	1	3	2	0.076	0.102	0.026
					Total	**0.339**

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	0	3	3	0.136	0.184	0.048
Interpreting the space	1	2	1	0.040	0.050	0.010
Personal safety	-1	3	4	0.086	0.252	0.166
Feeling comfortable	0	3	3	0.072	0.144	0.072
Sense of place	0	3	3	0.040	0.058	0.018
Opportunity for activity	0	2	2	0.223	0.281	0.058
					Total	**0.372**

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.339	3865	160	1.33	26.270
PERS Space	0.372	3865	160	1.33	28.828

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	o. People Staying Bas	Dwell Time (mins)	Change (ppm)
PERS Link	0.339	50	10	1.695
PERS Space	0.372	50	10	1.860

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.339	3865	160	1.33	13.135
PERS Space	0.372	3865	160	1.33	14.414

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.339	25	20	0.848
PERS Space	0.372	25	20	0.930

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£128,130
Space	£140,603
Link and Space Total	**£268,733**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	Queen Street - Scenario 1

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£268,730	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2018	
Last Year of Benefits Realisation	2037	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£347,777

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2018	1.036	0.934	£336,185
2019	1.053	0.902	£330,157
2020	1.070	0.871	£324,298
2021	1.089	0.842	£318,873
2022	1.108	0.814	£313,579
2023	1.128	0.786	£308,416
2024	1.150	0.759	£303,680
2025	1.172	0.734	£299,064
2026	1.195	0.709	£294,565
2027	1.218	0.685	£290,182
2028	1.242	0.662	£285,911
2029	1.267	0.639	£281,748
2030	1.292	0.618	£277,689
2031	1.319	0.597	£273,729
2032	1.346	0.577	£269,862
2033	1.373	0.557	£266,082
2034	1.403	0.538	£262,640
2035	1.432	0.520	£259,013
2036	1.462	0.503	£255,457
2037	1.492	0.486	£251,982

Total User Benefits Over Scheme Lifetime	£5,803,100	in 2016 Base Price Year

Queen Street Future Light Rail Transit Mall

Scenario 1 - 200%

TRANSPORT FOR LONDON

User Benefits - Step One

Scheme Name	Queen Street - Scenario 1
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	3865	11595	7730
Average Walk Distance (m)	160	160	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	50	150	100
Average Dwell Time (mins)	10	20	

Time Period of Analysis	15-Feb
Weekday Scaling Factor	9.2
Annualisation Scaling Factor	3,054

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-1	2	3	0.010	0.024	0.014
Dropped kerbs	1	3	2	0.039	0.045	0.006
Obstructions	0	2	2	0.016	0.026	0.010
Permeability	-1	3	4	0.064	0.133	0.069
Legibility	0	2	2	0.028	0.047	0.019
Lighting	2	2	0	0.074	0.074	0.000
Personal security	-1	3	4	0.057	0.152	0.095
Surface quality	2	3	1	0.107	0.112	0.005
User Conflict	0	2	2	0.082	0.115	0.033
Quality of environment	1	3	2	0.215	0.277	0.062
Maintenance	1	3	2	0.076	0.102	0.026
					Total	0.339

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	0	3	3	0.136	0.184	0.048
Interpreting the space	1	2	1	0.040	0.050	0.010
Personal safety	-1	3	4	0.086	0.252	0.166
Feeling comfortable	0	3	3	0.072	0.144	0.072
Sense of place	0	3	3	0.040	0.058	0.018
Opportunity for activity	0	2	2	0.223	0.281	0.058
					Total	0.372

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.339	3865	160	1.33	26.270
PERS Space	0.372	3865	160	1.33	28.828

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	o. People Staying Bas	Dwell Time (mins)	Change (ppm)
PERS Link	0.339	50	10	1.695
PERS Space	0.372	50	10	1.860

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.339	7730	160	1.33	26.270
PERS Space	0.372	7730	160	1.33	28.828

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.339	100	20	3.390
PERS Space	0.372	100	20	3.720

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£176,017
Space	£193,152
Link and Space Total	**£369,169**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	Queen Street - Scenario 1

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£369,170	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2018	
Last Year of Benefits Realisation	2037	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£477,761

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2018	1.036	0.934	£461,837
2019	1.053	0.902	£453,555
2020	1.070	0.871	£445,506
2021	1.089	0.842	£438,054
2022	1.108	0.814	£430,782
2023	1.128	0.786	£423,689
2024	1.150	0.759	£417,183
2025	1.172	0.734	£410,841
2026	1.195	0.709	£404,662
2027	1.218	0.685	£398,640
2028	1.242	0.662	£392,773
2029	1.267	0.639	£387,054
2030	1.292	0.618	£381,478
2031	1.319	0.597	£376,037
2032	1.346	0.577	£370,725
2033	1.373	0.557	£365,533
2034	1.403	0.538	£360,804
2035	1.432	0.520	£355,822
2036	1.462	0.503	£350,936
2037	1.492	0.486	£346,163

Total User Benefits Over Scheme Lifetime	£7,972,100	in 2016 Base Price Year

Karangahape Road Cycleway Project

Scenario 1 - Existing Footpath Widths -

User Benefits - Step One

Scheme Name	Karangahape Road - Scenario 1 - Option 1
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	1312	1968	656
Average Walk Distance (m)	100	180	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	25	38	13
Average Dwell Time (mins)	20	30	

Time Period of Analysis	5:00 - 6:00
Weekday Scaling Factor	7.79
Annualisation Scaling Factor	2,586

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-1	-2	-1	0.010	0.005	-0.005
Dropped kerbs	0	2	2	0.036	0.042	0.006
Obstructions	-1	1	2	0.010	0.021	0.011
Permeability	-2	1	3	0.032	0.108	0.076
Legibility	-1	1	2	0.019	0.038	0.019
Lighting	0	2	2	0.054	0.074	0.020
Personal security	-1	2	3	0.057	0.130	0.073
Surface quality	1	3	2	0.102	0.112	0.010
User Conflict	-1	0	1	0.055	0.082	0.027
Quality of environment	-1	1	2	0.120	0.215	0.095
Maintenance	-1	2	3	0.042	0.089	0.047
					Total	**0.379**

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	-1	1	2	0.091	0.152	0.061
Interpreting the space	-1	1	2	0.020	0.040	0.020
Personal safety	-1	2	3	0.086	0.212	0.126
Feeling comfortable	0	0	0	0.072	0.072	0.000
Sense of place	1	0	-1	0.049	0.040	-0.009
Opportunity for activity	1	1	0	0.252	0.252	0.000
					Total	**0.198**

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.379	1312	100	1.33	6.231
PERS Space	0.198	1312	100	1.33	3.255

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	No. People Staying Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.379	25	20	1.895
PERS Space	0.198	25	20	0.990

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.379	656	180	1.33	2.804
PERS Space	0.198	656	180	1.33	1.465

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.379	13	30	0.739
PERS Space	0.198	13	30	0.386

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£30,181
Space	£15,767
Link and Space Total	**£45,948**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	Karangahape Road - Scenario 1 - Option 1

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£45,950	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2018	
Last Year of Benefits Realisation	2037	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£59,466

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2018	1.036	0.934	£57,484
2019	1.053	0.902	£56,453
2020	1.070	0.871	£55,451
2021	1.089	0.842	£54,524
2022	1.108	0.814	£53,619
2023	1.128	0.786	£52,736
2024	1.150	0.759	£51,926
2025	1.172	0.734	£51,137
2026	1.195	0.709	£50,368
2027	1.218	0.685	£49,618
2028	1.242	0.662	£48,888
2029	1.267	0.639	£48,176
2030	1.292	0.618	£47,482
2031	1.319	0.597	£46,805
2032	1.346	0.577	£46,144
2033	1.373	0.557	£45,497
2034	1.403	0.538	£44,909
2035	1.432	0.520	£44,289
2036	1.462	0.503	£43,680
2037	1.492	0.486	£43,086

Total User Benefits Over Scheme Lifetime	£992,300	in 2016 Base Price Year

Karangahape Road Cycleway Project

Scenario 1 - Existing Footpath Widths -

TRANSPORT FOR LONDON

User Benefits - Step One

Scheme Name	Karangahape Road - Scenario 1 -Option 1 - 320%
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	1312	4198	2886
Average Walk Distance (m)	100	180	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	25	87	62
Average Dwell Time (mins)	20	30	

Time Period of Analysis	5:00 - 6:00
Weekday Scaling Factor	7.79
Annualisation Scaling Factor	2,586

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-1	-3	-2	0.010	0.000	-0.010
Dropped kerbs	0	2	2	0.036	0.042	0.006
Obstructions	-1	1	2	0.010	0.021	0.011
Permeability	-2	1	3	0.032	0.108	0.076
Legibility	-1	1	2	0.019	0.038	0.019
Lighting	0	2	2	0.054	0.074	0.020
Personal security	-1	2	3	0.057	0.130	0.073
Surface quality	1	3	2	0.102	0.112	0.010
User Conflict	-1	0	1	0.055	0.082	0.027
Quality of environment	-1	1	2	0.120	0.215	0.095
Maintenance	-1	2	3	0.042	0.089	0.047
					Total	0.374

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	-1	-2	-1	0.091	0.045	-0.046
Interpreting the space	-1	1	2	0.020	0.040	0.020
Personal safety	-1	2	3	0.086	0.212	0.126
Feeling comfortable	0	-1	-1	0.072	0.048	-0.024
Sense of place	1	-2	-3	0.049	0.013	-0.036
Opportunity for activity	1	-2	-3	0.252	0.074	-0.178
					Total	-0.138

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.374	1312	100	1.33	6.149
PERS Space	-0.138	1312	100	1.33	-2.269

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	No. People Staying Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.374	25	20	1.870
PERS Space	-0.138	25	20	-0.690

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.374	2886	180	1.33	12.173
PERS Space	-0.138	2886	180	1.33	-4.492

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.374	62	30	3.478
PERS Space	-0.138	62	30	-1.283

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£61,220
Space	-£22,589
Link and Space Total	**£38,631**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	Karangahape Road - Scenario 1 -Option 1 - 320%

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£38,630	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2018	
Last Year of Benefits Realisation	2037	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£49,993

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2018	1.036	0.934	£48,327
2019	1.053	0.902	£47,460
2020	1.070	0.871	£46,618
2021	1.089	0.842	£45,838
2022	1.108	0.814	£45,077
2023	1.128	0.786	£44,335
2024	1.150	0.759	£43,654
2025	1.172	0.734	£42,990
2026	1.195	0.709	£42,344
2027	1.218	0.685	£41,714
2028	1.242	0.662	£41,100
2029	1.267	0.639	£40,501
2030	1.292	0.618	£39,918
2031	1.319	0.597	£39,349
2032	1.346	0.577	£38,793
2033	1.373	0.557	£38,249
2034	1.403	0.538	£37,755
2035	1.432	0.520	£37,233
2036	1.462	0.503	£36,722
2037	1.492	0.486	£36,223

Total User Benefits Over Scheme Lifetime	£834,200	in 2016 Base Price Year

Karangahape Road Cycleway Project

Scenario 2 - Widened Footpaths - 150%

User Benefits - Step One

Scheme Name	Karanagahape Road - Scenario 2 - Option 3
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	1312	1968	656
Average Walk Distance (m)	100	180	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	25	38	13
Average Dwell Time (mins)	20	30	

Time Period of Analysis	5:00 - 6:00
Weekday Scaling Factor	7.79
Annualisation Scaling Factor	2,586

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-1	2	3	0.010	0.024	0.014
Dropped kerbs	0	2	2	0.036	0.042	0.006
Obstructions	-1	2	3	0.010	0.026	0.016
Permeability	-2	2	4	0.032	0.120	0.088
Legibility	-1	2	3	0.019	0.047	0.028
Lighting	0	2	2	0.054	0.074	0.020
Personal security	-1	2	3	0.057	0.130	0.073
Surface quality	1	3	2	0.102	0.112	0.010
User Conflict	-1	2	3	0.055	0.115	0.060
Quality of environment	-1	2	3	0.120	0.246	0.126
Maintenance	-1	2	3	0.042	0.089	0.047
					Total	0.488

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	-1	2	3	0.091	0.168	0.077
Interpreting the space	-1	2	3	0.020	0.050	0.030
Personal safety	-1	2	3	0.086	0.212	0.126
Feeling comfortable	0	2	2	0.072	0.120	0.048
Sense of place	1	3	2	0.049	0.058	0.009
Opportunity for activity	1	3	2	0.252	0.311	0.059
					Total	0.349

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.488	1312	100	1.33	8.023
PERS Space	0.349	1312	100	1.33	5.738

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	No. People Staying Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.488	25	20	2.440
PERS Space	0.349	25	20	1.745

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.488	656	180	1.33	3.610
PERS Space	0.349	656	180	1.33	2.582

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.488	13	30	0.952
PERS Space	0.349	13	30	0.681

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£38,861
Space	£27,792
Link and Space Total	**£66,653**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	Karanagahape Road - Scenario 2 - Option 3

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£66,650	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2018	
Last Year of Benefits Realisation	2037	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£86,255

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2018	1.036	0.934	£83,380
2019	1.053	0.902	£81,885
2020	1.070	0.871	£80,432
2021	1.089	0.842	£79,086
2022	1.108	0.814	£77,773
2023	1.128	0.786	£76,493
2024	1.150	0.759	£75,318
2025	1.172	0.734	£74,173
2026	1.195	0.709	£73,058
2027	1.218	0.685	£71,971
2028	1.242	0.662	£70,911
2029	1.267	0.639	£69,879
2030	1.292	0.618	£68,872
2031	1.319	0.597	£67,890
2032	1.346	0.577	£66,931
2033	1.373	0.557	£65,993
2034	1.403	0.538	£65,140
2035	1.432	0.520	£64,240
2036	1.462	0.503	£63,358
2037	1.492	0.486	£62,496

Total User Benefits Over Scheme Lifetime	£1,439,300	in 2016 Base Price Year

Karangahape Road Cycleway Project

Scenario 2 - Widened Footpaths - 320%

User Benefits - Step One

Scheme Name	Karangahape Road - Scenario 2 - Option 3 - 320%
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	1312	4198	2886
Average Walk Distance (m)	100	180	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	25	87	62
Average Dwell Time (mins)	20	30	

Time Period of Analysis	5:00 - 6:00
Weekday Scaling Factor	7.79
Annualisation Scaling Factor	2,586

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-1	2	3	0.010	0.024	0.014
Dropped kerbs	0	2	2	0.036	0.042	0.006
Obstructions	-1	2	3	0.010	0.026	0.016
Permeability	-2	2	4	0.032	0.120	0.088
Legibility	-1	2	3	0.019	0.047	0.028
Lighting	0	2	2	0.054	0.074	0.020
Personal security	-1	2	3	0.057	0.130	0.073
Surface quality	1	3	2	0.102	0.112	0.010
User Conflict	-1	2	3	0.055	0.115	0.060
Quality of environment	-1	2	3	0.120	0.246	0.126
Maintenance	-1	2	3	0.042	0.089	0.047
					Total	**0.488**

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	-1	2	3	0.091	0.168	0.077
Interpreting the space	-1	2	3	0.020	0.050	0.030
Personal safety	-1	2	3	0.086	0.212	0.126
Feeling comfortable	0	2	2	0.072	0.120	0.048
Sense of place	1	3	2	0.049	0.058	0.009
Opportunity for activity	1	3	2	0.252	0.311	0.059
					Total	**0.349**

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.488	1312	100	1.33	8.023
PERS Space	0.349	1312	100	1.33	5.738

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	No. People Staying Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.488	25	20	2.440
PERS Space	0.349	25	20	1.745

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.488	2886	180	1.33	15.884
PERS Space	0.349	2886	180	1.33	11.360

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.488	62	30	4.538
PERS Space	0.349	62	30	3.246

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£79,881
Space	£57,128
Link and Space Total	**£137,009**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	Karangahape Road - Scenario 2 - Option 3 - 320%

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£137,010	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2018	
Last Year of Benefits Realisation	2037	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£177,311

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2018	1.036	0.934	£171,401
2019	1.053	0.902	£168,328
2020	1.070	0.871	£165,341
2021	1.089	0.842	£162,575
2022	1.108	0.814	£159,876
2023	1.128	0.786	£157,244
2024	1.150	0.759	£154,829
2025	1.172	0.734	£152,475
2026	1.195	0.709	£150,182
2027	1.218	0.685	£147,947
2028	1.242	0.662	£145,770
2029	1.267	0.639	£143,647
2030	1.292	0.618	£141,578
2031	1.319	0.597	£139,559
2032	1.346	0.577	£137,587
2033	1.373	0.557	£135,660
2034	1.403	0.538	£133,905
2035	1.432	0.520	£132,056
2036	1.462	0.503	£130,243
2037	1.492	0.486	£128,471

Total User Benefits Over Scheme Lifetime	£2,958,700	in 2016 Base Price Year

O'Connell Street Shared Space (Implemented 2014)

Scenario 1 - 150%

TRANSPORT FOR LONDON

User Benefits - Step One

Scheme Name	O'Connell Street - Scenario 1
Section Number	1

Base Input Data

Pedestrians Moving	Baseline	Scenario	Change (S-B)
Number (per hour)	593	890	297
Average Walk Distance (m)	80	80	
Average Walk Speed (m/s)	1.33	1.33	

Static Users	Baseline	Scenario	Change (S-B)
Number	1	20	19
Average Dwell Time (mins)	1	15	

Time Period of Analysis	12:00- 1:00
Weekday Scaling Factor	11.8
Annualisation Scaling Factor	3,918

PERS Changes

PERS Link Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Effective width	-2	2	4	0.005	0.024	0.019
Dropped kerbs	0	3	3	0.036	0.045	0.009
Obstructions	-2	2	4	0.005	0.026	0.021
Permeability	-2	3	5	0.032	0.133	0.101
Legibility	-1	2	3	0.019	0.047	0.028
Lighting	-1	3	4	0.036	0.084	0.048
Personal security	0	2	2	0.086	0.130	0.044
Surface quality	-1	3	4	0.051	0.112	0.061
User Conflict	-2	2	4	0.027	0.115	0.088
Quality of environment	-2	3	5	0.060	0.277	0.217
Maintenance	-2	2	4	0.021	0.089	0.068
					Total	0.704

PERS Space Attributes	Baseline	Scenario	Change (S-B)	Baseline Value	Scenario Value	Change (ppm)
Moving in the space	-2	2	4	0.045	0.168	0.123
Interpreting the space	-1	2	3	0.020	0.050	0.030
Personal safety	0	2	2	0.129	0.212	0.083
Feeling comfortable	-2	2	4	0.024	0.120	0.096
Sense of place	-2	3	5	0.013	0.058	0.045
Opportunity for activity	-3	3	6	0.000	0.311	0.311
					Total	0.688

Benefits to existing users (Moving)

Total PERS Value	Total PERS Value	No. Moving Peds Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.704	593	80	1.33	4.185
PERS Space	0.688	593	80	1.33	4.090

Benefits to existing users (Staying)

Total PERS Value	Total PERS Value	No. People Staying Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.704	1	1	0.007
PERS Space	0.688	1	1	0.007

Benefits to new users (Moving)

Total PERS Value	Total PERS Value	Scenario-Base	Link Length	Av Walk Speed	Change (ppm)
PERS Link	0.704	297	80	1.33	1.048
PERS Space	0.688	297	80	1.33	1.024

Benefits to new users (Staying)

Total PERS Value	Total PERS Value	Scenario-Base	Dwell Time (mins)	Change (ppm)
PERS Link	0.704	19	15	1.003
PERS Space	0.688	19	15	0.980

For Section No. 1

Total Annual Benefit at 2006 prices

Total Annual Benefit (existing & new users)	
Link	£24,460
Space	£23,904
Link and Space Total	**£48,364**

Repeat for all scheme sections

User Benefits - Step Two

Scheme Name	O'Connell Street - Scenario 1

Base Input Data

Scheme Benefits: Single Year @ 2006 prices	£48,360	for all sections
Base Price Year	2016	(fixed for this version)
First Year of Benefits Realisation	2017	
Last Year of Benefits Realisation	2031	usually FYBR +14 or +19
Discount Factor	3.50%	

Lifetime Benefits Calculations

Year of Original Prices	GDP Deflator
2006	83.355

Base Price Year	GDP Deflator	VoT Multiplier	Single Year Benefit in Base Price Year
2016	102.819	1.049	£62,585

Scheme Lifetime User Benefits

Year	VoT Multiplier	Discount Factor	Single Year Benefit in Base Price Year
2017	1.018	0.966	£61,554
2018	1.036	0.934	£60,499
2019	1.053	0.902	£59,414
2020	1.070	0.871	£58,360
2021	1.089	0.842	£57,384
2022	1.108	0.814	£56,431
2023	1.128	0.786	£55,502
2024	1.150	0.759	£54,650
2025	1.172	0.734	£53,819
2026	1.195	0.709	£53,009
2027	1.218	0.685	£52,221
2028	1.242	0.662	£51,452
2029	1.267	0.639	£50,703
2030	1.292	0.618	£49,972
2031	1.319	0.597	£49,260

Total User Benefits Over Scheme Lifetime	£824,200	in 2016 Base Price Year

Case Study Summaries

Overall Benefits and Currency Conversion

Case Study	Scenario	Link	Space	Annual	Lifetime
Queen Street	150%	£128130	£140603	£268733	£5803100
		$243,732.17	$267,458.63	$511,190.79	$11,038,805.40
	200%	£176017	£193152	£369169	£7972100
		$334,824.04	$367,418.68	$702,242.72	$15,164,732.74
Karanagahape Road	Existing Footpath Width 150%	£30181	£15767	£45948	£992300
		$57,411.07	$29,992.39	$87,403.46	$1,887,578.47
	Existing Footpath Width 320%	£61220	£-22589	£38631	£834200
		$116,454.25	-$42,969.37	$73,484.88	$1,586,233.12
	Widened Footpaths 150%	£38861	£27792	£66653	£1439300
		$73,922.39	$52,866.65	$126,789.04	$2,737,873.31
	Widened Footpaths 320%	£79881	£57128	£137009	£2958700
		$151,951.68	$108,670.34	$260,622.03	$5,628,114.89
O'Connell Street	150%	£24460	£23904	£48364	£824200
		$46,528.44	$45,470.80	$91,999.24	$1,567,814.34

Boffa Miskell