NEW PLYMOUTH MODEL COMMUNITY EVALUATION

Author
Courtney Groundwater
MSc(Eng)(Transport Planning and Engineering), BE(Hons)(Civil), GIPENZ
Senior Transportation Engineer, Abley Transportation Consultants Ltd
courtney.groundwater@abley.com

ABSTRACT

In 2010 New Plymouth was named as one of two model communities for walking and cycling in New Zealand. "The intention is to deliver safer environments for novice users, with a range of community destinations within reasonable riding or walking distance from residential centres. The model communities programme encompasses both the hard and soft aspects of encouraging more people to walk and cycle.

The New Plymouth model communities application leveraged off the coastal walkway. The walkway is a high quality walking and cycling facility which created enthusiasm for walking and cycling within the community. The intent of the New Plymouth model community was to build on this enthusiasm and increase the levels of walking and cycling participation. This study sets out the methodology and results of a districtwide economic evaluation of the New Plymouth 'Let's Go' initiatives. The performance of the New Plymouth 'Let's Go' programme has been measured in this study using cost benefit analysis techniques. In addition to the districtwide analysis, the performance of cycle infrastructure implemented on the coastal walkway and another on-road location have been evaluated separately. Results of the study demonstrate the value of well designed facilities.

This study follows on from the poster presented at the 2015 conference "demonstrating the value of school travel plans".

INTRODUCTION

In 2010 New Plymouth was named as one of two model communities for walking and cycling in New Zealand. "Model communities are urban environments where walking and cycling are offered to the community as the easiest transport choices. The intention is to deliver safer environments for novice users, with a range of community destinations within reasonable riding or walking distance from residential population centres" (NZ Transport Agency, 2013a). New Plymouth branded their model community project 'Let's Go'. 'Let's Go' encompasses both the hard and soft aspects of encouraging more people to walk and cycle (New Plymouth District Council, 2013).

The New Plymouth model communities application leveraged off the coastal walkway and new Te Rewa Rewa bridge (opened in 2010). The walkway is a high quality walking and cycling facility which created enthusiasm for walking and cycling within the community. The intent of the New Plymouth model community was to build on this enthusiasm and increase the levels of walking and cycling participation.

Since becoming a model community the New Plymouth District Council have implemented a plethora of initiatives to encourage active travel including: travel planning with workplaces and schools, an extension to the coastal walkway and other infrastructure improvements.

Going forward it is understood that the focus of investment will be on continuing travel planning with businesses and schools and completing connections within the network. Two projects have been approved for funding under the Urban Cycleways Programme: Links to the Coronation Avenue cycleway and a connection within the Mangati walkway.

This paper sets out the methodology and results of a districtwide ex-post economic evaluation of the New Plymouth 'Let's Go' initiatives and coastal walkway. The performance of the New Plymouth 'Let's Go' programme has been measured in this study following techniques set out in the NZ Transport Agency's Economic Evaluation Manual (EEM). The evaluation builds on a previous evaluation of 15 school travel plans in the district.

AVAILABLE DATA

Pedestrian and cyclists counts

New Plymouth District Council collects count data at a range of sites across the district. Data is collected via automatic and manual counts. Methods of data collection include:

- TRAFx counters
  - TRAFx counters consist of a single laser beam. These count sites continuously count the number of movements past the counter. Cyclists and pedestrians are recorded together, therefore mode share information cannot be deduced from these sites. Data for 23 TRAFx counter locations in the district has been considered, however not all of these sites are currently operational. The first TRAFx counts are available from August 2008.
- Eco-Counters
  - Eco-Counters consist of two laser beams and in ground induction loops. These sites count the number of pedestrians and/or cyclists separately, by direction. There are three Eco-Counter sites in New Plymouth. Eco-Counter sites were established in 2011; currently the foreshore site on the coastal walkway is the only site that collects both pedestrian and cyclist information. Other sites count cyclists only and do not include the laser beam component of the counter.
- Manual counts
  - Dating as far back as 2007 in some locations, these record pedestrian and cyclist numbers separately and are undertaken during peak hours across a range of seasons for each site. Counts are categorised as "school, commute and various" dependent upon the location and time that the count is undertaken. Counts are undertaken during term time and the school holidays. Due to the low number of manual counts per annum at each site it is difficult to establish statistically robust trends at many sites.

The number of pedestrians and cyclists recorded on the coastal walkway over time are shown in Figure 1 and Figure 2 respectively.

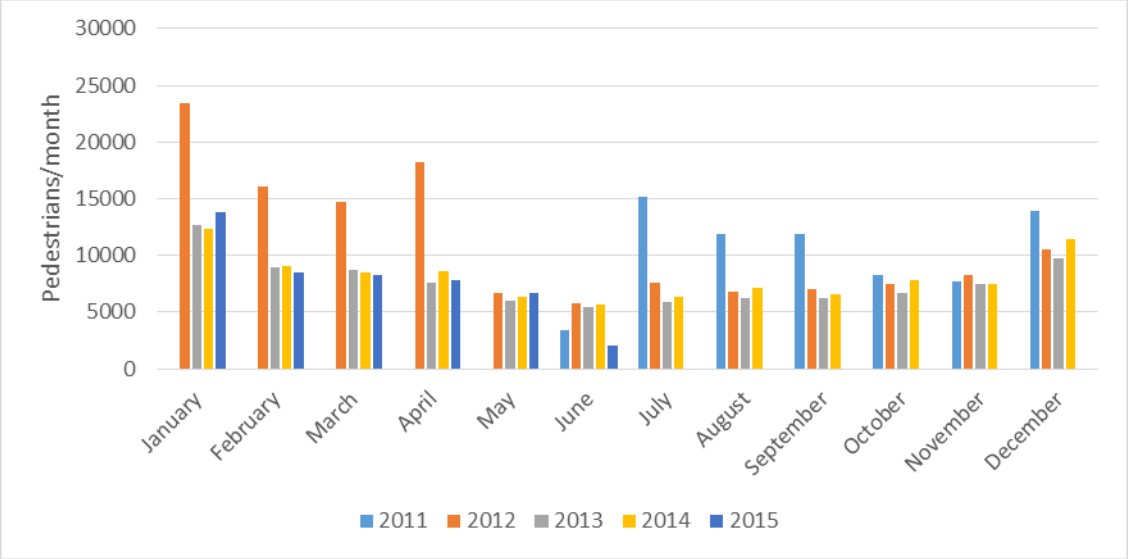

Figure 1: Pedestrians per month recorded on the coastal walkway (July 2011 to May 2015)

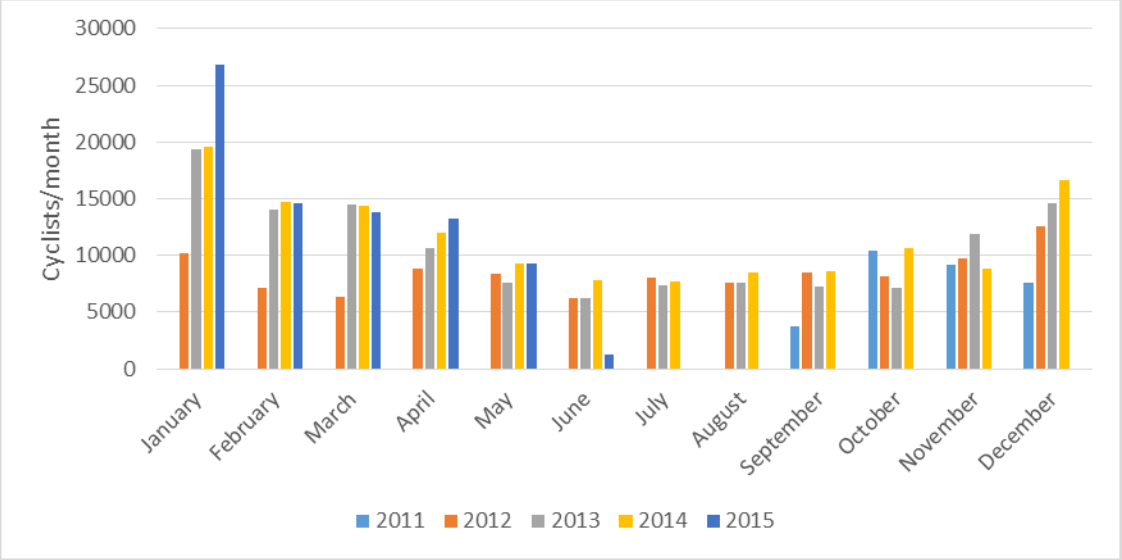

Figure 2: Cyclists per month recorded on the coastal walkway (July 2011 to May 2015)

Census journey to work (JTW) data

The New Zealand census collects JTW information about the main mode of travel to work on the census day for the working population. While this is a one day count only, it does cover the entire New Plymouth working population and is therefore useful in understanding how the working population as a whole travels.

For both walking and cycling, the most significant increases in commute trip numbers have been for travel between suburbs adjacent to the coastal walkway and the CBD, see Figure 3 and Figure 4. Large cycling increases are shown to radiate out from the CBD in all directions for suburbs located within 3km of the CBD, see Figure 3. Increases in longer cycling trips are most predominant along the coastal walkway.

Overall the number of people walking to work in the New Plymouth District has increased by 0.7% between the 2006 (7 March 2006) and 2013 (5 March 2013) censuses. The number of people who cycle to work has increased by 31.7% from 681 to 897 over the same time period.

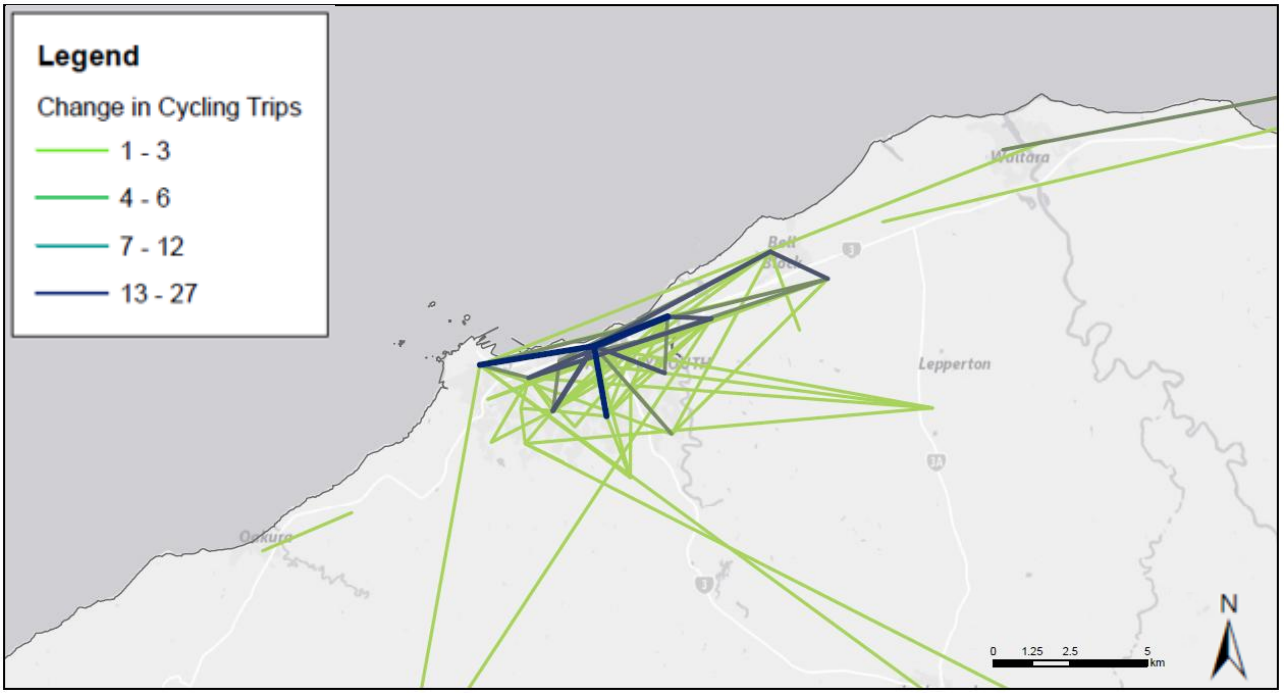

Figure 3: Change in number of people cycling to work between 2006 and 2013 by origin and destination area unit (positive change only)

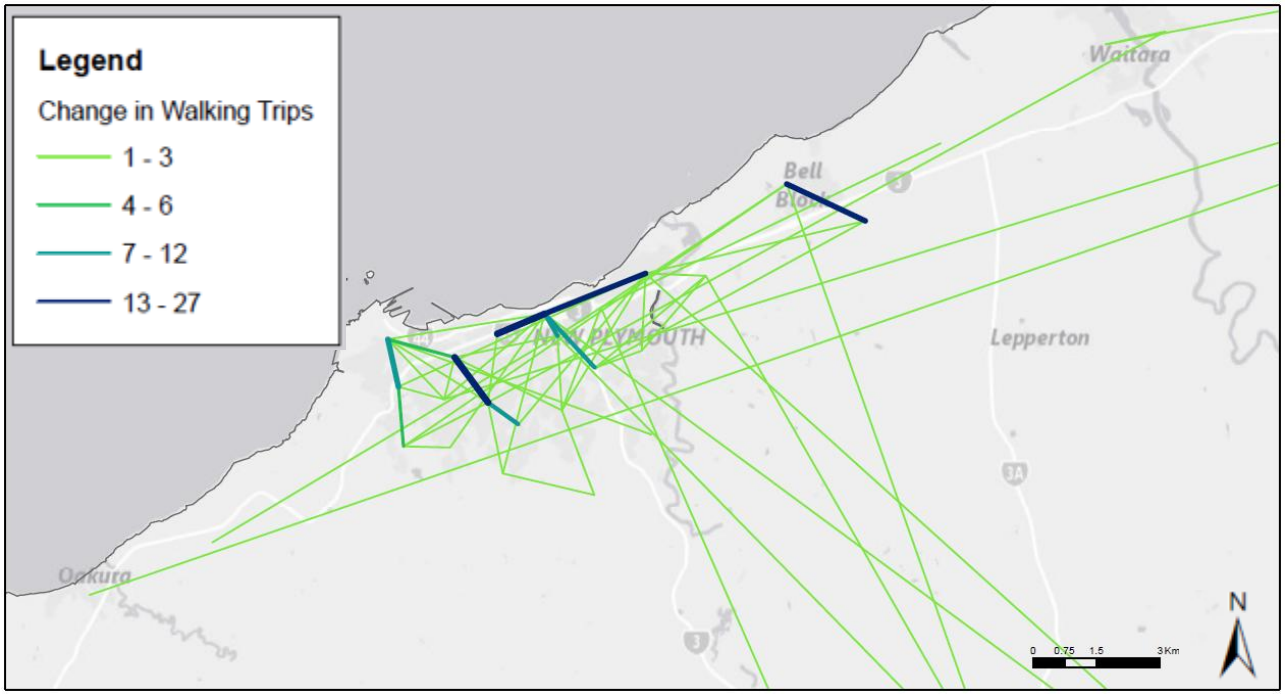

Figure 4: Change in number of people walking to work between 2006 and 2013 by origin and destination area unit (positive change only)

Growth trends

Analysis of the coastal walkway counts (Figure 1) shows that pedestrian counts were very high in late 2011/early 2012 following the implementation of the model communities programme and extension of the coastal walkway. Recorded walking trips have dropped to a relatively constant number per month ever since. However, census data shows a longer term increase in pedestrian commute trips along the coastal walkway from 2006 to 2013, see Figure 4. Pedestrian counts are not shown to be increasing significantly, except at manual school count sites and for commuters along the coastal walkway in the census data. Increases in active travel to schools reflects the significant increases in walking and scooting participation achieved through the 'Let's Go' school travel planning. The pedestrian growth taken forward in the analysis therefore assumes no additional pedestrian growth over and above what would be expected in the general New Zealand population except along the coastal walkway and for travel to schools.

Cyclist numbers are shown to grow over time. Census JTW data indicates that cycling trips are also growing across the District as a whole. It is possible that some walking trips are being converted to cycling trips as infrastructure in the district improves. Therefore the lower uptake in walking may be explained to some extent by the large uptake in cycling.

Trip Distances

The 'Let's Go' website facilitates trip logging for the members of the public. Trip purpose, mode and distance are logged by participants on the website. Data extracted from the website for 207,063 trips has been used to determine mean and median trip distances for different trip purposes and modes for the district as a whole. Mean and median trip distances for cycling and walking are shown in Figure 5 and Figure 6 respectively. All average trip distances are considered to be in the range of what is generally observed for each trip purpose in New Zealand. However it is considered that any new recreational cycling trips may be shorter than the average 13km recorded on the 'Let's Go' website. Therefore an average trip length of 6.5 km (50% of the recorded average) for new recreational cycling trips on the wider network is used in the evaluation.

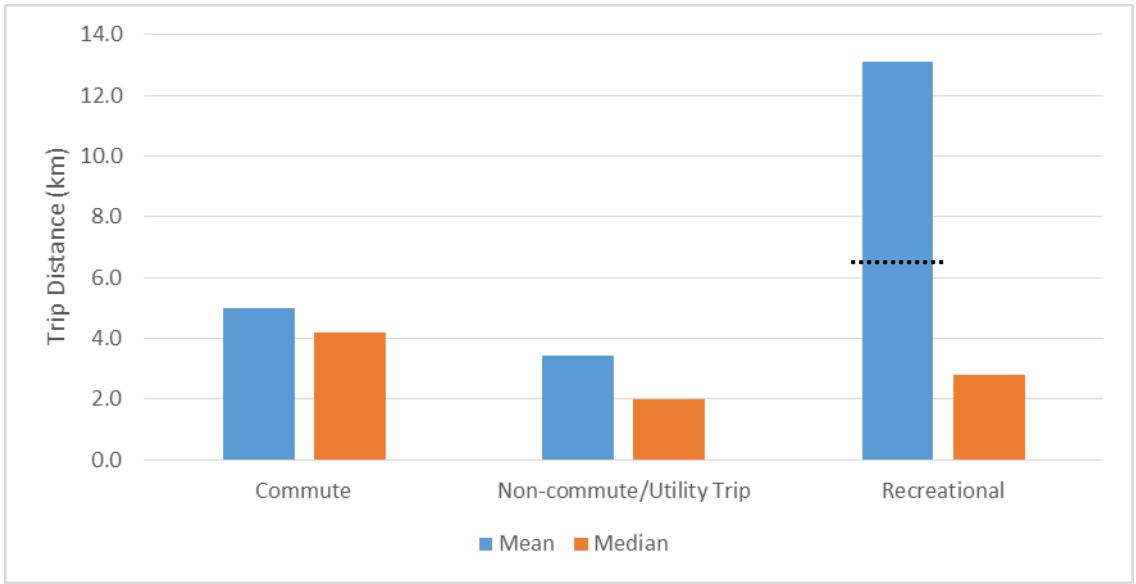

Figure 5: Cycling trip distance by purpose

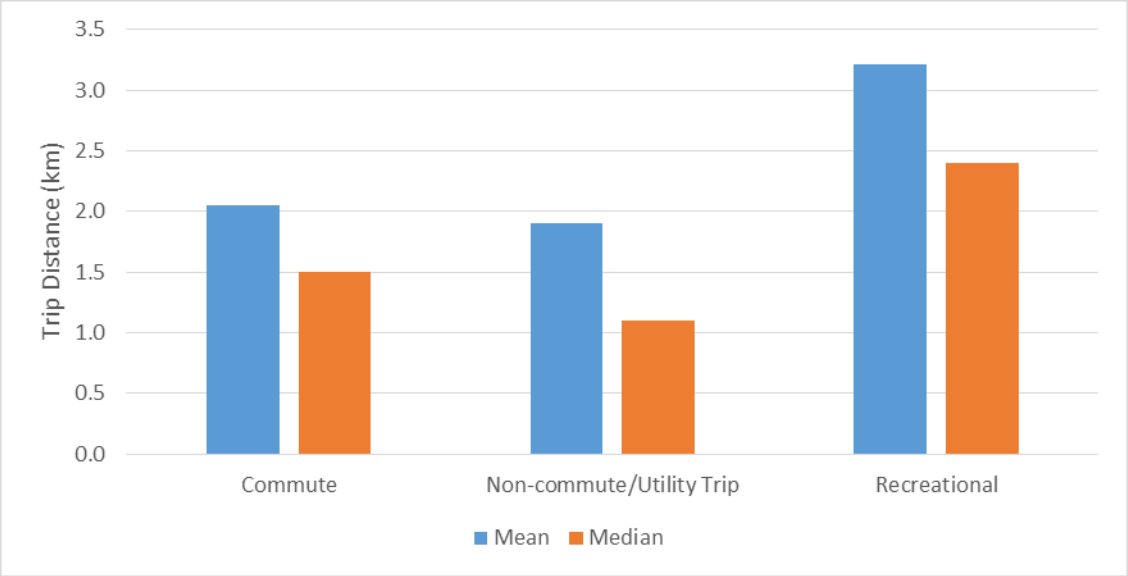

Figure 6: Walking trip distance by purpose

Trip distances on the coastal walkway have been calculated separately. Coastal walkway trip distances have been inferred from the recorded trip numbers at automatic count sites along the route and are based on the length of the coastal walkway facility.

METHODOLOGY AND ASSUMPTIONS

The performance of the New Plymouth 'Let's Go' programme and the coastal walkway has been measured in this study using the procedures set out in the NZ Transport Agency's Economic Evaluation Manual (2013) (EEM). The analysis draws from the methodologies in Simplified Procedures 11 and 12 (SP11 and SP12) for walking and cycling and travel behaviour change respectively. The evaluation was undertaken in two parts:

- The increase in active mode use across the district as a whole (excluding areas along the coastal walkway) is calculated and attributed to the 'Let's Go' programme.
    - The benefits of cycling infrastructure implemented on Coronation Avenue (State Highway 3) are calculated as a separate component within the overall 'Let's Go' Programme evaluation. The Coronation Avenue infrastructure provides mainly for trips to education including to New Plymouth Boys' High School and the Western Institute of Technology in the immediate vicinity.
- The benefits of the coastal walkway are calculated separately and apportioned between the initial coastal walkway infrastructure investment and the 'Let's Go' programme.

Benefits included in the analysis are:

- Health benefits
- Travel time reduction/relative attractiveness benefits (user benefits)
- Crash cost reduction benefits
- Road traffic reduction benefits

The analysis compares a scenario that includes the implementation of the 'Let's Go' programme against a do-minimum scenario. The do-minimum scenario assumes that New Plymouth residents would behave in the same way to the rest of New Zealand, including for some increase in the uptake of cycling and minimal change in walking. The inputs described in the 'Available Data' section have been used in the evaluation.

Benefits and costs pertaining to infrastructure investment have generally been calculated over a 40 year period. However, school travel plan benefits and accelerated rates of change due to other education and encouragement are calculated over 10 years only. This time period is consistent with EEM guidance due to the travel behaviour change nature of these benefits. Year zero is taken as 2010 for the analysis of the 'Let's Go' programme, as this was the year that the model communities were announced.

Health Benefits

Health benefits are calculated for new walkers and cyclists only, and are calculated based on the cumulative kilometres travelled by walking and cycling separately. The key inputs to establish health benefits are the number of walking and cycling trips made, trip frequency across the year and the mean travel distance by mode. Health benefits are calculated separately for each trip purpose in this evaluation.

The rate of uptake of cycling is assumed to decrease after 2020, growth in walking increases with the New Plymouth working age population only, see Figure 7. Growth on the coastal walkway is calculated separately.

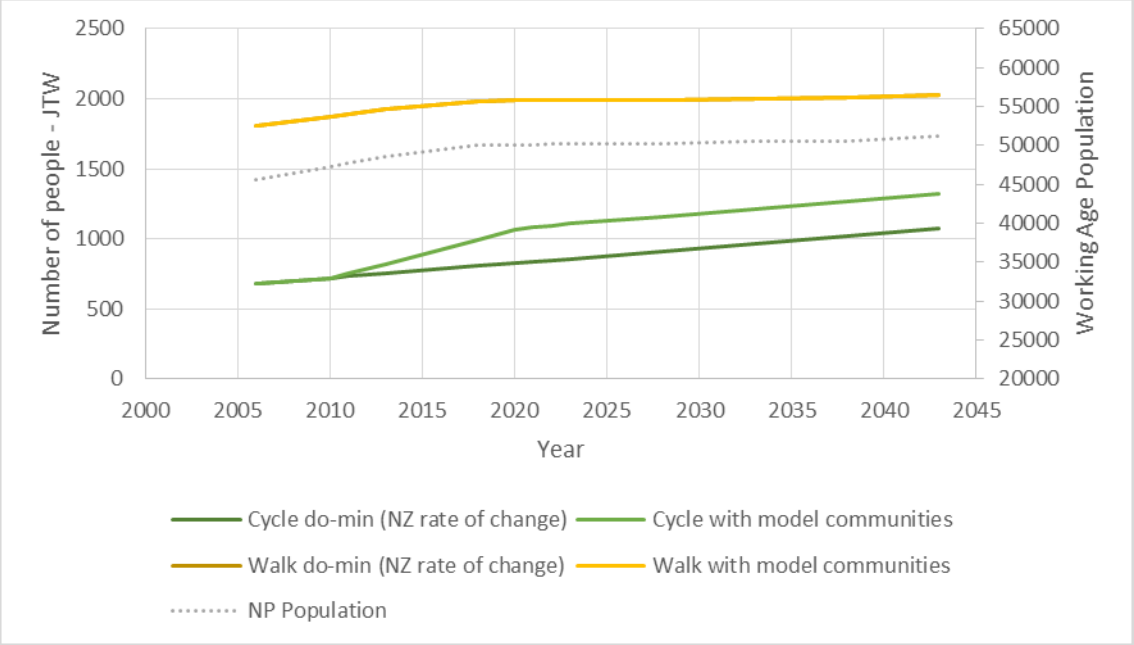

Figure 7: Assumed change in people who travel to work by active modes over time

User Benefits

User benefits are calculated for the coastal walkway and cycling facilities on Coronation Avenue only. User benefits in this evaluation are based on the relative attractiveness of the provided pedestrian and cycle facilities. The relative attractiveness of the coastal walkway as a pedestrian facility is assumed to be half of the relative attractiveness of the walkway as a cycling facility for the purposes of this evaluation. Consumer surplus theory is applied, i.e. the rule of a half, to calculate the user benefits in this analysis for existing and new users.

Crash Cost Savings

There is likely to be some reduction in overall crash risk exposure for active transport users due to the hard and soft measures implemented as part of the 'Let's Go' programme. However, the length of time since implementation is insufficient to understand the scale of this reduction in the available data. Crash cost savings have been calculated using crash prediction models for implemented pedestrian crossing facilities, hospital Accident Compensation Claims (ACC) data for

scooter crashes and facility specific calculations for Coronation Avenue. Other crash cost savings are not included in the analysis.

Road Traffic Reduction Benefits

The EEM SP11 calculates road traffic reduction benefits at a rate of $0.10 per cumulative kilometre travelled by active modes. This rate has been applied to the cumulative kilometre calculated in the health benefits analysis for commuter, school and 'other utility' trips. No road traffic reduction benefits are claimed for recreational trips.

Costs

Costs have been calculated based on actual spend to date since the 'Let's Go' programme was initiated in 2010, coastal walkway construction costs since 1999 and values included in the New Plymouth District Council's Long Term Plan for the next ten year period and an ongoing investment and maintenance assumption thereafter. Costs included in the evaluation are shown in Table 1.

Table 1: Costs included in Evaluation

Year	Capital Cost / Costs Spent to date*	Education and Encouragement (excluding School Travel Planning)	Walking and Cycling Operational Cost	School Travel Planning	Coastal WW Capital Cost	Coastal WW Operational Cost
2000-2009	-	-	-	-	$16,825,000	$353,750
2010	$603,100	(included in capital costs)			$4,300,000	$101,250
2011	$2,204,800	(included in capital costs)	$5,000	$78,700		$116,250
2012	$1,290,200	(included in capital costs)	$10,000	$80,200		$116,250
2013	$2,124,700	(included in capital costs)	$10,000	$55,500	$301,000	$116,250
2014	$1,392,500	(included in capital costs)	$10,000	$75,700		$116,250
2015	$296,700	$242,500	$38,700	$83,600		$116,250
2016	$296,700	$242,500	$38,700	$92,600		$116,250
2017	$296,700	$242,500	$38,700	$94,000		$116,250
2018	$204,200	$242,500	$112,400	$91,000		$116,250
2019	$204,200	$242,500	$112,400	$90,800		$116,250
2020	$204,200	$242,500	$112,400	$92,000		$116,250
Future	$204,200 to 2023 then $20,000 per annum (nominal sum) Values for 2015 to 2023 are based on NPDC LTP		$112,400 per annum based on LTP plus additional $10,000 per annum for maintaining cycle lanes	Reduces from $40,000 to $4,000 per annum over 5 years		$116,250per annum

*Includes for 2015 Coastal Walkway Extension as part of 'Let's Go' programme

Key Inputs

Key input values are shown in Table 2.

Table 2: Key Inputs and Assumptions used in Evaluation

Input	Value	Source
Inputs to Health Benefit Calculation		
Pre-travel plan JTW trips	Various	From 2001,2006 and 2013 census data
Proportion of cycle trips relative to work trips	**Other Utility** 1.81 **Recreational** 0.79	NZ Household Travel Survey
Proportion of walk trips relative to work trips	**Other Utility** 0.94 **Recreational** 0.96	NZ Household Travel Survey
Trips per person per day	**Commute** 2 **Other Utility** 2 **Recreational** 1	Assumption
Average Travel Distance by Mode/purpose (not including Coastal Walkway)	Walk Commute: 2 km Walk Utility: 1.9 km Walk Recreational: 3.2 km Cycle Commute: 5 km Cycle Utility 3.4 km Cycle Recreational: 6.5 km (factored down by 50% from 13km) Coastal walkway: 2.4 – 9.6 km dependent on count site	'Let's Go' Website Trip Logging and costal walkway count sites (includes additional 450m at each end of coastal walkway trips)
Commute days per year (adjusted for poor weather)	182	Assumption
Other Utility and Recreational trip days per year	260	Assumption
NZ Rate of change in JTW cycle numbers (JTW/working age population/year)	0.000211985	Census Data for all NZ excl New Plymouth
New Plymouth Rate of change in JTW Cycling Numbers (JTW/working age population/year)	0.000681136	Census Data for all New Plymouth excl area units along coastal pathway
NZ Rate of change in JTW walk numbers (JTW/working age population/year)	0	Assumption, calculated rate was slightly negative
New Plymouth Rate of change in JTW walk Numbers (JTW/working age population/year)	0	Assumption, calculated rate was slightly negative
Inputs to Crash Cost Reduction Calculation		
Reduction in scooter injury crashes per year due to scooter skills training	4	Conservative assumption based on ACC Claims and hospitalisation
Crash reduction due to pedestrian crossing facilities	35% - 70% dependent on facility type	As per EEM
Inputs to Road Traffic Reduction Calculation		
Number of commute and other utility walking and cycling trips	Varies	Uses number calculated for health benefits
General Inputs/variables		
Discount Rate	0.06	As per EEM
Analysis period	40 years (10 years for travel behaviour change activities)	As per EEM

RESULTS

The overall benefit cost ratio for the combined 'Let's Go' programme and coastal walkway is 3.8. A benefit cost ratio of 3.8 puts the investment in the 3-5 band for cost and benefit appraisal in the Investment Assessment Framework. This is the medium range for benefit and cost appraisal as defined for the National Land Transport Programme funding criteria for the 2015/18 period; further information on funding criteria is available at: www.pikb.govt.nz. The results are presented in Table 3.

Table 3: Evaluation Results

Measure	Value
Benefit Cost Ratio	**3.8**
Present Value Benefits	$ 97,334,000
Present Value Costs	$ 25,917,000
Net Present Value	$ 71,416,000
PV of Benefits per head of population	$1,262
PV of Costs per head of population	$336

The coastal walkway has been a very successful infrastructure investment. While the cost of implementation was high, the benefits associated with the investment have far outweighed the cost. This demonstrates that investing in high quality infrastructure for walking and cycling, especially where this is supported by education and encouragement, can be extremely successful. As demonstrated in the census JTW data, the coastal walkway has been successful in encouraging active commute trips, as well as recreation and other utility trips. It should be noted that there are likely other economic benefits associated with the coastal walkway and 'Let's Go' programme that are outside the scope of this transport focused evaluation, these could include tourism and benefits to local businesses.

ACKNOWLEDGEMENTS

I would like to thank New Plymouth District Council and the Let's Go team for supporting the sharing of this information. I would also like to acknowledge the success of the 'Let's Go' programme and coastal walkway investment to date.

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