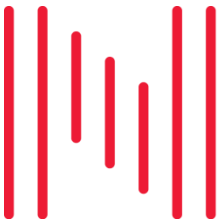
Appendix C: Integrated Traffic Assessment



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Planning. Traffic. Development.

Integrated Transport Assessment

prepared for

MERF AG SERVICES LTD AND MATTHEW REED

Darfield, Private Plan Change #63

April 2020

Integrated Transport Assessment

prepared for

Merf Ag Services Ltd and Matthew Reed

Darfield, Private Plan Change #63

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Introduction

1. Merf Ag Services Ltd have commissioned Novo Group to prepare an Integrated Transport Assessment (ITA) to accompany the application for a Private Plan Change on the sites known as Area 7 Kimberley Road (comprising Part Rural Section 27204, Lot 24 DP 366007, and Lot 3-4 DP 524058).

2. This report provides an assessment of the transport aspects of the proposed development. It also describes the transport environment in the vicinity of the site, describes the transport related components of the proposal and key transport provisions in the District Plan. It has been prepared broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research report 422, November 2010 and other relevant best practice guides.

3. The Plan Change seeks to amend the operative Selwyn District Plan (SDP) to enable development of the 60.5977 ha site ('the ODP Area') for residential purposes, including medium density lots and a retirement village. The proposed change is anticipated to provide for:

    - 14.6ha Living 1 Zone comprising an estimated:
        - 104 residential lots,
        - a retirement village (comprising up to 60 beds[1] and 50 independent units).
    - 46ha Living 1 Deferred zone comprising an estimated:
        - 337 residential lots,

4. The ODP includes new road and off-road connections as shown in Figure 1.

[1] Accommodating high care including dementia, home-care, hospital care

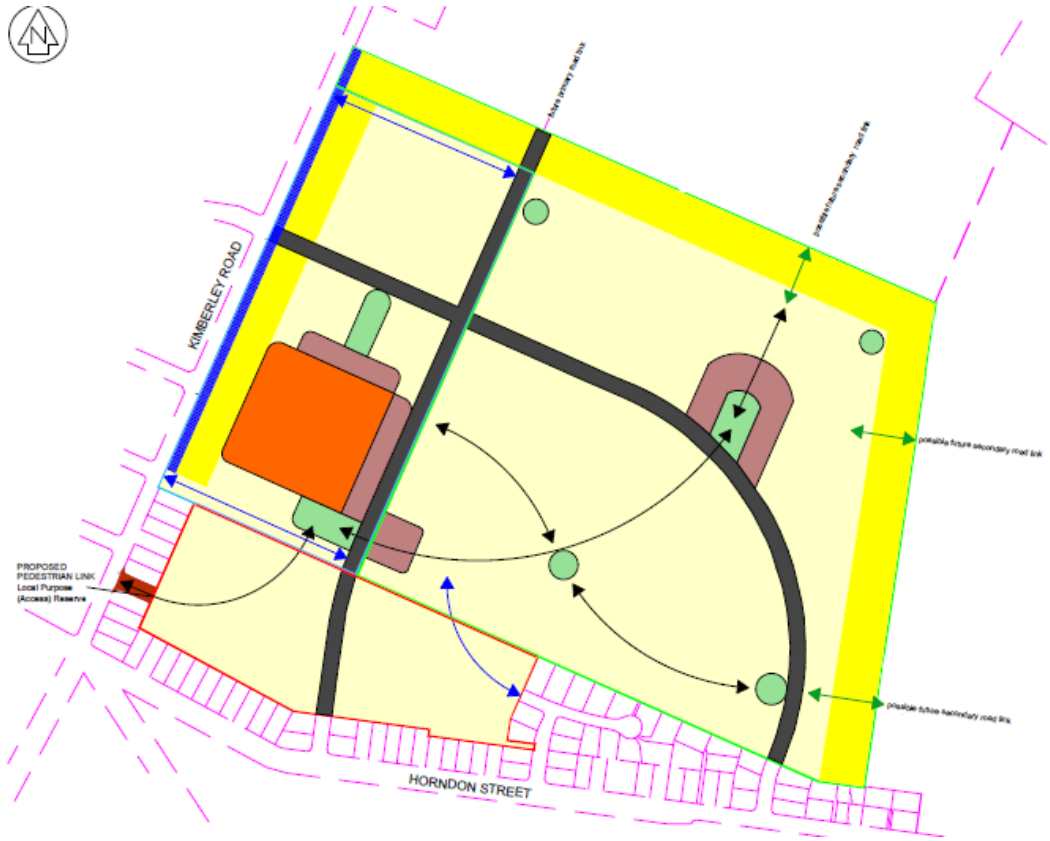

Figure 1: Proposed ODP

Transport Environment

Existing Road Network

Kimberley Road

5. Kimberley Road is classified as a Collector Road between North Terrace and Kowhai Drive. Kimberley Road has a 50km/h speed limit from North Terrace until approximately 150m north of the intersection with Kowhai Drive. Beyond the intersection with Kowhai Drive Kimberley road is a Local Road and has a 60km/h speed limit for an approximately 370m before the 100km/h rural speed limit applies.

6. Kimberley Road has a variable formation along its length. It has a rural formation generally North of Kowhai Road with a sealed carriageway width of approximately 6.5m and wide grass berms as shown in Figure 2.

Figure 2: Kimberley Road – typical formation north of the intersection with Kowhai Road

7. Between Kowhai Drive and Torlesse Crescent, there is a mixture of flush grass berms and kerb and channel and section with traffic calming where the speed limit changes. South of Torlesse Crescent, kerb and channel is provided on both sides of the carriageway and the width increases to 12.5m. This provides for kerb-side parking on both sides of the road as shown in Figure 3. The carriageway retains kerb and channel, although it reduces in width to 11.5m for the section south of the intersection with Horndon Street.

Figure 3: Kimberley Road – block south of Torlesse Street

8. A footpath is provided along the western side of the carriageway between Horndon Street and Landsborough Drive and along the eastern side between Torlesse Crescent and North Terrace.

9. The Mobile Road website estimates traffic volumes on Kimberley Road as approximately 1,241 vehicles per day at its southern end, reducing to 601 north of Kowhai Drive and 441 at the northern end, near the intersection with Homebush Road.

Horndon Street

10. Horndon Street is classified as a Local Road. Horndon Street has a 50km/h speed limit to a point approximately 570m east of Mathias Street then a 60km/h speed limit west of that point. Near the ODP area, Horndon Street has a sealed carriageway width of approximately 10m with wide grass berms on both sides.

11. A footpath is provided along the northern side of the carriageway to the end of the existing residential zone. A short section of footpath is provided along the southern side of the carriageway east of the intersection with Mathias Street, also to the edge of the existing residential zone.

12. The Mobile Road website estimates traffic volumes on Horndon Street as varying between 387 and 574 vehicles per day along its length.

13. The typical layout of Horndon Street is shown in Figure 4 below.

Figure 4: Horndon Street, near the intersection with Pearson Street (looking east)

Broadgate Street

14. Broadgate Street is classified as a Local Road with a 50km/h speed limit. Broadgate Street intersects with Horndon Street and its northern end terminates at the un-developed Living zone at the southern end of the ODP area.

15. It has a 12m carriageway with kerb and channel and footpaths provided on both sides. The existing section is shown in Figure 5. This section of road is currently approximately 62m long.

Figure 5: Broadgate Street (looking north)

Broadmeadows Drive

16. Broadmeadows Drive is classified as a Local Road with a 50km/h speed limit. Broadmeadows Drive intersects with Horndon Street and terminates at an area of un-developed Living zone at the southern end of the ODP area.

17. It has a 9.2m wide carriageway, with kerb and channel on both sides and a footpath on the western side. This segment of road is currently approximately 69m long.

Pearson Street / Reeds Road / Dundee Close

18. Pearson Street connects to Horndon Street and forms a 'T' intersection with Reeds Road to the west and Dundee Close to the east. Dundee Close is a cul-de sac providing access to nine residential dwellings. Reeds Road provides access to three properties terminating at the edge of the un-developed Living zone also at the southern end of the ODP area.

19. Pearson Street is classified as a local road with a 50km/h speed limit. Pearson Street has an approximately 8.2m wide carriageway at the northern end and a12.5m wide carriageway at the approach to the intersection with Horndon Street. Footpaths are provided on both sides at the southern end and on the western side on the approach to the intersection with Reeds Road and Dundee Close.

20. Reed Road and Dundee Close have a carriageway width of 8.2m and a footpath on the southern side.

21. Figure 6 shows the layout of Pearson Street looking towards the intersection with Reeds Road and Dundee Close.

Figure 6: Pearson Street (looking north)

Key Routes

22. The predominant travel destinations for day to day trips will be between the ODP area and the Darfield Town Centre and east on the strategic road network towards destination such as Rolleston and Christchurch.

23. Vehicle trips to the town centre would likely be via Kimberley Road or Horndon Street to North Terrance and McMillan Street.

24. Key road network connections east – towards Christchurch / Rolleston from Kimberley Road or Horndon Street would use North Terrace and McMillan Street, or Mathias Street These connections are shown in Figure 7.

Figure 7: Key travel routes to the town centre and east (Rolleston, Christchurch)

25. There may also be some trips to the north and west on SH73 via North Terrace and or Kimberley Road to Home Bush Road.

Future Transport Networks

26. A report prepared by Stantec (2019) titled "*RE322 Residential Deferred, Darfield Deferred Residential Rezoning, Integrated Transport Assessment"* considered the existing transport network and its ability to accommodate additional traffic associated with development of several greenfields areas. The report did not include this ODP area, although it does include a number of recommendations that are of relevance to the future transport environment in Darfield, particularly those associated with Area 5 on the opposite side of Kimberley Road (shown below).

Figure 8: Extract showing nearby ODP areas [Source: Stantec, 2019: from Figure 2]

27. The report identified the following network upgrades as being already warranted or anticipated which are of relevance to the ODP area:

- *A right turn lane for traffic turning right from SH73 into Horndon Street (East); and*
- *Railway level crossing safety assessments for the Homebush Road, Mathias Street, Horndon Street (East) and Creyke Road level crossings.*

28. The report also recommended consideration of:

- Classifying Horndon Street as a Collector Road to reduce traffic volumes using intersections closer to the town centre (noting this may require an upgrade of the Horndon Street / Kimberley Road intersection);
- Giving priority to the McMillan Street - Kimberley Road route (requiring alterations at the two intersections with North Terrace); and
- The intersection forms along SH73 including the Mathias Street crossroad intersection.

29. These wider network upgrades are assumed to be developed by the transport network operators (SDC, NZTA, KiwiRail) through general funds (development contributions, network upgrades etc) rather than being matters to be addressed by a single ODP / development.

30. In terms of anticipated upgrades required in respect of Area 5 for Kimberley Road, the reporting states: "*Kimberley Road Carriageway may not require upgrades along Large lot residential frontage. Footpath will be required. 80km/h speed limit likely appropriate with Large lot residential development on one side of the road only".*

31. With increased traffic flows from Area 5 and possible re-classification of Horndon Street to a Collector Road, the intersection of Kimberly Road and Horndon Street may require upgrade to a roundabout controlled intersection.

32. It is also understood that a 2017 Level Crossing Safety Impact Assessment of the McMillan Street level crossing recommended an upgrade to half arm barriers. This upgrade is planned for the 2019/20 financial year.

Crash Record

33. The aforementioned Stantec Report considered the existing crash record on all roads applicable to the ODP area and concluded there are no locations identified as having safety concerns based on existing crash records. That report was prepared in 2019, so the conclusions drawn are considered to remain relevant. No further consideration of this has therefore been undertaken in this report.

Alternative Transport Modes

Passenger Transport

34. The number 86 bus route (Darfield to Christchurch) operates one service in the morning (to Christchurch) and one in the evening (to Darfield). The closest bus stop is located on South Terrace (Darfield Township Bus Shelter).

Walking

35. Walking trips are likely to be concentrated between the site and the School, Town Centre and Darfield Domain. There are off road links from Perrin Place (south from Kimberley Road / North Terrace), through the domain with crossing points over the railway line and SH73 that connect to the School and McLaughlins Road.

36. There are several off-road path connections between North Terrace and McMillan Street providing access to the town centre.

Cycling

37. There are no dedicated cycle routes near the ODP area.

The Proposal

38. The proposed plan change is anticipated to provide for:

- 14.6ha Living 1 Zone comprising an estimated:
    - 104 residential lots,
    - a retirement village (comprising 60 beds[2] and 30-50 independent units).
- 46ha Living 1 Deferred zone comprising an estimated:
    - 337 residential lots,

39. The proposed ODP plan is provided in **Figure 1** and shows future road connections to Kimberley Road, connection to the existing sections of Broadgate Street, Broadmeadows Drive and Reeds Road.

[2] Accommodating high care including dementia, home-care, hospital care

40. A pedestrian connection is proposed in the south-western corner providing a direct route to the town centre.

41. Future road connections are proposed to the north and east.

42. It is envisaged that the future roads and property accesses will be consistent with the District Plan rules and no site-specific standards / cross sections are envisaged.

Traffic Generation

43. The Stantec Report referred to earlier identified traffic generation rates for future residences in Darfield, of 6 vehicle movements per day (vpd) per household. The report noted this is lower than that often used in cities as the rural location of Darfield and the resultant increase in linked trips and the previous use of this rate for other plan change applications in Selwyn District. For consistency, this rate has also been adopted for the purposes of this assessment.

44. A peak hour rate for residential activities of 0.85 trips in the peak hour per dwelling has been adopted (RTA Guide to Traffic Generating Developments).

45. In respect of the retirement village, the following traffic generation rates have been adopted:

- Independent living units: 0.2 trips per unit in the peak hour and 2 vehicle trips per unit per day (upper rates of the RTA Guide which also aligns reasonably well with that in the TRICS Database); and

- Higher level care beds a rate of 0.22 vehicles per hour per bed and 2.37 vehicle per day per bed (based on the ITE Trip Generation Manual – which is in the mid-range of other available data – refer to **Appendix 1**).

46. The potential traffic generation arising from the ODP area is therefore set out below:

Table 1: Estimated Peak Periods (winter)

	Daily generation movements	Peak hour generation movements
104 Lots, Living zone	624	88
Retirement Village 50 Independent units	100	10
Retirement Village, 60 Care beds	142	13
Sub-Total	**866**	**111**
337 Lots, Deferred zone	2,022	286
Total whole ODP	**2,888**	**397**

47. In terms of distribution, the aforementioned Stantec report assumed 50% of movements were work related of which 38% worked in Darfield and 62% outside. For non-work trips it was assumed 66% occurred in Darfield and 33% outside. For consistency these same distribution patterns have been adopted which suggests:

- Living zone (Inc. retirement village)
    - 22 peak hour work trips to Darfield, 34 trips to wider network; and
    - 37 peak hour non-work trips to Darfield, 19 trips to wider network.
- Deferred zone
    - 54 peak hour work trips to Darfield, 89 trips to the wider network; and
    - 94 peak hour non-work trips to Darfield, 49 trips to the wider network.

48. These trips would therefore be distributed across the key routes identified in Figure 7.

Assessment

49. Noting that wider network considerations have already been identified in the aforementioned Stantec Report, this assessment considers the specific traffic related effects arising as a result of the ODP area. It is noted that these effects will be disbursed overtime between those in the proposed living zone and those in the deferred living zone. Noting that the solutions / type of upgrade suggested for growth generally and to accommodate Area 5 at this stage it is not anticipated that the additional traffic resulting from the proposed ODP are would change the outcome required.

50. The assessment below considered the ODP Connections and Road Priority, and potential road upgrades.

ODP Connections and Road Priority

51. The ODP has been designed to provide one main (primary) road connection that links Kimberley Road and Horndon Street. It is envisaged that, following development of the deferred zone, this will provide the main connection to Horndon Street and directions of travel towards the east (Christchurch / Rolleston). Noting the traffic volumes estimated in Table 1, the likely distribution and status of the adjoining road network, it is considered that this could be formed as a Local Major Road (with through-priority at internal intersections) rather than a Collector Road. This connection may also help disburse some traffic from Area 5 that would otherwise have used the Kimberley Road / North Terrace route providing increased dispersion of trips to the town centre versus trips to other locations. This road should therefore have a 20m minimum legal width.

52. A primary north-south road link is also proposed from Broadgate Street with a future connection to the land north of the ODP area. This future connection aligns with the two existing land parcels to the north, maximising flexibility. It is envisaged this road would also be a Local Major Road, with a minimum 20m legal width and through traffic priority except where it crosses the other primary road outlined in paragraph 51.

53. A lesser road connection with Kimberley Road is proposed near the intersection with Torlesse Crescent. Torlesse Crescent is a cul-de sac and the proposed fourth arm is designed to provide for lower volumes of traffic, by managing priority and design to encourage the majority of traffic to use the main connections described above. Accordingly, through traffic volumes between Torlesse Crescent and this road are anticipated to be low such that a give-way or Stop-controlled intersection would be appropriate. It is envisaged this road would have a 16m legal width, consistent with its lower priority.

54. A third road connection to Kimberley Road is proposed near the northern end to provide connectivity to sites at that end of the subdivision. This intersection is anticipated to cater for low turning volumes and the proposed road would form a “T” intersection with Kimberley Road.

55. Future road connections (local, low volume connections) are also provided to the north (east of the main connection described above) and to the east (in two locations). These are envisaged to provide for local traffic connectivity with future development of adjoining land rather than key through routes. These are anticipated to be provided with a 16m legal width.

56. The remainder of the road network would comprise smaller Local Roads with an entirely property access function.

57. An off-road pedestrian connection is also proposed via an existing parcel of land owned by the Council in the south-western corner of the site which will provide the most direct route for access to the town centre, domain and schools. It is understood this parcel of land provides access to two existing lots and consideration of how to manage the off-road route and access provisions would need to be undertaken at subdivision stage. There is ample width to accommodate both property access and an off-road access.

58. In terms of road formed width and cross sections, there is no reason at this stage to suggest that there would be any need to deviate from standard formations in accordance with the Selwyn District Plan and Selwyn District Council Code of Practice.

Potential road network upgrades

59. It is envisaged that with the provision of a cross roads intersection at Kimberley Road and Landsborough Drive that the 50km/h speed limit would move north of this intersection with the 60km/h speed limit transition also moving north (being well north of the proposed northern intersection with Kimberley Road). This will improve the safe operation of these intersections. These speed limits would also be consistent with provision of additional vehicle access to properties fronting Kimberley Road (generally consistent with the development on the opposite sides of Kimberley Road).

60. The Landsborough Drive intersection would be anticipated to operate sufficiently as a give-way or stop controlled crossroads intersection in the short term. However, this intersection may require provision of a right turn lane on Kimberley Road once the later stages of the deferred zone are developed. Longer term this intersection might require a roundabout, however this would depend to some extent on the development of the Area 5 land north and west of the intersection and whether there is demand for through trips between Landsborough Drive and the ODP area (connecting to Horndon Street to travel towards Darfield and Rolleston).

61. It is envisaged that Kimberley Road would be upgraded with kerb and channel and a footpath along the eastern side, from the existing footpath (south of Torlesse Crescent) north to the intersection with Landsborough Drive. Beyond the intersection of Landsborough Drive a the ODP area includes rural-residential lots fronting Kimberley Road and retention of the existing rural formation would be appropriate (i.e., no kerb and channel) however a footpath should be provided along the eastern side adjacent to these properties.

62. The intersection of Broadgate Street is existing and has adequate formed width to cater for the anticipated traffic volumes associated with the living 1 zoned area (although some line markings could be provided). It is also considered to be a secondary route once the

deferred zone is developed such that traffic volumes through this intersection would remain low and would be unlikely to require any additional turning lanes or other upgrades.

63. The intersection of Broadmeadows Drive and Horndon Street will likely require a right turn lane to be provided on Horndon Street as this will cater for the majority of right turn traffic entering the ODP area in the PM peak from destinations such as Rolleston and Christchurch.

64. The road connection to Reeds Road is anticipated to be low priority providing solely for connectivity and property access rather than encouraging through traffic. This can be achieved through the road design and intersection priority.

65. In summary, there are no existing constraints from a transport perspective to achieving the upgrades outlined above. There is ample road reserve width on Kimberley Road to achieve the proposed upgrades. The existing sections of Broadmeadows Drive, Broadgate Street and Reeds Road / Pearson Street are suitable for the design of the proposed connections. Horndon Street has ample space to accommodate the provision of a right turn lane at the intersection, if needed, once the deferred zone is developed.

Conclusion

66. The ODP provides for around 104 lots and a retirement village and for a deferred zone accommodating an additional 337 lots. The ODP road network provides a number of road connections to Kimberley Road (Collector Road) and via existing partially constructed roads to Horndon Street (proposed to be upgraded to a Collector Road) which provide for good vehicular connections to the town centre and key destinations such as Rolleston and Christchurch.

67. The ODP primary roads, and other connections provides a good structure for development of property access roads at subdivision stage. In terms of road formed width and cross sections, there is no reason at this stage to suggest that there would be any need to deviate from standard formations in accordance with the Selwyn District Plan and Selwyn District Council Code of Practice

68. Some road upgrades are anticipated and there are no existing restrictions (from a transport perspective) to achieving these upgrades:

- Upgrade of Kimberley Road south of the intersection with Landsborough Street to kerb and channel;
- Move the 50km/h speed limit north of the intersection with Landsborough Street (and the 60km/ speed limit an associated distance north);
- Provide a footpath along the eastern side of Kimberley road adjacent to the ODP area;
- Consider the need for a right turn lane on Horndon Street at the intersection with Broadmeadows Drive once the deferred zone is developed;
- Provision of a crossroads intersection at the existing Kimberley Road – Landsborough Street intersection, including a right turn lane as the deferred zone is developed and a possible round-about if there is through traffic demand from Area 5;

- Provision of a cross-roads intersection at the existing Kimberley Road – Torlesse Crescent intersection; and

- Provision of a third road as a 'T' intersection with Kimberley Road near the northern end of the ODP area.

69. The ODP also provides for future road connections to the land north and east of the ODP area ensuring the potential for integration of local connections to any future development.

70. An off-road connection is proposed in the south-western corner of the ODP, which will provide a direct route for walking and cycling trips to the town centre, domain and schools.

71. The aforementioned Stantec Report considered upgrades to the wider road network to accommodate growth in Darfield in general and associated with Area 5 (opposite side of Kimberley Road). This assessment assumes that such upgrades would occur by the network controlling authority through general funding (including development contributions) and have been taken into account in the provision of the above assessment.

72. Accordingly, the proposed ODP is considered to be well connected and supportable from a transport perspective.

Appendix 1

Care Home Traffic Generation Data

Table 2: Care Home Traffic Generation Rates

Source	Peak Hour Rates	Daily Rate
ITE Trip Generation Manual	AM Peak – 0.17 vehicles per bed PM Peak – 0.22 vehicles per bed	2.37 vehicles per bed
Lower Hutt Retirement Village	-	1.3 vehicles per bed
Stokes Wood Retirement Village		1.9 vehicles per bed
Aroha Hospital and Rest home	-	2.06 vehicles per bed
Glenbrook Rest Home	-	1.84 vehicles per bed
Beckenham Courts	-	1.5 vehicles per bed
TRICS Data[3]	AM Peak - 0.202 vehicles per bed PM Peak - 0.247 vehicles per bed	3.233 vehicles per unit

[3] UK Trip generation database, excluding Greater London site and excludes Town Centre and Edge of Town Centre site.