▸ Case Study

Cheonggyecheon, Seoul, South Korea

Background

Cheonggyecheon was once an intermittent natural creek. It passed close to the downtown of Seoul from west to east, an easy walk from Seoul's City Hall and Central Business District (CBD). It measured 13.7 km long and 20 to 85 meters wide.

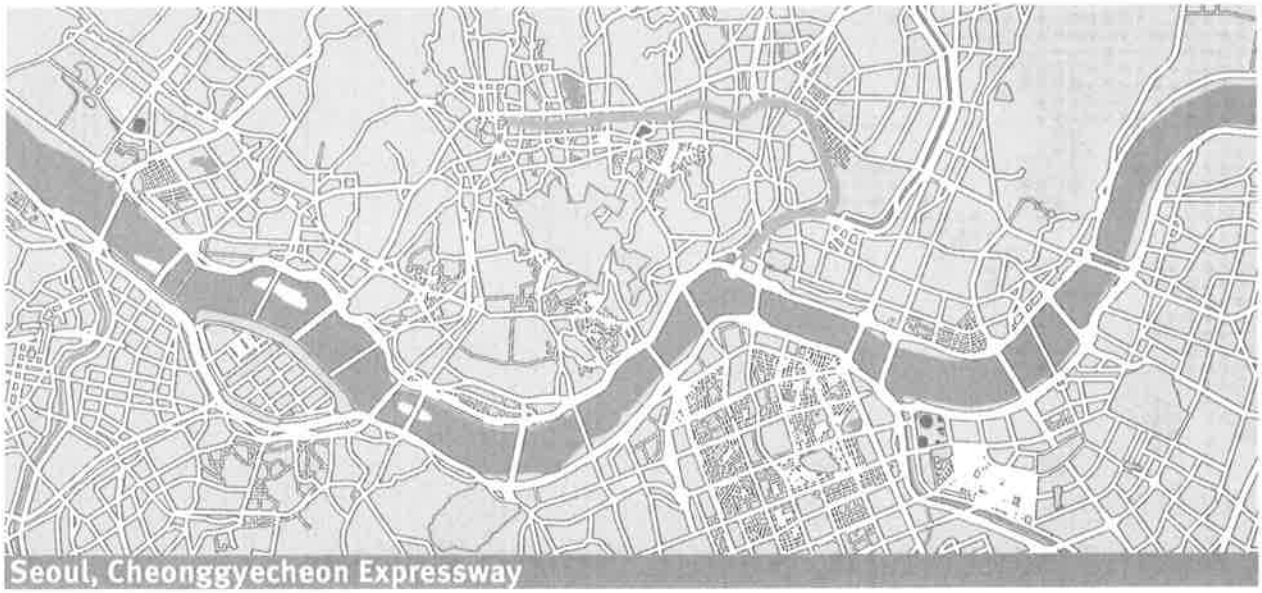
Over time people built along the creek, encroaching on its natural boundaries, and heavily polluting the waterway. By the late 1950s, the pollution and related sanitary issues were so serious that the government decided to cover 6 km with concrete roads. In the 1960s, as Seoul saw a large increase in private car ownership, the roads covering Cheonggyecheon became an ideal right-of-way for an elevated expressway, which was seen as the best way to reduce traffic jams and to improve quality of life. In 1976, the Seoul government completed a four-lane two-way elevated expressway over Cheonggyecheon ("the Cheong Gye Expressway"). In 2003 the Cheonggyecheon restoration project ("the restoration project" for shorthand hereafter) began.

In 2003, traffic surveys by the Seoul Metropolitan Government showed that there were about 1.5 million vehicles entering or leaving twenty-four points along the Cheonggyecheon Expressway each day. While the expressway served the mobility needs of Seoul's drivers, it severely diminished the attractiveness of Seoul's CBD. In the ten years after the expressway was completed, it was estimated that Seoul's CBD lost 40,000 residents and 80,000 jobs (Choi, 2006).

Over time, heavy traffic plus the moisture from the creek under the expressway threatened the safety of the structural elements of the expressway. In the 1990s, experts from the Korean Society of Civil Engineering gave the expressway an overall safety score of "C," meaning that the expressway could barely carry vehicular flows at its design capacity (Choi 2006). Large-scale maintenance and reduction of traffic would be needed to ensure continued safety. The Seoul government limited expressway access to passenger cars or lighter vehicles starting in 1997. Simultaneously, the government began investing millions of dollar to better maintain the expressway.

After lengthy consideration of the costs of ongoing maintenance and the expressway's negative economic impact on downtown Seoul, the government decided to demolish the expressway and to restore Cheonggyecheon beneath the expressway in July 2002. The budget for the entire project was initially estimated at 349 billion won (U.S. $254 million). The project began in July 2003 and was complete by September 2005. The actual price tag for the project was 386 billion won (U.S. $281 million). There are also ongoing costs associated with maintenance of the parks and water recycling facility.

It is worth noting a few other transportation related initiatives that happened around the same time as the restoration project. Seoul implemented a car restriction policy and established designated several kilometers of median lanes for busways simultaneously with the removal of the expressway.



Seoul, Cheonggyecheon Expressway

About the project

The Cheonggyecheon restoration project consisted of four components: removal of the expressway and bridges/ramps connected to it; enlargement and/or rerouting of the creek to the middle of a terrace which is three to four meters lower than the surface roads adjacent to it; construction of water recycling and maintenance facilities for Cheonggyecheon, to ensure adequate water flow quantity and quality; and finally, construction of a terrace and water passageway, a linear pedestrian park with bridges, indigenous plants, ramps for the disabled, sidewalks, waterfalls, squares, fountains, lights, signs, street furniture, etc.

The project created a new 16-m wide and 5.8-km long linear park, with landscaping, good walking facilities, and plenty of street furniture. The Seoul Metropolitan Government, under the leadership of then Mayor Lee Myung-bak, spearheaded the project.

Seoul's government articulated the following goals, providing a strong underpinning for the project:

a. Build Seoul as a human-oriented and environmentally-friendly city;
b. Use the restoration project to help rediscover Seoul's history and culture;
c. Protect citizens' safety;
d. Help revitalize Seoul's CBD with a world-class linear park consisting of a clean stream, indigenous plants, quality sidewalks, street furniture, and more importantly, waterfront places where various human activities such as sightseeing, bridge stepping, and the lantern festival can take place.

Stakeholders

Mr. Lee Myung-bak ran for mayor of Seoul promising to restore the Cheonggyecheon, a promise he fulfilled upon election. He went on to be elected president of South Korea in December 2007.

Drivers voiced concern about traffic congestion if the expressway was removed, and demanded that a traffic simulation model be created to evaluate the potential impacts. Business groups in the CBD voiced concerns that the construction would further reduce their property values and ability to attract business. The mayor convened the Cheonggyecheon Citizens Committee, to collect and coordinate opinions from citizens from all walks of life.

Finally, the mayor formed the Cheonggyecheon Restoration Center, within the metropolitan government to provide technical advice and solutions to the mayor. Other research groups like Workshops for Cheonggyecheon Restoration and the Seoul Development Institute also provided technical input to the center. The Center was responsible for compiling the ideas voiced by various groups about the restoration project and transforming them into actual, implementable plans and designs.

▸ Timeline

Cheonggyecheon Expressway Removal and Greenway Creation

1967-1971	Cheonggyecheon Expressway is constructed.
1990s	Korean Society of Civil Engineering gives expressway a "C" grade for safety.
1997	Government limits traffic on expressway to passenger vehicles only to protect the expressway from further degradation.
2001	Lee Myung-bak makes the expressway removal project a cornerstone of his campaign for mayor. Despite some opposition from the business community, polls show nearly eighty percent of Seoul residents support the idea. He is elected to office in June.
2003	A master plan for the stream restoration is completed. Construction on Seoul's first Bus Rapid Transit line begins, offering an alternative to motorists who used to take the expressway. Summer: Demolition of the freeway takes place. Fall: Stream restoration begins.
2004	January: O-gan Bridge completed. April: Yang-an road completed and open to traffic. May: Du-mool Bridge and Go-san-ja Bridge completed and open to traffic. July: Young-dong Bridge completed (but not open to traffic). September: Gwan-soo Bridge and Bae-o-gae bridge completed and open to traffic. Beo-dl Bridge completed. December: Highway removal is completed; Sae-woon Bridge completed.
2005	February: Creek maintenance facilities completed. March to May: Parkways, pedestrian walks, landscaping, and water features completed. July: Completed facilities tested. September: Artwork installed throughout the new park. Cheonggyecheon Cultural Center opens to the public. Restoration project is completed.

New park, pedestrian walkways, public art, and water features along the reclaimed Cheonggyecheon creek Image: riNux via Flickr

Effects

According to data collected by the Seoul Metropolitan Government, before the project, the average vehicle speeds on six major surface roads parallel to or crossing the Cheonggyecheon was 15.3 km per hour (Seoul Metropolitan Government, 2006).

According to the Seoul Metropolitan Government, the public transit accessibility measured by a composite index called "MAG" in Seoul increased by 13.4 percent between 2002 and 2006. After the restoration project, the public transit accessibility to districts of Do-hong, Gangbook, Sungbook, and Nowon in Seoul also saw a significant increase.

The restoration project was also a catalyst for increased property values. Since the project was announced in July 2002, land transactions (including change in ownership, change in renter, and change in lease length) grew in areas parallel to Cheonggyecheon and did not stop until 2006.

According to the surveys of the Seoul Metropolitan Government, the land values in areas around Cheonggyecheon increased after the restoration project, taking Byunk-San and Hyundai Apartment Complexes near the Cheonggyecheon as an example. In 2002, the average apartment price for these complexes was 2.42 million won per m^2. In 2006, the price rose by at least twenty-five percent, to 3-3.3 million won per m^2. During the same timeframe, Heang-dang and Dai-lim Apartment Complexes which are further away from Cheonggyecheon saw only ten percent growth in average price, from 10 to 11 million won per pyong. In terms of office rent, office buildings such as Samil, Dongga, and Seoul Finance near Cheonggyecheon also saw a greater growth than comparable buildings further away from Cheonggyecheon after the restoration project. On average, the former saw thirteen percent increase in rent (Seoul Metropolitan Government, 2006).

As a result of the restoration project, and also Seoul's expansion of mass transit as well as car-use restrictions, traffic in the Cheonggyecheon area decreased quite significantly. According to the traffic surveys by Seoul Metropolitan Government, the number of vehicles entering or leaving twenty-four entry/exist points along the Cheonggyecheon in 2006 decreased by forty-three percent and forty-seven percent, respectively, as compared to their 2002 baselines (Seoul Metropolitan Government, 2006).

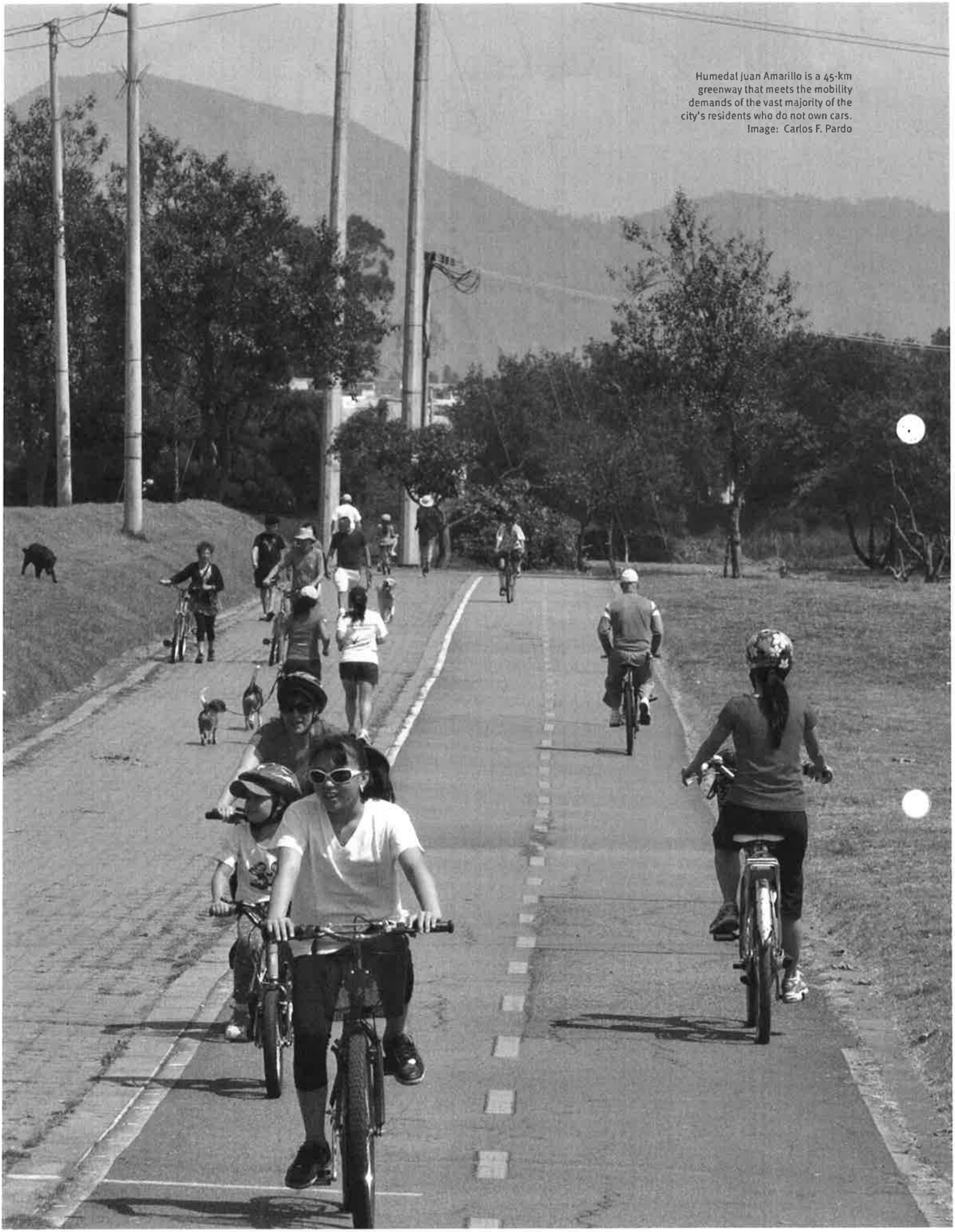
As traffic decreased, air quality improved. PM10 (tiny soot particles that are extremely dangerous to human health) levels decreased between 2002 and 2006 in areas both near and far to Cheonggyecheong, but the Seoul Municipal Government found that there was twenty-one percent less PM10 near the former highway site, compared to further away which saw a decrease of only three percent. Other pollutants including NO_2 and VOC/BETX (Benzene, Toluene, Ethylbenzene, m+p-Xylene) decreased in areas around Cheonggyecheon after the restoration project. Prior to highway removal, the area had an NO_2 density 1.02 times that of the rest of Seoul. After, the NO_2 density was reduced to 0.83 times of that of surrounding areas. After the restoration project, BETX pollutants in areas around Cheonggyecheong decreased by twenty-five percent to sixty-five percent (Seoul Metropolitan Government, 2006).

The removal of the highway led to a reduction of the heat-island effect by as much as eight degrees centigrade, according to summertime measurements in comparison to nearby paved roadway conditions (Seoul Development Institute, n.d.). It also brought a reduction of odor and noise, as well as improvements in water quality as well as the creation of a natural habitat. By 2008, the number of fish species had increased five fold, the number of bird species had increased six fold, and plant and insect populations went from fifteen species to 192, compared with 2005 levels (Shin et. al., 2010). More than nine out of ten Seoul residents regard the project as good or very good (Seoul Metropolitan Government, n.d.).

The improved air quality, decreased traffic volumes, and most of all, the high quality new public spaces have made Cheonggyecheon a popular entertainment and recreation spot for Seoul residents and a must-visit destination for tourists. As of October 1, 2007, there had been 56 million visitors to Cheonggyecheon. According to "Hi Seoul," the business and tourism agency of the city of Seoul, there are on average 53,000 visitors to the revitalized creek each weekday and 125,000 on each day of the weekend.

The Cheonggyecheon project has also put Seoul in the international media spotlight. Feature articles on the project have appeared in publications including *The International Herald Tribune, The New York Times, The Christian Science Monitor, Newsweek*, and *Time Asia*, as well as local publications in countries around the globe.

In 2006, Seoul won the Sustainable Transport Award for replacing the 4-mile elevated highway that once covered the Cheonggyecheon River in the city center with a riverfront park, high quality walkways, and public squares. Exclusive bus lanes were constructed along 36 miles of congested streets, and the city government initiated plans for additional bus lanes as part of a broader initiative to improve all aspects of the city's bus system.



Humedal Juan Amarillo is a 45-km greenway that meets the mobility demands of the vast majority of the city's residents who do not own cars.
Image: Carlos F. Pardo

▸ Case Study

Inner Ring Expressway, Bogotá, Colombia

Background

In the mid-1990s the city of Bogotá wanted to decrease traffic congestion and encourage economic activity in the city center, while also decreasing traffic accidents and preventing sprawl. In 1996 the Japanese International Cooperation Agency (JICA), Japan's bilateral aid organization, proposed creating a system of six urban highways and a metro system as the best way to meet these goals and was willing to provide financing for its construction. JICA recommended creating tolls on the highways to provide revenue to repay the loans.

Following a comprehensive review of JICA's proposals, in 1998, Enrique Peñalosa, Bogotá's mayor, had launched a long-term mobility strategy based on non-motorized transportation, bus transit improvements, and automobile restrictions. The JICA proposal, with its focus on highways, did not fit with the proposed mobility strategy.

Peñalosa, from the start of his term, realized that BRT could meet the mobility demands of the vast majority of the city's residents who didn't own cars and therefore were unlikely to benefit from the highways, and invested in a greenway that would better serve the local community. He also understood that BRT could be built in a fraction of the time, at a fraction of the cost that JICA proposed.

Today, the alternative mobility strategy in the city better serves the needs of the people. TransMilenio carries nearly 1.8 million trips per day and provides a traffic-free way for residents to move throughout the city. By 2006, traffic fatalities reduced by eighty-nine percent, thanks to more organized traffic patterns as well as improved crossings for pedestrians. The 357 km of bike lanes has also improved safety and accessibility in the city. Stretching from the poorer areas and suburbs to the downtown, the lanes have increased bike use by five times in the city. The city has been able to meet and exceed the goals they had set out in the mid-1990s without building new highways.

About the Project

JICA originally considered an urban expressway composed of six highways, including two rings and four radial-ways. The first ring, or IRE (Inner Ring Expressway), was to be a 17.6-km toll road on a concrete bridge with a toll. It was to be a 16.6-km elevated toll road on a concrete bridge with four lanes (two in each direction) and a speed between 60–80 km/h. It was envisioned to 35,000 to 45,000 passenger cars per hour in each direction by 2015.

The total cost for design and construction was estimated at U.S. $1.5 billion (2010 dollars). The project was estimated to have an economic internal rate of return of 14.7 percent and a financial internal rate of return of 5.6 percent and a net present value of U.S. $89 million. The IRE would have ringed Bogotá's central business district.

There were three alternatives considered for the IRE, two of which meant building two full ring roads, and one that would create a partial ring road. This last option was ultimately selected for technical, economic, and environmental reasons, mainly because the alternatives were either too expensive or difficult to implement.

JICA proposed setting the tolls at U.S. $1.25 (2010 dollars) for the IRE's opening in 2006. JICA then projected that the city would gradually increase the tolls to U.S. $1.67 by 2015.

JICA's study concluded the IRE would have no significant noise impact, but the study did recommend the provision of noise barriers along the IRE near school, hospitals, and residential areas. The study also says the IRE would reduce air pollution, probably as a result of the congestion reduction forecasted (idle cars emit more pollution than free flowing traffic).

Bogotá, Inner Ring Expressway

Peñalosa's administration decided to scrap JICA's plans for the IRE and move forward with the proposed mobility strategy that focused on bus improvements and automobile restrictions. He also invested in the creation of bicycle paths, sidewalks, and promenades. The proposed JICA highway location became the Juan Amarillo Greenway, a 45-km greenway for pedestrians and cyclists.

The greenway was previously full of informal settlements and the land had eroded because of lack of proper care by the residents. The greenway transformed the area into a place where the local residents could be outdoors with their families and helped revitalize the area.

The addition of TransMilenio's three trunk corridors, totalling 41 km, and feeder service of 309 km was the center piece and the initial implemented component of the mobility strategy. The system had four terminal stations and fifty-three standard stations. Thirty pedestrian overpasses were constructed to help passengers access the stations, as well as plazas and sidewalks near the stations. All of this was built at a cost of U.S. $213 million, (U.S. $5 million/km) far less than the cost of the proposed IRE. It was funded by a local surcharge on gasoline (forty-six percent), general city revenues (twenty-eight percent), a World Bank loan (six percent), and grants from the National government (twenty percent).

The BRT system opened on December 18, 2000, ten years before the IRE would have been finished, even according to optimistic forecasts. Upon opening, the BRT moved 792,000 passengers each weekday, far more than would have benefited from the IRE (Hidalgo, 2009).

Stakeholders

Mayor Peñalosa led the development of the mobility strategy and its implementation. JICA played an important role in proposing the original project that included an elevated highway as well as transit. Peñalosa instead planned and built many greenways and bikeways and opened the TransMilenio BRT system. He created a local surcharge on gasoline and used the city's budget to pay for the majority of the construction costs. He was also able to secure a World Bank loan and a grant from the national government to cover the rest. The Juan Amarillo Greenway, located where the proposed highway was supposed to go, was planned for during Penalosa's administration, but then built in the following mayor's term.

Effects

For the same cost that JICA projected for 17 km of highway, Bogotá built mass transit. Today, the system carries over 1.7 million passengers per day, equivalent to more than what the highway would have carried, and without the associated environmental and public health harm that additional passenger vehicles would have caused.

As of 2006, some of the project's achievements were: eighty-nine percent reduction in traffic accident fatalities on TransMilenio corridors; forty percent CO_2 reduction; thirty-two percent decline in travel times along the corridor, or an average of 14.7 minutes per user; and an affordable fare for most (U.S. $=0.36) without operational subsidies. (Hidalgo, 2009). It has also been reported that aggregated crime in area surrounding the Av. Caracas has decreased.

Also, several real estate agencies have reported an increase in property values less than 1 km away from TransMilenio even when the prices in the rest of the city were in decline (2000-2001). TransMilenio's impact on property values has been more likely to be positive for middle-income housing. Some higher-end residential developers choose to be further from Transmilenio because they dislike the commercial land uses Transmilenio attracts and because of the noise (Muñoz-Raskin, 2010).

TransMilenio is especially important to low-income and middle-income citizens who represent the majority of Bogotá's population. Low-income users represented thirty-seven percent of TransMilenio's ridership in 2003 (when phase two was completed). The highest percentage of TransMilenio users are middle-income citizens (forty-seven percent in 2003) (Jiménez, 2005). These citizens are not likely to have benefited from an elevated highway, or else would have had to spend a disproportionately higher amount of their incomes on transportation in order to access the highway by motorbike, private vehicle, or taxi.

Choosing TransMilenio BRT over the elevated highway will also lead to the city emitting 1.5 times less CO_2 emissions and consuming 1.2 times less energy consumption over a thirty-year period (Acevedo, Bocarejo et al, 2009).

As part of Bogotá's long-term mobility strategy, TransMilenio was implemented in place of constructing an elevated highway.
Image: ITDP

Demolition on the south end of the Alaskan Way elevated highway in Seattle.
Image: Washington State DOT

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More information about the various highway removal projects referenced on pp. 12-13 can be found here:

Berlin stadtentwicklung.berlin.de/bauen/strassenbau/en/a100_vorhaben.shtml

Boston massdot.state.ma.us/Highway/bigdig/bigdigmain.aspx

Louisville cnu.org/highways/freewayswithoutfutures

Milwaukee preservenet.com/freeways/FreewaysParkEast.html

New Haven cnu.org/highways/freewayswithoutfutures

New Orleans Recovery Planning Projects - District 4

New York cnu.org/highways/freewayswithoutfutures

New York preservenet.com/freeways/FreewaysWestSide.html

Oklahoma City stadtentwicklung.berlin.de/bauen/strassenbau/en/a100_vorhaben.shtml

Paris fhwa.dot.gov/environment/ejustice/case/cypress.pdf; preservenet.com/freeways/FreewaysPompidou.html

Paris tramway.paris.fr

Portland cnu.org/highways/freewayswithoutfutures; preservenet.com/freeways/FreewaysHarbor.html

San Francisco preservenet.com/freeways/FreewaysCentral.html

San Francisco preservenet.com/freeways/FreewaysEmbarcadero.html

Seattle wsdot.wa.gov/projects/Viaduct/; cityofseattle.net/transportation/awv.htm

Seoul city.minato.tokyo.jp; wfeo.org/documents/download/Cheonggeycheon%20Restoration%20Project_%20Korea.pdf

Syracuse cnu.org/highways/freewayswithoutfutures

Toronto 8664.org/about.html

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East-West Link

Onehunga Zoning, Population and Employment

Context

Figure 1: Onehunga circa 1940

Figure 2: Onehunga 2010

The study area is the western end of the proposed EWL and covers the Neilson Street interchange and over bridge to the west, the port and town centre and the new Galway Street link to the east.

An important strategic issue is the land / water interface in this area and how the suburb of Onehunga can reconnect with its harbour edge. The Onehunga community have spent considerable resources in advocating for reconnection and has recently seen the Taumanu / Onehunga Bay area restored.

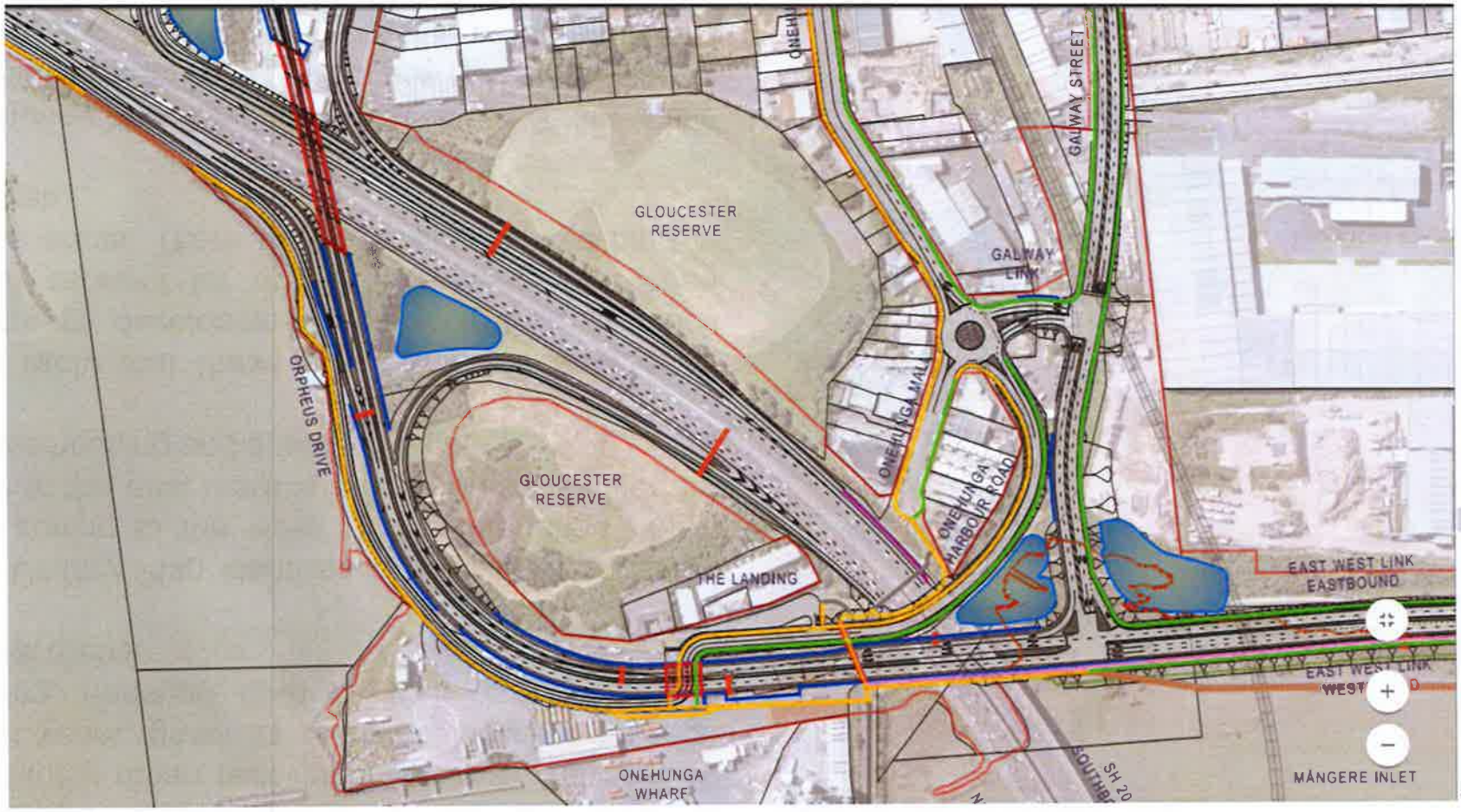


Figure 3: East-West Link

Zoning

Onehunga is anticipated to be an area of substantial urban redevelopment over the next 10 to 20 years, given its maritime location, heritage offering, transport links as well as proximity to central areas.

The Unitary Plan identifies a large area of Mixed Use zoning to the west of the Onehunga Mall, while to the east there is a large area identified for terrace housing and apartments.

It is likely that these areas will see substantial apartment development and with this, a much larger demand for access to coastal and open space areas. There is limited open space land in the area.

Onehunga Mall Road south of Princes Street would ideally develop as a mixed use link between the centre and the wharf / coastal area, as would Church Street to the north. Mixed uses require a level of passing trade to be viable. The maps on the next two pages show the zoning under the old district plan (Auckland City) and the new Unitary Plan.

Figure 4: Auckland Unitary Plan zoning

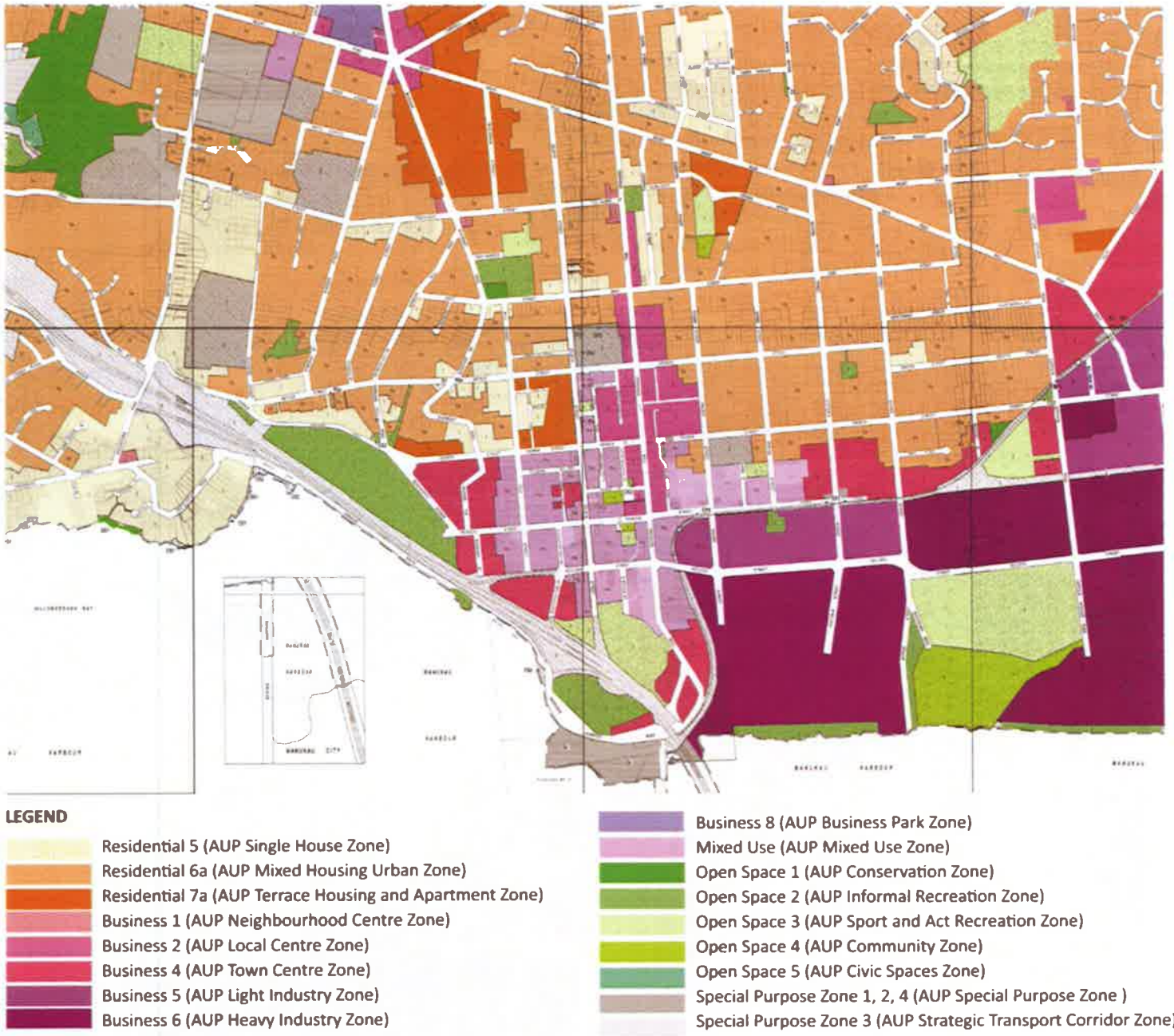
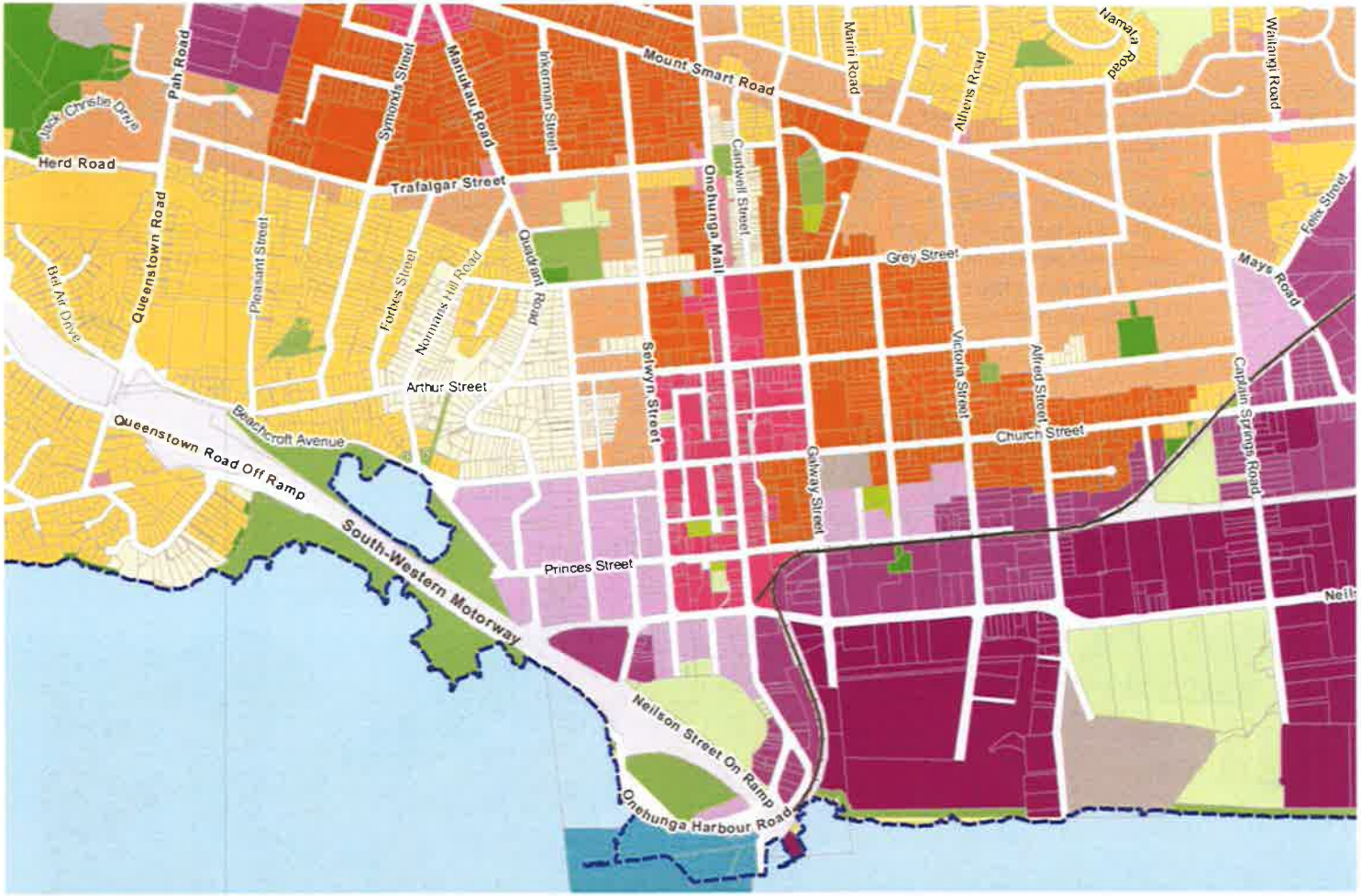


Figure 5 Previous Legacy District Plan - zoning



LEGEND

- Residential- Single House Zone
- Residential- Mised Housing Suburban Zone
- Residential- Mixed Housing Urban Zone
- Residential- Terrace Housing and Apartment Zone
- Business- Neighbourhood Centre Zone
- Business- Town Centre Zone
- Business- Light Industry Zone
- Business- Heavy Industry Zone
- Business- Business Park Zone
- Business- Mixed Use Zone
- Open Space- Conservation Zone
- Open Space- Informal Recreation Zone
- Open Space- Sport and Act Recreation Zone
- Open Space- Community Zone
- Open Space 5-Civic Spaces Zone
- Special Purpose Zone 1, 2, 4 (AUP Special Purpose Zone
- Special Purpose Zone 3 (AUP Strategic Transport Corridor Zone

Figure 6 New Unitary Plan - zoning

Area Units

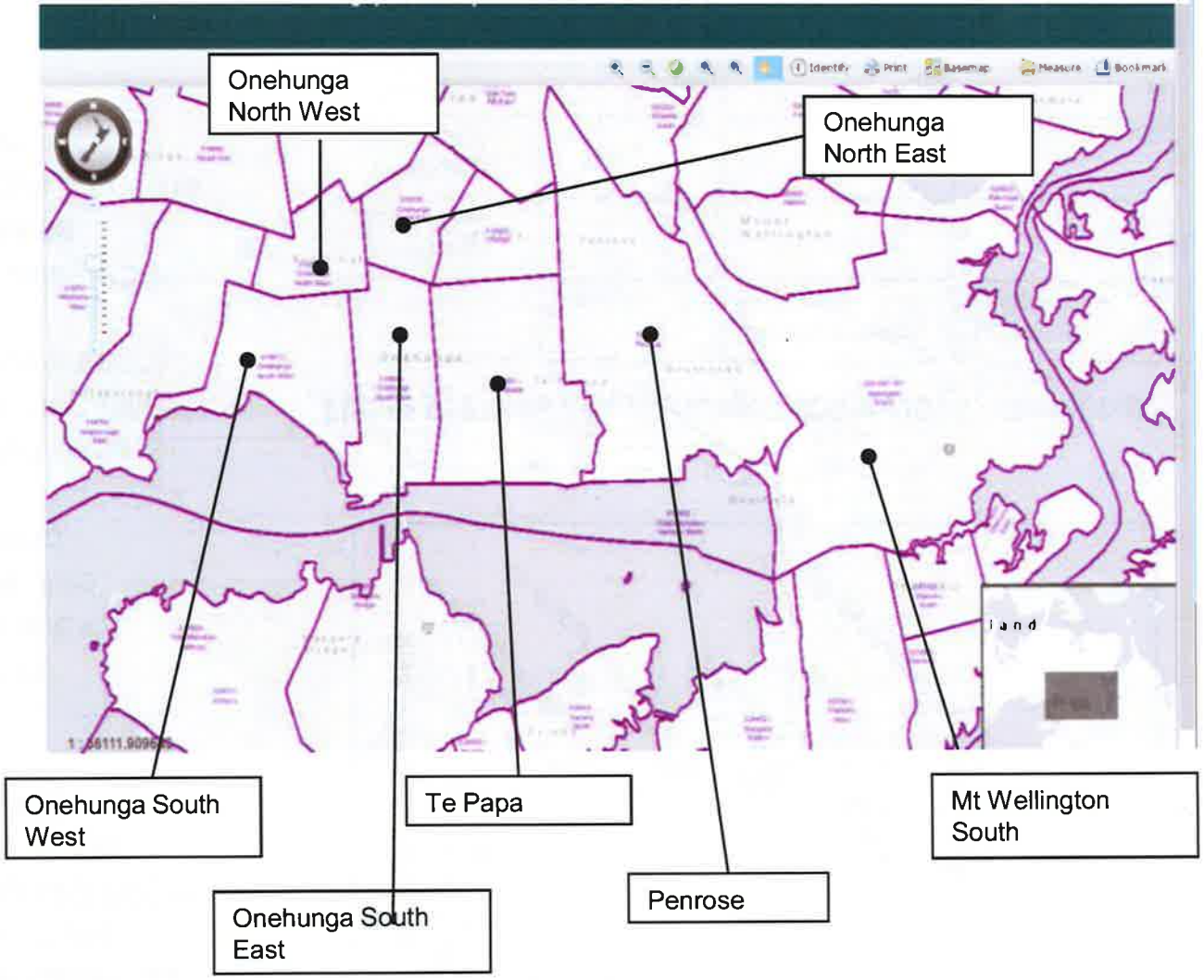
Relevant Stats NZ Census Area Units are shown in Figure 7.

The immediate catchment of the town centre covers the four census area units of Onehunga North East and West and Onehunga South East and West. There is an overlap with Royal Oak.

A wider catchment that is likely to use the coastal area will extend beyond these four areas into the Hillsborough, Mount Roskill, Three Kings and One Tree Hill areas.

The main employment areas lie to the east of the town centre, in the Te Papa, Penrose and Mt Wellington area units, closer to SH 1.

Figure 7: Stats NZ Area Units



Employment

The EWL link traverses a large employment area which is undergoing a transformation, as are other central employment areas in the region. Total employment in the area (55,000 in 2016) has grown since 2000 but not at the same rate as the region as a whole (23% growth versus 39%).

Stats NZ data shows strong growth in employment at the eastern end of the EWL (Penrose and Mt Wellington) , but limited growth at the western (Onehunga) end.

Onehunga South West and East area units have seen a decline in employment, consistent with a shift towards a mixed use environment.

In the Te Papa area there is a shift away from industry towards services and business activities. For these activities, the quality of the environment is important, along with good access by PT.

Figure 8: Employment change 2000 to 2015

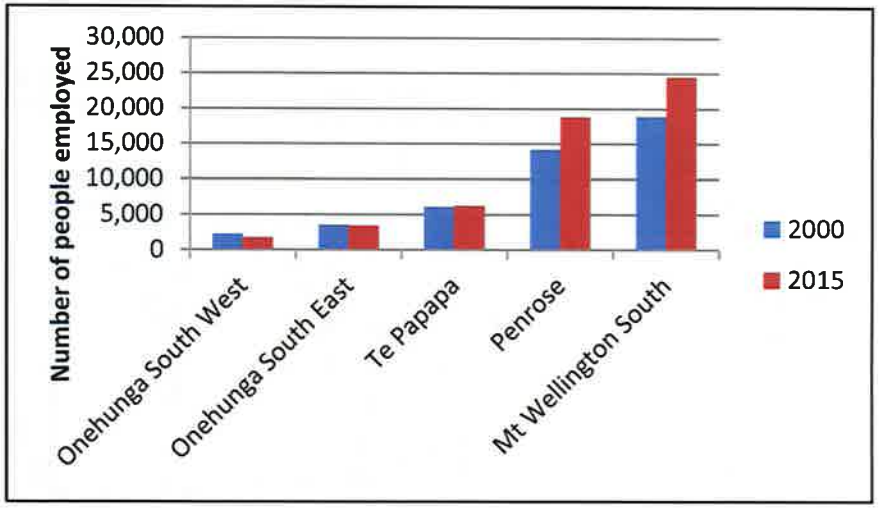


Figure 9: Employment change 2000 to 2016 - Onehunga

	Industry	Services (retail, cafe etc)	Business-based
Onehunga South West	-235	-120	-102
Onehunga South East	-593	580	-78
Te Papapa	-640	468	335

The EWL Transport Assessment contains estimates of future employment in the study area.

These estimates show little growth in total employment in the study area out to 2036, compared to other employment areas in the region, which show much stronger growth.

The composition of employment is likely to change, even if the amount of employment does not grow much.

Within the study area, transport-dependent employment has decreased somewhat between 2000 and 2016, if transport-dependent employment is taken to be manufacturing, wholesaling and transportation-related businesses.

This trend away from industry to business services is one noted in NZTA's economic assessment. This trend is consistent with higher land values.

Figure 10: EWL employment projections

Employment Growth							
North Shore	133,957	155,301	21,345	16%	171,604	16,302	10%
CBD	137,342	172,038	34,696	25%	198,888	26,849	16%
Central Isthmus/West	118,032	133,648	15,615	13%	145,879	12,231	9%
Eastern Isthmus	38,755	41,746	2,992	8%	44,099	2,353	6%
Onehunga Penrose	25,354	25,679	325	1%	25,961	282	1%
Māngere and Airport	25,409	32,566	7,157	28%	38,097	5,531	17%
Mt Wellington/Ōtāhuhu	13,652	14,080	429	3%	14,427	347	2%
East	45,912	49,998	4,087	9%	53,199	3,201	6%
Manukau and South	79,740	97,876	18,135	23%	116,686	18,810	19%
Regional Total	618,152	722,932	104,780	17%	808,840	85,908	12%

Source: Page 24, TECHNICAL REPORT 1-TRAFFIC AND TRANSPORT

Figure 11: Transport-related employment change 2000 to 2016

Transport-dependent employment *			
Year	Auckland	Study area	% of Auckland
2000	159,400	28,839	18%
2016	165,500	26,540	16%

* C. Manufacturing + F Wholesaling + I. Transport

Population

The population of the immediate Onehunga area (Onehunga North West, North East, South West and South East Census Area Units) is growing.

While population growth is not as strong as the region as a whole, the suburb's immediate catchment has increased by 25% since 2006. The fastest growing area has been the Onehunga South East area where a number of apartment developments have occurred. The Auckland Unitary Plan zonings enables and support this form of redevelopment and intensification.

Figure 12: Population change 2006 to 2016

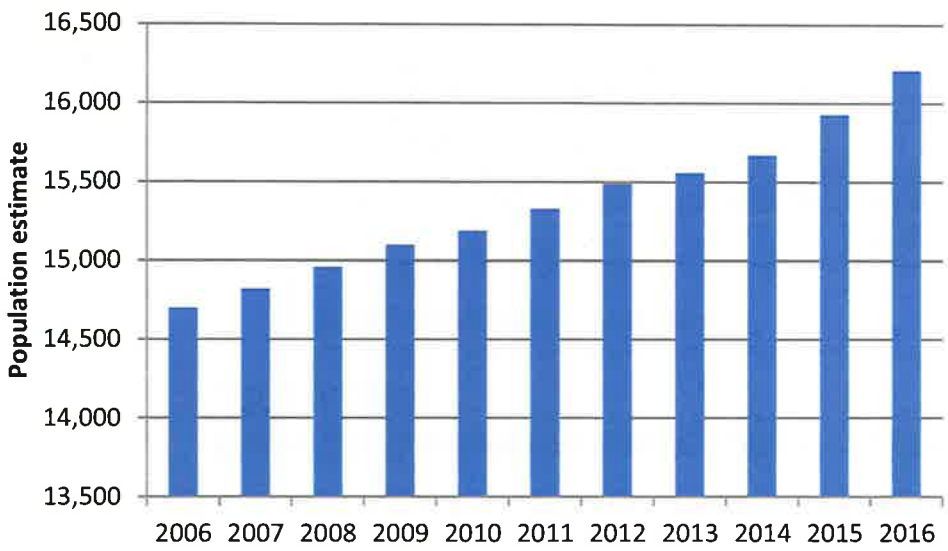


Figure 13: Population growth (high estimate) 2013 to 2043

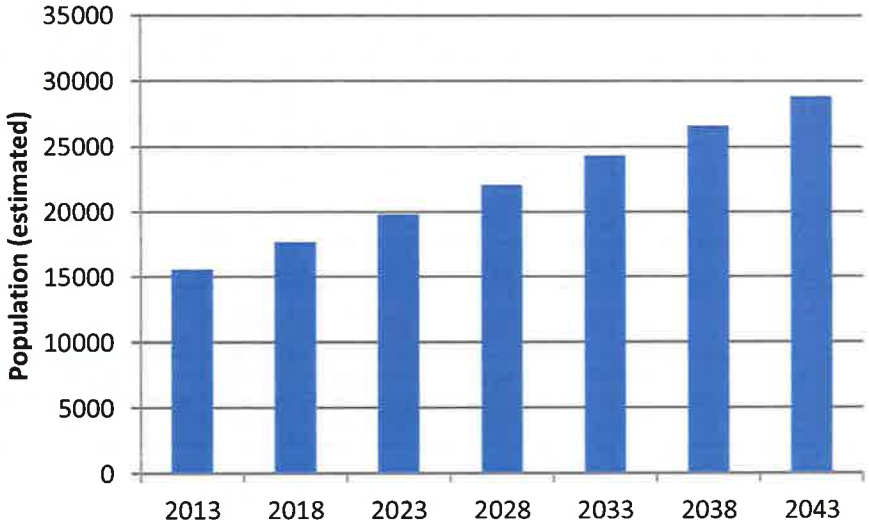
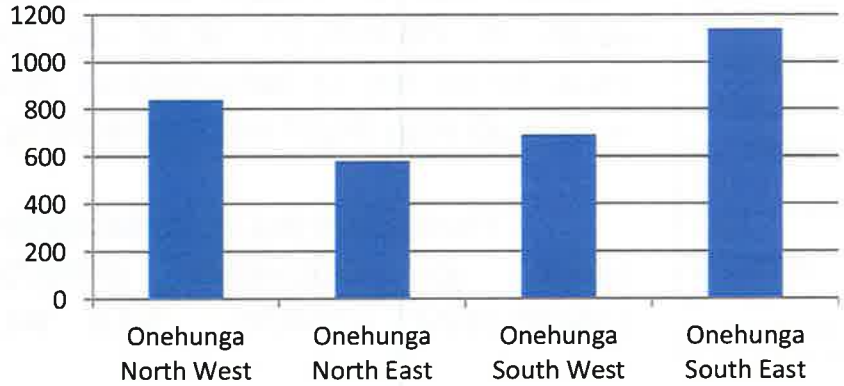


Figure 14: Population change 1996 to 2016



Age Structure

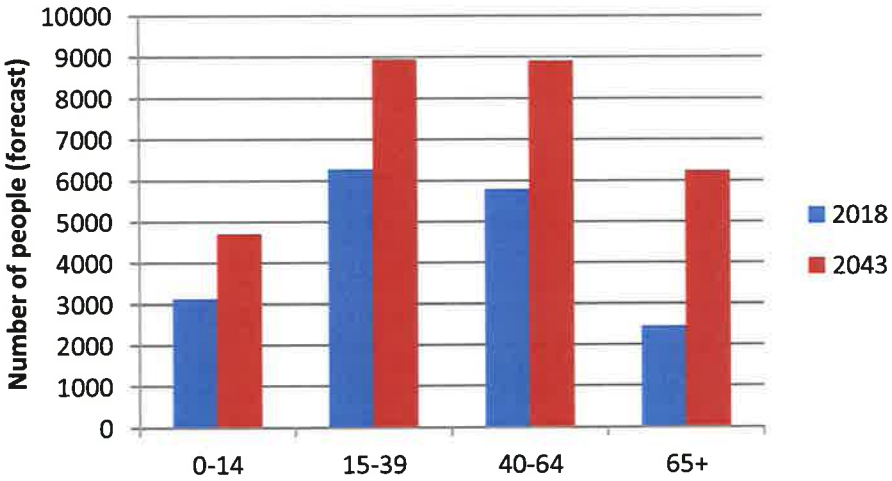
The area is experiencing a demographic shift with an substantial increase in the number of 40 to 64 year olds between 1996 and 2016 (Fig 15). This suggests a degree of gentrification, as well as likely upsurge in the number of families and children in the area, and associated demands for recreational and amenity spaces.

Population projections (under a high growth scenario) indicate a doubling of the population of the immediate area between 2018 and 20143 (see Figure 13 on previous page). Over this time, these will be substantial increases in all age bands.

Figure 15: Population structure: 1996 and 2016

Age band	1996	2016	Change
0-14 years	2360	2880	520
15-39 years	5480	6050	570
40-64 years	3160	5210	2050
65 years and over	1960	2070	110
Total	12960	16210	3250

Figure 16: Population structure: 2018 - 2043



Attachment Four: Assessment of Walking and Cycling Links and Associated Urban Amenity

Onehunga Town Centre to State Highway 20 Underpass (Onehunga Mall Road from Nielsen Street intersection to Onehunga Harbour Road).

This section is approximately 350m long.

The following diagram shows current conditions and the proposed EWL.

Current	Proposed
	

Figure One

Currently Onehunga Harbour Road has a two lane format. The road carriageway is about 15m wide. Footpaths exist on both sides of the road. On the western side, the footpath is up to 3m in places. The following diagram is sourced from Google Earth, and I have marked the width of the road and the width of the foot path at one point.

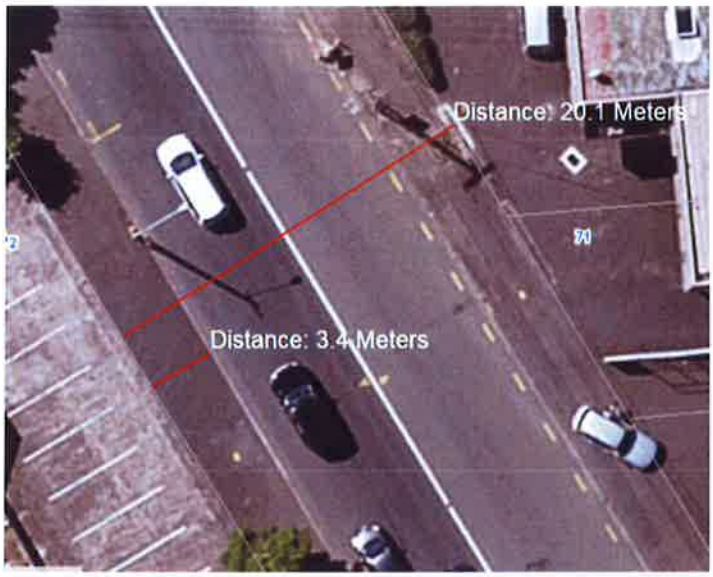


Figure Two

The existing pedestrian and cycle environment for this sector is summarised as follows in NZTAs Assessment of Environmental Effects[1]:

- *Connectivity: There is a network gap between the cul-de-sac end of Onehunga Mall to Onehunga Town Centre / train station;*
- *Amenity: The facilities are generally high amenity. The visual presence and noise of the adjacent SH20 is acknowledged; and*
- *Severance: Although SH20 provides a physical barrier, there are two connections (underpasses).*

The traffic and transport assessment notes that:

> *the existing AT Cycle Network map describes the southern end cul-de-sac end of Onehunga Mall as a route on quieter roads recommended by cyclists with the northern part of Onehunga Mall as a route with space for cyclists but may be on busy roads.*

With the EWL:

- Two lane format retained (20m road reserve retained)
- Roundabout added at the intersection of Onehunga Harbour Road and Onehunga Mall. Roundabouts can be difficult to pedestrians and cyclists to navigate around due to the constantly flowing traffic.

[1] Para 4.14.3.2 TECHNICAL REPORT 1 - TRAFFIC AND TRANSPORT ASSESSMENT

- Shared (3m wide) footpath retained and 'topped up' on western side (but this could be accommodated in the current road alignment).

Traffic and transport assessment[2]:

> *It is noted that the north/south connection already exists and is well used. However, there will be a significant improvement in the quality of connectivity for pedestrians and cyclists as there will be enhanced facilities (e.g. shared path) and significantly reduced traffic flows. There will be significantly increased accessibility between the Wharf and the town centre primarily due to traffic flows on Onehunga Mall reducing substantially.*

So the main benefit I see is a drop in traffic volumes and no/limited heavy vehicles as NZTA notes as follows:

1. Onehunga Mall (south of Neilson Street) changing from a strategic to secondary arterial[3];
2. Onehunga Mall south of Neilson Street - from 22,900 vpd to 3,700 vpd in 2026 (84% reduction)[4];

This may be an improvement to amenity, but not connectivity. A footpath already exists and the route is already "well used".

In terms of amenity, in comparison many busy but highly used arterial roads like Ponsonby Road and Mt Eden are in the order of 20,000 vpd. These roads are used for a wide range of recreational, shopping and business activities.

In urban design terms, I consider that the big improvement to the walking and cycling environment will come from redevelopment of the sites adjoining the road. A mixed use environment is expected, but mixed uses need, and commonly have, a degree of passing traffic to support commercial activity.

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[2] Para 7.4.2.2 TECHNICAL REPORT 1 - TRAFFIC AND TRANSPORT ASSESSMENT
[3] Para 5.13 (b), Statement of Evidence of Andrew Murray
[4] Para 10.14 (e)

SH 20 Underpass to Existing Wharf Entrance

This section is about 300m long.

Existing	
Proposed: (note: does not show potentially wider land bridge)	

Figure Three

Currently access from Onehunga Mall road is via the underpass, or under SH 20 via Onehunga Harbour Road.

Onehunga Harbour Road is an at grade, two lane road format.

Onehunga Harbour Road has about 19,000 vpd.

On the south side of Onehunga Harbour Road there is an 2.8m wide existing shared path .

The only comment in NZTA technical report notes that[5]:

> *Heading north towards the Town Centre and Train Station from Māngere Bridge/Waikaraka Cycleway there is a 4m wide shared path overbridge over Onehunga Harbour Road and then*

[5] Para4.14.3.2. TECHNICAL REPORT 1 - TRAFFIC AND TRANSPORT ASSESSMENT

an underpass under SH20 (Figure 4-28). This link connects to the southernmost extent of Onehunga Mall, a cul-de-sac with light industrial and residential land uses adjacent.

In terms of usage of Mangere Bridge[6]:

- *The shared path is used by significantly more cyclists on a weekend compared to a weekday. 250 cyclists used the path on the Sunday compared to 55 cyclists on a Monday;*
- *The shared path is used by significantly more pedestrians on a weekend compared to a weekday. 135 pedestrians used the path on the Sunday compared to 36 pedestrians on a Monday.*

Recreational (weekend) use is therefore much higher than commuter use.

With EWL:

- The road environment goes from 2 lanes to 6 lanes
- Road environment (footpath and carriageway) increases from about 12m to 40ms wide
- The at grade road condition is replaced by the four lane trenched section of at least 300m long.
- Total traffic volumes increase from 18,000 vpd to 41,000 vpd. Onehunga Harbour Road drops to 300 vpd (but not taking account future port traffic), but EWL carries 40,000 vehicles.
- Pedestrian connectivity to the port not substantially increased. Under the current situation pedestrian access to a (redeveloped) port would be possible to the east (off the approach to old Mangere Bridge) as well as to the west, by the existing vehicle entrance.
- In the mid section, opposite The Landing, a trench lid would add to connectivity (but pedestrian crossing under the existing situation could be improved by refuge in the middle of the road).
- Pedestrian and cycle connectivity to the north still involves the underpass, or a new path way on the north side of Onehunga Harbour Road under SH 20 (but this involves a dip down, then a sharp rise to meet Onehunga Mall).

In my assessment, there are no substantial improvements to walking and cycling conditions. In effect only one new link of limited benefit is added. The extra traffic volumes and wider infrastructure will diminish the quality of the environment to be experienced. The trench (and lid) helps to ameliorate some of these effects, but the lid does not extend across the full length of the trench.

Wharf to Cruising Club (Orpheus Drive)

This section is approximately 520m long.

---

[6] Para 4.14.6

Existing	Proposed
	

Figure Four

Currently, Orpheus Drive is a two lane format.

South of the existing SH 20 off ramp., traffic volumes are about 20,000 vpd. West of the SH 20 on ramp, traffic volumes are light.

There is shared path from the western end of the wharf to the Sea Scouts building. North of this, walkers and cyclists share Orpheus Drive.

Existing walking and cycling environment (NZTA's assessment)is as follows:[7]

- *Connectivity: There is a minor network gap on Orpheus Drive between the Manukau Cruising Club and the Sea Scout Hall where pedestrians and cyclists have to use the lightly trafficked Orpheus Drive when connecting between the shared path and a segregated 3m wide commuter cycle path/recreational path at Taumanu-Onehunga Foreshore;*
- *Amenity: The facilities are generally high amenity including a shared path and segregated cycle path and nearby recreation cycle and pedestrian route as part of the Taumanu-Onehunga Foreshore project. The visual presence and noise of the adjacent SH20 is acknowledged; and*

[7] 4.14.3.1. TECHNICAL REPORT 1 - TRAFFIC AND TRANSPORT ASSESSMENT

- *Severance: Although SH20 provides a physical barrier, there are two connections from Taumanu-Onehunga Foreshore to Onehunga communities over SH20.*

With EWL:

- Road environment goes from 2 lanes to 6 lanes in total
- Traffic volumes (south of SH 20 off ramp) go from 20,000 vpd to 40,000 vpd, but Onehunga Harbour Road and Orpheus Drive reduce substantially.
- Elevated structure introduced (from chainage 250 to 525)
- Trees (amenity) removed.
- Continuous 3m shared path provided .

Traffic and transport assessment[8]:

> *The shared path will improve connectivity by closing the existing minor network gap on Orpheus Drive between the Aotea Sea Scouts Hall and Manukau Cruising Club. Accessibility will also be improved, as the shared path will provide a continuous link from Old Māngere Bridge to Taumanu-Onehunga Foreshore.*
>
> *The shared path is considered to be high amenity as it will be off-road, 3m in width, separated from traffic by a kerb and adjacent to low trafficked environment, particularly on Orpheus Drive.*
>
> *Although positive, the scale of impact will be relatively modest as the existing connectivity on Orpheus Drive is not highly deficient and is lightly trafficked.*

The assessment concentrates on the gap to be filled. There is no comment on whether or not i amenity for walkers and cyclists is improved or reduced.. Traffic on Onehunga Harbour road and Orpheus Drive reduces, but the 4 lanes of the EWL link are introduced adjacent to these roads. Rather than be up to 200m away, the motorway is only metres away.

I do not agree with the technical assessment that the benefit will be relatively modest, given existing facilities present and the negative visual and aural impact of the EWL.

[8] Para 7.4.1.2: TECHNICAL REPORT 1 - TRAFFIC AND TRANSPORT ASSESSMENT