HUGHES
DEVELOPMENTS

Faringdon Residential Development
Rolleston

Transportation Assessment

CARRIAGEWAY
CONSULTING
traffic engineering | transport planning

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1. Introduction

1.1. Hughes Developments Limited is seeking land use consent for residential development within Rolleston at two locations, towards the southeast and southwest of the existing Faringdon subdivision.

1.2. This Transportation Assessment sets out a detailed analysis of the transportation issues associated with the proposed residential activity including changes in travel patterns that are likely to arise. Where potential adverse effects are identified, ways in which these can be addressed are set out.

1.3. This report is cognisant of the guidance specified in the New Zealand Transport Agency's 'Integrated Transport Assessment Guidelines' and although travel by private motor vehicle is addressed within this report, in accordance with best practice the importance of other transport modes is also recognised. Consequently, travel by walking, cycling and public transport is also considered.

2. Site Overview

2.1. Location

2.1.1. The ODP areas lie to the immediate southeast and southwest of the existing (and largely constructed) Faringdon subdivision, towards the north of Selwyn Road and approximately 2.5km south of Rolleston town centre. The locations of the ODP areas in the context of the local area are shown in Figure 1 and in more detail in Figure 2. The ODP areas are presently zoned as Inner Plains within the Selwyn District Plan ("*District Plan*").

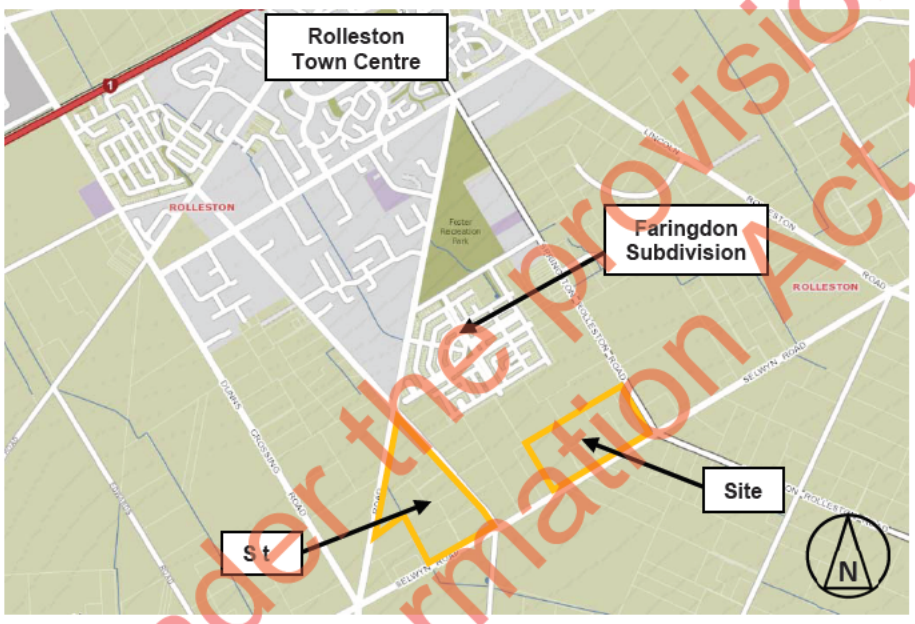

Figure 1: General Location of Proposed ODP Areas

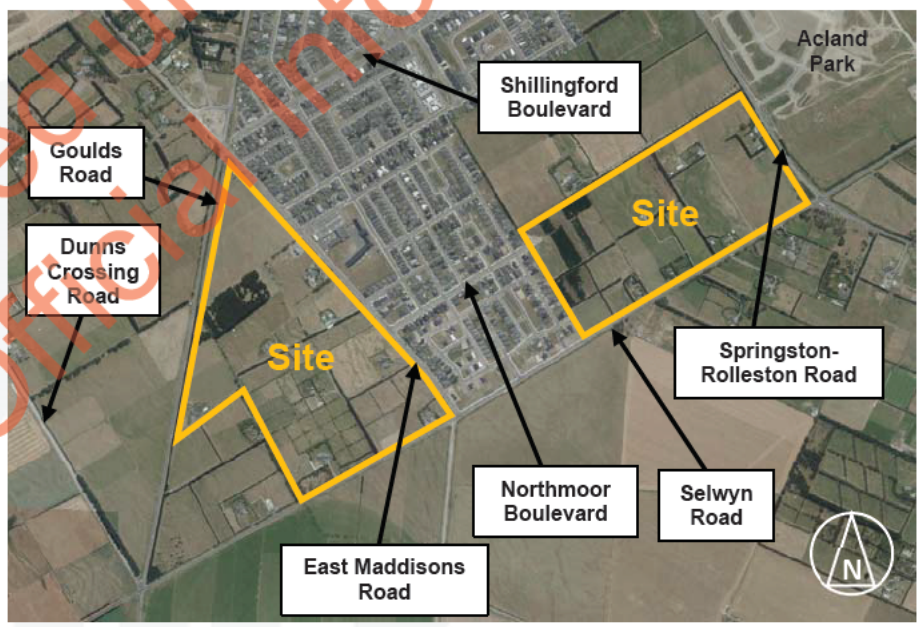

Figure 2: Aerial Photograph of Proposed ODP Areas and Environs

2.2. Road Hierarchy

2.2.1. The Selwyn District Plan classifies Selwyn Road and Springston-Rolleston Road as Arterial Roads, indicating a role of connecting areas of district importance including the district's townships and other key places and activities, including across district boundaries. As such, roads of this type primarily provide for through traffic.

2.2.2. Under the hierarchy, Goulds Road and East Maddisons Road are Collector Roads towards the north of Oak Tree Lane (approximately 1km north of the Goulds Road / East Maddisons Road intersection), described in the District Plan as having a role which distributes and collects local traffic within and between neighbourhood areas. They have a balance of a traffic movement function against a property access function that they also need to provide.

2.2.3. Towards the south of Oak Tree Lane and adjacent to the ODP area, Goulds Road and East Maddisons Road are Local Roads as are all other roads within Faringdon. These have a primary function of providing for property access.

3. Current Transportation Networks

3.1. Road Network (Southwestern ODP Area)

3.1.1. Towards the eastern side of the ODP area, East Maddisons Road has a sealed carriageway width of 11m with parking permitted on both sides, and a flat and straight alignment. The road is subject to a 60km/h speed limit. The eastern side of the road is characterised by multiple private driveways associated with the current extent of the Faringdon subdivision but the western (site) side is undeveloped.

Photograph 1: East Maddisons Road (Looking South)

3.1.2. At the northern extremity of the ODP area, East Maddisons Road meets Goulds Road at priority ('stop') intersection with Goulds Road retaining priority. On the immediate approach to the intersection, East Maddisons Road deviates towards the west such that it meets Goulds Road at 90-degrees. This scheme has recently been put in place as part of the Faringdon subdivision as previously East Maddisons Road met an acute angle. There are no auxiliary turning lanes at the inte section.

Photograph 2: East Maddisons Road / Goulds Road Intersection (Looking North)

3.1.3. Lemonwood School lies on the eastern side of East Maddisons Road. Based on information previously received, the school role is expected to be a maximum of 750 students, and there will also be a pre-school for up to 50 children. The school does not have direct vehicular access onto East Maddisons Road.

3.1.4. To the southeast, East Maddisons Road meets Selwyn Road at a priority ('give way') crossroads, where traffic on Selwyn Road retains the right of way. Sight distances for vehicles emerging from East Maddisons Road are excellent in both directions. There are no auxiliary lanes provided for vehicles turning into East Maddisons Road from Selwyn Road.

Photographs 3 and 4: Sight Distances to the Left and Right at the Selwyn Road / East Maddisons Road Intersection

Photograph 5: Selwyn Road / East Maddisons Road Intersection, Looking North from East Maddisons Road (South)

3.1.5. Along the southern edge of the ODP area, Selwyn Road has a 6.4m carriageway width, with grassed verges of 7-8m on either side. It has a flat and straight alignment, with a marked centreline but no edgeline markings. To the west of East Maddisons Road, Selwyn Road has an 80km/h speed limit.

Photograph 6: Selwyn Road (Looking West)

3.1.6. Approximately 1.1km southwest of East Maddisons Road, Selwyn Road meets Goulds Road at a priority ('stop') controlled intersection, with Selwyn Road retaining priority. Goulds Road meets at an acute angle of around 60 degrees but sightlines in each direction remain good. There are no auxiliary turning lanes at the intersection.

Photograph 7: Selwyn Road / Goulds Road Intersection (Looking South)

3.1.7. As shown on Photograph 7, there is a fifth leg at the intersection of Dunns Crossing Road. This joins Goulds Road just 15m north of Selwyn Road, and traffic must give-way at the intersection.

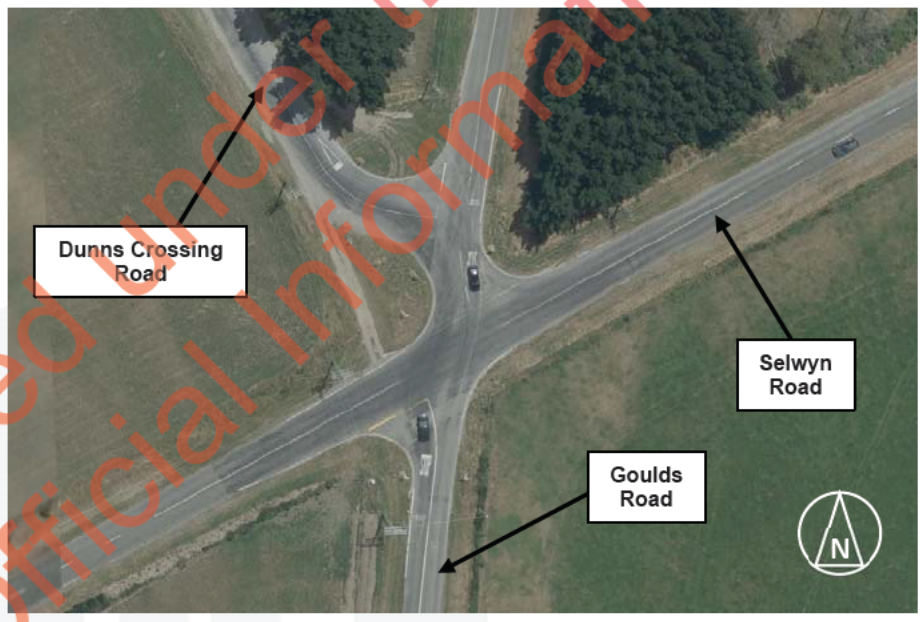

Figure 3: Aerial Photograph of Selwyn Road / Goulds Road / Dunns Crossing Road Intersection

3.1.8. West of this intersection, the speed limit on Selwyn Road increases to 100km/h and the road provides a connection to rural areas before terminating at the Selwyn River.

3.1.9. North of Selwyn Road, Goulds Road has a flat and straight alignment with a 6.5m carriageway width and wide grassed verges of 7-8m on either side. It is subject to an 80km/h speed limit and has a centreline but no edgeline markings.

Photograph 8: Goulds Road (Looking North)

3.1.10. Some 1.4km northeast of this intersection, Goulds Road meets East Maddison Road (discussed previously) before then connecting to other district roads that provide a connection into Rolleston town centre.

3.2. Road Network (Southeastern ODP Area)

3.2.1. Selwyn Road runs along the southern side of the ODP area. Immediately adjacent to the ODP area, the road has a 6.4m carriageway width, with grassed verges of 7-8m on either side. It has a flat and straight alignment, with a marked centreline but no edgeline markings, and has a speed limit of 80km/h.

Photograph 9: Selwyn Road Adjacent to ODP Area (Looking West)

3.2.2. However, immediately west of the ODP area lies an existing developed area of Faringdon. Along this section, Selwyn Road is subject to a 60km/h speed limit and has a number of driveways and a carriageway that has been widened to 9m, although at present this is divided as 6m for the eastbound traffic lane and 3m for the westbound lane.

Photograph 10: Selwyn Road Adjacent to Faringdon (Looking East)

3.2.3. The location where the two carriageway widths meet represents the southwestern corner of the ODP area. The layout is evidently temporary as there are no road markings or signage to indicate the reduced carriageway width.

Photograph 11: Selwyn Road Change of Carriageway Width and Speed Limit (Looking East)

3.2.4. Approximately 1850m from the existing edge of Faringdon, Selwyn Road meets Springston-Rolleston Road at a priority ('stop') controlled intersection, where traffic on Springston-Rolleston Road retain priority. The alignment of Springston-Rolleston Road curves slightly in this location, which increases sight distances for eastbound vehicles on Selwyn Road, but decreases them for westbound vehicles. The intersection does not have any auxiliary turning lanes, but there is a small amount of flaring which can be used by turning traffic.

Photograph 12: Springston-Rolleston Road / Selwyn Road Intersection (Looking South)

3.2.5. Springston-Rolleston Road forms the eastern edge to the ODP area. This presently has a variable carriageway width, notionally around 9m (two traffic lanes of 3.5m width each, with a 1m shoulder on both sides) but there is widening provided for the main entrance into the Acland Park subdivision, currently under construction, and which has auxiliary turning lanes.

Photograph 13: Springston-Rolleston Road (Looking North)

Photograph 14: Springston-Rolleston Showing Auxiliary Lanes into Acland Park (Looking South)

3.2.6. Further south, Springston-Rolleston Road turns towards the southeast and connects to the township of Lincoln. North of the ODP area, Springston-Rolleston Road meets Lowes Road at a four-arm roundabout. The northern continuation of Springston-Rolleston Road is known as Tennyson Street, and this provides a roading linkage to Rolleston town centre and to Main South Road (State Highway 1).

3.3. Non-car Modes of Transport

3.3.1. As the ODP areas represent the edge of the current urban development of Rolleston, footpath provision is intermittent and largely aligned with the extent of development. As such, there are footpaths along the eastern side of East Maddison Road, the northern side of Selwyn Road (adjacent to the current extent of Faringdon) and on the eastern side of Springston-Rolleston Road adjacent to Acland Park. Certain of these are sufficiently wide to accommodate a shared walking and cycling path, although there is presently no signage to indicate shared use.

Photograph 15: Footpaths on East Maddisons Road and Selwyn Road

4. Future Changes to Land Use and Infrastructure

4.1. Rolleston Structure Plan

4.1.1. The Rolleston Structure Plan has now been implemented through Plan Change 7 to the District Plan. Nevertheless, the Structure Plan is helpful in setting out the high-level principles guiding growth within the town, and of particular importance are the proposed amendments to the transportation network both for motorised vehicles and non-car users which affect both ODP areas.

Figure 4: Extract from Figure 8.2 of Rolleston Structure Plan ("Main Roads – Primary Network")

4.1.2. The form of development shown on the Structure Plan highlights that in due course, there will be two east-west routes in the area, one of which passes through the southwestern ODP area (Northmoor Boulevard).

4.1.3. The roading network towards the north of the southeastern ODP area will be extended as far as Selwyn Road, with extensions of Hungerford Drive and Faringdon Boulevard. It should be noted however that the location of all of these roads is slightly different to what has subsequently been implemented through Outline Development Plan Area 6 (Faringdon).

4.1.4. Faringdon Boulevard (and its southern extension) and Springston-Rolleston Road will be cycle routes.

Figure 5: Extract from Figure 8.3 of Rolleston Structure Plan ("Cycleway Routes")

4.1.5. Public transport is to be improved within Rolleston. Although the roading patterns have changed slightly, the Structure Plan suggests that Northmoor Boulevard will have a "*potential service*" which will also run along part of East Maddisons Road.

Figure 6: Extract from Figure 8.4 of Rolleston Structure Plan ("Public Transport Route Patterns")

4.2 *Land Use Changes*

4.2.1. The District Plan sets out that there are a number of residential areas in the immediate vicinity of the proposed ODP areas.

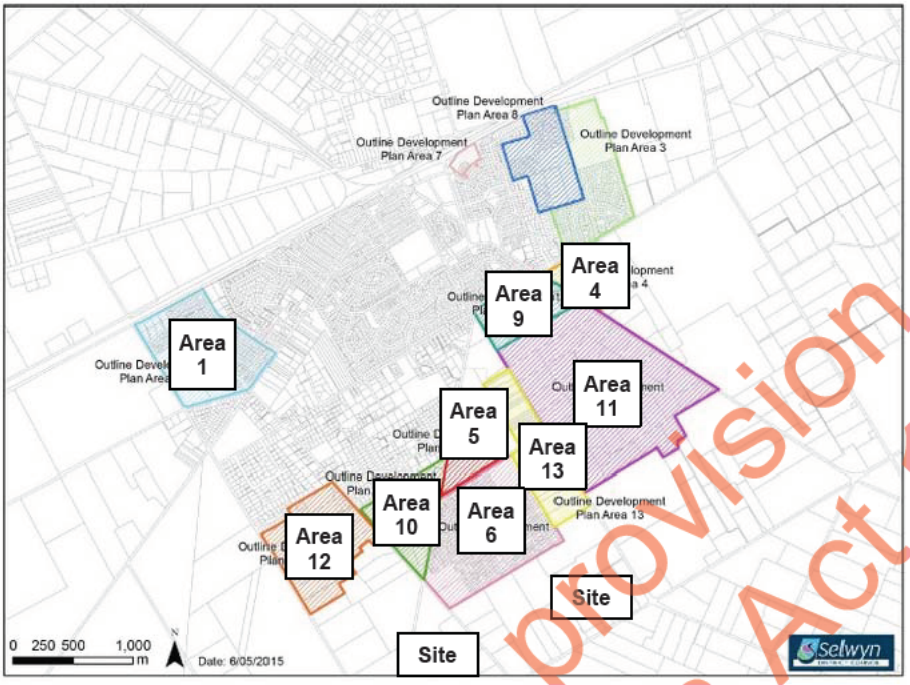

Figure 7: Confirmed Residential Areas Set Out in the Selwyn District Plan in the Vicinity of the ODP Areas

4.2.2. Development of Rolleston is continuing and therefore for the purposes of assessing the proposed ODP areas, it has been assumed that each of these areas noted above is fully developed. This is discussed further below.

5. Current and Future Transportation Patterns

5.1. Traffic Flows

5.1.1. Selwyn District Council carries out regular traffic counts on the key vehicle routes throughout the district. However, as noted above, there is ongoing development in the vicinity of the two ODP areas and therefore current traffic flows do not indicate future traffic flows particularly once the identified ODP areas discussed previously in this report are developed.

5.1.2. As a result of this, the Council has made available its microsimulation model for the Rolleston area. In brief, this transportation model includes the future land uses in the area, and assigns the likely traffic generation of these onto the surrounding road network. It is understood that the Council considers that the model reflects the most likely scenario for development in the Rolleston area, as described previously in this report. All modelling work included in this report was undertaken by the Council's preferred transport modelling consultants.

5.1.3. For this assessment, the model used allows for full development of the ODP areas plus known other developments in the area (such as Lemonwood School). A manual assignment has been used to recalculate the traffic flows at the East Maddisons Road / Goulds Road intersection as the model allow for a roundabout to be constructed in this location, which is unlikely to happen for some considerable time (if at all).

5.1.4. The forecast traffic flows at the intersections closest to the ODP areas are set out below.

Figure 8: Anticipated Traffic Flows at the Goulds Road / East Maddisons Road Intersection with Confirmed Development (Without Proposed ODP areas)

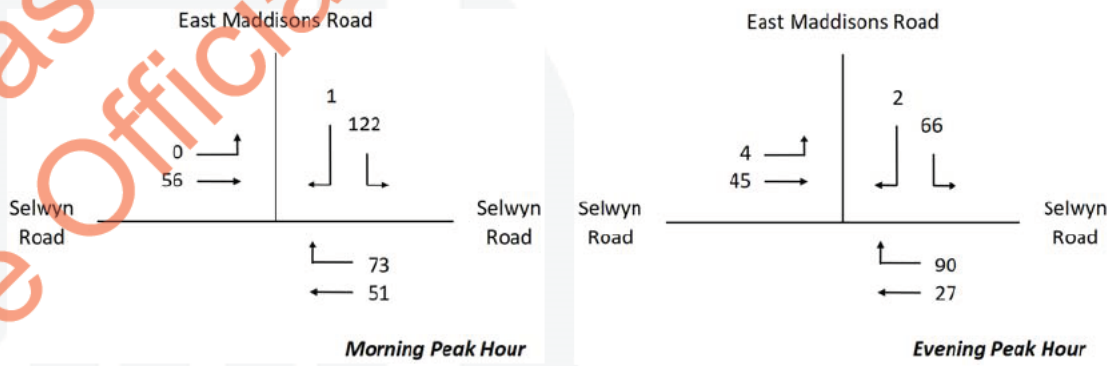

Figure 9: Anticipated Traffic Flows at the Selwyn Road / East Maddisons Road Intersection, with Confirmed Development (Without Proposed ODP areas)

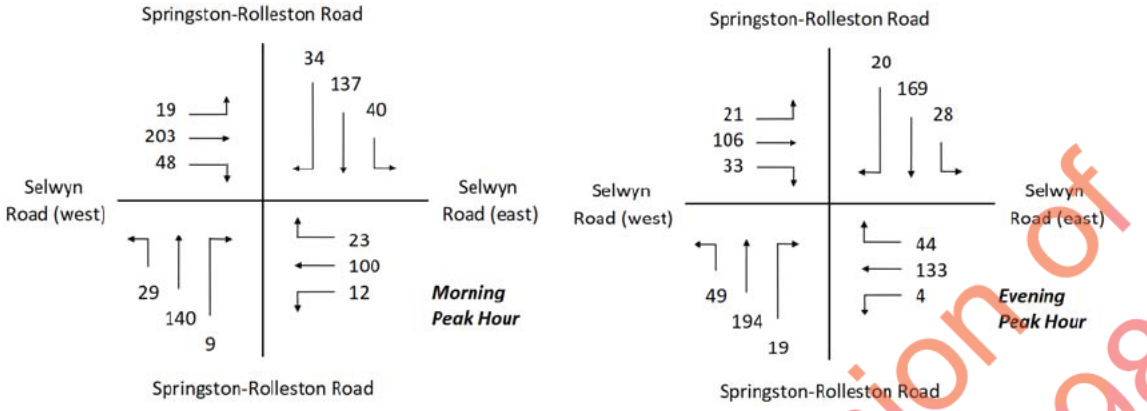

Figure 10: Anticipated Traffic Flows at the Selwyn Road / Springston Rolleston Road Intersection, with Confirmed Development (Without Proposed ODP areas)

5.1.5. The data shows that even with development of existing ODP areas, traffic flows remain relatively modest.

5.1.6. The microsimulation software provides an expected level of service for the intersections, but a more detailed evaluation has been carried out using the computer software program Sidra Intersection and the results are summarised below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
East Maddisons Road (southeast)	L	5.8	0.0	A	7.1	0.0	A
	R	6.5	0.2	A	6.1	0.2	A
Goulds Road (northeast)	L	6.4	0.0	A	6.4	0.0	A
Goulds Road (southwest)	R	7.5	0.0	A	7.1	0.0	A

Table 1: Anticipated Levels of Service at the Goulds Road / East Maddisons Road Intersection, with Confirmed Development (Without Proposed ODP areas)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Selwyn Road (northeast)	R	5.8	0.3	A	5.7	0.3	A
East Maddisons Road (northwest)	L	5.7	0.3	A	5.7	0.2	A
	R	6.1	0.0	A	6.0	0.0	A
Goulds Road (southwest)	L	5.6	0.0	A	5.6	0.0	A

Table 2: Anticipated Levels of Service at the Selwyn Road / East Maddisons Road Intersection, with Confirmed Development (Without Proposed ODP areas)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Springston - Rolleston Rd (south)	L	7.2	0.1	A	8.2	0.2	A
	R	7.6	0.1	A	8.6	0.2	A
Selwyn Road (east)	L	9.6	0.0	A	10.5	0.0	B
	T	11.3	0.7	B	13.7	1.3	B
	R	14.1	0.7	B	15.3	1.3	C
Springston - Rolleston Rd (north)	L	7.4	0.3	A	8.5	0.2	A
	R	7.6	0.3	A	8.8	0.2	A
Selwyn Road (west)	L	9.7	0.1	A	10.6	0.1	B
	T	12.4	1.9	B	13.0	0.9	B
	R	13.8	1.9	B	15.0	0.9	C

Table 3: Anticipated Levels of Service at the Selwyn Road / Springston-Rolleston Road Intersection, with Confirmed Development (Without Proposed ODP areas)

5.1.7. It can be seen that queues and delays are low, with good levels of service provided for each turning movement.

5.2. Non-Car Modes of Transport

5.2.1. The volumes of pedestrians and cyclists in the area are presently relatively low due to the limit extent of residential development. However it is anticipated that they will increase in due course on those parts of Selwyn Road and Springston-Rollestion Road as houses are constructed and occupied.

5.2.2. Similarly, the extent of public transport services is largely dependent upon the number of potential passengers in an area which in this case is currently minimal. As the extent of residential development increases then the number of potential passengers will also increase, and this means that it is likely that bus services could be extended. At present though there are no scheduled bus services in the immediate area.

5.3. Road Safety

5.3.1. The NZTA Crash Analysis System has been used to identify the location and nature of the recorded traffic crashes in the vicinity of the ODP areas. All reported crashes between 2015 and 2019, plus the partial record for 2016, were identified on Goulds Road (East Maddisons Road to Selwyn Road), Selwyn Road (Goulds Road to Springston-Rolleston Road), Springston-Rolleston Road (across the ODP area frontage and to the immediate south of Selwyn Road), and East Maddisons Road (Goulds Road to Selwyn Road).

5.3.2. This showed that 16 crashes had been recorded, of which 7 occurred at the Selwyn Road / Springston-Rolleston Road intersection, 7 occurred at the Selwyn Road / Goulds Road intersection, and one each occurred at the East Maddisons Road / Goulds Road and East Maddisons Road / Selwyn Road intersections.

5.3.3. At the East Maddisons Road / Goulds Road intersection, the crash occurred when a driver turned right from Goulds Road (north) into East Maddisons Road (west) and lost control. The

crash did not result in any injuries. Since that time, the speed limit on the roads has been reduced from the then-prevailing 100km/h, which will assist in mitigating this type of crash.

5.3.4. At the East Maddisons Road / Selwyn Road intersection, the crash occurred when a driver turned right from Selwyn Road (east) into East Maddisons Road and lost control. The crash did not result in any injuries. A temporary speed limit of 30km/h was in place at the time, potentially due to construction works at Faringdon, but it appears that the driver was t avelling more quickly than this.

5.3.5. Of the 7 crashes that occurred at the Selwyn Road / Springston-Rolleston Road intersection:

- One crash occurred when a vehicle travelling from Goulds Road (south) to Goulds Road (north) failed to give-way and struck an eastbound vehicle on Selwyn Road. The crash did not result in any injuries;
- One crash occurred when a southbound vehicle on Goulds Road failed to give-way and struck a vehicle turning from Selwyn Road (east) into Goulds Road. The crash resulted in minor injuries;
- Two crashes occurred when a vehicle travelling from Goulds Road (south) to Goulds Road (north) failed to give-way and struck a westbound vehicle on Selwyn Road. One crash resulted in minor injuries and the other resulted in no injuries;
- Three crashes occurred when a vehicle travelling from Goulds Road (north) to Goulds Road (south) failed to give-way and struck a westbound vehicle on Selwyn Road. One crash resulted in serious injuries, one crash resulted in minor injuries and one resulted in no injuries;

5.3.6. The crashes all involve a failure to give-way to another vehicle, with three involving northbound vehicles on Goulds Road. This is not uncommon within a high-speed rural area, but as set out below, the proposed deve opment will result in measures that will address the issue at least in part.

5.3.7. Of the 7 crashes that occurred at the Selwyn Road / Springston-Rolleston Road intersection:

- Two crashes occurred when a vehicle travelling from Selwyn Road (west) failed to give-way and struck a northbound vehicle on Springston-Rolleston Road. One crash resulted in serious injuries and the other resulted in minor injuries;
- Two crashes occu red when a vehicle travelling from Selwyn Road (west) failed to give-way and struck a southbound vehicle on Springston-Rolleston Road. The crashes both resulted in minor injuries;
- One crash occurred when a vehicle travelling from Selwyn Road (east) failed to give-way and struck a southbound vehicle on Springston-Rolleston Road. The crash did not result in any injuries;
- One crash occurred when a vehicle travelling from Selwyn Road (west) and turning right onto Springston-Rolleston Road lost control and left the road. The crash resulted in minor injuries;
- One crash occurred when a vehicle turning right from Springston-Rolleston Road (north) onto Selwyn Road (west) was struck by another southbound vehicle that attempted to overtake it. The crash resulted in minor injuries;

5.3.8. Most of the crashes all involve a failure to give-way to another vehicle, although the direction of travel does not show any strong bias in either direction of travel. The lower speed limit in this area is likely to have resulted in changes to the crash patterns, but this may not yet be reflected in the data.

5.3.9. Overall, there are clusters of crashes at the Selwyn Road / Springston-Rolleston Road and Selwyn Road / Goulds Road intersections, and these are discussed further below.

5.3.10. It should be reiterated that traffic flows will increase in future as a result of increased development within the immediate area, and thus the crash numbers are likely to change due to road users having greater potential for conflict with one another. However, it can reasonably be anticipated that all new and improved roads will be constructed to meet current standards and accordingly, that no inherent significant safety risks will be introduced.

6. Proposal

6.1. The proposal is for two residential areas, with the southeastern area providing a total of 405 lots and the southwestern area providing 564 lots.

Figure 11: Outline Development Plan for Southwestern ODP Area

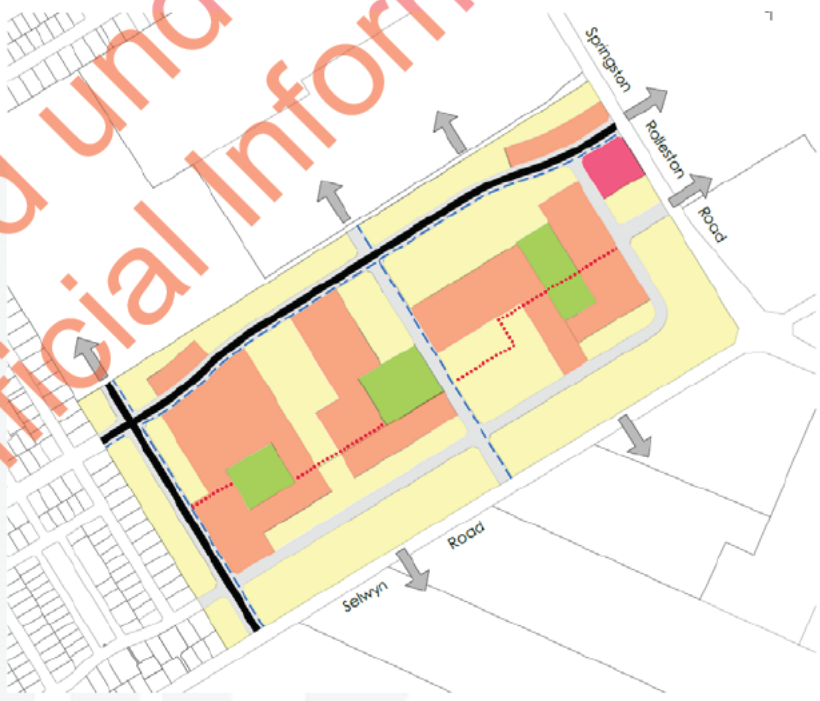

Figure 12: Outline Development Plan for Southeastern ODP Area

6.2. From a transportation perspective, each ODP area will have a number of linkages onto the adjacent roading network. The southwestern ODP area provides a main roading link between East Maddisons Road and Goulds Road, as an extension of Northmoor Boulevard. There are also two connections onto Selwyn Road. The southeastern ODP area provides an east-west

connection to Springston-Rolleston Road, also as an extension of Northmoor Boulevard, plus a north-south link that aligns with Faringdon Boulevard.

6.3. It is anticipated that each of the intersections at the ODP area boundaries and within the ODP areas will operate as priority intersections (rather than roundabouts).

7. Traffic Generation and Distribution

7.1. Traffic Generation

7.1.1. Traffic generated by residential developments is known to vary for a variety of reasons, with one such reason being the proximity (or otherwise) to employment and community facilities. Where a dwelling is some distance from these types of facilities, the traffic generation rates tend to be lower than for residences that are closer due to 'trip chaining', that is, the tendency of a resident to carry out multiple visits to different destinations during the same trip away from the dwelling.

7.1.2. In this instance, the locations of the ODP areas represents an extension to the urban area of Rolleston, and as a result, it is considered that a rate of 8 vehicle movements per day per residence is appropriate.

7.1.3. An allowance has been made for each dwelling to generate 1 vehicle movement in the peak hours. In the morning peak hour, 90% of these are likely to be exiting the development, with 65% of the generated vehicle movements entering the development in the evening peak hour.

7.1.4. This suggests the following traffic generation:

Scenario	Traffic Volumes		
	In	Out	Total
Morning Peak Hour	56	508	564
Evening Peak Hour	367	197	564
Daily	1,128	1,128	4,512

Table 4: Traffic Generation of Southwestern Area

Scenario	Traffic Volumes		
	In	Out	Total
Morning Peak Hour	41	364	405
Evening Peak Hour	263	142	405
Daily	1,620	1,620	3,240

Table 5: Traffic Generation of Southeastern Area

7.2. Trip Distribution

7.2.1. The microsimulation model has been used to determine the trip distribution. This has different distributions for each direction of travel and for the morning and evening peak hours, but on average shows the following:

- Towards State Highway 1 east: 14%
- Selwyn Road east: 16%
- Springston-Rolleston Road: 4%
- State Highway 1 west: 0%
- North of State Highway 1: 6%
- Rolleston town centre: 15%
- Other locations outside Rolleston (unspecified): 6%
- Internal movements: 39%

7.2.2. The data shows a high degree of trip-making that remains internal to the ODP areas.

7.2.3. The roading network towards the south of Rolleston generally comprises higher speed, rural roads, where drivers do not have to give-way to other vehicles. Conversely, the roading network within Rolleston has an urban speed limit and numerous locations where drivers must slow down or stop for other vehicles. It is therefore considered more likely that where drivers have a choice, they will use Selwyn Road rather than using the Rolleston urban road network. The vehicles have been assigned onto the network on this basis.

Direction	Routes	Traffic Volumes			
		Morning Peak Hour		Evening Peak Hour	
		In	Out	In	Out
Towards State Highway 1 east (14%)	50% on East Maddisons Road (north) 50% on Goulds Road (north)	4 4	36 36	26 26	14 14
Selwyn Road east (16%)	50% on East Maddisons Road (south) to Selwyn Road 50% direct to Selwyn Road	4 4	41 41	29 29	16 16
Springston-Rolleston Road (4%)	50% on East Maddisons Road (south) to Selwyn Road 50% direct to Selwyn Road	1 1	10 10	7 7	4 4
North of State Highway 1 (6%)	50% on East Maddisons Road (north) 50% on Goulds Road (north)	2 2	15 15	11 11	6 6
Rolleston town centre (15%)	50% on East Maddisons Road (north) 50% on Goulds Road (north)	4 4	38 38	28 28	15 15
Other locns outside Rolleston (6%)	Not assigned	3	30	22	12
Internal movements (39%)	Not assigned	22	198	143	77
Total	-	56	508	367	197

Table 6 Traffic Distribution of Southwestern Area

Direction	Routes	Traffic Volumes			
		Morning Peak Hour		Evening Peak Hour	
		In	Out	In	Out
Towards State Highway 1 east (14%)	All on Springston-Rolleston Road (north)	6	51	37	20
Selwyn Road east (16%)	50% on Springston-Rolleston Road to Selwyn Road 50% direct to Selwyn Road	3 3	29 29	21 21	11 11
Springston-Rolleston Road (4%)	50% on Springston-Rolleston Road to Selwyn Road 50% direct to Selwyn Road	1 1	7 7	5 5	3 3
North of State Highway 1 (6%)	All on Springston-Rolleston Road (north)	2	22	16	9
Rolleston town centre (15%)	All on Springston-Rolleston Road (north)	6	55	39	21
Other locns outside Rolleston (6%)	Not assigned	2	22	16	9
Internal movements (39%)	Not assigned	16	142	103	55
Total	-	41	364	263	142

Table 7: Traffic Distribution of Southeastern Area

8. Effects on the Transportation Networks

8.1. Roading Network Capacity

8.1.1. The computer software program Sidra Intersection has again been used to assess the effects of the increased traffic volumes at the nearby intersections, and the results are summarised below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
East Maddisons Road (southeast)	L	5.9	0.0	A	7.3	0.0	A
	R	7.4	0.8	A	7.0	0.4	A
Goulds Road (northeast)	L	6.4	0.0	A	6.4	0.0	A
Goulds Road (southwest)	R	7.6	0.0	A	7.5	0.0	A

Table 8: Anticipated Levels of Service at the Goulds Road / East Maddisons Road Intersection, with Confirmed Development (With Proposed ODP Areas)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Selwyn Road (northeast)	R	5.9	0.4	A	5.8	0.6	A
East Maddisons Road (northwest)	L	5.9	0.5	A	5.8	0.2	A
	R	6.3	0.0	A	6.4	0.0	A
Goulds Road (southwest)	L	5.6	0.0	A	5.6	0.0	A

Table 9: Anticipated Levels of Service at the Selwyn Road / East Maddisons Road Intersection, with Confirmed Development (With Proposed ODP Areas)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Springs on - Rolleston Rd (south)	L	7.2	0.1	A	8.2	0.2	A
	R	7.7	0.1	A	8.7	0.2	A
Selwyn Road (east)	L	9.7	0.0	A	10.5	0.0	B
	T	11.6	0.9	B	16.0	3.0	C
	R	16.7	0.9	C	18.6	3.0	C
Springston - Rolleston Rd (north)	L	7.3	0.3	A	8.4	0.3	A
	R	7.6	0.3	A	8.9	0.3	A
Selwyn Road (west)	L	9.7	0.1	A	10.7	0.1	B
	T	15.6	4.8	C	14.3	1.7	B
	R	17.1	4.8	C	17.9	1.7	C

Table 10: Anticipated Levels of Service at the Selwyn Road / Springston-Rolleston Road Intersection, with Confirmed Development (With Proposed ODP Areas)

8.1.2. It can be seen that although the queues and delays increase slightly from those without the ODP areas in place, they remain relatively low. In this regard, delays of 19 seconds (the greatest forecast) are not unreasonable for the weekday peak hours. Good levels of service are provided for each turning movement. On this basis, no revisions are proposed to the intersection geometries.

8.1.3. One outcome of the expected traffic distribution is that the extent of increase through the Selwyn Road / Goulds Road intersection will be very low. This intersection has therefore not been considered in further detail.

8.1.4. It is understood that the existing roading environment will be revised as a result of the development of the ODP areas. In response to the frontage changing from rural to urban it can be expected that the carriageways will be widened (in a similar fashion to the way in which that section of Selwyn Road adjacent to Faringdon has been widened) and will be reconstructed with an urban formation that includes kerbs and footpaths. Although details of this will only be provided at the time of subdivision, there are no reasons why such improvement schemes could not be implemented on view of the wide road reserves.

8.1.5. It is also expected that the opportunity will be taken to reduce the speed limits of Goulds Road and Selwyn Road, and potentially also Springston-Rolleston Road. In each case, it would be appropriate for the 80km/h speed limit to be lowered to 60km/h to be consistent with East Maddisons Road and the existing section of Selwyn Road adjacent to Faringdon.

8.2. Non-Car Modes of Transport

8.2.1. As a result of the proposed development areas, it can be expected that pedestrian volumes in the immediate area will increase. However the inclusion of a footpath along one side of Goulds Road, Selwyn Road and the affected part of Springston-Rolleston Road, plus a second footpath along the western side of East Maddisons Road will accommodate likely volumes. Such provision will be particularly important for those walking to and from school.

8.2.2. It is anticipated that the roads within the ODP areas will meet the Council's standards for new roads, including the provisions of footpaths and cycling infrastructure where necessary, and therefore no further comment has been made on the internal road network.

8.2.3. Although the provision of a bus service is beyond the scope of a resource consent application, the internal roading network creates the ability to form carriageway widths that are suitable for a service to pass through the site in future, should such a service operate.

8.3 Road Safety

8.3.1. The crash history in the vicinity of the ODP areas does not indicate that there are any particular features or factors that would affect, or be affected by, their development. Although there is a cluster of crashes at the Selwyn Road / Goulds Road and Selwyn Road / Springston – Rolleston Road intersections, the ODP areas will enable a reduction in the speed limit on both roads, which will therefore support a safer environment. Further, there is not expected to be any significant increase in traffic flows at the Selwyn Road / Goulds Road intersection.

8.3.2. The new roads which are being provided due to development in the area will meet current standards, including for non-motorised travel. and therefore it is unlikely that any new road safety issues will be introduced. Further, the flat and straight alignment of the frontage roads means that sight distances at the proposed new intersections will be excellent.

9. Statutory Planning Matters

9.1. Structure Plan

9.1.1. The Rolleston Structure Plan provides the overarching framework within which development of the ODP areas is expected to take place. A comparison has therefore been made in detail with these.

9.1.2. For the southwestern area, a road link is shown on the Structure Plan from East Maddisons Road to Goulds Road, being the continuation of an east-west route that lies further to the east. Within the ODP, the link is provided. It is not straight but curvilinear, and connects to East Maddisons Road further south in order to align with Northmoor Boulevard (which forms the east-west route).

9.1.3. For the southwestern area, the only cycling link is along Selwyn Road and this can be provided as part of the necessary upgrading of the road. A possible bus route is also shown on the northern part of East Maddisons Road but again, the upgrading of the road to provide this is not precluded.

9.1.4. For the southeastern area, two north-south links are shown as the extensions of Faringdon Boulevard and Hungerford Drive. These are shown on the ODP. The ODP also shows an east-west link to Springston-Rolleston Road but this is further north in the Structure Plan. It is understood however that the resource consents that have been granted for Faringdon resulted in the relocation of this link to the south meaning that it is now within the ODP area.

9.1.5. For the southwestern area, one cycling link is along Selwyn Road and this can be provided as part of the necessary upgrading of the road. A second link is along the extension of Faringdon Boulevard and this can be provided. A possible bus route is also shown on east-west route (Northmoor Boulevard) and this can be provided subject to a suitable design for the road.

9.1.6. Accordingly, it is considered that the ODPs are in accordance with the Structure Plan for the area.

9.2. District Plan

9.2.1. The District Plan sets out a number of transportation-related policies and rules with which any new development is expected to comply. Since the proposal at present is at a high level, it is not possible to undertake a detailed evaluation of the extent of compliance with these but an initial assessment has been carried out.

9.2.2. It is considered likely that there will be non-compliances with the separation of vehicle crossings and driveways, and sightlines from driveways, as these issues commonly occur within residential subdivisions due to the greater frequency of intersections and the lot density meaning that inevitable, some driveways are closer to intersections than anticipated. A full assessment will be required of these in due course but it is likely that the lower speed environment and road user familiarity will provided mitigation for any shortfalls.

9.2.3. The extent of any non-compliances can also be minimised by specifying the locations of driveways at the more sensitive lots.

9.2.4. For completeness, if direct driveways are proposed onto higher speed roads, then the speed limits will need to be reduced in order to ensure that vehicles can manoeuvre safely.

9.2.5. On this basis, at this stage we do not consider that the ODPs have any elements which preclude justified non-compliances with the District Plan, but acknowledge that this will need to be assessed in more detail when the relevant consents are applied for.

9.2.6. Consequently, subject to these caveats, the ODPs can be supported from a transportation perspective.

10. Conclusions

10.1. This report has identified, evaluated and assessed the various transport and access elements of two proposed ODPs which will facilitate residential subdivisions. Overall it is considered that the traffic generated by the development of the ODP areas can be accommodated on the adjacent roading network without capacity or efficiency issues arising, even allowing for development of surrounding residential areas. Intersection modelling using data extracted from the Council's microsimulation transport model shows that levels of service at all intersections remain good, with low queues and delays, and accordingly no improvement measures are required at any locations.

10.2. The crash history in the vicinity of the site does not indicate that there would be any adverse safety effects from the proposal. However the future increase in urbanisation of the area creates the opportunity for the Council to review (and lower) the current speed limits on Goulds Road, Selwyn Road and Springston-Rolleston Road which will provide an overall safer roading environment.

10.3. In view of the increased traffic flows on Goulds Road, Selwyn Road and Springston-Rolleston Road, these roads will need upgrading from their current rural formation. There are no constraints to this occurring.

10.4. The proposal is likely to be in accordance with the requirements of the District Plan, other than in respect of the separation distances at intersections and sight distances at vehicle crossings close to intersections. However, the majority of the shortfalls in the separation distances are likely to be small, and as the vast majority of drivers in the area will be familiar with the roading layout, it is likely that non-compliances could be supported.

10.5. The proposed ODPs are also in accordance with the Structure Plan for the area.

10.6. Overall, and subject to the preceding comments, the ODPs can be supported from a traffic and transportation perspective and it is considered that there are no traffic and transportation reasons why they could not be approved.

Carriageway Consulting Limited
December 2019

CCL Ref: 14614-200820-brown

20 August 2020

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By e-mail only: s 9(2)(a)

Dear Mark

Plan Change 64 (Hughes Development Limited): Response to Request for Further Information

Further to our emails and conversations, we have reviewed the Council's Request for Further Information dated 12 February 2020 in respect of Plan Change 64. Only one matter concerns traffic-related issues, Part 1b, and this is replicated below.

> *Has any consideration been given to impacts on the wider transport network beyond the local area? If not, can the application please provide consideration and comment of these potential impacts or how they are otherwise to be addressed?*

To recap, the Transportation Assessment accompanying the plan change request set out that for the purposes of assessing the traffic effects, a two-step process had been adopted. The first step was to utilise the services of the Council's preferred transportation modelling consultants to identify the expected traffic flows on the Rolleston roading network in a future 'design year' allowing for the development of existing zoned areas within the town. The second step was a manual calculation of the traffic flows associated with the proposed plan change, and the assignment of this onto the adjacent roading network in accordance with a trip distribution produced by the model. This meant that the Transportation Assessment therefore assessed and reported on those intersections closest to the plan change area.

In respect of intersections further from the plan change area, in the first instance we highlight that the trip distribution produced by the Council's transportation model showed that the traffic generated by the plan change area would be spread over a variety of different routes. Consequently, the greatest increase in traffic flows will occur at the boundaries of the plan change area, but further afield the increases will be less.

Beyond the area modelled, this effect is also evident because (as a general principle) as distance from any site increases, drivers have an increasing choice of possible routes. This means that further from the plan change area, any traffic effects become more dispersed.

The second matter of relevance is that we understand that the plan change request is in part being driven by an increase in employment opportunities in Selwyn. In 2018, the district had the highest rate of employment growth in Greater Christchurch[1] and in the past year, GDP in Selwyn was the second largest in the country[2]. Anticipating that economic activity continues to grow, this means

[1] https://www.greaterchristchurch.org.nz/indicators/economic/employment, accessed on 20 August 2020

[2] https://www.odt.co.nz/star-news/star-districts/star-selwyn/selwyn-district-leaves-rest-nz-its-dust, accessed on 20 August 2020

that fewer people will need to travel outside the district, and this will further diminish the potential for traffic growth on roads beyond the local area.

Overall then, we do not consider that the traffic generated by development of the plan change area will give rise to any adverse efficiency-related effects on the wider roading network.

Please do not hesitate to contact me if you require any further information or clarification of any matters.

Kind regards
Carriageway Consulting Limited

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