

Kaipara District Council

Mangawhai / Mangawhai Heads Review of Speed Limit Provisions





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Review of Speed Limit Provisions

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1 Introduction

1.1 Terms of Reference

This report has been commissioned at the request of the Kaipara District Council (KDC) to review the location of the existing speed limit signs when entering and exiting Mangawhai / Mangawhai Heads.

1.2 Background

The roads reviewed are as follows:

- Cove Road (2,600 – 6,000m);
- Mangawhai Heads Road (0 – 1,220m);
- Kaiwaka-Mangawhai Road (10,320 – 12,800m);
- Tara Road (0 – 2,800m);
- Moir Street (0 – 1,440m);
- Tomarata Road (0 – 1,500m);
- Insley Street (0 – 640m); and
- Molesworth Drive (0 – 5,020m).

1.3 Carriageway Information

The table below provides the One Network Road Classification (ONRC) of each road, along with the current Annual Average Daily Traffic (AADT) and Heavy Commercial Vehicle (HCV) percentages:

Road Name	ONRC	AADT	HCV	Count / Estimate
Cove Road	Arterial / Secondary Collector	1,100 / 775	7%	Estimate 2016
Mangawhai Heads Drive	Arterial	1,645	7%	Estimate 2016
Kaiwaka-Mangawhai Road	Arterial	1,360	6%	Estimate 2016
Tara Road	Secondary Collector	1,100	7%	Estimate 2016
Moir Street	Arterial	1,670	7%	Estimate 2016
Tomarata Road	Primary Collector	2,420	7%	Estimate 2016
Insley Street	Primary Collector	2,420	7%	Estimate 2016
Molesworth Drive	Primary Collector	3,745	7%	Estimate 2016

Table 1: Carriageway information.

It should be noted that during holiday periods, and when State Highway 1N is closed, traffic volumes can be significantly higher than the AADT.

The study lengths are highlighted on the map, below, and in **Appendix A**.

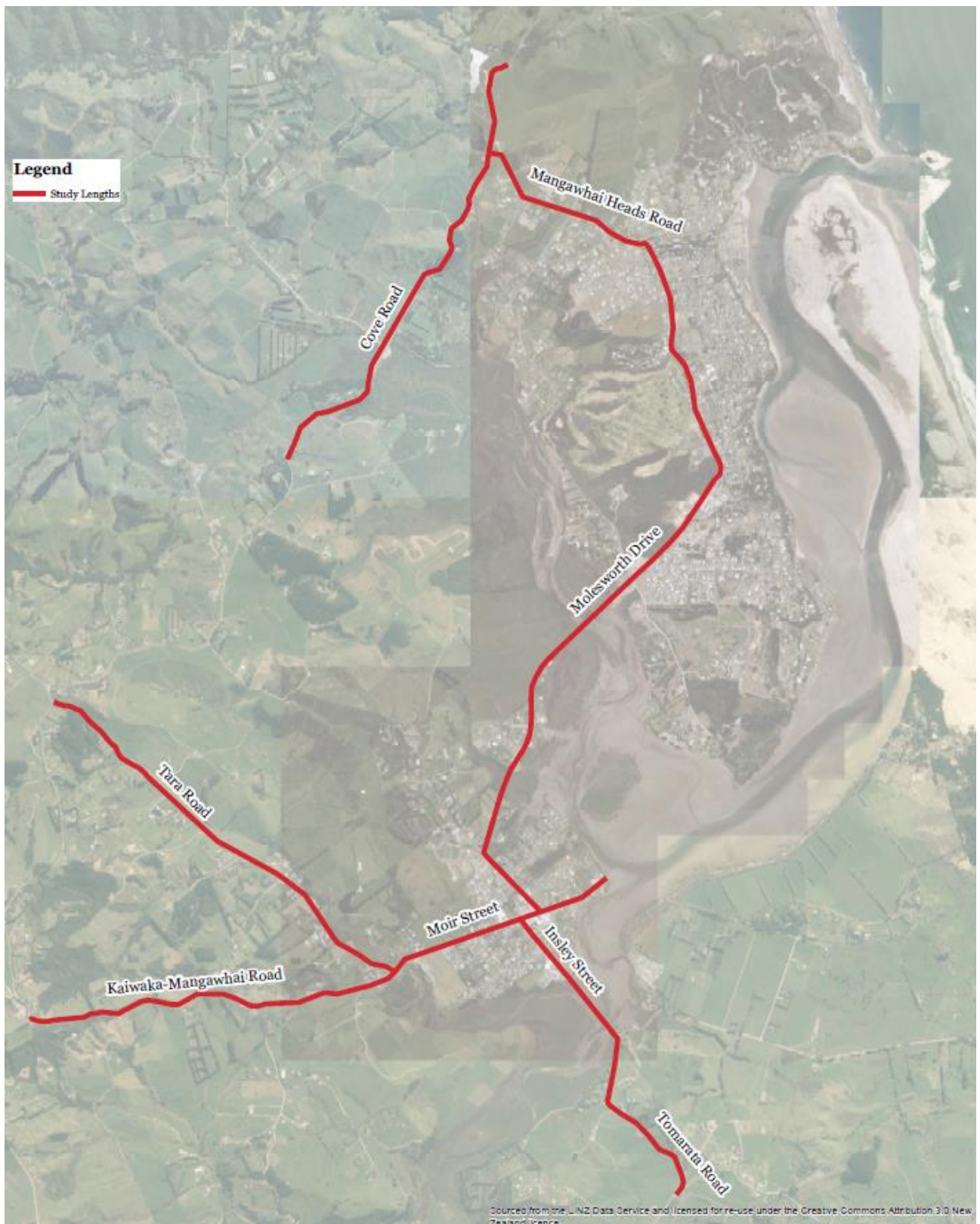


Figure 1: Map of study lengths.

1.4 Methodology

1.4.1 Desktop Analysis

A desktop study has been carried out in accordance with the NZTA's "Guidelines for setting speed limits and procedures for calculating speed limits" (SLNZ).

1.4.2 On-Site Speed Measurements

In order to ascertain actual vehicle speeds, measurements were taken at the RAMM displacements specified in the table for each study length.

These measurements were taken in both the increasing and decreasing direction.

The device used to ascertain the speed of the vehicles was a pneumatic traffic counter.

The dates of the speed surveys are as follows:

Road Name	Dates	RAMM Displacement
Mangawhai Heads Road	22/12/16 to 03/01/17	965m
Kaiwaka-Mangawhai Road	01/03/16 to 10/03/16	11,994m
Moir Street	16/12/15 to 11/01/16	800m
Tara Road	24/10/14 to 04/11/14	50m
Molesworth Drive	26/10/16 to 03/11/16	3,615m

Table 2: Dates of on-site speed measurements.

No on-site speed measurements are available for Cove Road and Insley Street / Tomarata Road.

Northern Entrance

The northern entrance to Mangawhai / Mangawhai Heads is via Cove Road and Mangawhai Heads Road. Cove Road is the only coastal road between Waipu and Mangawhai Heads, which also passes through the settlements of Waipu Cove and Langs Beach.

This entrance provides the shortest route from Bream Bay and further north. The roads on the northern entrance are also official State Highway detour routes.

2 Cove Road (2,600 – 6,000m)

The entire study length of Cove Road is posted 100km/h

Along the full study length there are various isolated lifestyle subdivisions, mixed in with sections of farmland and mangroves.

The following map shows the study length along Cove Road, the existing speed limit, and adjacent roads.



Figure 2: Cove Road study length map.

2.1 Desktop Analysis

2.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 3,400m section being examined. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
2600-3900m	1.5	100	100
3900-5200m	2.8	100	100
5200-6000m	1.5	100	100

Table 3: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

2.1.2 Discussion of Desktop Analysis

The rating results above indicate the current speed limits are appropriate for the assessed development rating, although there is a section which is on the cusp of requiring a reduced speed limit.

2.2 On-Site Speed Measurements

No on-site speed measurements have been undertaken within the study length.

2.3 Discussion and Proposal

The desktop assessment indicates that the entire study length should be 100km/h, however, given the section from RD 3,900m to RD 5,200m is so close to the warrant for an 80km/h, it is recommended that growth in this area be monitored, and the speed limit be lowered to 80km/h if development continues.

Therefore the proposed speed limits are as follows:

Section	Current Speed Limit	Proposed Speed Limit
2,600-3,900m	100	100
3,900-5,200m	100	100
5,200-6,000m	100	100

Table 4: Proposed speed limits for Cove Road.

The proposed speed limits are shown on the map, below.

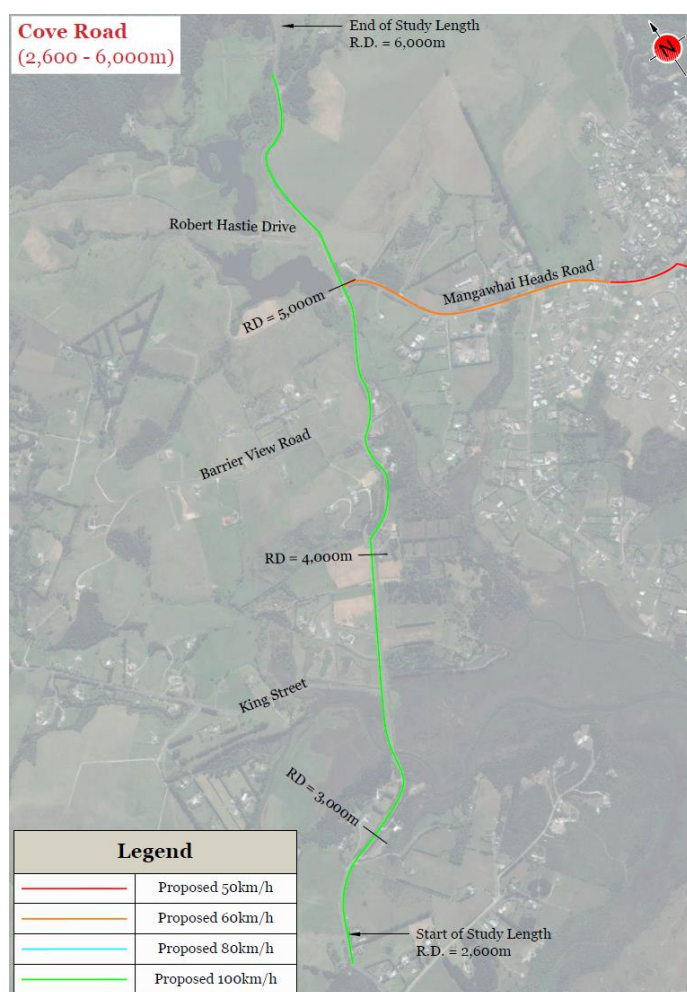


Figure 3: Cove Road, proposed speed limits.

3 Mangawhai Heads Road (0 – 1,220m)

The speed limit interfaces are at the following RAMM Displacements (RD):

- 100/70km/h = 200m; and
- 70/50km/h = 600m.

The 100/70km/h interface is 200m south of the intersection of Mangawhai Heads Road and Cove Road, and is approximately 145m prior to the start of sporadic housing on the right hand side of Mangawhai Heads Road, and 280m prior to the start of sporadic housing on the left hand side.

The total length of the 70km/h is 400m, which is 100m less than the minimum length of a 70km/h speed limit, as required by the “Land Transport Rule: Setting of Speed Limits 2003”, although this may have been impractical when the speed limit was implemented.

The 70/50km/h interface is 120m west of the Jack Boyd Drive intersection. The housing is sporadic, both sides of the interface, although the density of unconstructed, but subdivided sections increases to the east of the Jack Boyd Drive intersection (RD 720m).



Figure 4: Mangawhai Heads Road, 70km/h interface.



Figure 5: Mangawhai Heads Road, 50km/h interface.

The following map shows the study length along Mangawhai Heads Road, the existing speed limit, and adjacent roads.

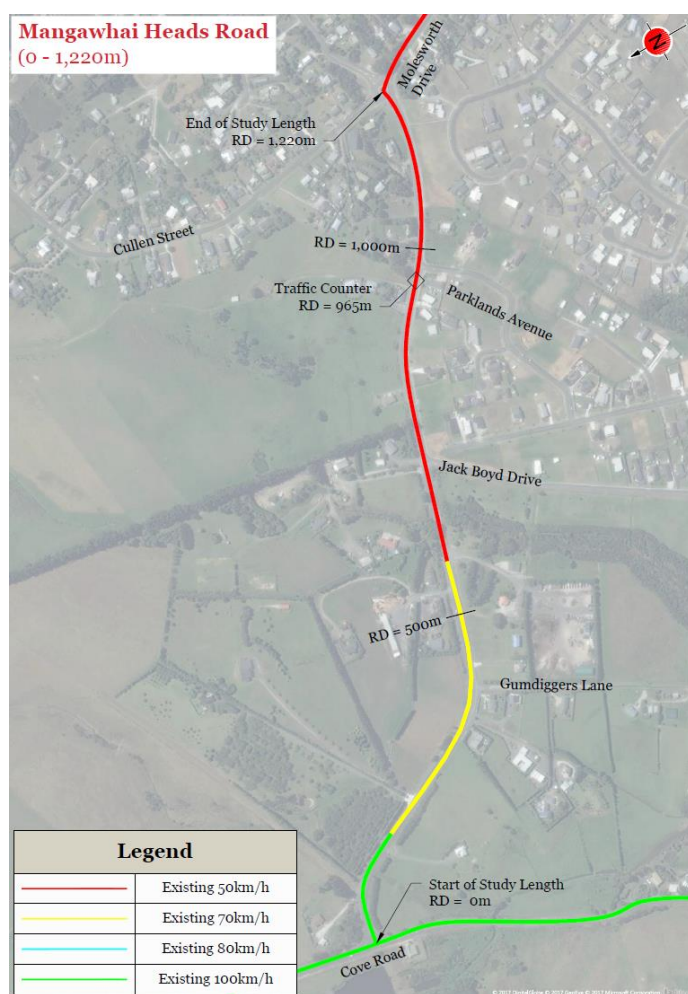


Figure 6: Mangawhai Heads Road study length map.

3.1 Desktop Analysis

3.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 1,220m section being examined. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
0-1,000m	7.4	100/70/50	70
1,000-1220m	13.2	50	50

Table 5: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

3.1.2 Discussion of Desktop Analysis

The rating results above indicate the existing speed limits could be adjusted, in order to reflect the existing development ratings, extending the length of the 70km/h zone, and removing the 100km/h.

Given the development rating for a length is equal to or greater than 11, it is possible to provide a 20, 30, or 40 km/h speed limit, although this requires engineering measures to control speeds to within 5km/h of the speed limit.

3.2 On-Site Speed Measurements

3.2.1 Results of Speed Measurements

The results obtained by the speed measurements are as follows:

	Mangawhai Heads Road, 965m
Minimum Speed	10.6km/h
Mean Speed	55.7km/h
Median Speed	49.7km/h
85th Percentile Speed	74.2km/h
Maximum Speed	157.8km/h
Standard Deviation	16.60km/h

Table 6: Results of on-site speed measurements.

Full results of the on-site speed measurements are included in **Appendix D**.

3.2.2 Discussion of On-site Measurements

Table 7 (below) gives the relationship between speed limit, mean speed and 85th percentile speed.

Speed Limit	Mean Speed (km/h)	85 th Percentile Speed (km/h)
50km/h	50	60
60km/h	60	70
70km/h	70	80
80km/h	80	90
100km/h	100	110

Table 7: SLNZ3 mean and 85th %ile operating speeds.

Table 8, below, shows the speed limit derived from mean speed.

Location	Mean Speed	Derived Speed Limit	Rounded Speed Limit
965m	55.7km/h	55.7km/h	60km/h

Table 8: Speed limit derived from mean speed.

Table 9, below, shows the speed limit derived from the 85th percentile speed.

Location	85 th %ile Speed	Derived Speed Limit	Rounded Speed Limit
965m	74.2km/h	64.2km/h	60km/h

Table 9: Speed limit derived from 85th %ile speed.

The results indicate that, based upon the on-site speed measurements, the appropriate speed limits are as shown in Table 10, below:

Location	Speed Limit, Based on Mean Speed	Speed Limit, Based on 85 th %ile
965m	60km/h	60km/h

Table 10: Summary of results from on-site speed measurements.

The on-site speed measurements are lower than the desktop assessment of the development rating would indicate.

3.3 Discussion and Proposal

The desktop assessment indicates that lengths of 70km/h and 50km/h should be applied to Mangawhai Heads Road, with the on-site speed measurement indicating that a 60km/h at RD 965m is appropriate. Given there are no allowances for 70km/h limits in the 2016 NZTA Speed Management Guide, it is proposed to amend the assessed 70km/h to a 60km/h area, which would reflect the on-site speed measurements. Therefore the proposed speed limits are as follows:

Section	Current Speed Limit	Proposed Speed Limit
0-1,000m	100/70/50	60
1,000-1220m	50	50

Table 11: Proposed speed limits for Mangawhai Heads Road.

It is noted that a change in speed limit sign for the speed limit on Cove Road will be required, in advance of the intersection.

The proposed speed limits are shown in the map, below.

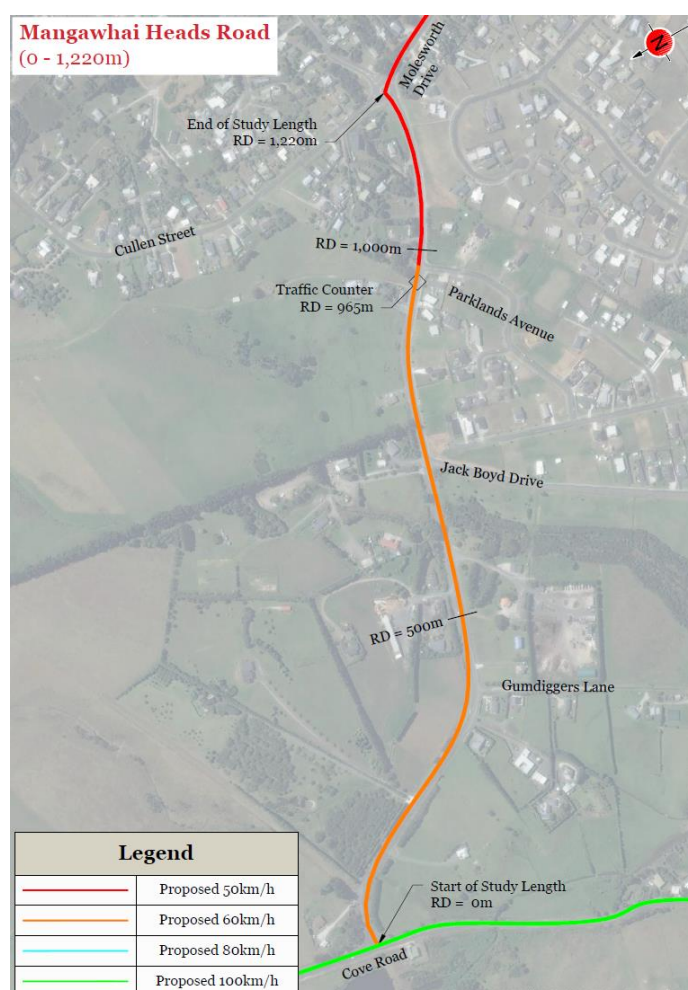


Figure 7: Mangawhai Heads Road, proposed speed limits.

Eastern Entrance

The eastern entrance to Mangawhai / Mangawhai Heads is via Kaiwaka-Mangawhai Road, Tara Road and Moir Street. Kaiwaka-Mangawhai Road is the primary link road between Kaiwaka and Mangawhai. Tara Road feeds numerous lifestyle subdivisions, both directly off Tara Road, and beyond. Both Kaiwaka-Mangawhai Road and Tara Road funnel into Moir Street, which continues through the heart of the Mangawhai township. Moir Street intersects both Molesworth Drive and Insley Street.

This entrance, while generally having the lowest volume of traffic, provides a vital component in terms of the official State Highway detour routes.

4 Kaiwaka-Mangawhai Road (10,320 – 12,800m)

Much of this length is 100km/h, changing to 70km/h at RD 12,500m, on the approach to Mangawhai. This termination is 305m prior to the Tara Road intersection, and ~50m from where housing commences on the LHS of the road. There are a number of lifestyle subdivisions within the study length.



Figure 8: Kaiwaka-Mangawhai Road, 100/70km/h interface.

The following map shows the study length along Kaiwaka-Mangawhai Road, the existing speed limit, and adjacent roads.

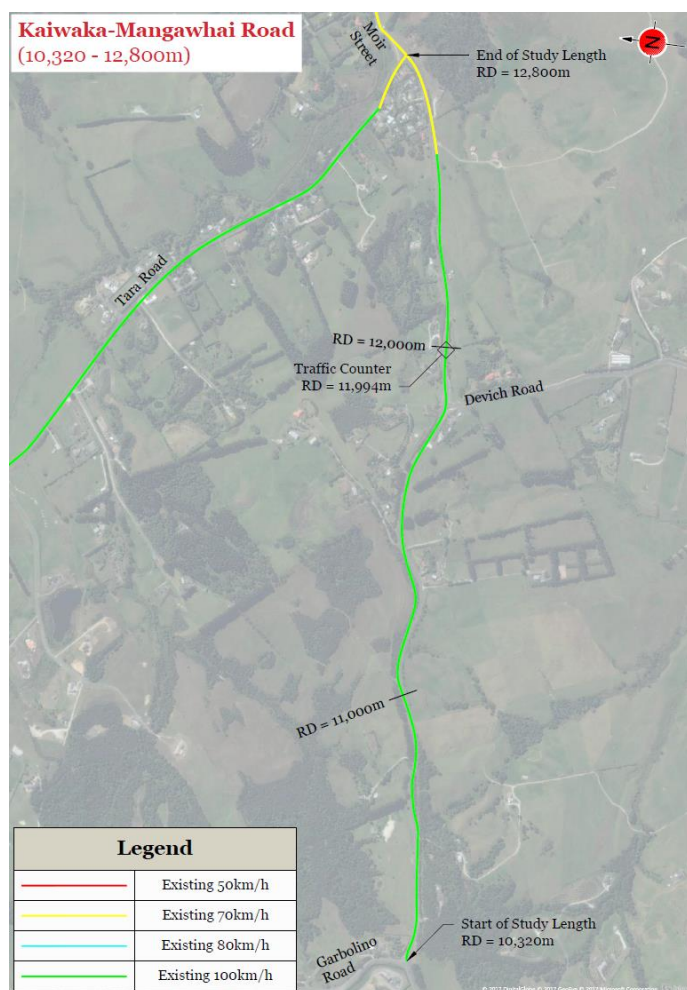


Figure 9: Kaiwaka-Mangawhai Road study length map.

4.1 Desktop Analysis

4.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 2,480m section being examined. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
10,320-11,300m	1.0	100	100
11,300-12,200m	3.1	100	80
12,200-12,500m	0.0	100/70	100
12,500-12,800m	6.7	70	70

Table 12: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

4.1.2 Discussion of Desktop Analysis

The rating results above indicate the existing speed limits are generally appropriate, however there is a short length through an area of greater development that could benefit from having a lowered speed limit.

It is noted that there is a short length between the calculated 80km/h and 70km/h areas, with no roadside development, which only warrants a 100km/h speed limit. In practice, it is expected that this area would be absorbed into the adjacent speed limits.

4.2 On-Site Speed Measurements

4.2.1 Results of Speed Measurements

The results obtained by the speed measurements are as follows:

	Kaiwaka-Mangawhai Road, 11,994m
Minimum Speed	22.7km/h
Mean Speed	75.5km/h
Median Speed	73.8km/h
85th Percentile Speed	88.2km/h
Maximum Speed	150.5km/h
Standard Deviation	12.21km/h

Table 13: Results of on-site speed measurements.

Full results of the on-site speed measurements are included in **Appendix D**.

4.2.2 Discussion of On-site Measurements

Table 14 (below) gives the relationship between speed limit, mean speed and 85th percentile speed.

Speed Limit	Mean Speed (km/h)	85 th Percentile Speed (km/h)
50km/h	50	60
60km/h	60	70
70km/h	70	80
80km/h	80	90
100km/h	100	110

Table 14: SLNZ3 mean and 85th %ile operating speeds.

Table 15, below, shows the speed limit derived from mean speed.

Location	Mean Speed	Derived Speed Limit	Rounded Speed Limit
11,994m	75.5km/h	75.5km/h	80km/h

Table 15: Speed limit derived from mean speed.

Table 16, below, shows the speed limit derived from the 85th percentile speed.

Location	85 th %ile Speed	Derived Speed Limit	Rounded Speed Limit
11,994m	88.2km/h	78.2km/h	80km/h

Table 16: Speed limit derived from 85th %ile speed.

The results indicate that, based upon the on-site speed measurements, the appropriate speed limits are as shown in Table 17, below:

Location	Speed Limit, Based on Mean Speed	Speed Limit, Based on 85 th %ile
11,994m	80km/h	80km/h

Table 17: Summary of results from on-site speed measurements.

The on-site speed measurement at RD 11,994m agrees with the desktop assessed 80km/h speed limit.

4.3 Discussion and Proposal

The desktop assessment indicates that lengths of 100km/h, 80km/h and 70km/h should be applied to Kaiwaka-Mangawhai Road, with the on-site speed measurement indicating that an 80km/h at RD 11,994m is appropriate. Given there are no allowances for 70km/h limits in the 2016 NZTA Speed Management Guide, it is proposed to amend the assessed 70km/h to a 60km/h area, which would reflect the proposed speed limits on adjacent entrance roads. Therefore the proposed speed limits are Table 18, below:

Section	Current Speed Limit	Proposed Speed Limit
10,320-11,300m	100	100
11,300-12,500m	100/70	80
12,500-12,800m	70	60

Table 18: Proposed speed limits for Kaiwaka-Mangawhai Road.

The proposed speed limits are shown in the map, below.

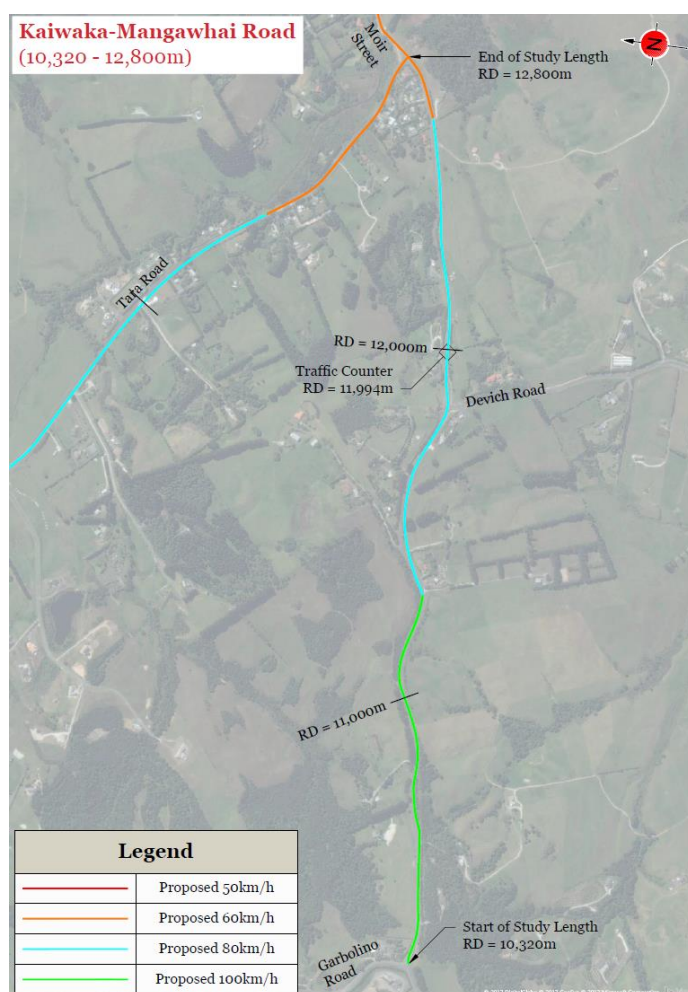


Figure 10: Kaiwaka-Mangawhai Road, proposed speed limits.

5 Moir Street (0 – 1,440m)

Moir Street extends east from the end of Kaiwaka-Mangawhai Road, at the Tara Road intersection. Part of the length is 70km/h, which ends at RD 610m. Contained within this length is a large subdivision, currently under construction, farmland, numerous residential dwellings, the Mangawhai Domain, a holiday park, restaurants, a building supplies store and a shopping centre.



Figure 11: Moir Street, looking east.

The following map shows the study length along Moir Street, the existing speed limit, and adjacent roads.



Figure 12: Moir Street study length map.

5.1 Desktop Analysis

5.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 900m section being examine. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
0-300m	7.0	70	70
300-1,440m	11.2	70/50	50

Table 19: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

5.1.2 Discussion of Desktop Analysis

The rating results above indicate the current speed limits are appropriate, the termination location could be adjusted to encompass the expanding subdivisions and growing development of the township.

Given the development rating for one length is equal to or greater than 11, it is possible to provide a 20, 30, or 40 km/h speed limit, although this requires engineering measures to control speeds to within 5km/h of the speed limit.

5.2 On-Site Speed Measurements

5.2.1 Results of Speed Measurements

The results obtained by the speed measurements are as follows:

	Moir Street, 800m
Minimum Speed	10.0km/h
Mean Speed	41.3km/h
Median Speed	42.5km/h
85th Percentile Speed	51.1km/h
Maximum Speed	103.7km/h
Standard Deviation	10.60km/h

Table 20: Results of on-site speed measurements.

Full results of the on-site speed measurements are included in **Appendix D**.

5.2.2 Discussion of On-site Measurements

Table 21 (below) gives the relationship between speed limit, mean speed and 85th percentile speed.

Speed Limit	Mean Speed (km/h)	85 th Percentile Speed (km/h)
50km/h	50	60
60km/h	60	70
70km/h	70	80
80km/h	80	90
100km/h	100	110

Table 21: SLNZ3 mean and 85th %ile operating speeds.

Table 22, below, shows the speed limit derived from mean speed.

Location	Mean Speed	Derived Speed Limit	Rounded Speed Limit
800m	41.3km/h	41.3km/h	40km/h

Table 22: Speed limit derived from mean speed.

Table 23, below, shows the speed limit derived from the 85th percentile speed.

Location	85 th %ile Speed	Derived Speed Limit	Rounded Speed Limit
800m	51.1km/h	41.1km/h	40km/h

Table 23: Speed limit derived from 85th %ile speed.

The results indicate that, based upon the on-site speed measurements, the appropriate speed limits are as shown in Table 24, below:

Location	Speed Limit, Based on Mean Speed	Speed Limit, Based on 85 th %ile
800m	40km/h	40km/h

Table 24: Summary of results from on-site speed measurements.

The on-site speed measurements is lower than the desktop assessment would indicate.

5.3 Kagan Avenue

This is a short (210m) cul-de-sac, accessed from Moir Street, in the 70km/h zone. There are no 50km/h signs at the start of, or anywhere along, the road, so the entire length of it has a speed limit of 70km/h.

Kagan Avenue will provide access to approximately 19 residential dwellings, when all sections have been built on.



Figure 13: Kagan Avenue.

5.4 Discussion and Proposal

The desktop assessment indicates that lengths of 70km/h and 50km/h should be applied to Moir Street, with the on-site speed measurement indicating that a 40km/h at RD 800m is appropriate. Given there are no allowances for 70km/h limits in the 2016 NZTA Speed Management Guide, it is proposed to amend the assessed 70km/h to a 60km/h area, which would reflect the proposed speed limits on adjacent entrance roads. Therefore the proposed speed limits are Table 25, below:

Section	Current Speed Limit	Proposed Speed Limit
0-300m	70	60
300-1,440m	70/50	50
Kagan Avenue	70	50

Table 25: Proposed speed limits for Moir Street.

There is also scope for a short length of 40km/h along Moir Street, but this would require engineering improvements to be carried out to maintain the appropriate speeds for the speed limit, as well as an site specific investigation with traffic counting loops to determine speeds.

The proposed speed limits are shown in the map, below.



Figure 14: Moir Street, proposed speed limits.

6 Tara Road (0 – 2,800m)

Tara Road intersects Kaiwaka-Mangawhai Road and Moir Street in the 70km/h zone. There are a number of lifestyle properties and small subdivisions both along the length of road, and accessed from the end of it. The interface between the 70km/h and 100km/h is at RD 265m.

The following map shows the study length along Tara Road, the existing speed limit, and adjacent roads.

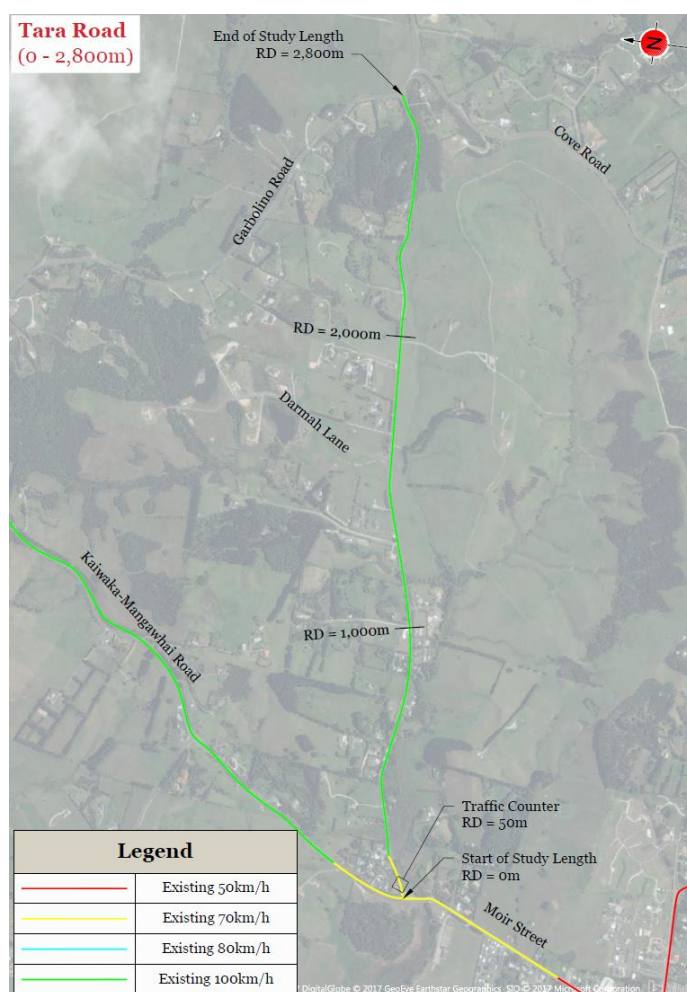


Figure 15: Tara Road study length map.

6.1 Desktop Analysis

6.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 2,800m section being examined. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
0-600m	6	70/100	70
600-1,900m	4.8	100	80
1,900-2,800m	1.3	100	100

Table 26: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

6.1.2 Discussion of Desktop Analysis

The rating results above indicate a section where the existing speed limit is greater than the desktop rating indicates as being appropriate.

6.2 On-Site Speed Measurements

6.2.1 Results of Speed Measurements

The results obtained by the speed measurements are as follows:

	Tara Road, 50m
Minimum Speed	10.6km/h
Mean Speed	47.2km/h
Median Speed	47.2km/h
85th Percentile Speed	54.0km/h
Maximum Speed	84.9km/h
Standard Deviation	7.18km/h

Table 27: Results of on-site speed measurements.

Full results of the on-site speed measurements are included in **Appendix D**.

6.2.2 Discussion of On-site Measurements

Table 28 (below) gives the relationship between speed limit, mean speed and 85th percentile speed.

Speed Limit	Mean Speed (km/h)	85 th Percentile Speed (km/h)
50km/h	50	60
60km/h	60	70
70km/h	70	80
80km/h	80	90
100km/h	100	110

Table 28: SLNZ3 mean and 85th %ile operating speeds.

Table 29, below, shows the speed limit derived from mean speed.

Location	Mean Speed	Derived Speed Limit	Rounded Speed Limit
50m	47.2km/h	47.2km/h	50km/h

Table 29: Speed limit derived from mean speed.

Table 30, below, shows the speed limit derived from the 85th percentile speed.

Location	85 th %ile Speed	Derived Speed Limit	Rounded Speed Limit
50m	54.0km/h	44.0km/h	40km/h

Table 30: Speed limit derived from 85th %ile speed.

The results indicate that, based upon the on-site speed measurements, the appropriate speed limits are as shown in Table 31, below:

Location	Speed Limit, Based on Mean Speed	Speed Limit, Based on 85 th %ile
50m	50km/h	40km/h

Table 31: Summary of results from on-site speed measurements.

The on-site speed measurements do not agree with the desktop assessment, likely due in part to the close proximity of the counter to the intersection.

6.3 Discussion and Proposal

The desktop assessment indicates that lengths of 100km/h, 80km/h and 70km/h should be applied to Tara Road, with the on-site speed measurement indicating that a 40km/h at RD 50m is appropriate. Given there are no allowances for 70km/h limits in the 2016 NZTA Speed Management Guide, it is proposed to amend the assessed 70km/h to a 60km/h area, which would reflect the proposed speed limits on adjacent entrance roads. Therefore the proposed speed limits are Table 32, below:

Section	Current Speed Limit	Proposed Speed Limit
0-600m	70/100	60
600-1,900m	100	80
1,900-2,800m	100	100

Table 32: Proposed speed limits for Tara Road.

The proposed speed limits are shown in the map, below.

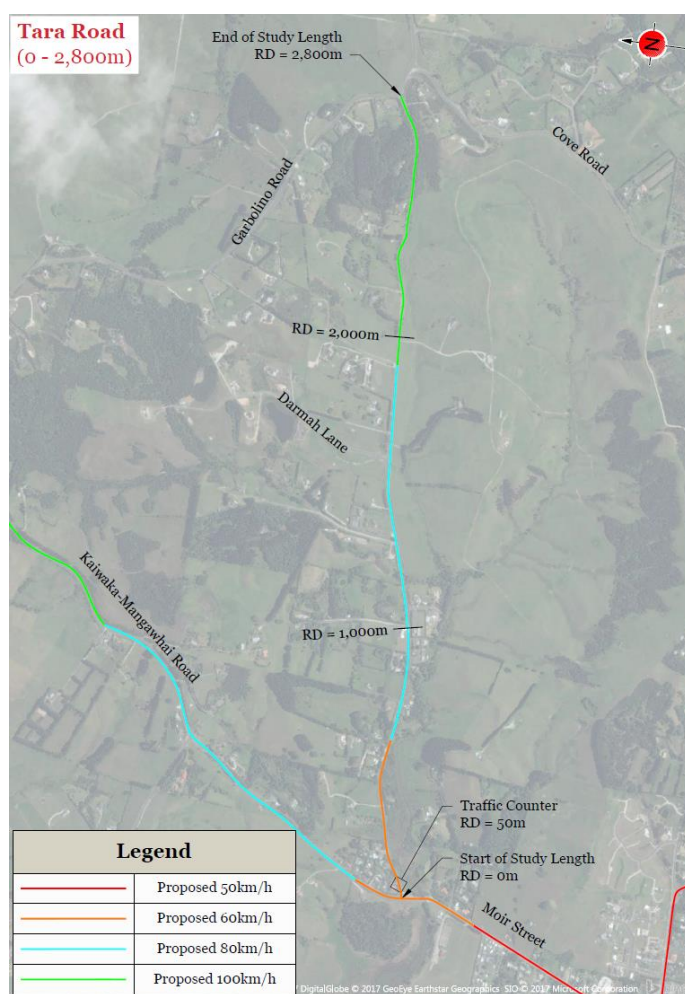


Figure 16: Tara Road, proposed speed limits.

Southern Entrance

The southern entrance to Mangawhai / Mangawhai Heads is via Tomarata Road and Insley Street. Tomarata Road is the highest volume entrance road, linking between Mangawhai and Te Hana (via Mangawhai Road) and between Mangawhai and Wayby (via Mangawhai Road, Waiteitei Road and Wayby Valley Road). Insley Street connects between Tomarata Road and Moir Street.

Both roads for the southern entrance form part of an official State Highway detour.

7 Tomarata Road (0 – 1,500m) / Insley Street (0 – 600m)

The interface between the 100km/h and 50 km/h zones on Tomarata Road is at RD 265m, and is characterised by farmland, and some lifestyle subdivisions, as well as a section of causeway through the harbour. The entire length of Insley Street is posted 50km/h, and is mainly urban and residential, although there are some small lifestyle sections and the Mangawhai Beach School. Part of Insley Road also runs along the harbour causeway.



Figure 17: Tomarata Road, 50km/h interface.

The following map shows the study length along Tomarata Road and Insley Street, the existing speed limit, and adjacent roads.



Figure 18: Tomarata Road / Insley Road study length map.

7.1 Desktop Analysis

7.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 2,140m section being examined. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Road	Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
Insley	0-600m	15.5	50	50
Insley	600-640m	0	50	100
Tomarata	0-600m	3	50/100	80
Tomarata	600-1,500m	1.6	100	100

Table 33: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

7.1.2 Discussion of Desktop Analysis

The rating results above indicate the existing speed limits are generally appropriate, however there is a short length through an area of greater development that could benefit from having a lowered speed limit.

Given the development rating for one length is equal to or greater than 11, it is possible to provide a 20, 30, or 40 km/h speed limit, although this requires engineering measures to control speeds to within 5km/h of the speed limit.

It is noted that there is a short length between the calculated 80km/h and 50km/h areas, with no roadside development, which only warrants a 100km/h speed limit. In practice, it is expected that this area would be absorbed into the adjacent speed limits.

7.2 On-Site Speed Measurements

No on-site speed measurements have been undertaken within the study length.

7.3 Discussion and Proposal

The desktop assessment indicates that lengths of 100km/h, 80km/h and 50km/h should be applied to, with the proposed speed limits as per Table 34, below:

Road	Section	Current Speed Limit	Proposed Speed Limit
Insley	0-600m	50	50
Insley	600-640m	50	50
Tomarata	0-600m	50/100	80
Tomarata	600-1,500m	100	100

Table 34: Proposed speed limits for Insley Street and Tomarata Road.

There is also scope for a short length of 40km/h along Insley Street, but this would require engineering improvements to be carried out to maintain the appropriate speeds for the speed limit, alternatively, this could also be in the form of a 40km/h variable speed limit for Mangawhai Beach School.

The proposed speed limits are shown in the map, below.

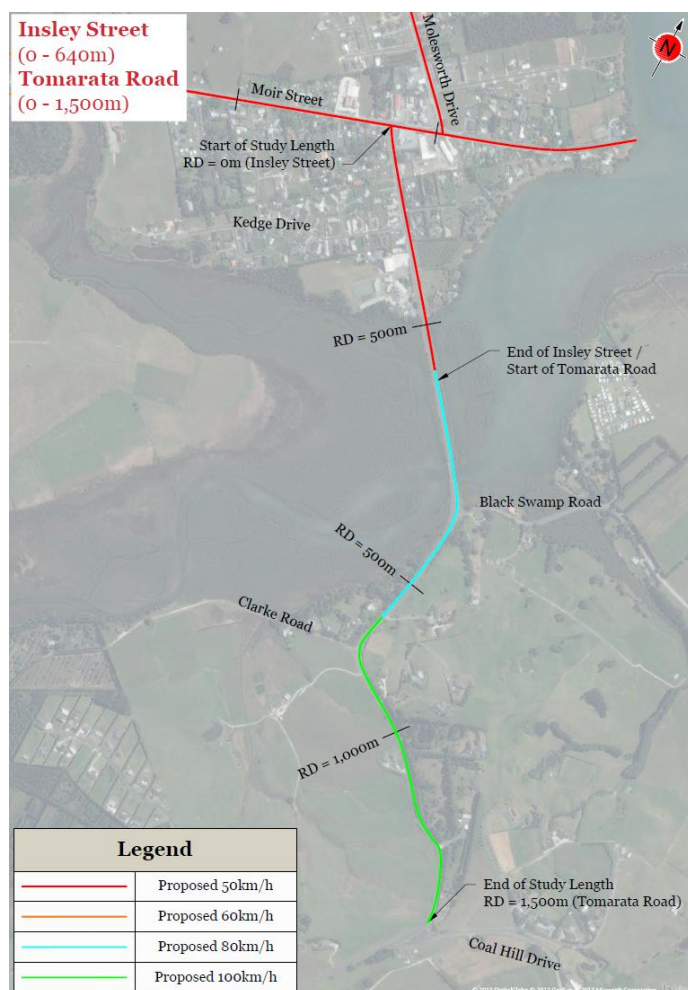


Figure 19: Insley Street / Tomarata Road, proposed speed limits.

Inter Urban Route

Molesworth Drive is the primary link between the Mangawhai and Mangawhai Heads communities, and is consequently part of an official State Highway detour route.

Molesworth Drive starts at Moir Street, and ends at Mangawhai Heads Road.

8 Molesworth Drive (0 – 5,020m)

The speed limit interfaces are at the following RAMM Displacements:

- 50/80km/h = 700m; and
- 80/50km/h = 2,530m.

The 50/80km/h interface is approximately 160m north of the Old Waipu Road intersection.

There is an inconsistent level of development along the higher speed section, with most properties accessed at common crossing points, and intersections, in an apparent effort to reduce vehicle crossings.

The 80/50km/h interface is approximately 50m south of the Thelma Road / Estuary Drive cross road intersection.

There is very little in the way of development along the western (left) side of Molesworth Drive for approximately 1,700m following the change in speed limit, with the exception of a handful of recreational sites. Development is more on the eastern (right) side of Molesworth Drive, although a large volume is accessed indirectly, through various private and public roads, with the exception being the short (~200m) section of commercial / light industrial. Development increases to having single lots accessed from Molesworth Drive north of Moir Point Road intersection.



Figure 20: Molesworth Drive, 50/80km/h interface.



Figure 21: Molesworth Drive, 80/50km/h interface.

The following map shows the study length along Molesworth Drive, the existing speed limit, and adjacent roads.

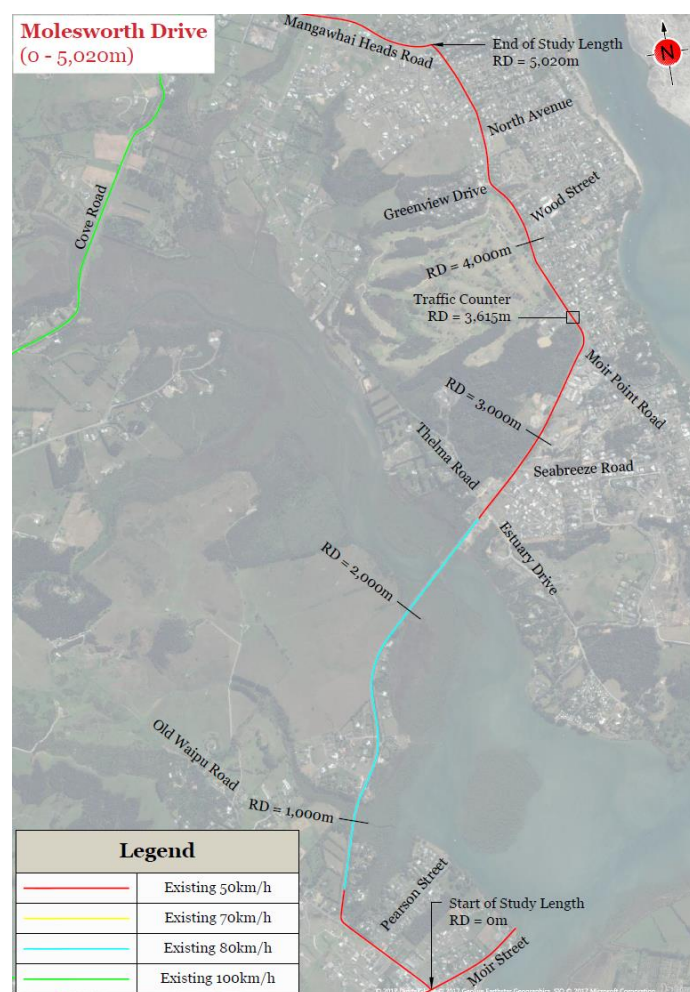


Figure 22: Molesworth Drive study length map.

8.1 Desktop Analysis

8.1.1 Results of Desktop Analysis

The desktop analysis indicated the following total rating for the 5,020m section being examined. The recommended speed limit has been derived from Table SLNZ12 (speed limit flow chart summary table) of SLNZ.

Section	Average Rating	Current Speed Limit	Calculated Speed Limit from figure SLNZ3
0-400m	11.8	50	50
400-1,200m	3.8	50/80	80
1,200-2,400m	2.0	80	100
2,400-3,300m	6.0	50	70
3,300-5,020m	11.2	50	50

Table 35: Results of desktop analysis.

Full results of the desktop analysis are included in **Appendix C**.

8.1.2 Discussion of Desktop Analysis

The rating results above indicate the current speed limits do not entirely agree with the assessed development ratings. While the development rating for the section 1,200 to 2,400 indicates a 100km/h speed limit is appropriate, the current geometry may not be suitable for the application of this speed limit.

Given the development rating for a length is equal to or greater than 11, it is possible to provide a 20, 30, or 40 km/h speed limit, although this requires engineering measures to control speeds to within 5km/h of the speed limit.

8.2 On-Site Speed Measurements

8.2.1 Results of Speed Measurements

The results obtained by the speed measurements are as follows:

	Molesworth Drive, 3,615m
Minimum Speed	10.0km/h
Mean Speed	45.0km/h
Median Speed	45.4km/h
85th Percentile Speed	51.8km/h
Maximum Speed	89.1km/h
Standard Deviation	7.86km/h

Table 36: Results of on-site speed measurements.

Full results of the on-site speed measurements are included in **Appendix D**.

8.2.2 Discussion of On-site Measurements

Table 37 (below) gives the relationship between speed limit, mean speed and 85th percentile speed.

Speed Limit	Mean Speed (km/h)	85 th Percentile Speed (km/h)
50km/h	50	60
60km/h	60	70
70km/h	70	80
80km/h	80	90
100km/h	100	110

Table 37: SLNZ3 mean and 85th %ile operating speeds.

Table 38, below, shows the speed limit derived from mean speed.

Location	Mean Speed	Derived Speed Limit	Rounded Speed Limit
3,615m	45.0km/h	45.0km/h	50km/h

Table 38: Speed limit derived from mean speed.

Table 39, below, shows the speed limit derived from the 85th percentile speed.

Location	85 th %ile Speed	Derived Speed Limit	Rounded Speed Limit
3,615m	51.8km/h	41.8km/h	40km/h

Table 39: Speed limit derived from 85th %ile speed.

The results indicate that, based upon the on-site speed measurements, the appropriate speed limits are as shown in Table 40, below:

Location	Speed Limit, Based on Mean Speed	Speed Limit, Based on 85 th %ile
3,615m	50km/h	40km/h

Table 40: Summary of results from on-site speed measurements.

The on-site speed measurements, for mean speed, at RD 3,615m agrees with the desktop assessment of 50km/h for this location.

It should be noted that this is the sole traffic counter over the 5km length. This assessment could benefit from additional counters placed at strategic locations.

8.3 Discussion and Proposal

The desktop assessment indicates that lengths of 100km/h, 80km/h, 70km/h and 50km/h should be applied to Molesworth Drive, with the on-site speed measurement indicating that a 40km/h at RD 50m is appropriate.

However, given the length of Molesworth Drive, a sole traffic counter is not appropriate to accurately verify the desktop assessment, with respect to the proposed speed limits.

While the desktop assessment has indicated a number of lengths where the speed limit should be increased, it is proposed that this not be done, due to the likely limitations in terms of sight distance and geometry.

Therefore the proposed speed limits are as per Table 41, below:

Section	Current Speed Limit	Proposed Speed Limit
0-700	50	50
700-2,400m	50/80	80
2,400-5,020m	80/50	50

Table 41: Proposed speed limits for Molesworth Drive.

There is also scope for a short length of 40km/h along Molesworth Drive (west of Moir Point Road), but this would require engineering improvements to be carried out to maintain the appropriate speeds for the speed limit. The advantages of this would relate to increased pedestrian safety at the Mangawhai Activity Zone, although this would have slight detrimental effects to the productivity of the route. The speeds through this area should be investigated with traffic counting loops to determine the appropriateness.

The proposed speed limits are shown in the map, below.

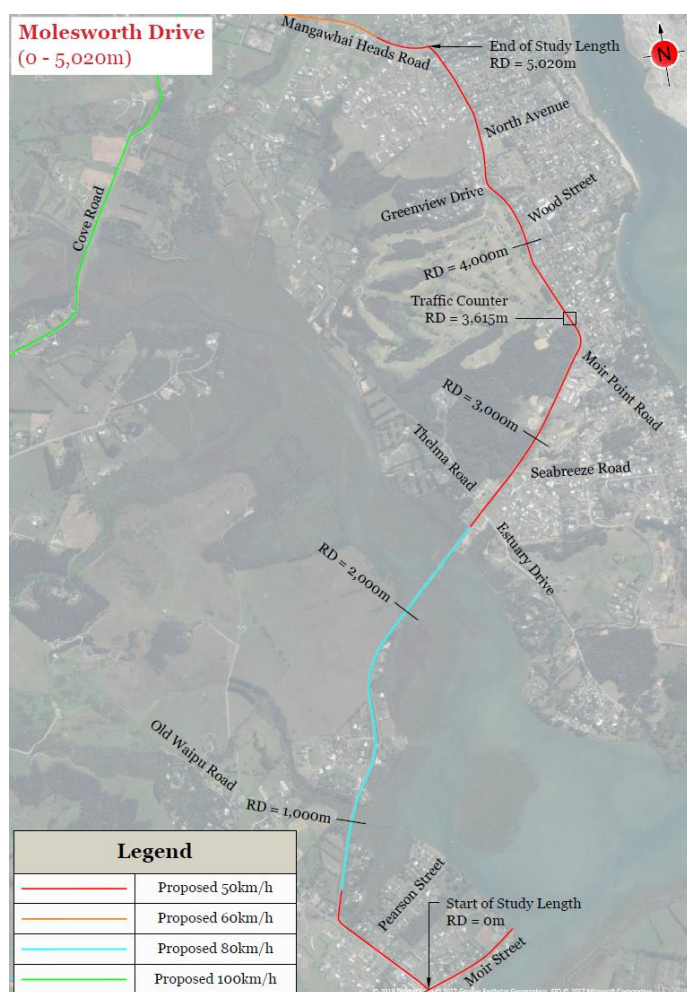


Figure 23: Molesworth Drive, proposed speed limits.

General Discussion

9 Crash History

The five year crash history has been retrieved from the NZTA Crash Analysis System (CAS), as per the following tables. Full CAS reports are in **Appendix E**. It should be noted, however, that the CAS is not entirely up to date with non-injury crashes for 2016, and could have as little as six or seven months of non-injury crashes from 2016 recorded in the database.

9.1 Northern Entrance

Road Name	Fatal	Serious Injury	Minor Injury	Non-Injury
Mangawhai Heads Road	0	0	1	1
Cove Road	0	0	2	0

Table 42: CAS data, northern entrance.

Mangawhai Heads Road: Both crashes were bend loss of control / head on type crashes. Alcohol, too fast and incorrect lane / position have each been identified in one crash. Poor handling was a factor in both crashes. Both crashes occurred in 2015.

Cove Road: One crash was bend loss of control / head on, with the other crash being rear end / obstruction. Only one crash had an identified factor (fatigue in this instance). Both crashes occurred in 2012.

9.2 Eastern Entrance

Road Name	Fatal	Serious Injury	Minor Injury	Non-Injury
Kaiwaka-Mangawhai Road	0	1	7	4
Tara Road	0	0	3	3
Moir Street	0	0	3	6

Table 43: CAS data, eastern entrance.

Four crashes occurred at the Kaiwaka-Mangawhai Road / Tara Road / Moir Street intersection.

Kaiwaka-Mangawhai Road: 75% (nine) of crashes have been bend loss of control / head on type crashes, with one crash being rear end / obstruction and two crashes crossing turning. 67% of crashes involved poor handling, 58% of crashes involved alcohol, 50% were too fast, and 25% involved being in the incorrect lane / position. Two crashes occurred in 2012, three in 2013, four in 2015 and three in 2016.

Tara Road: three crashes have been crossing / turning, two crashes bend loss of control / head on and one crash rear end / obstruction. Poor observation has been a factor in 67%, with poor handling involved with 33%. One crash occurred in 2012, one in 2014, three in 2015 and one in 2016.

Moir Street: Four crashes have been rear end / obstruction, two crashes crossing / turning, two crashes bend loss of control / head on and one crash a pedestrian crash. Six crashes have poor observation identified as a factor, with incorrect lane / position identified in three crashes. One crash occurred in 2012, one in 2013, two in 2014 and five in 2015.

9.3 Southern Entrance

Road Name	Fatal	Serious Injury	Minor Injury	Non-Injury
Insley Street	1	0	0	1
Tomarata Road	0	1	1	3

Table 44: CAS data, southern entrance.

Insley Street: One crash was straight road loss of control / head on, the other crash was a crossing / turning type crash. Alcohol, too fast and poor observation was each identified in a crash. Both crashes occurred in 2015.

Tomarata Road: All crashes were bend loss of control / head on type crashes. Alcohol, too fast, road conditions, fatigue and poor observation were each identified in a crash. One crash occurred in 2012, two in 2015 and two in 2016.

9.4 Inter Urban Area

Road Name	Fatal	Serious Injury	Minor Injury	Non-Injury
Molesworth Drive	0	1	4	9

Table 45: CAS data, inter urban area.

Molesworth Drive: Eight crashes were bend loss of control / head on type crashes, two crashes were each rear end / obstruction and pedestrian type crashes, with one crash being each overtaking and straight road loss of control / head on type crashes. 64% of crashes involved poor handling, 57% of crashes were too fast, and 50% involved alcohol. Three crashes occurred in 2012, two in 2013, three in 2014, four in 2015 and two in 2016.

10 Current and Proposed Works

The entire Mangawhai / Mangawhai Heads area has had an infrastructure plan completed, entitled “Mangawhai and Mangawhai Heads Infrastructure Plan – Transportation”. This plan sets recommendations in terms of infrastructure improvements through the Mangawhai / Mangawhai Head’s area, which also includes various route and intersection improvements, which will result in routes that are appropriate for their use, level of development, traffic volume and growth.

11 Recommendations

The recommended speed limits for the Mangawhai / Mangawhai Heads area are as per Table 46, below:

Road Name	Start RD	End RD	Current Speed Limit	Recommended Speed Limit
Mangawhai Heads Road	0	1,000	100/70/50	60
	1,000	1,220	50	50
Cove Road	2,600	6,000	100	100
Kaiwaka-Mangawhai Road	10,320	11,300	100	100
	11,300	12,500	100/70	80
	12,500	12,800	70	60
Tara Road	0	600	70/100	60
	600	1,900	100	80
	1,900	2,800	100	100
Moir Street	0	300	70	60
	300	1,440	70/50	50
Kagan Avenue	0	210	70	50
Insley Street	0	640	50	50
Tomarata Road	0	600	50/100	80
	600	1,500	100	100
Molesworth Drive	0	700	50	50
	700	2,400	50/80	80
	2,400	5,020	80/50	50

Table 46: Recommended speed limits.

A map of the current and proposed speed limits is also included as **Appendix B**.

12 Appendices

- Appendix A Map of Study Lengths
- Appendix B Map of Existing and Proposed Speed Limits
- Appendix C Desktop Analysis
- Appendix D On-Site Speed Measurements
- Appendix E CAS Reports
- Appendix F Map of Crashes

Appendix A

Map of Study Lengths

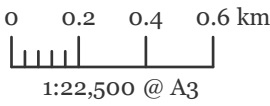
Study Lengths



Whangarei Office
Mansfield Terrace Service Lane
125A Bank Street
Whangarei 0110
Tel (09) 430 1700

Author: C. Nixon
Project No: 1-13563.01

File Location: G:\01 Clients\Kaipara DC\1-13563.01 KDC Speed Reviews x 8\06 - Mangawhai Area\Speed Limits.mxd



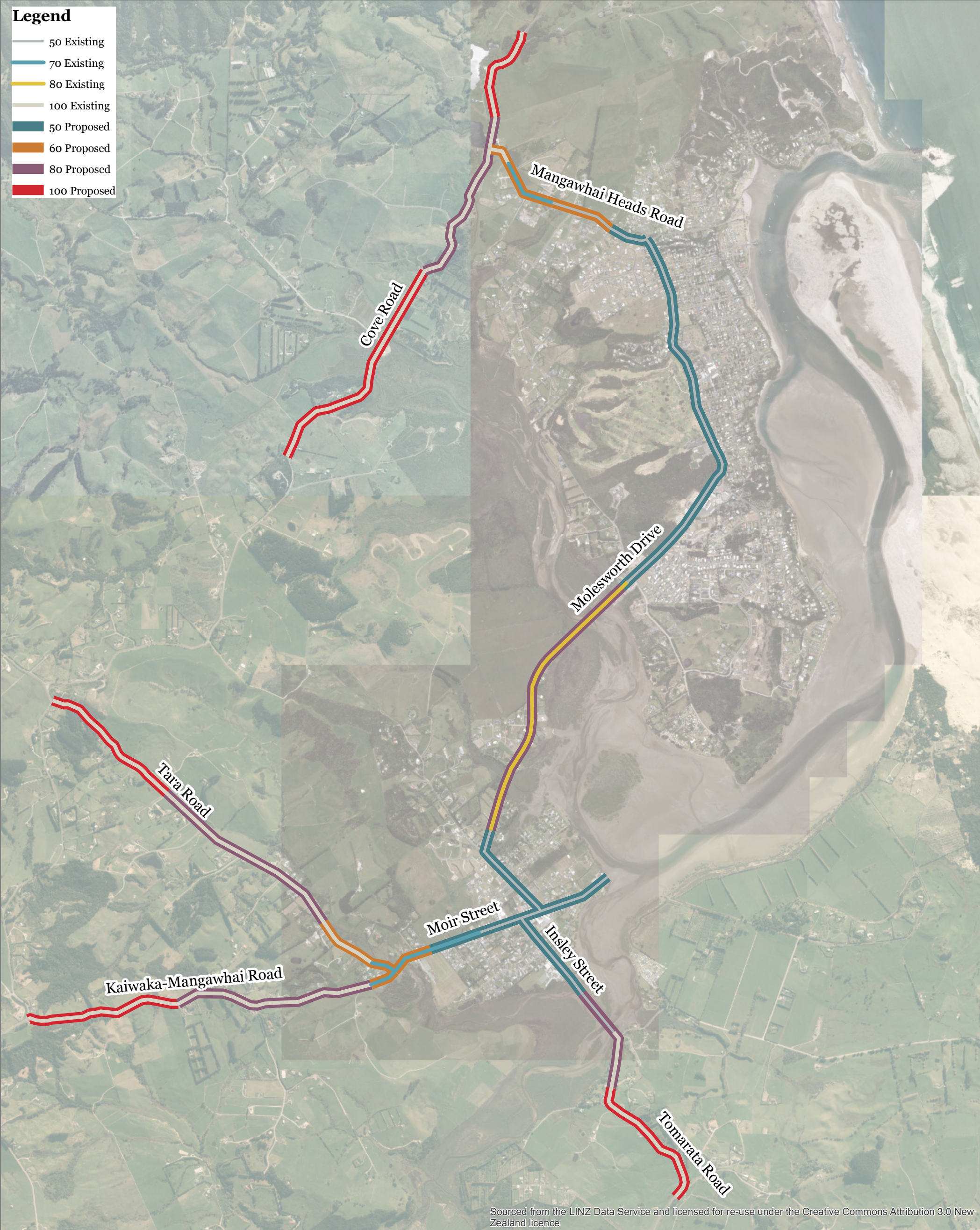
Projection:
NZGD 2000 New Zealand Transverse Mercator

| Date: 29/03/2017 | Revision: 0 |

Appendix B

Map of Current and Proposed Speed Limits

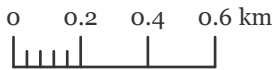
Existing and Proposed Speed Limits



**OPUS**

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Project No: 1-13563.01



1:22,500 @ A3

Projection:
NZGD 2000 New Zealand Transverse Mercator

| Date: 29/03/2017 | Revision: 0 |



Appendix C

Desktop Analysis

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
0															
100	1	4	5	1x RD (A), Cove Road	1	1	2	1	3	0	8	<200 ped shou, <200 cys, on road, ave visi, park obs	13	10	
200	1	0	1	1x RD (A)	1	1	2	1	0	0	5	<200 ped shou, <200 cys, on road, ave visi, park obs	6	2	
300	2	0	2	2x RD (A)	1	1	2	1	0	0	5	<200 ped shou, <200 cys, on road, ave visi, park obs	7	4	
400	4	0	4	4x RD (A)	1	1	2	1	0	0	5	<200 ped shou, <200 cys, on road, ave visi, park obs	9	8	
500	5	0	5	2x RD (A), 5x RD (C)	1	1	2	1	0	0	5	<200 ped shou, <200 cys, on road, ave visi, park obs	10	10	
600	5	0	5	3x RD (A), 2x BO (A)	1	1	2	1	0	0	5	<200 ped shou, <200 cys, on road, ave visi, park obs	10	10	
700	1	0	1	1x RD (A)	1	1	2	1	0	0	5	<200 ped shou, <200 cys, on road, ave visi, park obs	6	2	
800	2	2	4	2x RD (A), Jack Boyd Drive	0	1	1	1	0	0	3	<200 ped fp, <200 cye road, ave visi, park shoulder	7	8	
900	2	0	2	2x RD (A)	0	1	1	1	0	0	3	<200 ped fp, <200 cye road, ave visi, park shoulder	5	4	
1000	6	2	8	6x RD (A), Parklands Avenue	0	1	1	1	0	0	3	<200 ped fp, <200 cye road, ave visi, park shoulder	11	16	
1100	5	0	5	5x RD (A)	0	1	1	1	0	0	3	<200 ped fp, <200 cye road, ave visi, park shoulder	8	10	
1200	2	0	2	2x RD (A)	0	1	1	1	0	0	3	<200 ped fp, <200 cye road, ave visi, park shoulder	5	4	
1220	2	9	11	2x RD (A), Insley, Cullen, Mangawhai Heads	0	1	1	1	2	0	5	<200 ped fp, <200 cye road, ave visi, park shoulder	16	22	
Total			55								54		113	110	As RR is greater than DR

Development Rating (total/length) =	9	9
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Start	End	Length	Sections		DR	RR	Total	Av. DR	SL
0	500	500	5	Option 1	17	28	34	6.80	70
500	1220	720	7.2		38	30	68	9.44	70
0	900	900	9	Option 2	29	44	58	6.44	70
900	1220	320	3.2		26	14	40	12.50	50
0	1000	1000	10	Option 3	37	47	74	7.40	70
1000	1220	220	2.2		18	11	29	13.18	50

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
2600															
2700	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
2800	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
2900	3	0	3	3x RD (A)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	8	6	
3000	1	0	1	1x RD (A)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	6	2	
3100	2	0	2	2x RD (A)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	8	4	
3200	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
3300	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
3400	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
3500	0	0	0		1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	5	0	
3600	0	1	1	King Road	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	6	2	
3700	2	0	2	2x RD (A)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	7	4	
3800	1	0	1	1x RD (A)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	6	2	
3900	0	0	0		1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	5	0	
4000	2	0	2	3x RD (B)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	8	4	
4100	3	0	3	3x RD (A)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	9	6	
4200	2	0	2	1x RD (A), 1x BO (A)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	8	4	
4300	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
4400	2	0	2	2x RD (A)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	8	4	
4500	0	1	1	Barrier View Road	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	7	2	
4600	2	0	2	1x RD (A), 1x BO (A)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	8	4	
4700	1	0	1	1x RD (A)	1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	7	2	
4800	0	0	0		1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	5	0	
4900	0	0	0		1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	5	0	
5000	0	2	2	Mangawhai Heads Road	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	7	4	
5100	0	0	0		1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	5	0	
5200	3	0	3	Private Road (C)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, limit visi	8	6	
5300	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
5400	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
5500	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
5600	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
5700	0	0	0		1	1	2	2	0	0	6	<200 peds should, <200 cys road, park road, limit visi	6	0	
5800	3	0	3	Private Road (C)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	8	6	
5900	3	0	3	Private Road (C)	1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	8	6	
6000	0	0	0		1	1	2	1	0	0	5	<200 peds should, <200 cys road, park road, ave visi	5	0	
Total			34								189		223	68	As RR is greater than DR

Development Rating (total/length) = 7 2

Start	End	Length	Sections	Option 1	DR	RR	Total	Av. DR	SL
2600	4700	2100	21		23	119	46	2.19	100
4700	5300	600	6		5	31	10	1.67	100
5300	6000	700	7		6	39	12	1.71	100
2600	3900	1300	13	Option 2	10	71	20	1.54	100
3900	5200	1300	13		18	73	36	2.77	100
5200	6000	800	8		6	45	12	1.50	100

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
10320															
10400	0	2	2	Garbolino Road	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
10500	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	6	2	
10600	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	6	2	
10700	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
10800	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
10900	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	6	2	
11000	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
11100	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
11200	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
11300	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
11400	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
11500	3	0	3	3x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	8	6	
11600	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
11700	2	0	2	4xRD (B)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
11800	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
11900	0	1	1	Devich Road	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	6	2	
12000	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
12100	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
12200	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
12300	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
12400	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
12500	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	5	0	
12600	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	7	4	
12700	5	0	5	3x RD (A), 3xRD (B)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	10	10	
12800	1	2	3	1x RD (A), Tara Road	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave Vis	8	6	
Total			29								125		154	58	As RR is greater than DR

Development Rating (total/length) = 6 2

Start	End	Length	Sections		DR	RR	Total	Av. DR	SL
10320	11400	1080	10.8	Option 1	7	55	14	1.30	100
11400	12500	1100	11		12	55	24	2.18	100
12500	12800	300	3		10	15	20	6.67	70
10320	12500	2180	21.8	Option 2	19	110	38	1.74	100
12500	12800	300	3		10	15	20	6.67	70
10320	11300	980	9.8	Option 3	5	50	10	1.02	100
11300	12200	900	9		14	45	28	3.11	80
12200	12350	150	1.5		0	15	0	0.00	100
12500	12800	300	3		10	15	20	6.67	70

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
0															
100	2	4	6	2x RD (A)	1	1	2	2	3	0	9	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis, Stop	15	12	
200	3	0	3	3x RD (A)	1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	9	6	
300	1	0	1	1x RD (A)	1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	7	2	
400	3	0	3	3x RD (A)	1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	9	6	
500	2	0	2	2x RD (A)	1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	8	4	
600	3	0	3	3x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	8	6	
700	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	6	2	
800	3	0	3	3x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	8	6	
900	3	0	3	2x RD (A), 1x HC (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	8	6	
1000	6	0	6	1x RD (A), 3x RD (B), 5x RD (C)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	11	12	
1100	2	0	2	3x RD (B)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	7	4	
1200	3	0	3	Private Road (C)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	8	6	
1300	3	0	3	3x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	8	6	
1400	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	5	0	
1500	3	0	3	Private Road (C)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	8	6	
1600	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	7	4	
1700	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	6	2	
1800	2	0	2	2x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	7	4	
1900	2	0	2	3x RD (B)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	7	4	
2000	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	6	2	
2100	1	0	1	1x RD (A)	1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	6	2	
2200	0	0	0		1	1	2	1	0	0	5	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Ave vis	5	0	
2300	0	0	0		1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	6	0	
2400	0	0	0		1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	6	0	
2500	2	0	2	2x RD (A)	1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	8	4	
2600	0	0	0		1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	6	0	
2700	0	0	0		1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	6	0	
2800	2	0	2	2x RD (A)	1	1	2	2	0	0	6	Peds on Roadway or Shoulder but <200, Cycles Impede but <200, Inf. Parking impedes, Lim vis	8	4	
Total			55								154		209	110	As RR is greater than DR

Development Rating (total/length) =

7

4

Start	End	Length	Sections	Option 1	DR	RR	Total	Av. DR	SL
0	1900	1900	19		49	103	98	5.16	80
1900	2800	900	9	Option 2	6	61	12	1.33	100
0	600	600	6		18	38	36	6.00	70
600	1900	1300	13		31	65	62	4.77	80
1900	2800	900	9		6	51	12	1.33	100
0	600	600	6	Option 3	18	38	36	6.00	70
600	2800	2200	22		37	116	74	3.36	80
0	700	700	7		19	43	38	5.43	80
700	1200	500	5	Option 4	17	25	34	6.80	70
1200	1900	700	7		13	35	26	3.71	80
1900	2800	900	9		6	51	12	1.33	100
0	300	300	3	Existing	10	21	20	6.67	70
300	2800	2500	25		45	133	90	3.60	80

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
0															
100	1	0	1		0	1	2	1	0	0	4	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	5	2	
200	4	0	4	4x RD (A)	0	1	2	1	0	0	4	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	8	8	
300	5	0	5	6x RD (C), 2x SG (A)	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	8	10	
400	3	0	3	56x MU (C)	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	6	6	
500	6	0	6	3x RD (A), Private Road (C)	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	9	12	
600	4	3	7	2x RD (A), 4x RD (B), Kagan Avenue	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	10	14	
700	7	0	7	7x RD (A)	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, Parked veh obs,	10	14	
800	9	3	12	6x RD (A), 1x GS (C), Leslie Street	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, parked veh freq and close	15	24	
900	10	3	13	3x RD (A), 1x GS (C), 1x SS (C), 1x SH (A), Insley Street	0	1	2	0	0	0	3	Footpath behind berm, Cycles on road <200pd, parked veh freq and close	16	26	
1000	18	0	18	1x GS (C), 9x BO (A), 1x BO (C), 1x RE (C)	0	1	0	0	0	0	1	Footpath behind berm, Cycles on road <200pd, No parking	19	36	
1100	5	3	8	2x BO (A), 3x RD (A), Molesworth Drive	0	1	0	0	0	0	1	Footpath behind berm, Cycles on road <200pd, No parking	9	16	
1200	10	0	10	8x RD (A), 6x RD (B)	0	1	0	0	0	0	1	Footpath behind berm, Cycles on road <200pd, No parking	11	20	
1300	10	0	10	8x RD (A), 3x RD (B)	0	1	0	0	0	0	1	Footpath behind berm, Cycles on road <200pd, No parking	11	20	
1400	5	0	5	Private Road (C), 3x RD (B)	0	1	0	0	0	0	1	Footpath behind berm, Cycles on road <200pd, No parking	6	10	
1440	5	0	5	2x RD (A), 1x RE (C)	0	1	0	0	0	0	1	Footpath behind berm, Cycles on road <200pd, No parking	6	10	
Total			114								35		149	228	RR less than DR

Development Rating (total/length) =	10	16
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Start	End	Length	Sections		DR	RR	Total	Av. DR	SL
0	300	300	3	Option 1	10	11	21	7.00	70
300	1440	1140	11.4		10.4	2.4	128	11.23	50

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
0															
100	7	6	13	4x RD (A), 1x GS (3), Moir Street	0	1	3	0	2	0	6	<200 cys, open visi, fre par close, short dur	19	26	
200	10	0	10	9x RD (A), 1x BO (A)	0	1	3	0	0	0	4	<200 cys, open visi, fre par close, short dur	14	20	
300	7	3	10	4x RD (A), 6x RD (C), Kedge Drive	0	1	3	0	0	0	4	<200 cys, open visi, fre par close, short dur	14	20	
400	4	0	4	1x SG (A), 1x Kindergarten (F), 1x Ped Xing (A)	0	1	3	0	3	0	7	<200 cys, open visi, fre par close, short dur	11	8	
500	27	0	27	1x RD (A), 1x School (F)	0	1	3	0	0	0	4	<200 cys, open visi, fre par close, short dur	31	54	
600	0	0	0		1	1	2	0	0	0	4	<200 peds, <200 cycles, open visi, parking on road	4	0	
640	0	0	0		1	1	2	0	0	0	4	<200 peds, <200 cycles, open visi, parking on road	4	0	
Total			64								33		97	128	RR less than DR

Insley Road Development Rating (total/length) = 15 20

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes
	Frontage (SLNZ4)	Side Road (SLNZ5)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes			
0															
100	0	0	0		1	1	2	0	0	0	4	<200 peds, <200 cycles, open visi, parking on road	4	0	
200	0	0	0		1	1	2	0	0	0	4	<200 peds, <200 cycles, open visi, parking on road	4	0	
300	0	0	0		1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	5	0	
400	0	2	2	Black Swamp Road	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	7	4	
500	2	0	2	2x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	7	4	
600	5	0	5	3x RD (A), 3x RD (B)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	10	10	
700	0	1	1	Clarke Road	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	6	2	
800	2	0	2	2x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	7	4	
900	0	0	0		1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	5	0	
1000	0	0	0	2x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	5	0	
1100	2	0	2	2x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	7	4	
1200	0	0	0	1x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	5	0	
1300	1	0	1	1x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	6	2	
1400	0	0	0		1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	5	0	
1500	1	0	1	1x RD (A)	1	1	2	1	0	0	5	<200 peds, <200 cycles, ave visi, parking on road	6	2	
Total			16								73		89	32	As RR is greater than DR

Tomarata Road Development Rating (total/length) = 6 2

Road	Start	End	Length	Sections	Option 1	DR	RR	Total	Av. DR	SL
Insley	0	600	600	6		64	29	93	15.50	50
Insley	600	640	40	0.4		0	4	0	0.00	80
Tomarata	0	600	600	6		9	28	18	3.00	80
Tomarata	600	1500	900	9		7	45	14	1.56	100

RAMM Disp.	Development Rating				Roadway Rating								Total	Revised Total	Notes	
	Frontage (SLNZ4)	Side Road (SLNZ3)	Sub Total	Notes	Pedestrians (SLNZ6)	Cyclist (SLNZ7)	Parking (SLNZ8)	Geometry (SLNZ9)	Traffic Control (SLNZ10)	Use (SLNZ11)	Sub Total	Notes				
0																
100	3	6	9	1x RE (C), Moir Street	1	1	2	0	3	0	7	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi, stop control	16	18		
200	4	3	7	2x RD (A), 1x BO (B), Dune View Drive	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	11	14		
300	5	3	8	3x RD (A), 3x RD (B), Longview Street	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	12	16		
400	1	3	4	1x CH (A), Pearson Street	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	8	8		
500	2	0	2	2x RD (A)	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	6	4		
600	0	2	2	Old Waipu Road	0	1	1	1	0	0	3	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, ave visi	5	4		
700	2	0	2	2x RD (A)	0	1	1	1	0	0	3	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, ave visi	5	4		
800	3	0	3	3x RD (A)	0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	5	6		
900	2	0	2	2x RD (A)	0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	4	4		
1000	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
1100	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
1200	4	0	4	1x RD (A), Private Road (C)	0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	6	8		
1300	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
1400	6	0	6	15xRD (C)	0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	8	12		
1500	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
1600	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
1700	3	0	3	Proposed Private Road (C)	0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	5	6		
1800	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
1900	3	0	3	Proposed Private Road (C)	0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	5	6		
2000	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
2100	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
2200	0	0	0		0	1	1	0	0	0	2	<200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi	2	0		
2300	0	0	0		1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	3	0		
2400	0	0	0		1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	3	0		
2500	2	0	2	4x RD (B)	1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	5	4		
2600	0	5	5	Thelma Road / Estuary Drive	1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	8	10		
2700	0	0	0		1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	3	0		
2800	2	0	2	1x BO (B)	1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	5	4		
2900	0	3	3	Seabreeze Road	1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	6	6		
3000	0	0	0		1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	3	0		
3100	3	0	3	Private Road (C)	1	1	1	0	0	0	3	<200 peds on shoulder, <200 cyclists, narrow road, infr. Parking obstructing, open visi	6	6		
3200	2	0	2	2x SG (A)	0	1	1	0	1	0	3	>200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, open visi, traffic islands	5	4		
3300	10	0	10	10x BO (A)	0	1	2	0	0	0	3	>200 peds away from road, <200 cyclists, narrow road, frequent parking close to road, open visi	13	20		
3400	10	0	10	2x BO (A), 2x BO (D)	0	1	2	1	0	0	4	>200 peds away from road, <200 cyclists, narrow road, frequent parking close to road, ave visi	14	20		
3500	2	3	5	2x BO (A), Moir Point Road	0	1	2	1	0	0	4	>200 peds away from road, <200 cyclists, narrow road, frequent parking close to road, ave visi	9	10		
3600	1	0	1	1x RD (A)	0	1	1	1	0	0	3	>200 peds away from road, <200 cyclists, narrow road, infr. Parking obstructing, ave visi	4	2		
3700	7	0	7	5, RD (A), 2x SG (A)	0	1	2	0	0	0	3	>200 peds away from road, <200 cyclists, narrow road, frequent parking close to road, open visi	10	14		
3800	2	3	5	2x RD (A), Eveline Street	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	9	10		
3900	1	3	4	1x RD (A), Awatea Street	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	8	8		
4000	1	3	4	1x RD (A), Findlay Street	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	8	8		
4100	1	3	4	1x BO (A), Wood Street	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	8	8		
4200	3	0	3	3x RD (A)	1	1	2	1	0	0	5	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, ave visi	8	6		
4300	2	3	5	2x RD (A), Greenview Drive	1	1	2	1	0	0	5	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, ave visi	10	10		
4400	6	0	6	6x RD (A)	1	1	2	1	0	0	5	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, ave visi	11	12		
4500	7	0	7	5x RD (A), 3x RD (B)	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	11	14		
4600	5	3	8	5x RD (A), North Avenue	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	12	16		
4700	6	3	9	6x RD (A), Wharfedale Crescent	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	13	18		
4800	9	3	12	9x RD (A), Sailrock Drive	1	1	2	0	0	0	4	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, open visi	16	24		
4900	5	3	8	5x RD (A), Olsen Avenue	1	1	2	1	0	0	5	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, ave visi	13	16		
5000	8	0	8	8x RD (A)	1	1	2	1	0	0	5	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, ave visi	13	16		
5020	0	9	9	Mangawhai Heads Road	1	1	2	1	2	0	7	>200 peds close to road, <200 cyclists, narrow road, frequent parking close to road, ave visi	16	18		
Total			197								170	367	394	RR less than		

Development Rating (total/length) =	7	8
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Start	End	Length	Sections	Option 1	DR	RR	Total	Av. DR	SL
0	900	900	9		39	33	72	8.00	70
900	2500	1600	16		18	35	36	2.25	100
2500	5020	2520	25.2		140	102	242	9.60	70
0	400	400	4	Option 2	28	19	47	11.75	50
400	1200	800	8		15	20	30	3.75	80
1200	2400	1200	12		12	26	24	2.00	100
2400	3300	900	9		27	27	54	6.00	70
3300	5020	1720	17.2		115	78	193	11.22	50