Stantec

Memo

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Project/File:	310205861	Date:	29 April 2024

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

This memorandum provides a high-level technical assessment for the Rangitoopuni Land Trust Riverhead Project fast-track resource consent application.

Surveys

Turn count surveys were undertaken on Tuesday 19 September 2023 for eight key intersections in the vicinity of the development site. The information from these surveys was used to determine the traffic patterns within the transportation network surrounding the site and to assist with developing a trip distribution for the anticipated trip generation of the activities proposed for the site.

The intersections surveyed are illustrated in **Figure 1**.

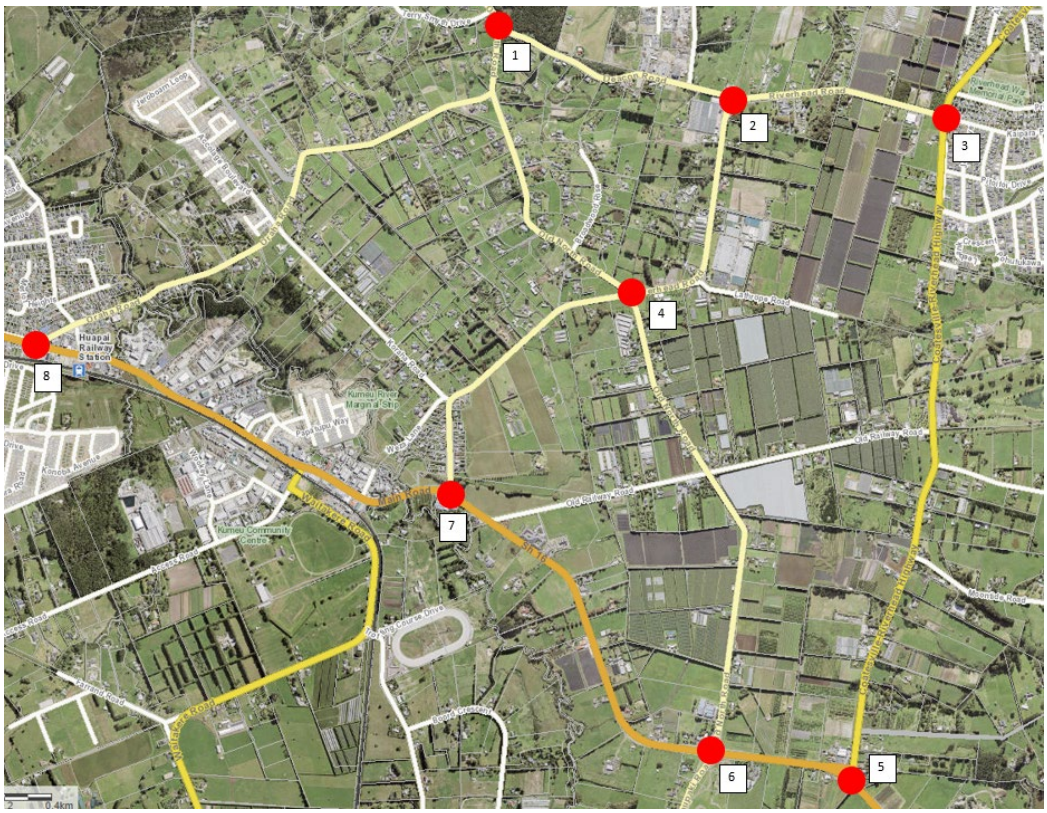

Figure 1: Intersections Surveyed

The intersections which were surveyed comprised the following:

1. - Old North Road / Deacon Road
2. - Riverhead Road / Deacon Road
3. - Riverhead Road / Coatesville-Riverhead Highway /Kaipara Portage Road
4. - Riverhead Road / Old North Road
5. - Coatesville-Riverhead Highway / State Highway 16
6. - Old North Road / State Highway 16 / Taupaki Road
7. - Riverhead Road / Main Road
8. - Oraha Road / Main Road

All intersections were surveyed for the following time periods:

- 6am to 9am; and
- 3pm to 6pm.

The surveyed periods cover the critical times of a typical weekday, these being the morning and evening commuter peak periods.

The peak hours for both periods were 7am to 8am in the morning and 4:30pm to 5:30pm in the evening.

The attached **Figures 2** and **3** show the morning and evening peak hour turning volumes on the network.

Proposed Development

It should be noted that the development site is located within land which is zoned Countryside Living in the Unitary Plan. The land which is also Treaty Settlement land is also subject to special plan provisions under Section E21 of the Unitary Plan. These provisions allow for housing to be established on Treaty Settlement Land at an average of one dwelling per hectare ("**ha**"). On this basis, with the total landholding (two Lots) comprising some 395ha (222ha for Lot 1 and 173ha for Lot 2), a theoretical yield of 395 dwellings is possible on the site.

However, the Rangitoopuni Land Trust Riverhead Project seeks to establish of 210 'normal' detached dwellings within Lot 1 and a retirement village comprising up to 350 retirement units within Lot 2. The impact of this proposal has been assessed and summarised below for the morning ("**AM**") and evening ("**PM**") peak hours.

For convenience, the theoretical development will be referred to as Scenario 1 and the proposed development will be referred to as Scenario 2.

Trip Generation

The peak hour trip generation rates used for the assessment are based on industry standard guidelines[1]. These are as follows:

- 0.85 trips/dwelling for 'normal' detached dwellings
- 0.2 trips/dwelling for retirement home dwellings

The inbound/outbound proportions adopted were also based on industry standard guidelines[2] and these were:

- 25/75 for the morning peak hour ('normal' detached dwellings)
- 63/37 for the evening peak hour ('normal' detached dwellings)
- 33/67 for the morning peak hour (retirement home dwellings)
- 61/39 for the evening peak hour (retirement home dwellings)

The forecast trip generations calculated for the two scenarios are summarised in the following **Table 1**.

Table 1: Trip Generation

Scenario	Trips	Morning Peak		Evening Peak	
		In	Out	In	Out
1 (Theoretical)	336	84	252	212	124
2 (Proposed)	249	68	181	156	93

As indicated within Table 1, the likely trip generation of Scenario 2 is around 25% less than Scenario 1 and as such the impact of Scenario 2, or the proposed development, will be less than that of Scenario 1, or what could be developed within the site taking into consideration the underlying zone rules.

A more detailed analysis of the operation of the critical intersections within the transportation network has been undertaken for Scenario 2.

Trip Distribution

The generated trips were assigned to the road network based on the surveyed traffic volume patterns.

The resultant distributed trips are illustrated in **Figure 4** and **5** for the proposed scenario, for the AM and PM peak hours.

[1] Transport for New South Wales – Guide to Traffic Generating Developments
[2] Institute of Transportation Engineers – Trip Generation Manual

Intersection Analysis

The SIDRA[3] Intersection software package, which is a commonly used tool for intersection analysis in New Zealand, was used to assess intersection performance at the key intersections within the transport network. Key performance indicators were delay (in seconds/vehicle), 95th percentile maximum queue (in vehicles) and Level of Service ("**LOS**"). LOS is defined as an incremental scale using the letters A through F, with LOS A indicating the best performance level and LOS F indicating the worst.

Table 2 describes traffic flow operation for each of the LOS scales, including a brief description of likely performance at a basic level.

Table 2: LOS description

LOS	Description of operation
A	Free flow conditions; little interaction between vehicles
B	Reasonably free flow condition; speeds similar to LOS A but some movement is restricted due to interaction between vehicles within traffic streams
C	Stable flow conditions; ability to manoeuvre within traffic streams is notably restricted but roads remain below capacity
D	Approaching unstable flow; freedom to manoeuvre is much more limited and driver comfort levels decrease. This is the common level for urban streets during peak hours of travel
E	Unstable flow; operating at capacity; drivers comfort level becoming poor. This would be a more common standard in larger urban areas where some congestion is inevitable during peak hours
F	Forced or breakdown flow; vehicle movement very constrained; traffic demand generally higher than capacity

Intersection performance was compared against the existing situation (Base Scenario) for the morning and evening peak hours and the comparisons are illustrated and discussed in the following sections of this memo.

[3] SIDRA – Signalised and unsignalised Intersection Design and Research Aid - aaSIDRA

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Old North Road / Deacon Road

The comparative performance for the morning peak hour for the Old North Road / Deacon Road intersection between the Base Scenario and Scenario 2 is shown in **Table 3**.

Table 3: Old North Road / Deacon Road (Morning Peak Hour) Comparison

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Old North (South)	Through	1.3	A	1.3	A
	Right	8.2	A	8.2	A
Deacon	Left	10.8	B	10.8	B
	Right	14.7	B	14.4	B
Old North (North)	Left	7.1	A	7.1	A
	Through	0.0	A	0.0	A
Intersection		4.6	NA	4.7	NA

Approach	Queue (veh)	Queue (veh)
Old North (South)	1.0	1.0
Deacon	0.6	0.6
Old North (North)	0.0	0.0

The comparative performance for the evening peak hour is shown in **Table 4**.

Table 4: Old North Road / Deacon Road (Evening Peak Hour) Comparison

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Old North (South)	Through	0.2	A	0.3	A
	Right	7.3	A	7.4	A
Deacon	Left	9.9	A	9.9	A
	Right	13.0	B	13.2	B
Old North (North)	Left	7.0	A	7.0	A
	Through	0.0	A	0.0	A
Intersection		4.4	NA	4.5	NA

Approach	Queue (veh)	Queue (veh)
Old North (South)	0.7	0.7
Deacon	1.2	1.2
Old North (North)	0.0	0.0

Overall, no noticeable effects are expected at the Old North Road / Deacon Road intersection for Scenario 2 for both peak hours.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Riverhead Road / Deacon Road

The comparative performance for the morning peak hour for the Riverhead Road / Deacon Road intersection between the Base Scenario and Scenario 2 is shown in **Table 5**.

Table 5: Riverhead Road / Deacon Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Riverhead (South)	Left	8.1	A	8.0	A
	Right	7.0	A	7.1	A
Riverhead (North)	Left	6.4	A	6.4	A
	Right	6.5	A	6.4	A
Deacon	Left	7.6	A	7.8	A
	Right	11.5	B	11.3	B
Intersection		7.2	NA	7.6	NA

Approach	Queue (veh)	Queue (veh)
Riverhead (South)	0.6	0.6
Riverhead (North)	0.0	0.0
Deacon	1.1	2.3

The comparative performance for the evening peak hour is shown in **Table 6**.

Table 6: Riverhead Road / Deacon Road Comparison (Evening Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Riverhead (South)	Left	9.0	A	8.6	A
	Right	7.1	A	7.4	A
Riverhead (North)	Left	6.3	A	6.3	A
	Right	6.4	A	6.4	A
Deacon	Left	7.2	A	7.2	A
	Right	10.5	B	12.0	B
Intersection		7.1	NA	7.5	NA

Approach	Queue (veh)	Queue (veh)
Riverhead (South)	0.6	0.6
Riverhead (North)	0.0	0.0
Deacon	0.9	1.4

For both peak hours, only marginal differences are expected for Scenario 2 compared to the existing situation.

Reference: **Rangitoopuni Land Trust Riverhead Project Fast Track Application**

Coatesville-Riverhead Highway / Riverhead / Kaipara Portage Road

The comparative performance for the morning peak hour for the Coatesville-Riverhead Highway / Riverhead / Kaipara Portage Road intersection between the Base Scenario and Scenario 2 is shown in **Table 7**.

Table 7: Coatesville-Riverhead Highway / Riverhead / Kaipara Portage Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Coatesville-Riverhead (N)	Left	7.9	A	8.0	A
	Through	8.7	A	8.8	A
	Right	12.1	B	12.2	B
	U-Turn	10.7	B	10.8	B
Kaipara-Portage	Left	9.2	A	10.0	A
	Through	9.8	A	10.6	B
	Right	13.4	B	14.2	B
	U-Turn	12.1	B	12.9	B
Coatesville-Riverhead (S)	Left	6.5	A	7.1	A
	Through	7.2	A	7.9	A
	Right	11.0	B	11.7	B
	U-Turn	9.4	A	10.0	B
Riverhead	Left	9.1	A	10.4	B
	Through	9.2	A	10.6	B
	Right	13.5	B	14.5	B
	U-Turn	11.6	B	12.9	B
Intersection		9.4	A	10.4	B

Approach	Queue (veh)	Queue (veh)
Coatesville-Riverhead (N)	1.9	2.1
Kaipara-Portage	0.8	0.9
Coatesville-Riverhead (S)	2.9	3.5
Riverhead	3.9	6.1

The comparative performance for the evening peak hour is shown in **Table 8**.

Table 8: Coatesville-Riverhead Highway / Riverhead / Kaipara Portage Road Comparison (Evening Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Coatesville-Riverhead (N)	Left	8.8	A	9.1	A
	Through	9.5	A	9.9	A
	Right	13.1	B	13.4	B
	U-Turn	11.7	B	12.1	B
Kaipara-Portage	Left	11.0	B	11.9	B
	Through	11.9	B	12.8	B
	Right	15.3	B	16.1	B
	U-Turn	13.9	B	14.8	B
Coatesville-Riverhead (S)	Left	6.9	A	7.4	A
	Through	7.5	A	8.0	A
	Right	11.1	B	11.6	B
	U-Turn	9.7	A	10.2	B
Riverhead	Left	8.0	A	8.1	A
	Through	8.5	A	8.6	A
	Right	12.3	B	12.3	B
	U-Turn	10.8	B	11.0	B
Intersection		9.4	A	9.9	A

Approach	Queue (veh)	Queue (veh)
Coatesville-Riverhead (N)	2.4	2.9
Kaipara-Portage	0.7	0.8
Coatesville-Riverhead (S)	5.6	6.6
Riverhead	2.2	2.8

Overall, only marginal differences when comparing the peak hour performance of the intersection of Scenario 2 against the existing case for the morning and evening peaks.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Old North Road / Riverhead Road

The comparative performance for the morning peak hour for the Old North Road / Riverhead Road intersection between the Base Scenario and Scenario 2 is shown in **Table 9**.

Table 9: Old North Road / Riverhead Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Old North (South)	Left	6.4	A	6.5	A
	Through	3.3	A	3.4	A
	Right	11.5	B	11.6	B
	U-Turn	9.7	A	9.8	A
Riverhead (East)	Left	8.3	A	8.1	A
	Through	8.4	A	8.5	A
	Right	9.4	A	9.5	A
	U-Turn	11.2	B	11.3	B
Old North (North)	Left	5.7	A	6.0	A
	Through	5.2	A	5.5	A
	Right	10.0	B	10.3	B
	U-Turn	11.5	B	11.8	B
Riverhead (West)	Left	4.0	A	4.1	A
	Through	7.8	A	7.9	A
	Right	12.3	B	12.4	B
	U-Turn	10.4	B	10.5	B
Intersection		7.7	A	7.9	A

Approach	Queue (veh)	Queue (veh)
Old North (South)	1.1	1.3
Riverhead (East)	0.9	1.3
Old North (North)	1.8	1.9
Riverhead (West)	1.5	1.7

The comparative performance for the evening peak hour is shown in **Table 10**.

Table 10: Old North Road / Riverhead Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Old North (South)	Left	6.7	A	6.7	A
	Through	3.6	A	3.7	A
	Right	12.0	B	12.0	B
	U-Turn	10.1	B	10.1	B
Riverhead (East)	Left	6.3	A	6.3	A
	Through	7.0	A	7.1	A
	Right	8.1	A	8.2	A
	U-Turn	10.0	A	10.0	A
Old North (North)	Left	4.1	A	4.6	A
	Through	3.9	A	4.5	A
	Right	8.4	A	8.9	A
	U-Turn	10.3	B	10.8	B
Riverhead (West)	Left	4.5	A	4.8	A
	Through	8.2	A	8.5	A
	Right	12.9	B	13.2	B
	U-Turn	11.1	B	11.3	B
Intersection		6.0	A	6.4	A

Approach	Queue (veh)	Queue (veh)
Old North (South)	2.8	3.1
Riverhead (East)	1.4	1.6
Old North (North)	0.7	0.8
Riverhead (West)	1.1	1.5

Again, only marginal differences are observed when comparing the peak hour performance of the intersection for Scenario 2 against the existing case for the morning and evening peaks.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Coatesville-Riverhead Highway / State Highway 16

The comparative performance for the morning peak hour for the Coatesville-Riverhead Highway / State Highway 16 ("**SH16**") intersection between the Base Scenario and Scenario 2 is shown in **Table 11**.

Table 11: Coatesville-Riverhead Highway / State Highway 16 Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
SH16 (East)	Through	6.5	A	6.5	A
	Right	8.4	A	8.8	A
Coatesville-Riverhead	Left	133.7	F	334.1	F
SH16 (West)	Left	8.2	A	8.2	A
	Through	6.4	A	6.4	A
Intersection		35.5	NA	85.6	NA

Approach	Queue (veh)	Queue (veh)
SH16 (East)	0.8	0.9
Coatesville-Riverhead	51.5	121.8
SH16 (West)	0.0	0.0

The comparative performance for the evening peak hour is shown in **Table 12**.

Table 12: Coatesville-Riverhead Highway / State Highway 16 Comparison (Evening Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
SH16 (East)	Through	6.8	A	7.0	A
	Right	7.5	A	7.6	A
Coatesville-Riverhead	Left	21.5	C	26.6	D
SH16 (West)	Left	8.4	A	8.5	A
	Through	6.3	A	6.3	A
Intersection		8.6	NA	9.5	NA

Approach	Queue (veh)	Queue (veh)
SH16 (East)	0.7	0.8
Coatesville-Riverhead	4.9	7.0
SH16 (West)	0.1	0.1

For this intersection, only marginal differences are noted between the existing scenario and Scenario 2 for the evening peak.

However, the morning peak results are very sensitive for the left turn movement out of Coatesville-Riverhead Highway. The morning peak is characterised by long queues on SH16 and on Coatesville-Riverhead Highway and SH16. Queuing on Coatesville-Riverhead Highway starts around 6am and continues through to around 8:40am. Queuing on SH16 typically starts at around 6:05pm and continues to around 9am.

A high degree of courtesy is typically exercised by drivers heading east on SH16 in the morning peak period. This main stream of traffic generally slows down and gives way to vehicles turning right into Coatesville-Riverhead Highway, which then allows the left turners out of Coatesville-Riverhead to filter out into the main stream of traffic heading east on SH16. Eastbound vehicles also give way to left turners exiting Coatesville-Riverhead Highway and with around 1,000 vehicles per hour heading east interacting with around 600 vehicles per hour exiting Coatesville-Riverhead Highway, roadway capacity is constrained.

This intersection is the critical intersection in the transportation network with respect to the development proposal for the morning peak period. However, the development adds only around 171 additional traffic movements to the intersection, of which 77 are left turns onto SH16. These volumes represent only around 6% and 3% of the total traffic volumes travelling through this intersection in the AM peak hour. This level of development should already be allowed for given that the site is live-zoned.

It is understood that a Private Plan Change (**PPC**) has been lodged with Council and was notified for submissions on 18 April 2024, with the final date for submissions being 17 May 2024. This PPC seeks to rezone 6ha of land in Riverhead from Future Urban to Rural-Mixed Rural zone and 75.5ha to a mix of Residential – Mixed Housing Suburban, Residential – Terrace Housing and Apartment Building, Business – Local Centre and Business – Neighbourhood Centre zones with associated precinct provisions. However, the proposed precinct provisions include a standard to ensure that the New Zealand Transport Agency / Waka Kotahi's SH16 Brigham Creek to Waimauku Upgrade project ("**the Waka Kotahi Project**"), which includes an upgrade of the SH16 / Coatesville-Riverhead Highway intersection to a two-laned roundabout is constructed prior to occupation of the proposed activities with the PPC area.

As reported in the Integrated Transportation Assessment for the PPC the performance of the SH16 / Coatesville-Riverhead Highway intersection, with the Waka Kotahi project included, is summarised below in **Table 13**.

Table 13: Coatesville-Riverhead Highway / State Highway 16 (with PPC 100)

Approach	Movement	AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
SH16 (East)	Through	6.4	A	6.5	A
	Right	12.3	B	12.4	B
Coatesville-Riverhead	Left	23.8	C	11.8	B
	Right	32.7	C	18.9	B
SH16 (West)	Left	9.0	A	12.7	B
	Through	10.1	B	14.2	B
Intersection		12.7	B	10.5	B

Approach	Queue (veh)	Queue (veh)
SH16 (East)	5.5	12.7
Coatesville-Riverhead	10.2	3.8
SH16 (West)	6.3	8.7

As shown, with the additions of the traffic associated with PPC 100, the intersection is anticipated to operate well in both peak hours.

For completeness, an assessment has also been undertaken for Scenario 2 plus PPC 100, and the results are summarised in **Table 14**.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Table 14: Coatesville-Riverhead Highway / State Highway 16 (with PPC 100 and Scenario 2)

Approach	Movement	AM Peak Delay (s/veh)	AM Peak LOS	PM Peak Delay (s/veh)	PM Peak LOS
SH16 (East)	Through	2.4	A	2.5	A
	Right	7.9	A	8.1	A
Coatesville-Riverhead	Left	58.7	E	9.8	A
	Right	68.8	E	15.8	B
SH16 (West)	Left	7.7	A	14.5	B
	Through	7.7	A	15.0	B
Intersection		19.2	B	8.1	A

Approach	Queue (veh)	Queue (veh)
SH16 (East)	5.8	16.4
Coatesville-Riverhead	25.5	4.4
SH16 (West)	8.0	12.2

As noted, in the AM peak the Coatesville-Riverhead Highway approach is likely to experience increased delays, but the overall intersection performance is good with an overall LOS of B. No significant issues are anticipated for the PM peak.

It should also be acknowledged that this is a conservative assessment as the wider area modelling undertaken for PPC 100 would already have considered some buildout within the Rangitoopuni Land Trust area since it is live-zoned.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

SH16 / Old North Road / Taupaki Road

The comparative performance for the morning peak hour for the SH16 / Old North Road / Taupaki Road intersection between the Base Scenario and Scenario 2 is shown in **Table 15**.

Table 15: SH16 / Old North Road / Taupaki Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Taupaki	Left	8.7	A	8.8	A
	Through	7.8	A	7.8	A
	Right	14.6	B	14.7	B
	U-Turn	11.6	B	11.6	B
SH16 (East)	Left	6.2	A	6.3	A
	Through	6.5	A	6.6	A
	Right	12.9	B	12.9	B
	U-Turn	10.7	B	10.8	B
Old North	Left	10.2	B	10.6	B
	Through	10.5	B	10.8	B
	Right	18.2	B	18.4	B
	U-Turn	14.0	B	14.4	B
SH16 (West)	Left	7.6	A	7.6	A
	Through	8.3	A	8.3	A
	Right	13.9	B	13.9	B
	U-Turn	11.5	B	11.5	B
Intersection		8.9	A	9.0	A

Approach	Queue (veh)	Queue (veh)
Taupaki	1.2	1.2
SH16 (East)	2.5	2.6
Old North	3.2	3.6
SH16 (West)	2.4	2.4

These morning peak hour results need to be viewed with caution as the model does not take into consideration the queuing which extends back to this intersection from the SH16 / Coatesville-Riverhead Highway intersection. The actual performance of this roundabout is likely to be lower than LOS A. Nevertheless, the anticipated quantum of change from the existing situation is expected to be low.

The comparative performance for the evening peak hour is shown in **Table 16**.

Table 16: SH16 / Old North Road / Taupaki Road Comparison (Evening Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Taupaki	Left	10.6	B	10.8	B
	Through	9.5	A	9.7	A
	Right	16.4	B	16.6	B
	U-Turn	13.5	B	13.7	B
SH16 (East)	Left	7.2	A	7.2	A
	Through	7.4	A	7.5	A
	Right	13.6	B	13.7	B
	U-Turn	11.4	B	11.5	B
Old North	Left	11.3	B	11.8	B
	Through	11.2	B	11.7	B
	Right	17.8	B	18.3	B
	U-Turn	15.0	B	15.5	B
SH16 (West)	Left	9.6	A	10.1	B
	Through	10.3	B	10.8	B
	Right	16.4	B	16.9	B
	U-Turn	14.0	B	14.5	B
Intersection		10.2	B	10.5	B

Approach	Queue (veh)	Queue (veh)
Taupaki	1.5	1.6
SH16 (East)	6.1	6.5
Old North	3.5	4.0
SH16 (West)	5.1	5.5

Only marginal differences are observed when comparing the peak hour performance of the intersection between Scenario 2 and the existing scenario for the evening peak.

Main Road / Riverhead Road

The comparative performance for the morning peak hour for the Main Road / Riverhead Road intersection between the Base Scenario and Scenario 2 is shown in **Table 17**.

Table 17: Main Road / Riverhead Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Main Road (East)	Through	0.1	A	0.1	A
	Right	9.6	A	9.6	A
Riverhead	Left	8.2	A	8.3	A
	Right	45.4	E	50.9	F
Main Road (West)	Left	4.9	A	4.9	A
	Through	0.3	A	0.3	A
Intersection		3.3	NA	3.7	NA

Approach	Queue (veh)	Queue (veh)
Main Road (East)	0.3	0.3
Riverhead	2.1	2.5
Main Road (West)	0.0	0.0

The comparative performance for the evening peak hour is shown in **Table 18**.

Table 18: Main Road / Riverhead Road Comparison (Evening Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Main Road (East)	Through	0.3	A	0.3	A
	Right	10.3	B	11.0	B
Riverhead	Left	8.9	A	8.9	A
	Right	66.1	F	78.6	F
Main Road (West)	Left	4.9	A	4.9	A
	Through	0.3	A	0.3	A
Intersection		3.2	NA	3.9	NA

Approach	Queue (veh)	Queue (veh)
Main Road (East)	0.5	0.9
Riverhead	2.2	2.6
Main Road (West)	0.0	0.0

For this intersection, only marginal differences are noted between the existing scenario and Scenario 2 for the morning and evening peak hours, although it is noted that right turners out of Riverhead Road are likely to experience a relatively high level of delay during both peak periods.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Main Road / Oraha Road

The comparative performance for the morning peak hour for the Main Road / Oraha Road intersection between the Base Scenario and Scenario 2 is shown in **Table 17**.

Table 19: Main Road / Oraha Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Main Road (East)	Through	0.1	A	0.1	A
	Right	10.3	B	10.4	B
Riverhead	Left	10.6	B	10.5	B
	Right	23.3	C	24.0	C
Main Road (West)	Left	4.6	A	4.6	A
	Through	0.2	A	0.2	A
Intersection		1.9	NA	2.0	NA

Approach	Queue (veh)	Queue (veh)
Main Road (East)	0.2	0.2
Riverhead	0.9	1.0
Main Road (West)	0.0	0.0

The comparative performance for the evening peak hour is shown in **Table 18**.

Table 20: Main Road / Oraha Road Comparison (Evening Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Main Road (East)	Through	0.2	A	0.2	A
	Right	8.7	A	8.7	A
Riverhead	Left	8.6	A	8.6	A
	Right	55.1	F	60.3	F
Main Road (West)	Left	4.6	A	4.6	A
	Through	0.1	A	0.1	A
Intersection		4.0	NA	4.4	NA

Approach	Queue (veh)	Queue (veh)
Main Road (East)	0.3	0.3
Riverhead	3.0	3.3
Main Road (West)	0.0	0.0

For this intersection, only marginal differences are noted between the existing scenario and Scenario 2 for the morning and evening peak hours.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Forestry Road / Deacon Road

The comparative performance for the morning peak hour for the Forestry Road / Deacon Road intersection between the Base Scenario and Scenario 2 is shown in **Table 17**.

Table 21: Forestry Road / Deacon Road Comparison (Morning Peak Hour)

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Deacon (East)	Through	0.0	A	0.0	A
	Right	7.9	A	7.7	A
Forestry	Left	9.2	A	8.3	A
	Right	12.7	B	12.8	B
Deacon (West)	Left	7.9	A	7.5	A
	Through	0.0	A	0.0	A
Intersection		2.8	NA	4.6	NA

Approach	Queue (veh)	Queue (veh)
Deacon (East)	0.2	0.5
Forestry	0.3	1.1
Deacon (West)	0.0	0.0

The comparative performance for the evening peak hour is shown in **Table 18**.

		Base		Scenario 2	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Deacon (East)	Through	0.0	A	0.0	A
	Right	8.7	A	7.3	A
Forestry	Left	7.3	A	7.4	A
	Right	13.1	B	13.7	B
Deacon (West)	Left	7.0	A	7.0	A
	Through	0.0	A	0.0	A
Intersection		2.1	NA	3.9	NA

Approach	Queue (veh)	Queue (veh)
Deacon (East)	0.1	0.5
Forestry	0.3	0.7
Deacon (West)	0.0	0.0

Table 22: Forestry Road / Deacon Road Comparison (Evening Peak Hour)

For this intersection, only marginal differences are noted between the existing scenario and Scenario 2 for the morning and evening peak hours.

Reference: Rangitoopuni Land Trust Riverhead Project Fast Track Application

Conclusions

The Rangitoopuni Land Trust is currently seeking a fast-track consenting process for the redevelopment of its landholdings in Riverhead. The proposal is for 210 'normal' detached dwellings and a retirement village comprising up to 350 retirement units. This will expedite the delivery of much needed housing to support population growth in Auckland, particularly in the north-western region.

It should be noted that from a transportation perspective, the proposal represents a lower intensity than what the current land zoning allows for, with likely trip generation of the proposal being around 25% less than what could potentially be developed on the land.

Nevertheless, a preliminary assessment of effects has been undertaken. For the majority of the intersections assessed, performance is unlikely to be significantly compromised by the anticipated traffic generated by the proposed yield associated with the development proposal. For the morning peak hour, the modelling indicates some effects at the Coatesville-Riverhead Highway / SH16 intersection. However, the site is live-zoned and the proposal only adds around 6% more traffic to the intersection, or only around 3% additional left turners onto SH16. These are not considered high increases.

The cumulative effects of PPC 100 have also been considered even though the PPC assessment is likely to already have taken account of development within the Rangitoopuni Land Trust landholdings. Notwithstanding this, even with this conservative approach being adopted, the transportation network, with the Waka Kotahi project incorporated, is expected to operate satisfactorily.

Overall, it is considered that the fast-track process sought by the Rangitoopuni Land Trust can be accepted from a transportation planning perspective.

Ngā mihi,

STANTEC NEW ZEALAND

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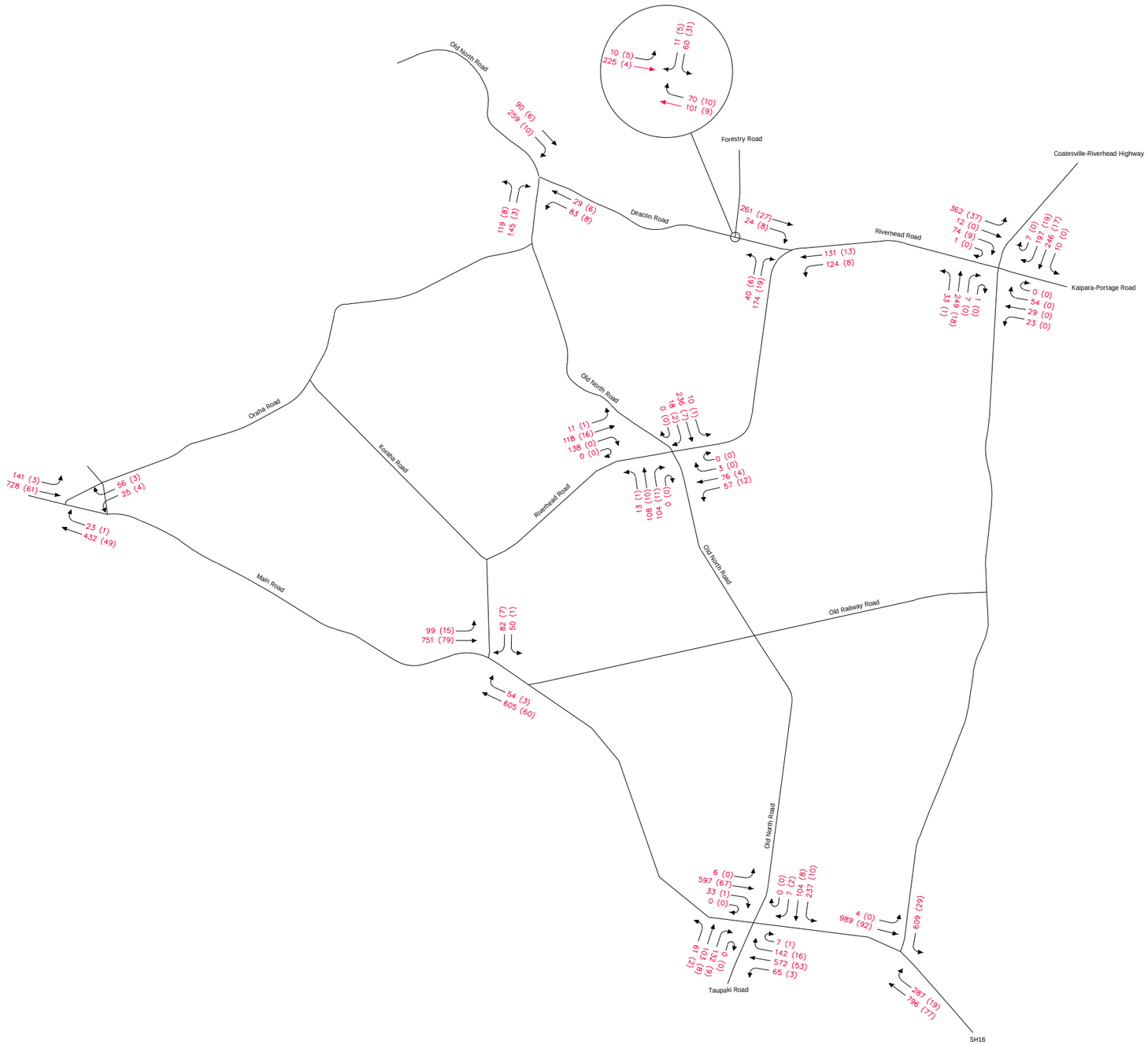
Attachment: Figures 2 through 5



Monday, 29 April 2024 7:20:10 pm

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RIVERHEAD FOREST DEVELOPMENT

AM PEAK HOUR - SURVEYED TURNING VOLUMES

7am to 8am

DRAWN: TLJ	---	---
DATE: 29.04.24	STATUS: RC	
SCALE: 1:20000 @ A3		
DWG NO:310205861A1A		

Stantec

2

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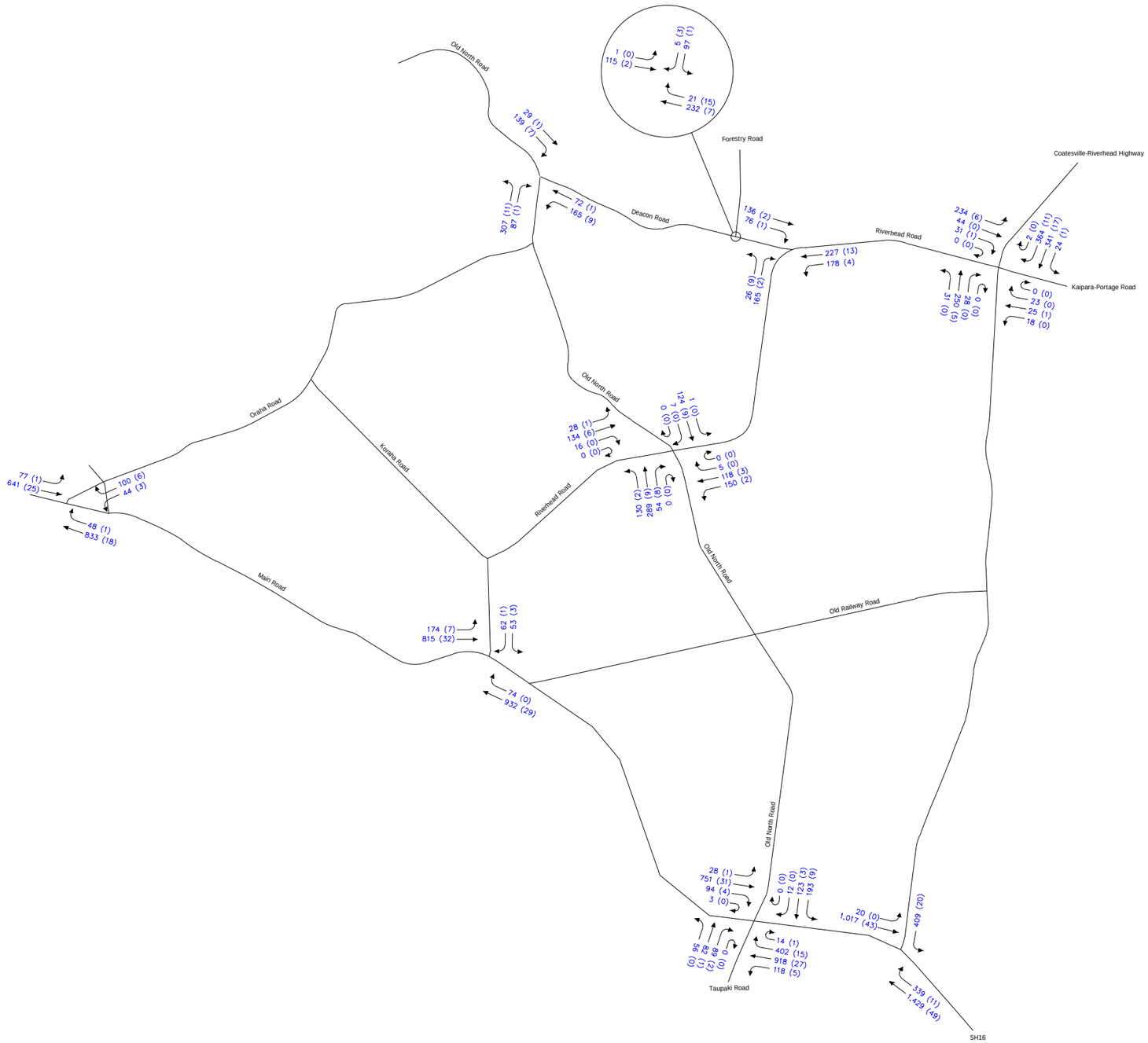

KEY

XXX – TOTAL VEHICLES
(XXX) – HEAVY VEHICLES

Monday, 29 April 2024 7:20:10 pm

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RIVERHEAD FOREST DEVELOPMENT

PM PEAK HOUR - SURVEYED TURNING VOLUMES

430pm to 530pm

DRAWN: TLJ	---	---
DATE: 29.04.24	STATUS: RC	
SCALE: 1:20000 @ A3		
DWG NO:310205861A1A		

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3

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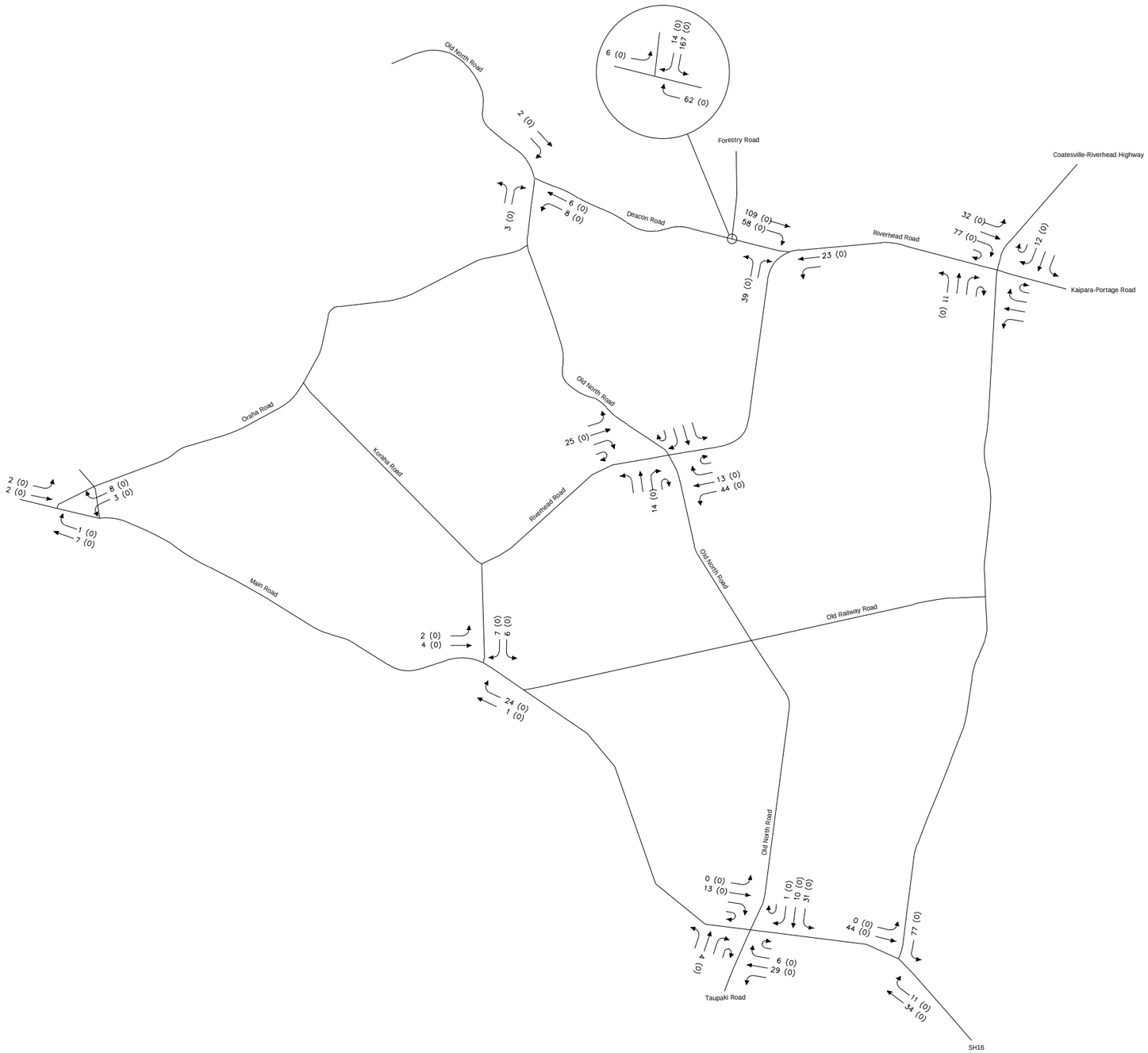

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(XXX) – HEAVY VEHICLES

Monday, 29 April 2024 7:20:10 pm

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RIVERHEAD FOREST DEVELOPMENT

AM PEAK HOUR - TRAFFIC DISTRIBUTION (SCENARIO 2)

7am to 8am

DRAWN: TLJ	---	---
DATE: 29.04.24	STATUS: RC	
SCALE: 1:20000 @ A3		
DWG NO:310205861A1A		

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4

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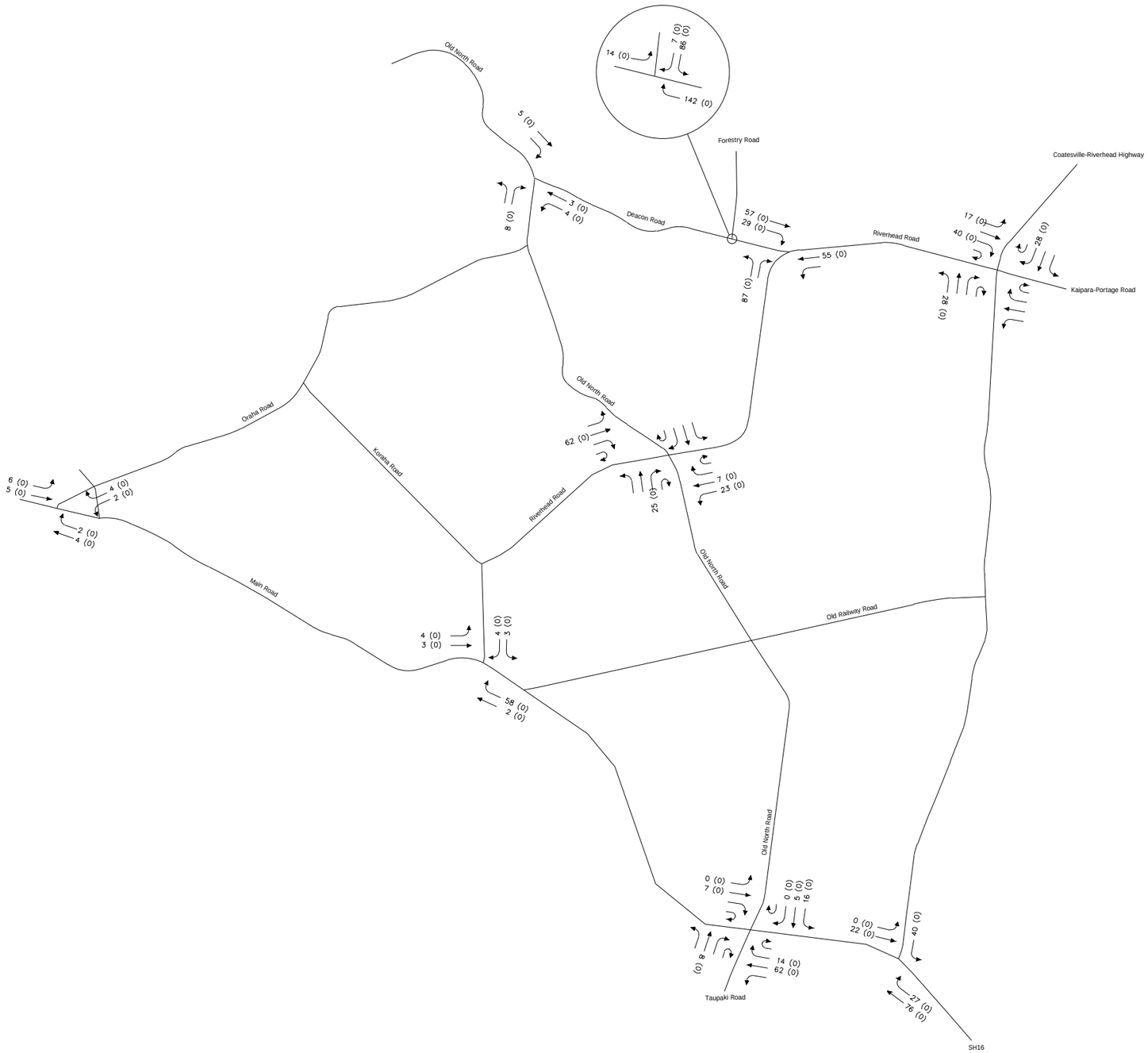

KEY

XXX – TOTAL VEHICLES
(XXX) – HEAVY VEHICLES

Monday, 29 April 2024 7:20:10 pm

REV	DATE	DRN	CHK	DESCRIPTION
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RIVERHEAD FOREST DEVELOPMENT

PM PEAK HOUR - TRAFFIC DISTRIBUTION (SCENARIO 2)

430pm to 530pm

DRAWN: TLJ	---	---
DATE: 29.04.24	STATUS: RC	
SCALE: 1:20000 @ A3		
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Stantec

5

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